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# THE CRISIS IN SCIENCE AND ENGINEERING EDUCATION IN INDIA

## **Abstract**

Rapid expansion of higher education in India in recent decades has created a crisis with serious implications. There is no dearth of admission seekers thanks to population explosion and relatively plenty of seats are also now available. However, there is dearth of qualified teachers, proper infrastructure and facilities. The quality of diploma and degree holders is on the decline and many graduates are simply unemployable. Poor planning, socio-economic and political factors and also corruption have compounded problems. The issues of quantity and quality are discussed in some detail here. Some remedial measures are also suggested.

## **Introduction**

It was the best of times/It was the worst of times.

- It was the age of wisdom/It was the age of foolishness.
- It was the epoch of belief/It was the epoch of incredulity.
- It was the season of light/It was the season of darkness.
- It was the spring of hope/It was the winter of despair.

## **Charles Dickens: A Tale of Two Cities**

Higher education refers to various courses in diploma, bachelors, masters and doctorate levels after school education. In recent times much has been written on the problems that have arisen out of its rapid expansion to meet demand. Two very informative and thought provoking articles have been published last year by Ghosh and Sen.

As one moves from diploma to higher levels, the emphasis on science

content increases and students are required to acquire more analytical ability in problem solving. There is more emphasis on self-study, library work, ability in communication (both written and oral) and projects/research. It has been now universally accepted that, at UG and PG levels, the students must be exposed to subjects beyond their specialization. Thus students, especially in the UG level, are now required to study some subject from Humanities and Social Sciences and other engineering branches which are known as 'minors'. In some US universities the curriculum may have as much as one third of the subjects from the minor stream as compulsory. In our country, awareness of environmental issues has also become necessary.

Ghosh writes that the higher education system has added, in the first decade of this century, 25000 colleges and nearly 8 million students. As on 2011 there were 42 Central universities, 130 deemed universities, 90 private universities and 5 institutions functioning under the State Act.

## **India's Competitiveness Ranking**

Country	Ranking in Competitiveness
USA	3
Japan	6
South Korea	26
China	28
Thailand	31
Indonesia	37
Russia	45
South Africa	49
Philippines	52
India	55
Brazil	75

- India is grouped under Factor-driven economies (unskilled labour & natural resources) dependent on well-functioning institutions, good infrastructure, stable macroeconomic environment and healthy workforce
- China, Indonesia, Thailand, South Africa and Sri Lanka grouped under Efficiency-driven economies
- Japan, South Korea, US under Innovative-driven economies

Information Extracted From:

**Unleashing the Growth Potential of Indian Steel**

**Sushim Banerjee**

**DG, Institute for Steel Development & Growth, Kolkata**

In 2012, there were 33 institutions of national importance, 35000 colleges as Government degree colleges and 1800 colleges exclusively for women. Many of these institutions are operating without adequate number of qualified teachers and proper infrastructure. There is also, as is well known, rampant corruption. This article, however, will not discuss this issue.

Going simply by numbers, India will rank second in the world i.e. the country has the second highest enrolments for higher education. Yet, this is not something to be proud of because the graduates often lack the skills to find employment. Perhaps many could be provided jobs if they were trained in some skills. For our population of 1.2 billion plus there are only 10,000 vocational training institutes (ITI) most of which have outdated facilities and pedagogy. These institutes have a lower status in society and the students coming out of these find it difficult, if not impossible, to move up to diploma level. Fortunately, there is now a National Skill Development Corporation which aims at imparting job oriented education. By 2015, some 500 million will have to be employed in various sectors such as agriculture (40%), industry (25%), and services (35%). Skill will be in demand.

Ideally, at the most only 10 percent should qualify for higher education if quality is to be maintained. Excellence demands selection. This may sound discriminatory, but it does not imply that those not taken in are inferior. The remaining may be suited better in sectors other than academics which, after all, need mainly one special type of intelligence, specially logical and mathematical. There are many other types of intelligence which make performing artists, musicians and dancers, artists, sports persons, actors, media persons, business persons, politicians, entrepreneurs, etc. In fact, most celebrities belong to these areas only which are beyond the conventional college education. However, they are considered risky and very competitive whereas a conventional education gives hope of a salaried job, but this hope is often misplaced as millions of graduates and doctorates remain as unemployed burden on the society.

Many students pushed into higher education by pressure of families with or without the quota provisions fail to fit in and a growing number is committing suicides in frustration. Some 15 lakhs dream to qualify for 10,000 IIT seats and many spend huge sums on special coaching. The coaching centres, operating like factories, put unbelievable pressure on the students. In one of the most famous coaching centres in Rajasthan there have been 18 or 19 suicides last years alone. Yet, the fact remains that many of the so-called misfits would have excelled in some areas other than education if only they had the opportunity.

The author was for some time attached to IEST Sibpur as an Adjunct Professor. As per the Government norm the Institution admitted some toppers from diploma courses in the second year. Unfortunately, in the classes that the author taught, these students were never admitted in the beginnings of the semester. Often they joined 5-7 weeks later when half of the courses were already covered. There is supposedly some special provision of special classes for them. But how can that arrangement work? These students remain behind from the very beginning simply because of the delay in processing of their cases for admission to their UG programme by some callous officials who are not accountable.

Things are bad at doctorate level too. Sen says that graduates and doctorates that India is producing is a matter of worry. He blames the problem on corrupted ways of recruitment of teachers, intake of mediocre, pedagogic practice of rote learning, poor facilities and outdated examination system, poor preparation in school level specially mathematics, lack of interdisciplinary UG programme, poor research guides etc.

In mid 80's a famous Chinese Professor Hsia Tsechiang (Xio Z.Q), during a visit to IIT-Kharagpur, requested for a Ph.D thesis from this author because he said that in China they needed to learn how to write a thesis! Now, after 30 years, they produce many more Ph. Ds in Metallurgy in China than in India. The overall figures for Ph. Ds produced per million population in all disciplines are as follows: Scandinavian countries (Denmark, Norway,

Sweden and Finland) ~6700, USA ~4700, China ~330. For India the figure is only around 150.

The expansion of higher education has been most remarkable in engineering because many graduates find employment in the Information Technology (IT) companies. At present there are perhaps over 4300 engineering institutes of which the largest numbers are in Andhra Pradesh and Telegana (over 1000), Maharashtra (over 700), and Haryana and Madhya Pradesh (each over 300). This number was only 22 prior to 1947. We will discuss engineering education, especially education in Metallurgical Engineering and Materials Science/Engineering later in this article in some detail.

### **Ranking of Indian Universities and Institutes**

In recent years there has been much interest in the global ranking of Indian universities and concerns about our poor ranking have been expressed by even the President of India during some formal occasions. Indian universities are not doing well as per global standards.

The Outlook magazine has started bringing out an issue every year on this subject in partnership with MRDA. Results of an all India survey are published for various professional areas, namely, Engineering, Management, Law, Medical, Dental, Architecture, Hotel Management, Fashion Technology etc. The ranking of colleges and institutes are for India only. Mukherjee believes that the data on rankings assume a 'special significance as a crucial and suitable beacon for stake holders to get a realistic picture of the situation'. Here, we will mainly consider ranking of engineering institutes only which are mainly based on feedback from various institutions to which detailed objective questionnaires are sent. Only colleges from which at least 3 batches have passed out are considered. There is also an open survey that will be discussed later. In 2015 some 300 institutes participated from amongst 1500 institutions in the country in 9

States that were contacted. Thus only a tiny fraction of the institutions in the country have been considered for rankings.

For ranking various parameters are considered viz. selection process, academic excellence, placements, infrastructure and facilities, personality development and industry exposure, Weightages given to the parameters, discussed in the magazine in detail, were decided in 2010 in consultation with a panel of experts with reasonable level of experience in their respective fields. There was also a separate perpetual survey conducted amongst students, senior faculty, HR professionals, recruiters and practicing professionals in various areas in several cities. The field research was conducted using questionnaire based interviews. Every year Outlook gives details of its procedure which cannot be discussed here. More details are available in the magazine's issues of 25 June 2012 and special issue of 6 July 2015, among others.

Each of the 5 parameters are, again, evaluated based on some sub-parameters detailed as follows:

Selection process	Type of entrance examination, fee structure, number of application versus selection ratio, age of the institution etc.
Academic excellence	Quality of permanent faculty, student/faculty ratio, number of patents, publications and books, research and consultancy opportunities, salaries of professors, post graduate programmes and some more.
Placement	Percentage of graduates given placement by in-house placement, salary offered, number of recruiters, return on investment etc.

Personality development and industry exposure	Co-curricular activities, student exchange programmes, industry interaction, number and types of live projects, entrepreneurship programmes etc.
Infrastructure	Physical infrastructure, laboratories, knowledge facilities for faculty members and students, residential facilities for students and teachers, sports facilities, industry sponsored laboratories etc.

Each of the sub-parameters is given weightage after consultation amongst experts. Obviously, this is a very elaborate exercise. The magazine lists every year names of top 100 institutions for various professional area.

Generally some well-known institutions come amongst the top 20 every year. These include the first 5 IITs (Kharagpur, Bombay, Kanpur, Delhi and Madras) and also IIT-Guwahati, IIT-BHU, BITS Pilani, PSG College of Technology Coimbatore, BIT Ranchi, DTU Delhi, ISM Dhanbad etc. and amongst NITs, those at Tiruchirupally, Warangal, Surathkal, Rourkela etc.

The rankings given are, of course, open to many questions such as selection of parameters and weightages given. Strangely, some well-known institutions such as Jadavpur University and IEST Sibpur rarely find any mention. This may be because they do not participate in providing feedback against enquires as also because in several areas they have really fallen behind many late comers.

### **Global Rankings**

Global rankings are done by several agencies of which only two will be discussed here one by Qucquarelli Symonds (QS) and the other by Times Higher Education. There is, however, a lot of information in this area in the Internet. One should remember, however, that all systems take into account only 3-5 percent of global universities and, always, there are questions regarding what are actually measured against various criteria fixed, how exactly are the scores

calculated, how final scores are evaluated and what the results actually mean etc. Yet the results announced by global surveys deserve serious attention. The surveys, while presenting a poor picture of Indian institutions in general, also present some encouraging surprises.

The QS ranking system, considered amongst the most reliable systems, is based on the following criteria (percentage weightage given within brackets): Academic reputation (40), Employer reputation (10), Students/Faculty ratio (20), Citation per faculty member (20), International faculty ratio (5) and International student ratio (5).

The QS ranking puts MIT at the top with a score of 100. Comparative scores of some other top rankers are as follows – Harvard- 98.7, Cambridge- 98.6, Stanford- 98.6, Caltech- 97.9, Oxford- 97.1, University College of London-97.2, Imperial College, London- 96.1, Swiss Fed. Institute of Technology- 95.5, Chicago- 94.6, Princeton- 94.4, National Institute of Singapore- 94.6. Then follow Yale, John Hopkias, Cornell etc. The US and UK universities dominate the list of toppers. Not a single Indian university makes it to be amongst the top 200, and only 5 IITs are listed amongst the top 400, Moreover, not any university has made it to the top in 12 out of 30 disciplines considered. Chinese universities, on the other hand, have 37 in top 50 rankings in 22 subjects. IITs in Bombay, Delhi and Madras are all ranked in the global top in at least one of the four areas of engineering- civil, mechanical, electrical and chemical. Indian universities are losing out to those in Singapore, Japan, China and Taiwan and South Korea. Some individual departments are exceptions. Thus global placement of IIT-Delhi Electrical is 37, IIT-Bombay Mechanical and Electrical is 43 and IISc Material Science is 50.

As mentioned earlier many questions can be raised against such rankings. The Internet quotes Indranil Manna, Director, IIT-Kanpur who said 'Our Institute has not participated in the ranking system. Where are these agencies getting their data from? They did not come to our campus, we have not participated. The ranking is based on unofficial and uncertified data'.

It may be added that QS and some other

agencies charge huge amounts from the institutions who participate in the ranking process and not all can afford this. Times Higher Education World University Ranking gives a more favourable picture (See Times of India, November 28, 2015) and gives the following global ranks : IIT-Bombay: 93, IIT-Madras: 119, IIT-Delhi: 160, University of Delhi: 175.

As regards ranking in BRICS and emerging economics the 2016 rankings given are as follows:

IISc: 16, IIT-Bombay: 29, IIT-Madras: 36, IIT-Delhi: 37, IIT-Kharagpur: 45, IIT-Rourkee: 48, Jadavpur University: 80, IIT-Guwahati: 83, IIT-Kanpur: 95, Panjab University: 121, Santibal Phule University, Pune: 127, University of Calcutta: 137, Aligarh Muslim University: 150, University of Delhi: 154, IISc with a rank of 16 heads the list. China, however, has 5 amongst the top 10, followed by 2 from South Africa and one each from Taiwan, Brazil and Russia. Taiwan has 24 universities in the top 200. India is the only country with no university amongst the top 10.

Times Higher Education ranking system considers performance indicators in two primary level criteria viz. Economic and Social aspects. The weightages of the sub parameters are as follows:

- Economic criteria – Innovation (60), Research (30), Publication (10)
- Social criteria – Facilities (15), teaching (30), employability (40), social responsibility (15)

Total scores are based on markings by research teams who use a simple scoring procedure, by giving for Good-3, for Average-2 and for Poor-1.

According to Varuna Verma (The Telegraph, Monday, 7 December 2015) what has helped IISc Bangalore to surge ahead of other Indian universities is their recently rolled out undergraduate programme in Science (BS) which brings back focus on research and core sciences away from job oriented engineering courses as are conventional. The USP of the BS programme is that it is a jack of all science courses. The primary subjects of Mathematics, Physics and Chemistry remain, but students also learn Biology, Computer Science, Engineering

and Humanities.

This discussion on ranking must end with the reminder that in all surveys only a small fraction of the existing universities are taken into account. A vast number of institutions are simply not worthy of serious consideration. There is a serious range of variation in the quality of education imparted in different colleges and perhaps the gap between the meritorious and mediocre is only widened by these inferior institutions. The author has known many so-called mediocre who could have improved a great deal if only they had the opportunity to study in a better institution. The wide variation in the quality of education in various institutions makes Indian higher education a threat to India's future. The overall quality in anything is poorer if the variations are larger.

### **Elitism and Differentiation in Higher Education**

Many intellectuals and social activists have raised questions on the society and the government favouring a select group of institutions that dominate. The Left Front Government of West Bengal thus wanted to end the dominance of the Presidency College of Calcutta by shifting good teachers to other less known colleges. Similarly, many disapprove of the special favour granted to the IITs amongst engineering colleges. While the basic idea does appeal, it is also true that in no field can one avoid gradation. During his recent speech delivered during Calcutta University's Convocation, Amartya Sen said that elitism is simply cultivation of excellence. This is not something undesirable.

There has to be a 'differentiation' if one wants excellence. Watch, who spent forty years at General Electric and retired as Chairman and CEO, gives some compelling reasons for differentiation. He says, 'I didn't invent differentiation! I learnt it on the playground when I was a kid'. We all know that when children play they select their captain and also who should play in what position and who will remain extras, waiting for their opportunities. Nobody has to tell them, but they can differentiate themselves using their own criteria and perception. The best players get picked first and everybody knows his worth. The top kids desperately want to stay there and get the reward of respect and thrill of winning. The

next in line of merit try to get better to move amongst the top. Those who do not make the cut usually find other pursuits where they can excel. Not everybody can be a great scientist, doctor or computer programmer, they may well be at the top elsewhere.

This author himself once gained because he lost out in one differentiation. A good sportsman in 2 or 3 games at college level, he was keen to get selected for his hostel's teams when he joined the UG stream in a technological Institute. He failed to make the cut as he was beaten squarely in trials. He then moved to some other co-curricular activities where he proved to be good enough to be the captain!

The Founder and Chancellor of the biggest private university of Odisha once thanked this author by saying that the author had a role in his success. When the author expressed his surprise he said that his university grew out of a school he opened for a living when he was not selected for a position in the laboratory the author then headed!

Of course, differentiation is unfair if it is corrupted by favouritism. If done fairly it is best for all. 'A merit-free system eventually destroys itself. It collapses from its own weight or has to change', says Watch. Differentiation creates competition to motivate people. That is why there are grades in school. Protecting under-performers always backfires, it hurts the most those who are protected. Differentiation rewards those members of a team who deserve it and it does not undermine team work. Finally, those who argue against elitism are often elitist themselves because they, as lead critics, select themselves to be leaders.

An institution's reputation necessarily depends on the achievements of students and, therefore, every institution has to try to select those who have merit and then nurture them. IITs could achieve a cult status because initially there was a fair system of selecting only the most meritorious students from among the applicants. Moreover, there were bright and dedicated teachers and wholesome residential environment for nurturing talent. Now a great demand for seats, in IITs and NITs specially, need of representation from weaker sections, need for distribution of funds to newer

institutions in different states etc. have created a very complex situation.

Evaluation of excellence needs time and its own pace. Oxford and Cambridge took centuries to become what they are today and the older IITs took several decades to become centres of excellence. Now a rather large number of new IITs are coming up, but they will need decades to become centres of excellence. Political decision to set up a new IIT in any State where even the existing NIT lags way behind NITs in other States is completely irrational.

### **The Student Intake**

Today the system of selection of students for the IITs is different from that for the NITs. Many students with problem solving skills required of engineers are losing out on NIT seats because of the weightages given to admission seekers' Board scores. The problem has been analyzed in Monday 28 October 2015 issue of The Telegraph, Calcutta edition.

In 2013 it was decided to give 40% weightage to Board scores so as to ensure that students stop neglecting their school education to focus only on the Joint Entrance Examination (JEE) for NITs and other colleges. However, today all 31 NITs are in favour of scrapping this system which accords only 60% weightage to JEE score. They want to follow the premier IITs in admitting students on the basis on their scores on JEE which only the top 1.5 lakhs JEE main performers are allowed to take (see The Telegraph, Calcutta ed., 8 February 2016).

Adding Board marks and JEE scores have given rise to many paradoxes some of which are the following:

- Some candidates with very poor, even negative, JEE main scores but good Board percentiles receive higher ranks in the merit list compared to some others with far better JEE ranks.
- A student with 0 marks in the JEE can earn a rank around 65000 thanks to his/her Board marks and find admission in some college.
- The objective that giving weightage to Board score will encourage students to pay more attention to school education is misplaced since only a tiny fraction of school children sit

for the JEE. Separate administrative measures are required to improve school education.

- Another objective was to check the growth of private coaching centres that draw IIT/NIT aspirants. However, it has been found that while 14.63% of all aspirants admitted having received private coaching in 2013, the percentage increased to 18.15 and 18.89 in 2014 and 2015, respectively.
- A serious problem in admission to NITs and other engineering colleges arises when there is delay in declaring the results of some Board examinations.

As mentioned previously, another serious problem concerns students admitted under reservation quotas. There is no dearth of merit amongst the weaker sections in the society. But poor schooling leaves many at a disadvantage. This is also true for all other sections of the society where students do not enjoy schooling in English Medium schools, like those in Metros, with good teachers and curricular and co-curricular programmes. The author himself was from an ordinary school from a modest town and he knows the problem. Those who are admitted under 'quotas' suffer from a real or imaginary social problem and a lack of self-esteem. This is a serious problem that social activities and educators need to eradicate by special coaching and counselling without fanning resentments. Ideally, their school education should be improved. Or else, if this is not possible, these students should be prepared to join the main stream only after an extended period of preparatory coaching. Thrusting them into the regular classes straight away only increases the pressure. This author, then in some position in a IIT and somewhat connected with this problem once faced the ire of some activists who demanded a separate examination and scoring system for all the students who were selected under special dispensation! It was an absurd argument.

### **Evolution of Metallurgical Education and Research in India**

Teaching of Metallurgy in India was started in the College of Mining and Metallurgy at BHU in 1923. It was followed by BE College (now IEST Sibpur) (1939), IISc, Bangalore

(1947), and then Government College of Engineering, Pune (1948). Till 1950 these were the four institutions teaching Metallurgy. Now the number has grown to 30 and most of the departments carry the name Materials Science or Materials Engineering attached to Metallurgy or Metallurgical Engineering. The first name change to add Materials Science was in North-western University, USA (1950) followed by MIT (1975). IIT Kharagpur, IIT Kanpur and IIT Bombay changed names in 1993 and then other Metallurgy or Metallurgical Engineering Departments followed the suit.

The following data are taken from a paper by Lahiri who has given a lot more information and a thoughtful analysis of problems of the Metallurgical education in the country. In the last 20 years more than 250 private colleges have been started to meet the demand of software engineers and these have programmes suitable for that. About 68% of these have departments of Mechanical Engineering, 12% Civil Engineering and 6% Chemical Engineering. Only 2 have Metallurgical Engineering programme. This means that Material and Material Science Departments are not economically viable for the owners of these colleges. Presumably, graduates of Metallurgy Engineering and Material Science Departments are either not keen to join the metallurgical industry or, if they are willing, they are not suitable for employment. In fact many metallurgy graduates, even from established departments, choose to go for the IT sector or management. Again, recruiters from the metallurgical industry avoid recruiting such graduates.

We have a paradoxical situation. An IIT Kanpur study carried out recently on behalf of the Ministry of Steel, says that for the steel industry alone there is requirement of around 1 lakh each of degree and diploma holders for the next 10 years. Graduates and post graduates will also be required for the nonferrous sector and educational institutions. The existing departments simply cannot supply them. It is well known that the metallurgical industry routinely takes graduates of other disciplines and get them trained for their needs. The report has recommended some remedial measures that merit serious attention.

## Some Ideals of Higher Education

According to Bertrand Russel, education should have two objectives, first to give definite knowledge in some subjects and habits of reading and writing and, second, to create those mental habits that enable individuals to acquire knowledge and form judgement themselves. Emerson held the view that things taught in schools and colleges merely meant education and not education per se. Similarly, John Lock said that reading furnishes the mind only with materials of knowledge but it is thinking that makes what we read ourselves. The educated should, therefore, be able to have independent judgement as to what to do, where, how and why. Simply speaking, the prime objective of education is to make people think correctly and not accept others' conclusions blindly. Coaching classes are not meant for education. One Joseph Addison had said that what structure is to a block of marble education is to the soul. Coaching classes kill the soul. Mazyka says, in reference to engineering education, that the industry needs a better engineered product that is completed in a shorter time and a lower price for the customer.

The 'market' outside the educational institution comprise teaching and research positions, jobs in the industry-related or unrelated to the individual graduate's basic discipline and self-employment. Only very few can become entrepreneurs and a good many look for better opportunities abroad.

In the post graduate level no student can flourish if the guide himself is less prepared. The research assistant should be seen more as a collaborator who may well have talents which the guide himself lacks. The guide has to be a mentor and not a slave driver.

A research student must enjoy freedom to see a wide horizon. R. Gopalkrishnan says that if an alligator, that normally grows to be 4-5 m in the wild, is released in a swimming pool as a new-born then eventually it never attains similar lengths. Its growth is stunted even if it is fed well perhaps because it sees a limited horizon. Even if it is released in the wild after some initial years it cannot grow like those in lakes and rivers. Thus if a student is denied wide horizons, his future is

forever spoilt.

In higher education today all students need to be exposed to newer areas of knowledge such as energy and environmental issues, values and ethics, innovations, good laboratory practice concepts of quality etc. For ideal education we should have the following categories of teachers:

Adhyapaka	One who gives information
Upadhyay	One who gives knowledge
Acharya	One who gives skill
Pandit	One who gives insight
Drasta	One who gives foresight
Guru	One who gives wisdom

Unfortunately, most institutions in India today do not go beyond simply imparting some information.

## Conclusions

It has to be accepted that rapid expansion of the higher education system in India has caused a decline in the standards due to lack of qualified teachers and adequate infrastructure and facilities. Far too many colleges have been allowed to start functioning with some disciplines of engineering the graduates from which essentially plan to enter the IT industry, Management courses or Administration. The selection process for admission to UG courses also raises questions. Indian universities are doing poorly not in global rankings but also in Asian rankings. Thus, immediate measures are necessary for course correction. Some of the measures will be the following:

- Tighten regulations for giving recognition to new institutions. Review earlier decisions by constant checking of facilities and infrastructure.
- Ensure sharing of facilities by institutions as and when needed.
- Employ more retired teachers of renown to improve teaching standards.
- Revisit promotion policies for teachers and maintain sanctity of designations in academic positions.
- Change selection and examination processes.

- Revise academic programmes to enhance employability. Emphasize skill development.
- Minimize political and government interference in academic institutions.
- Improve school education to improve higher education system.
- Have open discussions on the problems in higher education at regular intervals.

Article contributed by Prof. Hem Shanker Ray, Former Professor, IIT Kharagpur and Former Director RRL Bhubaneswar in the Metal News, August 2016 (Extracted from Metal News)

## STEEL COMPANIES TO FEEL THE HEAT FROM SURGE IN COKING COAL PRICE

Good times for the steel industry, led by the imposition of the minimum import price, anti-dumping and safeguard duties, might be getting

over soon, as 40 million tonnes (mt) of steel production will be impacted by the coking coal price in the third and fourth quarters. Since July, coking coal spot prices have increased from \$90 a tonne to \$245 a tonne and 40 per cent of India's current steel production of 90 mt that uses the blast furnace technology will be affected. That includes all major players, Tata Steel, SAIL, JSW Steel, Bhushan Steel and Essar Steel, to an extent. Indian Steel Association Secretary General Sanak Mishra pointed out around 60-70 per cent of the industry's coking coal requirements were imported. In the next two to three months, this increase will reflect in steel prices. "This is a serious concern for the industry. Coking coal prices have been moving up since July. Over the next two-three months, this increase will have to be passed on and it will have to be significant each month," JSW Steel Director for Commercial & Marketing, Jayant Acharya, said. But, prices internationally, too, will have to move up. So far, there has been an increase of \$15-20 a tonne.

India's installed capacity is 116 million but the production during last year was 90 mt. The installed capacity has grown about 19 per cent from 97 mt in FY12 and almost the entire expansion has happened through the blast furnace route. Coking coal accounts for 35-50 per cent of the cost of producing steel with this method. "The cost of steel production for domestic players would increase by around Rs 6,000 per tonne, actual hit would depend on contract vs spot purchase mix," Jayanta Roy, senior vice-president, ICRA, said. Steel prices, since the imposition of minimum import price, has increased by Rs 6,000, led largely by a recovery in international prices, but the sharp increase in coking prices is now threatening to wipe out the gains.

The reason for the price surge is that China, which relies mainly on domestic supply, has started importing coking coal to curb pollution levels, curtailing its own production. Also, there is supply disruption in Australia. The price surge has led debt-stressed companies like Bhushan Steel to contemplate restarting its direct reduced iron (DRI)-based plant that doesn't use coking coal. Typically, the cost of production in a DRI-based plant is higher by Rs 4,000 a tonne

### A CAUSE FOR CONCERN

Coking coal price

<b>75</b>	<b>90</b>	<b>245</b>
Oct '15	Jul '16	Oct '16
\$/tonne		Source: Industry

### THE IMPACT

<b>44%</b> of India's steel production uses coking coal	<b>60-70%</b> of total coking coal requirements is imported	<b>₹6,000</b> per tonne increase in the cost of production
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vis-a-vis the blast furnace technology because it is a power-intensive technology. But if the additional cost on account of coking coal is Rs 6,000 a tonne, it might make sense if the surge is going to continue. Demand is another factor that may come in the way of increasing prices significantly.

"We will have to see how coking coal prices will impact prices of per tonne of steel. If the steelmakers are unable to absorb the cost, they will have to pass it on to the buyers. So, even after the increase in input cost, if the prices go up, and steelmakers are able to sell at below the anti-dumping duty, they can pass on the increase to customers. The biggest issue is that steel consumption in the country is very low. The demand has to pick up. This will happen once infrastructure spending starts," Sunil Srivastava, deputy managing director, State Bank of India, said. But till the companies are able to pass on the price to consumers, margins will be under pressure. The increase in earnings before interest, taxes, depreciation, and amortisation levels after the imposition of MIP-led lenders to appropriate 5-15 per cent from each sale proceeds for at least part-interest realisation.

Source: Business Standard

## IN INFRASTRUCTURE PUSH, PROJECT STEEL AS BETTER CONSTRUCTION MATERIAL THAN CEMENT, PLASTIC

In infrastructure push, project steel as better construction material than cement, plastic, govt tells babus Concerned with anaemic consumption growth, steel minister Chaudhary Birender Singh has initiated talks with other ministries governing infrastructure sectors on ways to step up the use of the alloy. Concerned with anaemic consumption growth, steel minister Chaudhary Birender Singh has initiated talks with other ministries governing infrastructure sectors on ways to step up the use of the alloy. He has also asked steel PSUs like SAIL and RINL to improve on their marketing strategies to project steel as a construction material better than cement or plastic.

"I am holding inter-ministerial meetings with

all ministries dealing with infrastructure. I had a meeting recently with road transport and highways minister Nitin Gadkari where I highlighted the merits of using steel in building bridges and slag for construction of roads. The road ministry has formed a task force," Singh told FE in a meeting. Singh said steel not only enhances the longevity of the bridges by more than 30 years, it also takes half the time to erect a bridge compared to their concrete counterparts, but admitted that the cost might be higher by 10-15%. Similarly, latest findings showed that steel slag is a better material than others for road construction.

If not properly utilised, slags can cause environmental degradation. India produces around 35 MT of slag a year; while slag coming out of blast furnace, nearly 20 MT, is used in making cement, those coming out of the steel melting shops remains largely unutilised. The problem would get worse with the growth in steel production. India targets to near treble its steel production to 300 MT by 2030. Slag is a byproduct of steel. Incidentally, a committee has been formed to suggest ways of dealing with slag.

India's per capita steel consumption at 61 kg is much lower than the global average of 208 kg. It looks pale with major producing countries such as China at 489 kg and S Korea at 1,114 kg. Singh said apart from the Bhopal consultative committee meet, held on October 5, he would also hold three other such meetings in Agartala, Chandigarh and Mumbai shortly on measures to increase steel demand.

Source: Metaljunction

## GOVERNMENT TO COME OUT WITH NEW STEEL POLICY

### Govt to come out with new steel policy

The government is working on a new steel policy in a bid to steer the over USD 100 billion industry out of the rut and ensure that the growth is evenly spread across all the related sectors. "We are in favour of a new steel policy and I am already on the job," Steel Minister Chaudhary Birender Singh told PTI. He added that India led the world in growth in production and

consumption last year, which has continued so far in 2016 as well. "But, we need to ensure that this growth continues and for that we have to plan accordingly and come out with a policy that ensures that not only steel, but the related sectors such as iron ore, etc also grow," he explained. Government's think tank Niti Aayog too has pitched for for a "new and dynamic steel policy" to bring the industry back on track as well as meet the target of 300 million tonnes (MT) capacity by 2025.

The country's premier policy maker feels that mere changes in the National Steel Policy, 2012, will not help the sector as in the last few years the domestic market has been flooded with cheap imports from China, Korea and Japan, impacting its sales and profits, which has negatively influenced its capacity to repay debts. "There is need for a new and dynamic steel policy. Seeing the current situation of the steel sector, it may be unlikely to achieve the targets envisaged in National Steel Policy 2012 i.e. a capacity of 300 MT and production of 275 MT by 2025," the Aayog said in a Working Paper on the sector.

It further said, "To bring steel sector back on track, mere tinkering in the present policy would not bring out a transformational change that is required." The Aayog feels that there is a need to examine the entire value chain associated with the industry, from raw materials to production of finished products, to discover the bottlenecks in the sector. The working paper, prepared by Niti Aayog Member V K Saraswat and Niti Aayog professional Ripunjaya Bansal, said that an ecosystem has to be created that will ensure profitability of the associated industry be it mining, pet coke, pellet, sponge iron, etc.

Source: Metaljunction

## 58 EUROPEAN STEEL INDUSTRY CEOs WRITE TO EU HEADS OF STATE AND GOVERNMENT

58 of the most senior executives from the European steel industry have addressed EU leaders with a clear message: "Make the right choices to ensure that our sector and its value chains flourish, investment continues, and the

jobs of the men and women who work in our sector are sustained." This call comes ahead of the European Council summit of 20-21 October 2016, towards the end of a year that has seen the European steel industry under continued pressure. Notably, EU leaders will discuss the modernisation of Europe's Trade Defence Instruments, which the European steel industry has consistently pushed for. The Open Letter highlights the steel industry's challenges, and calls on EU policy makers to develop more effective, faster measures to re-establish fair trade, to align with the US on the Market Economy Status of China, and build an EU ETS that creates no cost burden beyond economic and technological feasibility.

Open letter by 58 CEOs of the European steel industry to Heads of State and government. We, the undersigned CEOs of the EU steel industry, are writing to you ahead of the European Council meeting on 20-21 October. During this meeting, you will be taking decisions that could help preserve an innovative, sustainable, and globally competitive steel industry in Europe. Making the right choices should ensure that our sector and its value chains flourish, investment continues, and the jobs of the men and women who work in our sector are sustained. We ask for your support on a number of issues that could make or break our industry:

### **Market Economy Status of China: Alignment with the US**

A revised EU anti-dumping regulation which includes the EU's five market economy criteria, with the burden of proof in dumping cases staying with exporters to the EU. We believe the EU's anti-dumping methodology should be closely aligned with the non-standard methodology applied by the US.

Trade Defence: More effective, faster measures to re-establish fair trade

EU Trade Defence Instruments are very slow to deploy, compared to our trade partners'. In addition, the effectiveness of the EU anti-dumping instrument is uncertain, producing measures which are significantly below the calculated size of the dumping, often less than a tenth of US measures. The EU is the only major region to systematically apply the Lesser Duty

Rule (LDR). Under certain conditions it must be possible to lift the LDR. These conditions must be achievable and workable, accompanied by a duty calculation based on improved injury margins. Emissions Trading: No cost burden beyond economic and technological feasibility. The EU Emissions Trading System is the largest and most ambitious carbon market in the world. The European steel industry is committed to CO2 reductions and is working hard to develop low carbon technologies. However, we need a reformed EU ETS that is fair and achievable. At present, the proposed EU ETS beyond 2020 creates costs for European steelmakers that are not borne by our global competitors. This risks jobs and investment in European steel. We need an EU ETS that changes how steel is made, not where it is made. We trust that you can make progress on the above issues so that steel will be able to contribute to the transition to a competitive, low carbon European economy.

Source: Metaljuncion

## TO STAY AFLOAT, STEEL MILLS GO FOR ENERGY-SAVING MEASURES

At a time when the industry in Punjab is making a hue and cry over government policies, steel re-rolling mills have set an example for others. Perturbed over the high energy cost in the manufacturing process, over 130 steel re-rolling mills in the industrial town of Mandi Gobindgarh have opted for energy-saving measures. The move has not only resulted in saving the huge energy cost which constitutes 40-45 per cent of the total production cost, but also enabled them to sustain themselves in the competitive domestic market.

Through different energy saving measures, the industry brought down the energy cost to 10-25 per cent. Over the years, around 100 rolling mills have closed down in the state due to high input cost and the highly competitive domestic market.

Currently, 275 mills in Punjab are producing over 40 lakh tonnes of steel. Further, these mills consume 2.5 lakh tonnes of coal worth Rs 341 crore per annum in addition to electricity. "The energy cost constitutes around 40-45

per cent of the total production cost. Over 50 per cent of the total steel re-rollings in Mandi Gobindgarh opted for energy saving measures which brought down the energy cost to 10-25 per cent. "The payback period of energy saving measures is around six months to two years. The move not only helped us in saving the input cost, but also helped us stay afloat in the domestic market and remain competitive," said Vinod Vashisht, president, All-India Steel Rolling Mills Association.

According to a senior official in Punjab State Council for Science and Technology (PSCST), these mills used to operate at a poor thermal efficiency of 20-30 per cent, resulting in wastage of precious heat energy. Also, during combustion, flue gases used to be generated from the combustion of pulverised coal in these rolling mills which are emitted at very high temperatures. With the assistance of PSCST, the industries deployed technology for pulverised coal fired mills for the first time in the country. This resulted in 8-10 per cent fuel savings with average financial savings of Rs 10 lakh/annum (payback period is only 3-4 months). Over 50 mills have availed of the benefit of this technology. Also, the industry in assistance with PSCST tackled the problem of pollution which also resulted in energy saving.

Source: The Tribune

## ANTIDUMPING DUTY LIKELY ON CERTAIN STEEL PRODUCTS FROM CHINA, EU

The government may impose anti-dumping duty on imports of certain flat steel products from China and European Union to protect the interest of domestic players from cheap in-bound shipments. In its preliminary findings, the directorate general of anti-dumping and allied duties (DGAD) has recommended the duty on imports of "colour coated / pre-painted flat products of alloy or non-alloy steel". Essar Steel India Ltd and JSW Steel Coated Products Ltd had jointly filed the application for initiation of the anti-dumping investigations. DGAD has suggested that the duty should be the difference between the landed value of the

steel products and USD 849 per tonne.

These steel products offers resistance to corrosion along with barrier protection. It is used in many applications and sectors including construction, roofing, walling, panelling, cladding and decking, automotive, white goods and appliances and furniture. In its findings, DGAD concluded that the product has been exported to India at "below the normal value" due to which "the domestic industry has suffered material injury". "The authority recommends imposition of provisional anti-dumping duty on the imports... so as to remove the injury to the domestic industry," DGAD said in a notification. The authority is of the view that imposition of provisional anti-dumping duty is necessary to offset dumping and injury, it said. Imports of these steel products have drastically increased to 213,311 tonnes during the period of investigation (July- December 2015) from 60,771 tonnes in 2012-13. India has already slapped anti-dumping duty on certain cold-rolled flat steel products from four nations, including China and South Korea. While DGAD recommends the duty to be levied, the finance ministry imposes it. Countries initiate anti-dumping probes to determine if the domestic industry has been hurt by a surge in below-cost imports. As a counter-measure, they impose duties under the multilateral WTO regime. Anti-dumping measures are taken to ensure fair trade and provide a level-playing field to the domestic industry. They are not a measure to restrict imports or cause an unjustified increase in cost of products. India has initiated maximum anti-dumping cases against "below-cost" imports from China. To protect the domestic steel industry, the government has also fixed minimum import price on certain goods.

Source: [www.moneycontrol.com](http://www.moneycontrol.com)

## MINISTRY TO BANKS: GUIDE STEEL UNITS OUT OF THEIR STRESSED STATE

With RBI's schemes for speedy resolution of distressed assets yet to show results, the Steel

Ministry has under-scored to banks the urgency of guiding steel units out of their current stressed state. The Ministry wants long-term measures drawn up for turning around the steel sector's fortunes, said a senior public sector banker privy to the development. According to the Reserve Bank of India, a mapping of the risk profile of select sectors as at end-March showed that the iron and steel industry was not only highly leveraged but also bent by the interest burden. Despite the levy of Customs/safeguard duties and imposition of floor prices, import of iron and steel had risen in 2015-16 in volume terms, impacting the domestic industry. According to the central bank, the iron and steel industry is among the half a dozen industries where the percentage of 'leveraged weak' companies is relatively high. The RBI has already warned that such highly leveraged companies with low debt-servicing capability can exert pressure on the already strained asset quality of banks in adverse situations.

A macro stress test of sectoral credit risk by the RBI revealed that in a severe stress scenario, among the select seven sectors, the iron and steel industry (which had the highest gross non-performing assets ratio, GNPA, at 30.4 per cent as of March 2016) could see its GNPA moving up to 33.6 per cent by March 2017. As per the latest RBI data on industry-wise deployment of gross bank credit, iron and steel sector loans amounted to ₹3,10,900 crore on August 19, 2016 against ₹3,11,500 crore as on March 18, 2016. For speedy resolution of distressed assets, the RBI, had over the last two years come up with a variety of schemes by which 'a more sensible capital structure can be crafted for projects'. These included the 5/25 (flexible structuring of long-term project loans to infrastructure and core industries) scheme, Strategic Debt Restructuring, and the Scheme for Sustainable Structuring of Stressed Assets. Bankers say the effectiveness of each of these schemes in turning around distressed assets through improvements to operational efficiencies and creating the right capital structure is yet to be proven.

Source: Business Lines

## DGAD RECOMMENDS ANTI DUMPING DUTY ON IMPORT OF COLOUR COATED STEEL

Director General Anti-Dumping (DGAD) has recommended anti-dumping duty in the form of a reference price on import of colour coated steel originating and exported from China and European Union (EU) region into India. The reference price is at \$849/tonne which translates to a landed price of about Rs 58000/tonne at the port. The recommendation has been forwarded to ministry of finance for issuing corresponding custom notification. The difference in the reference price between hot rolled, cold rolled and colour coated is \$375/tonne. Minimum Import Price (MIP) for colour coated on other origins continues to be at \$752/tonne. The petition was filed in June 2016 and investigations initiated in end June. Essar Steel and JSW Steel were the petitioners.

Source: The Economic Times

## CENTRE TO WIPE OUT RUST WITH GALVANISED STEEL

The Centre is considering a proposal to mandate galvanisation of steel in sectors such as automobile, construction and infrastructure in a bid to build corrosion-resistant vehicles and buildings. Inter-ministerial discussions on the issue are underway and a Cabinet note would be moved to stipulate the usage of zinc-coated steel which would last much longer than regular steel, especially in corrosion-prone areas along India's long coastline, Steel Minister Chaudhary Birender Singh said on the side-lines of an international galvanising conference in the capital. "India is the third largest producer of zinc but our consumption should also be higher and this will boost consumption of zinc as well as steel and curb losses of thousands of crore to the economy due to corrosion," the minister said, adding that galvanised steel could also be deployed in the Pradhan Mantri Awas Yojana for affordable housing. "We have had talks on this issue with a few ministries, including the Railways and Petroleum ministries

and will talk to other concerned departments such as road transport and defence soon. It will need a policy decision that we will take to the Cabinet," Mr. Singh said in response to a query from The Hindu on whether the government could mandate galvanisation for certain steel products.

### Zinc coating

Tata Steel chief technology officer Vinay Mahashabde said that zinc can arrest corrosion and cars in the rest of the world are galvanised to last 15 to 20 years, but in India, rust appears on car surfaces within three to four years. Earlier, the minister compared a zinc coating's effect on prolonging steel's life to the capacity of an ant to kill an elephant and said that all efforts are being made to minimise corrosion losses as part of the large scale infrastructure expansion under way in sectors such as roads, airports, power, ports and railways. "Steel usage would also be substantial in the smart cities program launched by the Prime Minister so there is an imperative need to adopt corrosion control methods in order to provide uninterrupted services to infrastructure users and prolong the life of such national assets," Mr. Singh said. Developed nations use galvanised steel for infrastructure projects, but in India, it's not yet mandatory, he pointed out. "India loses around 4 per cent to 5 per cent of gross domestic product annually on account of corrosion losses, according to our internal analytics", said Sunil Duggal, CEO of Hindustan Zinc Limited.

Source: The Hindu

## NOT LOOKING FOR A PARTNER IN NMDC'S NAGARNAR STEEL PLANT: GOVERNMENT

The steel ministry said recently it is not looking for a partner in the state-owned NMDC 3-mtpa steel plant at Nagarnar for which the government is lining up around Rs 15,525 crore. Asked if the government is looking for a partner for the Nagarnar steel plant, Steel Minister Chaudhary Birender Singh told reporters here: "No, not at all." He further said: "But I feel that if something

## Countrywise Share of Industry and Manufacturing in GDP

Country	Share of Industry in GDP (%)	Share of Manufacturing in GDP (%)	Steel Consumption in 2015 (MT)
India	31	18	80
China	43	32	672
S. Korea	38	31	56
Turkey	27	18	34
Russia	32	15	39

Source : World Bank, CSO

**China invests 46% of GDP and a significant proportion goes for steel-intensive sectors, India's investment at 31% of GDP is much less in Infrastructure, Capital Goods**

Information Extracted From:

Unleashing the Growth Potential of Indian Steel

Sushim Banerjee

DG, Institute for Steel Development & Growth, Kolkata

is there, it should be made operational at the earliest possible. I told them (NMDC) that you have the resources and this is a PSU where they are comfortable... I think NMDC has invested over Rs 12,000 crore in the plant." The country's largest iron ore miner, NMDC, is setting up a 3-mtpa integrated steel plant in Nagarnar in Bastar district of Chhattisgarh. In June this year, an environment ministry panel gave clearance to a captive iron ore mine in Bastar for the plant. The plant is expected to start trial production by mid-2017. The Bailadila Deposit-4, which has mineable iron ore of around 108 mt, will entail an investment of around Rs 1,900 crore. The Chhattisgarh government and NMDC have inked an MoU for a slurry pipeline from Bailadila to Nagarnar, along with ore processing plants at Bailadila and a 2-mtpa pellet plant at Nagarnar with an investment of Rs 4,000 crore.

Source: The Economic Times

## NITI AAYOG MOOTS INDEPENDENT REGULATORS FOR STEEL, MINES SECTOR

Government think-tank Niti Aayog has favoured creating independent regulators for steel and mining sectors in the country in a bid to make both industries profitable. The premier policy-making body has also pitched for a new and dynamic steel policy to bring the over \$100 billion industry back on track as well as meet the target of 300 million tonnes (mt) capacity by 2025. "Since steel is a deregulated sector,

## SNAPSHOT

### Indian Iron Pellet

Indian pellet prices increased on better export realizations



### Global Iron Ore

Chinese mills preferred high grade ore to low grade, resulting in increase in prices



### Non Coking Coal

Prices increased owing to falling supplies



### Indian Sponge

Prices decreased on increased production



### Indian Scrap

Prices range bound



### Indian Billet

Prices decreased owing to seasonal slowdown



### Indian Rebar

Prices decreased owing to seasonal slowdown



### Indian Pig Iron (Steel Grade)

Buyers preferred scrap to Pig Iron due to competitive prices



### Indian Silico Manganese

Prices increased owing to higher manganese ore prices



there is need for an independent regulator for effective regulation, which the sector presently lacks," Aayog said in a working paper. "Also, in the mining sector, though NMDC should act as a regulator, it itself is engaged in iron ore mining, which may create conflict of interest. Therefore, a new independent regulator is required in the mining sector as well." About the deteriorating financial health of steel firms, Niti Aayog said firms have a huge debt load over the past couple of years due to the combined effect of supply and demand factors. "Situation is quite critical as they are not even able to service their interest cost. There was an aggregate debt of Rs 45,160 crore on the iron and steel industry in 2014, according to the corporate debt restructuring cell progress report, which has increased to Rs 53,580 crore in March, 2016," it added. The working paper -- prepared by Niti Aayog Member V K Saraswat and Niti Aayog professional Ripunjaya Bansal -- said share of stressed advances has reached 25 per cent, of which 19 per cent are restructured standard advances and 7 per cent are non-performing assets (NPAs). It said the government has provided financial support to steel firms earlier in 1999 and 2003 while it is trying to support through RBI's strategic debt restructuring scheme currently. "Therefore, the steel sector, which has a long gestation period, needs long-term finance like pension funds, which have the capacity to withstand cyclical volatility of profits unlike funding from banks, external commercial borrowing (ECB) or capital markets," the paper suggested.

According to the think-tank, mere changes in the National Steel Policy, 2012, will not benefit the sector, which over the last few years has been flooded with cheap imports from China, Korea and Japan impacting its sales and profit. This has also impacted its capacity to repay debt. "There is need for a new and dynamic steel policy. Seeing the current situation of the steel sector, it may be unlikely to achieve the targets envisaged in the National Steel Policy 2012 i.e. a capacity of 300 mt and production of 275 mt by 2025," it added. "To bring steel sector back on track, mere tinkering in the present policy would not bring out a transformational change that is required." Aayog feels there is a need to examine the entire value chain associated with the industry -- from raw materials

to production of finished products -- to discover the bottlenecks in the sector.

Source: Metaljunction

## **CLEANER, BUT NOT LEANER: CHINA STEEL MILLS DEFY CAPACITY CUTBACKS**

Chinese steel mills are becoming cleaner every month as Beijing pushes to curb its smoke-stack industries. But they're not getting any leaner. Despite efforts to step up environmental checks and trim out excess capacity, steel output by the world's top producer has risen year-on-year for the past seven months. As emissions cuts will mean steel mills are better able to meet stricter government standards, Beijing may find it more difficult to cut overcapacity in a sprawling industry. For now, domestic demand from infrastructure and construction has been robust, absorbing most of the extra supply. But a steeper slowdown in the world's second-largest economy could force mills to ramp up sales abroad. That could rekindle tensions with Europe and the United States, major trading partners which have for years accused China of dumping its excess steel overseas, hitting producers and hurting global prices. The issue took centre stage at a recent G20 summit in China when world leaders pledged to work to address excess output. China's top steel producing city of Tangshan in Hebei province illustrates Beijing's dilemma. Hosting a months-long international horticultural show, Tangshan had a major six-month clean-up to ensure blue skies for visiting dignitaries, including the country's president Xi Jinping. Industry experts predicted this would see a big drop in output in a province that accounts for a fifth of national production, going some way to realising government goals on output and capacity cuts. But production dipped by far less than expected as mills sustained output even as they cleaned themselves up. They could do this largely because steel prices have risen 40 percent this year, and strong domestic

demand is expected to continue, underpinning those increases, though exports have fallen to their lowest since February. By end-September, China had completed more than 80 percent of this year's capacity reduction goals in coal and steel, said Huang Libin, an official at the Ministry of Industry and Information Technology. China has targeted a cut of 45 million tonnes from its surplus steel capacity this year. But the battle to tackle excess capacity and curb pollution has failed to dent production. China's annual crude steel surplus is estimated at around 300 million tonnes, three times the annual output of the world's second-biggest producer, Japan. "If steel mills are profitable, there's no reason for the government to order them to reduce production if they meet environmental criteria," said Xia Junyan, investment manager at Hangzhou CIEC Trading Co in Shanghai.

### Battleground in Tangshan

While many of Tangshan's small mills have closed, bigger plants have installed or upgraded equipment since a nationwide environmental crackdown began in 2014, industry sources say. Some were forced to cut sinter production - processing iron ore fines into lumps - for a few days in September and October to clear the

skies during the recent horticultural show. But the city's about 150 blast furnaces only dropped output three times - in June, July and September - and for only a couple of days during the six-month clean-up, according to a survey by industry consultancy Custeel.com. The biggest drop was in early June when operating rates fell below 65 percent as leaders from central and Eastern Europe gathered in Tangshan for talks on economic ties, followed by another fall in July as the city prepared to commemorate a 1976 earthquake that killed at least 250,000 people.

Otherwise, mills have been operating at above 80 percent of capacity this year, the Custeel.com survey showed. "Production can be flexible. Even if production at steel mills is hit temporarily by the environmental crackdown, they can increase production later to offset the losses," said Xia at Hangzhou CIEC Trading. The government looks ready to keep targeting Tangshan's mills in its war on winter smog, with Hebei province last week imposing what it calls "special emission restrictions" on local steel mills, according to a policy document. Last month, the National Development and Reform Commission, China's state planner, said it punished hundreds of steel and coal companies nationwide for violating environmental and safety regulations. Some were forced to close or cut output.

Source: The Economic Times

## TATA STEEL, JSW TO DRIVE RECORD COKING COAL IMPORT

India's coking coal import is likely to rise by 5.7 percent to 46 million tonnes, a record, in 2016-17. There has been a sharp increase in demand from steel mills, which have scheduled the commissioning of 6.7 mt of additional output capacity. Last year, coking coal import growth was flat, at 43.5 mt. An ICRA report estimates 46 mt for 2016-17 and 49.2 mt for 2017-18.

### Global Competitiveness Index (World Economic Forum) : 2015-16

- Competitiveness defined as the set of Institutions, policies and factors that determine the level of productivity (rate of return of investments in an economy)
- Measured as the weighted average of 12 pillars of competitiveness
  - Institutions (public and private)
  - Infrastructure
  - Macroeconomic environment
  - Health and Primary Education
  - Higher education and training
  - Goods market efficiency (healthy market competition)
  - Labour market efficiency
  - Technological readiness
  - Market size
  - Business sophistication (quality of operation)
  - Innovation
- All factors are interrelated and depend on stage of development of the country

Information Extracted From:

Unleashing the Growth Potential of Indian Steel

Sushim Banerjee

DG, Institute for Steel Development & Growth, Kolkata

Tata Steel is to commission new capacities for 3.7 mt and JSW Steel for three mt. Following various protection measures imposed by the government, Indian mills would get room to raise production. Steel demand normally moves in line with growth in a country's gross domestic product. With the government's increased focus on infrastructure development and investment on it, India's steel consumption is estimated to rise by at least seven percent this year. Steel output was a cumulative 89.8 mt for 2015-16, a marginal increase from 88.2 mt the previous year. In April-September this year, first half of the FY17 financial year, mills reported cumulative production at 47.8 mt, up from 44.6 mt in the corresponding period last year. Interestingly, the growth in production was not supported by demand from consumer industries. Data compiled by the Joint Plant Committee shows steel demand rose only 0.5 percent between April and August; it then surged in September.

"This means steel is stockpiled somewhere in the pipeline. But, an estimated 35 percent (fall) in import is likely to be filled by domestic steel mills, thereby raising demand for coking coal," said an observer. A recent Moody's report forecast India's steel production to continue rising in the near future, with the government's focus on infrastructure. "We expect year-on-year steel demand in India to increase to high single-digit percentage in 2016 and 2017...as the country's GDP growth of around 7.5 percent in 2016 and 2017, based on Moody's forecast, remains among the highest in Asia. India's reform and policy support for infrastructure and manufacturing, as well as increasing urbanisation, will drive steel consumption," Moody's had said.

Source: Business Standard

## ENOUGH VALUE ADDED IN ALUMINA TO JUSTIFY EXPORTS?

In Piyush Goyal, aluminium makers have found a mines minister with a clear vision of where he wants to see India's largest non-ferrous metal industry in the next decade and beyond. Maybe over-optimistic by a long margin, New Delhi had earlier given the steel industry a capacity target of 300 million tonnes (mt) against 115

mt at present. Goyal does not believe that in the intermediate product, alumina, derived from bauxite, there is sufficient value-addition to justify its export. What he finds baffling is while India has remained a large exporter of alumina since the government-owned National Aluminium Company (Nalco) was started nearly three decades ago in Odisha, the Indian aluminium industry continues to import the smelter feedstock.

At least one big producer of the silvery white metal cannot run its smelter at Jharsuguda in Odisha, which incidentally is among the largest single-site units in the world, without imports of alumina. Unlike its peers Hindalco and Nalco, Vedanta Aluminium – in the absence of ownership of bauxite mines and the Odisha government's failure to honour its bauxite supply commitment so that the company is able to run its Lanjigarh alumina refinery to capacity – is in constant struggle to procure bauxite and alumina from multiple domestic and foreign sources.

This puts Vedanta at a cost disadvantage as a producer of alumina. Vedanta Aluminium chief executive officer Abhijit Pati says: "We are able to almost make good what we lose at refinery point because of our high levels of smelter efficiency." Quite a few things go to the credit of Nalco, including the operational efficiency that runs through its value chain from bauxite mining to metal smelting. But, Goyal does not want Nalco to rest on its laurels. He wants the company to come out of the comfort zone of staying put at a smelting capacity of 462,000 tonnes. What does not find favour with him is Nalco exporting around 1.2 mt of alumina out of a production close to 2 mt in 2015-16. In Nalco's scheme of things, exports have a much bigger share of alumina production than its use by own smelter. If what Goyal has in mind for Nalco sees the light of day, then Nalco's present exportable surplus of alumina will all come for local smelting.

While recently asking Nalco to prepare a road map that will take its capacity to 2 mt, Goyal said the company "is exporting alumina while ironically the country keeps on importing it. We must use the smelter feedstock within the country to overcome such a scenario." The

task that the minister has set for Nalco is to say the least onerous. But, this finds resonance in Vedanta group chairman Anil Agarwal's forecast that "going ahead, India will have to have aluminium smelting capacity of 20 mt against the present 4.1 mt. As Indian industry gains in sophistication, the white metal will meet demand surge from sectors ranging from electrical to transportation and from defence to aerospace. India, having the world's seventh-largest bauxite reserves and fifth-largest coal deposits, is the ideal place to make aluminium."

To be fair to Nalco, the company, for many years since 2009, was in pursuit build a 500,000-tonne aluminium smelter and a 1,200-megawatt power complex at Jharsuguda in Odisha. Jharsuguda was considered an ideal location for its proximity to coal-rich Ib valley (Jharsuguda). But, the Rs 16,000-crore Nalco project failed to get environment clearances as Vedanta and Hindalco had earlier secured permissions to build smelting capacity of 2 mt at Jharsuguda. The National Environmental Engineering Research Institute said housing of smelting capacity beyond 2 mt would be environment-damaging for the region. Knocked out of Jharsuguda, Nalco should be looking for an alternative site at Sundargarh, Sambalpur, and Balangir, all in Odisha. On the premise that Nalco should ideally have a smelter in a country where the cost of power is less than in India, it hopped from South Africa to Indonesia to a number of gas-rich centres in West Asia in search of the right site and a reliable local partner. But, success has eluded Nalco. Let's see what comes out of Nalco's proposed business cooperation pact with Iranian Mines and Mining Industries Development and Renovation Organisation.

Source: Business Standard

## INDIA'S GREEN PUSH NEEDS WIND ENERGY

*With higher installed capacity than solar, wind energy may hold the key to unlocking India's renewable energy potential.*

Ever since the government unveiled its ambitious plans to generate 100 GW of solar electricity by the year 2022, solar energy has been the

showpiece of India's renewable energy policy and its climate change action plan. Wind energy has been reduced to playing second fiddle, despite the fact that it was an early mover in the renewable energy sector and even today has an installed capacity of about four times more than solar energy. Thanks to sustained policy push, incentives, and attention from the highest echelons of decision making, solar energy has started to take off in a big way. In the last one year, more than 3 GW of solar capacity was added in the country, taking the total installed capacity to almost 8 GW. It is still a tall order to attain the target of 100 GW in the next six years, but at least the sector cannot blame negligence. The wind industry, which had been spearheading India's renewable energy push since the end of 1990s, is now fearing just that. While the sector would not mind the attention that solar has been getting in the last few years, but has been seeking some policy consideration for itself as well. "The importance being given to solar is not unexpected. Wind is placed in a much better situation and is already fairly well established, while solar is still in its infancy. But solar cannot be the only solution to India's energy problems. The answer has to come from both solar and wind. Hybrid (combined solar and wind generation) policy is also going to play a major role," Sarvesh Kumar, chairman of the Indian Wind Turbine Manufacturers Association (IWTMA), said.

### Huge potential

At nearly 27 GW of installed capacity, India is already the world's fourth biggest producer of wind-based electricity, after China, the United States and Germany. Latest outlook from Global Wind Energy Council shows that India would have close to 45 GW of installed wind energy by the year 2020 even in the most modest of growth scenarios. If pushed aggressively, it can go up to 67 GW by 2020. That means, India's target of generating about 60 GW of electricity through wind energy can be realised two years in advance.

Last year, the National Institute of Wind Energy (NIWE) in Chennai revised the estimate of wind power potential in the country. It was earlier estimated to be just over 102 GW, if tapped at a height of 80 metres from the ground. Thanks to availability of better technology, the NIWE

said it is now possible for Indian companies to install taller wind mills that go up till a height of 100 metres. In that case, the potential for wind energy in India shoots up almost three times, reaching 302 GW. What's remarkable is that more than half of this potential, 153 GW, is located on wastelands, according to NIWE estimates. Viewed from this context, India has currently utilised just about eight per cent of its wind energy potential. It can easily grow at a fast rate, possibly even outpacing the growth in the solar energy sector.

### More attention needed

India's wind capacity has grown from nearly 12 GW in 2009-10 to more than 27 GW now. Almost 10 GW of this capacity addition has come in the last four years during which most of the policy focus was on solar energy.

To accelerate growth in the sector, the government, in January 2015, announced a separate Wind Mission under the National Action Plan on Climate Change (NAPCC). The Solar Mission has been in place since 2008, as one of the original eight missions in the NAPCC. There are also plans to increase the wind energy generation target to 100 GW by 2022 from the current 60 GW. Earlier this year, the government also announced incentives for the industry to 'repower' their existing wind turbines. Most of the wind mills in the country are of low capacities and are harnessing energy that is far less than the potential. As part of the incentive, the companies would get assistance from the government to replace the existing turbines with those of higher capacities. The wind industry, however, is asking for more. "There is no doubt over the intention of the government to promote the wind sector. But the clarity and focus seem to be missing. There is no consistency in the policies. Recently, the government decided to withdraw 50 per cent of accelerated depreciation benefit to the industry from next year. The generation-based incentives are also being

withdrawn. These steps are not particularly helpful for the growth of the industry," IWTMA's Kumar said.

He said the wind manufacturing industry had the capacity to produce equipments for 10 GW of generation, but domestic demand was only about 3 GW. "In the absence of proper atmosphere for export, our potential is getting wasted. The government needs to create the platform to enable the industry to export. Outside, our companies have to compete with their Chinese rivals who get lots of incentives from their government," Kumar explained. The industry is also keenly awaiting the Renewable Energy law that has been in the making for quite some time now. "The industry is looking forward to a new renewable law that would bring in policy clarity and remove uncertainties in the sector. Investors need long-term predictability to invest big money. Currently, that is missing in the wind energy sector. The Ministry of New and Renewable Energy issues guidelines from time to time, but many times these are not adhered to. States have their own separate policies. The wind energy sector is waiting for the right kind of attention from the government in order to achieve its true potential," Manish Kumar Singh, secretary of the Indian Wind Energy Association, said.

Source: The Indian Express

### CUMULATIVE INSTALLED CAPACITY OF WIND POWER IN INDIA (IN MW)

State	March 16	March 15	March 14	March 13	March 12	March 11	March 10
Tamil Nadu	7,615.78	7,456.98	7,275.68	7,162.18	6,987.60	5,904.4	4,907
Karnataka	2,870.35	2,639.45	2,323.85	2,135.15	1,933.50	1,730	1,473
Maharashtra	4,645.75	4,437.9	4,064.95	3,021.85	2,733.30	2,310.8	2,078
Rajasthan	3,993.65	3,308.15	2,783.45	2,684.65	2,070.70	1,524.8	1,088
Andhra Pradesh	1,438.25	1,038.15	783.35	447.65	245.5	200.2	236
Madhya Pradesh	2,138.1	876.7	423.4	386	376.4	275.5	229
Kerala	43.5	35.1	35.1	35.1	35.1	32.8	28
Gujarat	4,034.93	3,642.53	3,447.28	3,174.58	2,966.30	2,175.5	1,864
Telangana	77.70						
Others	0	4.3	4.3	4.3	3.2	0	4
<b>Total</b>	<b>26,862.76</b>	<b>23,439.26</b>	<b>21,141.4</b>	<b>19,051.46</b>	<b>17,365</b>	<b>14,158</b>	<b>11,807</b>

## If You Find An Excuse, Don't Pick It Up

When it comes to excuses, the world is full of great inventors. Don't spend half your life telling what you are going to do and the other half explaining why you didn't do it. An alibi is the proof that you did do what you didn't do, so that others will think you didn't do what you did.

Mistakes have hidden powers to help us, but they fail in their mission of helping us when we blame them on other people. When you excuses you give up your power to change and improve. So, "Never mind whom you praise, but be careful whom you blame". You can fall down many times, but you won't be a failure until you say that someone else pushed you.

Failures are experts at making excuses. There are always enough excuses available if you are weak enough to use them. The world simply does not have enough crutches for all the lame excuses. It's always easier to find excuses instead of time for the things we don't want to do.

So, find a way, not an excuse. There is no excuse for being fill of excuses. When you make a mistake and then make an excuse for it, you have made two mistakes. Note this truth: "The fox condemns the trap, not himself". Don't find yourself taking like that old fox!

Never complain and never explain. "Admitting errors clears the score and proves you wiser than before". Doing a job right is always easier than fabricating an alibi for why you didn't. You waste time and creative energies thinking up excuses. An excuse is a foundation used to build a house of failure. An alibi is worse and more troubling than a lie, because an alibi is a lie with other lies attached to it. It's been said that an excuse is a thin skin of falsehood stretched tightly over a bald-faced lie.

Nearly all failures come from people who have the habit of making excuses. When you're good at making excuses, it's hard to excel at anything else. **The book of Proverbs says, "Work brings profit; talk brings poverty."** Don't make excuses, make progress.

There may be many reasons for failure, but not a single excuse. Never let a challenge become an alibi. You have a choice: you can let the obstacle be an alibi or an opportunity. No alibi will ever support your purpose in life.

The person who really wants to do something finds a way; the other finds an excuse. Success is a matter of luck; just ask any failure. Don't buy that alibi.

**This is the twenty-sixth 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.**

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## SHAPE OF THINGS TO COME AND SOON

Rise and Fall: 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 were bankrupt. What happened to Kodak will happen in a lot of industries in the next 10 years – 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 superior and mainstream in only a few short years. This will now happen with Artificial Intelligence, health, self-driving and electric cars, education, 3D printing, agriculture and jobs.

Welcome to the 4th Industrial Revolution. Welcome to the Exponential Age. Software and operating platforms will disrupt most traditional industries in the next 5-10 years.

Uber is just a software tool. They don't own any cars, but they are now the biggest taxi company in the world. Airbnb is 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 are studying law, stop immediately. There will be 90% fewer generalist lawyers in the future; only specialists will be needed. 'Watson' already helps nurses diagnose cancer, four times more accurately than doctors. Facebook now has pattern recognition software that can recognize faces better than humans. By 2030, computers will have become 'more intelligent' than humans.

Cars: In 2018 the first self-driving cars will be offered to 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 on 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 you can be productive whilst driving. Our kids will never get a driver's license and will never own a car. It will change the cities, because we will need 90-95% fewer cars for our future needs. We can transform former parking spaces into parks. At present, 1.2 million people die each year in car accidents worldwide. We now have one accident every 100,000 kms. With autonomous driving, that will drop to one accident in 10 million km. That will save a million lives each year.

Electric cars will become mainstream around and after 2020. Cities will be cleaner and much less noisy because all cars will run on electricity, which will become much cheaper. Most traditional car companies may become bankrupt by tacking the evolutionary approach and just building better cars; while tech companies (Tesla, Apple, Google) will take the revolutionary approach and build a computer on wheels. I spoke to a lot of engineers from Volkswagen and Audi. They are terrified of Tesla.

Insurance companies will have massive trouble, because without accidents, the insurance will become 100 times cheaper. Their car insurance business model will disappear. Real estate values based on proximity to work-places, schools, etc. will change, because if you can work effectively from anywhere or be productive while you commute, people will move out of cities to live in a more rural surroundings.

Solar energy production has been on an exponential curve for 30 years, but only now is having a big impact. Last year, more solar energy was installed worldwide than fossil. The price for solar will drop so much that almost all coal mining companies will be out of business by 2025.

Water for all: 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 everyone can have as much clean water as they want, for virtually no cost.

**Health:** The Tricorder X price will be announced this year - a medical device (called the "Tricorder" from Star Trek) that works with your phone, which takes your retina scan, your blood sample and your breath. It then analyses 54 biomarkers that will identify nearly any diseases. It will be cheap, so in a few years, everyone on this planet will have access to world class, low cost, medicine.

**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 printing 3D 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 need in the past. At the end of this year, new smart phones will have 3D scanning possibilities. You can then 3D scan your feet and print your perfect shoe at home. In China, they have 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 enter, ask yourself: "in the future, do you think we will have that?" And if the answer is yes, then work on how you can make that happen sooner. If it doesn't work via your phone, forget the idea. And any idea that was designed for success in the 20th century is probably doomed to fail 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 that there will be enough new jobs in such a short time.

**Agriculture:** There will be a 100\$ agricultural robot in the future. Farmers in 3rd world

countries can then become managers of their fields instead of working in them all day. Aeroponics will need much less water. The first veal produced in a petri dish is now available. It will be cheaper than cow-produced veal in 2018. Right now, 30% of all agricultural surfaces are used for rearing cattle. Imagine if we don't need that space anymore. There are several start-ups which will bring insect protein to the market shortly. It contains more protein than meat. It will be labelled as "alternative protein source" (because most people still reject the idea of eating insects).

**Apps:** There is already an app called "moodies" which can tell the mood you are in. By 2020 there will be apps that can tell by your facial expressions if you are lying. Imagine a political debate where we know whether the participants are telling the truth and when not! **Currencies:** Many currencies will be abandoned. Bitcoin will become mainstream this year and might even become the future default reserve currency.

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

**Education:** The cheapest smartphones already sell at 10\$ in Africa and Asia. By 2020, 70% of all humans will own a smartphone. That means everyone will have much the same access to world class education. Every child can use Khan Academy for everything he needs to learn at schools in First World countries. Further afield, the software has been launched in Indonesia and will be released in Arabic, Swahili and Chinese this summer. The English app will be offered free, so that children in Africa can become fluent in English within half a year.



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