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In The Issue

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India is second largest steel producer now

India has replaced Japan as the world's second-largest steel producer. The country's crude steel output rose 4.9 per cent to 106.5 million tonnes in 2018, while Japan's production fell 0.3 per cent to 104.3 million tonnes, according to data from the World Steel Association (WSA). The development will boost the steel ministry's initiative to achieve 300 million tonnes of production capacity by 2030. The government is also making efforts to increase India's per capita steel consumption through various policy initiatives and stepping up spending on housing and infrastructure.

Rank	Country	2018 (Mt)	% chg
1	China	928.3	6.6
2	India	106.5	4.9
3	Japan	104.3	-0.3
4	US	86.7	6.2
5	S Korea	72.5	2.0
6	Russia*	71.7	0.3
7	Germany*	42.4	-2.0
8	Turkey	37.3	-0.6
9	Brazil	34.7	1.1
10	Iran*	25.0	17.7

WSA, based in Brussels, compiles data for 64 steel producing countries and said global crude steel production reached 1,808.6 million tonnes in 2018, up 4.6 per cent from 2017. Production increased in all regions, except in the European Union.

China remained the top producer, with output climbing 6.6 per cent to touch 928.3 million tonnes last year. In the process, China's share of global crude steel production increased to 51.3 per cent from 50.3 per cent in 2017. Asia's steel production rose 5.6 per cent to 1,271.1 million tonnes. South Korea's output was up 2 per cent to 72.5 million tonnes, the WSA said.

Source: The Economic Times

Minerals, Metals, Metallurgy and Materials 2018 (MMMM 2018)

The Delhi Chapter of the Indian Institute of Metals (IIM) along with International Trade and Exhibitions India Pvt. Ltd (ITEI) has been organizing once every two years Minerals, Metals, Metallurgy and Materials (MMMM) event consisting of Exhibition and concurrent Conference in the area of MMMM. The 12th edition of this event was held at Pragati Maidan, New Delhi from 29-31 August 2018. The Theme of the Conference was **"Minerals and Metals Sector – Growth Prospects in New Business Environment"**. This event was co-sponsored by Ministry of Steel, Ministry of Mines, Ministry of External Affairs and Council of Scientific & Industrial Research (CSIR).

The event was inaugurated by Hon'ble Minister of Steel Shri Chaudhary Birender Singh on

29 August 2018. In his inaugural address, Hon'ble Minister of Steel Shri Chaudhary Birender Singh said that within a short span of time, by following the practice of using domestic produce steel in government projects, country has been able to save at least Rs 5000 Crore. Among other things, he also mentioned that by end of this financial year, India will become the second largest steel producer in the world. He expressed his confidence that steel sector is on the right track and as envisaged in National Steel Policy 2017, India will be able to achieve 300 million ton steel production capacity by 2030-31. The Hon'ble Minister also stated that Ministry of Steel has created Steel Research & Technology Mission of India (SRTMI) to promote the R&D initiatives in the Steel Sector covering primary and secondary steel producers. The SRTMI has started functioning under the aegis of Ministry of Steel. After inauguration, the Hon'ble Minister and the dignitaries on the dais released the Conference Souvenir.

About 16 countries participated in the Exhibition. Around 500 Exhibitors had put their stalls in the Exhibition and more than 12000 trade visitors visited in the Exhibition stalls in the three days Exhibition.

Apart from the Inaugural Session, the Conference consisted of CEO Conclave, seven Technical Sessions and a Valedictory Session. The Technical Sessions covered in the Conference are as under:

Session I	Prospects of Mineral Industries and Raw Material Security for future growth of mineral and metal sectors.
Session-II	Planning of Infrastructure & Logistics Support
Session-III	Enhancing Competitiveness of Indian Steel Sector
Session-IV	Prospects of Non-Ferrous Industry
Session-V	Metals Requirement of Strategic Sectors
Session-VI	Secondary Steel Sector – its Contribution and Challenges
Session-VII	Energy /Environment Issues in Minerals and Metal Sectors

Begining the technical sessions was preceded by CEO Conclave.

The CEO Conclave comprised of:

- Mr. Anand Sen, President Indian Institute of Metals and President TQM and Steel Business TATA Steel

- Dr. Vinod Nowal, Deputy Managing Director, JSW Steel
- Mr. Gopal Singh, CMD, Central Coal Fields Limited
- Mr. H. N. Rai, Director (Technical), Steel Authority of India Limited (SAIL).
- Mr RN Parbat, a veteran in Metal industry & Past President, Indian Institute of Metals, moderated the proceedings of the CEO Conclave
- The Conclave had an interesting deliberation on the present and future of Indian Steel Sector and National Steel Policy – 2017 announced by Ministry of Steel, Government of India. JSW Steel, TATA Steel and SAIL – the three major domestic steel producers expressed their confidence of capacity enhancement to 50 Million ton each by 2030. Mr. Gopal Singh, CMD, Central Coal Fields Ltd, assured the steel

producers that the supply of both coking and non-coking coal from Coal India mines will improve in coming years and thrust should be given to install number of coal washeries to meet the requirement of low ash coal to consumers.

Mr. Anand Sen mentioned about the research activity being undertaken by Tata Steel to convert non coking coal to coking coal. Major steel producers currently spending huge foreign exchange in importing coking coal to meet their demand will witness a major revolution with a breakthrough in this important & relevant R& D effort.

Dr Nowal of JSW Steel emphasised that in order to achieve the targeted capacity of steel production as per National Steel Policy, the capital requirement will be huge. As such it is necessary that interest rate on borrowing should be attractive to raise capital for expansion / installation of green field plants.

Another pertinent issue raised by Director (Technical) SAIL was that India need to improve a lot on logistics front as the transportation cost of incoming raw material from mines to Plant site and outbound finished steel from Plant site to stockyards is significantly higher in comparison to China.

This marked the conclusion of the proceedings of the CEO Conclave. After this the seven technical sessions were started.

The first session was "Prospects of Mineral Industries & Raw Materials security for future growth of Mineral & Metal sectors."

This session was chaired by Shri R.N. Parbat Former President, Indian Institute of Metals.

The Session had four presentations. The eminent speakers were from Centre for Engineering and Technology (CET), SAIL, TATA Steel, NMDC & MECON.

The speaker from TATA Steel, presented an interesting analysis that for new steel plant facilities, the ROIC with captive iron ore supplies comes to 13.5% and without captive iron ore supplies, ROIC works out to 11.3%, which are both below the weighted average cost of capital, which is coming around 14%. Also, another fact highlighted i.e. within the entire steel value chain profitability is challenged and margins move to mining.

Presentation from CET,SAIL emphasised that raw materials are the most significant contributor towards the production cost in steel industry. Its contribution varies from 60-70% of the production cost. The steel making raw materials such as iron ore, coal, coke etc are known for their price volatility. The amplitude of the price volatility multiplied with the high percentage contribution of this factor of production induces a significant risk in the operating expenses of steel companies. The risk diversification can be achieved through

financial tools like derivatives and hedging. However, financial tools bring an additional cost which goes against the concept of cost leadership which is often the preferred strategy of steel companies as bulk producers. Another effective way which align very well with the strategy of steel companies is to have captive source for supply of the major raw materials. Since non-availability of captive source for supply of raw materials exposes a firm to higher risk and a position of competitive disadvantage, many steel companies hesitate in expansion of their existing production capacity or addition of new capacity. The hurdles coming into the way of having secured supply of raw materials may prove to be a major stumbling block in achieving the ambitious target contemplated in the New Steel Policy. The policy makers may look into the obstacles such as delay in getting various clearances, land availability, capacity restrictions, socio-economic factors etc which are hindering steel companies from having a secured, sustainable and cost effective source for supply of steel making raw materials.

NMDC presentation detailed out the salient features of proposed 3.0 Mt /yr capacity integrated steel plant under commissioning at Nagarnar, Jagadalpur, Chattisgarh along with 2.0 Mt/yr pellet plant. The feed for the pellet plant will be beneficiated lean iron ore which will be transported from Bailadila ore mines to pellet plant through slurry pipeline.

MECON presentation covered the raw material scenario to achieve 300 Mt/yr steel production by 2030. Requirement of iron ore & coking coal will be to the tune of 500 Mt & 170 Mt / yr respectively. For upgrading the scale of iron ore production concentrated thrust towards capacity enhancement of operating iron ore mines and speedy auctioning and development of free hold iron ore areas would be required. Development of Special Mining Zones (SMZ) in iron rich free hold areas shall be required to achieve the required iron ore production. In addition to this enhancement of the iron ore resource base of the country is the urgent need for sustainable supply of iron ores to cater the need of steel plants. Methods of exploration and exploitation of magnetite resource of the country is yet to be developed through the way of scientific and eco-friendly techniques. Integrated infrastructure facilities for mineral evacuation should be given due importance while developing the mine infrastructures. Although the country is having sizeable coking coal reserves, substantial quantity of the reserves are rendered unworkable on account of coal seam fire and subsidence. Planning for raising coal production from the Jharia coalfield requires addressing these inherent impediments adequately.

Another presentation from NMDC detailed out prospect of mineral industry under new business environment through a number of policy changes. Mineral Industry is set to be more vibrant with various measures adopted such as Exploration for deep Seated Minerals, Digital India, Introduction of e-way Bill in Logistic Sector, Transparency in allocation of Mineral Concession, addressing the concern of Mining affected persons, promulgation of National Mineral policy 2017 in align with sustainable development Goals and reforms to facilitate Ease of Doing Business .

The important take-aways from this session were

- Limited auction of iron ore resources amongst end users and provision of renewal of captive concession.
- Facilitate auction of mineral blocks in a regular manner.
- Utilization of low grade fines must be promoted
- Transportation of iron ore fines to pelletization units should be through cost effective slurry pipelines and conveyors.
- Acquisition of mineral assets overseas.
- Facilitate exploration & optimal utilization of deep seated coking coal reserve.
- Coking coal blocks should be allocated through limited auction amongst end users in steel industry.
- Semi coking / coking coal should be given to only steel producers.
- CIL should create e-auction windows for steel players.
- Explore the efforts to raise resources of limestone, manganese and chromite ore.
- Suitable measures and procedural simplification should be done to support the rising requirement of refractories.

The second session was "Planning of Infrastructure & Logistic support".

The Session was chaired by Dr Sanak Mishra, Former MD, RSP & President, IIM. The session had five presentations. The eminent speakers were from Vizag Port Trust, Power Finance Corporation, National Highway Authority of India Limited, MECON and SAIL. The speaker from Vizag Port Trust presented the roadmap for Port modernization and new port development in the country which include enhancing the port capacity to more than 3,500 MTPA by 2025 with 112 major capacity expansion projects at an investment of Rs.70,000 Crores, development of new ports, augmentation of rail and road connectivity, pipeline projects, development of IWT and other logistics like development of Multi

Model Logistic Parks etc. Shri P. L. Haranadh, Dy. Chairman, Vizag Port Trust, also briefly described the development plan developed by Vizag Port Trust for modernization of Port Infrastructure in the major thrust areas of Deepening of channels and berths, development of new berths, modernization/mechanization of existing berths and improvements in connectivity and other logistics such as Multi Model Logistic Hub. Vizag Port has taken up modernization plans with an investment of Rs. 4,450 crores through Private Sector participation as well as with the internal resources and with the funding from Sagarmala programme. The capacity of the Vizag Port has been augmented from 63 MTPA to 120 MTPA during the last 4 years.

The presentation from Power Finance Corporation emphasised that stressed asset in Power Sector is becoming a major challenge . It was mentioned that approximately 60,000 MW may be under financial stress. Lenders have exposure of approximately INR 3 Lakh

Crore to such assets and it is imperilled due to slow resolution process and tepid power procurement demand from Discoms in last 3 to 4 years.

Presentation from NHAI highlighted the various projects which are under execution and being taken up for next 3-4 years to ease out road transportation from one part of the country to another part of country.

Paper from MECON on iron ore slurry transportation through pipeline highlighted the importance of slurry transportation in view of projected growth of steel industry which is putting tremendous pressure on the Railways infrastructure with respect to inward & outward traffic, loading and evacuation of raw materials/ finished products. Lack of sufficient Railways infrastructure could pose a major challenge to the growth targets of steel. The paper gave a brief idea about the design of such iron ore slurry pipelines. The presentation also gave an overview of the various tests such as geological tests and complex hydraulics problems which are unique to the design of slurry pipelines and are used for finalization of design parameters of slurry pipeline. Presentation also mentioned the advantages of transportation of iron ore by slurry pipeline with respect to costs involved, impact on environment and reliability.

Presentation on smart city by Dr Rakesh Kulshreshtha stressed that making Indian cities smart and productive has introduced new thinking and skills in managing the urban infrastructure. These trends have definite imperatives for steel industry as the infrastructure and construction sectors are the biggest consumers of steel in India and the industry contributes to about 2 per cent of the country's GDP. The trend towards enhancing liveability quotient of India's urban dwellers and at the same time increasing awareness on climate change and desire to improve quality of life has raised expectations from industry to invest in environment friendly iron and steel making technologies with optimum use of resources and energy. On the other hand there are ample opportunities for the industry to develop steel for eco-friendly solutions; wind energy, electric cars, green buildings etc.

The third session was " Enhancing competitiveness of Indian Steel Sector".

The session was chaired by Shri P.K. Bajaj, Former CEO, Durgapur Steel Plant & Vice Chairman, IIM Delhi Chapter.

Five speakers namely from Tata Steel, JSW, CET (SAIL), Paulwurth and Dr Sanak Mishra made the presentation.

The presentation from CET, SAIL highlighted IISCO modernisation and expansion programme with an investment of over Rs 18,000 crore. The plant has now been completely transformed into a state-of-the-art integrated steel plant in all facets of steel making, right from raw material handling to finishing mills. The modernised and expanded ISP has epitomised the spirit of the 'Make in India' campaign. This modernised and expanded plant is producing high quality steel rebars, including earthquake-resistant

grades, wire rods and universal sections, including parallel flanged beams, for fulfilling the need of India's growing infrastructure and construction sector. ISP's new and modern plant has facilitated SAIL to a phase of reinventing its processes and becoming world class in all spheres of production performance and marketing to customers.

The paper from JSW highlighted the commercial use of Blast Furnace Slag and BOF slag. JSW initiatives for Recovery and Recycling of process wastes (dust, sludge and mill scale) is really commendable. Journey towards achieving zero waste through Process Improvements and Technological Innovations is possible – this has been demonstrated by JSW.

Presentation from Paul Wurth highlighted the fact that through smart modernisation techniques, capacity enhancement from the existing asset is possible by collaboration of technology provider and steel plant operators. Engineering solutions are available which can enhance substantially the capacity of existing production facilities of a steel plant with lesser CAPEX. Another point highlighted was that going forward for having 300 million tons capacity, one must keep in mind how to reduce the amount of carbon load on our society and how to make our steel plants more energy efficient & environmental friendly. It may be worthwhile to focus on Electric Arc Furnace route for tonnage steel production with considerable steel scrap availability and lower power tariff.

Dr Sanak Mishra stressed in his presentation that it is necessary to create a technologically advanced and globally competitive steel industry that promotes economic growth. Towards this goal, there are several segments of the steel industry in India which need to reach global norms in terms of energy efficiency in operation, cost efficiency in value addition, and in product characteristics in terms of chemical and physical attributes particularly with respect to surface quality and dimensional tolerances. At the same time, it is also imperative that major technological interventions are required, especially in many instances of steel assets created before 80's in areas of coke ovens, sinter plant, iron making, steelmaking, casting and rolling, to name a few. In the secondary steel sector the extent and level of automation must go up. In brown field expansions of capacity into new product lines, quality control systems throughout the processing chain have to be strengthened which again will require technology interventions. Being globally competitive will call for consistent reduction in specific consumption of raw material and energy, improvement in yield at all stages of conversion, and enhancement of product features. Much of this will be possible in the selection of state-of-the-art environment-friendly technologies in green field projects, as well as in their adoption in revamping of pre-existing older assets. Competitiveness will also depend upon the capability to design and innovate new processes and develop new products for the market; the importance of R&D cannot be underestimated.

The fourth session was "Prospects of non-ferrous industry"

The session was chaired by Shri Santosh Sharma, CMD, Hindustan Copper Limited. Eminent speakers from non-ferrous industry as well as Dastur & Co made the presentation.

Mr Pugazhenthy highlighted the current & emerging scenario of lead & zinc in India. He mentioned that about 80% of Zinc consumed in India goes into the hot dip galvanizing sector for tubes, wires, sheets, structurals, fasteners etc., Traditionally hot dip galvanized steel products are used in power transmission, railway electrification and telecom since they provide a long, maintenance free life. The new markets are highways, renewable energy, rural electrification, galvanized rebars for RCC structures, smart cities etc. About 75% lead is used for manufacture of lead acid batteries; Lead batteries find usage in automobiles, inverters, telecom, railways, defence communication, UPS for computers etc., The new, emerging application areas are renewable energy, electric vehicles, street lighting, traffic signals etc.,

Dr Agnihotri, Director, JNARDDC spoke about aluminium R&D & emerging applications in India. He mentioned that although Indian Aluminium companies have traditionally developed research capabilities in house, they have also established collaborative links with other organizations but still the Indian aluminium companies are dependent on international technology suppliers and they are acquiring technology from international enterprises through licensing or takeovers. Although in India aluminium R & D is generally undertaken by the industries, Government R & D institutes and academia but has not yielded significant benefit to the nation as a whole. Investment in R&D is still not considered a cost effective activity by the Indian aluminium companies, hence there is a necessity for the government to step in and support aluminium R&D efforts in collaboration with industries, academia & R&D institutes.

Indian aluminium companies along with Government of India should work on new developments for a number of strategic projects in all business segments related to aluminium like defence, automobile, building & construction, energy, environment. With both demand and consumption of aluminium in positive territory, the time is now opportune for producers to move beyond their traditional strengths in electrical and building segments and shift gears to the emerging applications offered by the defence and aerospace domains. Aluminium is widely used in making various ammunition components, parts for missiles and missile batteries, tanks, and components used in spaceships and satellites.

A growing number of emerging applications make aluminium the metal of choice in the future. Indian Aluminium industry research and development focus should also be also on product development to support sustainable, profitable growth; manufacturing technologies to improve efficiencies and reduce costs; and

on environmental risk reductions.

Converting Mining Waste to Secondary Resource was the presentation made by Hindustan Copper Limited. The speaker informed that HCL has taken projects to recover value minerals and metals from the concentrator plant tailing and find usage for the waste rock generated in open pit mining operation as construction material/railway ballast. Two concentrator plants tailings have been tested for the recovery of Copper Concentrate, Gold, Silver, Silica, Magnetite and Micronutrients. Based on the positive response of the laboratory scale tests, a pilot plant test carried out to validate the laboratory test results which proved success. It is found from the feasibility study that multi mineral and metal recovery from respective tailings is an economical proposition. Accordingly, HCL has undertaken construction of 3.29 MTPA tailing beneficiation plant for recovery of glass grade silica, magnetite, copper concentrate- ore grade and precious metals – Gold and Silver.

Presentation from Dr D De Sarkar, CEO, Indian Copper Development Centre highlighted the current and emerging applications of copper. Presently electrical sector is the largest user of copper in generators, transformers, motors, switchgears, power & control cables, etc. The other sectors using substantial quantity of copper are – transport including automobile, railways and marine; building & construction; process industry; general engineering; consumer durables; defence; coinage and of course, handicraft and metal art ware. There are a large number of emerging areas for usage of copper. These include e-vehicle (both for vehicles and charging stations); renewable energy sector as copper is the primary material for induction coils in wind turbine, in stator and rotors of giant turbines. Another newer application for copper tube is high efficiency gas thermal heat pumps. Solar panels will also need large quantity of wires. "Touch surface" concept based on copper's anti bacterial property is expected to open up new usages of copper based sheets, rods & tubes. Use of copper tube in hospitals' medical gas supply line is adding to copper tube demand substantially. Similarly another potential emerging area is aqua culture. Copper alloy netting improves fish productivity leading to heavier fish, higher yields and at lower cost. Additional benefits include less damage, long life and 100% recyclability. In hi-tech end use sector – copper finds its uses in coating of superconducting alloys, containers and pipe lines of cryogenic medium, cooling linings of rocket engines and magnet windings in high energy accelerators.

The fifth session was "Metals requirement of Strategic Sectors"

The session was chaired by Shri A.C.R Das, Former Industrial Adviser, Ministry of Steel.

Presentations were made by Indian Rare Earths Ltd., Midhani, Metal & Steel Factory, Ishapore, Centre for Engineering & Technology (CET), BSP Sub-Centre, SAIL & Indian Stainless Steel Development Association .

Presentation from IREL focussed on the importance of strategic minerals. It was explained that critical mineral/material may or may not be strategic while a strategic mineral/material will always be critical. These minerals would also play an important role in nurturing the domestic manufacturing capacity to support the Government's low-carbon plans. Commercially, rare earth minerals find specialised use in a range of industries and modern applications, such as aerospace, automobiles, cameras, defence, entertainment systems, laptops, medical imaging, nuclear energy, smart phones,

batteries, hybrid car batteries, and also a host of other new technologies that are skyrocketing in popularity and sales. Growing demand for magnets in automobiles, and energy generation will majorly contribute to the growth of global rare earth metals. The demand for rare earth magnets containing neodymium is expected to grow at a CAGR of 8.2% from 2017 to 2024. Rare Earth minerals are found in form of oxides, carbonates, phosphates or silicates from which individual high purity rare earth materials are produced. The production process involves several purification stages such as mining, mineral beneficiation, concentration by hydrometallurgy / pyrometallurgy, solvent extraction and molten salt electrolysis and vacuum reduction. Strategic minerals such as lanthanum, neodymium, dysprosium, terbium, beryllium, uranium, cobalt, chromium, manganese and platinum are expected to gain importance due to the bulk requirement. Based on a study released by the Council on Energy, Environment and Water (CEEW), a leading policy research body, twelve critical identified minerals could play an important role in the success of 'Make in India' programme and the sustainable growth of the Indian economy.

Paper from OFB, Ishapore stressed the need for advanced materials for Defence sector under Make in India initiative. The speaker explained that with the current economical growth, India is likely to become the second largest economy in the world by 2050. As India is dislodging many countries to move to the second position, non-cooperation in strategic sector is likely to be faced from those countries. To counter the same, India has to be self-reliant in the strategic sectors like Defence. It is felt that the absorption or development of advanced Defence technology is a slow process due to its complexity and business risk involved even though the Government is committed to transform India to a Defence Industry Hub. The advance material will play a key role for the efficiency and effectiveness of the current/future technology. The advance material need to have improvements in strength, stiffness, toughness and able to be produced in large quantities at a reasonable cost. The advanced materials need to have light weighting, improved thermal stability and excellent performance at high strain rates.

The advanced materials cover metallic and non-metallic like composites. Composites include MMCs, PMCs, CMCs and CCs. Today, the Defence sector is heavily using various types of steel like carbon steel, stainless steel, other alloy steels and aluminium & its alloys. At present the steel being used are having strength 0.5 to 1.5 GPa but future requirements being forecasted for ultra high strength steel beyond 2GPa and toughness about 50 joules. Metal & Steel Factory, Ishapore has already carried out developmental work and in a pilot scale could achieve strength close to 2 GPa in Micro Alloyed Steel. Wherever drastic weight reduction is required, Ti and its alloys are being slowly replacing steel. Development is also going on for developing new Aluminium based alloys and Nickel alloys. Each material choice is application specific and is selected based on its strengths and weaknesses. Today the need is to develop advanced materials for strategic Defence Sector to improve the performance of the current technologies as well as to adopt new technologies.

The presentation from CET, BSP Sub-centre SAIL has highlighted the salient features of newly commissioned Universal Rail Mill. The state-of-art 1.2 Mtpa capacity URM will enhance BSP's overall capacity to produce rails to more than two million ton per annum. It will be the largest production capacity for rails in any single location for a plant world over. The rails rolled from new URM will be of good surface quality having less residual stresses and improved overall quality. The URM complex would equip

SAIL to meet Indian Railways' specific demand of 260 meter long rails.

The presentation from ISSDA discussed the importance of nickel alloys and stainless steel for strategic sector applications. India has emerged as the fastest growing economy of the world. Most crucial to this development is the need to have a strong and robust "strategic" sector industries. One of the key parameters for the performance and capability of these strategic industries such as nuclear and defence, aerospace, power, oil and gas, chemical and other key industries is the availability of high performance materials. Nickel alloys and stainless steels, being corrosion resistant and high temperature alloys, have been the backbone of these industries. Over the last few decades extensive research and development has been done to design and produce these alloys strategically to fulfil the need of this industry, demanding cutting-edge alloys for enhanced performance. Over the time Nickel alloys and stainless steels are of considerable economic and strategic importance to many countries, as can be appreciated from the wide diversity of end-use industries which it serves.

The sixth session was "Secondary Steel Sector – Its Contribution and Challenges"

The session was chaired by Ms Ruchika Chaudhry Govil, Jt. Secretary, Ministry of Steel, Govt. of India.

The presentations were made by MECON, SRTMI, All India Induction Furnaces Association.

Mecon presentation highlighted the future opportunities for the growth and sustainability of secondary steel sector for achieving the steel capacity build up of 300 MTPA by 2030-31 as per the National Steel Policy (NSP) -2017. More over the contribution of secondary sector through Electric Arc Furnace (EAF) and Induction Furnace (IF) route shall be 35-40% that is an addition of 60 MTPA steel. The ambitious infrastructure projects and the thrust in manufacturing through the "Make in India" campaign are steps in the right direction. The plan for smart cities, improved road and rail connectivity by building highways, bridges and dedicated freight and superfast rail corridors have huge potential to spur domestic steel demand. The secondary sector has an important role in bridging the steel demand gap by setting up of compact, energy efficient and environment friendly steel making units spread out over the entire country. Presentation covered the various challenges being faced by conventional IF steel making route and how it can be updated with adoption and adaption of advanced technologies to improve the quality of steel, make it more energy efficient and environmental friendly. Quality issues like Ladle Dephosphorization, adoption and integration with ladle furnace and other secondary refining units ensuring quality steel production has also been covered in the presentation.

Dr. Mukesh Kumar, Director, SRTMI discussed the issues & imperatives of secondary steel sector. He pointed out that during last few years the entire secondary sector has undergone tremendous stress because of raw material issues arising mainly due to some legal mining issues, high energy cost , lack of financing options and surging imports of steel products into the country. Although, a number of initiatives have been undertaken by the Ministry of Steel, Government of India, to provide support to the secondary sector but still the secondary sector is under stress and more than 50% of the capacity based on DRI route is lying unutilized. To achieve target of 300 My/yr by 2030, 35-40% of the steel production is envisaged from the secondary sector. Such mammoth target is difficult to

achieve unless development is driven by Technological interventions so that secondary sector not only can produce quality steel in the most cost effective manner with continuous reduction in greenhouse gas emission but also can contribute in producing alloy steels also. Now the main focus will be on the adoption of best available technologies including use of coal gas, introduction of refining technique to control Phosphorous and Sulphur, heat recovery system, use of plastics and polymers, scrap preheating, EAF slag utilization, direct charging of hot DRI etc. Since, majority of the secondary sector is dominated by small players, there are corporate issues also like lack of incentives, awareness and motivation to upgrade and innovate for enhanced productivity and profitability. Hence, confidence building along with technological intervention may be the only way for the future development of the secondary steel sector to ensure that the expectation from the secondary sector is fully achieved and India can be one of the lowest cost producer of steel.

Secondary Steel Sector is presently contributing more than 50% of the total steel production of India. Shri Kamal Aggarwal of All India Induction Furnaces Association presented a paper on "Road Ahead for Induction Furnace Segment – Challenges and Prospects".

The seventh session was "Energy / Environment Issues in Mineral and Metal Sectors"

The session was chaired by Shri K.K.Mehrotra, Former CMD, MECON Ltd.

Presentations were made by RINL,Paul Wurth, JSW Steel, Primetals Technologies, Nippon Steel, Sagta Engineering Ltd, China & Kluber Lubrication.

The presentation by RINL focused on experience of RINL in deploying energy conservation technologies in the new business environment. Policy framework, enablers for implementation of policy, deployment of eco friendly state of art energy efficient technologies, Bench Marking and adopting technologies to minimize gap, harnessing waste energies in all processes to generate electricity and process heat to reduce reliance on grid, making road map to comply PAT 2nd cycle targets, Renewable Power Purchase Obligations (RPPO).GHG inventorisation and reducing GHG emissions through above technologies. Deploying technologies though international cooperation mechanism (Clean Development Mechanism and BOCM) where capital is not available and projects which are not feasible. Institutionalization of energy management system through ISO: 50001 to make energy conservation as a way of life has created foundation stone for optimizing energy at shop floor level. The plant has achieved highest level of waste heat recovery (62%) in Indian Steel Industry. The plant has installed majority of energy efficiency technologies. These measures resulted in reduction of overall specific energy consumption by more than 5% during the year 2017-18.

Presentation from M/s Paul Wurth described that how modern coke plant technology can fit in pollution reduction in coke plant. A coke oven plant is an industrial plant, which will always influence the environment. With this in mind and using the best available technology as mentioned below it is possible to reduces the pollution drastically.

Sealing system for coke oven doors.

- Coke oven door cleaner
- Sealing lids during charging of top charged coke oven
- Single Oven Pressure Control valve for smokeless charging system for both top charged and stamp charged Battery.
- Sealing frame at SCP machine

- On-board de-dusting system at Pusher Machine/SCP machine

Presentation from Primetals deals with four different environmental saving technologies from its entire product spectrum:

1. Selective Waste Gas Recycling (SWGR) which features the partial diversion and reuse of hot Sinter off-gas from selected wind boxes along the Sinter strand.
2. Maximized Emission Reduction Of Sintering (MEROS®) wherein hot flue gas from sinter plant is adsorbed in a reagent to remove SOx, NOx, VOCs and heavy metals to meet regulatory standards.
3. Dry De-dusting System and the Energy saving module in ESP ("Precon") for gas collection and cleaning in the BOF steel-making route.
4. Dynamic damper control in secondary de-dusting wherein real-time mathematical models reduce the absorbed electrical power.

Thus all the process technologies for sintering, iron making, steel making etc. can be modified to recover energy (thermal, steam etc.), minimize emissions and reduce the carbon footprint while the Return of investment for this CAPEX is very short period of time.

Presentation from Nippon Steel was on Dry Type Vessel Electrostatic Precipitator System for Blast Furnace Gas Cleaning Technology. In order to meet the growing momentum for "ZERO Effluent discharge", NSENGI has developed a completely new dry gas cleaning system "Dry type Multi-Vessel Electrostatic Precipitator system (Dry-MVEP system)"in 2016. The system has huge advantages such as, high dust collecting efficiency to reduce the dust content in cleaned gas below 5 mg/Nm3, increasing the TRT power generation (approx. 25□□30% higher than conventional wet-type.), saving the required site area and reducing the maintenance frequency. Furthermore, it contributes a stable operation in any case of low and high gas temperature. The integrated dust transportation technology had installed in 4 units of large blast furnaces in Japan and they have been operating successfully.

Another presentation from Nippon Steel was on KR De-sulphurisation Technology. As there has been a rapid increase in the demand for high-quality steel in India.Hot metal with sulphur concentration as low as 10-20 ppm is being required for various applications. KR De-Sulphurisation is a hot metal pre-treatment system that removes Sulphur from hot metal to lower levels at a cheaper cost than conventional systems. The Kanbara Reactor (KR) was developed by Nippon Steel & Sumikin Engineering Co., Ltd. (NSENGI) and this technology has been successfully performing in Japan, India and abroad. This is an ideal technology for efficient and economical De-Sulphurisation of Hot Metal by maximizing the contact between the desulfurizing agent and the hot metal. In the KR process lime (CaO) is used as the main reagent, which reduces the operation cost drastically (approx. 30%) as compared to other De-Sulfurization systems.

The pellet and sinter quality characteristics depend, to a large extent on aerodynamics parameters prevalent in the pellet and sinter making. A presentation on "Optimisation of Pellet Car Aerodynamics for Improvement in Quality and Yield of Sinter" was made by representative of JSW Steel.

Sagta Engineering in their presentation highlighted the technology for Real Time Condenser Cleaning System. This is a solution for efficient cleaning of heat exchangers.

Some of the highlighted features are as follows:

- Real-time equipment cleaning with simultaneous heat transfer improvement.
- Improvement of condenser efficiency by a 300 MW generating unit heat transfer by over 20%
- compared ball cleaning systems, the savings may amount to over 1.5 g/kWh of coil for a 600 MW generating unit

M/s Kluber presented the lubrication methods for continuous caster. For decades, continuous caster bearing lubrication (considering billet, bloom, slab) with grease through centralized grease lubrication system is a challenge for maintenance persons in steel plants. Many times they spend sleepless nights to overcome bearing failure and line clogging issues. Moreover these issues cost heavy mechanical downtime with man-hour losses with premature bearing

failures. Modern CCP segments are having multiple split rollers with increasing number of lubrication points. With higher slab width, increased metallurgical length with higher exit slab temp the performance of lubricant is also in a demanding position. At Klüber Lubrication 3 greases were tested (one existing product of Klüber which is in use at different slab casters across India , one competitor equivalent product , one developed test grease) for high temp pump ability. As per the trial report and pilot grease performance for last eight months, the grease is successfully used in all slab casters and customer is highly satisfied. This newly developed grease will not only solve bearing starvation or line clogging problem but also reduces consumption dramatically. The other intangible benefits are like less mechanical downtime, higher productivity, enhanced bearing life, less grease accumulation at pulpit etc.

Valedictory Session

The Valedictory Session covered presentation of a brief Summary of the Techncial papers presented in the three days Conference. Shri P K Bajaj, Vice Chairman of Delhi Chapter presented the Summary of the Conference in this session. Shri Gagan Sahni, Director, ITEI presented the Summary of the Exhibition. Shri B D Jethra,Chairman of Delhi Chapter, gave away the awards to the distinguished exhibitors in the Valedictory Session.

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ZINC & ITS MARKETS IN INDIA – CURRENT & EMERGING SCENARIOS

L. Pugazhenthy
Executive Director
India Lead Zinc Dev. Assn &
Past President, The Indian Institute of Metals

Introduction:

Corrosion of steel is a natural, unavoidable phenomenon. Various protection coatings are applied on the steel to delay the onset of corrosion. One well-known and well-proven protection method is through the hot dip galvanizing process (applying a Zinc coating on the cleaned steel products). Zinc is an excellent corrosion protector, because of its slow rate of depletion, in various atmospheres, inherent sacrificial properties. Zinc provides a very long, maintenance free protection for several decades. More importantly zinc has excellent life cycle advantages as a corrosion protector.

Traditional Markets

During 2017-18, India's Zinc consumption stood at around 657000 tonnes. About 75% zinc gets consumed in the hot dip galvanizing sector ie., galvanizing of steel sheets, structurals, pipes, wires, fasteners as well as guard rails, street lamp poles, cable trays, buckets, rebars etc.; the balance gets consumed in zinc die casting, dry cell batteries, alloys, chemicals, zinc wire etc.,

While galvanized steel sheets are largely used in building & construction sectors for roofing, paneling etc., the galvanized steel structurals as well as galvanized fasteners find application in power transmission lines, railway electrification towers, telecom towers etc., It is well known that galvanized pipes are used mainly for conveying domestic drinking water, irrigation, agriculture etc., and galvanized wires are used for fencing, strapping, wire ropes etc., Dry cell batteries provide instant energy in torch lights, wall clocks, toys, calculators, remote controls, electronic gadgets etc., Zinc diecast components find application in automobiles, builders hardware, electronic & electrical parts (like heat sinks), zippers, sliders, LPG regulators, decorative components etc., Zinc oxide is used in rubber, paints, ceramic and electronic applications. Zinc chloride finds usage as fluxes in surface protection and dry cell batteries. Zinc sulphate is an ideal agricultural micronutrient to make up for zinc deficiency in the soils.

Key Drivers

The key drivers for Zinc demand are growth in steel usage due to investments in infrastructure, building & construction sectors and of course the severity extent of corrosion in the areas concerned.

Fortunately, in India the zinc production has been growing steadily all these years and hence zinc availability is no issue at all. HZL has been continuously expanding their production capacities, keeping in view the domestic demand scenario. India's Zinc production during 2017-18 was 791000 tonnes; India also exports zinc to other countries

Infrastructural Investments

During the 11th Five Year Plan (2007-12), India's investments in infrastructure (power, telecom, renewable energy, highways, ports, aviation, railways etc.,) amounted to US$500 billion; the same was doubled to US$1000 billion for the 12th Five Year Plan (2012-2017). This naturally

led to an increased usage of steel in all the above infrastructural sectors and this trend will continue in the coming years as well. By 2023, India will be investing Rs.38.6 Trillion in the infrastructure sector.

Emerging Markets

The huge investments in highways and smart cities project would lead to more and more usage of galvanized guard rails/ crash barriers, street lamp poles, high mast lighting columns, railings, road signages etc., Similarly the increasing penetration of mobile phones in tier-II cities and rural areas, after its successful acceptance in metro cities, have resulted in more demand for galvanized telecom towers in rural areas. Currently the teledensity in India is about 75%. The investments in increased power generation and distribution have resulted in more demand for power transmission line networks across the country as well as galvanized cable trays. The new terminal buildings in various airports and upgradation of existing airports, seaports etc., require more galvanized or galvalume steel sheets for roofing, airport hangers, air conditioning ducting etc., Currently there is also an increased activity in solar & wind energy generation capacity in the country (175GW by 2022); the support structures for solar panels and wind mill are usually galvanized, to obtain a long maintenance-free service life. Rural Electrification, Industrial Corridor Projects, Bharatmala and Sagarmala are the other projects with very high investments.

In our country, the concrete cracking and spalling due to steel reinforcement corrosion is very common and a proven method for delaying the corrosion process is through the use of hot dip galvanized rebars in RCC structures. Zinc coating weights for galvanized rebars are specified in IS 12594: Hot dip zinc coating on structural steel bars for concrete reinforcement. Galvanized rebars should be used particularly in RCC structures in coastal areas, bridge decks, petrochemical complexes as well as water–retaining structures, irrigation dams, immersed columns etc., A large no. of successful case studies are available on this product.

Conclusion

The huge investments in infrastructure, building & construction sectors as well as the high GDP growths in the country leading to an increased buying power present an ideal, conducive atmosphere for the continued growth in the markets for Zinc. On its part, the Zinc downstream industry need to offer durable, quality products, with assured performance and delivery at competitive prices.

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Odisha to offer 188 acres for Nalco's Rs. 5,500 – crore downstream project

Billed as one of the largest investments in the metal space, the project is likely to generate 1,700 jobs.

The Odisha government is on course to offering 188 acres of land to National Aluminium Company (Nalco), for its proposed ₹5,500-crore downstream complex at Kamkhyanagar in Dhenkanal district of the State. Finalisation of land requirements and other details are expected by the end of February. This is billed to be one of the largest investments in the metal downstream space in eastern region and in Odisha as well.

According to government sources, Nalco, in its proposal, has sought the land in Markata and BS Sasan areas of Kamkhyanagar. Based on the report, the Industrial Promotion and Investment Corporation of Odisha Ltd (IPICOL) has engaged Engineers India Ltd (a Navratna PSU providing engineering and related technical services) to do the land assessment and submit a report on the technical and other requirements. The report is expected next month, post which IPICOL will make its recommendations. Nalco will have to purchase the land from the Odisha Industrial Development Corporation, government sources said. Clearances from different approval committees of the State have been received between September and November last year. According to Sanjeev Chopra, Principal Secretary, Industries Department, Government of Odisha, the State government is "actively promoting" investments in the downstream metal business across steel, stainless steel and aluminium sectors.

"The High Level Clearance Authority (headed by the Chief Minister, Naveen Patnaik) has already approved the (Nalco) project and land assessment is underway. This will be followed by land acquisition. Nalco's proposed downstream unit is expected to generate over 1,700 jobs and also give a fillip to establishment of ancillary units around it," Chopra told *BusinessLine*.

Downstream unit

For the planned downstream complex, Nalco expects to complete the project within 48 months of taking possession of land. The complex will house facilities for aluminium foils, rolled products and extrusions, with a combined capacity of 170,000 tonnes per annum. Production of aluminium alloy wheels, used in automobile industry, will also happen here, as per Nalco's plans. The Navratna PSU's enhanced focus on downstream applications comes at a time when its alumina arm is contributing handsomely to its gross turnover; and also Ebitda.

Previous proposals

According to Chopra, nine investment proposals worth ₹1,177 crore have already received the final nod post the biennial investors' conclave, Make-in-Odisha event, held in October last year. The single window for investor facilitation and tracking gave a go-ahead to Bharat Petroleum to invest ₹250 crore for setting up a biomass bio-refinery plant at Bargarh. Besides this, the other big ticket clearance was granted to Hindustan Sanitaryware Industries Limited for a ₹350-crore container glass manufacturing facility at Cuttack. Others include a ₹100-crore plant at Cuttack by Om Oil and Flour Mills Ltd, a similar investment by HIL Ltd to manufacture agro-chemicals at Chatrapur; and a ₹125-crore resort project by Mayfair Hotels and Resorts in Puri. Omjay EV Ltd will invest ₹53 crore for an e-rickshaw and e-scooter manufacturing facility at Jajpur, while Hindalco will set up a coal gasification plant with an investment of ₹60 crore at Sambalpur.

In the electronics and IT sector, Jaipur's Star GSM Upakaran Peripherals will invest ₹75 crore for a facility on the outskirts of Bhubaneswar; while Hyderabad-based C-TEL Infosystems will invest ₹65 crore to set up a research facility.

Source: Hindu Business Line

Steel Industry: The Real Steel Frame of India

Steel production, once solely associated with India's public sector, has been witnessing strong private sector participation, with more than 85% share in iron and steel production processing. India is the second-largest producer in global crude steel production after China and the EU since H12018, with a marginal dip in H2. The National Steel Policy 2017, the Domestically

Manufactured Iron and Steel Product (DMI&SP) policy, the amendment in the general financial rules (GFR), and the application of Bureau of Indian Standards (BIS) on steel products have been some policy initiatives taken to spur this sector.

Trade remedial measures, and resolving non-performing assets (NPAs) under the Insolvency and Bankruptcy Code (IBC) have also contributed towards enhancing domestic production. Preference to domestic value addition in steel output in GoI's procurement has not only encouraged 'Make in India' steel production but also contributed in increasing production capacity by 25.6% from 2014-15, with 75% capacity utilisation during 2017-18.

According to provisional Joint Plant Committee (JPC) data, by producing crude steel at 8.936 million tonnes (MT) in December 2018, India reached 106 MT production during 2018, a 5% increase year-on-year. During April-December 2018, this figure was 78.984 MT, thereby a growth of 4.30% over the corresponding period the previous year. This strong performance has been driven by private steel companies. Unlike the globally adopted trend, India is making most of its steel (57%) through the electric route, the rest being via the usual oxygen one. This trend is mindful of reducing carbon footprint.

The steel industry is highly energy-intensive. Almost 25% of the total energy consumed by industry in India is accounted by steel production. Besides its durability, steel also offers savings over the life cycle of products, particularly in terms of energy and iron ore required to produce them. Moreover, with 100% recyclability, steel scrap as an input is environment-friendly. However, not enough recycled steel scrap is generated domestically, and India is heavily dependent on imports (7.5 MT in 2017). As announced recently by Union steel minister Birender Singh, GoI is formulating a draft National Scrap Policy. This hopes to facilitate the seamless supply of recycled ferro scrap for steel-making with a focus on import substitution.

Congratulations!

The Delhi Chapter extends heartiest congratulations to YOGIJIDIGI collective on their receiving the Award "The Economic Times Most Promising Leader of Asia" from Mr. Y B Datuk Ignatius Darrel Leiking, Minister of International Trade & Industries, Government of Malaysia

To curb imports of substandard steel products and to enhance quality in general, BIS is increasingly being applied to more steel products. Today, 47 carbon steel products and six stainless steel products are covered under the Quality Control Order regime, covering 85-90% of carbon steel and steel products consumed in the country. With the BIS mark on their products, even small steel producers can compete with integrated large ones like the Steel Authority of India (SAIL) and Tata Steel.

India overtook Japan in January-December 2018 to become the world's second-largest crude steel producer. The need of the hour is to sustain this momentum by increasing demand by raising gross fixed capital formation as a percentage of GDP. An aggressive drive for the growth of infrastructure projects, building

of steel-intensive structures, enhanced construction activities, development of special-grade steel for the automobile sector and the like will be significant steps in this direction to look forward to in the furthering interim Budget announcement.

Source: Economics Times

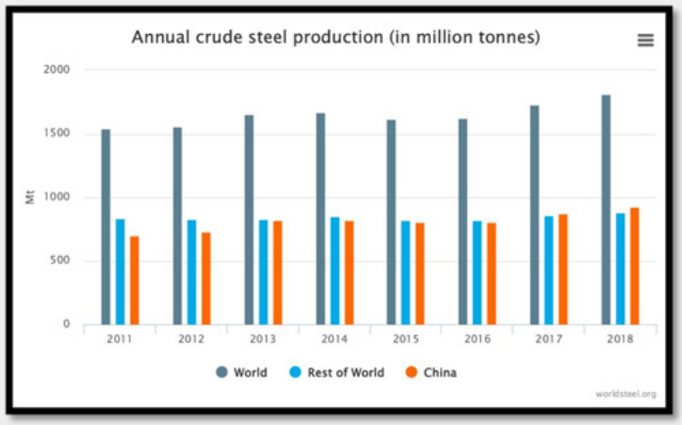
KIOCL-SAIL PACT

Pellet maker KIOCL said a few days back that it has entered into an agreement with Steel Authority of India Limited (SAIL) to set up a pellet plant. In December 2018, KIOCL had said it was planning to sign a memorandum of understanding (MoU) with SAIL to set up a pellet plant under a joint venture.

Source: Statesman

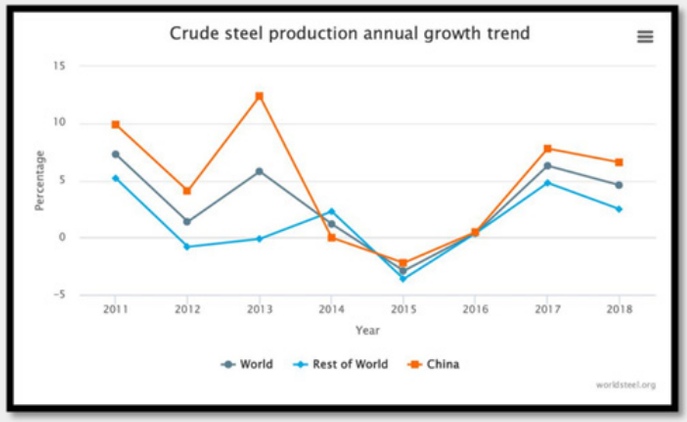
GLOBAL CRUDE STEEL OUTPUT INCREASES BY 4.6% IN 2018

Global crude steel production reached 1,808.6 million tonnes (Mt) for the year 2018, up by 4.6% compared to 2017. Crude steel production increased in all regions in 2018 except in the EU, which saw a 0.3% contraction.

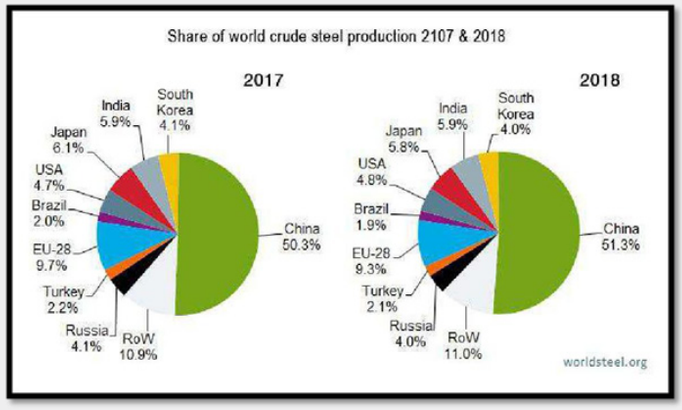


Asia produced 1,271.1 Mt of crude steel in 2018, an increase of 5.6% compared to 2017. China's crude steel production in 2018 reached 928.3 Mt, up by 6.6% on 2017. China's share of global crude steel production increased from 50.3% in 2017 to 51.3% in 2018. India's crude steel production for 2018 was 106.5 Mt, up by 4.9% on 2017, meaning India has replaced Japan as the world's second largest steel producing country.

Japan produced 104.3 Mt in 2018, down 0.3% compared to 2017. South Korea produced 72.5 Mt of crude steel in 2018, an increase of 2.0% compared to 2017.



The EU produced 168.1 Mt of crude steel in 2018, a decrease of 0.3% compared to 2017. Germany produced 42.4 Mt of crude steel in 2018, a decrease of 2.0% on 2017. Italy produced 24.5 Mt in 2018, up by 1.7% on 2017. France produced 15.4 Mt of crude steel, a decrease of 0.7% on 2017. Spain produced 14.3 Mt of crude steel in 2018, a decrease of 0.1% on 2017. Crude steel production in North America was 120.5 Mt in 2018, 4.1% higher than in 2017. The US produced 86.7 Mt of crude steel, up by 6.2% on 2017. The CIS produced 101.3 Mt, an increase of 0.3%. Russia produced 71.7 Mt of crude steel in 2018, up by 0.3% on 2017. Ukraine produced 21.1 Mt of crude steel in 2018, a decrease of -1.1% compared to 2017.



Annual crude steel production for South America was 44.3 Mt in 2018, an increase of 1.3% on 2017. Brazil produced 34.7 Mt in 2018, up by 1.1% compared to 2017. The Middle East

Top 10 steel-producing countries

Rank	Country	2018 (Mt)	2017 (Mt)	%2018/2017
1	China	928.3	870.9	6.6
2	India	106.5	101.5	4.9
3	Japan	104.3	104.7	-0.3
4	United States	86.7	81.6	6.2
5	South Korea	72.5	71.0	2.0
6	Russia (e)	71.7	71.5	0.3
7	Germany (e)	42.4	43.3	-2.0
8	Turkey	37.3	37.5	-0.6
9	Brazil	34.7	34.4	1.1
10	Iran (e)	25.0	21.2	17.7

produced 38.5 Mt of crude steel in 2018, an increase of 11.7% on 2017. Iran produced 25.0 Mt in 2018, up 17.7% on 2017. Turkey's crude steel production for 2018 was 37.3 Mt, down by 0.6% on 2017.

Source: World steel Association

SAIL scouting for locations in three states for steel plant

Steel PSU SAIL is considering locations in three states of Gujarat, Andhra Pradesh and Maharashtra to set up Rs 5,000-crore auto-grade steel plant in joint venture with ArcelorMittal, Steel Minister Chaudhary Birender Singh said. The steel minister has expressed that SAIL considered three places for putting up the plant. One in Maharashtra, another in Gujarat and the third place was in Andhra (Pradesh). The auto-grade steel plant project with a capacity of 1.5 million tonnes per annum would be scaled to 2.5 million tonnes per annum. According to official sources, negotiations were still under way with regard to detailed technical agreements of the joint venture. Domestic steel giant, SAIL in December last year announced that its board had approved a proposal to enter into a joint venture with the world's largest steelmaker ArcelorMittal for manufacturing high-end automotive steel. The PSU had also said that definitive agreements in that regard would be finalised in due course, subject to financial viability.

Source: JPC Bulletin

Moody's maintains stable outlook on Asian steelmakers

Moody's Investors Services said its outlook for the steel industry in Asia in 2019 is stable as China reduces capacity and enforces tough environmental rules. In 2019, demand for steel in Asia will likely stay at levels similar to that in 2018, indicating a softening from the robust growth seen in 2018, Kaustubh Chaubal, Moody's Vice-President and Senior Credit Officer, said in a statement accompanying a Moody's report, "Steel – Asia: 2019 Outlook."

"As for profitability, rated Asian steelmakers will see their profitability levels weaken mildly because of a decline in Chinese demand growth but stay strong overall." The stable forecast also reflects the direction taken by China's Purchasing Mangers' Index, which has sustained a score above 50 in recent months. A score above 50 signals expansion.

"As for profitability, rated Asian steelmakers will see their profitability levels weaken mildly because of a decline in Chinese demand growth but stay strong overall," he added.

Moody's noted that business conditions and profitability vary by company and the particular economy that steelmakers operate in. The profitability is underpinned by robust demand in South and Southeast Asia, as well as China's capacity cuts and strict environment protection measures, according to the report. Moody's also said its forecast on flat steel demand in China reflects higher infrastructure spending that will limit the negative effects of the ongoing US-China trade dispute and slower growth in China's real-estate investments. The Chinese steel industry drives the outlook for the sector in Asia because China is by far the regions largest steel customer and producer.

India, for instance, with the consolidation of its steel sector accompanied by solid demand, will allow robust profitability for Tata Steel Ltd (Ba3 positive) and JSW Steel Ltd (Ba2 stable). Moody's has said consolidation in the steel sector and solid demand for steel will support the robust profitability of Tata Steel and JSW Steel. The global ratings agency said demand

outlook in 2019 is likely to remain similar to 2018. While profitability may vary according to country and region, most Asian steelmakers are likely to see healthy profitability despite softening demand, it said in its latest report.

Tata Steel acquired Bhushan Steel now renamed Tata Steel BSL as part of the Corporate Insolvency Resolution process while JSW Steel has acquired Monnet Ispat. Earlier, the two debt-ridden companies Bhushan and Monnet were admitted to the National Company Law Tribunal and put up for auction. Meanwhile, the profitability of Japanese and South Korean steelmakers will diverge due to their exposures to various end-markets. "For Japanese companies, profitability will hold steady or improve slightly, but for South Korean Steelmakers like POSCO (Baa1 stable) and Hyundai Steel Co. (Baa2 stable), profitability will fall moderately in 2019," it added.

Moody's noted that the escalation of the Sino-US trade tensions will have a minimal effect on Asian steel demand because of the moderate indirect impact through supply chains and "manageable" direct impact on the macro economy. Our forecast of flat steel demand in China for 2019 reflects higher infrastructure spending that will limit the negative effects of the ongoing Sino-US trade dispute, and slower growth in China's real-estate investments," Kai Hu, a Moody's Senior Vice-President, was quoted as saying.

However, it also cautioned that potential US tariffs on imported vehicles pose key downside risks to Japanese and South Korean steelmakers. Moody's also pointed out escalation of trade disputes will have a limited effect on Asian steel demand, given the moderate indirect impact through supply chains. However, the spill-over impact could be greater, Moody's cautioned, adding that potential US tariffs on imported vehicles pose key downside risks to Japanese and Korean Steelmakers.

Source: Steel Insights

SAIL supplied nearly half of all the steel required Bogibeel Bridge

Steel Authority of India Limited has supplied nearly half of all the steel required for construction of the 4.94 km long Bogibeel Road-cum-Rail Bridge on river Brahmaputra, which was inaugurated by the Prime Minister Narendra Modi on December 25. It took 21 year-long wait by residents of Assam and Arunachal Pradesh for the completion of the double decker rail and road bridge. This led to a jump in the cost of the project which escalated by 85% to INR 5,960 crore from the sanctioned estimated cost of INR 3,230.02 crore. SAIL supplied around 35,400 metric tonnes of steel for the construction of Bogibeel Road-cum-Rail Bridge the company said in a statement. The state run steel company said it has supplied TMT Rebars, Plates and Structurals for the bridge, which has composite welded steel truss girders in its structures. Earlier, SAIL had also supplied 90% steel for the construction of the Dhola Sadiya Bridge, which is India's longest bridge.

Source: Steel 360

Steel consumption to grow 7% in FY20: ICRA

Domestic steel consumption is poised to grow at around 7% in FY2019 and FY2020, ratings agency ICRA has said.

The growth will be led by the government's thrust on infrastructure, affordable housing, power transmission and the Railways. This prompted the agency to give a stable outlook for the steel industry, in its year end assessment of the sector. However, despite robust demand, domestic steel production growth is likely to remain low at about 2.5-3% in FY2019 due to increased threat from cheaper imports combined with a considerable de-growth in steel exports due to rising global trade tensions. ICRA expects domestic steelmakers to increase the capacity further by about 16 million ton over FY2019 and FY2021. Additionally, with investments towards a ramp-up and debottlenecking of stressed

assets taken over recently, this would lead to an industry capex estimate of Rs 750-800 billion between FY2019 and FY2021. The industry's capacity utilisation level is expected to remain at a healthy 82-83 percent between FY2019 and FY2021, supported by a favourable domestic demand low greenfield capacities coming up in the medium term.

Export volumes are likely to stabilise however in FY2020, albeit at a lower level, with domestic steel production slated to grow at a higher rate of around 5.5-6%, supported by healthy domestic demand, the report added.

A flat demand growth forecast for China in CY2019 would keep average international prices and thus domestic prices lower in FY2020, than the current year levels, the report predicted. Elaborating on this trend, Jayanta Roy, senior vice-president ICRA said: "We believe that the steep reduction in international steel prices recently would make domestic steel imports cheaper in the coming weeks, when these shipments start hitting the Indian shores. This would in turn exert pressure on domestic steel prices in Q4 of FY 2019. Chinese hot rolled coil export offers have declined from US$ 560 per ton in the first week of October 2018 to US$ 476 per ton in the first week of December 2018. Despite an expected reduction in margins in H2 FY2019 over H1 FY2019, the domestic steel sector's overall profitability in FY 2019 is likely to remain higher than the previous year levels due to improved performance in the first half.

Domestic flat steel prices may go down

Domestic flat steel manufacturers may have to brace for a downward revision in prices, as threat of cheap imports into India in near-term has increased, according to another report by ICRA. It said domestic flat steel prices are likely to face temporary pressures from cheaper imports. The rating agency also said that expectations of lenient production curbs in China during winter months and rising steel output amid a seasonal moderation in demand have led to a steep correction in Chinese steel prices in November. "The threat of cheaper flat steel imports to India in the near term has increased and, as a result, domestic flat steel producers may have to brace for a downward revision in prices, especially in Q4 FY2019 (fourth quarter of 2018-19 fiscal)," according to the report.

The growth in China's steel consumption sequentially eased in the July-September period due to weakened demand from the auto sector, and some moderation in the property segment. On the other hand, steel production growth remained high at 5.8 percent and in anticipation of stricter environmental curbs during the winter months, production recorded an all-time high of 82.5 million ton in October. "However, following a shift in the government's policy from imposing blanket winter production curbs to allowing local governments to decide on meeting their individual emission targets, uncertainties about actual production cuts and the possibility of resultant supply glut in China have resurfaced," ICRA said.

According to the report, Chinese hot rolled coil export offers have declined from $560 per ton in the first week of October to $477 per ton at November-end. A major reason for the sharp correction in prices is the ongoing oversupply concerns in China during winter, leading to believe that seaborne steel prices would remain soft in the coming months. However, a typical pick-up in Chinese demand post the winter months is likely to lead to recovery in international steel prices in the next fiscal.

Even after a sharp fall in international steel prices, the anti-dumping duties in India on flat products do not kick in at the current price levels. As a result, steel imports, especially from free-trade countries such as Japan and South Korea, are likely to remain high in the coming months, which would keep domestic steel production growth under check, ICRA added. "While the domestic hot-rolled coil prices are currently trading at a marginal premium over imported prices, we believe that the steep reduction in international steel prices recently would make steel imports cheaper from January 2019 onwards, when these shipments start hitting Indian shores, and would, in turn, exert pressure on domestic steel prices in the fourth quarter of FY2019," he noted.

Source: Steel Insights

NINL's Blast Furnace Achieves 110% of Rated Capacity

Odisha's Kalinga Nagar-based Neelachal Ispat Nigam Limited set another benchmark in production with highest ever single-day Hot Metal output of 3412 tonne on 15th December, 2018 surpassing the previous best of 3105 tonne recorded on 28th June this year. With this, Brahmani, the Blast Furnace of the company, achieved 110 percent of the rated capacity. The company has been climbing new heights in production soon after completing its Blast Furnace capital repair in April this year. Subsequently it established international benchmark of achieving rated production in 12 days of blow-in. Mr. S S Mohanty, Vice-Chairman & MD, NINL, congratulated the team and all concerned in and around. NINL resumed Billet production by restarting its state-of-the-art Steel Melting Shop which is the second milestone, the company has planned for the turnaround of the plant. NINL had achieved the first milestone with the completion of the Blast Furnace and expects to achieve the third milestone with operation of its captive Iron Ore mines towards the end of the present Financial Year. The company has also plans to produce TMT Bars and Wire Rods soon.

Source: Business Standard

Collaborative research required between coal, power & steel sectors

Coal is a commodity which drives an economy and the steel industry is a little worried that if the first preference of supply of coal, especially coking coal, should go to the power sector, and not the steel industry. Steel can be purchased. But power cannot be, reminded Subrata Mitra, Joint Managing Director, M N Dastur & Co. (P) Ltd, while speaking at the 12th Indian Coal Markets Conference, which was organised by mjunction services limited recently. Endorsing that this was a vast subject, Mitra said steel in particular demands coal and its scarcity is a huge hindrance to its development. Because, he emphasised, the steel industry has to grow if the country has to grow. It is well-known by now that India has a target to take its crude steel production to 300 mt by 2030-31. To achieve that goal the steel mills will require a lot of iron ore, deposits of which are ample in the country. But India does not have good quality coking coal which increases the operating cost, and impacts quality of the end-product, Mitra said. The Jharia belt is the only coking coal supply resource in India.

"But the best of that coal used to be utilised in running steam engines for decades. At that time, there was no steel demand. The coal was only sourced from Jharia and Raniganj belts. Jharia coal was the best and the top part near the surface has hard coking coal which is desired for making coke. Over the years, that hard coking coal has diminished. And we now have with the inferior varieties in the Jharia belt which has called for beneficiation and washing. Washing has been there for the last 100 years but it has to increase," Mitra emphasised.

But why is coal so important for the steel industry? First, coal is converted to lump coke in a coking oven. Then raw iron is made by reducing (removing the oxygen from) iron ore (iron oxide) by reacting it at high temperature with coke in a blast furnace. About half of the carbon in the coke combines with the oxygen from the iron ore to make CO2. Since we do not have enough coking coal, we keep on importing it.

Quality comparison of typical Indian and imported Australian coking coal

Coal/ Coke Parameters	Australian Coking Coal	Indian washed Coking Coal	Remark
Proximate Analysis			
Moisture (%)	1 - 2	2 - 2.5	
Ash (%)	7.5 - 9.8	15.24 - 18.03	Higher in Indian coals. It is upto 40% to 45% before washing
Volatile Matter	19.3 - 24.3	18.58 - 24.84	
Ultimate Analysis			
Carbon (%)	88.3 - 90	70.9 - 75.1	
Hydrogen (%)	4.67 - 5.0	4.03 - 4.23	

Nitrogen (%)	1.8 - 2.06	1.08 - 1.57	
Sulphur (%)	0.55 - 0.7	0.57 - 0.83	
Phosphorus (%)	0.007 - 0.07	0.026 - 0.18	
Petro graphic Analysis			
Vitrinite (%)	55 - 70	46.5 - 55.0	Lower in Indian coals
Liptinite (%)	0 - 1	0 - 4.4	
Exinite (%)	0	0	
Inertinite (%)	27 - 42	38.1 - 45.6	Higher in Indian coal
Mineral Matter (%)	2 -4	5.9 - 9.9	Higher in Indian coal
Vitrinite Reflectance (Rmax)	1.17 - 1.55	0.98 - 1.3	Lower in Indian coal

It is cyclic and the import cost goes into steel as a result of which we are unable to compare in the market," Mitra added. China has huge amounts of coking coal and naturally supplies to the rest of the world. The United States has some of the best coking coal grades and has reaped the benefits. Some other countries like South Africa, Russia and Kazakhstan too have deposits of this precious commodity.

Way forward

In that case, how will the industry, which depends so much on coal, survive in the face of scarcity of the material?

Mixing of non-coking and coking coal:

Mitra said coal beneficiation thus is the way forward and has to be sustained. Mixing of coking and non-coking coal has come into play and India should think more extensively along such line since it has more than 300 billion tons of non-coking coal reserves. About 10-15 percent of the mix is taking place but in the US this has gone up to 40 percent. "However, the ash in that mix also has to be lowered. High ash only reduces the yield and output of the final product. That is why washing has to come up in a big way. Mixing of non-coking and coking is a big endeavour whose importance industry players are beginning to realise because it can reduce the reliance on imported coking coal," Mitra said.

Coal to chemicals and fertilizers - a new era:

Methanol: A policy is expected for coal blending with gasoline. Hence, there is likely to be a strong market demand for it in the next decade. This can reduce the gasoline price up to 15 percent by reducing crude oil imports. "Converting coal to fuel is another initiative that has started by mixing it with petroleum and reducing the use of petroleum," Mitra observed.

"Coal gasification is coming up in a big way and some of the industries in India have installed plants where coal is being gasified and then used as fuel. We do not have enough of natural gas or much of petroleum. So huge amount of coal can be converted into gas, which, in turn, can be used as fuel and reductants for making direct reduced iron. DRI can be converted into steel for which we, of course, require some amount of power and thus that is again connected to coal. So the fundamentals bog down to using non-coking coal to the extreme after washing. Washing reduces the ash content. The more the ash content the more yield loss and the more we suffer. So non-coking coal utilisation is coming up in a big way and that has to be harnessed substantially for the country to grow industrially," Mitra said, adding that since we do not have enough natural gas and petrol and, of course, coking coal, we must use what we have to the extreme, and that is non-coking coal.

Coal is the most trustworthy Indian energy choice and the major coal consumption in India occurs in the power, steel, chemicals and fertilizers and cement sectors and high ash-coal can be gasified at $5-6/mmbtu for iron production.

Urea: There is strong demand of around 38 million tons per annum (mtpa) in India by 2025. A policy from the Government of India is expected very soon for determination of the subsidy. The coal gasification route is preferred as methanol and urea production economics from natural gas may not be viable in India in future. "Nowadays, society is more concerned about protecting the environment and a question arises that if we do gasification of coal,

produce methanol and fertilisers like ammonia etc, then probably there will be more emissions of carbon capture technologies. But if we can introduce carbon credit models then we can go forward to blend methanol with gas online up to 15-20 percent to reduce the price and also improve the octane," Mitra said, adding that coal has to be used for fertilizer preparation and it is an area that is coming up.

CO_2 efficiency: But Mitra added that CO2 efficiency control is another important area that can be optimized through multiple process routes, efficiency, digital innovation and carbon abatement. There has to be a combination of process routes and capacity for optimal product, process mix and flexibility. "There is a need for cost-effective and sustainable DR route through coal gasification. Mix and match BF-BOF and DR output for hedging risk and optimizing cost. Carbon efficiency is of utmost importance across the world. Whatever be the steel-making route, we ultimately land up in using coal. Thus, that again needs beneficiation of coal," Mitra added.

Strategic areas

What are the strategic areas that need to be looked into with regard to sustaining competitiveness in the steel industry?

Unless steel grows, industry does not grow. If industry does not grow, coal suffers. So all are interconnected, he stressed.

The three strategic investment areas for world class competitiveness that drives the steel industry:

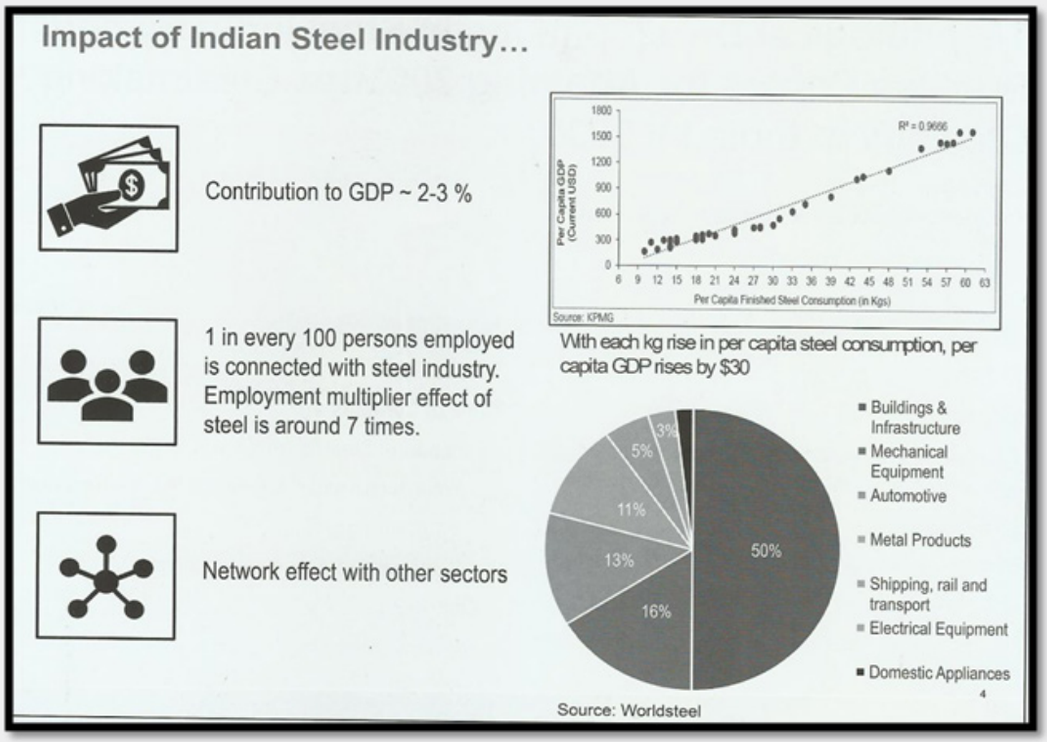
- Flexible & intelligent capacity:
  a) Flexible and resilient capacity expansion
  b) Gasification for steel
  c) Carbon capture & policy
- Logistics & supply chain
  a) Logistics efficiency
  b) Slurry pipelines
  c) Coastal steel clusters
- Productivity & digital transformation
  a) Operations & productivity
  b) Energy & carbon efficiency
  c) Digitally-enabled operations

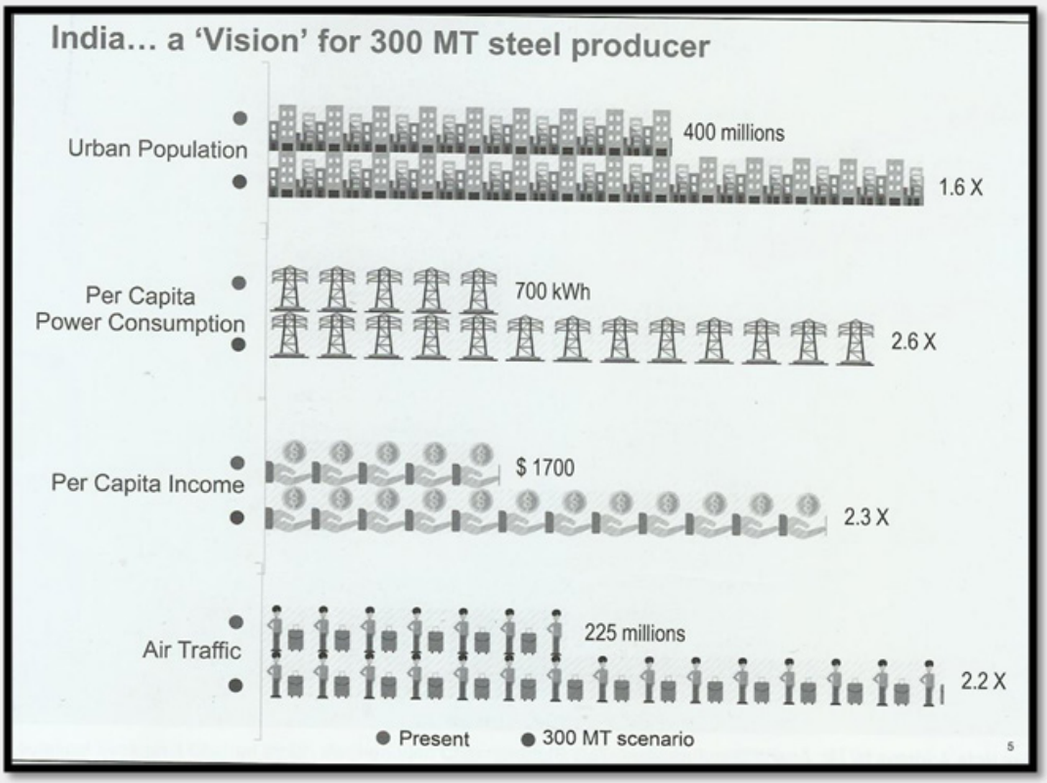
Conclusion

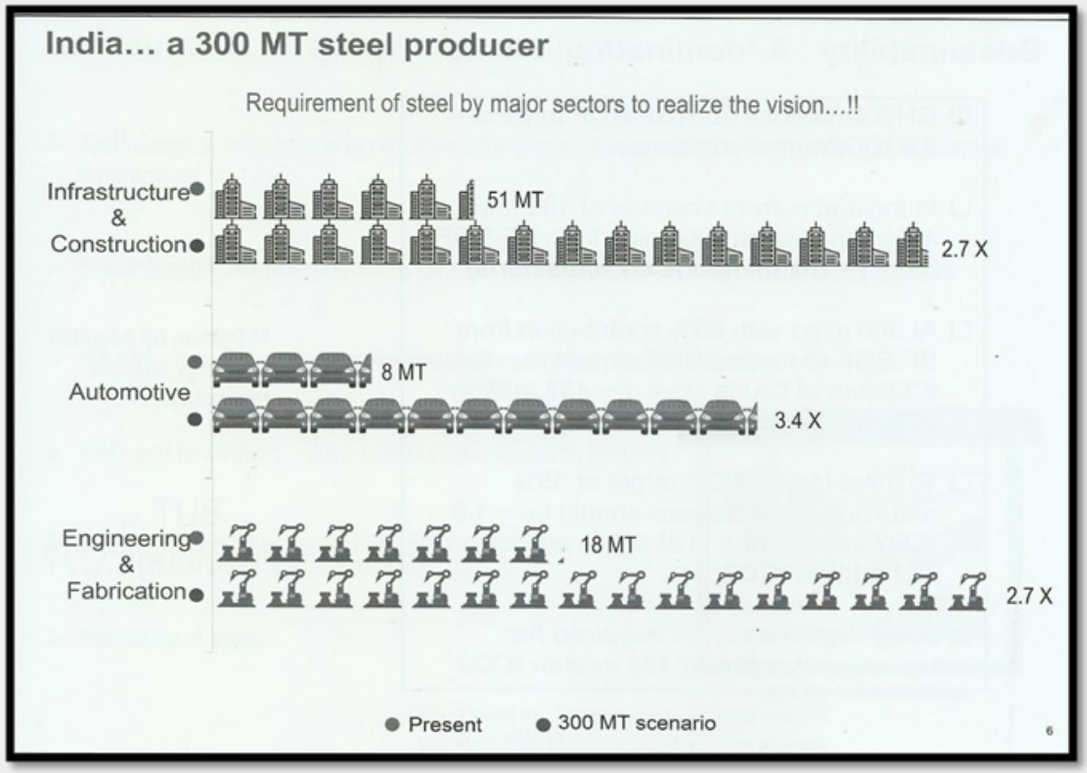
So what has to be done by the coal industry? "We feel there has to be good interface between the metal and coal industries for R&D activities. There has to be good collaborative efforts between the steel and power sectors for making good use of whatever reserves nature has given us," concludes Mitra.

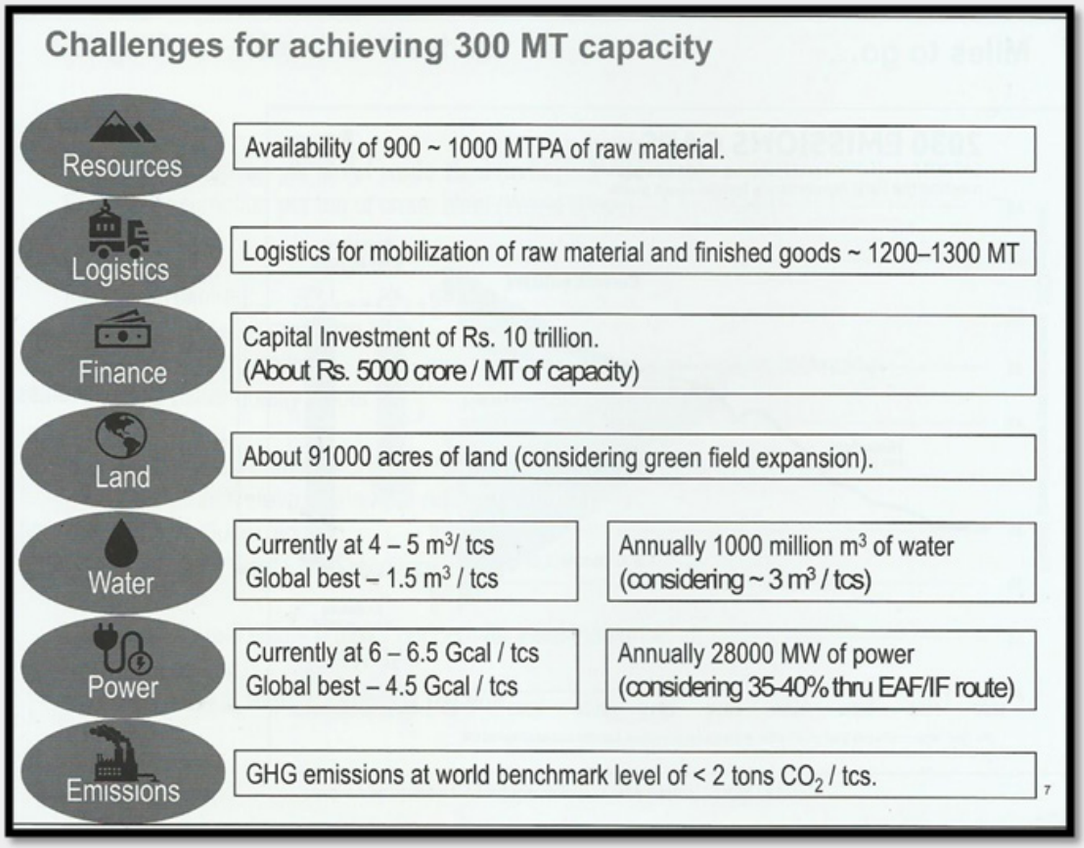
Source: Steel Insights

Technological Development in Steel Industry and Process Routes for Attaining 300Mtpa Steelmaking Capacity in India by 2030






India... a 300 MT steel producer
Requirement of steel by major sectors to realize the vision...!!
Infrastructure & Construction
51 MT
2.7 X
Automotive
8 MT
3.4 X
Engineering & Fabrication
18 MT
2.7 X
Present
300 MT scenario
6


Challenges for achieving 300 MT capacity
Resources
Availability of 900 ~ 1000 MTPA of raw material.
Logistics
Logistics for mobilization of raw material and finished goods ~ 1200–1300 MT
Finance
Capital Investment of Rs. 10 trillion.
(About Rs. 5000 crore / MT of capacity)
Land
About 91000 acres of land (considering green field expansion).
Water
Currently at 4 – 5 m3/ tcs
Global best – 1.5 m3 / tcs
Annually 1000 million m3 of water
(considering ~ 3 m3 / tcs)
Power
Currently at 6 – 6.5 Gcal / tcs
Global best – 4.5 Gcal / tcs
Annually 28000 MW of power
(considering 35-40% thru EAF/IF route)
Emissions
GHG emissions at world benchmark level of < 2 tons CO2 / tcs.
7

Sustainability : A '*dominating*' theme

- GHG emissions from BF-BOF route is ~ 2.6 tCO2/ton of crude steel.
- In India at current scenario of 100 mtpa, 40% contribution is coming from BF-BOF route ***(~ 104 million tCO2 emissions)***
- At 300 mtpa with 60% contribution from BF-BOF route and GHG emission ~ 2.4 tCO2/ton of Crude steel ***(~ 432 million tCO2 emissions)***
- To meet India's NDC target of 35% reduction the emissions should be ~ 1.8 tCO2/tcs resulting in absolute emission of **324 million tCO2**
- ***Mitigation measures required for reducing the gap of 108 million tCO2***

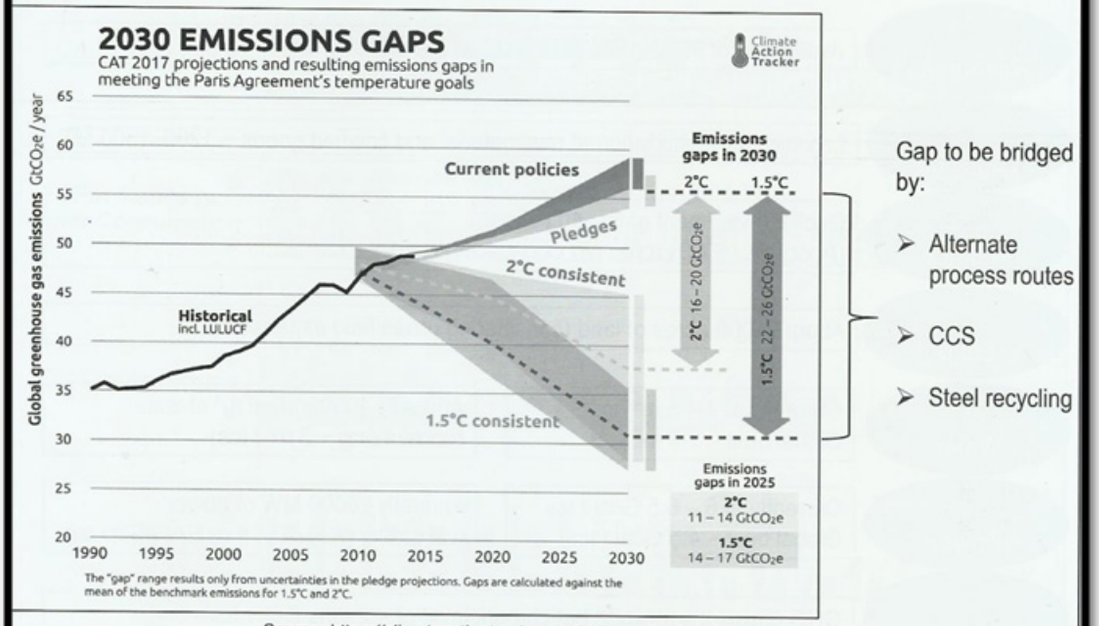
→ Mitigation by adoption of energy efficient technologies

BUT...
Is it enough...??

Present: BF-BOF (40%) and @300 MT: BF-BOF (60%)
Absolute emission figures are for BF-BOF route only

8

Miles to go...



Gap to be bridged by:

- Alternate process routes
- CCS
- Steel recycling

Source: https://climateactiontracker.org/global/cat-emissions-gaps

9

Strategies

- Technological Innovations in processes for 'green' steel making to limit rise in global average temperature to < 2°C.
- Breakthrough technologies via innovation and exploration of new production processes.
- M&A's to improve on existing technologies and best practice transfer.
- R&D and innovation – Joint collaborative research projects.
- CCS – Carbon Capture and Storage.
- Recycling of steel.

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Mitigation – Need of the hour

Energy consumption per ton of crude steel (India) – 6 - 6.5 Gcal
Energy consumption per ton of crude steel (World Class) – 4.5 - 5 Gcal

Initiatives required:
- Technological upgradation
- Waste heat Utilization
- Use of better quality inputs

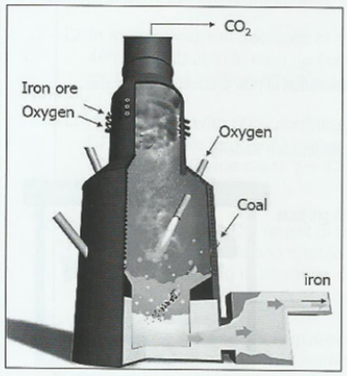
} Towards 'green' steel making technology

Following projects commissioned under the coordination of MoS
- Blast Furnace stove waste heat recovery
- Coke Dry Quenching
- Sinter cooler waste heat recovery

Utilization of steel slag – a major concern for steel industries…!!
- Steam ageing
- Conversion to High Phosphorus Pig Iron

Bridging the gap under CO_2 breakthrough programme

HIsarna Process



- Raw materials
  - Uses iron ore fines
  - 100% non coking coal and oxygen
- Unlocking VALUE of high P and high Al2O3 ores
- Unlocking new products, low P steels
  - Producing low P steels from indigenous ores
- Environment & Physical foot print
  - CO_2 and other emissions – Low environmental foot print
  - No coke, sinter and pellet plant needed
- Recycling enabler
  - Use of LD slag (0.12 – 0.20 mtpa) to replace imported limestone

Up to 80% CO_2 reduction (using CCS/CCU)

12

Source: Steel Tech