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K L Mehrotra - Chairman, Delhi Chapter | **S C Suri** - Editor-in-Chief (IIM-DC Newsletter)

In The Issue

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Jawahar Dhatu Bhawan, 39, Tughlakabad Institutional Area
M B Road, Near Batra Hospital, New Delhi-110062
Tel: 011-29956738, Telefax: 011-29955084
E-mail:iim.delhi@gmail.com; Website: iim-delhi.com

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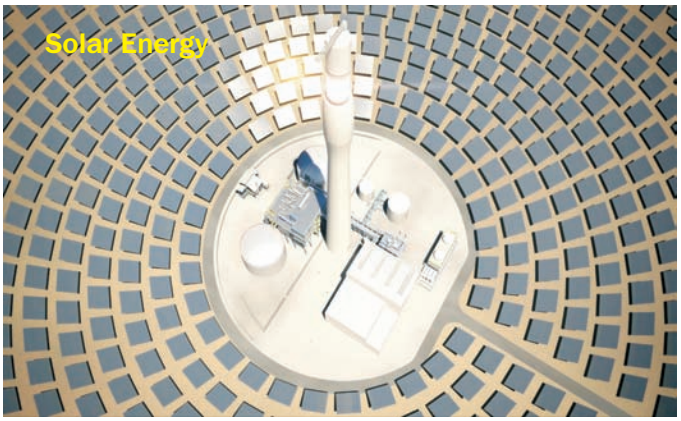

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TATA STEEL'S KALINGANAGAR PLANT TO START BY SEPTEMBER

Tata Steel is getting ready to commence "integrated, commercial production" of the first phase of the 3-million ton steel plant in Odisha by September and is keen to keep the project cost below the projected Rs 25,000 crore.

"Integrated commissioning of all units for the first phase will take another six months. Project cost remains within the revised budget and even it could lower," said Rajiv Kumar, Tata Steel Vice-President, Operations (Odisha).

The company is gradually synchronising integrated steel plant components like blast furnace, coke oven, sinter plant, captive power units and hot rolling, among others in stages, he said.

The timeline and cost was revised in 2011 in the wake of delay in land acquisition, which pushed back the project by four years.

Kumar did not share the cost of the original project, the MoU of which was signed with the Odisha government a decade ago.

With the Kalinganagar first phase, capacity of the steel major is expected to go up to 13 mt in India.

Kumar indicated that demand and the market scenario could play a big role in construction of the second phase.

He said that the greenfield plant would produce 3 mtpa of steel in the first phase and later the capacity would be ramped up to 6 mtpa. No time-frame for scaling up the capacity has been announced.

"We need to have the market share intact as the Indian steel market grows. Accordingly, we will plan that," he said when asked about time period for ramping up production to 6 mtpa.

The Kalinganagar plant will be spread over 3,470 acres, of which, about 900 acres are not under the company's possession at present. "Out of the total land required, we are in the process of getting 900 acres," Kumar said.

The company will eventually source iron ore from the Khonbond mine located in the Keonjhar district of Odisha.

"We have a dedicated iron ore mine at Khonbond around 200 km away from the plant. The mine is being developed. Right now, we are getting iron ore from Joda (Joda East Iron Mine)," he said.

"Close to Rs 2,000 crore is being invested to develop the mine and investment for mining development is separate from the Rs 25,000 crore investment in the Kalinganagar plant," he said.

Hundred percent flat, lighter and higher tensile strength steel will be produced at the plant. The product portfolio will be expanded to high-grade flat products for application in ship-building, Defence equipment, energy and power, infrastructure, aviation and lifting and excavation, Kumar said.

A 202-MW gas-based captive power plant, using gases discharged by the coke oven and blast furnace, will also be commissioned at the plant.

The company had signed an MoU with the Odisha government way back in 2004 for setting up the plant. Subsequently, some events in 2006 over land acquisition and police firing pushed the project back by about four years, he said.

Kumar said: "Resettlement and Rehabilitation (R & R) initiatives taken by the company helped to gain the confidence of the people."

Later, in 2011, the company sought its board's approval for the revised scheme.

"We took a major drive in R & R initiatives. So far, 1,084 families have been rehabilitated out of the total 1,234 displaced families. Around 150 families are yet to be rehabilitated," said Parthasarathi Mishra, Chief of Human Resource Management at the Kalinganagar and Gopalpur projects of the company.

Tata Steel's Kalinganagar blast furnace to be largest in India

The blast furnace at Tata Steel's new greenfield plant at Kalinganagar in Odisha is tipped to be the country's largest.

The furnace with a production capacity of 4,330 cubic metres will produce 3.2 million tons per annum (mtpa) of hot metal per annum.

Prior to Kalinganagar, Kalyani, the blast furnace at the Steel Authority of India's new and expanded IISCo Steel Plant at Burnpur, commissioned on December 1, 2014 was the country's largest with a capacity of 4,160 cubic metres. It was followed by Durga, the new blast furnace at SAIL's Rourkela Steel Plant, with a capacity of 4,060 cubic metres which was commissioned in August 2013.

With the first phase at the Kalinganagar plant being commissioned, Tata Steel's total domestic production is poised to go up to 13 million tons per annum (mtpa), while its flat product production will

rise to 10 million tons (7 million tons in Jamshedpur and 3 million tons in Kalinganagar).

Apart from the large blast furnace, Kalinganagar also has the first twin wagon tippler allowing unloading at the rate of 3,500 tons per hour. It will be the first such installation for bulk material handling in the country.

At the steel melting shop with a 4.1 mtpa capacity, the country's largest LD converter of 310 tons will be in operation. The plant's hot strip mill, presently having a 3.5 mtpa capacity, can go up 4 million tons.

Co in no hurry for second phase

Tata Steel is in no hurry to start work on the second phase of its 6 million tons steel plant at Kalinganagar in Odisha, said T V Narendran, Managing Director.

According to him, the company will look at future cash flow and demand for flat products before taking a call on expansion plans.

"The focus for us is to stabilise operations of the first phase of the Kalinganagar plant. The plant is expected to be fully operational in the next few months," he said on the sidelines of the annual regional meeting of the Confederation of Indian Industry (CII) held recently in Kolkata.

The first phase of the Kalinganagar plant will have a capacity of 3 mt and the second phase will have a similar capacity.

"First, we have to assess the cash flows before deciding investments for the next phase of expansion of the plant. We will also have to take into account the future demand of steel," he added.

Capacity addition

Currently, Tata Steel produces 10 mt from Jamshedpur, of which 7 mt are flat products, while 3 mt are long products.

"We have a 3 mt capacity for long products, but if domestic demand increases, we can always import from our capacities in South-East Asia," he said.

Source: Steel Insights

WHY THE WORLD HAS TOO MUCH STEEL

The two giant furnaces at Port Talbot steelworks, Britain's biggest, were still hard at work, pouring out vast quantities of molten iron. But production of steel from iron ore here may soon come to an end. At the end of March, the plant's owner, Tata Steel, said that the operation was losing more than £1m ($1.45m) a day due to the low price of steel on global markets, and that it planned to sell off or close down its British operations as it could no longer shoulder the losses; bidders were given until May 3rd to state whether they were interested in buying it. (So far two bidders have gone public, one a management buy-out and a second by Liberty House, an international metals group.) Britain's steel industry is not the only one in the West feeling the pinch from low steel prices. Both Belgium and Italy are spending public money to keep their steel mills open and the American industry there has been announcing a steady flow of job losses. Too much supply and not enough demand has been blamed for the falling prices. So what is causing the world's glut of steel?

GEOPOLITICAL POWER INDEX 2016

	US	CHINA	UK	INDIA	FRANCE	GERMANY	RUSSIA	JAPAN	BRAZIL	S.AFRICA
Economy	8(+)	9(-)	4(+)	7(+)	5(-)	8(-)	5(-)	5(-)	4(-)	5(-)
Development	8	5(+)	7	3(+)	7	9	6	8	5(+)	5
Military	10(-)	9(+)	7(+)	6(+)	7(+)	5(+)	8	4(+)	4	4
Governance	8	2	7	3(+)	6	8	3(-)	5	5	4(-)
Innovation	9(+)	7(+)	6	4(+)	5(-)	8	7	7(-)	5(+)	5(+)
Geography	7	9	5	5	5	4	9	4	7	6
Population	5(+)	8(-)	5(+)	8(+)	5(-)	4(-)	5(-)	4(-)	7(+)	5(+)
Culture	9(-)	7	7(-)	7(+)	7(-)	4(+)	5(-)	7	6(+)	6(+)
Religion	6	2	5	7	5(-)	3	4	6	5	5
History	5	7	7(-)	7	7(-)	4	5	4(+)	5	7(-)
Diaspora	5	7(+)	5(-)	7(+)	4	5(-)	4(-)	4	4	4
TOTAL SCORE	80	72	65	64	63	62	61	58	57	56

(ALL CATEGORY RANKINGS ARE ON A SCALE OF 0 TO 10. THE (+) SIGN DENOTES POSITIVE TREND IN A CATEGORY; THE (-) SIGN DENOTES NEGATIVE TREND; NO MARKING DENOTES NEUTRAL TREND. HIGHEST AGGREGATE SCORE IS 110 ACROSS 11 PARAMETERS. © MINHAZ MERCHANT – GLOBAL INTELLIGENCE REVIEW)

The collapse in the price of steel is mainly the result of falling demand and, until recently, rising production in China, says Edwin Basson of the World Steel Association, an industry group. Between 2000 and 2014, global production doubled from around 800m tonnes to around 1.6 billion tonnes a year, mainly driven by rising output in China. Until 2014, Chinese demand rose at approximately the same rate as its steel mills could produce, meaning that the impact on the rest of the world was limited. But as its construction boom came to an end, demand sagged, prompting the country's state-owned steelmakers to sell their growing surpluses on foreign markets. Exports of steel from China increased from 45m tonnes in 2014 to 97m tonnes last year—marking a bigger rise than Germany's entire output of the past year: 43m tonnes. This has triggered demands from rival firms for protection, from what they see

as dumping.

Many economists argue that government subsidies are responsible for the overcapacity in the industry lasting so long. The flood of Chinese steel around the world should have caused high-cost producers elsewhere to extinguish their blast furnaces, eventually allowing supply and demand to reach a new equilibrium. But because steel is often seen as a strategic industry, providing lots of jobs in areas where there are few other employers, governments are usually keen on propping them up, either through subsidies or nationalisation. China has overproduced steel for so long because regional Communist Party officials, who control local steel plants, prefer to subsidise their local plants to keep them open rather than risk the unemployment and unrest that may follow shuttering them. In Europe, Italy has spent €2 billion to support the Ilva steel mill in Taranto. And even in Britain, where nationalisation has long been out of favour, the Conservative government has expressed a willingness to take a 25% stake in the Port Talbot steelworks.

Rising steel prices in America and Europe since January have raised hopes that plants such as Port Talbot may soon be able to break even without any government assistance. But many commodities and metals analysts predict this will simply encourage Chinese plants to increase production again, causing more overcapacity and lowering prices again later this year. About two months back, the OECD, a club of rich countries, convened a bunch of ministers in Belgium to discuss measures to deal with the crisis. But until countries stop subsidising their plants, or imposing tariffs to artificially raise prices, progress towards ending the steel glut will be slow.

Source: http://www.economist.com

Global Steel Demand Set to Rise Predicts Arcelor-Mittal

When an industry is in doldrums, it looks for reassurance from some of the bigger stake holders in the industry. In that regard, it is indeed heartening news for the steel industry, that Arcelor-Mittal, the biggest steel producer in the world has stated that steel consumption is going to rise in the coming financial year following one of the most disappointing periods in the recent history of the steel industry.Over the past year or so, the global steel industry has probably gone through its most trying period for many years and plenty of global steel giants have found the going tough in a global business climate that has seen steel prices crash overnight due to a glut of steel from China. Plenty of steel factories at different parts of the world have had to be closed down since the business had become commercially unviable for many major corporations and one of the most widely reported closure was that of the TATA Steel plan in Wales since the company was losing £1 million each day.

In addition to that, steel stocks have also taken a royal beating at all the leading stock exchanges across the world and in such a situation, the reassurance from the world's leading steel producer would certainly come as a welcome boost for the industry at large. Analysts at the company believe that the consumption of steel on a global scale is going to be stabilised in the near future and they expect that total demand would increase by 0.5%. The projected increase in demand is due to increase in demand from China, one of the biggest steel consumers in the world and there is no doubt that this would come as great relief to steel companies all across the world, who have reported huge losses this past financial year. Arcelor-Mittal have themselves reported a loss this year to the tune of a jay dropping £287 million for the financial year. However, it is important to take not that the company is not exposed to the Chinese market and hence some of its forecasts should be taken with a pinch of salt.

Source: http://www.newseveryday.com

Probes start into steel, aluminium dumping

JSW, SAIL, Essar seek anti-dumping duty on some categories in steel; Vedanta, Hindalco want safeguard duty in varieties of aluminium.

Three major steel companies have sought anti-dumping duties (ADDs) on cold rolled steel products.

Alongside, Vedanta and Hindalco have sought imposition of safeguard duty on import of unwrought aluminium. Investigations have begun on both.

On an application filed by JSW Steel, Steel

Authority of India and Essar Steel, the Directorate General of Anti-Dumping & Allied Duties (DGAD) has initiated the investigation, said a person privy to the development. The investigation has started even after safeguard duty and minimum import prices (MIPs) on various steel products have been levied by the government.

"We have initiated investigation on CR steel products from China, Japan, Korea and Ukraine," a government official confirmed.

In the case of aluminium, the Directorate General of Safeguards (DGS) has initiated a probe into increased import of unwrought aluminium allegedly injuring the domestic industry. The period of investigation is 2011-12 till 2015-16. The application, filed by Vedanta, Bharat Aluminium Company (Balco) and Hindalco, has sought "immediate imposition of a safeguard duty on the imports of unwrought aluminium for four year", both for alloyed and non-alloyed wrought aluminium products.

As reported earlier by this newspaper, DGAD' is also investigating another complaint by five major steel companies on products of one category, hot rolled (HR) flat products of non-alloy and other alloy steel, in coils of a width of 600 mm or more. Apart from the three previously mentioned, these five major companies include Jindal Steel & Power and Tata Steel.

In September, the government had imposed a 20 percent safeguard duty for six months on various products of the HR category. Last month, it extended the duty for two and a half years, saying increased imports threatened serious injury to domestic producers.

In February, the government had also imposed an MIP for six months on 173 steel products, to protect domestic companies from cheaper import. And, the steel ministry is working with the finance ministry on a financial package for the sector.

"Both the anti-dumping applications, for the HR and CR steel products, were sent within a small time interval," said the source.

DGAD is also investigating a complaint by Jindal Stainless for imposition of countervailing duty on various stainless steel products. The steel ministry said imports were down 25 percent over a year before in the first 11 months of 2015-16. In 2014-15, imports were 9.3 million tonnes; in 2015-16, these would be seven mt.

In the latest available data, China has had 166 anti-dumping investigations initiated against it, with duty imposed on 134 of those. There are 11 new cases currently being investigated in the case of China, of a total of 32.

While the department of commerce recommends an ADD, it is the finance ministry which levies it. The petitioners should account for at least 25 percent of total domestic production to appeal for an investigation. The probe normally takes a year and may be extended by six months. Preliminary findings are normally to be made within 60-70 days and a provisional duty may be imposed, for six months and extendable till nine months in certain circumstances.

The domestic aluminium industry has asked for an increase in import duty to 10 percent from the current 7.5 percent. It was five percent till revised in this year's Union Budget. The import of aluminium rose 78 percent between 2011-12 and 2015-16, touching 432,000 tonnes. Domestic production rose 43 percent in the period, to reach 1.5 mt.

The applications have said, "The profitability of the domestic industry has deteriorated in the recent year (2015-16) and the domestic industry is now suffering financial losses." The application, reviewed by Business Standard, also said the market share of imports had increased to 15 percent from 11 percent over four years.

The DGS notice for investigation said, "After examining the application on different economic parameters, it is seen that prima facie, despite improvement in productivity, increased imports of PUC (alloyed and not alloyed unwrought aluminium) in absolute terms have caused losses to the domestic industry and are threatening to cause serious injury to domestic producers of PUC."

Safeguard duty is allowed under World Trade Organisation rules as a temporary measure. The purpose of ADD is to rectify a trade-distortive effect when goods are exported by one country to another at a price lower than its normal value.

In June last year, India imposed ADD of up to $316 a tonne on import of certain steel products from three countries, including China.

Source: Business Standard

New fund to address capital problems of stressed steel sector

The government is looking to create a separate fund under the NIIF, the country's first sovereign wealth fund, to address the capital requirement of domestic steel companies.The Rs 40,000-crore National Investment and Infrastructure Fund (NIIF) will operate as the mother fund, which will have several sectoral funds under it. However, the sizes of the funds are not known.

"The government is working to operationalise the NIIF…we are trying to see how we can structure something for the steel industry there, which will definitely go a long way in bringing down the capital costs," steel secretary Aruna Sundararajan said.High capital cost is one of the main reasons impacting the competitiveness of the domestic steel industry. "The government is developing long-term funding for sectors, including steel, while the Reserve Bank of India (RBI) has brought the 5/25 format, where there is a recognition that you cannot expect industries like steel to repay their loans in short spans of five to seven years," she said.The 5/25 norms allow banks to extend long-term loans of 20-25 years to match the cash flow of projects, while refinancing them every five or seven years.

The NIIF will invest in greenfield, brownfield and stalled projects, which are commercially viable. The government will invest Rs 20,000 crore in the NIIF and the remaining amount will come from private investors. The fund will also facilitate foreign investment in India, particularly in the infrastructure sector.Finance minister ArunJaitley announced setting up of the NIIF while presenting Budget 2016.Gross non-performing assets (NPAs) — loans that do not yield returns — in the banking sector surged to over 6% of total advances as on March 31, 2016.Steel is one of the most stressed sectors. Bankers recently met representatives of debt-laden companies, including Jindal Steel & Power Ltd, Bhushan Steel, Essar Steel, Visa Steel and Adhunik Metals, in Mumbai, to conduct a review of loan repayments and explore possible options of bringing in strategic investors. According to a Financial Stability Report by the Reserve Bank of India (RBI), five out of the top 10 private steel companies are under severe stress.

Jaitley also said that the steel industry accounts for the largest proportion of banks' NPAs. "The biggest contributor in the NPAs is steel sector. Because if our companies will not be able to sell their steel, it is obvious that they will not be able to repay bank loan and the interest upon it."Steel, a key alloy used for making cars and consumer goods and in building houses, has seen a major drop in demand after China, the world's largest consumer and producer of the material, hit a major slowdown.

Source: www.hindustantimes.com

Steel, finance ministries drafting steel package

The steel and finance ministries are working on a package for the steel sector that will be finalised in the next two months, according to Steel Secretary Aruna Sundararajan.

A number of options are being considered, including bringing investments by overseas investors in domestic steel companies, Sundararajan said.

"There is a broad range of proposals that include banks taking certain equity as redeemable preference shares and then giving the companies enough time to redeem them. There are other proposals, where we are looking at bringing in financial investors who can hold some of these stakes for a period of time, and then when the company comes back to health, they can disinvest," Sundararajan said.

"We are also looking at bringing in certain external or international investors who can pump fresh equity into these companies. There has been a fair degree of interest from international investors," she added.

Sundararajan pointed out the government had already started taking steps to ease the troubles faced by the steel industry.

"The biggest support that the steel industry has been asking for is the minimum import price. Already, even though it is early days since it was announced, we are seeing much better sentiment in the market. Prices are going up and banks' and companies' financial health is improving," she said.

The government, recently announced a minimum

import price on 173 steel products for a period of six months to protect the domestic industry from cheap Chinese imports.

"There are companies that are overleveraged. Those kinds of companies have to bring in some discipline. For others, we are looking at what can be done in terms of a broad financial package. We are in consultation with department of financial services," said Sundararajan.

The sector has been hit by a combination of adverse factors, including poor demand, a slump in prices, competition from cheaper imports and delays in project execution.

Banks talk tough

As banks close their books for the financial year, they are talking tough with stressed steelmakers and making clear their intent to classify them as defaulters. Banks have also asked the government to seriously consider a specialised funding organisation for the steel industry on the lines of the Power Finance Corporation for the power sector.

Last week, lenders met highly leveraged steel manufacturers and put them on notice. Although classifying loans to these companies as non-performing assets (NPAs) will mean banks taking a hit on their profits, it will shift the balance of power in favour of the lenders as they will now stop coaxing borrowers and instead initiate recovery proceedings.

The immediate impact would be that Rs 50,000 crore worth of steel loans could be added to non-performing assets. Some of them will be recognised as default cases in the fourth quarter of this fiscal while others would be classified as bad loans in the first quarter of FY17. The companies that banks are holding discussions with include Essar, Bhushan, Visa and Electrosteel.

Ironically, some of these lenders have had their loans restructured under the 5/25 scheme. The scheme was introduced in 2014 by Reserve Bank of India Governor RaghuramRajan, where loans were extended to 25 years with a condition that interest rates would be reset after every five. The 5/25 scheme involved zero sacrifice from lenders but it made repayment easier for the borrower by reducing the instalment size. Around 21 percent of the restructured loans as of December 2015, amounting to Rs 54,051 crore, were from the iron and steel industry. The gross non-performing assets in the steel sector as of September 2015 stood at 8.4 percent. This is expected to rise to nearly 12 percent by March 2017. The steel industry is the highest leveraged sector in India and banks are not in a position to extend fresh loans.

In a recent industry note, State Bank of India Managing Director B Sriram had said, "We think time has come for the government to seriously look into the possibility of setting up a funding agency for the steel sector, as well, on the same line of PFC or REC for the power sector. For, the industry will be requiring more than Rs 10 lakh crore to raise its capacity to 300 mtpa by 2025."

The note pointed out that government measures like the safeguard duty and minimum import price were benefiting steelmakers, but the impact of this on margins of user industries such as automobiles, appliances and engineering needs to be seen.

Lenders hope that the demand for steel will go up with the government's push on infra and construction through its thrust on highways, railways and smart cities. The 26 nationalised banks, which are expecting a Rs 25,000-crore government bailout in the coming financial year, have lost at least Rs 30,873 crore to frauds in four years from 2011-12 to 2014-15. According to finance ministry documents, these losses are only due to frauds of Rs 1 lakh or more. Some of these cases are being probed by investigating agencies.

Source: Steel Insights

THE EXPONENTIAL TECHNOLOGIES

In 1998, Kodak had 170,000 employees and sold 85% of all photo paper worldwide.

Within just a few years, their business model disappeared and they got bankrupt.What happened to Kodak will happen in a lot of industries in the next 10 year - and most people don't see it coming. Did you think in 1998 that 3 years later you would never take pictures on paper film again? Yet digital cameras were invented in 1975. The first ones only had 10,000 pixels, but followed Moore's law. So as with all exponential technologies, it was a disappointment for a long time, before it became way superior and got mainstream in only a few short years. It will now happen with Artificial Intelligence, health, autonomous and electric cars, education, 3D printing, agriculture and jobs. Welcome to the 4th Industrial Revolution.

Welcome to the Exponential Age.Software will disrupt most traditional industries in the next 5-10 years.Uber is just a software tool, they don't own any cars, and are now the biggest taxi company in the world. Airbnb is now the biggest hotel company in the world, although they don't own any properties.

Artificial Intelligence:

Computers become exponentially better in understanding the world. This year, a computer beat the best Go player in the world, 10 years earlier than expected. In the US, young lawyers already don't get jobs. Because of IBM Watson, you can get legal advice (so far for more or less basic stuff) within seconds, with 90% accuracy compared with 70% accuracy when done by humans. So if you study law, stop immediately. There will be 90% less lawyers in the future, only specialists will remain.

Watson already helps nurses diagnosing cancer, 4 time more accurate than human nurses. Facebook now has a pattern recognition software that can recognize faces better than humans. In 2030, computers will become more intelligent than humans.

Autonomous cars:

In 2018 the first self-driving cars will appear for the public. Around 2020, the complete industry will start to be disrupted. You don't want to own a car anymore. You will call a car with your phone, it will show up at your location and drive you to your destination. You will not need to park it, you only pay for the driven distance and can be productive while driving. Our kids will never get a driver's licence and will never own a car. It will change the cities, because we will need 90-95% less cars for that. We can transform former parking space into parks. 1,2 million people die each year in car accidents worldwide. We now have one accident every 100,000km, with autonomous driving that will drop to one accident in 10 million km. That will save a million lives each year.

Most car companies might become bankrupt. Traditional car companies try the evolutionary approach and just build a better car, while tech companies (Tesla, Apple, Google) will do the revolutionary approach and build a computer on wheels. I spoke to a lot of engineers from Volkswagen and Audi; they are completely terrified of Tesla.Insurance companies will have massive trouble because without accidents, the insurance will become 100x cheaper. Their car insurance business model will disappear. Real estate will change. Because if you can work while you commute, people will move further away to live in a more beautiful neighborhood. Electric cars will become mainstream until 2020. Cities will be less noisy because all cars will run on electric. Electricity will become incredibly cheap and clean: Solar production has been on an exponential curve for 30 years, but you can only now see the impact. Last year, more solar energy was installed worldwide than fossil. The price for solar will drop so much that all coal companies will be out of business by 2025.

With cheap electricity comes cheap and abundant water. Desalination now only needs 2kWh per cubic meter. We don't have scarce water in most places, we only have scarce drinking water. Imagine what will be possible if anyone can have as much clean water as he wants, for nearly no cost.

Health:

The Tricorder X price will be announced this year. There will be companies who will build a medical device (called the "Tricorder" from Star Trek) that works with you phone, which takes your retina scan, you blood sample and you breath into it. It then analyses 54 biomarkers that will identify nearly any disease. It will be cheap, so in a few years everyone on this planet will have access to world class medicine, nearly for free.

3D printing:

The price of the cheapest 3D printer came down from 18,000$ to 400$ within 10 years. In the same time, it became 100 times faster. All major shoe companies started 3D printing shoes. Spare airplane parts are already 3D printed in remote airports. The space station now has a printer that eliminates the need for the large amount of spare parts they used to have in the past.

At the end of this year, new smartphones will have 3D scanning possibilities. You can then 3D scan your feet and print your perfect shoe at home. In China, they already 3D printed a complete 6-storey office building. By 2027, 10% of everything that's being produced will be 3D printed.

Business opportunities:

If you think of a niche you want to go in, ask yourself: "in the future, do you think we will have that?" and if the answer is yes, how can you make

that happen sooner? If it doesn't work with your phone, forget the idea. And any idea designed for success in the 20th century is doomed in to failure in the 21st century.

Work: 70-80% of jobs will disappear in the next 20 years. There will be a lot of new jobs, but it is not clear if there will be enough new jobs in such a small time.

Agriculture:

There will be a 100$ agricultural robot in the future. Farmers in 3rd world countries can then become managers of their field instead of working all days on their fields. Aeroponics will need much less water. The first petri dish produced veal is now available and will be cheaper than cow produced veal in 2018. Right now, 30% of all agricultural surfaces is used for cows. Imagine if we don't need that space anymore. There are several startupswho will bring insect protein to the market shortly. It contains more protein than meat. It will be labeled as "alternative protein source" (because most people still reject the idea of eating insects).

There is an app called "moodies" which can already tell in which mood you are. Until 2020 there will be apps that can tell by your facial expressions if you are lying. Imagine a political debate where it's being displayed when they are telling the truth and when not.

Bitcoin will become mainstream this year and might even become the default reserve currency.

Longevity:

Right now, the average life span increases by 3 months per year. Four years ago, the life span used to be 79 years, now it's 80 years. The increase itself is increasing and by 2036, there will be more that one year increase per year. So we all might live for a long long time, probably way more than 100.

Education:

The cheapest smartphones are already at 10$ in Africa and Asia. Until 2020, 70% of all humans will own a smartphone. That means, everyone has the same access to world class education. Every child can use Khan academy for everything a child learns at school in First World countries. Khan academy have already released their software in Indonesia and will release it in Arabic, Swahili and Chinese this Summer. The English app for free, so that children in Africa can become fluent in English within half a year.

An article collected by RAJ TIWARI

Steel sector accounts for biggest chunk of NPAs: Arun Jaitley

The steel industry accounts for the largest proportion of the non-performing assets (NPAs) of banks, Finance Minister ArunJaitley told the Lok Sabha recently."The biggest contributor in the NPAs is the steel sector. Because if our companies are not able to sell their steel, it is obvious they will not be able to repay bank loans and the interest upon it," Jaitley said replying to the debate on the Finance Bill, 2016-17.Jaitley said the Indian steel industry has been weakened by the dumping of Chinese steel at below cost-level prices. The sector has in turn affected the banks' balance sheets, he said."When the business cycles are weak in some sectors during global headwinds, then not only the sector goes weak, but it affects the banks' balance sheets. It is called twin balance sheet problem," Jaitley said. Some loans which have turned bad might have been given on a wrong basis, and such cases will be investigated, the minister said."(Out of) the current NPAs ... there are some which have been given on a wrong basis. It will be investigated into ... I do not want to go into the details of who was responsible for the same," he said.

Jaitley said the government was committed to bringing the banks out of the financial crisis and the NPA issue can be resolved only if the bad assets are reflected properly on the balance sheets, and not kept hidden.The top 50 defaulters of public sector banks had exposure in excess of Rs 1.21 lakh crore as on December 2015, the Minister of State for Finance Jayant Sinha had told Parliament a few days back.Jaitley said: "We are working upon making laws for the banks to deal with the current situation of rising NPAs. Bankruptcy Bill has already been tabled in the Parliament."The finance minister also said that below average monsoon had an impact on the economy in the last two years and an expected normal monsoon this year will revive the rural economy.Jaitley also outright rejected suggestions from some opposition members to bring agricultural income under the tax net, saying this is not being considered at all.He said

that, firstly, large farm-based income was rare and people using agriculture as a front to hide income from other sources need to be dealt with by the tax authorities.

The finance minister asserted that despite global recession, the Indian economy is doing well.He pointed out that despite the global recession and uncertainty prevailing on how long the crisis will remain, India still continues to maintain a high growth rate at 7.65 percent in 2015-16 compared to 7.2 percent in 2014-15.On the issue of one percent excise duty on non-silver jewellery, the finance minister ruled out its rollback, saying the levy was not applicable on small traders and artisans. Only those jewellers with more than Rs.12 crore turnover will attract the duty, he said.Responding to criticism that government's steps have often been against people-oriented schemes, Jaitley said: "In all the three budgets this government presented, we tried to ensure that small tax payers have more money in their hands."

Source: Business Standard

Government admits Indian steel industry under "stress"

Admitting that steel industry in India, one of the fastest growing steel producing nations, is passing through "stress" for some time due to rising imports, Government assured Rajya Sabha recently that it will take all steps to promote and safeguard the sector. "The concern of the member is justified. It has come to the notice of the government that the imports from China, Japan and Korea have increased, which is creating trouble for the domestic industry and also causing losses to it. "Government has made efforts to check this by steps like imposing anti-dumping duty, safeguard duty on imported steel products and policy announcement on minimum import price (MIP). After these steps, the pressure on the steel industry is gradually coming down," Steel Minister Narendra Singh Tomar said replying to a question on the pressure being felt by the Indian steel sector and steps being take to address that. "Steel industry is passing through stress this time. Government is fully aware of it. Steps have been taken and steps that are required will be taken in future as well," he assured the House. Replying to another question whether average steel production of India was less in comparison to other developed or developing countries, the minister said India's per capita consumption of total finished steel stood at 59 kg compared to the world per-capita consumption of 217 kg during 2014. "The main reason for higher per capita consumption of steel in developed countries is due to higher level of infrastructure and industrial development, as compared to developing countries," Tomar said. He expressed confidence that steel consumption will pick up with the government's focus on infrastructure development. "There has been a total growth of 8 million tonne in steel production in last two years both by public and private companies. This is a good indication. The demand for steel will grow as the focus on infrastructure grows," he said listing a number of measures of the government.

In his written reply, Tomar said the average growth of crude steel production in the last three years was 1.3 per cent for the world on the whole and 5.3 per cent for India. "The data released by the World Steel Association, which is reported on a calendar year basis, indicates that India has improved the global ranking and now become the third largest producer of crude steel in the world during 2015. "It indicates that India has been the third largest finished steel consumer in the world during the last," he said. Listing the steps taken by the government, he said the government has notified Mines and Minerals (Development and Regulation) Amendment Act, 2015 to streamline grant of mining leases in order to maintain sufficient availability of raw materials for the various sectors including steel sector. "To provide level playing field to domestic and steel producers, Government has imposed Minimum Import Price on 173 steel products," he said. The ministers both public sector and private sector steel companies are expected to make rapid strikes in increasing steel production in future.

Source: The Economic Times

JSPL sees steel shining after MIP

Jindal Steel and Power Ltd (JSPL) has posted a weak set of Q4 numbers with a loss of □371 crore as the steel sector continues to be stressed and power demand seems dim. Speaking to Bloomberg TV India, JSPL Managing Director and Group CEO Ravi Uppal says the government's decision to impose Minimum Import Price (MIP)

helped steel sector improve realisation while the UjwalDiscom Assurance Yojana (UDAY) is set to improve the outlook on power sector.

Did some of the government moves such as safeguard duty and MIP help operationally? Or are you still seeing some pressure?

Well, we are quite happy with the performance of the fourth quarter. I would say that the fourth quarter would mark a turning point for JSPL. The last 18 months have been a tough period as the price of steel went down month after month. But, I think after the introduction of MIP, positive developments have taken place. Fortunately, the international prices have also gone up now and they are almost at the level of MIP or slightly higher than that. So, I think the increase in prices has definitely come as a much needed relief for the steel industry and as a result of this, our earning, both at the EBITDA level and contribution, has risen and are considerably well in the fourth quarter as compared with third quarter in the same year as well as the same quarter in the previous year. EBITDA is up by 59 per cent. Our volumes have also gone up.

Our Oman plant was commissioned and from the domestic markets also we were able to deliver a lot more steel. The volumes have also gone up by 39-43 per cent in the domestic as well as the export markets.All in all, the steel business of JSPL has done well and set the stage for continued better performance in the first quarter of FY17. Price realisation has definitely improved compared with how it was in November 2015 to February 2016. But, I think we still have more distance to go before the price becomes sustainable.

Steel has been stable at the EBIT level, but power has been a laggard. Can you run us through what's really happening on that front?

As far as steel is concerned, we have done much better, especially in the fourth quarter. The volume really rose and we have been able to deliver 18-per cent higher sale in the steel business compared with the previous year. Even in international business sector, we have grown by about 12 per cent at the consolidated sales level.

As far as power is concerned, although our units are fine and could deliver as much power as required, somehow the demand for power has been quite tepid. And that has resulted in lower utilisation of our power capacity during the year. We were really hoping that the demand would really look up because a large part of country is still going without power supply.

So, as the latent demand is pretty large but as the health of the discoms is restored after the UDAY scheme is implemented, I think the demand will surely go up for power as well. But last year, the plant load factor (PLF) was not as much as we hoped it would be and we really look forward to much more dispatches in the weeks and months to come.

How's the PLF been in this quarter? And what's the outlook going forward?

As I mentioned, the PLFs that we had on the power was lower compared with what we had in the same quarter last year. And there is definitely some room for the PLFs to go up. We have units which are fully commissioned, synchronised and ready to go. So, we are really looking forward to higher demand from consumers.

Source: Metaljunction

ArcelorMittal Says Steel Markets Are Stabilizing as Losses Narrow

ArcelorMittal, the world's biggest steel producer, said U.S. and European markets are stabilizing after record Chinese steel exports last year caused prices to plummet around the globe."It's recovery with a pinch-of-salt concern about Chinese overcapacity," Chief Executive Lakshmi Mittal said in an interview recently.The Luxembourg-based steelmaker, which accounts for roughly 6% of global steel output, posted a net loss of $416 million in the first quarter, compared with a $728 million net loss in the same period a year earlier, missing analysts' forecasts. Revenue fell 22% to $13.4 billion, reflecting lower steel and iron-ore prices as well as lower steel and iron-ore shipments by the company.

The steel industry has been cyclical since its creation in the 19th century, but the latest downturn has been particularly pernicious because of Chinese capacity. The country now accounts for half the world's annual production of 1.6 billion metric tons of steel, and it has been on an export binge. China last year set a record, shipping out 100.4 million tons of the metal, more than the U.S. produced annually during

World War II. Last year, only Japan made more steel than China exported.As a result, prices fell almost everywhere. "China's dumping steel and overcapacity has clearly influenced prices," Mr. Mittal said. "We always believed those price levels were not sustainable."Chinese officials have denied dumping, or selling without profit to gain market share, saying lower demand has deflated prices.

The wave of low-cost shipments coming out of China prompted European Union and U.S. governments to impose import tariffs to protect their steelmakers. Imports are now ebbing in the U.S. and EU. That trend along, with falling inventories and strengthening demand, has buoyed prices. In the U.S., the benchmark hot-rolled coil index has risen 45% to $548 since Jan. 1, after declining by a third in 2015.Inventories in the U.S. are now below the historical average, said Jim Baske, executive vice president for North America. Demand in the automotive sector is still strong, and there has been a moderate pickup in construction, he said.Chinese steel officials have said they need to eliminate 200 million tons of overcapacity. Mr. Mittal said he thought China had become much more serious about cutting capacity.

Mr. Mittal cautioned that the global steel market remains vulnerable to excess steel capacity in China. He urged governments to remain vigilant about unfair trade and granting China so-called market economy status, a certification by the European Union or U.S. that would make it harder to impose tariffs on Chinese imports.

ArcelorMittal's mining business has also suffered from the downturn. Its iron-ore production of 14.1 million tons in the first quarter was down 9.1% from a year earlier.The company's narrower first-quarter loss stemmed in part from a small foreign-exchange gain compared with a foreign-exchange and net financing loss of $756 million in the year-earlier quarter.ArcelorMittal earlier this year raised €2.8 billion ($3.2 billion) through a rights issue tostrengthen its balance sheet given the protracted steel-price rout. Other steelmakers, such as Sweden's SSAB AB, followed suit. ArcelorMittal's shares subsequently rallied after the rights issue was announced and are up nearly 50% so far this year, buoyed by the pickup in steel prices in its key U.S. and European markets as well as China. The company's American depositary receipts fell 0.9% to $5.26 in New York recently. The steelmaker expects the higher steel prices to be fully reflected in its earnings in the second half of the year. The company kept its 2016 forecast for earnings before interest, taxes, depreciation and amortization at a minimum of $4.5 billion. Jefferies analyst Seth Rosenfeld said he was slightly surprised that ArcelorMittal didn't raise its outlook, although he noted the company doesn't necessarily need to revise the guidance since it is open-ended.Net debt rose to $17.3 billion as of the end of March, from $15.7 billion at the end of December, because of seasonal working capital adjustments.

At the end of the first quarter, net debt was estimated at $13.3 billion after taking into account the proceeds from its $3.2 billion rights issue in April and the roughly $1 billion sale of its 35% stake in Spanish auto-parts manufacturer GestampAutomoción, the company said.

Source: www.wsj.com

Steel shield review

> "MIP is certainly under constant review because we do not intend to continue it unless it is strictly necessary. So if the industry comes back to a healthier position and if global prices continue to stay where they are, then yes, definitely MIP will be reviewed"
>
> ARUNA SUNDARARAJAN, Steel secretary

The minimum import price (MIP) on steel will be discontinued unless it is absolutely necessary, a senior official in the steel ministry said.MIP has been criticised by several countries, including China, which allege that it is against WTO rules."The MIP is certainly under constant review because we do not intend to continue it unless it is strictly necessary. So if the industry comes back to a healthier position and if global prices continue to stay where they are, then yes, definitely MIP will be reviewed," steel secretary Aruna Sundararajan said recently. In February, the government had imposed MIP ranging between $341 and $752 per tonne on 173 steel products to shield domestic manufacturers from cheap inbound shipments. It will remain in place for six months.Sundararajan said following the imposition of MIP, steel prices firmed up, imports came down and domestic production increased. "It is too early to make a full assessment, but initial reports indicate that it has certainly had a hugely beneficial impact," she said."One, the surge in imports has definitely come down. Two, prices have firmed up. And thirdly, many companies, which had actually closed down or had reduced production drastically, have certainly ramped up production," she said.On the rise in global prices and its impact on MIP, she said, "We will have to see. One thing is that nobody really knows why the global prices have gone up the way they did. It could be in response to India's MIP."Provisional data from the steel ministry showed that imports fell 15.5 per cent year-on-year to 654,000 tonnes in April. Imports stood at 994,000 tonnes in March.

Source: www.telegraphindia.com

Cheap imports continue to hit steel sector

ARCELORMITTAL SA says the global steel industry continues to struggle, and that SA is feeling the pain.The country's largest steel producer said in a quarterly update to March that Chinese producers continued to flood the world with cheap steel exports."For the first quarter of 2016, SA continued without duties on hot-rolled coil," the South African unit of the Indian-backed global ArcelorMittal group said recently. This had resulted in large amounts of this product being imported into SA between January and February. Sometime back, the International Trade Administration Commission (Itac) had recommended the imposition of 10% tariffs on hot-rolled coil and various bars and rods, but this was still being implemented."Safeguard duties still remain critical in the short term to ensure the future sustainability of primary steel production (in SA)," ArcelorMittal SA said.During the quarter, the company's capacity utilisation fell from 84% in the period last year to 81%, with overall steel production falling 9%. Steel sales, though, were 3% higher, mainly due to improved exports.

Acting CEO Dean Subramanian said that while it acknowledged progress had been made against Chinese imports, without safeguards and use of domestic steel for state infrastructure projects, the company and domestic steel industry were vulnerable to volatile international prices.A recent slowdown in China's economy has led to considerable overcapacity among Chinese steel producers. The country makes and uses half of the total global production of steel.In SA, after a protracted decline, Tata Steel's KwaZulu-Natal ferrochrome plant in Richards Bay has gone into liquidation. Meanwhile, SA's second-largest steel producer, Evraz Highveld Steel and Vanadium, is being sold off in pieces after a sale to Chinese interests failed. ArcelorMittal SA has also placed its Saldanha Works under review, after the steel manufacturer recorded a loss of R8.63bn for the year ended-December.

On Friday, it said that while the base international price of hot-rolled coil had increased by $86 a tonne, main steel-making inputs of coal, iron ore and scrap had also risen significantly.

"Perhaps the key comment from management on the positive side is that, following the increase in international steel prices, overall liquidity will normalise at acceptable levels," Stephen Meintjes, an analyst at Momentum SP Reid Securities, said recently.Subramanian said ArcelorMittal SA had made progress with the departments of trade and industry and economic development regarding

a pricing mechanism for flat steel.The authorities have hounded the firm for years over the price charges, also saying it was untransformed in terms of black economic empowerment codes.This had effectively excluded it from the country's R4-trillion infrastructure plan and caused problems with the Competition Commission. But, an empowerment deal is now in process.

Source:www.bdlive.co.za

Steel companies raise prices by 13% post-MIP

Indian steel mills have increased prices by an average of 13 percent since the imposition of the import restrictions (or minimum import prices) by the Indian government in the first week of February 16.

The increase in steel prices has been higher for longs (wire rods and rebars) at 17 percent compared to that for flats (12 percent).

Whereas there was estimation that Indian steel mills will eventually raise steel prices by 20 percent over the entire tenure of MIP (six months), the pace of price increase, so far, has surprised the industry positively in general.

Steel imports fall y-o-y in Jan-Feb

Since the imposition of the MIP, it is estimated that the incremental contracting for imports has fallen considerably, given that it is no longer economical for steel consumers to import steel.

However, the absolute rate of steel imports in India has remained high (around 900,000 tons per month), as material contracted before the imposition of the MIP are still arriving on Indian shores.

Nevertheless, it has been observed that there has been a year-on-year 9 percent decline in steel imports for January and February, 2016.

Over the next two quarters, it is expected that the pace of imports would almost halve to an annualised rate of just 5.6 million tons compared to 11.2 million tons in 2015.k

According to analysts, Indian steel mills can still increase prices by another 10 percent and the steel sold domestically will still be priced lower than the landed costs of the imported material.

Strong earnings growth?

The first quarter of a calendar is a seasonally strong one from the demand standpoint. The overall growth in India's steel consumption should stay high as 5 percent y-o-y, according to analysts.

In addition, the four large Indian steel mills should take significant market share away from imports that are already down 9 percent.

With the exception of SAIL, it is expected the other large players (TATA, JSW and JSPL) will report strong increase in earnings, with their EBITDA up 19 percent y-o-y following record shipments as well as higher prices.

Overall, it is estimated the EBITDA of four large Indian steel mills (including SAIL) will drop 19 percent y-o-y in 1QCY16.

Analysts continue to expect negative net income for SAIL but the quantum of loss will reduce meaningfully.

Ind-Ra maintains negative outlook

India Ratings and Research has maintained a negative outlook on the steel sector for the next fiscal due to high indebtedness and pricing pressures in the industry.

The rating agency expects steel demand to grow marginally by 0.5 percent, to 6.5 percent in the next fiscal with the overall GDP growth of 7.9 percent (7.4 percent). Key infrastructural initiatives such as housing for all, development of 100 smart cities, and launch of the National Infrastructure Investment Fund are likely to give a substantial boost to the construction sector.

Further, the government's focus on "Make in India" and "ease of doing business", along with a fall in inflation and interest rates are expected to support manufacturing sector growth.

Ind-Ra does not expect any major recovery in domestic price levels next fiscal unless mechanisms to restrict cheaper imports are put in place. Global steel prices started declining from the fourth quarter of FY14, mainly due to global overcapacity and falling demand.Though steel demand has tapered off in the entire world, it is largely influenced by the slowdown in China, which controls nearly half the global steel production.

Despite many policy actions, steel imports into India were up 34 percent in the first eight months of this fiscal. The price differential between imported and domestic products has forced Indian steelmakers to offer substantial discounts which, as a consequence, have severely impaired

their profitability.A surge in imports was one of the important reasons for the fall in domestic capacity utilisation to around 80 percent in FY15, the lowest since FY10.

Source: Steel Insights

ISI Mark on Steel Products

Bureau of Indian Standards (BIS), to ensure steel quality, has made ISI mark mandatory on 36 steel products from 18 Mar'16 under Steel and Steel Products (Quality Control) Order 2015. Now, the steel products that do not meet the standards will be disposed off as scrap. Besides, the ISI symbol, the number of Indian Standard unique to each product will be provided.

In India, about 30% of bars & rods are produced by primary makers and 70% by secondary, indicating that a huge quantity of steel is produced without and ISI mark. Now, under quality control order, all the secondary producers across India will have to produce steel with BIS specification only.

Steel Products on which BIS is Applicable

BIS is applicable on a total of 36 products under the Quality Control Order, 2015. 33 companies across the world have BIS license to trade flat steel products into India.

On 17 Mar'16, the ministry extended the date of BIS implication from 18 Mar'16 to 18 Sept'16 for some IS grades namely IS 513, IS 1079, IS 1875, IS 5986, IS 7283, IS 10748 and IS 11513. These grades include steel products like cold reduced low carbon steel sheet & strip, hot rolled carbon steel & strip, carbon steel billets, blooms & bars for forgings, hot rolled steel flat products for structural forming & flanging purposes, hot rolled bars for production of bright bars & machined parts for engineering application, hot rolled steel strips for welded tubes & pipes and hot rolled carbon steel strips for cold rolling purpose.

The Society of Indian Automobile Manufacturers (SIAM) has asked the government to extend time to comply with the BIS notification, which was applicable from 15 Mar'16. Currently, all auto manufacturers' import specialized steel from countries, including Japan and Korea for production of various parts like roofs and panels.

Steel Products on which BIS is Not Applicable

There are a few other steel products on which BIS is still not applicable. In the ministry's notification dated 1 Oct'13, carbon steel cast billet ingots, billets, blooms and slabs for re-rolling into low tensile structural steel with IS 2832 grade and HS code 72061090, 72071190, 72071290, 72071920, 72071990 and 72072090 were omitted from BIS certification.

In addition, there are no IS grading on sponge iron, pellet sponge and structural steel with sizes less than 50 mm. Few other manual rolling mill products are also not considered under BIS certification.

The quality control order issued by the government will go a long way in improving, establishing and standardizing the Indian steel quality in domestic as well as global market. While some of India's automotive manufactures are distressed over the decision of BIS certification as they fear that it would hurt and even halt their manufacturing operations, the mandatory ISI mark on steel products will fully benefit the end-users.

Source: Steel 360

Application of Steel Intensity Technique for Estimating India's Future Steel Demand

The concept of 'Steel Intensity' was first mooted in the report PROJECTION 85, based on the study commissioned by the Committee on Economic Studies of the International Iron and Steel Institute (now World Steel Association), published in March 1972.

As stated in report, the projections presented therein 'represent plausible trend values that give weight to the technological and structural changes which have influenced steel consumption trends in the past'. In the model adopted, steel consumption per unit of Gross National Product (GNP) is related to GNP per capita.

Methodology Adopted by IISI – The Steel Intensity Curve

Considering the limitations in respect of availability of consistent and reliable data on a world-wide basis, it was decided to adopt a model combining "time series" and "cross-section" analysis, which relates steel consumption to two macro-economic variables, i.e. GNP and Population. It was the intention of the model adopted to suitably address the structural peculiarities of a particular country/region, while giving due consideration to structural changes as they have occurred in

other areas at similar income levels.

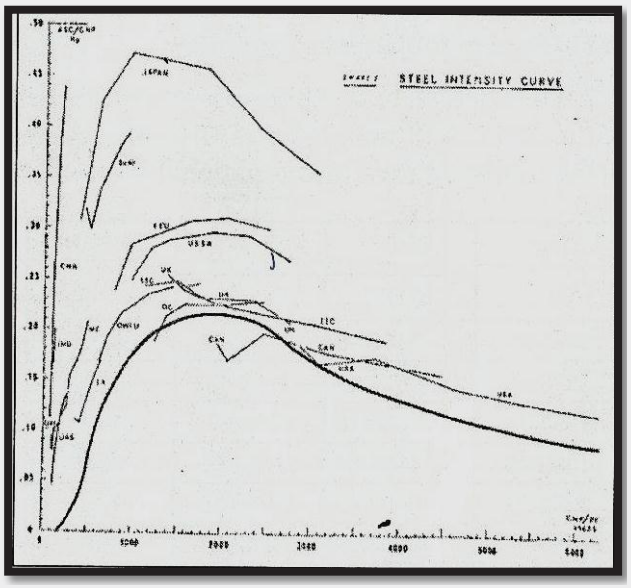
The Steel Intensity Curve proposed in Projection 85 was generated by plotting the Steel Intensity values against the per capita GNP values. In doing so, the following principles were adopted:

- Apparent steel consumption figures corresponded to quantities in terms of crude steel equivalent.
- GNP values, in real terms, were converted to constant 1963 values to take care of inflation.

A theoretical average curve of Steel Intensity vs. per capita GNP (in 1963 US$) was developed on the basis of a sampling of 20 individual countries. The shape of the theoretical average curve, along with the curves for a number of countries/regions, as presented in PROJECTION 85, is depicted in the figure below.

Estimates for India in PROJECTION 85

The study indicated that during the period 1955 to 1970, apparent steel consumption grew at a relatively high rate, notwithstanding the low growth of the economy as a whole. However, per capita steel consumption (~12-14 kg) ranked amongst the 'very lowest in the world'. Considering the extremely low per capita income levels, the values of Steel Intensity were higher than expected. The yearly values, as reported in PROJECTION 85, are given on the next page:



Year	Steel Consumption	Steel Intensity
	Kg per cap	Kg/1963 US$
1955	8	0.096
1960	11	0.132
1965	15	0.174
1970	11	0.118
Source: PROJECTION 85, IISI		

The projections made in the study for 1980 and 1985 are reproduced below:

Year	Steel Intensity	Population	Steel Consumption	
	Kg/1963 US$	Million	Kg per cap	Mill. Tons
1980	0.182	717.4	20	14.4
1985	0.205	807.6	25	20.0
Source: PROJECTION 85, IISI				

Past Trend of Indian Steel Intensity

The Steel Intensity method, as conceived by IISI in 1972, had adopted the GNP figures as being representative of the national economy.

Year	GDP*	GNP*	GDP:GNP
	blnRs	blnRs	
1980-81	1368.38	1371.83	1.00
1985-86	2627.17	2612.88	1.01
1990-91	5318.13	5242.68	1.01
1995-96	11185.86	11051.02	1.01
2000-01	20007.43	19780.10	1.01
2005-06	33905.03	33643.87	1.01
2010-11	72488.60	71670.53	1.01
2011-12	83916.91	83148.61	1.01
2012-13	93888.76	92721.10	1.01
2013-14	104728.07	103445.07	1.01
Note: *At factor cost and in current prices. **Source:** Reserve Bank of India			

In India, the Gross Domestic Product (GDP) is more commonly used as being representative of the national economy. It is observed that the values of GDP and GNP are very close to one another, as shown in the left for the period 1980-81 to 2013-14:

Since GDP is commonly adopted for planning purposes, for the purpose of Steel Intensity computations for India, one could adopt GDP figures instead of GNP.

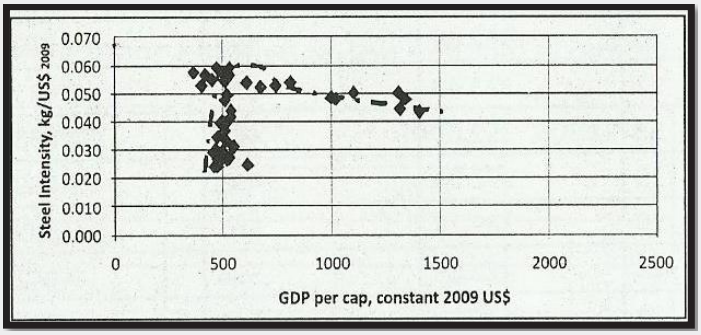
Computation of Steel Intensity for India, for the period 1965-66 to 2014-15 is presented in the table below. The Steel Intensity values have been computed in terms of per capita crude steel consumption (in kg) per US$ at constant 2009 prices. From the table it will be observed that Steel Intensity continuously increased until 1995-96. For the next 6-7 years Steel Intensity remained stagnant, and then started to decline gradually.

Computation of Steel Intensity of India

Year	Population	ASC(1)	Per cap ASC	GDP(2)	Per cap GDP	Steel Intensity
	Million	Thou tons	Kg	bln US$ 2009	US$ 2009	Kg/US$ 2009
1965-66	485	7,422	15	298.49	615	0.025
1966-67	495	6,777	14	247.09	499	0.027
1967-68	506	6,445	13	239.00	472	0.027
1968-69	518	5,861	11	240.88	465	0.024
1969-70	529	6,059	11	252.06	476	0.024
1970-71	541	6,432	12	255.29	472	0.025
1971-72	554	7,710	14	259.55	469	0.030
1972-73	567	9,227	16	269.75	476	0.034
1973-74	580	8,221	14	303.71	524	0.027
1974-75	593	8,551	14	315.41	532	0.027
1975-76	607	8,500	14	285.27	470	0.030
1976-77	620	8,202	13	281.76	454	0.029
1977-78	634	9,321	15	315.37	497	0.030
1978-79	648	11,131	17	329.79	509	0.034
1979-80	664	12,433	19	336.65	507	0.037
1980-81	679	11,751	17	375.66	553	0.031
1981-82	692	14,201	21	358.22	518	0.040
1982-83	708	14,098	20	352.69	498	0.040
1983-84	723	12,385	17	373.43	516	0.033
1984-85	739	12,329	17	352.60	477	0.035
1985-86	755	14,653	19	372.04	493	0.039
1986-87	771	15,290	20	389.74	505	0.039
1987-88	788	17,640	22	422.69	536	0.042
1988-89	805	19,040	24	435.39	541	0.044
1989-90	822	20,036	24	421.07	512	0.048
1990-91	839	21,700	26	438.39	523	0.049
1991-92	856	20,300	24	360.03	421	0.056
1992-93	872	18,540	21	322.47	370	0.057
1993-94	892	18,850	21	357.92	401	0.053
1994-95	910	22,320	25	409.07	450	0.055
1995-96	928	26,080	28	441.48	476	0.059
1996-97	946	27,100	29	475.19	502	0.057
1997-98	964	27,300	28	496.95	516	0.055
1998-99	983	27,100	28	500.64	509	0.054
1999-00	1001	29,900	30	532.40	532	0.056
2000-01	1019	30,200	30	530.32	520	0.057
2001-02	1040	31,200	30	541.52	521	0.058
2002-03	1056	33,350	32	565.41	535	0.059
2003-04	1072	35,000	33	654.21	610	0.053
2004-05	1089	38,300	35	734.43	674	0.052
2005-06	1106	43,140	39	822.63	744	0.052
2006-07	1122	49,100	44	913.45	814	0.054
2007-08	1138	55,491	49	1162.40	1021	00.048
2008-09	1154	56,209	49	1157.16	1003	0.049
2009-10	1170	64,360	55	1286.07	1099	0.050
2010-11	1186	69,082	58	1559.94	1315	0.044
2011-12	1202	73,154	61	1685.13	1402	0.043
2012-13	1217	77,768	64	1628.98	1339	0.048
2013-14	1233	80,524	65	1611.32	1307	0.050
2014-15	1272	84,139	66	1880.62	1478	0.045

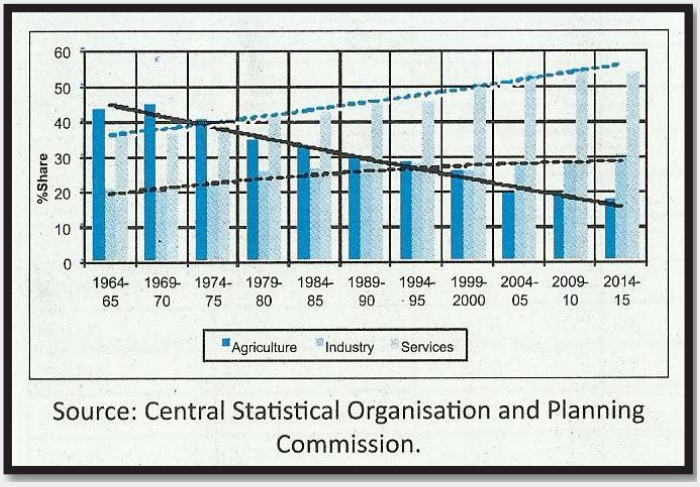
The generalised Steel Intensity curve for India is presented below:

The reason for the premature dip in Steel Intensity can be found in the evolving structure of India's GDP, as illustrated in the figure below:



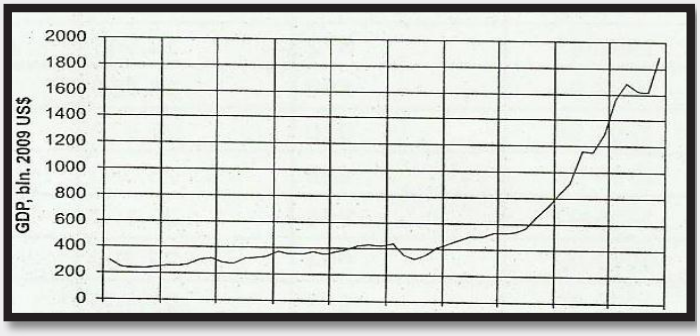
From the above figure, the following inference can be drawn:

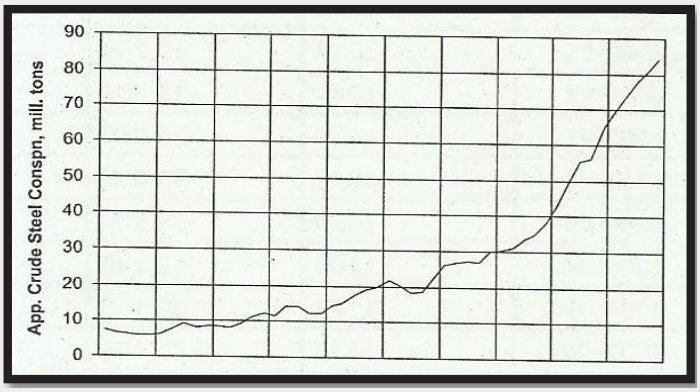
- The contribution of 'Industry' sector to GDP has gradually tapered off during the later part of 1990s.



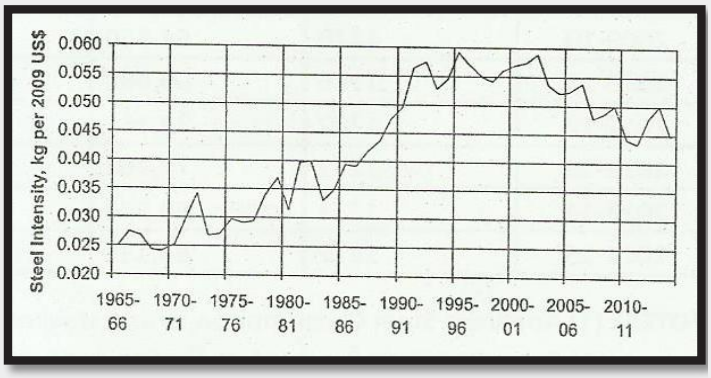
Source: Central Statistical Organisation and Planning Commission.

- In comparison, the contribution of the 'Services' sector to the GDP has registered increasing growth trend.
- The share of 'Agriculture' sector has been dropping markedly.





Since steel consumption is closely linked with industrial activity, as well as development of infrastructure facilities, and has far lesser relationship with the service sector, the above structural changes in India's economy contributed to the lowering in Steel Intensity values. It, therefore, becomes imperative that if the country's economic growth and prosperity is to be sustainable in the long run, determined efforts and greater emphasis will be needed in the areas of industrial and construction activities, and in infrastructure development.



The trends in national GDP, apparent steel consumption and Steel Intensity for the period 1965-66 to 2014-15 are compared in the figures on the next page.

From the trends, the following observations emerge:

- The initial decade of the 21st century witnessed significant growth in GDP.
- Apparent crude steel consumption has, generally, been in sync with GDP.
- As mentioned earlier, while Steel Intensity values increased consistently up to around 1995-96, it has not kept pace with general economic development thereafter.

Likely Future Domestic Steel Demand Levels

In order to estimate the future domestic steel demand utilising the Steel Intensity method, it is necessary to assess the likely levels of (i) population, (ii) GDP in terms of US$ at constant 2009 prices and (iii) Steel Intensity.

Population: As per the article, Demographic Scenario, 2025 by P. N. Mari Bhat of the Institute of Economic Growth, Delhi, India's total population in the years 2020 and 2025 are projected as 1,331 million and 1,403 million respectively.

GDP: The IMF in World Economic Outlook Database, October 2015 edition, has projected India's GDP in 2020 at US$ 3,443.6 billion at current prices. Considering the projected annual US inflation rates for the period 2010 to 2020, as given in the World Data Atlas, the projected GDP in 2020 at constant 2009 US$ works out to US$ 2,830 billion.

For estimating India's GDP in 2025, two growth scenarios have been considered for the period 2020-2025, i.e. 7.5% and 8.5% CAGR. Further, considering average yearly inflation rate of 3 percent for the US economy during 2020-2025, the projected GDP's for India in 2025, at constant 2009 US$, works out to US$ 3,515 billion for 7.5% CAGR and US$ 3,660 billion for 8.5% CAGR.

Steel Intensity: As highlighted earlier, for sustaining and enhancing the pace of economic development of the country, it will be essential for the government to make substantial investments in the infrastructure and manufacturing sectors. As Steel is a vital input for the growth of these sectors, it is anticipated that consequent to this, the Steel Intensity of the economy will climb back to levels witnessed prior to 2000-01, and rise beyond. Accordingly, the Steel Intensity values (kg crude steel per US$ 2009) expected to be achieved in 2020-21 and 2025-26 are 0.055 and 0.060 respectively.

Based on the above considerations, the likely

levels of domestic crude steel demand may be expected to be as follows:

Population, million	2020-21	2025-26
	1,331	1,403
GDP, bn US$ 2009	2,830	7.5% CAGR – 3,515 8.5% CAGR – 3,660
Per capita GDP, US$ 2009		7.5% CAGR – 2,505 8.5% CAGR – 2,609
Steel Intensity, kg/US$ 2009	0.055	0.060
Steel demand, mill tons	156	211-220
Per cap demand, kg	117	150-157

From the table it will be seen that by 2025-26, domestic crude steel demand could well be in the region of 210-220 million tonnes.

In addition to meeting domestic demand, the Indian steel producers have also been exporting a part of their output. According to JPC, between 2010-11 and 2014-15, the quantum of yearly exports has generally amounted to about 5-7 percent of production. It would be reasonable to expect that, with India anticipated to become the second largest steel producer in the near future, the quantum of yearly exports would also go up in sync with production. Accordingly, one can justifiably expect the level of exports to rise to about 10 percent of production. This should be possible considering reports in the print media that SAIL is contemplating radical measures at improving operating efficiencies and reducing costs, in order to enhance competitiveness in the global steel market. Other major steel producers are also thinking along similar lines. Hence, the effective demand that the domestic steel industry will have to cater to would be in the region of 175 million tonnes of crude steel in 2020-21 and 235-245 million tonnes by 2025-26. Considering an overall capacity utilisation of around 85 percent, it would be rational to plan for a domestic capacity of 280-290 million tonnes by 2025-26, which is in line with the 300-million-tonne target proposed by the government.

However, in the event the structure of the GDP continues to evolve in the manner it has been doing over the past 10-15 years, in the absence of determined efforts at substantially enhancing activities related to manufacturing and infrastructure development, the domestic steel demand scenario could be somewhat different from that indicated above. This is because the Steel Intensity values are expected to decrease further, even though per capita GDP values (at constant 2009 prices) would progressively go up. Based on this scenario, the likely steel demand values would be substantially lower as shown in the table below:

Considering the above estimates, the corresponding domestic crude steel capacity required in 2025 would be in the region of 200 million tonnes, which is considerably lower than that targeted by our national planners.

Population, million	2020-21	2025-26
	1,331	1,403
GDP, bn US$ 2009	2,830	7.5% CAGR – 3,515 8.5% CAGR – 3,660
Per capita GDP, US$ 2009	2,126	7.5% CAGR – 2,505 8.5% CAGR – 2,609
Steel Intensity, kg/US$ 2009	0.045	0.040
Steel demand, mill tons	127	140-146
Per cap demand, kg	95	100-104

Concluding Remarks

Steel Intensity technique is a useful concept that attempts to link steel consumption/demand to technological and structural changes occurring in an economy.

Steel Intensity in India has been on a downward trend for the last 10-15 years. This trend needs to be arrested and reversed through proper planning, and greater enhanced activity in areas related to manufacturing and infrastructure. In such an event, India's steel consumption can be expected to be well in excess of the 200-million-ton mark over the next decade, in line with the Government's target of achieving a domestic capacity of 300 million tonnes by 2025. However, should the industrial and infrastructure development activities not pick up, domestic steel demand will fall far short of the 300-million-tonne target.

Source: JPC Bulletin

Challenges before the Indian Steel Intensity in the Coming Decades – Some Reflections and Relooking the Indian Steelmaking Cost Elements

Introduction: Steel Industry is very important for India

India has a very large steel industry. The total steel production in 2015 was 89.6 million tonne primary steel, globally ranking 3rd largest

producer country after China and Japan (See Table 1). Thus the economic importance of steel Industry in India is very high and all efforts must be made to modernize the industry, upgrading the technology and increasing its efficiency at par with the global level.

Table: 1 World Crude Steel Production (million tonne), Dated January 2016

Rank	Country	Annual Steel Production
1	China	803.8
2	Japan	105.2
3	India	89.6
4	United States	78.9
5	Russia	71.1
6	South Korea	69.7
7	Germany	42.7
8	Brazil	33.2
9	Turkey	31.5
10	Ukraine	22.9
-	WORLD	1622.8

Source: World Steel Association dated January 2016

Ecological Challenges

The phenomenon of global warming is adversely changing the climate threatening life and ecology and seriously affecting the world economic system. Unless the global warming is prevented in near future, the world ecological balance is going to be irreparably damaged. The dire risk of global warming requires that the steel industry minimizes CO2 emission and energy consumption in compliance with the United Nation Framework Convention on Climate Change (See Ghosh Roy JPC Bulletin, Jan 2015).

UNFCCC Paris Agreement on Climate Change, December 2015

The latest Conference of the UNFCCC (COP 21) took place at Paris in December 2015. There are in all 29 Articles under the Paris Agreement 2015. But we will deal only with a few important provisions concerning climate change that has bearing on the steel industry.

- The Paris Agreement on Climate Change that came into effect on 12 December 2015 constitutes a part of the United Nation Framework Convention on Climate Change 1992 (UNFCCC) and have the following main provisions;
- To hold global temperature increases to well below 2 degree C above the preindustrial levels, but to aim efforts to limit the temperature increase to 1.5 degree C, To enhance climate change Adaptation and foster resilience against climate change impacts,
- To promote low greenhouse gas emission development,
- To maintain the basic principles of this Convention like equity and common but differentiated responsibilities and respective capabilities.
- To take into consideration the needs of the developing countries, least developed countries and small island countries,
- To take good care of different ecosystems in terms of "Climate Justice",
- To emphasize sustainable lifestyles in terms of sustainable patterns of consumption and production.
- To ensure finance flow commensurate with the pathways of the Agreement.
- To require each country shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve.

Plan of India's Nationally Determined Contributions (INDCs)

- To reduce the emission intensity of its GDP by 33 to 35 percent by 2030 from 2005 level.
- To achieve about 40 percent electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including green finance climate fund;
- To create an additional carbon sink of 2.5 to 3 million of CO2 equivalent through additional forest ad tree cover by 2030.

Some Acts that have already been taken to promote India's INDCs

Energy Intensity:

Because of various actions already initiated, energy Intensity of the Indian economy has come down from 18.16 goe (gram oil equivalent) per rupee GDP in 2005 to 15.02 goe per rupee GDP in 2012.

Low-carbon Energy:

A comprehensive programme of developing carbon-free or low-carbon energy has already been initiated in India consisting renewable

energies (solar, wind, biomass energies etc.) and other low-carbon energies (Nuclear, clean coal etc.).

Adaptation:

It includes protection from flood & drought, modernising water resource management & agriculture, improving health & livelihood, etc.

Ecological Challenges before the Steel Industry: CO2 Emission & Energy Consumption

The national INDCs of India throws special responsibilities on the large Indian steel industry in respect of both energy optimization and mitigation of Carbon Dioxide emission.

Today India is a big emitter of CO2-equivalent or GHG, being globally the 4th largest, emitting 3.0 Gt gas in 2012 (See Table 2). Now as per the Paris Agreement 2015 above, India has committed to reduce its 2005 CO2 eqv emission intensity of its GDP by 33 percent by 2030. Thus the steel industry which is big emitter of CO2, amounting to about 21.5% of India's total annual emission (See Box 1) will be under great pressure to reduce its emission intensity. In any case, record of Indian Steel sector has a poor record emitting 6.8 tonne CO2 per tonne of steel compared to the global average of 4.5 tonne per tonne of steel.

Energy Economy Challenges:

The consumption of fossil-fuel energy causes CO2-eqv emission. Hence the Paris Climate Agreement 2015 demands that either the use of fossil energy be decreased or energy consumption be tightly economized or both the measures.

Table 2: World CO_2-eqv Emission (Giga Tonnes), 2012

Rank	Countries	Total GHG Emission
1	China	10.98
2	United States	6.23
3	European Union (28)	4.4
4	India	3.0
5	Russian Federation	2.32
	World	44.8

Source: CAIT- World Resource Institute www.wri.org

BOX 1: CO2e Emission from Steel Plants in India

Indian primary Steel Production in 2015 = 89.6 million tonnes

CO2e emission from per tonne of Indian steel = 6.891 t*

Therefore total CO2 e emission from Indian Steel industry

= 6.891 x 89.6 Mt = 617.43 Mt

Steel Industry CO2 e emission to total Indian CO2 e emission

= [0.617.43 / 2.89] x 100 = 21.35 %

*Source: M K Ghosh Roy, JPC Bulletin January 2015

Cost Economy Challenges

Global Recession in Steel

The steel industry is in serious trouble because of great fall in international prices of steel and many other bulk materials including petroleum oil. The fall in demand of steel in the large Chinese market, is so steep that China is exporting steel to India at the landed cost of USD 370 per tonne, much below the marginal cost of steel of the Indian steel. Economic cost of steel in India is about USD 480 per tonne and in the US it is about USD 520 at tonne. In the last part of this presentation, we will review the cost structure elements and their dynamics of Indian steel mills.

Steelmaking Processes

Steelmaking process influences both the energy input and the cost of production. Globally steel is produced via two main routes: the blast furnace-basic oxygen furnace (BF-B0F) route and direct-reduction-electric arc furnace (DRI-EAF) route. There is an old process open hearth furnace (OHF), which is energy intensive and getting phased out.

The BF-BOF route produces steel predominantly using raw materials such as iron ore, coal, coke, limestone and steel scrap. BF produces molten iron, which is converted into steel in the BOF. After casting and rolling, the steel is delivered as coil, plate, sections or bars.

Steel made in EAF uses either recycled steel or direct reduced iron (DRI) with necessary additives. Downstream processes such as casting, reheating and rolling are same as for BF-BOF.

Globally about 70% steel is produced using BF-BOF, 29% steel is via the DRI-EAF and only about

1% steel is produced via DRI-EAF (WSA site 2014).

Energy Inputs in Steel Production

About 75% of the energy of coal at an integrated steel plant is consumed in the blast furnace, where in the form of coke it serves as chemical redundant to reduce iron ore. The remainder energy is provided as heat at the Sinter and Coking plants. Thus the production of primary steel is more energy intensive than the production of secondary steel.

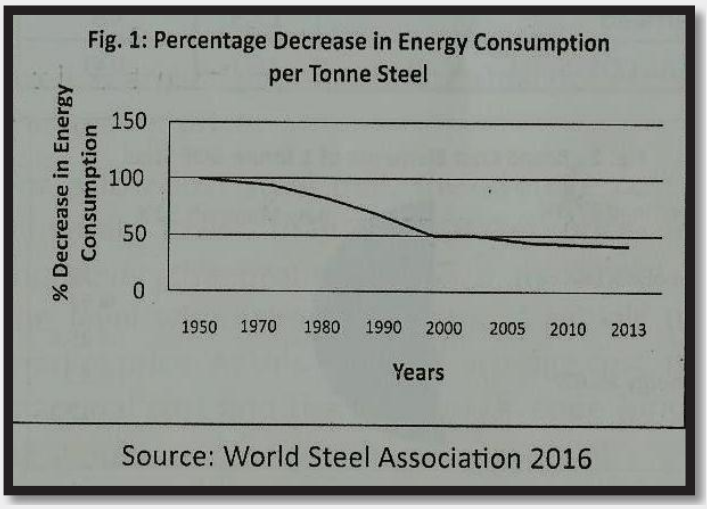
By-product gases from the coke oven, blast furnace and basic oxygen furnace can be fully reused in different steel plant processes including generation of electricity. The exhaust gases from the furnaces constitute about 60% of total energy deployed in steel making. Table 3 describes the principal modes of energy consumptions in the steel plant.

Table 3: Main Energy Inputs

Category of Energy	Application as Energy only	Application as both Energy & reducing Agent
Coal		Blast Furnace, Coke Production
Furnace Gases & Natural Gas	Furnaces, Power Generation	BF Injection, DRI Production, Sintering
Electricity	EAF, Rolling Mills, Other motors	
Oil	Steam production,	

Specific Efficiency

The energy efficiency of steel making processes vary depending upon production route, type of iron ore and coal used, the steel, operation control technology and material efficiency. In an integrated steel plant, about 50% of energy comes from coal, 35% from electricity, 5% from natural gas and 5% exhaust gas.



Nevertheless, steel production is energy intensive. However over the years since 1960, the specific energy consumption per tonne of steel has come down by 60% (See Fig. 1).

Relooking Steelmaking Cost Elements

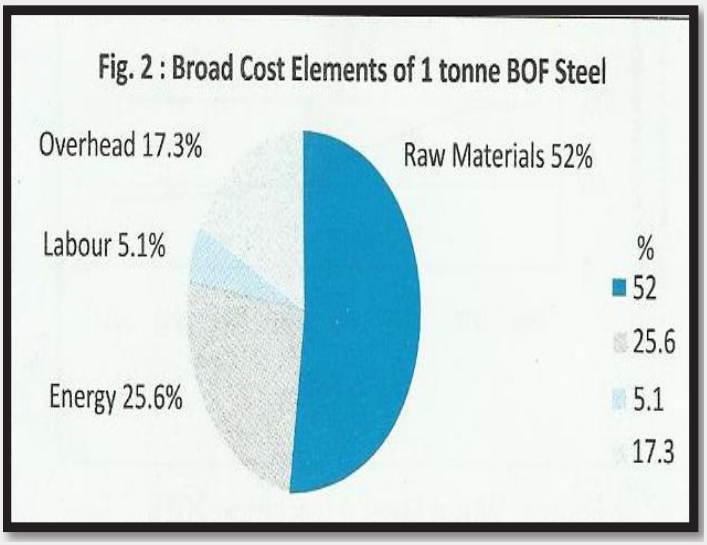
Total Costs

In the Table A in the Appendix, the detailed cost elements to make a tonne of BOF liquid steel is presented in standardized format adapted from www.costonline.com/cost-bof.html

From the Table A, the main cost elements, in percentages, are presented in Table 4 and also illustrated in the Pie Diagram alongside (See in Fig. 2)

Table 4: Broad Cost Structure for a Tonne BOF Steel

Main Cost Elements	%	%
Direct raw material (iron ore / scrap / alloys)	38	
Other raw materials (fluxes / refractory)	14	
Gross Materials		52
Energy	25.6	
Labour	5.1	
Overhead	17.3	48
TOTAL COSTS	100	100



From the Pie Diagram and the Table 4, it is seen that the material cost, consisting of direct and indirect materials, cost about 50-52 percent, energy costs about 25 percent, and overhead about 17-20 percent. The labour costs as little as 5

percent, showing that steel making is basically an automated process.

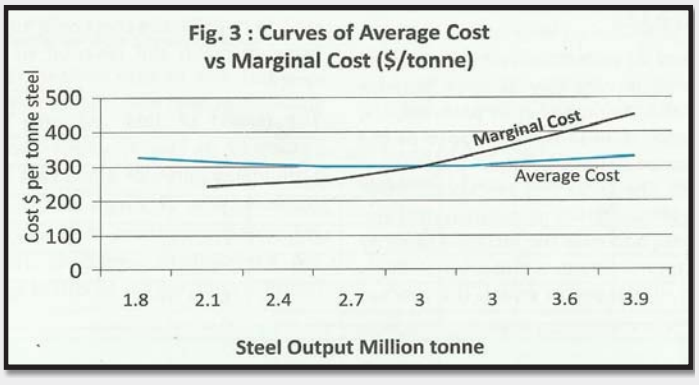
Average Cost & Marginal Costs of a 3 Million tonne Steel Mill: Cost Dynamics

From the Table 5 and the Fig. 3, it will be seen that if the average cost is falling, marginal cost remains less than the average cost; however, when the average cost is rising, marginal cost is higher than the average cost. Thus, at the lowest average cost, the marginal cost equals the average cost and in the Figure the curve of marginal cost cuts the curve of average cost.

This relationship gives the mill operators an opportunity to test if the mill is working at the optimum level of production by varying the production capacity upwards or downwards and studying the data as in the Table 5.

Table 5: Relationship between AC and MC

Steel Mill Output (Million t)	Total Cost Million $	Average Cost $	Marginal Cost $
1.8	582	323	-
2.1	654	311	240
2.4	729	304	250
2.7	810	300	270
3.0 (Optimal Capacity)	**900**	**304**	**300**
3.3	1002	304	340
3.6	1119	311	390
3.9	1254	322	450



Low Cost Steel Mill

Profit will be a maximum for a steel Mill at an output level where the marginal cost, that is, the cost to produce an additional tonne of steel is just equal to the market price of a tonne of steel. Now in an open market with a number of steel suppliers, the market price of steel does not change with the supply pattern of an individual steel maker and may be deemed as fixed. Marginal price therefore shall not exceed the market price.

For a low-cost steel mill, the average cost is generally lower than the market price and moreover the profitability is a maximum at the level when the marginal cost equals the market price. At this level, the average cost, the marginal cost and the average revenue (price) all should become simultaneously equal.

Table 6: Low Cost Steel Mill

Steel Output Million t	Total Cost Million $	Average Cost $/t	Marginal Cost $/t	Avg. Revenue (Price) $/t	Total Revenue Million $	Total Profit Million $
1.8	582	323	-	330	594	+12
2.1	654	311	240	330	693	+39
2.4	729	304	250	330	792	+63
2.7	810	300	270	330	891	+81
3.0	900	300	300	330	990	+90
3.3	1002	304	340	330	1089	+87
3.6	1119	311	390	330	1188	+69
3.9	1254	322	450	330	1287	+33

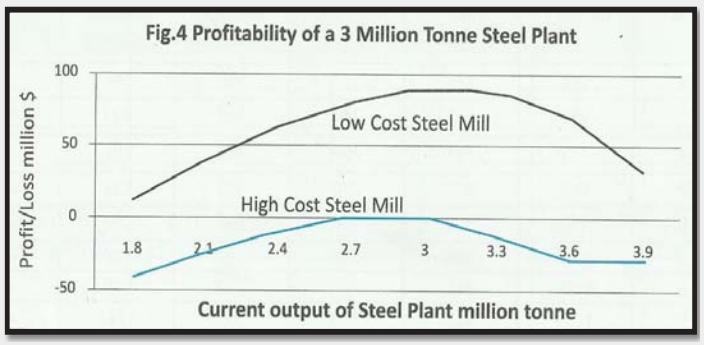
High Cost Steel Mill

In a depressed or recessionary market, when the steel price is very low as it pertains in India today, the average cost of production is generally higher than the market price or the average revenue. The steel mill becomes a high-cost mill. The Table 7 shows such a High-Cost Mill, profitability being negative over the range of production over the installed capacity of 3 million tonne. However the profitability is nil when the marginal cost equals the average cost. In real life, the cost could further escalate, bringing down the revenue to the negative range.

The results of Table A1 and Table A2 are combined in Fig. 4, which shows both the profitability curve of a low cost steel mill and the loss curve of a high cost steel mill. There will possibly be some steel mills operating in the intermediate conditions. This diagram is useful in studying the health of a steel mill.

Table 7: High Cost Steel Mill

Steel Output Million t	Total Cost Million $	Average Cost $/t	Marginal Cost $/t	Avg. Revenue (Price) $/t	Total Revenue Million $	Total Profit Million $
1.8	582	323	-	300	540	-42
2.1	654	311	240	300	630	-24
2.4	729	304	250	300	720	-9
2.7	810	300	270	300	810	-
3.0	900	300	300	300	900	-
3.3	1002	304	340	300	990	-12
3.6	1119	311	390	300	1088	-29
3.9	1254	322	450	300	1170	-84



Appendix

Conversion Costs for BOF Steel Making

The typical breakdown cost of one tonne of steel made from BOF process is shown in Table A1. The Factor column shows the proportion of the input material by weight or appropriate unit for each tonne of steel. The raw material costs and energy cost per tonne of BOF steel are also derived in Table A1 and Table A2.

Table A1: Costs for a Metric Tonne of BOF Steel

Item / Unit	Factor	Unit	Unit cost	Fixed	Variable	Total	% Cost
Iron Ore	1.559	Tonne	51.63	0	80.49	80.49	25.0
Iron ore transport	1.559	Tonne	5.83	0	9.04	9.04	2.9
Coal	0.892	Tonne	82.12	0	73.25	73.25	23.7
Coal Transport	0.892	Tonne	4.22	0	3.77	3.77	1.2
Steel scrap	0.15	Tonne	160.65	0	24.10	24.10	7.8
Scrap transport	0.15	Tonne	5.00	0	0.75	0.75	0.2
Industrial gases	0.62	Cu. M	0.07	0	18.75	18.75	5.8
Ferro alloys	0.006	Tonne	1383	0	7.70	7.70	2.5
Fluxes etc.	0.536	Tonne	37.50	0	20.10	20.10	6.5
Refractory	0.011	Tonne	685.00	0	7.71	7.71	2.5
Other costs	1	Unit	15.48	3.87	11.61	15.48	5.0
By-product credits	1	Unit	-4.44	0	-4.44	-4.44	-1.4
Thermal energy net	-7.769	GJ	4.35	0	-33.80	-33.80	-10.9
Electricity	0.141	MWH	127.00	2.69	15.22	17.91	5.8
Labour	0.518	Hours	30.56	3.96	11.87	1	5.1
Capital Charges	1	Unit	53.63	53.63	0		17.3
TOTAL				64.14	245.43		100%

Source: adapted from www.steel_on_the_net.com/cost-bof.html

The breakdown of energy costs of various types for each tonne of steel is shown in Table A2.

References:

WSA Site, www.worldsteel.org/publication/fact-sheets; Fact sheet: Energy Use in the Steel Industry 2014

www.eef.org.uk/uksteel/about-the-industry/steel-fact; Steelmaking inputs and costs [EEF/UK Steel]

www.steelonthenet.com/cost-bof.html; Basic Oxygen Furnace Steel making Costs 2016

Table A2:

Breakdown of Total Energy Cost for a tonne of BOF Steel

Coal & Transport =23.7 + 1.2 =	24.9 %
Industrial gas	5.8 %
Electricity	5.8 %
Gross Energy consumed	36.5 %
Thermal Energy recovered	-10.9 %
Net Energy expended	25.6 %

Table A3: Raw Material Costs for a tonne of BOF Steel

Iron ore + transport	= 26.0 + 2.9	28.9 %
Steel scrap + transport	= 7.8 + 0.2	8.0 %
Ferro-alloys		2.5 %
By-product credits		-1.4 %
		38.0 %
Other costs:		
Fluxes	6.5	
Refractory	2.5	
Others	5.0	
		14.0 %
		52.0%

Ghosh Roy, M K, "Ecological Sustainability of a One Million TCS Steel Plant Model" JPC Bulletin Special Issue, Steel in 2015, January 2015

Bibliography:

Several Books authored by Dr. M K Ghosh Roy on Ecology, Energy, Environment and Climate Change served as the bibliography of this presentation –

1. Sustainable Development – Environment, Energy & Water Resources CRC Press, USA/ Ane Books, New Delhi
2. Green World Green Energy, Gyan Publishing House, New Delhi
3. Water Resources – Strategic Overview for Global Sustainability, Scientific International,

New Delhi

4. Renewable Energy, Scientific International, New Delhi
5. Global Warming & Climate Change, Scientific International, New Delhi

Source: JPC Bulletin

Steel in 2015

Snapshots of principle achievements of steel industry throughout the globe in 2015 has been captured in this section for our erudite readers.

- China removed export tax rebates of 9%-13% on boron-added steel, effective from January 1, 2015.
- Posco-Odisha project failed to make headways, but it inaugurated Posco-Maharashtra, its 1.8 mtpa CRM in western India.
- India amended its key mining bill, paving the way for introduction of competitive bidding for allocation of mines of iron ore and other non-coal minerals.
- Chinese steel exports crossed 100 million tonne mark in February 2015 itself.
- The Thai Industrial Standards Institute has introduced mandatory registration and licensing for imports of finished steel.
- Saudi Arabia lifted its ban on rebar exports, conditional on "the availability of sufficient quantities of this item in the local market".
- For the first time, a state-owned 2 mtpa iron ore concentrate mine in Beijing closed down in February 2015.
- China announced that it had set up ten inspection teams to monitor pollution levels in Beijing, Tianjin and Hebei. The new measures include the deployment of aerial, unmanned drones over the targeted areas and any mill that fails to meet the desired norms will be forced to half operations.
- China's MIIT is reportedly working on a plan called "Steel industry transition development action plan (2015-17)" which among others, will target eliminating 80 mtpa of steel output capacity by 2017, reducing the number of steel enterprises from more than 500 companies currently to about 300, achieving zero growth in total energy consumption and reducing the total emissions of pollutants.
- Ukraine extended for 18 months, its tonnage import quotas on certain seamless pipes which have been in place since 2008 to September 30, 2016.
- Unicoil received quality accreditation from the Jordan Standards & Metrology Organisation for tis galvanized and pre-painted sheet products, making it the first Saudi company to obtain the Jordanian Quality Mark (JQM).
- India removed the pre-inspection clause for metal scrap import from its Foreign Trade Policy.
- China announced a reduction in its resource tax on iron ore, from 80% to 40%, effective from May 1, 2015 in a bid to help domestic miners amid slumping global prices.
- India reduced export duty on iron ore with Fe content of less than 58%, from 30% to 10% keeping duty rates on higher grades unchanged.
- Australian coking coal is set to enjoy 0% import tax in China again from January 1 2016, following the implementation of the free trade agreement between the two countries.
- Chinese ferrous scrap recyclers will enjoy a 30% rebate on VAT from July 1, 2015.
- Russia moved closer to banning scrap exports.
- Brazil has announced a plan to attract investment worth 198.4 billion Reais ($63.2 billion) to spend on improving the country's infrastructure and spurring economic growth.
- Vietnam has introduced a new law requiring scrap importers to deposit as much as 20% of the value of an imported cargo prior to bringing it into the country.
- Hebei's provincial government released a document outlining production limits for industries ahead of the September 3, 2015 military parade in Beijing that will mark the 70th anniversary of the end of the 2nd World War. The announced pushed up spot prices of rebar as city authorities issued a stop work order at construction sites to ensure clear skies over the city.
- The People's Bank of China set its reference exchange rate at 6.4010 yuan to the US dollar which is almost 4.7% lower from earlier level, before the country changed the methodology for calculating the rate.
- Kazakhstan has extended its ban on ferrous scrap exports until March 2016.
- Baosteel commissioned the first Blast Furnace at its new greenfield in Guangdong province.
- After two rounds of import duty hikes, India imposed provisional safeguard duty of 20% on HR products with some exceptions, effective 15 Sept. 2015 and is valid for 200 days.
- CLSA has slashed iron ore price forecasts to $56/t cfr China in 2015 and $46/t in 2016 in contrast to previous respective forecasts of

$80/t and $75/t.

- Moody's has lowered its forecast for average metallurgical coal prices in 2015 to $100/t fob Australia amid a continued slower growth rate in Chinese steel production.
- Wood Mackenzie expects global coking coal demand to rise by 113 mt by 2035.
- The UK government has announced that energy-intensive industries such as steelmaking and chemicals will be "permanently exempt" from the cost of environmental tariffs designed to support renewable energy projects.
- Samarco will be fined over $200 million for damage to the environment and population caused by the tailing dam collapse at its Germano mine in Minas Gerais state, where it faces a ban in operation.
- IMF names yuan as global reserve currency, includes it in its SDR.

Source: JPC Bulletin

Supernova iron found on moon

Scientists have used samples from the moon to confirm a supernova explosion that happened in the neighbourhood of our solar system about two million years ago. A star exploded in a supernova close to our solar system and its traces can still be found today in the form of an iron isotope found on the ocean floor. Now scientists at the Technical University of Munich, and their colleagues from the US, have found increased concentrations of this supernova-iron in lunar samples as well. They believe both discoveries to originate from the same stellar explosion. A dying star ends its life in a cataclysmic explosion, shooting the majority of the star's material, new chemical elements created during the explosion, out into space. One or more such supernovae appear to have occurred close to our solar system approximately two million years ago. Evidence of the fact has been found on earth in the form of increased concentrations of the iron isotope 60Fe detected in Pacific Ocean deep-sea crusts and in ocean-floor sediment samples.

Source: Hindu Business Line

Rising Steel Production Catalyzing Coking Coal Consumption in India

Coking coal consumption in India will increase further as steel production in the country is poised for a substantial boost. Towards the first half of 2017, steel production capacity in the country will go up by at least 7.3 mnt as additional capacities will go on-stream. This will necessitate substantial volumes of coking coal to fuel the incremental production.

Growing consumption of this coal variant is, however, not a boon for the domestic producers, as it constitutes a small proportion of the total coal production in the country. India produces a meager quantity of coking coal, which is roughly equivalent to 8% of the total coal (coking and non-coking) production in the country.

Coking Coal Production vis-à-vis Total Coal Output in India (in mnt)

Fiscal	Coking Coal Production	Total Coal Production
2013-14	56.82	508.95
2012-13	51.58	504.82
2011-12	51.66	488.29
2010-11	49.55	483.15
2009-10	44.41	487.63

In addition to significantly low production, coking coal produced in the country is also inferior in quality owing to high ash content and poor coking strength, which is why consumers in the country opt for foreign supplies, predominantly from Australia.

On the other hand, strong demand for coking coal prevails in the country due to substantial steel production. Data analysis shows that demand for coking coal has been growing at a CAGR of around 6% in the country. The demand would have been higher if Met coke producers in the country had not constrained to curtail their production rates on account of low demand for domestic Met coke, arising from Chinese dumping.

Production Vs Import

	2013-14	2012-13	2011-12	2010-11	2009-10
Production	56.818	51.582	51.66	49.547	44.413
Import	36.872	35.557	31.801	19.484	24.69
Demand	93.69	87.139	83.461	69.031	69.103

Consumption of coking coal will rise substantially in the country after the new projects come on-stream, tentatively by the first half of 2017. Typically, production of every metric tonne of steel requires approximately 700 kg of coking coal.

- State-run Rashtriyalspat Nigam Limited (RINL) is currently ramping up its steel production capacity by 1 mnt pa, which is expected to be commissioned by the first half of 2017. RINL also has recently raised its production capacity by 3.3 mnt, taking its total production capacity to 6.3 mnt. The expanded capacity will be put commercial production towards the end of 2016.

- NMDC Limited, a state-owned mining company, is setting up a 3 mnt pa steel plant in Bastar region of Chhattisgarh. If the project deadline is adhered to, then, the plant is expected to be commissioned by Dec'16, and commercial production is slated for July'17.
- Government-owned SAIL is also in the process of increasing its total production capacity from 12.84 mnt pa to 21.4 mnt pa by 2020.

If the ongoing anti-dumping duty investigation on Met coke imports into India culminates into imposition of the duty, then, consumption of coking coal by the Met coke producers will improve significantly as the production will rise. The Met coke industry in the country is in a slump due to widespread dumping by China.Ironically, the growing demand for coking coal is certainly good news for overseas suppliers as India has become a lucrative hot spot for foreign suppliers due to inadequate domestic supply.

Source: Steel 360

Lead Batteries in Solar Energy & Electric Vehicles

ILZDA workshop sees a bright future

For quite some years now, there is an increasing action in India on accelerating the green, solar energy sector to bridge the perennial power deficit; also massive investments have been made in solar energy and will continue to flow in the coming years as well. Global players are also keen to enter India in a big way. Also the long debated, much awaited "Electric Vehicle" has finally arrived in India. There are vibrant noises from the courts, state governments on urban environment protection, alternate modes of transport, last minute connectivity, rapid installation of charging stations etc., More players are now visible in manufacture of electric cars, two wheelers, e-rickshaws etc., A positive trend!

A "National Workshop on Lead Batteries in Solar Energy & Electric Vehicles– Challenges & Opportunities" was organized by India Lead Zinc Development Association (ILZDA), its affiliate body Battery Society of India (BSI) in association with Solar Energy Society of India, Society of Manufacturers of Electric Vehicles, Federation of Indian Small Scale Battery Assns, Amara Raja Batteries Ltd, Luminous Power Technologies P.Ltd, Black Diamond Structures LLC, Eastman Auto & Power Ltd, Exide Industries Ltd, Supreme Batteries Pvt Ltd, Nile Ltd, Firefly Batteries P Ltd & Deepak International Ltd.

At the outset, Mr.L.Pugazhenthy, Executive Director, India Lead Zinc Development Assn, welcomed the dignitaries as well as the delegates and underlined the objectives of the workshop. Mr.Rakesh Malhotra, Founder Chairman, Luminous Power Technologies & Founder, SAR Group of Companies delivered a Keynote Address **"Advanced Lead Acid Battery Technology– Imperative to Steer Electric Mobility & Solar to next Frontiers of Adoption & Growth in India"**. Mr.Prafulla Pathak, Secy General, Solar Energy Society of India delivered the other Keynote Address **"Solar Energy in India–Current & Future Scenario"**. Thereafter the deliberations of the Technical Sessions 1&2 took place during the daylong event.

About 150 delegates representing various interests and stakeholders attended the workshop. Two keynote addresses and fourteen thought–provoking technical presentations were made, followed by meaningful discussions between the speakers and the participants. A Panel Discussion Session also took place between a panel of experts and the delegates.

The comparative merits and demerits of Lead Batteries and Lithium Ion Batteries were discussed in detail. In view of its proven advantages, economic affordability and easy recyclability, it was felt that lead acid batteries will continue to dominate the emerging applications also–Solar Energy & Electric Vehicles–in the decades to come.

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TRIBUTE TO SHRI RK GUPTA

We are sorry to inform our esteemed members that Shri R K Gupta, who was Chairman of the Chapter Relations Committee of Delhi Chapter, left for his heavenly abode on 29th April 2016.

He has been a member of IIM since 1985. He served as Secretary of Delhi Chapter from 1989 to 1997. He was also Chairman of our Chapter for 2007-08 and 2008-09. He contributed immensely in our MMMM events since 1993. As a matter of fact, our Chapter's building was constructed during his tenure as Secretary and he left no stone unturned for giving it the shape it enjoys today. The absence of Shri RK Gupta will be felt by all of us.

He had a strong belonging to the IIM. He was conferred Honorary Membership of the IIM in 2015 on account of his dedicated services to the metallurgical profession and IIM.

The Delhi Chapter prays to the Almighty that his soul rests in eternal peace.

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Climb Out of The Grandstand And Onto The Playing Field

You can't fulfil your destiny on a theory… it takes WORK. None of the secrets of success will work unless you do. You are made for action. Success simply takes good ideas and puts them to work. What the free enterprise system really means is that the more enterprising you are the more free you are. What we all need is less emphasis on free and more on enterprise.

"Striving for success without hard work is like trying to harvest where you haven't planted". What you believe doesn't amount to very much unless it causes you to wake up from your dream and start working. You cannot just dream yourself into what you could be. The only time a lazy person ever succeeds is when he tries to do nothing. A famous old saying says it best: "Laziness travels so slowly, poverty soon overtakes it."

When you are lazy, you must work twice. It is always a trying time for the person who is always trying to get something for nothing. Did you notice? We weren't given apple juice, we were given apples. Some say nothing is impossible, yet there are a lot of people doing nothing every day.

Some do things while others sit around becoming experts on how things might be done. The world is divided into people who do things and people who talk about doing things. Belong to the first group-there is far less competition.

"All men are alike in their promises. It is only in their deeds that they differ". Wishing has never made a poor man wealthy. "Laziness is the secret ingredient that goes into failure, but it's only kept a secret from the person who fails."

Tell yourself: "Inspirations never go in for long engagements; they demand immediate marriage to action". If the truth were know, most of our troubles arise from loafing when we should be working, and talking when we should be listening.

This is the Twenty-Third of series of "Nuggets of truth" which are our sound food for soul. Get ready to blow the lid off our limited Thinking & create your recipe for happiness & success.

Compiled by Shri K L Mehrotra
Chairman – IIM-DC & Former CMD – MOIL
E-mail: klmehrotra48@gmail.com

India Could Be Sitting on a Gold Mine

Gold is so popular in India that it's created an economic problem for PM Narendra Modi.

The country vies with China as the world's biggest buyer of gold. Imports of the metal came to $35 billion last year, and were equivalent to about 43% of the country's current account deficit in the September quarter. In November, Modi launched a programme to lure private gold holdings to the market by getting banks to offer interest on items deposited in their vaults. If he really wants to limit the amount of gold imported, here's a smarter way of doing it: Make it easier to produce the stuff domestically. At the start of the 20th century, India was the world's sixth-biggest gold producer. Since then, production has slipped dramatically. You'd think the government would be doing everything it could to encourage local miners. Far from it: Deccan Gold Mines, which hasn't dug up an ounce in 13 years because of the difficulty of obtaining permits from state governments, told that it has no incentive to explore for gold after laws passed last year forced miners to bid for the right to mine the deposits they find. Finding mineral deposits is risky, cost-incentive business. As with pharmaceuticals or movies, there are a long tail of failed investments behind every blockbuster.nIndia has long-standing problems with corruption around the free allocation of mining leases, which helps explain the desire to change the law. The problem at the moment is that without robust private-sector exploration, it's hard to be sure what the problem is: A paucity of resources on the ground, or a lack of capital to develop them. Only 13% of the country's land with geological potential has been explored. It could be sitting on a gold mine, and not even know it. – Bloomberg.

Source: The Economic Times

Platinum Jewellery Demand to Stay High

Retail sales growth of platinum jewellery in 2016 is expected to keep pace with the rapid expansion seen last year as platinum has turned Rs 4,000 per 10 gm cheaper than gold. Platinum Guild International (PGI), in its third annual retail barometer report, recent forecast 23% growth while its strategic partners such as Orra, Joyalukkas, IshwarlalHarjivandas Jewellers and Senco Gold & Diamonds projected 25% growth during the year. In 2015, retail sales of platinum jewellery went up 24% over that in the previous year. Vasihali Banerjee, country manager India at PGI said: "Platinum has seen an excellent growth of 24% despite it being a challenging year. In 2016, we are expecting 23% growth, though retailers are pegging growth at 25%. The month-long strike in March in gold trade may affect the growth." Recently, platinum was priced at Rs 2,450 per gram while gold was selling at Rs 2,850 per gram.

In 2015, studded platinum jewellery accounted for 53% of the sales growth. The research for the annual retail barometer was conducted by a third-party agency, Stratwon Business Consulting, between January and February 2016. It covered 21 more retail companies with nearly 310 retail outlets in platinum markets across India. Banerjee said a price drop in platinum is helping Indian consumers upgrade from 18-carat studded gold jewellery to platinum jewellery. Suvankar Sen, executive director of Senco Gold & Diamonds said platinum jewellery sales have grown over 25% across the company's stores. "Rings are the fastest moving categories in platinum, followed by earrings and pendant sets. We have also seen increase in men buying platinum chains and bracelets. With increasing awareness among consumers in tier 2 and 3 towns, we see opportunity this year to introduce platinum in our stores in these cities."

Source: The Economic Times

Nalco eyes JV route for 5 lakh tonne aluminium plant in Iran

The state-owned aluminium maker Nalco is considering setting up a 5-lakh tonne per annum aluminium plant in Iran through a joint venture (JV). Nalco CMD T K Chand, who was part of the delegation led by petroleum minister Dharmendra Pradhan to the Islamic country, met a top Iranian official recently and discussed the feasibility of setting up such a plant in the Chabahar Free Trade Zone (FTZ), a senior official said. "Chand met Iran's mines and mining Industries development and renovation organisation head Mehdi Karbasian in Tehran over the proposed JV for setting up the plant, which includes a smelter and a gas-based

power plant," he added. The discussions also touched on Nalco's interest to further expand its presence in Iran through more co-operation in bauxite mining and aluminium ingot production, the official said. The public sector undertaking (PSU) has been scouting for opportunities to set up a gas-based thermal power plant and an aluminium smelter in Iran, Qatar and Oman. The Navratna firm faces a daunting challenge of keeping operational and raw material costs in check in its bid to stay competitive even as it aims to expand capacity to take advantage of infrastructure boom in India. It takes around $1,500-1,700 to produce one tonne of aluminium, with alumina and power accounting for 40% each of the cost and raw materials and others contributing the remaining 20%. Nalco announced that a task force has been set up by the PSU and Iran's industries ministry to deliberate on the proposed smelter and gas-based power plant in Chabahar FTZ.

Source: Financial Express

Why gold refinery consolidation is the need of the hour

Finance Minister ArunJaitley's decision to cut arbitrage may ensure that the standards of purity of the refined gold in the Indian market meet the global benchmark.

The 278-km-long road between Delhi and Nainital in Uttarakhand is not only used by thousands of tourists but also by hundreds of gold refiners. In the past three years, Uttarakhand has emerged as India's gold refining capital. The number of firms in this business in the state has grown five times in this period, almost doubling their refining capacity to 1,587 tonnes by the end of 2015. Yet, as the government launched its ambitious gold monetisation scheme last year to mop up idle deposits stored with the public and religious institutions through banks, it found that most of these companies lacked the ability to process gold at the level of purity required."It is necessary to put order in the gold refining business," a top revenue department official said. In this direction, Budget 2016-17 clipped a tax arbitrage these units enjoyed as an area-based incentive. At the same time, the finance ministry has also cut a parallel benefit for larger units located elsewhere, including a joint venture of state-run MMTC and Switzerland-based PAMP.However, prospects of the industry, which is supposed to provide assaying and refining support to banks, are looking difficult. This may force the government to tweak parts of its tax proposals on gold in the Budget.

Gold refining units flocked to Uttarakhand from 2011-12. Till then, despite having the largest gold reserves among the public, India had little refining capacity for extracting usable gold from raw or semi-processed stock, also known as gold Dore. Instead of doing this, people filled up on imported refined gold. The UPA government scrambled to remedy this. It offered a liberal area-based tax break to set up refining units. While it imposed a stiff import duty of 10 percent on finished gold or bullion, it offered a countervailing duty of eight percent set off on processing of gold Dore, giving a margin of two percent for "manufacturing" gold. From just four units in 2012, the number of units jumped to 21 by 2015 in the excise-free zone of Rudrapur in the state. During the same period, the number of units in the rest of the country rose to only nine from two. Finance Minister ArunJaitley this year corrected this anomaly by reducing the arbitrage to 1.25 percent from the existing two percent. Moreover, in line with the government's plan to phase out these exemptions, he has decided no new units or their additional capacity will get the benefit from now.

According to SudeeshNambiath, lead analyst (precious metals) at Thomson Reuters, the minister's move is clearly aimed at consolidation of the business to ensure that the standards of purity of the refined gold in the Indian market meet the benchmark of London Bullion Market Association. "For banks, meeting this benchmark is necessary to ensure that high-value customers, including temple trusts, deposit their gold with them as part of the gold monetisation scheme," he said.For instance, a major Indian public sector bank discovered a horror story in its stock of gold bullion processed domestically. Instead of the 99.95 percent purity level demanded from each piece, one consignment sent for refining to one of these units had purity level of 99.945 – a difference good enough to shave off a few lakh rupees per bar.

The largest refiners for gold in the global market as of now are Turkey and Switzerland. But that picture is changing. Bengaluru-headquartered Rajesh Exports, which tied up with Switzerland's Valcambi, is now the owner of the world's largest gold refinery. It also has a presence in

All you need to know about heart attack

Keeping World Heart Day on September 29 in mind, Dr Amar Singhal, MD, DM, FACC, head of the department of cardiology, Interventional Cardiologist of Balaji Action Cancer Hospital, answers some frequently asked questions on heart diseases.

What is the cause of chest pain in heart patients and how do we recognize it?

The heart requires blood to function efficiently. When the coronary arteries, which supply blood to the heart, develop a blockage in their lumen, it results in inadequate blood supply to the heart which causes chest pain and is called angina. The disease is called Coronary Artery Disease (CAD). The pain is typical and feels as if a heavy weight has been kept on the chest. The pain can go from the chest to the jaws and make the person feel as if they are choking. It can also spread to the inner aspect of the left arm, shoulders or the back. Sometimes severe forms of angina can occur

even when a person is resting and may be associated with sweating. Typical symptoms include epigastric discomfort, belching, sweating, breathlessness, and are common in diabetics.

What is the difference between heart attack and angina?

When a blood clot is formed over a pre-existing obstruction in the artery supplying blood to the heart, it results in total occlusion of the artery and no blood is supplied to that particular part of the heart. This results in a heart attack. The pain is similar to angina but it is more severe and is associated with sweating.

Who is more prone to heart disease?

There are certain conventional risk factors for developing CAD, like hypertension, diabetes, smoking, increased cholesterol (especially the bad cholesterol, LDL) and family history. But individuals without any of these risk factors can also develop CAD.

What is the best mode of treatment?

There are two ways. The patient can be given clot dissolving drugs which are relatively inexpensive, but have low success rate. The other option is to go for an angioplasty, which has more than 98% success rate. So, patients should be rushed to a hospital with the needed facilities within 24hours.

Most important ways to take care of our heart:

- Make sure your diet has less carbohydrates and oil, and more of protein.
- Exercising is crucial. Walk for half an hour at least five days a week. Avoid lifts and sitting for a long time.
- Quit smoking
- Control weight
- Keep your blood pressure under control. Diabetes patients should also control their ailment.

Uttarakhand.Jaitley, to draw parity, has also increased the excise duty on gold refineries in the rest of the country to 9.5 percent from the exiting 9 percent. At a stroke, the margins for these refineries have come down to only 0.5 percent (10 percent import duty minus 9.5 excise).

Source: Business Standard

New state of matter found in 2D material

Scientists, led by an Indian-origin researcher, have found evidence of a mysterious new state of matter in a 2D material, in which electrons – thought to be indivisible building blocks of nature – break into pieces. This state, known as a quantum spin liquid, was first predicted 40 year ago. The scientists, including those from University of Cambridge, measured first signatures of these fractional particles, known as Majorana fermions, in a 2D material with a structure similar to graphene. Their results matched with the Kitaev model, one of the main theoretical models for quantum spin liquid. Quantum spin liquids are mysterious states of matter which are thought to be hiding in certain magnetic materials, but had not been sighted in nature. The observation of one of their most intriguing properties – electron splitting, or fractionalisation – in real material is a breakthrough.

Source: Times of India

The Technological Indian

In a new book, American science historian Ross Bassett looks at the careers of 850 Indian engineering graduates from MIT and their enormous contributes to India.

For most of the 20th century, when the very idea of a hi-tech India seemed improbable,

WALK - A Must for the Senior Citizens

Walking is a Great exercise, which has excellent outcomes apart From burning fat. It can be done without much effort and risk of complication. all of us are aware of that we speak a lot about walking, but we don't practice it.

- **Good for the Heart** :- Regular walking has been shown to reduce the risk of heart disease ad stroke. it lowers the level of LDI (bed) Choiesterol while increasing level of HDL (Good) Cholesterol and Keeps the Blood Pressure in check. walking briskly for up to 30 Minutes can help prevent and control the high blood pressure that can cause strokes-reducing your risk by up to 27 percent.

Prevention of Various Diseases: Walking habit can slash the risk of developing diabetes, asthma and some cancers. it Lowers the risk of developing cancers of the colon, breasts and uterus by about 20% Percent.

Control of Your Body Weight : Regular walking for 45 Minutes day for 4 day a week can reduce 8 kg in a year with no change in diet. walking can help you trim fat and at the same tine increase yiur muscle strength.

Prevention fo dementia: By being active you can increase your brain functions their density your body's stores of vitamin D. which prevents your bone from being fragile.

Transfer of energy : a Brisk walk is one of the best natural energizers. which transfers energy from the nature to your body. it Further boosts circulation and increases oxygen supply in your body, making your day active and healthy.

Spreading happiness: various studies show that regular exercise. like brisk walking can be effective anti depressants. being active releases endorphin into the bloodstream. reducing stress and anxiety.

Adding years to your life: Thirty Minutes of daily physical activity is said to extend your life by 1.3 years. walking with peers can also cheer your up and motivate you.

BUT KEEP IN MIND FOR HEALTHY WALKING

Proper Outfits: Wear the right pair of walking shoes and comfortable clothes.

Hydration : drink water in between your walks. to hydrate yourself and make sure you do not eat an hour before going out for a walk.

Perseverance : Start walking for 15-20 minutes for the first few days. and then gradually increase the time by 1 minutes every day to reach 40-45 minutes of brisk walking.

Brisk walk: Walk briskly. swing your hands and remember to perspire at the end of walking

Start early : walking early in the morning gives you fresh oxygen and a chance to enjoy the greenery and beauty fo GOD

walking is like meditation when you focus on the rhythm of your breath and rhythm of each step you get relaxed and increase self Awareness. it will with time. become a creative & Rejuvenating experience

IF you walk at a steady pace for 30 to 45 minutes for at least 4 to 5 days a week along with a heathy diet than you are probably one of the healthiest people in the world. walking is simple exercise which requires no trainer of gadgets, but will burn nearly the same calories as jogging, if done properly. we often don't use simple things but prefer to do complicated thing likes signing up for expensive aerobic classes and spending a lot of time in gyms.

the foundation was actually being laid to make the dream a reality. India recently sent a space probe to orbit Mars and Indian-born engineers were named chief executives of two top global technology firms. In this new book, The Technological Indian, American science historian Ross Bassett analyses the careers of 850 Indians who earned engineering degrees from Massachusetts Institute of Technology (MIT) between 1880 and 2000, and looks at their enormous contributions to India's technological destiny. Excerpts from an interview:

Did Indians first begin enrolling at MIT in the 19th Century?

Indians had been going to MIT since 1882, far longer than I would have thought. Bal Kalelkar, a disciple of Mahatma Gandhi, wrote in 1940 that he was not seeking an MIT doctorate in engineering for personal glory but "to serve our motherland through my profession and to see her in a better position". Many went with the desire to develop skills that would help build the Indian nation. The graduates who came back in the 1940s and '50s were precious commodities in helping India develop its technological infrastructure.

Scions of business families went to MIT too

Yes. Perhaps the closest connection was between the Birla family and MIT. G.D. Birla got the institute to assist in developing Birla Institute of Technology and Science into a premier engineering institute, a private version of the Indian institute of Technology. Birla's grandson Aditya studied chemical engineering at MIT in preparation for taking on a leading role in the family business. S.L. Kirloskar went to MIT, as did members of the Lalbhai, Godrej, and Chauhan (Parle Products) families.

And some MIT graduates helped create the information technology (IT) industry in India. How did that happen?

In the 1950s and '60s, MIT was ahead of all U.S. universities in computer technology. A number of Indians who went to MIT then got exposed to computer technology simply because working at a computer centre was a way they could fund their education. Tata Consultancy Services (TCS) was started by three MIT graduates and then later led by another MIT graduates, F.C. Kohli. Narendra Patni started another early IT venture and he was also an MIT graduate. The team he assembled later left to form Infosys, so MIT was indirectly involved in it.

In post-liberalisation India, have MIT graduates tended to return home?

Among Indians who had graduated from MIT in engineering since 2000, more of them do return to India, but the vast majority stays in the United States, often taking positions either in Silicon Valley or on Wall Street. The technological Indian is a citizen of the world.

Does the institute help spur India's space programme as well?

Brahm Prakash, who did a doctorate in metallurgy from MIT, came back and served as the first head of the department of metallurgy at the Indian Institute of Science. He was a key lieutenant to HomiBhabha in the atomic energy programme, and later led the Vikram Sarabhai Space Centre in Trivandrum. During that time India developed the SLV3 launch vehicle, which put the country's first satellite into orbit in 1980. He was a mentor to A.P.J. Abdul Kalam, the project manager for the SLV-3.

Tell us about the man who put India on the world's steel engineering map.

M.N. Dastur, whose father was a clerk at Tata's steel company in Jamshedpur, had worked as an engineer at the steel plant himself. Then, funded by a Tata scholarship, he went to MIT, where he earned a doctorate in metallurgy in 1949. He worked with one of the world's leading steel consultants at their office in New York City. After his return to India in the 1950s, he went on to play a particularly important role in building up India's technological capacity. As India looked to the Soviet Union, West Germany, and Great Britain to help it build steel mills, he argued that Indians could design steel mills more cheaply that were better suited for the Indian environment. He found a great ally in Prime Minister Jawaharlal Nehru, and established a steel consulting business. His firm was scheduled to design the great steel mill at Bokaro, but the Soviet Union offered to finance the mill's construction if its design was used. Dastur and his firm provided India with a wealth of steel expertise and gained global recognition.

Source: The Hindu

Scientist record heat travelling through materials

In an "extremely exciting" discovery, scientists with the aid of an ultra-fast electron microscope have for the first time recorded how heat travels through materials at the speed of sound. The research by University of Minnesota in U.S. provides unprecedented insight into roles played by individual atomic and nanoscale features that could aid in the design of better, more efficient materials with a wide array of uses, from personal electronics to alternative-energy technologies. Such work would be greatly aided by actually watching heat move through materials, but capturing images of the basic physical processes at the heart of thermal-energy motion has presented enormous challenges, researchers said. They used a brief laser pulse to excite electrons and very rapidly heat crystalline semiconducting materials of tungsten diselenide and germanium. They then captured slow-motion videos of the resulting waves of energy moving through the crystals. "As soon as we saw the waves, we knew it was an extremely exciting observation. Actually watching this process happen at the nanoscale is a dream come true," said lead researcher David Flannigan, from the University of Minnesota. Flannigan said the movement of heat through the material looks like ripples on a pond after a pebble is dropped in the water. The videos show waves of energy moving at about 6 nanometres per picosecond.

A critical process

Mapping the oscillations of energy, called phonons, at the nanoscale is critical to developing a detailed understanding of the fundamentals of thermal-energy motion. This is because the fundamental length scales are nanometres and the speeds can be many miles per second. Such extreme conditions have made imaging this ubiquitous process extraordinary challenging. – PTI

Source: The Hindu

Bharat Forge to supply titanium forgings to Boeing

Bharat Forge Ltd. will supply titanium forgings for Boeing 777X, a new series of aircraft in the Boeing 777 family which is under development. "We are pleased to expand our partnership with Bharat Forge who started supplying titanium forged flap tracks for the Boeing Next Generation 737 airplane earlier this year. "They have demonstrated not only a high level of technical expertise but also an understanding of the need to meet market requirement for affordability," said Pratyush Kumar, President, Boeing India. "This contract demonstrates our commitment for building a globally competitive aerospace supply chain in India to realise the full potential of the Make in India initiative," Mr. Kumar said. Under development, Boing 777X is a new series of the Boeing 777 family of aircraft. With new engines and new wings made of composite materials, this aircraft will compete with Airbus A350. – Special Correspondent.

Source: Hindu Business Line

Anglo to sell Niobium, Phosphate biz for $1.5 bn

Anglo American Plc will sell its niobium and phosphate unit for $1.5 billion in cash, the mining giant's first big disposal since announcing a plan to cut debt and turn around a struggling business.

Source: Finance Express

Mahindra Intertrade, MSTC to set up first vehicle crushing unit

India, the fifth-largest market for passenger vehicles in the world, is set to get its first automobile shredding facility. Mahindra Intertrade, a Mahindra group company, has partnered with government-owned MSTC to set up an automated facility to recycle vehicles for reuse of steel scrap, aluminium scrap, plastic and rubber. Details about the location, capacity and investment are still being discussed, a company official said.

The proposed facility will be equipped with fully-automated vehicle recycling equipment and will be India's first such plant, Mahindra Intertrade said in a statement. A total of 2.78 million passenger vehicles and 685,704 commercial vehicles were sold in 2015-16.

India does not have a vehicle scrappage policy as yet, but the industry and the government have been discussing it in recent times.

Society of Indian Automobile Manufactures (Siam) has sought a temporary incentive for replacing old vehicles with the new ones. The association has suggested 15 years as the age of retirement for vehicles. It has said the replacement will help in improving air quality in cities apart from making vehicles safer and fuel-efficient. Siam estimated that 30 million vehicles, 80 percent of which are two-wheelers, are older-than 15 years.

"MSTC is always looking at innovative ways to recycle scrap and protect the environment and this facility will help to participate in the emission targets which India has promised to fulfil via the COP 21 Emission Treaty," said S K Tripathi, Chairman and Managing Director. MSTC, which is under administrative control of the Union Steel Ministry, operates e-auction portal for metal scrap, machineries, minerals etc.

Sumit Issar, managing director at Mahindra Intertrade said recycling not only saves energy costs but also minimises the need for other resources as every tonne of new steel manufactured from scrap steel saves a substantial amount of iron ore, coal and limestone. "If India focuses on scrapping old automobiles, it can recover significant amount of steel scrap, aluminium scrap, plastic and rubber. Hence, there is a pressing need for facilities such as this one," he said.

The shredding plant will reduce the dependence on import of shredded scrap, save foreign exchange and help the secondary steel sector. Shredding of automobiles and other scrap will facilitate and promote recycling, reduce pollution and make Indian roads safer.

Source: Business Standard

Strategy Management

Once upon a time a tortoise and hare had an argument about who was faster. They decided to settle the argument with a race. They agreed on a route and started off. The hare shot ahead and ran briskly for some time. Far ahead of his competitor, the hare thought he would relax before continuing the race. He sat under a tree and soon fell asleep. Plodding on the tortoise overtook and soon finished the race. Did not slow and steady win the race?

This is the familiar story that we have all grown up with. Recently, someone told a more interesting version.

The disappointed hare realized that he lost the race because of overconfidence, carelessness and laxity. Had he not taken things for granted, there was no way the tortoise could have beaten him. Determined to win, the hare challenged the tortoise to another race. This time, the hare went all out and won by several miles.

"It is good to be slow and steady; but it is better to be fast and reliable"

Moral of the Story?

Fast and consistent will always beat the slow and steady.

If there are two people in an organization, one slow, methodical and reliable and the other fast and

still reliable the latter will consistently climb the organizational ladder

faster than the former. It is good to be slow and steady,

but it is better to be fast and reliable.

The story doesn't end here

The tortoise realized that there was no way he could beat the hare the way race was formatted. He challenged the hare to another race but on a slightly different route. They started off. In keeping with his self-made commitment to be consistently fast, the hare took off and ran at top speed until he came to a river. The finishing line was a couple of miles away on the opposite side of the river. The hare sat there wondering what to do. In the meantime the tortoise trundled along, got into the river, swam to the opposite bank, continued walking and finished the race.

Moral of the Story?

Identify the core competency and suitably change the playing field.

If you are a good speaker, create opportunities to give presentations

that enable the senior management to notice you.

If your strength is analysis, ensure you do some research,

make a report and send it upstairs.

Working to your strengths will not only get you noticed,

but also create opportunities for growth.

"Identify the core competency and suitably change the playing field"

The story has not ended.

The hare and the tortoise, by this time, had become good friends and realized that the last race could have been run to the advantage of both as a team. They started off. Hare carried the tortoise till the riverbank. There, the tortoise took over and swam across with the hare on his back. On the opposite bank, the hare again carried the tortoise. They reached the finishing line together. Both felt a sense of achievement.

Moral of the Story?

It is good to be brilliant and to have strong core competencies;

but unless you are able to work in a team and

harness each other's core competencies, you will perform below par.

There will be situations in which you will do poorly

while someone else does better.

Teamwork is mainly about situational leadership.

Let the person with the relevant core competency take the leadership.

"Unless you are able to work in a team and harness each other's core competencies, you will perform below par"

More lessons to be learnt from the story

Neither the hare nor the tortoise gave up after failures. Tortoise changed his strategy because he was already working as hard as he could. When faced with failure, sometimes, it is appropriate to work harder. There are times when it is appropriate to change the strategy. And at times it is appropriate to do both.

The hare and the tortoise also learnt another vital lesson.

When we stop competing against a rival and start competing against the situation, we perform better.

Roberto Goizueta when took over as CEO of Coca-Cola, was faced with intense competition from Pepsi. His Pepsi-focused executives were intent on increasing market share 01. Per cent a time.Goizueta stopped competing against Pepsi and instead concentrated against the situation of 0.1 per cent growth. He asked his executives what was the average fluid intake of an American per day? The answer was14 ounces. Coke's share?Just two ounces.Goizueta sought a large share of that market. The competition was not from Pepsi. It was the water, tea, coffee, milk and fruit juices that went into the remaining 12 ounces.

"When we stop competing against a rival

and start competing against the situation, we perform better"

The public should reach for a Coke whenever they felt like drinking sometimes. To this end, Coke put up vending machines at every street corner. Sales took a quantum jump and Pepsi has never quite caught up since.

Hare-Tortoise story teaches us:

Fast and consistent will always beat slow and steady

Work to your competencies

Pooling resources and working as a team will always beat individual performers

Never give up when faced with failure

Compete against the situation – not against the rival

Compiled By:
Shri K L Mehrotra, Chairman IIM-DC & Former CMD-MOIL
E-mail: klmehrotra48@gmail.com





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SOUTHERN REGION:
Ispat Bhawan
5 Kodambakkam High Road
Chennai – 600 034
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