November–December 2019

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Steel market developments

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November–December

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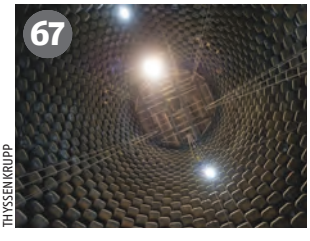

THYSSENKRUPP

November–December

News and analysis

Regulars

ALCOA

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ARCELORMITTAL BELGIUM

MX3D

Comment

International progress

This November-December issue of *Metal Market Magazine* is as notable for its diverse geographical coverage as the spectrum of steel and metal markets that it covers.

In addition to its own organic growth, US-based Wendt Corporation has multiple international connections and partners for its range of scrap recycling technologies, as the chief of the business, Tom Wendt Jr., explains in our cover profile interview.

Our steel feature section looks at the fortunes of the US steel sector, the sizeable ambitions of India's steel industry, as well as developments in the Middle East steel sector. Two focused pieces on Chinese steel mill aspirations and the insights of a hollow section producer give another perspective on international steel markets.

This issue also includes our concise annual review of progress in the Arab primary aluminium sector. Additional capacity and production are to the fore.

Our latest list of new plant orders is wide-ranging in terms of international customers supplied and types of equipment provided, as well as an illustration of where investments in new capacity expansion, or competitiveness through the latest types of equipment, are focused.

Sometimes such investments are made to achieve environmental improvements and reduce emissions. In Europe, they are being driven in part by the increasing costs of permits under the EU's emissions trading scheme. Another feature article summarizes steelmakers' efforts to reduce their carbon emissions.

Downstream, the demands of consumers are a driving force for white goods manufacturers, with consequences for the choice and volume of materials used – the focus of this month's end-user spotlight.

All the above, together with our regular pages, a copper market overview and an in-depth article on new technology for small-diameter tube production, fills this issue's coverage to the brim.

"Our steel feature section looks at developments in the US, the Middle East, India and China"

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Metal Market Magazine

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Fastmarkets

News review: non-ferrous

BHP base metal outputs down in Q3

Anglo-Australian miner BHP recorded production declines in all base metals during the third quarter, with nickel and zinc down by 25% and 33% quarter on quarter, respectively, while copper production slipped by only 3% in the same comparison.

BHP produced just 22,000 tonnes of refined nickel in the third quarter of the year, with the decrease attributed to planned maintenance and the company's focus on the exploitation of new ore bodies.

BHP's faltering nickel output has worsened. It had already retreated by 9% year on year to 19,200 tonnes in the first quarter due to production outages at Nickel West and a fire at its Kalgoorlie smelter in Western Australia in September 2018.

Alcoa places half of its global aluminium portfolio under review

Alcoa has launched a multi-year review of its aluminium portfolio, placing roughly half of its global smelting capacity under scrutiny for potential improvement, curtailment or closure, the company said in an earnings call with investors on October 16.

"To become a profitable and more competitive company, today we're announcing a multi-year review of our asset portfolio," Alcoa chief executive and president Roy Harvey said. "The review will consider opportunities for significant improvement, potential curtailment, closures or divestitures."

Jiangxi Copper-backed investment firm raises stake in First Quantum

An investment firm backed by Jiangxi Copper increased its stake in First Quantum Minerals Ltd, which is in discussions on a possible investment by the Chinese producer in its Zambian assets.

The increase in shareholding was made on October 16 via Pangaea Investment Management Ltd (PIM), which raised its stake in Canada's First Quantum to 10.827% from 9.956%. PIM has the right to buy a further 5.802% stake in the Vancouver, British Columbia-based company by September 4, 2020, which would take its total shareholding to 16.629%.

ALCOA

Alcoa scrutinizes its aluminium smelting assets portfolio in a multi-year portfolio review

EGA ramp-up on track for 2020

Emirates Global Aluminium's (EGA) new Al Taweelah alumina refinery in Abu Dhabi is expected to produce more than one million tonnes of alumina by the end of 2019.

The producer announced that 600,000 tonnes of alumina have been produced since the company began operations at the new refinery in April.

Once fully-ramped up, production at the new refinery is expected to be some two million tonnes of alumina per year and it is expected to reach sustained full production in 2020.

Barrick eyes alternative smelter for Lumwana copper concentrates

Mining corporation Barrick is eyeing potential alternative processors for concentrates produced at its Lumwana copper mine in Zambia while it waits for a third-party smelter to resume operations after a major refurbishment.

The refurbishment was to one of the third-party smelters that processes a portion of the copper concentrate produced at Lumwana. It was expected to be completed by the end of this year, Barrick said.

Nyrstar to shut and sell Langlois zinc-copper mine

Nyrstar will shut its Langlois zinc and copper mine in Quebec, Canada, in December and has opened discussions with interested parties to sell it, the company said.

The mine will shut "due to rock conditions having deteriorated to the point where the company considers it uneconomic to continue to operate Langlois to mine zinc and copper ore next year," Nyrstar said in a public statement.

US Vanadium completes Evraz Stratcor buy

New York-based US Vanadium has completed the acquisition of Russian steel producer Evraz' vanadium production facility in Hot Springs, Arkansas.

The company last month signed an agreement to acquire Evraz Stratcor's Hot Springs facility, which produces high-purity vanadium oxides and downstream vanadium chemicals.

Framework needed for green ali to succeed

Executives from aluminium producers Alcoa, Hindalco, Norsk Hydro and EN+ have said that governments, regulators and companies need to work together to develop a framework to make sustainably produced aluminium competitive against metal produced by more traditional methods.

They were speaking during a panel at Fastmarkets' Base Metals: Unplugged event on October 28, as part of the London Metal Exchange's LME Week. Multilateral initiatives must be used to kick-start the green aluminium market, they said.

Ramu nickel-cobalt mine to shut during pollution probe

The Ramu nickel-cobalt project in northeastern Papua-New Guinea will close imminently pending an environmental investigation, the region's minister for mining, Johnson Tuke, confirmed on October 23.


ESCONDIDA

Unionized workers at copper producer Escondida in Northern Chile threatened strike action

The closure comes after it was discovered by regional authorities on August 30 that the plant, which is 85%-owned by Metallurgical Corp of China, was spilling waste into the nearby Basamuk Bay.

Codelco copper units hit by Chilean strike action

Two of Codelco's divisions are operating at minimum rates or have been completely halted due to a general strike in Chile, the state-owned copper producer said on October 23.

Trade federations representing workers of both the state-run producer and private copper companies decided to join a nationwide standstill in response to governmental measures taken to counter violent demonstrations in the country.

Hydro's Alunorte ops rise to 83% capacity

Alunorte alumina refinery's utilization rate reached 83% of its capacity in the third quarter following the end to federal court-imposed embargoes, owner Norsk Hydro said on October 23.

Brazil's federal court in Belem removed its final embargo on Alunorte's new bauxite residue disposal area (DRS2) on September 26 after a 19-month restriction, allowing Alunorte to resume installation and commissioning at DRS2.

Alunorte has an annual production capacity of 6.3 million tonnes.

Rio Tinto mulls fate of New Zealand ali smelter

Rio Tinto has launched a strategic review of its Tiwai Point aluminium smelter in New Zealand, and will make a final decision on the smelter's fate by the first quarter of 2020, while it considers curtailment or closure, among other options, Rio Tinto told Fastmarkets on October 22.

The announcement comes just days after Alcoa announced a strategic review of roughly half of its global aluminium smelting capacity.

Indonesia's Ni ban start reverts to Jan 2020

Indonesian officials said on October 29 that their country's ban on the export of nickel ore will begin in January 2020, as previously scheduled, once a review of irregular ore exporting practices is concluded.

This reverses reports on October 28 that the ban would begin with immediate effect.

The review is likely to be finished in a week or two, Luhut Pandjaitan, Indonesia's coordinating minister for maritime and mining affairs, told reporters in Jakarta.

Onça Puma Ni ops to boost output

Activity at Vale's Onça Puma nickel unit in Brazil's northern state of Pará will ramp up throughout November following a favorable judicial ruling allowing it to reopen, Vale chief of base metals operations Mark Travers said.

The smelter at the site has been running normally using stocked nickel ore, Travers said in a conference call on October 25 to discuss the company's third-quarter earnings results. Inventories have lower-content ore that will be supplanted by freshly mined material throughout the first half of 2020.

Asarco, USW scheduled to meet in mid-Nov

A meeting between Asarco and representatives of striking workers has been scheduled for mid-November, a United Steelworkers (USW) union spokesperson told Fastmarkets.

"We are scheduled to meet on November 14," Manuel Armenta, a sub-district director for USW told Fastmarkets on October 30.

"The strike is going on, people are on the picket lines," Armenta added, referring to the ongoing picketing at the integrated copper producer's Mission mine and three other company plants in the US state of Arizona and a copper refinery in the US state of Texas.

About 2,000 hourly workers have been on strike at five locations in Arizona and Texas since October 13 after rejecting the latest labor contract offered by Asarco.

Antamina output to jump over guidance in 2020

The world's third biggest zinc mine, Antamina, is set to challenge for the top production spot next year.

Peru's Antamina, which is co-owned by BHP, Glencore, Mitsubishi Corp and Teck Resources, will produce close to a million tonnes of zinc concentrates in 2020, sources told Fastmarkets.

Equating to approximately 500,000 tonnes of zinc metal, this would be almost double the current zinc output at Antamina and comes as the mine again transitions to a high-zinc yielding area of its copper-zinc-lead ore body.

Miners called on to 'paralyze' industry in Chile

Unionized workers at Escondida, the world's largest copper mine, have threatened strike action and have called on miners across Chile to "paralyze" the mining industry after a state of emergency was declared.

The state of emergency was instigated after a protest over fare increases on the country's metro system erupted into deadly violence, with the military and police resorting to using tear gas and water cannons against the protesters.

News review: steel

Nucor brings CRC, galv and longs tons online

Nucor has brought on a host of new steelmaking capacity across both long and flat products and will continue bringing it in through the New Year.

The moves, while not unexpected, come at a time when other mills are also boosting capacity.

"We are not adding capacity simply to get bigger. These projects target defined market opportunities where we are confident that we will compete and win highly profitable market share," Nucor president and chief operating officer Leon Topalian said during a quarterly earnings conference call in late October.

UAW ratifies GM pact, ending strike

Members of the United Automotive Workers (UAW) union have ratified a four-year contract with General Motors Co, ending a six-week strike that impacted the automaker's production and sparked concern among steel market participants in the United States.

The ratified contract includes an economic package of an $11,000-per-member signing bonus, performance bonuses, two 3% annual raises and two 4% lump-sum payments, the union said on October 25, adding that the deal also keeps health-care costs steady.

The union will now proceed with pattern bargaining at Ford Motor Co, UAW president Gary Jones said in a statement.

UAW members earlier this month voted to accept a tentative labor agreement with GM that included higher benefits for workers and the closure of three GM plants.

The GM strike began on September 16 and stifled production of the manufacturer's Chevrolet Blazer sports utility vehicle at its Ramos Arizpe Complex in Northeastern Mexico due to a resulting parts shortage.

SHUTTERSTOCK

GM experienced parts shortages at its Chevrolet Blazer plant in Mexico during a strike in the US

Vale halts activity at Itabiruçu tailings dam

Vale has suspended activities at its Itabiruçu tailings dam, which is located at its Itabira mining complex in Brazil's Southeastern Minas Gerais state.

The dam's temporary shutdown will have an impact of about 1.2 million tonnes of iron ore output that is limited to 2019, since the Brazilian miner's production plan has already accounted for a stoppage of the dam for most of the year, it said on October 21.

The Itabiruçu dam receives tailings from the Conceição mine.

Vale expects its sales of iron ore fines and pellets to remain between the lower and midpoint of its latest guidance of 307-332 million tonnes due to the stoppage.

Algoma kicks off Ontario plate mill upgrades

Algoma is spending Canadian $120 million ($91.5 million) to overhaul its plate mill in Sault Ste. Marie, Ontario, company representatives confirmed to Fastmarkets.

"With the investments Algoma is making over the next two years, we are looking to be a leader in plate," Tom Katagis, project manager for the plate mill modernization, told Fastmarkets in a phone interview on October 22.

Work got under way this month and should be concluded in the summer of 2021. Customers will not be affected because the work will be conducted in stages and during routine downtime, he said.

ATI's deal with BWXT to boost output, revenue

Allegheny Technologies Inc's (ATI) new multi-year purchasing agreement with BWX Technologies (BWXT) is expected to increase production and revenue, Fastmarkets understands.

From 2019 through mid-2026, Pittsburgh-based ATI will supply BWXT with specialty alloys that will be used to manufacture naval nuclear reactor components, an ATI spokeswoman confirmed to Fastmarkets on October 21.

EU new car sales jump 14.5% in September

Demand for passenger cars in Europe jumped by 14.48% year on year in September 2019, the European Automotive Manufacturers Association (ACEA) said on October 16.

New car sales in Europe totalled 1,249,403 vehicles in September this year, compared with 1,091,390 units sold in the corresponding month of 2018.

"To a large extent, this strong year-on-year growth is the result of a low base [for the] comparison, because registrations fell significantly

in September 2018 [down by 23.5% year on year] following the introduction of the [Worldwide harmonized Light vehicles Test Procedure] WLTP testing regime," ACEA said.

USS aims to acquire BRS fully by 2023

U.S. Steel plans to fully acquire Big River Steel (BRS) within four years, and to focus on flat-rolled production at the Osceola, Arkansas-based mini-mill – along with its Gary Works and Mon Valley Works – according to the company's top executive.

"Today's investment is the first step in a two-step process to ultimately acquire all of Big River. We fully intend to acquire the remaining 50.1% interest in Big River within the next four years," U.S. Steel president and chief executive officer David Burritt said during a conference call on October 1, after U.S. Steel announced plans to buy a 49.9% stake in Big River Steel.

Minas Rio's iron ore output guidance raised

Anglo American has raised the 2019 iron ore production guidance for its Minas Rio operations in Brazil, while maintaining the one for its Kumba operations in South Africa.

The miner now expects Minas Rio to produce 20-22 million tonnes of the steelmaking raw material, compared with 19-21 million tonnes previously, it said in its third-quarter production report published on October 22.

The miner continues to ramp up production at Minas Rio after operations were restarted in December last year. A pipeline rupture had kept the mine shut for most of 2018.

Cliffs tops out tower for Ohio HBI plant

Cleveland-Cliffs Inc has finished erecting the 457-foot reactor tower for its hot-briquetted iron (HBI) plant in Toledo, Ohio.

The US iron ore miner and pellet producer said that construction is ahead of schedule and that it expects to start commercial production of HBI in the first half of 2020.

Cliffs broke ground on its $700-million HBI plant in Toledo in April. The facility is expected to produce 1.9 million tonnes of HBI per year once it reaches capacity.

SHUTTERSTOCK

Demand for passenger cars in Europe jumped year on year in September 2019, said ACEA

Ampco-Pittsburgh sells Akers, ASW units

Ampco-Pittsburgh has completed the sale of two subsidiaries, Akers National Roll in the United States and ASW Steel in Canada, the company said this week.

Avonmore, Pennsylvania-based Akers National Roll was bought by an affiliate of Whemco Inc.

Whemco is a supplier of heavy industrial parts for the metals, mining, power generation and shipbuilding industries. The company also focuses on heat-treating, forging, machining, melting and casting materials.

SSAB Americas adopts AI tech in steelmaking

SSAB Americas will integrate artificial intelligence (AI) technology into its steel manufacturing process in an effort to improve efficiency at its operations in the United States.

By utilizing production data from Noodle.ai's Enterprise AI Platform and suite of applications, SSAB Americas will be able to "anticipate and plan for key variables affecting business operations, including asset uptime, product quality and production flow," the companies said in a release dated October 22.

Unlike the traditional deterministic, rules-based decision-making process, the platform from Noodle.ai will enable probabilistic, pattern-based decisions to be utilized by SSAB Americas.

Ukraine's DMKD idles billet capacity on global steel 'crisis'

Ukrainian steel billet producer Dneprovskiy Dzerzhinsky Metallurgical Plant (DMKD) has decided not to resume operations in part of its main production facility after a maintenance outage, due to the crisis in the global steel market, the company announced.

DKMD decided to idle blast furnace (BF) No.9, which can produce 800,000 tonnes per year of pig iron, and BF No.12, which has capacity for 900,000 tpy, with the aim to reduce operational costs and keep workplaces open, according to a company press release.

The company will not restart basic oxygen furnace (BOF) No.1, which has capacity for 2.4 million tpy of steel, and continuous casting machine (CCM) No.3, which can make 1.7 million tpy of billet. The units were stopped for maintenance in the summer.

The new measures will leave the producer with operations at only one BF with capacity for 1 million tpy of pig iron, one BOF which can produce 2.4 million tpy of steel, and two CCMs with combined capacity for 2.4 million tpy of billet.

Bluescope taps Andritz to update Ohio mill

North Star BlueScope has picked equipment supplier Andritz to provide a tunnel furnace and two shuttle furnaces for the expansion of its flat-rolled mill in Delta, Ohio.

The furnaces will be used to move slabs from the mill's casters to its two-stand roughing mill, Andritz said in a press release announcing the order.

The company said it has also received an order to supply automation systems to North Star Bluescope.

The shuttle furnaces will be put in place in the fourth quarter of 2020, and the tunnel furnace will kick off production by the end of the following year, Andritz said.

NW Pipe wins New Mexico pipe contract

Northwest Pipe said it has been selected to produce more than 7,300 short tons of water-transmission pipe for a project in New Mexico.

Northwest Pipe won a contract to supply 42in and 48in diameter spiral-welded pipe for the Navajo-Gallup Water Supply Project, the Vancouver, Washington-based pipe mill said. ▶

News review: steel

The pipe will feature cement mortar lining and polyurethane coating, the statement said. Oscar Renda Contracting bid this job for the US Bureau of Reclamation and the Navajo Nation.

HBIS president Yu named Worldsteel chief

Yu Yong, president of HBIS Group Co Ltd, has become the new chairman of the World Steel Association.

Yu assumed the role at the end of Worldsteel's annual conference in Monterrey, Mexico, as highlighted by Worldsteel director general Edwin Basson during a news conference on October 14.

Yu will remain chairman of Worldsteel until its annual conference next year in Shanghai. Yong replaced Gerdau vice president André Bier Gerdau Johannpeter.

HBIS, a Chinese company, is among the largest steelmakers in the world.

Metro Metals acquires Simon Metals

Metro Metals Northwest Inc is further boosting its presence in the Pacific Northwest with the purchase of Simon Metals. The terms of the transaction were not disclosed.

The acquisition of Tacoma, Washington-based Simon Metals deepens the Portland, Oregon-based scrap exporter's footprint in the Pacific Northwest by adding to its existing holdings in Portland, Oregon; Vancouver; and Denver, Colorado.

Turkey, China changing global scrap dynamics

Turkey and China – both key scrap consumers – and free trade emerged as hot topics at the Bureau of International Recycling's (BIR) 2019 World Recycling Convention in Budapest, Hungary.

At the forefront of debate in the international recycling arena are how trade will be impacted by current events in Turkey – in terms of conflict with the Kurds and the potential that it will drive other countries, like the United States, to issue economic sanctions against the nation – and the lack of clarity on China's strict import policies, market participants said at the event.

Less than eight hours after a panel discussion about Turkey's importance in the industry, President Donald Trump said that steel imports from Turkey would again be subject to a 50% Section 232 tariff due to that country's military actions in Northeastern Syria, but later suspended that increase.

NLMK

Sales to foreign subsidiaries and affiliates of Russia's NLMK fell year on year in July–September 2019

Vale's iron ore output down 17% in the third quarter

Vale's iron ore output dropped year on year in the third quarter, though it produced more of the steelmaking raw material than in the second quarter through a resumption of operations in its Southern and Southeastern Systems.

The Brazilian miner produced 86.7 million tonnes of iron ore from July to September, down 17.4% from 104.95 million tonnes a year earlier.

The volume is still 35.4% higher than the second quarter's 64.06 million tonnes.

CMC shutters Rancho Cucamonga meltshop

Commercial Metals Company (CMC) has ceased meltshop operations at its steel mill in Rancho Cucamonga, California.

"The burdensome regulatory environment and cost of doing business in California has put the Rancho Cucamonga meltshop at a severe cost disadvantage in the highly competitive rebar market," a CMC spokesperson told Fastmarkets via email on October 14. The company did not immediately specify when the shutdown occurred, nor how many employees would be affected.

CMC acquired the mill from Gerdau in November 2018.

NLMK slab sales to US, Europe subsidiaries down in Q3

Slab shipments to foreign subsidiaries and affiliates of Russia's largest steelmaker, Novolipetsk Steel (NLMK), fell by 43% year on year in the third quarter of 2019.

Slab sales to the company's internal customers in the July-September quarter fell to 550,000 tonnes from 956,000 tonnes in the same period in 2018, according a company report published on October 15.

Of the total figure, sales to NLMK USA and NLMK Dansteel (Denmark) dropped by 71% year on year to 119,000 tonnes in July-September 2019, down from 415,000 tonnes in 2018.

Erdemir Jan–Sept earnings down on weak demand

A summary of the financial results for Turkey's largest steelmaking group, Erdemir, for nine months ended September 30, 2019 showed earnings fell by 24.2% due to the negative sentiment in Turkey since late 2018, especially after the United States doubled the tariff imposed on Turkish steel imports in August last year, leading to a sharp depreciation of the country's lira against the dollar.

The duty was reduced back to 25% on June 17, 2019, but this did not improve demand significantly.

The Turkish lira was trading at 100 to $17.26 on September 28. It fell to 100 to $15.12 on August 8 last year from $28.34 on August 15, 2017, according to exchange rate website Oanda.com.

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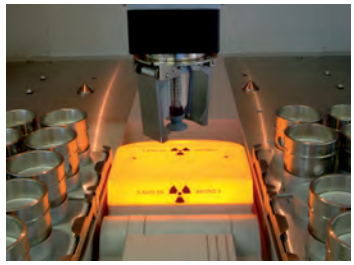

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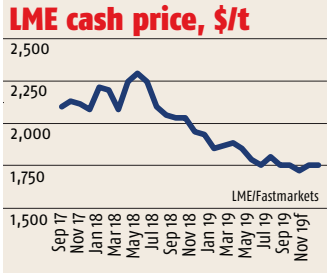
Market analysis

Aluminium

Room for a rebound

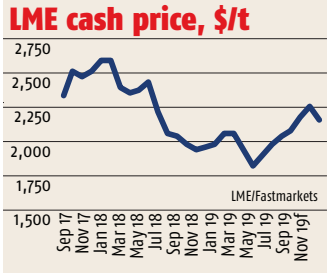
LME aluminium has been trading within a descending triangle on the price charts all year, recording a series of lower lows in the process, the last being in early October. However, emerging optimism that restarted US-China trade talks has helped to underpin prices. It has helped establish support above the $1,700 per tonne level and there is even an emerging upside bias, which, given bearish speculative positioning, could trigger a round of short-covering. The top of the descending triangle has slipped below $1,800 and so this is the likely upside limit for any Q4 rallies unless a trade deal emerges, in which case rallies could run higher. However, demand has been weak this year. We are being generous with our forecast of 1.2% growth globally, so while exchange stocks are low, off-exchange stocks are not. While there is a case for a short-term bounce in technically oversold aluminium prices it is hard to make a fundamental case that higher prices can be sustained.



Lead

Robust rally needs a breather

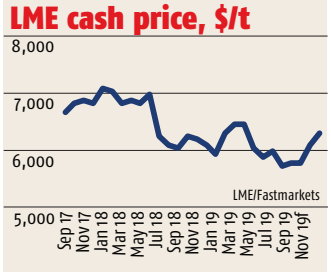
Lead enjoyed a steady rally to 14-month highs during October, extending an uptrend that stretches back to May. Lead has a habit of putting in some strong directional moves, but, because the market can get thin, when it does undergo corrections the pullbacks can be sharp. Since the May low at $1,774 per tonne, there have been three main corrections that have averaged $186 and these have come after up-legs averaging $223. The current up leg has travelled to $248 per tonne. From a technical perspective, it may be that prices need to consolidate, or undergo a correction. Fundamentally, lead is benefitting from supply disruptions, low stocks, and seasonal demand. With new vehicle sales so weak this year – down 5.6% year on year in the January-September period, according to LMC Automotive – owners are holding on to their cars so batteries on the road are older and more likely to fail when the weather turns cold, suggesting strong demand for replacement batteries.



Copper

Risk/reward favors the upside

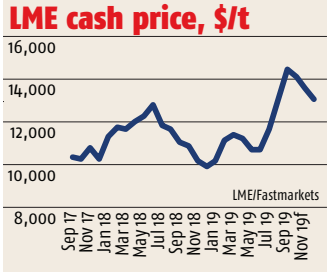
Copper has rebounded by roughly 3% since the start of Q4, ending October by challenging the $6,000 per tonne level again – a psychologically important level the LME market has not attained since July. Behind the improvement is a thawing in US-China trade relations, as well as dollar weakness and a flurry of supply disruptions. In the current regime, copper is only marginally influenced by its fundamental dynamics and is instead governed by the macroeconomic backdrop. This has seen speculative investors build up large short positions in LME and Comex copper, according to Commitment of Traders reports. We reiterate that a regime shift is likely to occur at some point either in Q4 or next year, because copper's tight fundamentals cannot continue to be overlooked. October's price recovery may be the shift. Thus far, long position building has been the main driver, indicating bulls getting more bullish. This could trigger short-covering, so we maintain that the risk/reward ratio is skewed to the upside.



Nickel

Correction to continue

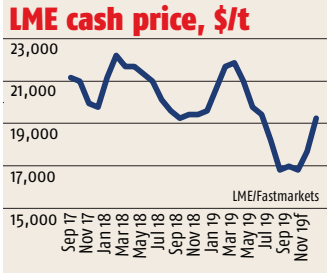
Supply-side uncertainties relating to Indonesian ore exports dominate nickel market sentiment. At the end of October, nickel miners in the country had agreed to halt the exports of unprocessed ore while the government conducts an investigation into alleged violations of export rules, ahead of the expedited resumption of the ban from the start of January 2020. But this has not been enough to reignite prices, even though LME availability has fallen to fresh 12-year lows around 30,000 tonnes and the other metals have shown strength amid thawing US-China relations. This suggests the Indonesian situation is fully priced in and that bears are focusing on (1) disappointing EV sales and falling margins for stainless steelmakers, which is reducing the demand outlook for nickel in both Li-ion batteries and stainless steel; (2) rising off-exchange nickel inventories; (3) the rapid investment in downstream capacity in Indonesia and the restart of idled mines elsewhere. We envisage the short-term series of lower highs and lower lows since nickel's early-September peak to continue.



Tin

Price rebound set to continue

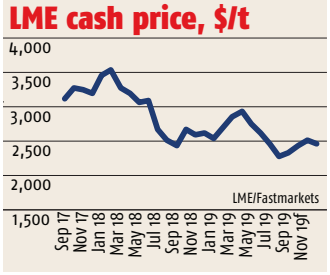
Despite the stability in refined tin since the start of Q4 – global exchange inventories barely moved in October, in contrast with a marked decline of 1,110 tonnes or 9% in September – we expect a renewed drawdown of exchange inventories and tighter forward spreads in the remainder of the year, driven by two key fundamental factors. First is the implementation of refined production cuts in the world's two largest tin-producing countries, China and Indonesia, first announced in early September but now starting to be felt. Second is a likely recovery in refined tin demand conditions underpinned by a pick-up in confidence following de-escalating US-China trade frictions. We expect the rebound in tin prices from late August to continue in the months ahead, even though we now model a smaller 2019 refined deficit due to a downwardly revised demand base. Our deficit for 2019 is now 6,000 tonnes, from 10,000 tonnes previously, as our global demand growth assumptions have been cut from +0.5% to -0.5%.



Zinc

Beware the 'sell-the-rally' mindset

LME three-month zinc prices rose with little volatility during October, moving through the $2,500 per tonne level for the first time since June and extending the uptrend off September's $2,190 low. There is support for the price rally in zinc fundamentals, with some supply disruptions in the headlines and exchange stocks at decade lows but still declining. The modest backwardation in nearby LME spreads has yet to attract any stock inflows, suggesting the overhang of off-market inventory may have been run down. But there are reasons for caution. Zinc prices approaching the mid-$2,500s at the time of writing are looking technically overbought. Fundamentally, Chinese production trends have turned and are now price-bearish with smelter output leaping 18.9% year on year in September and up 9.5% in Q1-Q4, according to the NBS. Forecasts from the ILZSG project the global market swinging to a 192,000-tonne surplus in 2020. Although this is a more bearish view than our own forecast, it could generate a 'sell-the-rally' mindset.



Analysis by **Andy Cole**, Fastmarkets MB

Steel

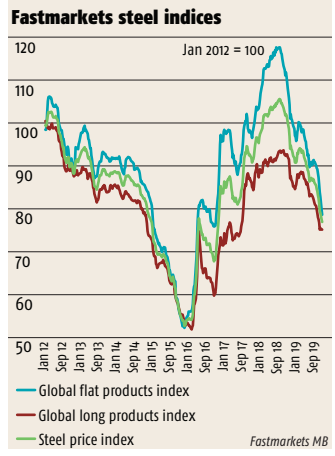
Competition in Southeast Asia puts pressure on Chinese HRC exporters

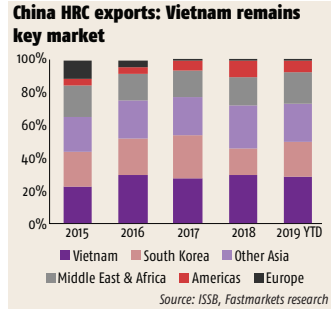
Southeast Asia is one of the main export markets for Chinese hot-rolled coil (HRC) producers, with Vietnam being the largest importer, accounting for 28.3% of Chinese shipments in the first eight months of 2019. But competition in the Vietnamese import market has recently intensified, with Russian and Indian exporters among others undercutting Chinese offers, putting pressure on the Chinese HRC price level.

Indian mills had to push more material into the export market due to rising steel stocks and retreating demand at home. According to the latest report from the Indian Ministry of Steel (MoS), the growth rate of real steel demand (defined as apparent consumption less changes in stock) decelerated to 6.1% in the April-August period, down from 8.8% in the financial year ending in March. Steel producers responded to slowing demand by reducing their production levels, and crude steel output trended down after peaking at just over 10 million tonnes in March. But these cuts were not sufficient to offset waning demand, leading to an accumulation of steel stocks, with a 31.7% increase in inventory of finished steel between February and August.

Steel demand in India suffered from a pronounced deceleration of rates of growth in flat-steel consuming sectors this year. The automotive sector has been in a decline, with motor vehicle production falling by 11.6% year on year in the first nine months of the year after a 14.5% increase in 2018. The downturn intensified in the second half of the year, under pressure from weak domestic demand as local sales dropped by 22.9% year on year in Q3. According to Oxford Economics, the growth rate of the manufacturing sector is on course to decrease to 2.5% in 2019, down from 8.6% last year.

Export sales have been an important avenue for Indian steel mills to ease the pressure from swelling inventories. The latest data from the MoS has shown that although in the April-August period of ▶





2019 flat steel exports fell by 5.6% year on year, in August they jumped by 27.2% year on year to 799,000 tonnes, more than doubling from July's 351,000. This rise contributed to making India a net flat steel exporter in August, with net flat exports of 297,000 tonnes.

Japan has also increased its HRC exports, which rose to over 1 million tonnes in July and August, after averaging at 815,000 tonnes in the first half of the year. This rise has also pushed the share of HRC in the total ordinary steel exports to 52.6% compared with the average share of 45.8% in the past five years. The main markets for Japanese HRC exports are east and southeast Asia, adding to the glut of supply in the region.

As a result, since early September the cfr Vietnam HRC price assessment has been set below the Chinese HRC export index, breaking from the traditional relationship of being priced at an average premium of $14 per tonne to Chinese offers, similar to the freight rate between the two countries.

But low HRC production margins in China, which were hovering below $10 per tonne in October according to our estimates, make it difficult for Chinese mills to engage in price competition and continue reducing their offers. Instead, they are likely to concentrate more on the domestic market, as the manufacturing sector in China traditionally has its strongest quarter at the end of the year, or they would have to start looking into reducing their output.

Analysis by **Marina Maliushkina**, Fastmarkets MB

Steel raw materials

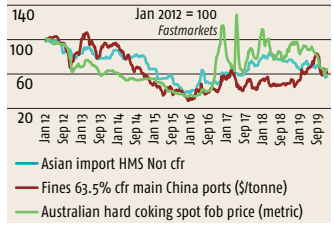
High costs force China's steelmakers to seek alternative raw materials

Although Chinese steel prices have this year been stronger than those in many other major markets around the world, mills have nonetheless been been hounded by expensive raw material costs. East China domestic hot-rolled coil (HRC) prices in the year to date have averaged 7.8% year on year lower than the average for 2018, while those for rebar in the same area have averaged 5.9% lower. Over the same period, the average hot metal costs have risen 10.1% year on year, noticeably squeezing steelmaking margins.

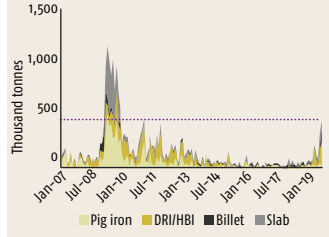
Despite their stronger performance this year, hot metal costs have fallen over recent months in line with weaker iron ore and coking coal costs as we had expected. Iron ore prices have come under pressure from higher supply, with a ramp-up in Vale's Brucutu mine operations from June, together with record output from its S11D mine project likely to support higher sales and decrease global prices in the short term. Premium hard coking coal prices, which trended downward in June-September, hit the market bottom in October and we expect a stable-to-upward movement in the coming months as China looks to book cargoes ahead of its import quota renewal in January.

We also expect ferrous scrap prices in the country to drop in November-December, but acknowledge the significant supply-side constraints keeping prices high. The premium for Chinese domestic heavy scrap over hot metal moved up to a record $56 per tonne in October, we calculate,

Fastmarkets MB steelmaking raw materials indices



China's combined imports of metallics and semis hit a highest level since 2009* in August



*Except January 2011's 464,080 tonnes compared with 453,099 tonnes in August 2019

Source: ISSB, Chinese customs via Steelhome

with scrap prices recording an unexpected month-on-month increase. Although Chinese basic oxygen furnace (BOF) mills started to procure less scrap in their converters from August when scrap regained its premium over hot metal in the country, we believe that scrap prices have been kept high by tight supply in key areas and exacerbated by the ban to scrap imports introduced in January.

The highest average scrap price in the country comes in 'Northern' China, Steelhome data shows. The North is China's largest steel producing region and is where steel output has outpaced most quickly the rise in BF rates this year, suggesting a larger use of scrap. At the same time as this high demand, the 'North' also has only 4.5% of all automotive units produced in China last year and about 12% of China's total population, according to NBS, limiting the region's access to prime and obsolete scrap, respectively.

High raw materials prices have therefore led Chinese steelmakers to explore other options in an attempt to preserve margins. Price spreads for both iron metallics and semi-finished steel over iron ore have dropped significantly year on year in 2019 to date, making these imports attractive for some Chinese producers. In January-August, Chinese imports of DRI amounted to 686,964 tonnes, compared with just 79,475 tonnes in the corresponding period of last year. Imports of merchant pig iron (MPI) also increased, to 193,817 tonnes in January-August, from only 22,802 tonnes in the first eight months of 2018 – already exceeding annual imports seen in the last five years. Combined imports of billet and slab more than doubled year on year to total 522,135 tonnes in the year to date.

We believe China's importing of semi-finished steel to be a temporary phenomenon as Chinese local steel prices are expected to continue falling in Q4, reducing profit margins for mills to roll semi-finished material into finished steel. But China's ban on scrap imports could mean that – so long as prices of imported DRI and MPI remain competitive compared with iron ore and Chinese scrap – imports of these iron metallics may be here to stay.

Analysis by **Lee Allen**, Fastmarkets MB

WENDT CORPORATION

Tom Wendt Jr.

'Our industry is always searching for a competitive edge'

Now under the leadership of Tom Wendt Jr., the family owned and operated Wendt Corporation has served the scrap metal recycling industry for over 40 years. Bette Kovach asks him about the growth of the business founded by his father, now chairman, in 1977 and company strategy to supply ever more demanding markets

While still in high school, Tom Wendt accompanied his father Thomas Wendt Sr. to a conference held by the Institute for Scrap Recycling Industries where he was fascinated by the diversity of the audience. They ranged from owner operators to large publicly traded companies and everything in between, all dedicated to operating their businesses profitably and making a positive impact on the environment. Wanting to contribute to the growth of the family business, he decided to work in the recycling industry to provide equipment that would help to make better use of the world's resources.

Today, Tom leads Wendt Corporation, Buffalo, N.Y., one of the world's largest technology-driven manufacturers of a wide range of recycling equipment for ferrous and non-ferrous scrap management. Employing more than 100 people, the firm has customers throughout the Americas and Europe, and is working with potential clients in Asia, including India, the newest developing markets for recycling. Upon graduation from Canisius College, Tom spent 10 years in sales for Wendt before being named president, at age 35, in 2011.

The company's portfolio of products and services has grown steadily over the past 42 years as the firm has evolved from an organization servicing recycling machinery to an agent for the products made by others to eventually become a full-scale design and manufacturing firm. Today, Wendt Corporation ▶

Technology partners

Wendt Corporation's current technology partners include:
– TOMRA Sorting Solutions (Germany) for processing end-of-life vehicles and automotive shredder residue in North America using transformative technologies and sensor-based systems for optimal material separation and recovery.
– MTB (France) for non-ferrous metals shredding, granulation and sorting technology. In addition to being the equipment manufacturer, what makes this partner unique is the operation of its own full-scale processing plants, thus making the firm one of the largest scrap processors in France of wire, cables and other complex non-ferrous scrap.
– Westeria (Germany) for material handling equipment complementary to Wendt's scrap processing solutions that enhance integration for metal recycling applications.
– MOROS Industrias Hidraulicas SA (Spain) for a high-performance shearing and high-density baling product line that complements Wendt's products.
– Bowe Machine Company (United States) for replacement automobile shredder rotors for all shredder makes and models as well as extensive fabrication capabilities to extend Wendt's product offerings.
– Joest (Germany) for vibratory and air classification technology that produces cleaner products and improves efficiency in the automobile shredder residual plants.
– APC Technologies (United States) for technology to control air pollutants for use in Wendt's proprietary automobile shredder emission control systems.

offers a full range of products for the ferrous and non-ferrous recycling industry from the shredder infeed conveyor through the recovery and finishing of non-ferrous metals supported by a trained and experienced staff.

And while the leadership has changed – Thomas Wendt Sr. serves as chairman in a largely advisory role – there are many things about Wendt Corporation that have transcended the generations. "One leg we stand on is continuous development of our products. But we also have become technical partners to our customers through systems and process innovation. We leverage the technology of our partners to provide a comprehensive solution that is state of the art, fully integrated and proven to perform. That is different from the past, where a technology company would introduce a new product, and scrap companies would have to figure out how to use it," said Tom.

Entering the shredding market

The firm evolved during the 1970s and 1980s from a service organization to a provider of its own products. But the real watershed moment in shaping the Wendt Corporation of today took place when the company became a shredder manufacturer coupled with its asset purchase of Sunbelt Technologies, Dallas, Texas, a leading shredder producer, in 1998. Wendt pursued the assets of Sunbelt because of the compatibility of technology between the two firms. The first shredder sold by Wendt was complete with an infeed conveyor, a 6,000-horsepower shredder mill and the complete downstream separation system. "Prior to 1998, we were an accessory to the big projects by supplying downstream projects or replacements. But now we were able to enter a whole new market" right as large shredders were gaining in popularity, said Tom.

In 2004, Wendt launched its HEAVY shredder line that was completely designed and built in-house. The entry into the heavy shredding market at a time of strong business conditions for metals companies helped Wendt increase its revenue between 2003 and 2008 to over $80 million and the workforce from 50 to more than 100 employees. The line of heavy shredders offers efficiency with the highest production levels per kilowatt hour, the lowest cost per shredded ton and increased reliability under the toughest shredding applications – maximizing up-time.

During the evolution of the Wendt brand, one mainstay has been embracing the latest technology. Wendt takes a two-pronged approach – developing its own innovations in a captive technology center and partnering with providers of world-class technology.

In 2013, Wendt opened a technology center "to further differentiate ourselves in the market by developing products in house," said Tom. The center has evolved over the past few years, proving out technology that will create additional value for customers. "Our current plant serves as a versatile advanced metal sorting plant used for the cleaning and sorting of shredded non-ferrous materials such as zorba and zurik as well as mixed aluminium scrap that can be recovered and reused. At the tech center we can take customer material, run it through the process and show the customer the end result," he said. The first two installations at the technology center served as automobile shredder residual plants.

'We also have become technical partners to our customers through systems and process innovation'

Power of partnerships

In addition to its internally driven technology advances, Wendt continues to partner with companies that bring proprietary technologies from Europe and North America to its equipment (*see list*).

When selecting partners to support Wendt's growth, company leadership looked for companies that provide best-in-class technology with unique attributes and organizational depth for research and development. "Our partners are all experts in highly specialized fields. We assess their appetite for growth so they will become partners for the longer term. Our partners all have a competitive edge where we bring industry knowledge to them, and they help optimize their technology to our specific applications that bring value to our customers," said Tom.

"Together with our partners, we are investing significant resources into technology and processes to recycle more of the world's scrap and waste streams.

I find it very satisfying to know that we play an important role in helping to recycle the world's scrap and waste."

The environmental challenge

Recycling by its very nature intends to create a cleaner environment and can bring to life the concept of a circular economy to reduce the use of natural resources. But recycling also brings myriad environmental challenges to both the recycler and the scrap equipment provider. The work at Wendt's technology center is focused on resource recovery and increased efficiency, which help lower emissions and carbon footprints.

Shredder manufacturers have long sought ways to mitigate emissions and provide a cleaner and safer work environment. Wendt is currently building a new shredder for a customer in Minnesota that, because of tightening environmental standards and citizen activism, is relocating its shredding facilities. "Automobile shredders are held to a higher standard of controlling and measuring emissions. That standard and the community concern has led us to design and build a shredder that will be completely enclosed. It is cleaner than anything I have ever seen and could be used as the new standard of environmental responsibility around the world," Tom explained. The installation is expected to be completed in late 2019.

One earlier breakthrough environmental development was achieved when Wendt introduced HydroSort, a complete material cleaning and separation system for automobile shredding plants. The system separates the shredded automobile into three segregated material streams: a washed clean grade of ferrous scrap metal, a clean and pure grade of non-ferrous residue averaging over 80% metal content by weight, as well as the automobile shredding residue or fluff stream. "Consisting of a wet downstream and the first infeed conveyor manufactured by Wendt, it helped establish Wendt's future as a comprehensive solutions provider to the shredding industry," said Tom.

WENDT CORPORATION

Wendt Corporation develops its own innovation in its technology center

Modular shredders also help reduce the carbon footprint while expanding shredding capabilities to smaller firms that want to enter the recycling market. Wendt has seen a steady growth in modular shredder sales with first-time shredder owners looking for low construction and installation costs while still reaping premium shred. One such customer in Newfoundland, Canada, started up a shredder in spring 2019 to expand his business and keep his operating costs low. One deciding factor for selecting a Wendt product was its strong customer service. Said the shedder owner, "Wendt was prepared and willing to spend the time with me to select a shredder and a downstream that best suited my needs."

Building from the foundation

The founding of Wendt Corporation was somewhat happenstance. While working in the R&D department at Columbus McKinnon, Thomas Sr. received a call from a customer of his former employer D&J Press Company. Thomas had installed a baling machine press that was no longer working and needed repair. Although then employed by another company he agreed to visit the former customer's yard on a weekend to offer advice on how to repair the baler. That experience of being proactive, responsive to a customer – even a former one – and troubleshooting with success made Thomas think that maybe he could launch his own business.

In the early days of Wendt Corporation, the focus, according to Thomas, was on "rebuilding equipment to make it more efficient and safer to create lasting value." It helped establish a business model that expanded the firm's focus. He sought partners to provide leading-edge technology and introduced those firms to new markets. Wendt Corporation became the agent and/or distributor for several leading European brands of recycling equipment such as Germany's Thyssen Henschel, England's MMH and Spain's Moros, as well as companies in Denmark, France and Italy.

In 1981, Wendt Corporation acquired the intellectual property of D&J Press Company, which was partially owned by Thomas' father Will Wilfred. That ▶

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acquisition allowed Wendt Corporation to repair and rebuild aging D&J equipment and actively solicit the business of all former D&J customers, many of which were among the first metal processors to embrace automobile shredding. With the orientation of using top-notch technology to create lasting solutions, Thomas entered the manufacturing arena in 1987 when Wendt introduced its non-ferrous baling press and also that decade introduced its own brand of products specifically for ferrous shredders.

A plan for accelerated growth

With its extensive product portfolio built over the decades, Wendt has experienced record growth in the past two years, particularly with customers looking to further recycle insulated copper wire and aluminium scrap into furnace-ready commodities. Wendt completed the commissioning of eight automobile shredders and more than ten large separation and sorting systems. To support future growth, Wendt announced this summer several strategic initiatives to support accelerated growth. One involved establishing a regional sales force. Another has expanded the service department into two groups – parts and technical support along with field service, which has doubled its staff, and a technical support group. This structure supports the growing Wendt installations while also expanding its service-related product offerings.

The recently announced strategic initiatives also reinforce its commitment to technology partnerships with highly specialized companies whose technology and capacity expands the value of Wendt's product lines. The result is an efficient and agile supply chain with an increased ability to deliver more product, on-time, and with better quality. The company also said it remains committed to a growth strategy that delivers value to its customers through creative process solutions, service and overall customer experience.

WENDT CORPORATION

A Wendt HEAVY shredding plant in operation

And although the firm is planning to keep the forward momentum, Tom acknowledges that the road may be bumpy – at least for the near term. "Commodity prices are at three-year lows. While we have several large projects in the pipeline, that number is less than this time last year. Many customers seem to slow down or put projects on hold in soft markets. But our best customers tend to make investments when the market is down because they have the time, the resources and they know they get better pricing from contractors and faster project schedules. When the market rebounds, they are better positioned to take advantage of it."

Global economic forces also affect the scrap equipment market. "Chinese demand for non-ferrous metals has provided a marketplace for our auto shredder customers to get paid near intrinsic values for lower grade mixed metals. On one hand, that's helped our customers be profitable and invest in more equipment to recover more metals from automobile shredder residue. But on the other hand, it has prevented further investment in technology to sort commodities into a 'furnace ready' state because China has made it difficult to justify. But with an election coming up next year and a possible future trade agreement, things could change."

"I believe that our industry is always searching for a competitive edge, and our business is built around providing that for our customers. If recent history is any indication of the future, when markets are soft, we've remained busy and simply grown our market share. Long term, I feel great about where we are and that we will continue to grow," he concluded.

US steelmakers react to market forces

It has been tough for US steel producers to repeat their exceptional results achieved in 2018, but they have continued to prosper despite increasing market uncertainties. Myra Pinkham reviews current circumstances and summarizes the outlook

RIVER BIG STEEL

Big River Steel has widely deployed the latest digital technologies at its mill, helping it to achieve a performance that has attracted investment from US Steel

There is no doubt that 2019 has been a challenging year for everyone in the US steel supply chain, especially coming off a very strong year in 2018. It remains largely unclear what 2020 will bring. That depends upon several still unknown factors both on the demand and supply sides of the equation, including whether, as some fear, US economic growth continues to soften and whether, as they hope, there is some easing of trade-related tensions. It is also uncertain what the impact will be as extra production capacity comes online over the next several years.

Despite all these uncertainties, 2019 has not been a bad year for the US steel market. Even though market conditions have been more difficult than they were last year, Christopher Plummer, managing director of Metal Strategies Inc., observed that overall it has been flat to slightly positive year, with apparent consumption estimated to be up a very slight 0.3% for the year as a whole, before a forecast fall of about 1.6% next year.

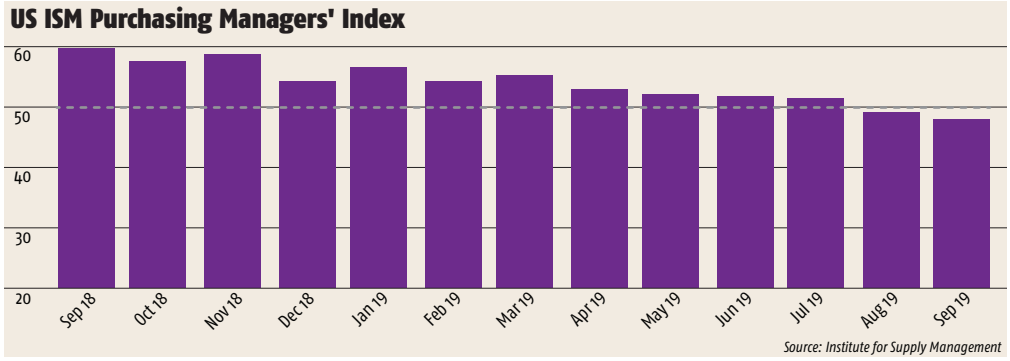
"It has definitely been more stable than some other US markets," John Tumazos, president and metals analyst for John Tumazos Very Independent Research, said. He pointed out that, for example, US aluminium mill orders were down by 7.2% year-to-date through August, and that over the same timeframe US paper and paper board production was down by 4.6%.

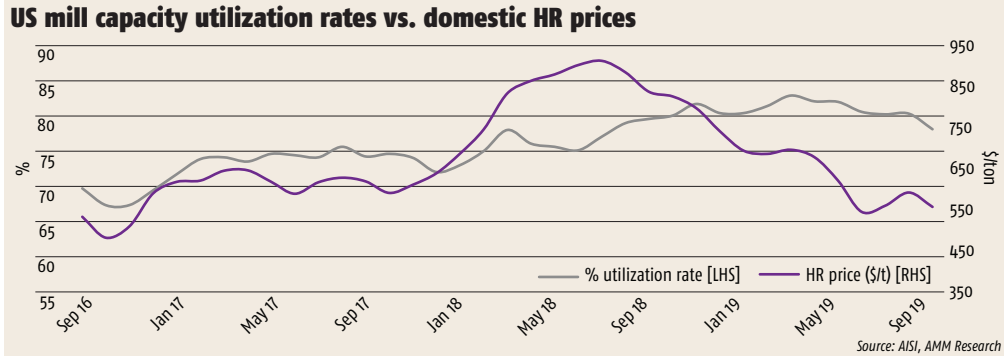
Nevertheless, as of mid-October, US steel products – particularly sheet – were stuck in a downward pricing spiral, Amy Bennett, principal consultant for Fastmarkets MB, observed, with Fastmarkets' US steel hot rolled coil (HRC) price falling under $475 per short ton as of October 18. Although, with the $40/ton sheet hike led on October 24 by ArcelorMittal, a pricing floor could soon be established, and prices could start coming back up by the end of December or early in the first quarter of next year. "It won't be anything huge, but rather a slight turnaround in pricing," Bennett said.

That, however, assumes that steel buyers become less cautious than they have been in recent months. "US demand has been soft in 60% of steel product categories since March," Becky E. Hites, president of Steel-Insights LLC, observed, maintaining, "The quagmire in Washington DC has resulted in a slowdown in manufacturing."

Bennett agreed, stating that in particular the uncertainty that has been the end-result of the US-China trade war has definitely had a dampening effect, not just upon numerous key steel end-use sectors, but the manufacturing sector as a whole. Evidence for that is provided

by the Institute for Supply Management's manufacturing purchasing managers index (PMI) falling into negative territory for at least two consecutive months, with the September PMI plummeting to 47.8% – its lowest level since June 2009 at the bottom of the 'Great Recession'. "Manufacturers in general are very nervous and very cautious," she pointed out.





A buyers' market

John Anton, director of steel analytics for the pricing and purchasing service of IHS Markit, said this comes as the US steel market is in one of the strongest buyers' markets that he has ever encountered, marked by weak demand, short mill lead times and weak pricing.

"Service centers are very quiet. It seems as if no one is buying any more steel than they absolutely have to. Prices are tumbling even though there isn't much excess domestic supply," at least at this time, Anton observed, blaming much of the weakness in steel end-use markets, particularly for industrial goods, upon tariffs, which he said have been hurting OEMs. "They can't keep eating the tariffs, but they are also having a hard time passing them along."

"Steel industry consumers have long memories, and when prices are falling and steel is broadly available for purchase, there is no incentive for them to enter the market early," Hites said. "They have bad memories of getting caught with steel that devalued quickly after they purchased it, so they are only purchasing what is absolutely necessary," she explained.

"We expect overall steel demand growth to decelerate over the next two years as the US economy slows and manufacturing activity softens," said a spokesperson for the American Iron and Steel Institute (AISI). They observed that after increasing about 5% last year, US steel industry shipment growth slowed to a little under 2% in the first half of 2019, compared with the first six months of last year. Plummer estimated that for the full year it will decline by 3.5% this year and another 1.3% in 2020. Philip Bell, president of the Steel Manufacturers Association, said that in addition to all the domestic and geopolitical uncertainty, some of the recent weakness in steel demand has been seasonal in nature as both distributors and OEMs tend to throttle down their purchases as the end of the year approaches. "Also, with the 2020 US presidential election on the horizon, companies are trying to weigh-up what the outcome will be and what impact it will have upon them."

It is still unknown what impact the 40-day automotive strike at 33 US General Motors operations, which was GM's longest nationwide strike since 1970, will have upon steel demand, given that the deal reached did not reverse GM's plans to close its assembly plants in Warren, Michigan, Lordstown, Ohio, and Baltimore, Maryland. There is also a possibility of labor action at other automakers.

Plummer said that GM has been producing about 12% of North American light vehicles, but some of its strike-related production losses were made up for by sales from other automakers. Tumazos pointed out that there had been excess dealer stocks of automobiles going into the strike. Tyler Kenyon, a metals and mining analyst with Cowen & Co., has not seen a major shift in auto steel buying patterns because of the strike, but noted there would have been if the strike had lasted longer – as some Tier 1, 2 and 3 auto suppliers had already begun to feel an impact.

This comes as overall auto output has been down slightly. Anton estimated that somewhere between 16.5 and 17 million light vehicles are being produced in North America this year. He said that since those units are largely light trucks, which consume far more steel, and any switchover to aluminium content is more of an ongoing process than a big flip, steel consumption by the automotive sector has been flat to just down slightly.

Cooler construction market

Meanwhile, Tumazos said that the construction sector, which is a major end-use market for steel, especially steel long products, has not been as strong this year as had been expected. Steel use for construction, however, has been better than overall construction spending data indicates. While the US Census Bureau reported that construction spending was down ▶

US Steel and Big River Steel join forces

While United States Steel Corp.'s investment in, and likely future acquisition of, Big River Steel, is largely perceived as a win-win for both companies, one unanswered question is whether such an integrated-mini-mill business arrangement is unique to these two steelmakers or if it is a sign that similar combinations are likely in the future.

On October 1, the two steelmakers entered into an agreement in which US Steel attained a 49.9% minority ownership stake in Big River Steel. It is a deal that gives US Steel the option to acquire the remaining 50.1% of Big River – a call option that David Burritt, US Steel's president and chief executive officer, said the company plans to eventually take advantage of – likely sooner than in four years. "First we want to see how our cultures mesh," he said.

During a conference call on the joint venture, Burritt called the deal a key step in transforming US Steel into a world competitive steel producer by adding sustainable steelmaking technology to its footprint. He said that this move is consistent with its desire to have a "best of both" footprint that includes the best of both the integrated and mini-mill business models. "Big River will help us to get where we want to go, faster."

David Stickler, Big River Steel's chief executive officer, said: "Big River has proven its capability to produce the highest quality steels with a cost structure equal to or below that of mini-mills," and that under this new combination its growth-oriented, "can-do" culture will not change. He said, "In fact, we expect US Steel to accelerate our growth and advancement even further into the very highest quality steels," and possibly to building a second mill. Meanwhile, as far as operations and management, Stickler said, "Big River fully maintains the keys and remains in the driver's seat in all regards."

Burritt said that with this investment, US Steel plans to center its North American production around three assets – Big River; Gary Works, which has a world class hot strip mill; and Mon Valley Works, which has low-cost liquid steel capabilities and will be the future home of US Steel's endless casting and rolling line. "We are also on the way with adding an electric arc furnace at Fairfield," he pointed out.

Asked about its Great Lakes and Granite City facilities, Burritt said that they are still part of US Steel's portfolio, adding, "Over time we will make the right decisions about our footprint."

While John Tumazos, president and metals analyst for John Tumazos Very Independent Research, sees the US Steel-Big River deal as a "one-off" thing rather than a sign of more EAF/integrated mill joint ventures, Stickler is not so sure. "Our common goal is to show the world that combining integrated and mini-mill know-how operating capabilities is the winning formula. If we are successful, as I believe we will be, it would certainly make sense for others to follow in our footsteps."

by 2.1% year-to-date through August, Plummer said that steel use for non-residential construction was up by 2.7% year to date through July, and steel use for public works construction was up by 6.7%. He said that while he does not believe that this growth rate is sustainable, that would still be good growth rate.

There has been some question about where non-residential construction activity will go from here, especially with the American Institute of Architects' architecture billings index fluctuating between expansion and contraction. It fell back into negative territory of 47.2 points in August. Anton pointed out that company investments are not getting the same push from tax cuts as they did last year, calling tax reform a one-time gift that provided a 15-18 month "sugar high" that was not sustainable.

Plummer said that it is likely that steel use in public works construction is likely to continue to grow, even though the long-talked-about federal infrastructure spending plan keeps being delayed and it is unlikely to be passed by Congress this year – and possibly not until late 2020 or even early 2021, despite its bipartisan support.

Also, with US housing starts down by 1.8% year to date through August, major appliance shipments were down by 4.6% year to date through September, according to the latest data from the Association of Home Appliance Manufacturers.

Anton said that farm equipment OEMs have been hit by a double whammy of tariffs and low farmer income due to difficult weather conditions. Nevertheless, Plummer said that steel use for tractors and combines were up by 3.7% year to date through July.

Domestic supply growth

US domestic production of steel will grow over the next few years. Kenyon maintains that imports have been largely absent this year, as could be expected with service centers and OEMs alike working down their inventories and with the price differential so narrow for most steel products that imports are just not worth the risk. Also, with domestic lead times as short as they are – three to four weeks for HRC – companies are not enticed to bring material onshore, especially in a falling price environment. This is despite the removal of the Section 232 tariffs on Canadian and Mexican imports, which industry observers said has not resulted in much of an import surge.

There are, however, some exceptions, including US rebar imports from Mexico, which Kenyon said are on track to reach about 120,000 tons in 2019, up by 15% from 2018. That is one reason why the US Commerce Department launched an investigation on October 22 to determine if any of those imports – especially of rebar that is bent at one or both ends – circumvent current antidumping duties.

At the same time, Kenyon pointed out that domestic steel supply has been gradually ramping up ever since the back half of last year, including restarts of both two blast furnaces at United States Steel Corp.'s Granite City, Illinois, facility, which was idled in 2015, and JSW Steel's Mingo Junction, Ohio, mill, which was idled in 2009. There has also been a new joint venture between Russia's Novolipetsk Steel (NLMK), and Allegheny Technologies at its Brackenridge, Pennsylvania, facility, adding some incremental supply. In addition, Nucor Corp. started up a new galvanizing line at its Gallatin facility in Ghent, Kentucky, and is ramping up its Marion, Ohio, rebar mill.

Plummer estimated that from the beginning of 2019 through 2022, about 12.1 million tons of new flat rolled steel capacity – all electric arc furnace, or mini-mill,

capacity – will be coming online in the United States, including 10.9 million tons of sheet and 1.2 million tons of plate, largely by Nucor, Steel Dynamics and Big River Steel. He said that in addition to that about 1.8 million tons of long product capacity – mostly rebar micro-mills, but also some merchant bar (MBQ) and wire rod capacity – will be coming online over the same timeframe.

He added that plans for another 3.7 million tons of new sheet capacity could be announced shortly, with the largest portion of that expected to be for a new mill that Big River Steel is expected to build in Brownsville, Texas, or elsewhere in the Southwest. While he fell short of announcing that mill, David Stickler, Big River's chief executive officer, told *Metal Market Magazine* that US Steel's purchase of a 49.9% stake in the company (*see box*) will likely accelerate both its project to double its steelmaking capacity at its existing Osceola, Arkansas, plant and its plans to build a second mill.

With all this new EAF steelmaking capacity, much of which is almost certain to be brought online, Tumazos said that it will tighten scrap availability. "Because of that when we look back at recent steel prices, we will view them as a long-term low."

SMA's Bell, however, warns that these moves should not just be looked at as capacity additions, but as an algebraic equation, given that could also result in some inefficient existing capacity being idled or closed, the displacement of imports and even some companies going out of business and exiting the market.

"Also, some of the capacity additions could be postponed, rescheduled or even shelved," he pointed out. "I think that there is too much fear about this and not a real understanding of what is happening right before our eyes."

Such decisions are also not necessarily influenced by market ups and downs, John Ferriola, Nucor's chairman and chief executive officer, said during the company's recent earnings call, noting, "We invest in the downturns to come back into the upturn stronger. If we didn't invest and grow our company during the last recession, we would not have seen the record year that we had in 2018."

BIG RIVER STEEL

Millions of tons of new flat rolled steelmaking capacity are due on stream in the US over the next three years

Fastmarkets' Bennett said that, at least at this point, she is not worried about the new capacity coming online, especially with US Steel extending its furnace idlings at its Gary and Great Lakes plants. "But the new EAF capacity coming online over the next few years will make some existing, higher cost integrated steel capacity very vulnerable." The same is true of some less competitive EAF capacity, Hites said, maintaining that what is happening is that the US steel industry is going through a cycle of 'growing young' similar to what happened with sheet in the late 1980s.

It will also result in greater EAF market share, which Tumazos estimated could move up to at least 72% of total US steel output from 68% today. "But I don't know if the US market will ever get to 80- 85% EAF," he said.

"It will be a very competitive environment as this new supply comes onstream," Bennett said. Just how competitive could depend upon what happens with imports. While some market observers are optimistic that more imports will be displaced, IHS Markit's Anton is not so sure. "New capacity doesn't drive out imports, it drives out domestic capacity," he maintained.

The additional capacity is also likely to limit how much domestic steelmakers will be able to raise prices. "That isn't to say that steel prices will fall forever," Anton said, saying that prices should start bottoming out sometime between November and January. Where they go from then depends upon what happens with scrap prices, which had sharper-than-expected declines in both September and October. He predicted that scrap prices should turn up soon – as much as $100 to $150 per long ton between November and February – given that they are already below levels where collection is profitable. Also, they tend to rise once wintry weather approaches.

"But while we could see a turnaround in prices by the end of the year, it won't be anything huge," Bennett said, adding that overall 2020 market conditions remain somewhat unknown. "While hopefully some of the uncertainty resulting from US trade policies and nervousness about the future will start to get resolved, currently both US and global economic growth have been slowing," she said. "Because of that, next year could be somewhat subdued with lower average steel prices than we have seen for 2019."

Indian steel – both public and private

The contribution made by both state- and independently-owned steelmaking assets in India continues to evolve as the nation's efforts to boost steelmaking capacity develop. Kunal Bose captures present entrepreneurial and political thinking on the steel industry's best way forward

A financially robust group will attempt an acquisition only if it is convinced that the growth potential of the target company in terms of size of operation, turnover and profits has only been partly realised. This has been the driving consideration for Vedanta Resources chairman Anil Agarwal for a series of takeovers in India, from government-owned Bharat Aluminium Company (BALCO) to Hindustan Zinc Limited (HZL). Vedanta's acquisitions have also included oil & gas business Cairn India and now, more recently, Electrosteel Steels Limited (ESL).

Beyond the non-ferrous metals and energy industries about which Agarwal is particularly passionate, his recent cherry picking of the insolvent ESL under India's Insolvency and Bankruptcy Code (IBC 2016) is a path-breaking move in Indian industry. An official of the Confederation of Indian Industry (CII) said: "Look at the industrial landscape here outside the domain of the humongous public sector. Groups owning steel mills, a few with captive iron ore and coal mines, have all stuck to that profile [of concentrating on iron & steel]."

At one point the steel-to-automobile Tata conglomerate joined hands with Alcan, before its acquisition by Rio Tinto, and Norway's Hydro for a major bauxite mining and alumina project in Orissa. "But the 1.5 million tonne per year alumina refinery was finally implemented exclusively by Hindalco as Tata thought it should stick to its core competency in steel," said the CII official.

SAIL

Similarly, a company belonging to AV Birla group, which is also the owner of Hindalco, ran a gas-based sponge-iron plant for a few years "before deciding it would be better off by sticking to its knitting – that is primary aluminium and value-added products in the downstream," he added.

It is no surprise then that only the country's steel industry leaders in the private sector, and ArcelorMittal and the UK-based Liberty House, were participants in open bidding contests for steel companies held under the IBC. Steel ministry officials say that public sector undertakings (PSUs) Steel Authority of India Limited (SAIL) and Rashtriya Ispat Nigam Limited (RINL), which are preoccupied with major modernization and capacity expansion programmes, stayed away from auctions of ailing steel enterprises.

India is determined to more than double its existing steelmaking capacity to 300 million tonnes per year

While land availability has not been an issue for SAIL's integrated mills housing incremental capacity growth, it has suffered cost and time overruns in achieving an increase in crude steel capacity to 21.40 million tonnes from a previous level of 12.84 million tonnes. Some expansion-related work at SAIL's Bhilai mill is still in progress. "Hopefully, lessons have been learnt in managing expansions of all the mills simultaneously" said a former SAIL leader, so that experience will help its further capacity-building efforts.

Taking advantage of its large land bank, SAIL has announced plans to raise its crude steelmaking capacity to 50 million tonnes per year in two phases. Growth to 35 million tonnes per year is planned by 2025-26, and then to 50 million tonnes by 2030-31, when India aspires to own a 300 million tonne per year industry in contrast to its present size of about 140 million tonnes per year.

As the PSUs are talking about capacity expansion or building a greenfield mill – the country's largest iron ore miner NMDC will hopefully start production at the 3 million tonne per year steel plant at Nagarnar in Chhattisgarh by the middle of 2020, after missing its commissioning target date a few times.

Government thinking

A Cabinet member of India's government, Dharmendra Pradhan has charge of steel in addition to petroleum and natural gas. He recently remarked that for "Some time I have been wondering whether the government should be there in the steel sector at all. I would like experts and economists to study the subject and give their opinion. There was a time in the past when we really needed the PSUs and they have done a good job... Look at the secondary steel sector where the government was never present, but it has come up well with capacity of around 50 million tonnes." An informed guess is that – as a follow-up to the minister's thoughts

– the government think-tank Niti Aayog may deliberate on the desirability of the state's role in the steel industry.

Since its return to power for another five years following an absolute majority in the May national elections, the government's disinvestment programme got a boost with New Delhi recently announcing that it is to sell its entire holding in at least three companies which the government had previously believed should remain in its fold for "strategic reasons."

This being so, it is no wonder that the department of investment and public asset management (Dipam) has recommended separation of the Nagarnar steel mill from NMDC in order to sell it. But the recommendation is on hold following the steel ministry's observation that any sale of the NMDC plant should await its completion. Any disinvestment in India will invariably become a contentious political issue. In this case, since Chhattisgarh is ruled by the Indian National Congress Party, its state-level leadership has lost no time in opposing the Hindu nationalist Bharatiya Janata Party led central government's move to sell the Nagarnar mill.

An ardent supporter of disinvestment, Agarwal says that the government's progressive withdrawal from business – including steel as it would improve state finances – would create "ideal conditions for rapid growth of privatized units." Citing the experience of Vedanta, Agarwal said: "Stellar performance has marked the working of HZL and BALCO since we took control of their management."

Industry watchers are busy reading in between the lines of Pradhan's open praise of Tata Steel, JSW Steel, Essar Steel (for its past work) and secondary steelmakers. The highest bidder, ArcelorMittal, will take control of the 10 million tonne per year Essar Steel once some hitches in the insolvency resolution process are over. Ahead of the resolution, Pradhan has extended a "warm welcome" to the multinational steelmaker. He appears to be keen to encourage private steelmakers to build new capacity, defying the headwinds that the industry is now facing.

Tata Steel strategy

In the meantime, Tata Steel's acquisition of the insolvent Bhusan Steel, since renamed Tata BSL, and subsequently the special steel mill of Usha Martin (UM) through its subsidiary Tata Sponge Iron, plus Vedanta's new ownership of ESL, has brought relief to the steel ministry.

Problems surrounding insolvency resolution of Bhusan Power and Steel should be cleared soon for the highest bidder, JSW Steel, which has an enviable track-record of turning around mills in the past – most notably the former Ispat plant at Dolvi in Maharashtra to put it on the road to recovery.

Tata Steel has set two goals for itself: to enhance its Indian production capacity to 30 million tonnes per year by 2025 and to feature among the "top five technologically advanced steelmakers in the world." Even though it is constrained by land availability, the company has been able to pack in capacity of 10 million tonnes per year, including 7 million tonnes of flat products and 3 million tonnes of long products at its over-a-century-old complex at Jamshedpur in Jharkhand.

At Kalinganagar in Orissa, where in the new millennium the company commissioned a 3 million tonne per year flat product mill, work has begun to create an additional capacity of 5 million tonnes at an investment of Rs235 billion ($3.36 billion). The Kalinganagar complex offers scope for further major capacity expansion. Major features of current expansion include a 5,800 cubic meter blast furnace and a state-of-the-art cold rolling mill to make value added products.

In its pursuit of the 30 million tonne capacity, acquisition of stressed assets subsequently brought up to Tata Steel standards will play an important role. Among potential suitors, Tata Steel was swift to snap up TSBSL. Describing the acquisition of TSBSL, with a capacity of 5.6 million tonnes per year, as strategic, TV Narendran, CEO and managing director, and Koushik Chatterjee, executive director and CFO, of Tata Steel said in a joint statement that besides capacity enhancement, the new asset "complements our product mix. We have had a very encouraging start to the integration journey and are well on our way to ramp up capacity use to the rated level. This acquisition gives us the opportunity to scale up our operations and strengthen our presence in various market segments."

Chairman N Chandrasekaran is confident that once the process of merging TSBSL with Tata Steel is completed, a "unified and simple organization will emerge" and that will aid realization of optimum synergies.

Elaborating on the synergies to result from the amalgamation, Narendran and Chatterjee said: "We are to realise improved utilization of facilities, efficient movement of raw materials, reduction in logistics cost, benefits of a single value chain and reduction in working capital. The union will also underpin improvement in customer satisfaction levels."

A unique opportunity to enrich its long products portfolio came Tata Steel's way last year, when the heavily indebted UM group, the country's leader in steel wire rope ▶

Government policy support

India alternates between being a net importer and exporter of steel. At a recent brainstorming session with industry leaders, steel minister Dharmendra Pradhan said what was happening on the ground in terms of new capacity building along with the pursuit of high value addition to primary steelmaking would make India "not in the distant future a regular net exporter." In pursuit of that goal, Pradhan has promised government policy support, particularly on logistics, for the industry to be able to make "quality steel at low cost." He said that "Armed with such steel products, India could easily find a big market in unexplored Africa and many south and south-east Asian countries."

Pradhan said that the recently introduced steel import monitoring system would let the government and industry know what varieties of foreign-origin steel in what quantities were coming into the country, and on that basis domestic manufacturing capabilities could be created to negate imports. "In my capacity as petroleum minister, I do go to countries from where we make oil imports. I have now made it a practice to tell my counterparts in those places that we buy such large quantities of energy from you and in turn we will expect you to use our steel," said Pradhan. This has started to yield results.

business, had to sell its 1 million tonne per year mill designed to make special steels, including automotive steel, to pare debts. Since the mill is at Jamshedpur, Tata Steel was logistically inclined to acquire the UM plant. Even while other groups had an eye on the plant, the Jhawar family were in agreement that the mill they built incurring major time and cost overruns would see better days under "Tata care" and that the jobs would be protected. The Tata-UM deal was made outside India's IBC.

New dimensions

The steel ministry as well as governments in states where insolvent and ailing mills are located are relieved that strong groups have been enthusiastic in acquiring stressed assets. Without exception, after their auction wins the mill buyers have announced that the immediate priority would be to ensure that the current assets work to capacity in the quickest possible time. Then follows capacity expansion and more value added products. ArcelorMittal, whose attempts over the past decade to set up large greenfield mills in Orissa, Jharkhand and Karnataka faltered either on failure to acquire land or get iron ore mines, swiftly announced ambitious growth plans for Essar Steel once its resolution plan under IBC proved to be the best.

Essar's plant at Hazira in Gujarat has a nameplate capacity of 10 million tonnes per year, but it produced only 6.8 million tonnes in 2019-20, a rise of 10% over the previous year. Once it gets ownership of Essar, ArcelorMittal will give shape to the plan to lift Hazira's capacity to 12 million tonnes and also build a 6 million tonne greenfield mill in Orissa in two phases. Along with increasing capacity, ArcelorMittal will push along other Essar projects, including a 6 million tonne per year pellet plant and a 12 million tonne iron ore beneficiation unit at two different locations in Orissa, to be connected by a 235 km slurry pipeline. The arrival of ArcelorMittal, with its repository of many advanced steelmaking technologies, in India will add a new dimension to the nation's steel industry.

Land availability

There is convergence of government and private sector thinking on the use of land – a resource that is no longer abundantly available. Interestingly, the chief secretary of Orissa, Asit Kumar Tripathy, and Vedanta's Agarwal have similar opinions on the "optimum utilisation" of land already available to the industry, seen by the two of them as a key to the country creating new capacity of around 160 million tonnes per year by 2030-31.

This is why Agarwal wants his new ESL management to ensure that the 1.5 million tonne per year capacity plant at Bokaro in Jharkhand is raised to 3 million tonnes in two years. Aware that in the present economic situation, where the country's GDP growth in the current year will not be more than 6% and demand for everything from automobiles to commercial and residential buildings is sputtering, Agarwal knows selling of TMT bars, wire rods and ductile iron pipes will demand best product quality and aggressive brand promotion.

An industry official does not think that Vedanta will stop at 3 million tonnes. ESL will still be left with surplus land on which to pack in more capacity and land adjacent to the ESL complex looks set to be available for major expansion. "Look at what Agarwal has done with HZL. Since his buying HZL, mined metal production was up from about 100,000 tonnes to 936,000 tonnes in 2018-19. Next year, mined metal capacity will rise to 1.2 million tonnes. At BALCO, he not only has raised smelting capacity multifold, but also expanded the portfolio of value added products," said the industry official. Agarwal, however, told *Metal Market Magazine* that "once ESL becomes a 6 million tonne unit, we will take a pause, deliberate on how the market is emerging and then decide on future course of action."

The understanding in the government is that Orissa – considering its iron ore, coal and chromite resources and its long coastline and major all-season ports – will have a share of at least 100 million tonnes per year in the 2030-31 targeted capacity of 300 million tonnes. In normal course, this should happen. But, as Tripathy said, "The state government has given a lot of land to the steel industry. Regretfully, the recipients have made poor utilization of land in their possession. Even then, we are making more land available to the industry so that the state emerges as a major steel hub."

SAIL

Value-added products are a focus for Indian steelmakers

Tackling logistics

A common concern of Tripathy and Narendran is that logistics costs in India are about double those in many major steel-producing countries. Orissa today has a 30 million tonne per year capacity, but the logistics that come into play to move raw materials from local mines and ports to mills, and then dispatch finished steel products from there are complex.

The logistics costs of the leading steel producers in Orissa are 15% and more, which compromises the global competitiveness of Indian steel. Narendran said: "Quite a few mills here are globally competitive within their premises. But much of that advantage gets compromised when they will step outside their factory gates" for raw materials procurement and egression of finished products. "Inconsistencies in logistics result in higher inventories and that translates into inflated inventory carrying cost and working capital," said Narendran.

The industry has assurances from steel secretary Binoy Kumar that the government would promote multimodal transport in which the mighty rivers will be used to move goods in a cost-effective and environmentally friendly way. At the same time, the ministry wants steelmakers to install slurry pipelines between iron ore mines and mills to reduce pressure on the overworked rail and road systems. Taking a cue, Tata Steel has decided to own wagon rakes, build slurry pipelines and set up ports, which should help to bring down its logistics costs.

The dynamics of Middle East steel

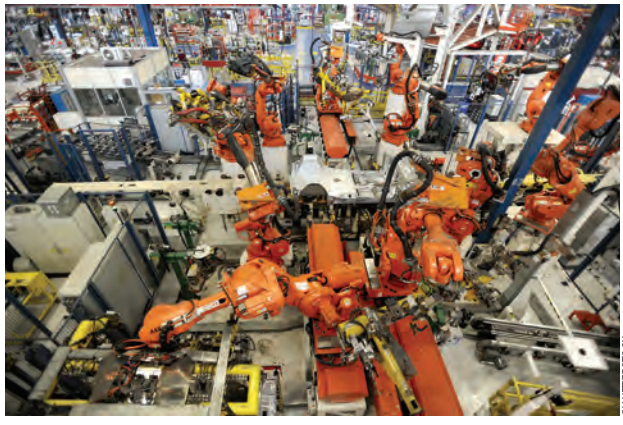
Local, national and international market trends and protectionism are buffeting the Middle East's steel producers. Serife Durmus and Cem Türken review their impacts

Demand for steel in the Middle East is expected to increase marginally over the next five years, mainly because of big construction projects, professionals from across the sector told Fastmarkets in a survey before the 22nd Middle East Iron & Steel Conference held in Dubai in December 2018.

Infrastructure construction is well under way in the United Arab Emirates for the Dubai Expo 2020, and in Qatar for the 2022 football World Cup, which is supporting steel demand in the region, survey respondents said then. They also saw the rebuilding of both Syria and Iraq after recent military conflicts as another major reason for higher steel demand in the Middle East.

In addition, they identified the biggest challenge for Middle East steelmakers over the next five years as being competition from increasing volumes of Chinese imports, while that nation's domestic demand drops.

In a more recent assessment, the World Steel Association expected Middle East steel consumption to decrease by 4.6% in 2019 to 47.9 million tonnes, according to its October 2019 short-range outlook. In 2020, steel consumption in the region will increase to 48 million tonnes, up by only 0.2%, according to Worldsteel's forecast.



SHUTTERSTOCK

Sentiment in the Turkish automotive market remained weak in the first nine months of 2019

GCC demand

Demand for steel was comparatively strong in the United Arab Emirates early in 2019, but it has been slow since the second quarter of the year because most big construction projects are completing.

UAE's state-owned long-steel producer Emirates Steel was expecting a slowdown in the Middle East construction sector that will persist throughout 2019 because of increases in iron ore prices, a drop in sales prices, market volatility, and protectionist actions by some nations, chief executive officer Saeed Al-Remeithi said in February 2019. He is proving to be right.

Steel prices in the UAE have decreased this year. Fastmarkets' weekly price assessment for steel reinforcing bar (rebar) domestic, exw UAE was AED 1,680-1,737 ($457-473) per tonne on October 22, having fallen from AED 1,888-1,899 per tonne on January 2.

The UAE government, together with other members of the Gulf Co-operation Council (GCC), including Bahrain, Kuwait, Oman, Qatar and Saudi Arabia, took some steps to support local steel production and reduce imports at the beginning of 2019.

GCC countries increased the import duty on rebar and wire rod to 10% from the previous 5% in effect from January 1, 2019. The increased duties will be in effect for one year, after which the GCC Council of Ministers will decide whether to reduce the duty or continue to impose 10%.

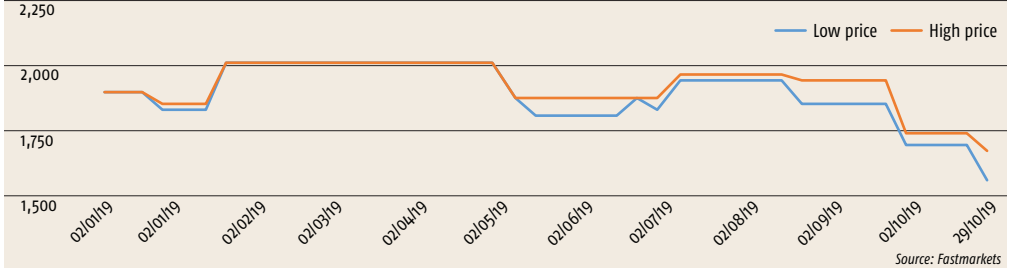
GCC countries used to import significant quantities of rebar and wire rod, mostly from Turkey, until 2017. Since then, however, the region has become almost self-sufficient for long-steel products.

The decision for the duty increase came after the United States announced Section 232 trade measures. The duty is 25% for most countries in the world with few exceptions.

"We [GCC countries] have had an indirect impact from countries who used to export to the US. In addition to China, Turkey has become a potential exporter to the region due to its geographical location and the currency depreciation [in Turkey]," Rayed Abdullah Al-Ajaji, chairman of the Saudi National Committee for the Steel Industry, said.

In addition to reducing imports, the Middle Eastern producers started to export big quantities of rebar, wire rod and billet – mainly to Asia in 2019. Qatar and Saudi

Steel reinforcing bar (rebar) domestic, exw UAE, dirhams/tonne



Source: Fastmarkets

Arabia are two of the biggest suppliers of rebar, wire rod and billet to Asia, which is a trend expected to continue in 2020.

Middle East steel production is largely focused on long steel products, given that demand in the region primarily stems from construction projects, and with construction demand having decreased from its peak a few years ago, the region is now self-sufficient in long products.

The region still has to import flat steel though, because there is only one producer of hot-rolled coil in the region at present – Saudi Arabia's Hadeed Sabic. Other producers are now looking at diversifying into flat steel products, particularly given the threat to margins from global protectionism and increased imports, with at least two companies rumoured to be planning such investments.

Duties in Egypt

Demand for steel in Egypt remained subdued in 2019, and is expected to remain the same next year. The Egyptian government took some steps to encourage local production and limit imports, but these did not help end-user demand improve significantly.

Egypt's prime minister announced a reduction in the cost for natural gas to $5.50 per BTU, down from $7.00 per BTU, for the steel sector early in October. The price will now be reviewed every six months in light of global prices and local economic and social conditions.

The Egyptian Ministry of Trade & Industry announced definitive duties on steel billet, rebar and wire rod on October 10, and they became effective on October 12, for a period of 3 years. The safeguard duty for steel billet was set at 16% of the cif price and a minimum of $74 per tonne for the period from October 12, 2019, until April 11, 2020.

This duty will fall to 13% and a $60-per-tonne minimum payment from April 12, 2020 until April 11, 2021; then to 10% and a $46-per-tonne minimum payment from April 12, 2021, until April 11, 2022.

For steel rebar and wire rod, the safeguard duty was set at 25% of the cif price and a minimum of $125 per tonne from October 12, 2019, to April 11, 2020; 21% and $105-per-tonne minimum payment from April 12, 2020, to April 11, 2021; and 17% and $85-per-tonne minimum payment from April 12, 2021, to April 11, 2022.

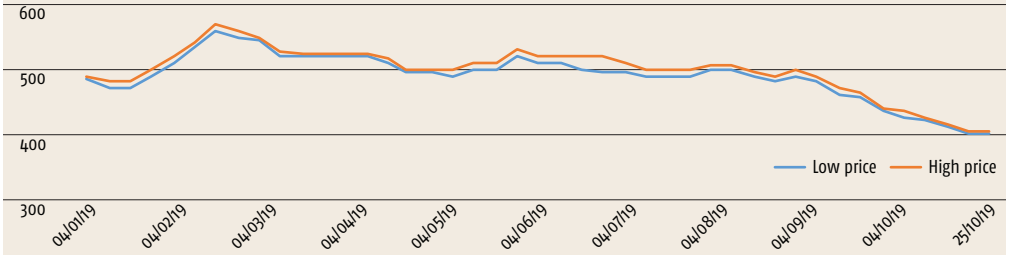
Until the definitive duties were announced, Egypt had temporary safeguard duty on rebar and billet since April 2019. The duty was 25% for rebar imports, and between 3% and 15% for billet imports.

Turkish hot-rolled coil imports (tonnes)

Country of origin	Jan–Jun 2016	Jan–Jun 2019	% change	Q1 2019	Q2 2019	% change
Romania	79,752	162,696	▲104	55,240	107,456	▲95
Netherlands	101,726	153,051	▲51	84,968	68,083	▼20
France	175,518	144,397	▼31	51,609	92,788	▲80
Italy	35,854	95,408	▲166	9,657	85,751	▲788
Germany	94,908	104,401	▲10	3,258	101,143	▲3000

Source: Turkish Statistical Institute (TUIK)

Steel hot-rolled coil export, fob main port Turkey, $/tonne



Source: Fastmarkets

Turkish flat products

The Turkish flat steel sector failed to improve in 2019 because of political problems, increasing protection in the country's export destinations, a weak Turkish Lira, and consequently weak end-user demand.

The country took some measures to avoid increasing imports, but these were not enough. Turkey increased the hot-rolled coil (HRC) import duty to 6% for re-rollers, up from 3.5% previously, effective from January 1, 2019. The country will impose the import duty on HRC imports from re-rollers as well as tube and pipe producers. Tube and pipe producers were previously exempt from the duty discount until January 1.

The import duty for Turkish HRC imports was 9% until January 1, 2018 and re-rollers paid 5%, while tube and pipe producers were subject to 9% duty. Effective from January 1, 2019, the duty is still 9% for HRC imports with re-rollers subject to 6%. Under the new regulations, tube and pipe producers are now subject to 6% import duty.

The duty for cold-rolled coil (CRC) imports is now 7%, including for hot-dipped galvanized coil (HDG), pre-painted galvanized coil (PPGI) and white goods producers, effective from January 1, 2019. It was 7% for HDG producers and 5% for PPGI producers previously, while white goods producers did not get a duty discount until 2019.

Turkey had previously imposed a 10% import duty on CRC imports. Flat steel imports from Europe, which are exempt from import duties in Turkey, increased in 2019 (*see table*), and Turkish producers complained about this.

Overall, exports of HRC by European steel producers to Turkey totaled about 600,000 tonnes in the first half of 2019, increasing by 96% in April-June compared with January-March, Turkish steel producers said. The average price of these imports was below Chinese prices for similar material, one Turkish source said.

In addition to increasing HRC sales to Turkey, Europe limited Turkey's HRC exports within its safeguard regulations. On September 30, 2019, the ▶

European Commission decided to set a limit of 30% of the overall total for any country exporting hot-rolled (HR) flat steel to Europe. In the specific case of HR flat steel, the EC originally chose to impose general quarterly quotas to preserve traditional trade volumes.

Given all these factors, Turkish flat steel prices failed to increase in 2019. Market participants do not expect any significant increase in prices and demand in 2020 because none of the factors described above have terminated.

Fastmarkets' weekly price assessment for steel hot-rolled coil export, fob main port Turkey, was $400-405 per tonne on October 18, down from $485-490 per tonne on January 9.

Görkem Bolaca, chief executive officer of global steel trading company Galex Steel, believed that prices for HRC would reach $380 per tonne within a couple of months. With decreasing demand for flat steel, imports to Turkey also decreased in 2019.

The country imported 2,063,111 tonnes of flat steel in January-June 2019 according to the Turkish Statistical Institute (TUIK), down by 11.28% compared with 2,325,460 tonnes imported in January-June 2018.

Flat steel exports from Turkey increased despite limited export destinations. The country exported 3,037,796 tonnes of flat steel in January-June 2019. This was 17.64% more than the 2,582,199 tonnes exported in the first six months of 2018, according to TUIK.

The sentiment in the Turkish automotive market remained weak in the first nine months of 2019, with production continuing to decrease. Turkey's vehicle output totaled 1,550,150 units in 2018, down by 8.59% from 1,695,731 vehicles the previous year, according to the Turkish Automotive Manufacturers Association (OSD). In the first nine months of 2019, Turkey produced

Turkish scrap and long product markets

The Turkish scrap and long product markets have been hit strongly by trade barriers and political developments this year, while the outlook for the country is still cloudy. Steel producers in Turkey had to cut or reduce output since the beginning of the year in response to limited demand in domestic and export markets.

In the January-August 2019 period, Turkey's finished steel output fell by 17.3% year on year to 22.2 million tonnes, while long steel production decreased by 24% year on year to 13.2 million tonnes, according to the Turkish Steel Producers' Association (TÇÜD).

Reflecting the limited demand in the local market, the country's finished steel consumption fell by 27.7% year on year to 16.7 million tonnes in the first eight months of the year. Its consumption of long steel products fell by 40.6% year on year to 7 million tonnes in the same period of 2019.

The country's crude steel output from electric arc furnaces (EAF) fell by 12.5% year on year to 15.2 million tonnes in January-August 2019. About 69% (25.8 million tonnes per year) of Turkey's 37.3 million tpy of steel production is based on EAF technology, while 31% (11.5 million tpy of steel production) is based on blast furnace technology, according to BIR statistics.

Within the same period, Turkey's billet production was only 13.8 million tonnes, which was 17.5% lower than the same period of 2018, according to TÇÜD data. The sharp decrease in the country's steel output in 2019 was mostly because of limited demand in the export and domestic markets. The demand for long steel products in the local markets was mostly driven by construction activities, which were mostly slow in 2019 because of political and economic instability. In the meantime, the demand in the export markets was also weak amid trade barriers in the key markets.

Political uncertainties

Turkey continued to suffer from political uncertainties this year, which resulted in a weaker economy. The United States doubled Section 232 tariffs applied to steel and aluminium imported from Turkey in August 2018. Turkey immediately appealed against the tariff increase to the World Trade Organization (WTO), which accepted Turkey's request in December 2018, but the US did not remove the additional tariffs on Turkish steel and aluminium until May 2019.

Turkey was subject to 50% duty on steel exports to the US until May 2019. Other countries, meanwhile, were subject to 25% duty on steel tariffs that were introduced after the US finished its Section 232 investigation into imports with a bearing on US national security. The US lowered its tariffs on steel imports from Turkey to 25%, down from the 50%, on May 17, 2019. The announcement had caused some optimism in the Turkish steel market but it was still insufficient for a recovery.

Ugur Dalbeler, chief executive officer of the Turkish steelmaker Çolakoglu Metalurji and a member of the board of directors of the Turkish Iron & Steel Producers' Association (TÇÜD), said that Turkish steel production and consumption decreased significantly in 2019.

The fall in output was largely due to negative sentiment that has been dominating Turkey's domestic steel market since August 2018, when the country's lira lost significant ground against the dollar after the US doubling of tariffs on US steel imports from Turkey.

Before Section 232 tariffs were initiated, Turkey used to have a 15% share of the US steel import market. The duty exemptions for Canada and Mexico announced in May will not allow Turkish steel to restore its place in the US market. Turkish steel will still be subject to a 25% duty, while Canada and Mexico will not pay any duty for their steel exports to the US.

Adnan Aslan, president of the Turkish Steel Exporters Association believes it is positive that the US removed the extra duties, but it is still insufficient for Turkey to catch up with its previous export tonnages.

"The US government took a quick decision against our country in August 2018 and closed the US market for the Turkish steel industry. In the meantime, the US domestic steel industry, taking the advantage of the trade barriers, could raise its capacity by 10%. The US domestic steel industry found a chance to increase its market share in an environment with no international competition," Aslan said.

"Besides, instead of the main players, who are excluded from duties, new countries, such as Qatar, Saudi Arabia and Algeria, started to export to the US," he

700,581 vehicles, down by 8.95% from 769,487 vehicles produced in the same period of 2018.

Investments and acquisitions

UAE-based United Iron & Steel Co (UISC) started producing its own cold-rolled coil at its plant in Abu Dhabi for processing into hot-dipped galvanized coil in March 2019.

The new 250,000 tonnes-per-year CRC facility consists of an in-line push-pull pickling line, a single-stand cold-rolling mill and a continuous galvanizing line to process both hot- and cold-rolled coil, equipment supplier Danieli said.

Dubai-based multinational Dana Group completed building new mills for the manufacture of cold-rolled coil (CRC) and hot-dipped galvanized coil (HDG) in the United Arab Emirates in February 2019. Bahraini rebar producer Unirol increased its rebar production capacity to 275,000 tonnes per year from 175,000 tpy with the launch of a new unit in March 2019.

The company uses direct-reduction iron (DRI) pellet as raw material, sourced locally, and is now offering material that is officially labelled 'Made in Bahrain', chairman and chief executive officer Maher Abu Ghazaleh said.

Turkey's military pension fund, OYAK, reached a provisional agreement to buy steelmaker British Steel, OYAK said in August 2019. However, the proposed takeover of the steelmaker by the Turkish army pension fund is looking uncertain with the UK government indicating it is willing to open talks with other interested parties, the official receiver said in October 2019. British Steel has capacity to produce 4.5 million tonnes per year of crude steel. It has facilities to roll long steel products in England, France and the Netherlands and has a product range including rails and wire rod.

added. "Due to these reasons, removal of the extra duties doesn't mean that Turkey will resume exporting to the US as it used to do. The US market is not how we left anymore. It will not be easy for us to reach to our previous market share," Aslan warned. "We look at the US government's decision positively, but we do not expect it to compensate our loss completely in the US market," he said.

The US had been an important market for Turkish rebar before the 50% duty was introduced. Turkey exported 664,216 tonnes of rebar to the US in 2017, according to the Turkish Statistical Institute (TÜİK).

Rebar exports from Turkey to the US fell to 305,794 tonnes in 2018 and reached just 38,327 tonnes in January-August 2019. Turkey exported 3.83 million tonnes of rebar in January-August 2019, compared with the 3.80 million tonnes that it exported in the same period of 2018, according to the TÜİK data.

Following Turkey's purchase of the S-400 missile defense system from Russia, US buyers became more anxious that the Trump administration could retaliate in the trade realm and apply punitive trade measures on Turkish steel exports to the US with little to no warning. Later in the year, the tension between US and Turkey increased once again with Turkey's decision to undertake a military operation in Northern Syria in October 2019.

The two countries were in the process of discussing an increase in their trade to $100 billion and a Turkish delegate was meeting US officials to discuss replacing Section 232 tariffs with import quotas. However, any hopes that the United States might relax its sanctions on Turkish steel exports were scuppered after Turkey launched an air and ground assault on Kurdish-held northern Syria.

On Wednesday October 9, Turkey launched 'Operation Peace Spring' east of the Euphrates River in northern Syria to secure its borders, after the US army retreated from the region. The head of the Turkish Parliament's Foreign Affairs Committee said that the plan was to "form a safe zone" and to "eliminate the terror groups" in the region.

US secretary of state Mike Pompeo denied that the US had ever given the operation the "green light". US President Donald Trump said on October 14 that he will impose a 50% tariff on imports of steel from Turkey in response to that country's military actions in northeastern Syria.

However, market participants believed such a move will have a minor impact on the Turkish steel sector, because Turkey's steel exports to the US are already limited because of weak demand. The US then held off on levying a 50% tariff on imports of Turkish steel after the two countries reached an agreement on October 17, with the US implying that it would refrain from imposing the steel tariff increase if Turkey halts its offensive.

"Once Operation Peace Spring is paused, the US agrees not to pursue further imposition of sanctions under the executive order of October 14, 2019," the White House said in issuing a joint statement with Turkey.

Steel prices in Turkey have constantly weakened so far this year amid limited demand. Turkish rebar export prices have seen their highest level in the mid-February at $490-510 per tonne fob and continuously fell to their lowest level of $395-400 per tonne early in October, according to Fastmarkets data.

The export price for billet out of Turkey has followed a similar trend and fell to its lowest level of $350-360 per tonne fob in October, down from its highest point of $470-480 per tonne in mid-February.

Outlook

With current trade barriers in the USA and EU, Turkey is already facing weakening demand and consequential production cuts. If steel imports into Turkey also continue to increase, the loss of the steel industry, which employs 300,000 people, will worsen and new investments may come to halt, said the Turkish Steel Producers Association.

Taking all of these developments into account, Turkey should immediately take protectionist measures to reduce the effects of the damage in the industry, TÇÜD said. A chief executive of a major steel mill in Turkey agreed. "I do not expect a recovery in the rest of the year. Turkish steel exports are on thin ice. Yemen, Israel and Singapore are the top steel importing countries now. Mills seek new markets and export some rebar to Djibouti and billet to Ethiopia. Algeria is importing some billet, but they will be launching a new steelworks soon. So, the future of the steel industry does not seem to be bright," he concluded.

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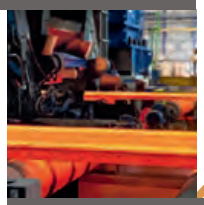

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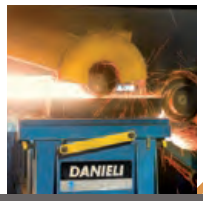

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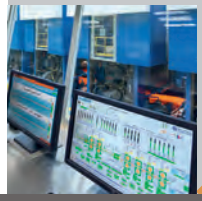

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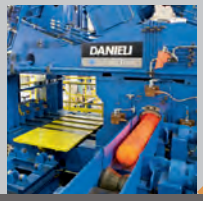

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China steel mill hopes

Chinese steel mills are hoping that domestic infrastructure projects will help to beat the 2019 bear market, although expectations for the balance of this year are not as rosy as the first half owing to the country's slowing growth rate, reports Miranda Song

"Some sectors have been growing fast enough to bolster demand for some steel producers in the first half of 2019, especially those which supply steel to the infrastructure and heavy machinery industries," an east China trader told Fastmarkets.

"Major producers that have long-term contracts in infrastructure projects received more orders in 2019 compared with 2018," he said. In fact, China issued 4.02 trillion yuan ($560 billion) worth of local-government special bonds as of September 22 this year, several domestic media outlets reported, together with reports of investment growth of 4.5% annually in infrastructure over the first nine months of the year.

China's infrastructure investment has rebounded since September 2018, according to Ye Yanwu, research director at brokerage Everbright Futures.

The government special bonds have mainly been issued to provide sufficient funds to boost infrastructure development, such as construction for the 2022 Winter Olympics, shantytown renovations and rural development. China's heavy machinery industry posted annual growth of 25.3% in equipment sales during January and February, according to the National Bureau of Statistics.

Tianjin Juncheng Pipeline Industry Group Co export director Li Zhiyuan said that his company posted annual revenue growth of 20% for the first half of 2019, after winning contracts for infrastructure projects to develop the household water network and fire control.

But while Li said that his company was still posting growth thanks to infrastructure projects – including export contracts, such as supplying pipes to a power station project in Bangladesh – he added that many other companies supplying steel to some of China's key industry sectors, such as real estate, shipbuilding and automotive production, had seen their revenues dip.

JUNCHENG

Galvanized pipes stacked at Tianjin Juncheng Pipeline Industry Co for use in a fire-control project in eastern China

Some businesses actually saw their revenues increase, but their profits decline. Nanjing Nangang Iron & Steel United Co, for example, saw its revenues increase by 11.8 billion yuan in the first quarter of the year – up by 13.95% compared with the same period in 2018 – but its profit for the same period dropped by 4.27% compared with the year before. The company said in March that a large proportion of its revenue comes from key infrastructure projects nationwide.

Falling Chinese steel prices have dismayed steel producers this year, especially as the key hot-rolled coil and rebar price indicators fell by as much as 15-17% year-on-year, with falling demand failing to meet output growth, leading to rising inventories. Higher raw materials prices also eroded profit margins.

Hot-rolled coil prices in eastern China were 3,500-3,510 yuan per tonne ($494-496) on Monday October 21, compared with 4,210-4,220 yuan per tonne a year ago, according to Fastmarkets price data. Rebar prices in the region were 3,580-3,610 yuan per tonne on the same day, down from 4,620-4,650 yuan per tonne a year ago.

However, these price changes do not mean that "every seller will suffer losses," the east China trader said.

Fastmarkets launched its China Insight column to look in greater depth at the country's steel markets and industry. This article and the next one are updated stories originally published in that on-line column.

Outlook for 2020

Steel producers will need to accelerate their searches for infrastructure projects if they aim to participate in this sector, a Shanghai-based trader told Fastmarkets. "Otherwise, they could experience harder days in the near term," he said.

This is because China issued most of the government special bonds planned for the year 2019 by late September, with the remaining three months of the year possibly posting limited further investment.

A source at a Shanghai-based bank told Fastmarkets that was because it normally takes around three months for funds to reach genuine projects, which made the government order that the funds should be issued three months ahead of year-end. It raises questions about the next few months, with uncertainty lingering whether enough further funds will be issued to support infrastructure projects in January-March 2020. That could cause uncertainty on infrastructure demand accordingly, he said.

In fact, China has already pledged to pre-issue part of the special bonds planned for next year during October-December, but the Shanghai bank source said that the exact amount was unknown.

Key infrastructure projects and heavy machinery orders mainly benefit those producers with advanced technologies or economies of scale, rather than smaller- or medium-sized companies – especially small trading companies that serve the spot market.

"China's steel industry is [becoming] increasingly concentrated, with larger companies accounting for a larger market share, while some small companies or start-ups have to find ways to upgrade to be competitive," the trader in east China concluded.


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Chinese hollow sections find global markets

Chinese hollow section products are set to take a bigger share of the global market, having increased their visibility over recent years, according to Paul Zhao, export director of Yuantai Derun Pipe Manufacturing Group, report Jessica Zong and Miranda Song

"China will export more hollow steel sections due to the increasing global demand from emerging markets, as well as the very competitive prices available from Chinese manufacturers," Paul Zhao, export director of Yuantai Derun Pipe Manufacturing Group, told Fastmarkets in a recent exclusive interview.

"The continued addition of real estate and infrastructure projects in countries participating in China's 'Belt and Road' initiative is also another factor that is bolstering demand for hollow steel sections," he added.

In Southeast Asia, the momentum of infrastructure growth is expected to be sustained over the next two or three years due to the region's large population, rapid economic growth and favorable investment environment, according to China International Contractors' Association chairman Fang Qiuchen, who spoke at an industry conference in May.

Yuantai Derun is looking to benefit from these factors, according to Zhao.

Growing global market

In addition to Southeast Asia, Yuantai Derun exports hollow steel sections to Central and South America, the Middle East, North Africa and the European Union.

"We won a contract to supply 4,000 tonnes of hollow steel sections for construction projects for the Expo 2020 Dubai in the United Arab Emirates," Zhao said. "Meanwhile we have delivered around 10,000 tonnes [of hollow sections] to Kuwait for the construction of its airport, beating rivals from South Korea and Europe," he added.

Based in northern China, the mill anticipates that its exports of the product will reach a total of 120,000 tonnes this year, up by 50% from 80,000 tonnes last year.

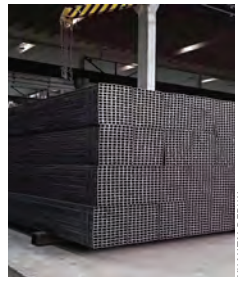
The company has been working to gain certifications such as European standards EN10210 and EN10219 over the past several years, which will allow the company to "export its products to European countries that require materials of certain grades," Zhao said.

Beating downturns

Although it is expected that the global economy will experience some form of a downturn due to various trade disputes – particularly those between the United States and China – producers of hollow steel sections can still find business opportunities by supplying materials to the prefabricated buildings sector, according to Zhao.

The global prefabricated buildings market will reach a total value of $243.3 billion by the end of 2019, followed by "a golden era" bolstered by robust downstream demand at least until 2024. By then, the market value would reach $448.1 billion, according to qianzhan.com, a Chinese industrial research agency.

"This means that hollow steel sections, which are key components of prefabricated buildings, have huge potential for market development," Zhao said. "China's regular hollow sections products are $100 per tonne cheaper than those from the Middle East, and $200 per tonne cheaper than those from European and Japanese producers, so Chinese producers have been depending on their competitive prices to win orders in the global market," he continued.



YUANTAI DERUN

Hollow sections at Yuantai Derun's warehouse in Tianjin, northern China

Chinese producers typically keep a sizeable stock of key substrate materials such as hot-rolled coil (HRC) and hot-rolled steel strip. This practice is designed to reduce their exposure to fluctuating costs in the face of volatile prices for these raw materials.

"Yuantai Derun's inventory usually consists of around 150,000 tonnes of HRC and hot-rolled steel strip. That is why our production costs haven't risen much even though prices for these substrates have been very volatile in the past few months," Zhao explained. China's lower labor costs in comparison with other countries, such as Japan, have also allowed producers in the country to keep their prices low, he said.

Yuantai Derun is capitalizing on these factors to raise its production rates. "We are planning to increase production by 10% per annum in the coming years. Our sales of hollow steel sections reached 3.5 million tonnes in 2018, based on a capacity for 5 million tonnes per year," Zhao said.

The company will also invest in new production lines that will produce materials for steel structural buildings, including more than 6 million yuan ($836,900) for facilities to produce corrosion-resistant hollow sections that can be used in coastal regions.

Meanwhile, Zhao said, the company is working on producing galvanized hollow steel sections, which, for buyers, are typically cheaper than stainless steel hollow sections by a third.

Rising demand for copper

Major drivers for copper demand include the constant increase in the speed and capacity of communications systems and the growing need for electricity distribution. Others include the battle to reduce greenhouse gas emissions and invest in clean technology, energy storage and improved efficiency, but can supply sustain demand, asks Seema Chaudhary

The long-term prospects for global copper demand seem promising on the basis of the metal's value as an electrical and thermal conductor, combined with its machinability and malleability. Moreover, a theme highlighted in new research commissioned by the International Copper Association (ICA), and presented during an ICA-IWCC (International Wrought Copper Council) Workshop in London in October, was the constant increase in speed and capacity of communications systems as a clear long-term driver for demand.

In addition, the growing efforts worldwide to reduce greenhouse gas emissions to alleviate climate change are adding pressure to invest in clean technology, energy storage and improved efficiency – all of which will need to utilize copper.

Demographic changes and population growth were also highlighted as strong drivers of demand at the workshop. "The global middle class is set to grow to 5.6 billion in 2030, a 4% increase per annum, creating significant new demand for the construction of homes and commercial buildings," according to research conducted for the ICA by Metra Martech, which highlighted the three most significant growth areas for copper as electric vehicles, renewable electricity generation and the construction sector.

SHUTTERSTOCK

Power production and the infrastructure for electricity distribution are important indicators for copper demand in China

Volatile prices

Despite the positive long-term outlook for demand for the red metal, copper prices have faced considerable headwinds during 2019. Supply disruptions have been rife this year, with strikes at Codelco, Chuquicamata, floods in Chile, curtailments at Chilean smelters, and some unplanned cuts in Africa and Europe. Analysts note that supply-side constraints in Peru, Chile and Zambia are still evident.

The journey for copper prices this year has been decidedly choppy. The LME copper cash price averaged $6,211 per tonne in the first quarter, according to Fastmarkets research data.

China's subdued economic growth was buoyed to a degree by the country's authorities boosting spending on infrastructure and making tax cuts, which kept copper demand relatively upbeat.

But the decline of 10% in year-on-year car sales seen in the first half of the year in China was a drag on demand for the red metal. The total weight of copper in a vehicle typically ranges from 15 kg for a small car to 28 kg for a luxury model, according to the UK Copper Development Association.

Boris Mikanikrezai, Fastmarkets copper analyst, said "the US-China trade dispute has played a key role in the negative performance of copper prices. Interestingly, the LME copper price peaked in December 2017, while the US-China trade dispute began officially in January 2018."

"This year started with strong infrastructure-led demand out of China and clear supply disappointment. Since then, ex-China demand has continued to weaken consistently, and without competition for units the price has slipped lower," Colin Hamilton, managing director, commodities research, BMO Capital Markets, said.

April this year saw a resolution of MMG's Las Bambas, Peru mine road blockade, where local protestors disrupted outbound concentrate. Protests left stakeholders concerned about global copper supply and the scarcity of a good project pipeline needed to support demand growth and counteract a supply shortfall.

Overall, markets saw the LME copper cash price, which averaged at $6,121 per tonne for the second quarter, move down in the third quarter to average at $5,800 per tonne. Fastmarkets research analysts forecast that it will finish the fourth quarter of 2019 at an average of $6,080 per tonne.

Inventory flow

For the third quarter, Sucden Financial's *Quarterly Metals Report* highlighted that LME inventories have been trending higher since the beginning of 2019, "up 116% year to date but 9.5% in Q3 to 264,000 tonnes," affirming weak end-user demand for copper. Copper faces considerable headwinds in Q4. This was due to the strong dollar, rising inventories, weak renminbi, falling macroeconomic indicators and risk aversion, Sucden noted.

Stimulus from central banks is expected to take time to filter into end-user demand. Also, as some investors see the dollar weakening in 2020 they may hold off buying until then.

Fastmarkets October 29 weekly *Base Metals Market Tracker* highlighted that from the perspective of inventory flow, the global refined copper market has begun to tighten since the second half of the year, driven by China, while the rest of the world is balanced overall.

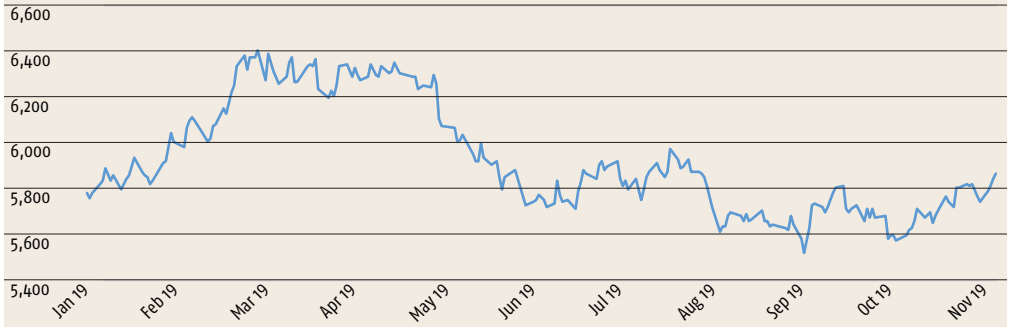
It reported "global copper visible inventories (LME, SHFE, Comex, Shanghai bonded zone) increased by around 145,000 tonnes, or 19% in the first half of 2019, thereby pointing to looser refined market conditions. But stocks have declined by roughly 110,000 tonnes since the start of the second half of the year, thereby suggesting a tightening of the fundamental picture."

Fastmarkets' Tracker forecasts a global refined market deficit of 279,000 tonnes this year.

"This year has been highly frustrating for copper. While the refined copper market has tightened this year, copper has been engulfed in a downtrend since mid-April, driven by negative speculative flows on fears over a more pronounced slowdown in the global manufacturing sector as a result of persistent trade frictions," Mikanikrezai stressed.

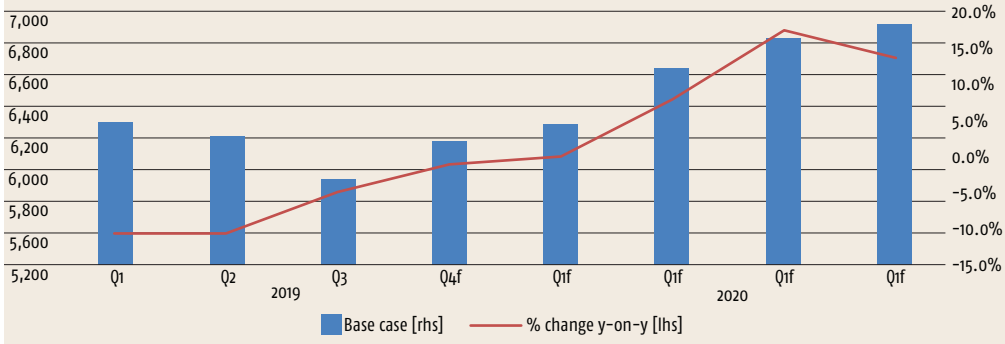
Looking forward, said Hamilton, "We see a further copper market deficit in 2020 to the order of about 290 kt. To get there, we need to see an end to destocking at ex-China consumers (with potential upside from fiscal stimulus) and Chinese property completions move back into positive territory in terms of growth rate. We see supply growing once more, but only at 1-2%."

LME copper cash daily official price ($ per tonne)



Source: LME, Fastmarkets

LME copper cash price forecasts to 2020 ($ per tonne)



Source: LME, Fastmarkets

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Meanwhile, Mikanikrezai said, "For 2020, we expect a larger deficit of 264,000 tonnes because: 1) refined output growth should continue to be constrained by tight raw material availability; and 2) refined consumption growth should be stimulated by the positive effect from the global policy easing trend this year." He explained that there is about a 6/9 month lag effect between policy easing and improvement in economic conditions usually.

Price forecasts for 2020

Most analysts agree that copper prices are set to rise over the next two quarters. Fastmarkets research data predict that it will continue up to average $6,900 per tonne by the fourth quarter of 2020. While some see a 2019 year-end copper price of around $6,000, others are more bullish than that, with a forecast Q4 average of $6,500 per tonne.

Although the copper price is underperforming, many analysts forecast that the red metal will gain traction in the coming months, now that the US and China are in trade talks once again.

Tristan Fletcher, chief executive of ChAI, which offers solutions to mitigate metal commodities price risk to manufacturers, believed that the recent protests at Chile's Codelco have ignited speculation in the price of copper.

"As our models indicate that such rallies are often driven by short covering, and as we are convinced the US/China trade war will continue for some time, we believe the rally should be sold into. We estimate the risk of rising inflationary pressures to be low on the price of copper as we think the Fed is looking for controlled growth," said Fletcher.

Fletcher remains mildly bearish about future copper prices in 2020. "Balancing the political risk of trade wars with macro factors such as inflation and aggregate demand across physical positions and traders, our outlook for the price of copper in 2020 is mildly bearish," he explained.

Key long-term drivers

BMO Capital Markets sees the trend for global copper demand growth at about 2.5% CAGR, helped by increased copper penetration via renewable energy and electric vehicles. It sees China's continued growth, but more or less at the global average. "India and ASEAN grow faster, the developed world slower," said Hamilton.

Krystyna Dawson, director BSRIA, at the ICA-IWCC Workshop, highlighted how opportunities for copper in data centers would burgeon in 2030 in North America, led by companies such as Apple, Google and Facebook. She highlighted that: "Large and hyperscale data centers are projected to account for 67% demand of copper in the building contained sector by 2030, increasing from 37% in 2018 with the rise of edge computing, alongside the growth of smartphones, smart cities and smart transport infrastructures. It is likely to increase demand further from 543,000 tonnes in 2020 to an estimated 725,000 tonnes in 2030."

China's Belt and Road Initiative will provide infrastructure to less wealthy countries, not fully accounted for in Western forecasts, while in the USA, the need to build infrastructure is amplified by President Trump's "Infrastructure Initiative".

In the near term, China is still a very important driver in today's market, according to Sucden's Quarterly Metals Report. Starkly, investment in China's power grid has declined by 15.2% (237 billion yuan) through to the end of August 2019, resulting in weak cable orders.

The Copper Alliance, noted Sucden's report, quotes power utility as 13.3% of the Chinese end-use market, consuming 3.86 million tonnes of copper. It estimates that electrical power within the building and construction sector consumed 6 million tonnes of copper, or 20.6% of the end-use market.

Fletcher highlighted that: "On the one hand, we believe that the continued electricity grid investment by the Chinese state combined with rising disposable household incomes – driving white goods purchases – will support demand, pushing copper prices up. On the other, we see a more cautious sentiment related to a negative macro outlook and a less-than-buoyant property market to cause pressures in the opposite direction."

'This year has been highly frustrating for copper. While the refined copper market has tightened this year, copper has been engulfed in a downtrend since mid-April'

Scrap dilemmas

New research on recycling by the Fraunhofer Institute, presented at the ICA-IWCC Workshop by Luis Tercero Espinoza, coordinator of business unit systems risks, showed geographical disparities between recycling in Europe where systems are supported by regulation, and the USA, where different state regulations and an abundance of landfill sites limits efforts for greater rates of recycling. In China, however where copper demand is very high, the government has introduced the "Green Fence", a halt on poorly sorted or dirty shipments of recyclable waste from foreign exporters.

Meanwhile, restrictions of some classes of scrap imposed by China led to a quota system and a ban on some types. Since China is the world's largest copper consumer, the new restrictions put a dent in the market.

Sucden noted continuing scrap processing in South East Asia, particularly in Malaysia, from where it is imported into China as higher quality scrap. It also noted that the domestic scrap market has been strong, while it is anticipated that China's scrap regulations will remain stringent.

Hamilton concluded that scrap could provide up to 3 million tonnes per year more copper units in 2025 than current levels. "However, while we have to model long-term recovery as inelastic, in short-term cycles copper scrap will be elastic to price. It will continue to provide an important global market buffer, particularly as SXEW [solvent extraction and electrowinning] copper production falls."

Laser welding for small copper tubes

The International Copper Association and Nexans have joined forces to develop a laser-based technology that could disrupt the conventional route for producing small-diameter copper tubes used in heat exchangers, writes Richard Barrett

Heat exchanger designs are rapidly evolving for applications requiring ever greater compactness and efficiency, and the use of new refrigerants places greater demand on the materials they are made of.

The high thermal conductivity needed for heat exchanger materials commonly calls for the use of two metals in particular – copper and aluminium. While the two base metals are sometimes used in combination – for example copper tubing joined to closely spaced aluminium fins – there is healthy competition between the two metals for applications in the multi-billion dollar market for heating, ventilation, air-conditioning and refrigeration (HVAC&R) units.

International Copper Association technology director Hal Stillman, based in the United States, noted that 1.6 million tonnes of copper are used in heat-exchange systems annually in industrial, commercial and residential air conditioning, heat pumps and refrigeration systems. He also said that 1 billion room-air-conditioning units have been installed globally, each of which uses two heat exchangers.

While he added that concerns about climate change will drive better designs of building envelopes to control their internal environment, the ICA estimates that as many as 3 billion room installations will be needed by 2050 as more people need the comfort and convenience of air-conditioning and refrigeration. According to the International Energy Agency's report *The Future of Cooling*, the global stock of air conditioners in buildings will grow to 5.6 billion by 2050, up from about 1.6 billion now.

There is a trend for tube diameters to become smaller

"The world is moving towards the decarbonization of home heating," Stillman added, "which means that heat pumps are also a growing market. As of now, room-air-conditioning system production alone sees a heat exchanger roll off global production lines every six seconds."

Regulatory demands to reduce or eliminate refrigerants that are particularly damaging to the Earth's ozone layer if released to the atmosphere – so-called greenhouse gases – have seen the introduction of other refrigerants, including propane and carbon dioxide. The flammability of the former needs careful management while the latter demands heat-exchange systems to operate at higher pressures. In addition, regulations now include the requirement for a minimum energy efficiency, which in turn requires improving the efficiency of the heat exchangers

Smaller tubes needed

All those factors, including the desire to make air-conditioning units more compact for city environments, have created a demand for smaller diameter copper tubes.

The ICA notes that there is already an established trend for copper tube diameters to become smaller – 9.5mm (3/8") outside diameter copper tube used to be the standard, before dropping to 7 mm to reduce costs and increase efficiency. Over the last 10 years, the ICA supported projects to reduce the tube diameter further to 5 mm, which is now becoming the new standard. Stillman noted that 4 mm diameter tubing is already in use in Japan and that 3 mm, or even 2 mm, diameter tubing is under development, having thinner wall, which could be used for high-pressure heat-exchange units.

Downsizing has reduced the amount of copper used in

heat-exchange tubing by about 40%. Projects are under way in Europe, the US, Japan and China to advance the use of such small-diameter tube further. For example, the US Department of Energy Office of Building Technology is supporting a program to reduce the volume of heat exchangers by 20-30%.

"Small-diameter copper tubes of 3 and 2mm take many steps to produce," said Stillman. The conventional route for making copper tubes consists of billet-piercing to create a mother tube through extrusion, drawing down through dies to achieve smaller diameters, and annealing. This process is not well suited to making thin-walled, small-diameter copper tubes that will be needed in the future. Stillman explained that although traditional copper tube manufacturing can produce small-diameter products (2-3mm outside diameter), it is not cost-effective given the number of process steps required to achieve small diameters.

Tube from strip

Inspired by the consistency with which flat-rolled copper strip is already produced for applications such as microelectronics, the ICA looked at the possibility of making small-diameter tube by longitudinally welding a folded strip. Coils of thin gauge, precision-rolled copper strip are regularly produced in volume.

Such material can be slit into the widths needed to produce longitudinally welded tubes. The ICA witnessed the production of welded metal tubing by international cable and cable systems manufacturer Nexans, and partnered with it to test the possibilities of producing small copper tubes for heat exchangers using Nexan's technology and experience. Stillman initiated the project in the first half of 2018 with Ralf Egerer, director, machines & automation, Nexans, who is based in Hannover, Germany.

Both men saw the similarities between the tubular products already made for medical applications by using Nexans NanoWEMA™ forming and welding machines for thin-walled, small-diameter stainless steel and alloy tubes and the current need for copper tubes of similar dimensions for heat exchangers.

NEXANS

Nexans NanoWEMA™ technology

Stillman highlighted an added advantage that surface features can be created to increase the internal surface area of the tubes produced for heat exchangers by embossing the strip before forming and welding it to form a tube. Internal surface textures are added to larger diameter copper tubes produced conventionally for heat exchangers, but that feature is more difficult to achieve for very small diameters via that production route.

Nexans' existing NanoWEMA technology produces tubes with an outside diameter range from 2-7 mm and a wall thickness of 0.05-0.17 mm, used for cannulas and injection needles. Nexans says that the longitudinal welding of strip with an infrared laser to create tube offers a significant saving compared with TIG or plasma welding machines producing tubes with a 4-6 mm outside diameter, wall thickness of 0.15-0.22 mm and a line speed of 5-10 meters per minute.

In addition to being a manufacturer itself, Nexans has its own technology division designing production equipment. That division already supplies welding machines such as its NanoWEMA range for other metals, which use near-infrared (NIR) lasers to weld, but that wavelength is unsuitable for copper because the absorption of the energy needed to achieve the weld is poor due to reflection from the metal surface. Research demonstrated that the absorption of blue (450 nm wavelength) or green (532 nm) laser light was much better with about 75% absorption for liquid for copper with blue laser and over 65% absorption with green laser.

Demonstrating potential

In a recent pilot demonstration, Nexans showed the capabilities of one of its existing NIR machines that was modified to run with a laser emitting blue or green laser light.

Egerer stressed the importance of delivering a stable process to form tubing. That is achieved by using a closing die for final forming and guiding the open seam consistently under the welding laser. He stressed that a simple system that needs no electronic tracking or guidance system achieves very consistent presentation of the strip edges to the laser for welding: "We have 100% the same conditions under the laser," he stressed. Consistent and careful preparation of the surface of the copper strip is needed to ensure a constant weld quality.

He noted that the laser-welded copper-tube project draws on Nexans' 25 years of experience of using lasers for forming and welding, and the experience of building its existing equipment for producing other metal tubing, which can deliver "100 km in one shot" on equipment capable of running 60-70 hours without stopping. These machines use NIR lasers in a range of 2kW to 12kW.

It is particularly important for medical applications that the interior of tubes are free from contamination – something of similar importance for the easy flow of refrigerant inside copper heat exchanger tubing.

Why now?

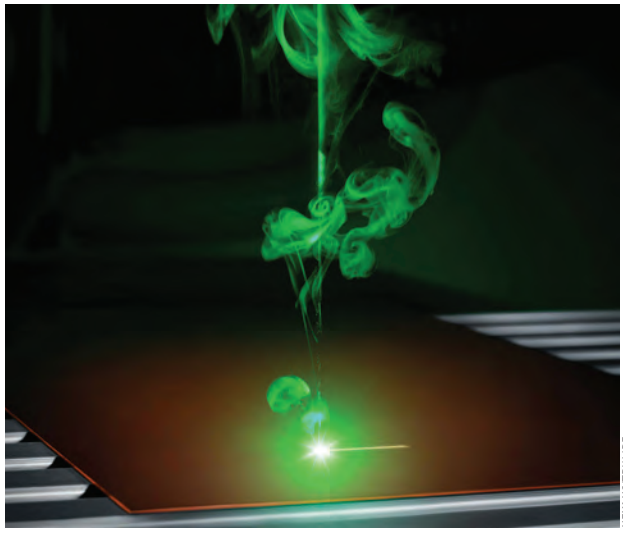
So what is new and what has changed in technology for the production of laser-welded, small-diameter heat-exchanger tube? "It is the continuous production of copper tube using laser sources with minimum

outlet power by using blue or green lasers," Egerer summarized. He quoted estimated line speeds of 20 to 40 meters per minute, before optimization, for industrial machines, and stressed the continuous nature of the process by contrast with batch welding components for applications such as batteries or motors. "Smaller and thinner tubes can be produced much faster than larger ones," said Egerer.

The new technology enables a stable process and energy-efficient welding of highly reflective materials like copper due to significantly increased absorption of blue or green laser radiation – 8 to 12 times higher than NIR lasers – in the material, even at room temperature, Egerer elaborated. "This was the main problem when welding these materials with NIR lasers: the cold absorption was very low, but the warm absorption was significantly higher, which led to uneven welding penetration." He added that the NIR welding processes were also much more sensitive to changes in the surface structure, for example due to tarnish, roughness or contamination.

Over recent years, lasers have become increasingly powerful. "Only now the lasers (blue and green) with the corresponding outlet power, process stability and continuous laser beam, including the light transmitting fiber and laser optics, are available," Egerer noted. Eight years ago, green lasers, for example, were only available commercially in the low-power 5-20 W range. Now they provide a 500 W to 1 kW range – as can blue lasers. Egerer believes that Nexans is the first to have used green and blue laser technology to produce copper tube.

"Due to the now available and upcoming higher laser powers, we now achieve the same or better results with copper tubes compared to stainless steel tubes welded with NIR lasers," Egerer noted. "Based on our prototype production for copper tubes in June 2019, we have not noticed any differences in process performance between the use of green or blue lasers for copper tube production," Egerer added.



NEXANS/TRUMPF

The increasing availability of more powerful lasers emitting green or blue light has helped to enable their use for small diameter copper tube production

NIR sensors continuously monitor and image the quality of the weld in Nexans equipment. Egerer explained that tailor-made materials run through the machine so the only adjustment that might be needed while the line is running is the laser power to compensate for any dust build-up. A sliding roller for the incoming strip can eventually wear out, but monitoring of its condition allows timely replacement.

For thin copper strip about 80 micrometers thick the continuity of material feed is achieved by simply taping the head end of a new coil to the tail end of the previous coil, with the joining tape detected downstream and cut out from the tube produced. Nexans supplies cross-welders to join thicker strip. Stillman noted that the technology works on a range of copper alloys, enabling the right strength of material to be selected to suit the pressures that the tubes will meet in service.

Lasers emitting green light can be used to weld stainless steel, aluminium or copper. "It's a multifunctional tool," said Egerer. He explained that the laser-welding machine can be reprogrammed and retooled within an hour to account for a change of strip thickness or strip material. He also stressed the "perfect roundness" of the tube produced, the cleanliness of the process, and the avoidance of the annealing step required for conventional tube production through extrusion and drawing. Other advantages he highlighted include space, energy and logistics, with the process requiring less warehousing and shorter delivery times. Nexans' estimated savings are in the range of 20-60%.

Since the equipment is modular, factories using it might start, for example, with a 150 W blue laser to produce large volumes of a single dimension, but with the flexibility to shift up to a 500 W laser a year or two later to expand product range if required. The equipment is laser Class 1 certified and has got the highest level of safety devices required for use. "You could run it in the office," Egerer declared.

Disruptive technology?

Stillman pointed out that while laser-welding technology for small-diameter copper tube for heat exchangers is at an early stage, the technology has the potential to disrupt the traditional supply chain. Third-party producers of copper tube usually supply factories making heat exchangers. He envisages that some heat exchanger manufacturers will choose to make their own small-diameter laser-welded copper tube by buying strip and producing small-diameter tubes in-house, cutting down on the shipment of empty space inside fully formed tubing purchased and transported from elsewhere.

Egerer predicts that green lasers in particular will serve well as a multifunctional tool for copper, aluminium and stainless steel running in a single welding machine.

Stillman also indicated that there are configurations for small-diameter welded copper tubes of 2mm or less that eliminate the need for external (aluminium) fins altogether, enabling the manufacture of "finless heat exchangers." With over 100-million room-air-conditioning units produced each year – half of which are made in China – with their two heat exchange units needed apiece, the future demand for copper to serve the market looks strong.

Arab aluminium smelters advance

It has been a busy year for the Middle East's primary aluminium smelters, as the events reviewed here illustrate

EGA

Arriving at Khalifa Port in the UAE for the first time earlier this year, the *Cape Taweelah* can carry loads of about 180,000 tonnes of bauxite to feed EGA's Al Taweelah alumina refinery

The fundamental advantages of Arab primary aluminium smelters are a constant – plentiful supplies of power, some of the world's most modern smelting technologies and a geographical location well placed to serve both eastern and western markets.

The smelter 'fact-files' on the following pages provide a snapshot of the current scope and scale of the region's primary smelter fleet. There has been some notable progress over the past 12 months.

Alba's expansion

Alba's Line 6 expansion project in Bahrain is one of the biggest brownfield developments in the Middle East. With a capex of about $3 billion, the project has seen construction of a sixth potline, using EGA's proprietary DX+ Ultra Technology, and a 1,792 MW power station known as power station 5.

Alba's potline 6 was commissioned on December 13, 2018 with the delivery of the first hot metal. Progress since then has been fast, with the successful starting of 212 pots, which is equivalent to half of the potline's total capacity. Alba is now looking to commission the remaining 212 pots and to move closer to full production in 2019.

Alba already has the capacity to produce over 1 million tonnes per year of primary aluminium. Extrusion billet took a higher share of the company's sales in 2018, up from 37% to 41%. Liquid metal's share, at 27%, was about the same as the previous year, but rolling slabs accounted for a much smaller proportion than the year before – down to 2% from an 8% share in 2017. Last year saw a jump in the share of sales for foundry alloys, at 17% by contrast with 12% in the previous year, while ingot sales were down by one percentage point at 13%.

As of September 30, 2019, the potline 6 smelter's overall progress exceeded 98%. Power station 5 and the power distribution system overall progress exceeded 97%, and over 99%, respectively. The expansion project will boost employment opportunities for Bahrainis at both Alba and in the local downstream market. It is also expected to present many co-investment opportunities through local and foreign aluminium investments in the country.

EGA's eventful year

Emirates Global Aluminium (EGA) has also had an eventful year. In May, it announced that it had started up a new AED 15 million spent pot lining pre-treatment and crusher facility. The crusher pre-treats spent pot lining, a by-product of aluminium smelting, for re-use by the UAE cement industry. It has the capacity to crush 60,000 tonnes of spent pot lining annually.

EGA has worked with UAE cement companies since 2010 to develop the potential of spent pot lining to replace some fuel and refractory materials required in cement manufacturing. Last year, EGA supplied over 41,000 tonnes of spent pot lining to UAE cement companies, reducing stockpiles from previous years. The new pre-treatment and crusher facility is located at EGA's Al Taweelah site.

In June, EGA and Abu Dhabi Ports welcomed the largest bulk cargo ship ever to call at Khalifa Port – located halfway between Abu Dhabi and Dubai – as EGA started to use Capesize vessels to import bauxite for the newly launched Al Taweelah alumina refinery. *Cape Taweelah* was reported to be the first fully laden Capesize vessel to call at any GCC port.

EGA imports bauxite ore from the Republic of Guinea to supply the Al Taweelah alumina refinery. Use of Capesize vessels reduces shipping costs per tonne. With a draft of 18.2 metres fully-laden, Capesize vessels are amongst the

largest bulk cargo ships in the world. They are up to 300 metres long and 50 metres wide, and they can carry about 180,000 tonnes of bauxite ore.

Abdulla Kalban, managing director and chief executive officer of EGA, said: "The arrival of *Cape Taweelah* is a landmark moment for EGA, but these huge ships will become a familiar sight at Khalifa Port over the years ahead. We are glad Abu Dhabi Ports addressed our need to bring Capesize vessels to our quay and decided to further develop the capabilities of Khalifa Port, also benefitting trade in Abu Dhabi and the UAE more broadly."

EGA's Al Taweelah alumina refinery is the first in the UAE and only the second in the Middle East. The plant converts bauxite ore into alumina and is expected to meet 40% of EGA's alumina needs once fully ramped-up. EGA invested some $3.3 billion to build Al Taweelah alumina refinery, which began production in April.

Cape Taweelah is operated by the shipping company K-Line and UAE local agent Sharaf Shipping, and is one of several Capesize vessels built to transport EGA's bauxite to the UAE.

Downstream from EGA's smelter, the company highlighted UAE aluminium's role in the European car industry at the GIFA trade show in Düsseldorf, Germany, at the end of June. EGA supplies metal directly to two European carmakers as well as to more than 15 of the most important parts makers in the European automotive industry's supply chain, the company noted. Europe accounts for about a quarter of the company's worldwide sales. About one-third of EGA's supplies to Europe are to the region's automotive sector.

Raid Mallala, EGA's senior director of marketing and sales in Europe and America, said: "EGA has supplied aluminium to Europe since the start of production at our Jebel Ali smelter in 1979, and today we meet more than 10% of Western Europe's primary aluminium needs... With our direct sales to car companies and parts makers in their supply chain, we believe that almost all major European car manufacturers are today using UAE-made aluminium in their vehicles."

EGA also noted that it is one of the largest suppliers of foundry alloys to the automotive industry worldwide and is certified to IATF 16949:2016, a global standard established by the automotive industry that aims to ensure even more rigorous quality management in the global automotive supply chain.

More besides

Meanwhile, in Qatar, Qatalum has seen significant upward capacity creep since last year. With a design capacity of 585,000 tpy of primary aluminium, its production level had already exceeded 600,000 tpy a year ago and it reports current production of over 625,000 tpy of primary aluminium.

Sohar Aluminium, in Oman, has a production capacity of 390,000 tpy of aluminium and it produced a cumulative total of 3 million tonnes of aluminium at the beginning of the year before last. It reached an agreement in May 2018 with a new downstream customer that allowed it to meet its goal of supplying 60% of its hot metal production to downstream customers.

The past year has also seen Alcoa step back from joint ownership of the flat-rolling mill at Ma'aden – part of its joint venture in Saudi Arabia. It announced in June that it had amended its joint venture with the Saudi Arabian Mining Company in which Alcoa holds a minority, 25.1% stake. The joint venture was created in 2009 as a fully integrated aluminum complex in Saudi Arabia, composed of three entities: the Ma'aden Bauxite and Alumina Company (MBAC, the bauxite mine and alumina refinery); the Ma'aden Aluminium Company (MAC, the aluminum smelter and cast house); and the Ma'aden Rolling Company (MRC, the can and auto sheet mill).

As a result of the amended joint venture agreements, which were signed on June 26, 2019, Alcoa transferred its 25.1% interest in MRC to Ma'aden. Alcoa and Ma'aden further defined MBAC and MAC shareholder rights, including the dividend policy.

'We believe that almost all major European car manufacturers are today using UAE-made aluminium in their vehicles'

The companies have maintained their commercial relationship, which includes Alcoa providing sales, logistics and customer technical services support for MRC products for the North American can sheet market. Alcoa retained its 25.1% interest in MBAC and MAC, and Ma'aden will continue to own a 74.9% interest.

"The Ma'aden joint venture aluminium complex has been an integral part of our portfolio, and we greatly value our relationship with our Saudi partners," said Alcoa president and chief executive officer Roy Harvey. "As we look ahead, divesting Alcoa's investment in MRC enables us to pursue future returns in our bauxite mining, alumina refining, and aluminium smelting businesses and gives Ma'aden more strategic flexibility to further develop the rolling business."

Outlook

While the scale, location and technological advantages of Arab aluminium smelters remain their strength, they are part of a wider international aluminium smelting industry that has seen headwinds in 2019 – not least a declining LME aluminium price trend-line throughout the year, which analysts do not see showing much of a rally unless there is a good resolution to the US-China trade war. High aluminium stocks in China also overhang the global market. Alcoa is undertaking a performance review that includes about half of its global smelting capacity.

During LME Week in late-October, the question of carbon emissions by the global primary aluminium industry rose to the top of the agenda, with some of the smelters blessed with hydroelectric power pointing a finger at burgeoning aluminium production in China using coal-based power plants. While the gas-based power plants of the Middle East emit much lower levels of carbon dioxide than the latter, it seems likely that Arab aluminium smelters will need to continue the conversation about lowering carbon emissions as climate change stays high in the minds of the public and the large consumer-goods manufacturers that supply them.

Key smelter data

Arab aluminium smelters continue to upgrade their operations and invest. The data for capacities, products and markets listed here demonstrate their regional and international importance in a globally competitive market for primary aluminium

ALUMINIUM BAHRAIN BSC (Alba)

Capacity/production
> Over 1 million tonnes per year of primary aluminium production

Location
> 150 Askar Road, Askar 951, Kingdom of Bahrain

Raw materials
> Purchased on long-term contracts from several international suppliers. Alba imports close to 2.5 million tpy of alumina from multiple suppliers worldwide

Owners
> Alba launched an Initial Public Offering (IPO) in November 2010
> Current shareholders: Bahrain Mumtalakat HoldingCompany (69.38%); Sabic Investment Company (20.62%); General Public (10%)

Staff
> About 3,192, of whom 83% are Bahraini nationals as of the end of 2018

Finance
> Alba shares have been listed on the Bahrain Bourse as well as the London Stock Exchange since December 2010

First metal
> First metal produced in 1971 with smelter capacity of 120,000 tpy. Alba's capacity has been increased in stages to reach over 1 million tpy now

Line 6 expansion
> Alba's Line 6 expansion project is due to make Alba the world's largest aluminium smelter. The project is one of the biggest brownfield developments in the Middle East. With a capex of about US$ 3 billion, the project involves the construction of a sixth pot line using EGA's proprietary DX+ Ultra Technology, a 1,792 MW power station (Power Station 5) utilizing the world's first H-class General Electric (GE) 9HA gas turbine (GT) and other industrial services.
> Alba Potline 6 was commissioned on 13 December 2018, ahead of schedule, with the delivery of the first hot metal. Project progress has been rapid since then with the successful starting of 212 pots, which is equivalent to 50% of Potline 6 total capacity. Alba is now looking at the commissioning of the remaining 212 pots and to move closer to full production this year.
> Bechtel is the EPCM contractor for the Line 6 expansion project smelter. For Power Station 5 (PS 5), a GE and GAMA consortium was awarded the EPC contract, while Siemens is the power distribution system contractor. J.P. Morgan, Gulf International Bank (GIB) and National Bank of Bahrain (NBB) are the financial advisors for the project.
> In June 2015 the Alba Board approved the Line 6 Expansion Project, and in November 2015 Alba secured the natural gas supply for this project.
> Alba successfully closed a US$1.5 billion syndicated term-loan facility comprising two tranches, Conventional Facility & and Islamic Facility, in October 2016. The first tranche of the Export Credit Agencies (ECA) financing of about US$700 million for Euler Hermes and SERV-covered facilities was closed in July 2017, while the first part of the second ECA-tranche of €204.5 million for Bpifrance Assurance Export ("BpiAE") and Euler Hermes-covered facilities was secured in April 2018. Alba successfully closed the final instalment of the second ECA-tranche – about US$136 million and about Euro 90 million from ECA supported-facilities – by end of 2018.
> As of 30 September 2019, the Line 6 smelter's overall progress exceeded 98%. Power Station 5 and power distribution system overall progress exceeded 97%, and by over 99%, respectively.
> The project will be transformational for the Kingdom of Bahrain as it will significantly boost employment opportunities for

ALBA

ALUMINIUM BAHRAIN BSC (Alba) (continued)

Bahrainis at both Alba and the local downstream market. It will also present many co-investment opportunities through local and foreign aluminium investments in the Kingdom of Bahrain.

E&S

> In line with the performance standards of the International Finance Corporation (IFC), Alba has launched its external grievance mechanism to receive and facilitate the resolution of the affected communities' concerns and grievances about Alba's Environment and Social (E&S) performance. External grievances about Alba's E&S performance can be logged via the Alba Integrity Line – an independently operated confidential reporting hotline in multiple languages – via a toll-free phone system or via the intranet 24 hours a day, every day.

Major equipment

> Six production potlines for producing liquid aluminium, which can produce over 1 million tpy
> Five power stations
> Three carbon plants; 2 casthouses; coke calciner plant

Products and markets

> Alba produces extrusion ingot as cut-to-length billet or log, foundry alloys, liquid metal, sheet ingot (slab) for rolling, and standard ingot
> Sales in 2018: extrusion billet (41%); liquid metal (27%); rolling slab (2%); foundry alloys (17%); ingot (13%)
> Bahrain has the biggest downstream sector amongst the GCC countries. Much of Alba's output is supplied to downstream industries in Bahrain, as liquid metal, billet and slab
> Sales in 2018: Bahrain (34%); Other MENA (17%); Asia (14%); Europe (20%); Americas (15%)

MA'ADEN-ALCOA JV, KSA

Locations

> Bauxite mine at Al Ba'itha, near Quiba, Saudi Arabia
> Alumina refinery, aluminium smelter and hot rolling mill at Ras Al Khair on the Gulf Coast of Saudi Arabia, 90 km north of Jubail. Ras Al Khair is the location for Ma'aden's 77 sq km minerals industry complex

Capacities

> 4 million tpy bauxite mine. It reached commercial production on 1 October 2016 and produced 3.7 million tonnes of ore in 2017
> 1.8 million tpy alumina refinery. It reached commercial production on 1 October 2016. 1.5 million tonnes were produced in 2017
> 740,000 tpy aluminium smelter. It reached commercial production on 1 September 2014. The smelter has been operating at full capacity, and it produced 765,000 tonnes in 2018
> 380,000 tpy rolling mill. First coil was produced in December 2013. A 100,000 tpy expansion including a cold mill, heat treating line and finishing line produced its first auto coil in Q4 2014. Construction of the rolling mill is complete and produced 153,000 tonnes of product in 2017. The mill complex also has a large UBC recycling facility

Ownership

> Ma'aden, the Saudi Arabian Mining Co (74.9%)
> Alcoa (25.1%). In June 2019, Alcoa Corporation divested its 25.1% interest in the rolling mill and retained its 25.1% interest in MBAC (the bauxite mine and alumina refinery) and MAC (the aluminum smelter and cast house).
> Total investment of $10.8 billion

ALCOA

Finance

> The joint venture partners signed $6.8 billion of the initial financing for the aluminum complex with several financial institutions, including $3.1 billion by Saudi Arabia's Public Investment Fund and $560 million by the Saudi Industrial Development Fund
> The remaining $4 billion was financed by the joint venture project partners on a pro rata basis

Major equipment

> Ingot and billet casting systems from Wagstaff and Alcoa. Hot and cold rolling mills from SMS group
> Coating line from Germany's BWG Bergwerkund Walzwerk-Maschinenbau
> Preheat furnaces from Ebner

Raw materials

> Bauxite feedstock for the alumina refinery is transported by rail from the mine at Al Ba'itha
> Alumina feedstock for the aluminium smelter is supplied by the adjacent alumina refinery at Ras Al Khair

Products and markets

> While packaging, including body-, end- and tab-stock for aluminium beverage cans, is the major end-use market sector, it also serves the foil stock, building and construction and automotive industries for the Middle East and beyond ▶

Aluminium
for the world

The Start of
a New ERA
in Industrial **Excellence.....**

From a blueprint, Alba's Line 6 Expansion Project is now a reality. With the **First Hot Metal poured on 13 December 2018**, Line 6 will boost Alba's per-annum production by **540,000 metric tonnes** making it one of the **largest** and most modern Aluminium smelters in the world at **1.5 million mtpa.**

A historical project, **Line 6** will pave the way for a brighter and sustainable future for the **Kingdom of Bahrain**

. . . one that we can all be proud of.

www.albasmelter.com

EMIRATES GLOBAL ALUMINIUM (EGA), UAE

Introduction

> Emirates Global Aluminium (EGA) has two primary aluminium smelters: one at Jebel Ali in Dubai and the other at Al Taweelah in Abu Dhabi. The UAE-based business has started production in both the Guinea Alumina Corporation (GAC), a strategic bauxite mine in Guinea, West Africa; and has developed the UAE's first alumina refinery in Al Taweelah, Abu Dhabi

Products and markets

> EGA supplies more than 350 customers in over 60 countries. The company's major markets in 2016 were: GCC (13%); Asia (33%); East and North Africa (3%); EU (27%); and the Americas (24%).

> EGA products by industry were:
Construction (38%)
Automotive and Transportation (34%)
Packaging (10%)
Aerospace, high-end electronics applications and capacitors (7%)
P1020 (general use) (11%)

Owners

> EGA is jointly held in equal ownership by Mubadala Investment Company and Investment Corporation of Dubai

Staff

> About 7,000, with more than 6,000 in the UAE with 36% Emiratisation in target roles

EGA

	Jebel Ali	Al Taweelah
Location & development		
Site area	4.8 sq km	6 sq km
Construction schedule	Built in multiple sequential phases	Built in two phases
First cell energized	October 1979	December 2009
Last cell energized	September 2015	June 2014
Reduction		
No. of cells	1,577	1,200
No. of potlines	7	3
Hot metal production capacity	Over 1,000,000 metric tpy	Over 1,440,000 metric tpy
Technologies	D18+; CD20; D20; DX; DX+ Ultra	DX; DX+
Casting		
Total casting capacity	1,316,000 tpy	1,896,000 tpy
Sow	100,000 tpy	350,000 tpy
Standard ingots	225,000 tpy	600,000 tpy
Properzi ingots	97,000 tpy	–
Horizontal direct casting	120,000 tpyy	–
Vertical direct casting	774,000 tpy	446,000 tpy
Sheet ingot	–	400,000 tpy
Liquid metal	–	100,000 tpy
Power generation		
Generation capacity	2,350 MW	3,100 MW
Gas turbines	23	9
Steam turbines	7	4
Seawater desalination		
Technology	Multi-stage evaporation	Reverse osmosis
Capacity	30 million gallons/day	3.75 million gallons/day
Carbon		
Greenmill capacity	72 tph	155 tph
Baked anodes	397,000/year	735,000/year

QATAR ALUMINIUM (QATALUM)

Capacity/production

> Design capacity of 585,000 tpy of primary aluminium

> Current production level is over 625,000 tpy of primary aluminium

Location

> Mesaieed Industrial City outside Doha

Raw materials

> Alumina imported from Brazil and Australia

Owners

> Joint venture between Norsk Hydro (50%) and QAMCO (50%), of which Qatar Petroleum owns 51% of shares

Staff

> 1,150

Finance

> Initial estimated capital investment in the Qatalum project: $5.7 billion

Schedule

> Commissioned in December 2009

> Full production capacity of 585,000 tpy of primary aluminium was reached in September 2011

> The smelter has the potential to double its production capacity to 1.2-1.5 million tpy, but no decision to expand has been made

HYDRO/QATAR ALUMINIUM

QATAR ALUMINIUM (QATALUM) (continued)

Major equipment
> Twin 1.2 kilometre-long potlines, a carbon plant, port and storage facilities, and a captive power plant
> The smelter uses Hydro's enhanced HAL300 technology, running at 320 kA, and the dedicated 1,350 MW power plant, built for Qatalum by General Electric and Doosan Heavy Industries & Construction, includes four gas turbines and two steam turbines operating in a combined cycle
> Qatalum's casthouse has a capacity of around 640,000 tpy to accommodate alloying and scrap recycling

Products and markets
> Main products are extrusion ingots and foundry alloys for a global customer base in the global transport, building and consumer goods industries. Metal is mainly being shipped to the Asian and North American markets. Qatalum may sell more metal into the domestic Qatar market in the long term

SOHAR ALUMINIUM, OMAN

Capacity/production
> Sohar Aluminium has a production capacity of 390,000 tonnes of aluminium through its 360 pots (AP39 technology) of which 60% is committed to adjacent downstream customers. The rest of the metal is sold in solid form as 700 kg sows and 24 kg ingots
> ISO 9001:2015 certified Quality Management Systems for Sohar Aluminium's Casthouse. ISO 14001: 2015 and OHSAS 18001:2007 certified for Sohar Aluminium's EHS Management System.
> The smelter has an anode plant, reduction potroom and casthouse. It has a dedicated 1,000 MW power plant and port facility for raw material imports and finished goods exports


SOHAR ALUMINIUM

Location
> Sohar, Oman

Owners
> Joint venture shareholders in Sohar Aluminium Company LLC are Oman Oil Company (40%), Abu Dhabi National Energy Company PJSC – TAQA (40%), and Rio Tinto (20%)

Staff
> 76% of the company's workforce of 974 direct employees are Omani nationals (by September 2019)
> The company also provides 1,500 indirect jobs

Finance
> Total project cost for phase 1: US$2.5 billion (2009)
> Annual budget of US$ 600 million, with a local spend of at least US$130 million

Schedule
> Sohar Aluminium was formed in September 2004
> Construction of the smelter and associated facilities commenced in January 2006
> The first pot started operating in June 2008 at 350 kA amperage
> Full Potline in operation on 19 February 2009
> Ramp up to 375 kA was achieved in December 2010
> A cumulative total of 3 million tonnes of aluminium was produced in January 2017
> An agreement was signed in May 2018 with a new downstream customer allowing SA to meet its goal of supplying 60% of its hot metal production to downstream customers

EGYPTIAN ALUMINIUM (Egyptalum)*

Capacity
> 320,000 tpy

Location
> Nag Hammady HQ. Smelter 100 km north of Luxor

Ownership
> Metallurgical Industries Co. (92.20%), Funds (5.20%), Private Investors (2.60%)

Schedule
> Initiated in 1972 with an inaugural capacity of 100,000 tpy
> First two potlines constructed in 1975 and expanded to five in 1983. New prebaked potline no. 6 started in October 1997. In 2010, completely changed to prebaked technology with 320,000 tpy capacity

Major equipment
> Operates 12 potrooms. Billet and slab casting. Two extrusion presses (1,900 and 2,500 ton). Hot and cold sheet and plate mills

Products and markets
> Billet, discs and circles, extrusions/profiles, ingot, plate, primary alloys, rolling slab, sheet, T-bar and wire rod

**Egyptalum updates from Fastmarkets Metal Producers of the World Directory 2020*

New plant orders and technologies

A list of recently placed international new plant orders – announced for new and upgraded plants, expansions, modernizations and revamps – provides examples aplenty of the application of the latest innovative technologies available from a range of leading suppliers

Customer	Supplier	Order Details	Start Up
China			
Baosteel Zhanjiang	Primetals Technologies	CCM 3 continuous slab caster for 2.8m tpy of high-quality, high-strength steel grades to feed new 1,780 mm hot-strip mill	Early 2021
Baosteel Zhanjiang	Primetals Technologies	Digitalization packages, automation technology and electrical equipment for its new 1,780 mm hot-strip mill to be built in Zhanjiang, Guangdong province	End-2022
Baosteel Zhanjiang	Fives	Complete thermal part (Stein Digiflex® furnace) for the continuous annealing line (CAL) with a production capacity of 630,000 tpy	End-2021
BaoWu Aluminium Technology	Primetals Technologies	Combined 300,000 tpy hot-rolling mill for heavy plate and strip	H2 2020
Baotou Steel	Danieli	Modernization of 600,000 tpy wire rod mill, including new, four-pass TMB high-speed finishing block to produce smooth wire (4.5-26 mm dia), and rebar wire (6-16 mm dia at a max. speed of 110 mps)	Q1 2020
Fujian Luoyuan Minguang Iron and Steel	SMS group	New 1.3 million tpy section mill for parallel flange beams up to 750 mm web height	H2 2020
Fuxin Special Steel	SMS group Amova	Coil transport logistics for hot- and cold-rolling mill complex	Mid-2021
HBIS Shijiazhuang Iron & Steel Company	Fives	Two Stein Digit@l Furnace® reheating furnaces (130 tph each)	–
Jiangsu Shagang	Primetals Technologies	Automated tapping systems at two BOF converters to reduce tapping time and minimize slag carry-over, improving subsequent phosphorous refining	Q3 2019
Luzhou Xinyang Iron & Steel	Danieli	Two new 100 t UHP Ultra-High Power furnaces with Danieli original ECS Endless Charging System for continuous scrap charging and preheating	Q3 2020
Ma'anshan Iron & Steel (Masteel)	Fives	Turnkey contract to revamp continuous galvanizing line (CGL No. 1) to produce new quality coated products. Thermal optimization solution (Virtuo®) for hot-dip continuous galvanizing line (CGL No.3) and a continuous annealing line (CAL)	2019-2020
Minyuan Iron & Steel	Danieli	New mill for 12-40 mm rebar, produced at up to 240 tph from a 165 mm, 2,300 kg billet	–
Ningbo Baoxin Stainless Steel	Fives	New 50,000 tpy cold-rolling mill DMS 20Hi EcoMill to roll strip down to 0.03 mm (30 microns) over the width of 1,040 mm	End-2020
Ningbo Powerway Alloy Material	SMS Amova	Automated logistics system	Early 2020
Shijiazhuang Iron & Steel	SMS group	Second continuous 3-strand bloom caster for blooms of 410 x 530 mm cross-section with lengths between 5.0 and 6.1 meters	–
Sichuan Guanghan Desheng Iron & Steel	Tenova	Tenova EAF Consteel® Evolution	–
Tangshan Zhengfeng Iron & Steel	Tenova	Three iRecovery® intelligent waste heat recovery systems after already commissioning Consteel Evolution®	–

Ternium chose Danieli to supply an inventory management system and fully automatic handling equipment that will feed 4.1 Mtpy of slabs to a greenfield hot-strip mill at Pesqueria, Mexico. The purpose is to optimize incoming slab flow by applying artificial intelligence for the slab yard management system (SYMS), in direct connection and communication with the downstream process of the hot-strip mill.

A complete handling system – including 10 EOT cranes, seven transfer cars and two destackers – will receive slabs from the mill and to distribute and transfer these products through the intermediate and final storage areas. The SYMS calculates the task for all operating equipment according to the forecast production mix submitted by the plant MES; optimizing the movements and the relocation of each slab; and thus in real-time tuning the mission to the actual needs determined by the product mix and equipment status.

Customer	Supplier	Order details	Start-up
Walsin Yantai Stainless Steel	Primetals Technologies	New stainless steel combination mill to convert billets from existing plant into finished products	Late 2020
Yantai Walsin Stainless Steel	Fives	85 tph walking beam reheat furnace for long products	–
Zenith Steel Group	Primetals Technologies	Modernization of a 10-strand billet caster in converter steelmaking plant No.3 in Changzhou. First one worldwide to be equipped with Primetal's new SRD (Single-Roll DynaGap) segments	March 2020
Denmark			
NLMK DanSteel	SMS group	New 100 tph walking beam furnace for existing plate mill to reheat slabs in weight range from 3.1 up to 62 t for use in structural, shipbuilding, boiler and pressure vessel applications	Q1 2021
Germany			
Salzgitter	SMS group	New 500,000 tpy HDG line (FV3 AHSS) for 0.7-2.5 mm thick and 800-1,700 mm sheet in 32 ton (max) coils	2022
Salzgitter Flachstahl	SMS group	Revamp of CC No. 1 with a new machine head with mold, oscillator and segment 0	October 2020
Thyssenkrupp Rasselstein	Andritz	New chromium plating line	Q1 2022
India			
Hindalco Industries	Andritz	New 100,000 tpy tension leveling line and new 150,000 tpy degreasing line	Spring 2021
SAIL Durgapur	SMS group	Turnkey contract for the supply of three new 110-ton converters for steelmaking plant No. 2	September 2020
Tata Steel	SMS group	Upgrade of CSP® continuous caster with an electromagnetic brake for both strands	End-2019/End-2020
Italy			
Metra	Danieli Breda	Revamp of 55 MN short-stroke press to operate with greater force at 75 MN, processing billets up to 2,100 mm long	–
Padani Tubi	SMS group	New 16 ¾-inch ERW tube welding line to increase the product portfolio for round tubes up to 406 mm (16 inch) diameter, as well as for square sections up to 350 x 350 mm and rectangular sections up to 500 x 200 mm	–
Japan			
Tokyo Steel	Danieli	Q-ASC automatic scrap classification system	–
Mexico			
Ternium Pesqueria	Danieli	Inventory management system and fully automatic handling equipment that will feed 4.1 Mtpy of slabs to a greenfield hot-strip mill	–

The first of four converters has been commissioned by SMS group for Hoa Phat Group in Vietnam. More converters will be commissioned before the end of 2019.

In total, the new converter shop will produce four million tons of liquid steel per year.

The SMS group will supply four converters, each of them with a capacity of 120 tons, including converter tilt drives and the maintenance-free lamella suspension developed by the plantmaker, as well as oxygen lance systems, sublances and relining facilities. All converters will be equipped with SMS group's dry ESP primary dust collecting system.

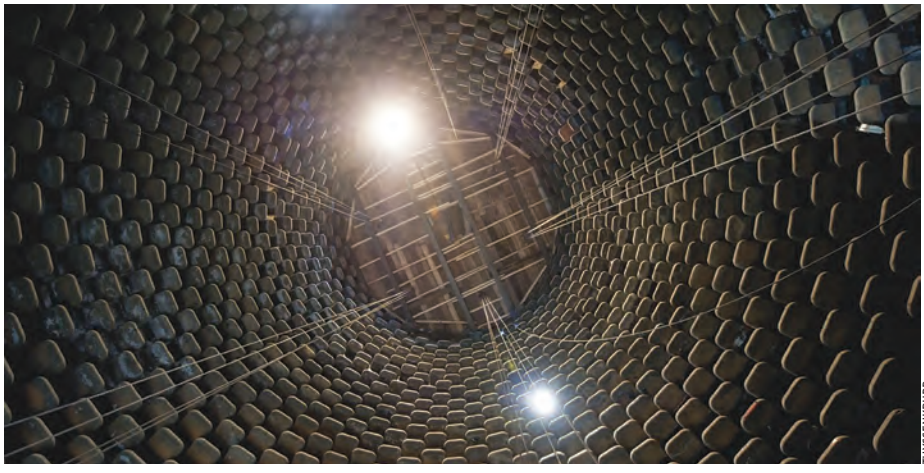
Customer	Supplier	Order details	Start-up
Russia			
AEMZ Abinsk Electrik Steel Works	Danieli	New finishing area (for the existing mill 350) to enhance bundling of rebars from 1 up to 5 ton bundles to maximize the mill output	Q3 2020
MMK	Danieli	Automatic Robots zinc dross skimming system for the dross removal on the ANGTS-1 and ANGTS-2 zinc pots	Q1 2020
MMK	Danieli	New coil inspection and sampling station for HSM 2500	Q2 2021
MMK	Danieli	Q-Melt: Modernization by new Intelligent System for existing EAF 180 T	Q3 2020
NLMK	Danieli	Modernization of existing WR Mill at NLMK Ural by increased flexibility and efficiency in starting billet size through the installation of additional roughing stands. New square billet 150 mm x 12,000 mm length to produce coils up to 2.1 tons	Q3 2020
NLMK	SMS group	Two gas recovery systems from Lipetsk's converters to reduce CO_2 emissions	2022
OMK	Danieli	New EAF meltshop 180 T for the production of 1.8 Mtpy steel for pipes, wheels and spring grades and new CCM for billets from 170 to 455 mm diameter for 800 ktpy for seamless steel tubes production, wheels and special bars for OMK Vyksa Steel Works	
OMK	Danieli	OMK: new section mill for 200 ktpy production of spring grade flats, and small sections for OMK Chusuvoy Plant	Q1 2022
Severstal	Danieli	New in-line inspection section to be installed on existing Cold Rolling Mill 1700 Plant in Cherepovets facility	Q3 2020
Severstal	Danieli Corus	3 Sub Lance Systems for BOF Shop of Cherepovets Plant	
Severstal	Danieli	Upgrade of existing 2800 plate mill at Cherepovets facility for plates surface quality and production enhancement, consisting of a new hot dividing shear, two new cooling beds, disc type, upgrade of plate tilter for plates inspection, two chain transfers and new piling facilities	Q1 2021
Severstal	Danieli	Revamping of existing VD 300 Ton equipment, by installation of new vaccum pump	Q1 2021
Severstal	Fives	Two new 440 tph (each) Stein Digit@l Furnace® walking beam slab reheating furnaces as part of major reconstruction of No.2 rolling plant at Cherepovets	–
Slovakia			
U.S. Steel Košice	Tenova	Annealing and coating line for dynamo steel strip (Dynamo Line No. 4 for NGO electrical steel)	–
South Korea			
Daehan Steel	SMS group	New (70 tph) equipment to bundle rebars in small and main packages. The rebars have a diameter range from 10-32 mm to be bundled to packages of commercial lengths from 6-12 meters and weight of 1.5-2.5 tons	Mid-2020
Hyundai Steel	SMS group	Revamp of heavy section mill to expand product range towards larger sections with webs of up to 1,100 mm and sheet piles up to a system height of 800 mm	October 2020

Primetals Technologies is installing automated tapping systems at two BOF converters of Jiangsu Shagang in China, in the first commercial implementation of Primetals Technologies' automated tapping system in a steelworks. The work is at the steelmaker's converter steelworks in Zhangjiagang in Jiangsu province. The package will reduce tapping time and minimize slag carry-over, improving subsequent phosphorous refining. Automated tapping sequences will optimize tapping performance and make it independent from the operator's experience. In addition, working safety will be largely improved, Primetals Technologies noted.

Customer	Supplier	Order details	Start-up
Spain			
Celsa	SMS group	Modernization of 6-strand billet caster for Global Wire to add 200-240 mm square sections to range	Early 2021
Exlabesa	SMS group	Hertwich PR130 multi-chamber aluminium melting furnace to increase capacity of Padrón casthouse to 60,000 tpy	Mid-2020
Taiwan			
First Copper Technology	Andritz	Modernization of 20-high rolling mill	Q2 2021
Turkey			
Çolakoglu Metalurji	Primetals Technologies	Conversion of vacuum degassing (VD) plant into a 295 tonne vacuum oxygen decarburization (VOD) plant	March 2020
Ukraine			
Centravis	Danieli Breda	Revamp of runout system for its extrusion line producing extruded specialty steel pipe	2020
USA			
Evraz North America	Danieli	New 670,000 stpy premium rail rolling mill for production of up to 88 kg/m rails for heavy-haul, high-speed and other railway applications	–
Gerdau AmeriSteel	SMS group	Rolling mill stands to upgrade the heavy section mill in Petersburg, Virginia (two CCS®) stands, and the medium section mill in Cartersville, Georgia (3 CS stands)	By end-2020
North Star BlueScope Steel	SMS group	New single-strand thin-slab CC for thickness range of 95-110 mm and a width range of 900-1,595 mm. It will allow an increase in thin-slab production from 2.2 million metric tons (2.4 million short tons) to over 3.3 million metric tons (3.6 million short tons) per year	2021
North Star BlueScope Steel	Andritz	Tunnel furnace with two shuttle furnaces to convey the slabs from both casters to the two-stand roughing mill at the Delta, Ohio plant	Q4 2020 for shuttles End 2021 for tunnel
Nucor	Danieli	Equipment for new greenfield 1.2 million net tpy plate steel mill complex in Brandenburg, Kentucky. Danieli will supply the new EAF melt shop and plate-/Steckel-mill, plus an electrical and automation package	First plate due 2022
Nucor Marion	Danieli	QTB quenching and self-tempering system for a new 18-stand rolling mill. QTB system designed for rolling speeds up to 13 m/s for single and multi-strand rebar, controlled by dedicated stand-alone system from Danieli Automation	Q4 2019
Nucor Steel Gallatin	Danieli	Complete fume treatment plant for new 170 t EAF, twin ladle furnace, and other auxiliary suction lines, to treat about 3.6 million cu-meters/h	–
Steel Dynamics	Andritz	Process equipment for existing CGL No.1 furnace at Columbus, Mississippi, including new direct-fired furnace (DFF), new differential rapid jet cooling (DRJC), and after pot coolers (APC)	Q4 2020
Uzbekistan			
JSC Uzbek Metallurgical Plant	Danieli	New plant for production of 1 Mtpy HRCs. Meltshop with 120 t EAF, one twin-LF, and a twin-tank, twin-cover VD-OB. The QSP® compact line will produce final strip thickness of 1.4-12 mm, in widths of 800-1,300 mm, in 30 t coils	2020
Vietnam			
Tung Ho Steel	Danieli	Upgrade of 600,000 tpy flexible rolling mill by adding an in-line water quenching system for 10 to 43 mm straight rebars	Q4 2019

The quest for low carbon emissions

Faced with high and increasing emissions costs during a period of challenging market conditions, the European steel industry is driving a change toward carbon-neutral and fossil-fuel-free steel production, reports Carrie Bone.



THYSSENKRUPP

ThyssenKrupp will test hydrogen as a reductant in its BF No. 9 in Duisburg (archive image shows interior of a BF in preparation for relining)

Many European steel producers have reported significant falls in profits in recent results due to weaker demand for steel during an economic downturn, the disruption of traditional trade flows due to the ongoing trade war between the United States and China and the EU's subsequent safeguard measures. Additionally, carbon emission costs are running into the millions of euros, leaving companies to look for alternative feedstocks to reduce their carbon costs.

The CDP, formerly the Carbon Disclosure Project – a non-governmental organization that supports companies and cities to disclose the environmental impact of major corporations – ranked Swedish steelmaker SSAB at the top for switching to fossil-fuel-free steel production. Europe's largest steel producer, ArcelorMittal, also achieved a high ranking position for its various carbon-reduction initiatives.

Several steel companies have goals to become carbon neutral or achieve 'fossil-fuel free' steel production, with SSAB aiming for 2045 and ArcelorMittal targeting 2050 while Liberty Steel Group aims to be the world's first carbon neutral steel company by 2030.

The EU's Emissions Trading Scheme (ETS) permits the purchasing of "allowances" or "permits" for emission levels. These are usually auctioned or allocated to European industrial operators by national governments in the EU in February of each year. Each permit allows a company to emit 1 tonne of carbon dioxide.

The permitted level of industrial emissions is reduced each year, with the number of free allowances brought down accordingly. The EU is in the process of approving the fourth phase of the ETS, which will run from 2021 to 2030.

In June of this year, domestic EU steelmakers claimed that CO_2 emissions costs are now five times higher than at the beginning of 2018, in response to the EU's decision on eco-duties on imported material, and following a planned revision to the ETS after 2020.

"Assuming a plant emits 1.8 tonnes of CO_2 per tonne of steel produced and the CO_2 price is €25 ($27.55), the additional margin cost of every tonne of steel for which companies have to buy CO_2 allowances is €45. This is a cost constraint that non-EU producers do not face," Eurofer president Geert Van Poelvoorde said at European Steel Day in June.

The ETS aims to help the EU achieve a significant part of its commitment under the Paris Agreement to reduce greenhouse gas emissions by at least 40% by 2030. Several steel companies, including flat-rolled steel producer Arvedi, have attributed falling profits to the scheme.

Czech steelmaker Třinecké železárny expects a "significant cost increase" from the scheme and will "adjust [its] product portfolio and investment direction to minimize these negative effects."

The scheme has also been linked to job losses, with U.S. Steel cutting 2,500 jobs at its flat-rolled steel mill in Kosice, Slovakia, in addition to imports and high electricity costs. The company has also idled one of its blast furnaces in Europe. "The financial burden that the EU ETS has put on European business is simply not an equitable solution because businesses outside the EU do not have to carry this cost burden," U.S. Steel Kosice president James E. Bruno said when announcing the cuts.

British Steel, with four blast furnaces on its Scunthorpe site, requested a government loan of £120 million to cover its annual carbon emissions bill to the EU, weeks before it fell into administration. Allowances issued by the UK were suspended from the ETS on January 1 this year, meaning that UK steelmakers did not receive their free allowances for 2019, which British Steel had not budgeted for.

Scale of carbon dioxide emissions

ArcelorMittal estimates that, globally, the [steel] industry emits more than three gigatons per year of CO_2

Steel can be made either via an electric arc furnace (EAF), which uses steel scrap and/or direct reduced iron (DRI) as raw materials for steel production, or via blast furnace-basic oxygen furnaces (BF-BOF), which use iron ore and coking coal as the basic raw materials.

Worldsteel claims that 630 million tonnes per year of steel scrap is recycled, saving 950 million tonnes of CO_2 that would have otherwise been emitted from the production of steel from virgin raw materials.

Although specific details vary from one company to another, in 2017 Worldsteel stated that 1.83 tonnes of CO_2 was produced for every tonne of steel produced. Current ▶

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steelmaking comprises 72% BF-BOF production and 27% EAF production.

Estimates from Fastmarkets MB's research team show that EAF use in Europe has increased in recent years, while BOF output has moved down. European crude steel output via BOF was 58% in 2018, down from 61% in 2015, while EAF steel production increased from 39% to 42% over the same period.

Regardless of the steelmaking method, companies also remain exposed to volatile raw material costs. Iron ore prices have rocketed over 2019, with Fastmarkets' iron ore 65% Fe blast furnace pellet index, cfr Qingdao reaching a year-to-date high of $147.08 per tonne cfr Qingdao on July 5, up from $121.38 per tonne on January 4.

The scrap markets have also been unpredictable this year, with the international scrap market plummeting from a year-to-date high of $324.72 per tonne on February 8 to a three-year low of $218.98 per tonne on October 1, which dragged the long steel markets down – affecting ArcelorMittal's and other companies' products.

Innovative projects

SSAB is working with Swedish iron-ore pellet producer LKAB and power company Vattenfall on a project named HYBRIT for fossil-fuel-free steel production. The steelmaker plans to close its BOFs and use EAFs instead, replacing coking coal with hydrogen and therefore reducing carbon emissions.

They plan to build a demonstration plant by 2025, three years ahead of plan to produce iron-ore-based, fossil-fuel-free steel for commercial use, with an aim to sell fossil-fuel-free steel on a broad scale by 2035.

"Our aim is to eliminate carbon dioxide emissions entirely. Replacing coal and coke with hydrogen and fossil-fuel free electricity so all we will emit is ordinary water," Martin Pei, head of technical development at SSAB and chairman of HYBRIT, said in a press release. This comes with its own challenges, however, as it is estimated that the transition to HYBRIT requires the equivalent of about 10% of Sweden's current electricity consumption.

Access to renewable power is also key for the industry to achieve its goals. According to the CDP, seven of the 20 largest-ranked steel companies have set up Power Purchase Agreements (PPAs) to utilize renewable energy in steelmaking operations. This includes ArcelorMittal – ranked first with a number of renewable assets, including 75MWe solar capacity – for multiple PPAs to acquire solar and wind power and for actively exploring the potential for further PPAs to supply its steel plants.

ArcelorMittal is also investigating the industrial use of pure hydrogen as an alternative feedstock to reduce CO_2 emissions. It intends to launch a new project at the ArcelorMittal plant in Hamburg to use 100% hydrogen as the reductant in direct reduced iron (DRI) production. A pilot plant will be built, requiring a $65 million investment. ArcelorMittal hopes to produce about 100,000 tonnes per year of DRI – initially with so called 'grey' hydrogen, which is non-renewable hydrogen sourced from natural gas.

The conversion to 'green' hydrogen – from renewable energy sources such as wind power from offshore wind turbines located off the coast of Northern Germany – will be possible once there is sufficient supply at an economical cost.

Liberty Steel Group launched its GREENSTEEL scheme in the UK to focus on using scrap as feedstock in EAFs, instead of BOFs, as well as further investment for EAFs in order to transition their existing blast furnaces. This is in addition to investing in low-cost long-term renewable power, which is as close to the steel plants as possible.

Speaking at World Steel Dynamics' European Conference in Milan, Italy, Sanjeev Gupta, Executive Chairman of GFG Alliance, said - "We recognise that becoming carbon neutral by 2030 is a very ambitious target but we have firm foundations already with our GREENSTEEL strategy in motion, and with technical viability of hydrogen usage for direct reduced iron now proven it gives us the confidence that such developments allow us to aim even higher with our goals."

Primetals Technologies will set up a pilot plant with Voelstalpine Stahl in Austria that will process iron ore concentrates from ore beneficiation using hydrogen gas as a reduction agent, without the need for sintering or pelletizing. The pilot plant for testing will be commissioned in the second quarter of 2020 and have a minimum capacity of 250,000 tpy. Primetals expects the use of DRI and hot briquetted iron (HBI) to increase because of the switch to EAF production globally and the need to reduce greenhouse gas emissions.

Rogesa – a joint subsidiary of German steelmakers Dillinger and Saarstahl – is sticking with BFs but still hopes to cut carbon emissions. Rogesa produces pig iron for its two owners, has two blast furnaces and will invest €14 million to make use of hydrogen-rich coke gas in its BFs to reduce its reliance on coking coal. "This measure leads to hydrogen replacing carbon [i.e. coke] as a reducing agent, thus achieving a significant reduction in carbon emissions," the company said.

Major investment

The industry has called on respective governments for support through the investment-heavy process of moving to low-carbon steelmaking, which remains untested on a large scale and is yet to be proven to be economical.

The total expected cost of European steel carbon-neutral innovation projects is expected to be €10-15 billion over the next 10-15 years, according to Eurofer. Addressing this transition, Herbert Eibensteiner, chief executive officer of Austrian steelmaker Voestalpine, has called for "a clear framework" to manage the tension between investment in low-carbon technologies and the costs of the ETS.

Energy costs must be considered in the transition to low-carbon steel production, Eurofer director-general Axel Eggert said at European Steel Day. "In theory, it's possible to substitute coking coal in the steelmaking process with hydrogen, but this will need a huge amount of additional electricity in the market. This will drive up electricity prices in Europe, which are already higher than the rest of the world," Eggert said.

Some governments have also pledged money to assist the industry to meet their climate goals. The UK government is proposing a £250 million Clean Steel Fund to "focus on the transition to lower-carbon iron and steel production through new technologies and processes, placing the sector on a pathway consistent with the UK Climate Change Act," the Department for Business, Energy and Industrial Strategy reported. "We also intend to establish a new £100 million Low Carbon Hydrogen Production Fund to support the deployment of low-carbon hydrogen production," the department added.

In April this year, Thyssenkrupp received government funds from its initiative IN4climate.NRW for the first test phase at its Duisburg steelworks in northwestern Germany to use hydrogen as a reducing agent for iron ore in a blast furnace BF. "With the use of hydrogen at our BF No.9, we continue to work consistently on the conversion of our production processes. Our goal is almost CO_2-neutral steel production. This will be a long and costly process and we will take another step today," said Arnd Köfler, production director of ThyssenKrupp Steel Europe.

Thyssenkrupp Steel Europe aims to achieve an 80% reduction in carbon emissions by 2050, the company added.

Trends and tariffs in electrical appliances

Electrical appliance manufacturers are facing headwinds, while consumer taste and buying patterns are changing. Gregory DL Morris reviews the trends

Steel shipped by US mills for use in the appliance sector grew a strong 22% in 2018 from 2.2 million net tons in 2017 to 2.687 million net tons, according to data from the American Iron and Steel Institute (AISI). That was the second year in a row of gains, after a robust 40% growth from 2016 to 2017. While dwarfed by the construction and automotive sectors, which accounted for 44% and 28%, respectively, of total US shipments in 2018, the appliances segment in steel has grown to a significant 5%.

In the near term, the trade war instigated by the current US administration has seen tariffs as high as 25% applied on imported appliances and components, the US-based Association of Home Appliance Manufacturers (AHAM) noted.

In the longer term, the outlook for metals in appliance fabrication sees some challenges from material substitution. One global manufacturer recently introduced luxury lines with a chassis of carbon fiber, for example. It remains to be seen how well those sell and whether other makers try the idea.

Additive layer manufacturing is widely seen as a way to add metal to appliance components that are currently fabricated in polymer or composites. Analysts agree that appliances are an ideal application for additive-layer manufacturing because components are high-volume and complex shapes, but do not have the same safety-critical concerns of aerospace or defense uses. That said, profit margins in appliances are thin and manufacturers are hesitant to invest capital without clear prospects of a good return.

Non-ferrous metals are widely used in appliances, notably in heat exchangers, motors and fittings. But aluminium, copper, and other non-ferrous metals constitute the minority portion of the weight of a finished machine. Steel accounts for about three-quarters of the weight of an appliance, according to the AISI.

The major components are structural frames, also called cabinets or boxes, as well as motors and hinges. Exterior panels are also often made from stainless steel or other alloys. The AISI notes that 25 percentage points of the three-quarters contributed by steel comes from recycled steel. Furthermore, 90% of appliance steel is recycled at the end of appliances' life.

The ratios of steel and metals used in appliances have remained pretty steady for years, but could change as a consequence of material substitution. In February Beko, a major Turkish manufacturer, claimed primacy as "the first to launch a carbon-fiber line to the US" noting that "carbon fiber has long been used for its durability, light weight, heat resistance and unmatched strength for world-changing machines like aircraft engines and Formula 1 race cars. Now, Beko is taking this luxury design element and combining it with their world-class appliance engineering to create a collection that brings the sleek aesthetic and natural benefits of carbon fiber to homes across America." The line includes stoves, refrigerators, freezers and dishwashers.

Major home appliance industry domestic shipments*

	Year to Date		
Product	**2019**	**2018**	**%Chg**
All major appliances	57,514.50	60,318.70	-4.60%
Cooking	16,000.40	16,766.20	-4.60%
Home laundry	12,963.90	12,914.10	0.40%
Kitchen clean up	11,192.80	11,633.70	-3.80%
Food preservation	9,463.50	9,763.30	-3.10%
Home comfort	7,893.80	9,241.50	-14.60%
AHAM 6**	34,601.30	35,090.00	-1.40%

**Thousands of units (to 28 September 2019)*

*** AHAM 6 includes: washers, dryers, dishwashers, refrigerators, freezers, ranges & ovens.*

Source: Association of Home Appliance Manufacturers

Fluctuating sales

While the percentage of materials used has held steady, the total sales of appliances has gone through several distinct fluctuations in the past 10 years, according to data compiled by AHAM. Aggregate sales plunged almost 13% from 68.2 million units in 2008 to 59.5 million in 2009. Sales then held steady in the 59 to 61 million range before gaining 5% from 2012 to 2013. That roughly 5% per year pace of growth continued through 2017, reaching 79.2 million. Last year's total for 2018 was virtually unchanged (*see chart*).

AHAM represents manufacturers of major, portable and floor-care home appliances, and suppliers to the industry. Its membership includes more than 150 companies globally. AHAM members employ tens of thousands of people in the United States and produce more than 95% of the household appliances that are shipped for sale within the US. The value of member factory shipments is nearly $50 billion annually.

"For kitchen appliances, many manufacturers are looking to innovate and bring consumers new features that they previously could only find in professional models," said Dean Schwartz, vice president of merchandising for Lowe's, the North American hardware, home, and garden 'big-box' chain. It is the largest retailer of appliances in the country with sales of about $8 billion in that sector at more than 2,000 stores.

"Over the past 18-24 months, we've seen manufacturers bring appliances to market with enhanced features, including steam, *sous vide* (under glass) and algorithmic cooking," Schwartz added.

"Additionally, manufacturers have recently introduced anti-fingerprint stainless-steel appliances that help eliminate the need to clean constantly." Under-glass cooking, also called low-temperature, long-time cooking, is a technique where food is placed in a plastic pouch or a glass jar and cooked in water for a precise time and at a precise temperature.

Last year, retail trends for appliances had been skewing towards the extremes – high-volume inexpensive models, and high-margin luxury models – but not many models in between. There is strong communication between retailers and manufacturers, and that apparent gap may now be closing.

Lowe's carries a wide range of appliances, including Samsung, Whirlpool and Bosch. "For refrigerators, we're seeing customers gravitate towards affordable luxury where they are willing to trade certain features for a clean, sleek stainless-steel appliance that is budget friendly," said Schwartz. On stoves, he added, "We're starting to see that an increasing number of people are interested in the benefits associated with induction cooking, which allows for precise temperature control and faster heat transfer from the stovetop to the cookware. People are also interested in ranges that can be used for multiple types of cooking, for example all-in-one ranges with steam, sous vide, true convection, and air frying."

Overall, he noted, "Homeowners have become much more aware of kitchen appliance features such as convection cooking, French-door configurations on refrigeration, and over-the-range microwaves that can also be used as a second oven. That means they have features such as traditional baking and roasting – features only more luxury models have had in the past.

Another large market beyond direct consumer buying is commercial or professional for rental properties, businesses and institutions. "Property managers, a key audience within our professional business, are looking for high quality, lower-cost, and low-maintenance models, especially electric ranges and top-mount refrigerators," said Schwartz.

"We work closely with our suppliers on development," in both consumer and professional lines, he added. "For instance, our manufacturers and merchants will collaborate to understand consumer insights and how these may influence product design. This process begins about 18-24 months before a model is introduced in the market."

Tariff issues

Some variables remain outside the control of both manufacturers and retailers – notably trade rules and tariffs. "We constantly monitor the marketplace and work with our vendor partners to manage the impact of the tariffs efficiently," said Schwartz. "We are committed to continuing to offer consumers the highest quality brands, most innovative models, and best value in the marketplace."

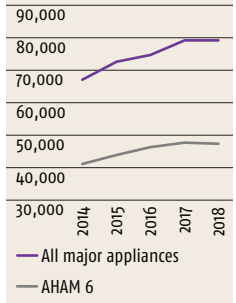
Talks between Washington and Beijing continue in fits and starts and, at press time, there was no sense of a resolution. There are two distinct impacts of the present situation. Upstream, the steel sector has seen some domestic recovery. But downstream, end-use segments, including appliances, have felt some pain.

The administration's "use of the Section 232 trade remedy has helped the domestic industry begin to rebound, with imports declining and shipments and production rising since the tariffs' implementation," said Lisa Harrison, senior vice president for communications at AISI. "Steel imports have decreased by 47% since the Section 232 took effect, and imports make up a smaller part of the steel market."

Also, capacity utilization is higher now than when the Section 232 took effect. "Shipments of steel mill products were 4.8% higher in 2018 than in 2017 and are up 2% in the first half of 2019 compared to the same period in 2017," Harrison said. "Several idled steel mills have been restarted, many laid-off workers have been called back to their jobs, and American steel producers have announced plans to invest in new steelmaking capacity. However, there is still more to be done."

Downstream, Joseph M. McGuire, president and chief executive of AHAM, detailed the

Industry shipments of major home appliances
(Thousands of units)



Source: Association of Home Appliance Manufacturers

detriment to the appliance sector brought by the tariffs in a letter to Robert Lighthizer, United States trade representative. "AHAM's data indicate that manufacturers will need up to three years to qualify new suppliers from other sourcing countries, including the US. This is a conservative estimate. For example, AHAM data indicates room air conditioners, portable air conditioners, dehumidifiers, vacuum cleaners, and compact refrigeration and some other refrigeration finished-appliances currently are primarily only produced in China. Shifting sourcing countries would take years, resulting in product shortages and/or noticeable price increases."

On the tariff list, there are also several types of appliance component for which alternative suppliers outside of China are hard to find. Those include critical parts for the functioning of home appliances, such as AC motors and control boards. Companies have to absorb the additional cost resulting from the proposed tariff or pass it along to consumers.

McGuire asserted that US suppliers and manufacturers "will not benefit from the tariffs. Instead, they will be punished as supply continues to come from outside the US and American jobs are lost in an effort to compensate. Even if alternatives exist, capacity may not be sufficient, which will cause significant disruption and impact the availability of essential home appliances for Americans."

In any case, "the time and effort it takes to accomplish a shift in the supply chain is already diverting resources away from research and development," McGuire wrote. "Our members have indicated that due to the already imposed and newly proposed tariffs, their organizations are focused on finding alternative sources, if any exist. Unfortunately, many parts are not available in the United States and so companies will still be importing from somewhere. Companies are busy working on finding possible alternative sources rather than innovating to improve appliances and offer new features for American consumers."

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NOTICE

ArcelorMittal completes Belgium's biggest solar roof at its Ghent site

ArcelorMittal has completed the installation of 27,104 solar panels on the roof of its Ghent, Belgium, facility, utilizing 157.2 tonnes of steel, making it the biggest solar roof in Belgium.

The solar panels, together with the site's current 10 wind turbines and 2 planned wind turbines, will be able to produce around 50MW of renewable power.

ArcelorMittal Belgium plans to produce 43% fewer emissions to reduce its carbon footprint by 2050, in line with the Paris climate change agreement.

Installed by renewable energy producer Eneco, the new solar panels will produce 10,000MWh per year of energy, equivalent to powering 2,900 households.

"In addition, the new solar panels are also a good example of the importance of steel in our daily lives. The panels are fixed on a framework made of steel coated with Magnelis®. The Magnelis® [coated] steel, produced at our production site in Liège among others, is a strong illustration of sustainability. It guarantees the long-term viability of each solar park, regardless of the environment in which it is located. Steel clearly is a sustainable product for a more sustainable future," Manfred Van Vlierberghe, CEO ArcelorMittal Belgium, said.

More than 5,000 employees have co-invested in the solar panels through crowdlending to actively involve them in the sustainable development and benefit from the revenues.

"If you, for example, lend 500 euros, you will earn an extra 20 euros a year. In six years' time, the employee earns 120 euros. After the term, (s)he will recover the original investment of 500 euros as well," Iwein Goigne, CEO Eneco Solar Belgium, said.

The city of Ghent and the North Sea Port are committed to renewable energy, CO_2 reduction and reuse. By installing solar panels and solar parks in the cross-border port area, like at ArcelorMittal in Ghent, the port companies are generating renewable energy which is injected into the electricity grid, accounting for the equivalent of more than 31,000 households, according to Mathias De Clercq, mayor of the city of Ghent.

ARCELORMITTAL BELGIUM

ArcelorMittal's installation of 27,104 solar panels at its Ghent facility in Belgium complements existing wind turbines there

Thyssenkrupp's digital initiative offers cost savings in energy procurement

Thyssenkrupp Materials Services has moved forward with its digitalization initiative offering significant cost savings and greater transparency for energy and gas procurement on a single platform.

Thyssenkrupp Materials Services, one of the biggest materials distributor and service providers, operates in over 40 countries, with 480 locations, 271 of them being warehouses. A high-performance logistics system ensures that deliveries are managed efficiently into customer production processes on a just-in-time or just-in-sequence basis.

Electricity and gas procurement has previously required extensive tenders and price comparisons; now, by cooperating with a specialized service provider, more than 350 customers for electricity and 200 jobs for natural gas can be supplied digitally.

"By digitizing all data relevant to the energy industry from the Group, we are now in a position to issue tenders at short notice. By pooling all requirements, our small team has succeeded in achieving significant cost savings for the Group as a whole," Dirk Lieske, Head of Energy Purchasing at Thyssenkrupp Materials Trading, said.

"Our service provider enPORTAL offers us a transparent comparison with exchange-traded electricity and gas prices with the possibility of addressing over 600 audited energy suppliers digitally," said Lieske.

THYSSENKRUPP MATERIALS SERVICES

Thyssenkrupp's digitalization initiative offers cost savings and greater transparency for energy and gas procurement

Fetch.ai partners with steelmakers to develop an exchange

A group of Turkish steelmakers and traders, including Başturğ Metallurgy, have partnered with artificial intelligence lab Fetch.ai to help develop a decentralized, blockchain-based, tokenized metals exchange.

By using Fetch.ai technology, the exchange will integrate AI-supported blockchain solutions that the developers say will allow increased liquidity in the trading of steel, base metals and other commodities. The Fetch.ai platform enables the recording and monitoring of transactions via an intelligent smart contract.

Fetch.ai said it will help market participants overcome existing barriers to entry through innovative technology. It is designed to enable and simplify digitized trading of materials through the use of tokens, allowing more market players to gain access to new risk management tools, while maintaining market efficiency and security.

The decentralized platform is also designed to unlock new funding models for supply chain participants by allowing them to collateralize their material and production capacity, to enable realization of the value of the underlying commodity they are holding.

Fetch.ai announced completion of the first transaction on its exchange (DEX) in mid-October, which was conducted between Başturğ Metallurgy and one of its suppliers.

"This is only the beginning. Working with a consortium of steel mills, shipping companies, trading firms, trade banks and brokerage houses, we look forward to watching Fetch.ai's decentralized trading platform grow to support a thriving metals trading market, with physical delivery of assets," said Fetch.ai CEO Humayun Sheikh.

MX3D software 3D prints bespoke aluminium bike at speedy turnover

Netherlands-based MX3D has developed bespoke software and wire arc additive manufacturing with a robotic arm to create an aluminium bike called Arc Bike II.

MX3D already produces components for the maritime, mining, oil and gas, and heavy industry, as well as artwork and architectural pieces, and had previously created the Arc made from steel. The flexible on-demand printing process takes only 24 hours to make a bike tailored to fit individual specifications.

"It took some time to master aluminium printing, which is more challenging than other metals, but the outcome was a convincing strong and lightweight bike," said Thomas Van Glabeke, project leader at MX3D.

Orders can be printed to fit customers' data sent direct to the manufacturer to create the exact specification for the user. The head tube, bottom bracket and saddle fixings are drilled in after printing.

The Arc II aluminium frame, which is a more challenging material then other metals, weighs 29.7 lb; this is more than the conventional 17 lbs for road bikes, and 21-29 lb for mountain bikes as the technology is still expanding.

"After the initial technical challenges were solved, it was amazing to see the turnover speed from idea to final product. It is exciting. I can't wait to see a whole family of these bikes rolling off the MX3D production line," said Van Glabeke.

MX3D

The aluminium Arc Bike II is an example of how MX3D software can be used for on-demand printing

UK companies trial EV energy storage system with potential use in construction

A prototype energy storage system on board an electric vehicle (EV) is set to be a turnkey solution to UK households undergoing power cuts and could also offer a temporary power solution for vulnerable industries like construction.

The two-year Silent Power project formulated by a team of UK-based companies including: Hyperdrive, which manufactures lithium-ion battery systems; Offgrid Energy, which develops hybrid generator systems; and utilities company Northern Powergrid, responsible for electricity distribution, aim to offer a cleaner, quieter alternative to traditional diesel-powered generators.

Currently, up to three homes or a small community in the north of the country could potentially be powered with one van for up to 24-hours during the trial, and longer for those with solar power, according to Northern Powergrid.

"Alongside the direct customer benefit, we are very excited by the wider positive environmental impact of this trial. Many industries need temporary power supplies, if this can be shared across other sectors, we have another way to bring more renewable sources into our energy mix," Ross McFarlane, Innovation Project Manager for Northern Powergrid, said.

Northern Powergrid is hoping to see a reduction in overall CO_2 output when compared with traditional diesel generators and plans to share its findings during the trial with other electricity network operators across the UK.

"Traditional generators cannot accept power input from customers' generation, which can happen at times of low load, as they were only designed to output power. The Silent Power battery solution can. This is becoming ever more important with rooftop solar installations throughout electricity networks. It means we don't waste green energy that otherwise would be lost," Patrick Erwin, Policy and Markets Director at Northern Powergrid, said.

NORTHERN POWERGRID

The Silent Power vehicle with on-board energy storage system offers better air quality and less noise pollution

EMR joins big UK retailer in school recycling programme

EMR Metal Recycling has teamed with major UK electrical retailer Currys PC to bring recycling awareness to schools on the vast amounts of untapped metals in UK homes.

Primary school children in the UK will learn all about how recycling benefits the planet in an interactive school science programme named Recyclabots, using videos, tactile activities and workbooks encouraging mindful recycling.

Household metal waste in unused technology such as phones and hairdryers is an untapped supply of rare earth metals, such as indium.

EMR highlights a study by the Royal Society of Chemistry estimating that around 40 million unused gadgets are not being recycled. Given the demand for new technology, secondary sources of rare earth metals could be an important consideration.

"The more metal we recycle, the less ore and virgin materials we need to take from the ground in the race to meet consumers' needs. It's important to consider the impact of waste for future generations," Andrew Brady, EMR UK chief executive officer, said.

The school will receive vouchers from Currys PC World, which has a network of 800 stores countrywide, as a reward for recycling through the programme.

The Recyclabots initiative was born directly in response to The Prince's Responsible Business Network, Waste Wealth Initiative.

EMR is a member of the British Metals Recycling Association.