THE INDIAN INSTITUTE OF METALS - DELHI CHAPTER

IIM Metallurgy Materials Engineering

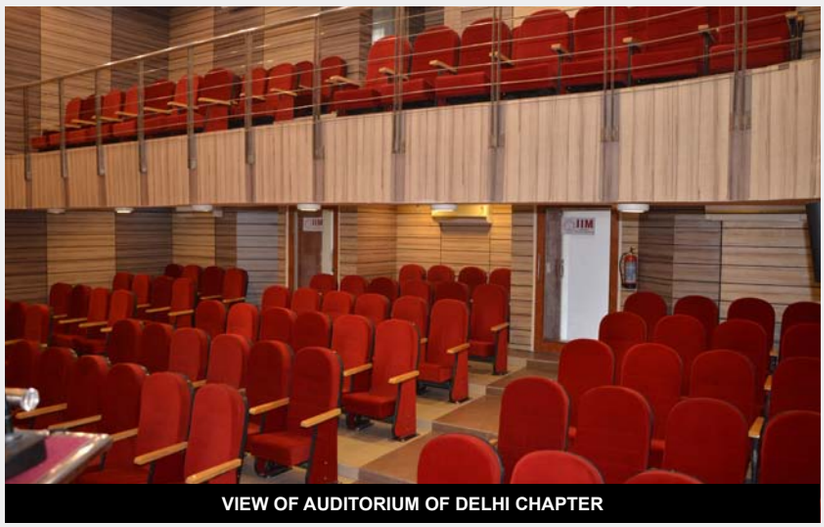
NEWS LETTER

ISSUE NO. 101/2016 VOL. CI "MONTHLY" JUNE 2016

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

In The Issue

THE INDIAN INSTITUTE OF METALS - DELHI CHAPTER



VIEW OF AUDITORIUM OF DELHI CHAPTER

SHOW PREVIEW

11th International Exhibition & Conference

MINERALS METALS METALLURGY MATERIALS

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10 - 12 AUGUST. 2016

PRAGATI MAIDAN, NEW DELHI, INDIA

International Conference on

"MINERALS & METALS AND THEIR CONTRIBUTION TO MAKE IN INDIA"

Organised by: IIM-Delhi Chapter

Published By

The Indian Institute of Metals – Delhi Chapter

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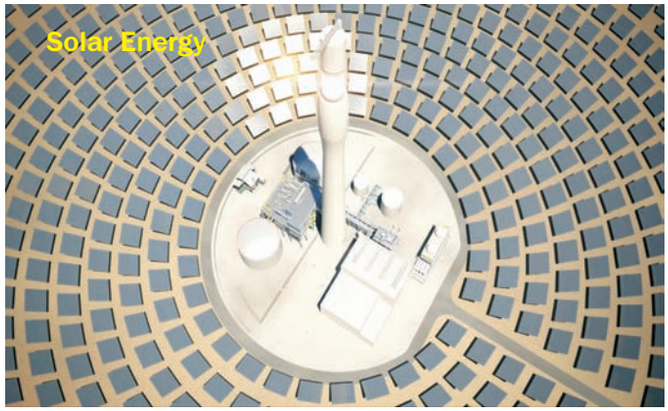

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Chairman's Message

I convey my sincere thanks to the newly constituted Executive Committee of our Chapter for once again assigning me the responsibilities of Chairman of the Chapter for 2016-17. I am humbled and honoured to accept the responsibility of serving the interests of the Chapter for one more year.

In the year 2015-16 we conducted a number of technical activities at our Chapter. We organised one technical activity every month. This would not have been possible without the active support of the members.

As the esteemed members are aware our Chapter organises International Conference in the area of Minerals, Metals, Metallurgy and Materials ((MMMM) once every two years. This is a flagship event of the Chapter. The next Conference is scheduled to be held at Pragati Maidan, New Delhi, from 10th to 12th August 2016. The Theme of the Conference is Minerals and Metals and their Contribution to Make-in-India. The preparatory work relating to the Conference is in full swing. I would solicit the cooperation of all the members in organising this mega event effectively. I am sure with the support of our members, we will accomplish this event successfully.

Our Chapter enjoys excellent infrastructural facilities in terms of auditorium, board room and library. I am happy to share with members that we have recently installed CCTV system at our Chapter. We are also in the process of installing lift at our premises. It is expected that lift will be commissioned at our Chapter by July/August 2016.

Although we are trying our best to undertake technical activities to the members' expectations, there is always a room for improvement. Our members have a lot of potential to further the cause of the metallurgical activities. I seek the cooperation of all our valued members to excel in organising technical activities at our Chapter. I have no doubt that with the active support of all our members, the Delhi Chapter will attain new heights.

I once again convey my gratitude to the members for reposing their trust in me for serving the Chapter.

K L Mehrotra
Chairman

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Mineral Production

1: Based on the overall trend so far the index of mineral production (base 2004-05) for the year 2015-16 is estimated to be 129.2 as compared to 126.5 for 2014-15 showing a positive growth of 2.1%. The trend of index of mineral production and trend in value of mineral production for the last five years is depicted in **Figure 1** and **Figure 2** respectively. The value of minerals produced by groups for the last five years is given in **Figure 3.**

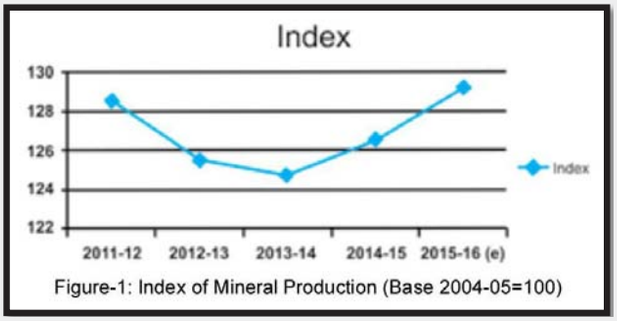


Figure-1: Index of Mineral Production (Base 2004-05=100)

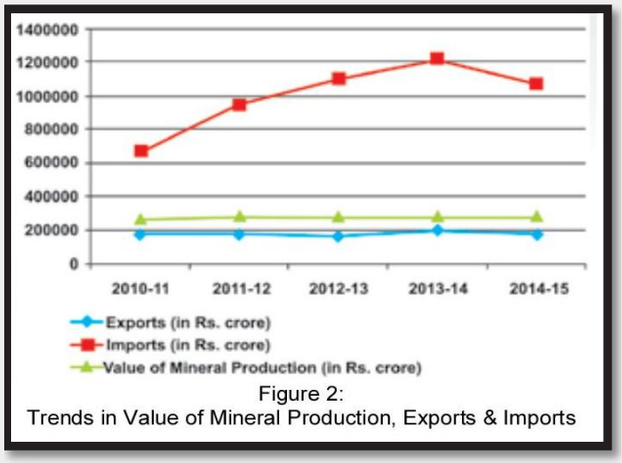


Figure 2:
Trends in Value of Mineral Production, Exports & Imports

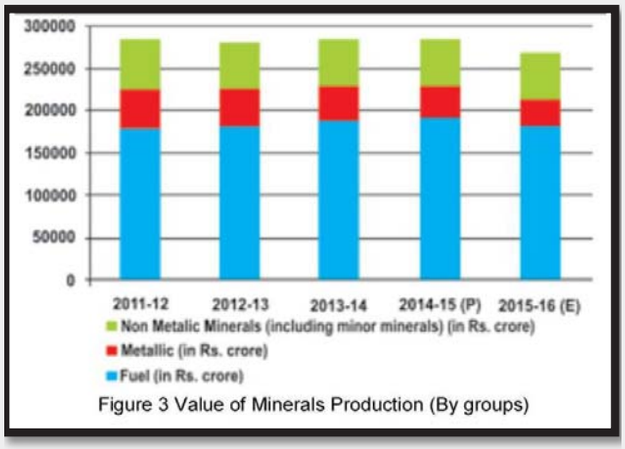


Figure 3 Value of Minerals Production (By groups)

2: The total value of mineral production (excluding atomic minerals) during 2015-16 has been estimated at Rs. 2,68,955 crore, which shows a decrease of about 5.05% over that of the previous year. During 2015-16, estimated value for fuel minerals account for Rs. 1,82,920 crore or 68.01%, metallic minerals, Rs. 31,066 crore or 11.55% of the total value and non-metallic minerals including minor minerals Rs. 54,969 crore or 20.44% of the total value. Information on production and value of selected minerals from 2011-12 to 2015-16 is given in **Table 1.** The details of export and import of minerals during the period 010-11 to 2014-15 is given in **Table 2** and **Table 3** respectively.

Price Trend

3: The Office of the Economic Advisor, Ministry of Commerce and Industry has shifted the base year from 1993-94 to 2004-05. The WPI for minerals (base 2004-05=100) stood at 217.6 in November 2015, and the corresponding index was 305.39 for November, 2014.

4: The minerals included in the wholesale price index are bauxite, chromite, iron ore, copper ore, zinc concentrate, manganese ore, barytes, dolomite, fireclay, gypsum, kaolin, limestone, magnesite, phosphorite, graphite, steatite and sillamanite. The wholesale price index for metallic minerals was 289.8 in November, 2015 as compared to 413.7 in November, 2014 and that of other minerals was 205.3 in November, 2015 as compared to 216.2 in November, 2014. The wholesale price index for Coal stood at 189.9 in November, 2015 as compared to 189.8 in November, 2014.

Gross Domestic Product from Mining & Quarrying Sector

5: The Gross Value Added (GVA) accrued from mining and quarrying sector at 2011-12 prices for the first two quarters of 2015-16 is estimated at Rs. 1,37,416 crore, indicated a increase of about 3.6% over that in the same period of previous year. Similarly, the advance estimates of GVA (at current prices) for the first two quarter of the year 2015-16 is estimated at Rs. 1,43,068 crore. The mining and quarrying sector contribution to GVA accounted for about 2.4 % for the first two quarters of the year 2015-16.

Mining

6: Indian mining industry is characterized by a large number of small operational mines.

Table 1

Production of Selected Minerals, 2011-12 to 2015-16

(Value in Rs. Crore)

	Unit	2011-12		2012-13		2013-14		2014-15 (P)		2015-16 (E)	
		Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
All Minerals			2,84,579.06		2,79,999.37		2,83,051.18		2,83,232.03		2,68954.65
Fuel			1,78,921.99		1,82,689.24		1,86,466.93		1,90,633.81		1,82,919.80
Coal	M.Tonnes	539.95	70,171.91	556.40	74,718.66	565.77	82,534.75	610.21	89,175.45	578.03	83,690.31
Lignite	M.Tonnes	42.33	5,337.65	46.45	5,511.41	44.27	5,967.53	48.29	6,418.09	39.06	5,180.34
Natural Gas (ut)	M c m	47,559.00	34,210.70	40679.00	33,642.05	35,407.00	29,282.04	32,583.00	26,946.56	31,734.00	26,244.42
Petroleum(Crude)	M.Tonnes	38.09	69,201.73	37.86	68,817.11	37.79	68,682.61	37.46	68,093.72	37.31	67,804.72
Metallic			47,032.02		43,167.30		42,389.95		38,596.57		31,065.94
Bauxite	Th.tonnes	13,599.57	612.60	16,611.61	799.46	22,319.15	999.69	22,226.06	1,076.93	30,996.86	1,528.42
Chromite	Th.tonnes	2,923.44	2,424.50	2,833.90	2,262.76	2,878.32	2,375.95	2,163.94	1,818.55	2,280.57	2,039.03
Copper Conc	Th.tonnes	130.46	538.58	123.65	628.90	139.31	668.10	107.54	544.57	135.88	595.95
Gold	Kg	2,194.00	531.16	1,588.00	517.25	1,564.00	422.53	1,440.00	360.76	1,282.11	307.14
Iron Ore	M.Tonnes	168.58	38,357.03	136.62	32,824.44	152.18	31,649.18	128.91	28,533.66	139.73	21,642.19
Lead Conc	Th.tonnes	161.85	245.45	184.49	330.09	194.43	437.25	197.67	559.66	258.19	763.63
Manganese Ore	Th.tonnes	2,411.87	1,177.70	2,342.17	1,283.62	2,626.29	1,518.18	2,345.36	1,362.55	2,001.35	870.03
Zinc Conc	Th.tonnes	1,414.01	1,986.22	1,492.78	2,394.87	1,490.66	2,738.93	1,501.59	3,143.66	1,354.59	2,907.77
Other Met. Minerals			1,158.78		2,125.92		1,580.15		1,196.22		411.78
Non Metallic Minerals			6,134.56		7,464.60		7,516.05		7,323.42		6,456.38
Ball Clay	Th.tonnes	1,646.52	69.37	1,750.56	78.07	2,131.00	105.54	1,910.06	92.05	NA	NA
Barytes	Th.tonnes	1,776.98	168.60	1,789.43	531.41	1,170.52	356.14	910.96	269.35	NA	NA
Diamond	Crt	18,490.00	19.82	31,988.00	36.65	37,517.00	61.41	35,724.00	61.35	32,686.59	55.34
Dolomite	Th.tonnes	5,968.55	173.70	7,233.96	261.89	7,310.60	268.39	6,209.48	225.18	NA	NA

Table 1 Contd..

Production of Selected Minerals, 2011-12 to 2015-16

(Value in Rs. Crore)

	Unit	2011-12		2012-13		2013-14		2014-15 (P)		2015-16 (E)	
		Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Fire Clay*	Th.tonnes	983.16	15.80	999.93	18.27	920.81	18.57	712.79	13.11	NA	NA
Garnet(Abrasive)	Th.tonnes	1,717.90	98.16	768.25	92.47	483.56	111.32	78.92	70.27	76.19	65.24
Gypsum	Th.tonnes	3,978.81	168.60	3,556.72	169.98	3,115.36	154.51	2,477.85	128.39	NA	NA
Kaolin	Th.tonnes	3,076.00	65.24	4,258.70	115.74	4,853.42	124.05	3,861.38	110.02	NA	NA
Laterite	Th.tonnes	2,815.28	39.55	4,121.19	70.28	3,475.37	68.78	4,650.60	88.82	NA	NA
Limeshell	Th.tonnes	33.23	4.08	24.04	4.19	18.75	3.52	16.15	3.62	8.41	2.48
Lime Stone	M.tonnes	262.88	4,085.54	285.03	4,797.32	280.86	5,133.20	292.81	5,211.75	292.97	5,809.07
Magnesite	Th.tonnes	224.10	35.50	224.32	45.92	196.94	44.56	275.68	66.81	249.52	66.46
Phosphorite	Th.tonnes	2,259.73	749.63	1,941.16	680.72	1,453.58	475.48	1,579.56	390.51	1,790.07	351.10
Pyroxenite	Th.tonnes	86.03	3.31	58.56	1.80	2.99	0.08	-	-	NA	NA
Sand (Others)	Th.tonnes	2,625.11	16.30	2,638.42	20.18	2,577.87	24.49	2,100.56	24.40	NA	NA
SilicaSand	Th.tonnes	4,867.67	71.41	4,303.88	100.20	3,724.24	96.62	3,047.49	87.75	NA	NA
Sillimanite	Th.tonnes	59.21	52.27	43.74	35.21	67.27	40.82	66.03	47.06	71.62	50.05
Steatite	Th.tonnes	998.44	87.86	971.78	88.84	887.93	98.33	774.28	95.03	NA	NA
Wollastonite	Th.tonnes	184.45	16.00	145.67	12.75	192.71	15.71	186.52	16.22	183.68	16.16
Other Non-Met.Min			193.81		302.71		314.54		321.74		40.48
Minor Minerals		-	52,490.49	-	46,678.24	-	46,678.24	-	46,678.24	-	48,512.54

M.Tonnes-Million Tonnes, Th. Tonnes-Thousand Tonnes, MCM-Million Cubic Metre, Kg-Kilogram, (P) Provisional and based on monthly returns to the extent available with IBM, * Excludes the production of fireclay, if any recovered to coal mining. €-Estimated figures

Note: (1) The value figures pertain to pithead value. (2) Data based on the returns received under MCDR, 1988 except coal, lignite, petroleum (crude), natural gas (utilised) and minor minerals. (3) Value of petroleum(crude) and natural gas on the basis of the price received from the NAD,CSO. (4) 31 minerals have been declared as minor minerals wef 10.2.2015. The data for these minerals for 2014-15 is upto January 2015

Source: (a) Coal & Lignite: Coal Controller, Kolkata. (b) Petroleum(crude) and Natural Gas: Ministry of petroleum & Natural Gas, New Delhi (c) Minor Minerals: State Governments

The number of mines which reported mineral production (excluding minor minerals, petroleum (crude), natural gas and atomic minerals) in India was 1,878 in 2015-16 as against 3,524 in the previous year. Out of 1878 reporting mines, 245 were located in Madhya Pradesh followed by Jharkhand (208), Gujarat (192), Tamil Nadu (185), Andhra Pradesh (169), Odisha (158), Chhattisgarh (154), Maharashtra (121), Karnataka (115), West Bengal (101), Goa (75) and Rajasthan (66). These 12 States together accounted for 95% of total number of mines in the country in 2015-16. The numbers of reporting mines are given in **Table 4.** Area-wise distribution of Mining Leases all over India pertaining to all minerals excluding fuel, atomic and minor minerals is given in **Table 5**.

Table 4

Number of Reporting Mines

Sector	2013-14	2014-15(P)	2015-16(E)
All Minerals*	3,979	3,524	1,878
Coal (including Lignite)	552	552	552
Metallic Minerals	711	637	604
Non-Metallic Minerals	2,716	2,335	7,22

**Excluding atomic minerals, petroleum (crude), natural gas (utilized) and minor minerals.*

7: The number of underground mines in operation mineral-wise (excluding fuel, atomic and minor minerals) is **given Table 6**.

Mineral Production

8: During 2015-16, Mineral production was reported from 33 States/ Union Territories (actual reporting of MCDR & fuel minerals from 23 states and estimation of minor minerals for all 32 States/Union Territories) of which the bulk of value of mineral production of about 93.68% was confined to 13 States (including off shore areas) only. Offshore

Table 5

Area Wise Distribution of Mining Lease*

As on 31/03/2014 (All India)

Frequency Group (Area in Hect.)	Number of Mining Leases	Percentage of Total Leases	Area in '000 Hects.	Percentage of Total Area
All Groups	10,982	100	455	100
0 to 10	7,411	67	30	6
10 to 20	949	9	14	3
20 to 50	1,098	10	36	8
50 to 100	718	7	53	12
100 to 200	363	3	50	11
200 to 500	257	2	82	19
Above 500	186	2	193	42

**excluding fuel, atomic & minor minerals*

Table 6

Number of Underground Mines 2014-15 @ (By Principal Minerals)

Minerals	'A' Category	'B' Category	Total
Apatite	-	1	1
Barytes	-	3	3
Chromite	8	-	8
Copper ore	4	-	4
Gold	4	1	5
Lead & Zinc	8	-	8
Manganese Ore	8	5	13
Mica	2	18	20
Steatite	2	15	17
TOTAL	34	43	77

@ Excluding fuel, atomic & minor minerals

'A' Mechanized Mines: >150 labour in all or >75 labour in workings below ground 'B' Other than 'A'

areas are in leading position, in terms of estimated value of mineral production in the country and had the share of 20.20% in the national output. Next in order was Rajasthan with a share of 11.93% followed by Odisha (11.49%), Jharkhand (9.05%), Gujarat (7.73%), Madhya Pradesh (6.21%), Telangana (6.19%), Chhattisgarh (5.22%), Maharashtra (4.33%), Assam (3.75%), Andhra Pradesh (3.01%), Karnataka (2.34%), Tamil Nadu (2.22%), and Uttar Pradesh (2.06%) in the total value of mineral production. Remaining States and Union Territories having individual share of less than 2.0% all together accounted for remaining of total value during the year under review. The contribution of States/ Regions in the value of mineral production during 2014-15 estimated is pictorially shown in **Figure 4**.

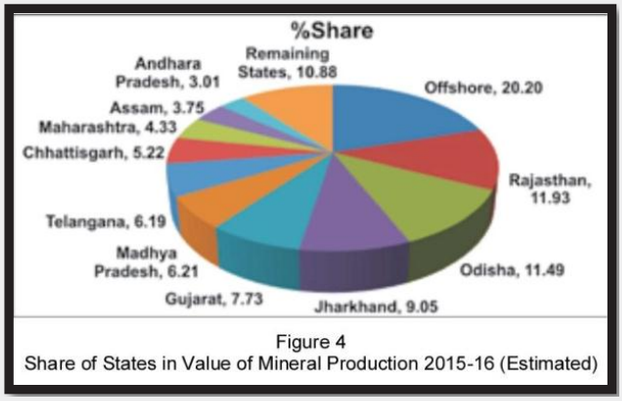


Figure 4
Share of States in Value of Mineral Production 2015-16 (Estimated)

9: State-wise analysis revealed that during 2015-16, the value of mineral production have shown a mixed trend as compared to that in the previous year. The states which have indicated an increase in the value

of mineral production are Tripura (22.96%), Madhya Pradesh (12.58%), Odisha (4.55%), Telangana (3.57%), Uttarakhand (3.07%), Andhra Pradesh (2.02%) and Kerala (1.15%). However, some of the principal mineral producing states revealed decrease in value of mineral production and those includes Chhattisgarh (29.25%), Karnataka (22.08%), West Bengal (21.22%), Jharkhand (16.78%), Meghalaya (16.77%), Tamil Nadu (13.55%), Maharashtra (10.07%), Uttar Pradesh (8.19%), Assam (6.71%), Rajasthan (1.68%), Gujarat (1.36%), Off-shore (0.36%) percent. The all India Reserves and Resources of various minerals as on 1.4.2010/2013, as per UNFC System is given in **Table 7.**

Reserves / Resources on Minerals as on 1.4.2010 / 2013* in India

Table 7

Mineral	Unit	Reserves				Remaining Resources								
		Proved	Probable		Total	Feasibility	Pre-Feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Andalusite	000 t	0	0	0	0	0	0	0	0	0	18450	0	18450	18450
Antimony*														
Ore	Tonnes	0	0	0	0	0	0	0	0	0	10588	0	10588	10588
Metal	Tonnes	0	0	0	0	0	0	0	0	0	174	0	174	174
Apatite*	Tonnes	29112	0	1680	30792	0	491818	1225345	2281521	11481250	6132768	1017646	22630348	22661140
Asbestos	Tonnes	1700152	4588	806101	2510841	109641	3072849	3257941	100687	2527918	10528926	57800	19655762	22166603
BallClay	Tonnes	12292820	350832	4134190	16777842	6122450	3906958	12387575	268486	2279330	41650863	0	66615662	83393504
Barytes	Tonnes	29557972	90844	1935312	31584128	179447	4288189	2608562	207384	1269214	32491229	105721	41149746	72733874
Bauxite*	000 t	401993	52254	375948	830195	134706	131749	348925	653773	431524	1161536	46644	2908856	3739051
Bentonite	Tonnes	0	11415982	13644526	25060508	0	3067	0	26519818	225744237	265309715	25730000	543306838	568367346
Borax	Tonnes	0	0	0	0	0	0	0	0	0	0	74204	74204	74204
Calcite	Tonnes	1265135	38525	1360678	2664338	665454	227265	3126218	9122235	1236864	3805598	97476	18281110	20945448
China Clay	000 t	124118	11034	42006	177158	24543	22980	71270	284781	412852	1651286	60338	2528050	2705208
Chromite*	000 t	56890	14045	36286	107221	28011	20171	36806	21249	32994	53376	21922	214530	321751
Cobalt Ore*	Mill t	0	0	0	0	0	0	0	30.63	2	0.28	12	44.91	44.91
Copper Ore*	000 t													
Ore	000 t	40650	6521	190401	237573	53789	32161	61061	123569	233913	763892	5060	1273445	1511018
Metal	000 t	370.31	61.44	2565.22	2996.97	511.15	338.00	625.88	1589.19	2077.81	4064.35	15.18	9221.56	12218.53
Chalk	000 t	3266	537	528	4332	184	5	127	0	0	269	0	585	4917
Corundum*	Tonnes	100	310	188	597	58469	763	62872	13	38	92389	52675	267219	267816
Diamond*	Carats	984875	0	0	984875	0	0	0	304601	1524317	29047514	0	30876432	31861307

Reserves / Resources on Minerals as on 1.4.2010 / 2013* in India

Table 7 Contd..

Mineral	Unit	Reserves				Remaining Resources								
		Proved	Probable		Total	Feasibility	Pre-Feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Diaspore	Tonnes	1469687	1106296	283691	2859674	187821	714316	488395	248880	133360	1306306	46068	3125144	5984818
Diatomite	000 t	0	0	0	0	634	0	0	0	0	2251	0	2885	2885
Dolomite*	000 t	494815	146050	143039	783905	171293	268984	464085	269812	746919	5167039	212535	7300667	8084572
Dunite	000 t	14894	0	2243	17137	130	4717	107597	24516	1164	21471	8637	168231	185368
Feldspar	Tonnes	24545334	8278221	11679685	44503240	14672107	4427797	12967154	4191330	9874858	41549070	149895	87832212	132335451
Fireclay	000 t	14376	7358	8371	30104	10020	19215	21775	47666	54377	529173	1190	683415	713519
Fluorite*	Tonnes	4509488	63860	0	4573348	697519	745390	571311	1713833	6218421.1	3522536.6	145183	13614193	18187541
Fuller's Earth	Tonnes	0	0	58200	58200	0	0	0	0	912340	255681539	0	256693879	256652079
Garnet	Tonnes	3252107	4712202	11360484	19324793	9270	81901	207041	117887	10226689	26995243	0	37638032	56962824
Gold *														
Ore (Primary)	Tonnes	10920436	2832000	863529	14615965	1486133	1260000	1104647	38101248	70136727	223529973	144569333	480188061	494804026
Metal(Primary)	Tonnes	56.44	7.72	7.75	71.91	4.98	3.59	4.35	144.5	143.8	206.78	60.5	568.5	640.41
Ore (Placer)	Tonnes	0	0	0	0	0	0	0	0	2552000	23569000	0	26121000	26121000
Metal(Placer)	Tonnes	0	0	0	0	0	0	0	0	2.29	3.57	0	5.86	5.86
Granite (Dimension Stone)	Th.cu.m	35741	201377	26574	263692	38462	51990	8234	837325	2063964	42499338	467296	45966608	46230300
Graphite*	Tonnes	5435659	3013	3030005	8468677	9794555	3427932	3629229	738607	7366997	19280299	135967175	180204794	188673471
Gypsum	000 t	22494	239	16363	39096	8502	73651	17659	8455	710853	428272	10	1247402	1286498
Iron Ore (Heamatite)*	000 t	5029221	746910	830431	6606562	2742272	1018515	1009051	1105212	1320700	4358014	2415382	13969145	20575708
Iron Ore (Magnetite)*	000 t	18180	0	16412	34592	206758	17354	61453	1513195	1984616	6344986	584402	10712763	10747355

Reserves / Resources on Minerals as on 1.4.2010 / 2013* in India

Table 7 Contd..

Mineral	Unit	Reserves				Remaining Resources								
		Proved	Probable		Total	Feasibility	Pre-Feasibility		Measured	Indicated	Inferred	Reconnai-ssance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Kyanite	Tonnes	551529	524485	498839	1574853	322622	25917	1238407	578607	3590902	95914312	0	1.02E+08	103245620
Laterite*	000 t	46710	6111	7077	59898	30992	5025	20989	24	1628	229259	210860	498777	558675
Lead & Zinc Ore*														
Ore	000 t	34289	66200	2306	102795	7654	7341	10507	18465	208111	349641	4530	606248	709043
Lead Metal	000 t	657	1422.3	35.61	2114.91	181.62	230.44	198.23	411.87	2421.79	6444.94	0	9888.89	12003.8
Zinc Metal	000 t	3716.4	7041.1	135.6	10893.1	488.97	330.29	493.21	854.76	8563.08	14131.04	101.65	24963	35856.1
Lead & Zinc Metal	000 t	0	0	0	0	0	0	0	0	0	118.45	22.37	140.82	140.82
Limestone	000 t	8978583	3650574	2297234	14926392	1827583	3739470	6309489	6858999	22040640	124835558	4396981	170008720	184935112
Magnesite*	000 t	13455	1837	5481	20773	3987	7384	43905	59010	59652	133356	45	307339	328111
Manganese Ore*	000 t	150213	46485	7812	204510	65956	42343	67787	6184	31884	160561	4952	379666	584176
Marble	000 t	103736	172661	98	276495	0	29842	72289	0	107129	1445708	0	1654968	1931463
Marl	Tonnes	133236150	4650000	2090000	139976150	11704870	0	0	0	0	0	0	11704870	151681020
Mica	Kgs	169840721	15268960	5631767	190741448	2.1E+07	11317310	118867638	5.3E+07	42504035	94427443	228415	341496531	532236979
Molybdenum*														
Ore	Tonnes	0	0	0	0	0	1500000	0	36000	569304	17098594	167800	19371698	19371698
Cotained MoS2	Tonnes	0	0	0	0	0	1050	0	83	287	11198.03	50.34	12668.37	12668.37
Nickel*	Mill.Tonnes	0	0	0	0	0	21	21	31	53	63	0	189	189
Ochre	Tonnes	39863403	683093	14395680	54942176	15897677	13232482	21008598	2477593	3232246	32701243	769250	89319089	144261265
Perlite	000 t	140	0	288	428	0	683	307`	0	0	0	988	1978	2406

Reserves / Resources on Minerals as on 1.4.2010 / 2013* in India

Table 7 Contd..

Mineral	Unit	Reserves				Remaining Resources								
		Proved	Probable		Total	Feasibility	Pre-Feasibility		Measured	Indicated	Inferred	Reconnai-ssance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Platinum Group of Metals (PGM)	In tonnes	0	0	0	0	0	0	7.7	0	0	6.5	1.5	15.7	15.7
	of Metal cont.													
Potash	mill.tonnes	0	0	0	0	0	0	0	0	18142	3652	22	21815	21815
Pyrite	000'tonnes	0	0	0	0	27129	0	32597	9590	77729	1527356	0	1674401	1674401
Pyrophyllite	Tonnes	12146045	6888351	4241055	23275450	3256515	4919285	6595687	3976532	3963980	9786686	308766	32807450	56082901
Quartz & Silica Sand	000'tonnes	272972	35079	121173	429223	185399	322454	321760	58683	259116	1907994	14402	3069808	3499031
Quartzite	000'tonnes	59004	1647	25948	86599	33217	105018	147686	93116	113611	669453	2548	1164648	1251247
Rock Phosphate*	Tonnes	53370665	1763187	10257699	65391551	7697147	34990335	15432125	2912633	3549750	181859733	2678275	249119998	314511549
Rock Salt	000'tonnes	10036	0	5990	16026	0	0	0	0	0	0	0	0	16026
Ruby	Kgs	143	0	93	236	0	0	3165	286	38	1623	0	5113	5349
Sapphire	Kgs	0	0	0	0	0	0	0	0	0	450	0	450	450
Shale	000'tonnes	14992	76	263	15331	0	0	245	0	0	252	83	580	15911
Sillimanite	Tonnes	1693000	1602228	789824	4085052	317869	124000	20082855	4579816	17795772	16152473	3849600	62902385	66987437
Silver*														
Ore	Tonnes	73381065	0	44900000	118281065	17368349	1484543	81338273	53600000	47676000	199821729	0	401288894	519569959
Metal	Tonnes	5213.97	0	2694.00	7907.97	107.38	42.85	403.00	3625.20	1995.36	15706.59	0	21880.38	29788.35
Slate	000'tonnes	0	0	0	0	0	113	1187	0	0	1069	0	2369	2369
Sulphur (Native)	000'tonnes	0	0	0	0	0	0	0	0	0	210	0	210	210

Reserves / Resources on Minerals as on 1.4.2010 / 2013* in India

Table 7 Contd...

Mineral	Unit	Reserves				Remaining Resources								
		Proved	Probable		Total	Feasibility	Pre-Feasibility		Measured	Indicated	Inferred	Reconnai-ssance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Talc/Steatite / Soapstone	000'tonnes	54615	8772	26640	90026	9732	12773	27080	6403	7256	115195	558	178996	269023
Tin*														
Ore	tonnes	4288	976	1709	6973	22592860	2372	31330038	168457	561080	29064387	0	83719193	83726166
Metal	Tonnes	958.26	189.56	33.37	1181.19	32230.7	656.84	54033	813.29	231.63	13128.16	0	101093.7	102274.84
Titanium Minerals	Tonnes	15271219	4274178	2484826	22030223	5198882	151888	0	2046780	50177023	314391121	0	371965694	393995917
Ilmenite	Tonnes	13369586	4090393	2209232	19669211	4970726	151888	0	1090326	39870981	269835940	0	315919861	335589072
Rutile	Tonnes	933502	183785	132553	1249840	228156	0	0	4460	3331042	8584030	0	12147688	13397528
Leucoxene	Tonnes	674592	0	25625	700217	0	0	0	1994	0	341949	0	343943	1044160
Anatase	Tonnes	0	0	0	0	0	0	0	0	3345000	0	0	3345000	3345000
Titaniferous Magnetite	Tonnes	293539	0	117416	410955	0	0	0	950000	3630000	35629202	0	40209202	40620157
Tungsten														
Ore	Tonnes	0	0	0	0	2230000	0	173063	19611152	23435954	25356049	16581246	87387464	87387464
Contained WO3	Tonnes	0	0	0	0	3568	0	450	9914	20180.92	103415.15	4566.28	142094.4	142094.35
Vanadium*														
Ore	Tonnes	0	0	0	0	276530	1720000	4108100	0	232000	18297225	0	24633855	24633855
Contained V2O5	Tonnes	0	0	0	0	1106.12	2835	6032.4	0	487.2	54133.29	0	64594.01	64594.01
Vermiculite	Tonnes	1628475	24593	50939	1704007	22733	75790	71744	35195	24930	569012	3600	803003	2507010
Wollastonite	Tonnes	2289869	0	197253	2487122	3750545	0	3724191	76088	3325042	3206885	0	14082751	16569873
Zircon	Tonnes	1025942	146085	175443	1347470	649938	0	0	81741	338525	716279	0	1786483	3133953

*The reserves are as on 1.4.2013.

10: During 2014-15, the Public Sector continued to play a dominant role in mineral production accounting for 73.41% or Rs. 1,73,675 crore in the total value. Small mines, which were mostly in the private sector, continued to be operated manually either as proprietary or partnership ventures. The minerals which were wholly mined / recovered by the public/ joint sector in 2014-15 were copper ore and concentrate, diamond, fluorite (graded), selenite and sulphur. By and large, almost the entire production of sand (others), lignite and gypsum was from Public Sector. In 2014-15, the Public Sector accounted for sizeable 93% production of coal and tin concentrate each, 69% of Petroleum (crude), 99% of gold, 91% of phosphorite and 60% of magnesite.

11: India's ranking in 2013 as compared to world production was 2nd in barytes, and talc/ steatite/pyrophyllite; 3rd in chromite; 4th in coal & lignite, iron ore, kyanite/andalusite/ sillimanite and Steel (Crude); 5th in bauxite and zinc (slab); 6th in manganese ore; 7th in aluminium and 8th in copper (refined). The statistics on indigenous and world production of principal minerals and metals are given in **Table 8**.

Self-Reliance in Minerals & Mineral Based Products

12: India continued to be wholly or largely self-sufficient in minerals which constitute primary mineral raw materials to industries, such as, thermal power generation, iron & steel, ferro-alloys, aluminium, cement, various types of refractories, china clay-based ceramics, glass, chemicals like caustic soda, soda ash, calcium carbide, titania white pigment,

Contribution and Rank of India in World Production of Principal Minerals & Metals, 2013

Table 8

Commodity	Unit of Quantity	Production		Contribution (Percentage)	India's rank in order of quantum of production
		World	India*		
Mineral Fuel					
Coal & Lignite	Million Tonnes	7,906	610	7.7	4th
Petroleum (crude)	Million tonnes	4,425	38	0.9	25th
Metallic Minerals					
Bauxite	'000 tonnes	2,96,000	21,666	7.3	5th
Chromite	'000 tonnes	28,800	2,853	9.9	3rd
Iron ore	Million tonnes	3,012	167	5.5	4th
Manganese ore	'000 tonnes	52,800	2,588	4.9	6th
Industrial Minerals					
Barytes	'000 tonnes	8,400	1,137	13.5	2nd
Kyanite, andalusite & Sillimanite	'000 tonnes	460(e)**	63	13.6	4th
Magnesite	'000 tonnes	46,900	195	0.4	12th
Apatite & rock phosphate	'000 tonnes	2,03,000	2,330	1.1	14th
Talc/steatite/ pyrophyllite	'000 tonnes	8,000	1,073	13.4	2nd
Mica (crude)	Tonne	3,50,000	1,610	0.5	16th
Metals					
Aluminium	'000 tonnes	47,100	1,667	3.5	7th
Copper (refined)	'000 tonnes	21,000	644	3.0	8th
Steel (crude/liquid)	Million tonnes	1,607	81.7@	5.0	4th
Lead (refined)	'000 tonnes	10,500	122	1.2	15th
Zinc (slab)	'000 tonnes	13,500	766	5.7	5th

** Figures relate to 2013-14, ** Mineral Commodity Summary 2014,USGS.*
@ Annual Report 2014-15, Ministry of Steel.
Source: World Mineral Production, 2009-2013; British Geological Survey.

etc. India is, by and large, self-sufficient in coal (with the exception of very low ash coking coal required by the steel plants) and lignite among mineral fuels; bauxite, chromite, iron and manganese ores, ilmenite and rutile among metallic minerals; and almost all the industrial minerals with the exception of chrysotile asbestos, borax, fluorite, kyanite, potash, rock phosphate and elemental sulphur. Despite high degree of selfsufficiency, some quantities of flaky and amorphous graphite of high fixed carbon, kaolin and ballclay for special applications, very low silica limestone, dead-burnt magnesite and sea water magnesia, battery grade manganese dioxide, etc. were imported to meet the demand for either blending with locally available mineral raw materials and /or for manufacturing special qualities of mineral-based products. To meet the increasing demand of uncut diamonds, emerald and other precious and semiprecious stones by the domestic cutting and polishing industry, India continued to depend on imports of raw uncut stones for their value-added re-exports. The degree of self-sufficiency in respect of various principal minerals and metals/ferro-alloys in 2013-14 is given in **Table 9**.

Production Trends

Metallic Minerals

Degree of Self-sufficiency in Principal Minerals & Metals, 2013-14(p)

Table 9

S. No	Commodity	Demand/Domestic Consumption ('000 tonnes)	Supply/Domestic Supply ('000 tonnes)	Order of self-sufficiency (%)
	Minerals			
1	Asbestos (chrysotile)	104	NA	NA
2	Barytes	186	1,137	100
3	Bauxite	12,021	21,666	100
4	Chromite	2,622	2,853	100
5	Dolomite	6,794	7,109	100
6	Felspar	497	1,412	100
7	Fireclay	536	707	100
8	Fluorite	63	3	5
9	Ilmenite	191	722	100
10	Iron ore	1,07,879	1,52,433	100
11	Kyanite	3	2	66
12	Limestone & other calcareous minerals	2,70,518	2,78,884 1/	100
13	Magnesite	491	195	40
14	Manganese ore	4,186	2,588	62
15	Rock phosphate (including apatite)	4,192	1,385	33
16	Rutile	26	13	50
17	Sillimanite	21	62	100
18	Silica minerals	2,136	5,272	100
19	Talc/steatite/pyrophyllite	381	1,074	100
	Metals 2/			
20	Aluminium	2,308	1,667	72
21	Copper (refined)	638	644	100
22	Lead (primary)	233	123	53
23	Zinc	774	766	99
	Ferro-alloys 3/			
24	Ferro-chrome	287	944	100
25	Ferro-manganese	125	518	100
26	Ferro-silicon	42	90	100

Note: Even in cases where almost entire domestic demand is satisfied by domestic supplies, some quantities of certain special quality/types of minerals and metals/ferroalloys are imported to meet the requirement in certain specific end-uses.

1/ Excludes production of limestone as a minor mineral, calcite and chalk.

2/ Apparent demand.

3/ Excludes production in small-scale sector.

13: The value of metallic minerals in 2014-15 at Rs. 38,597 crore decreased by 9% over the previous year. Among the principal metallic minerals, iron ore contributed Rs. 28,534 crore or 74.66%, zinc concentrate Rs. 3,144crore or 6.46%, manganese ore Rs. 1,363 crore or 3.58%, chromite Rs. 1,819 crore or 5.60%, bauxite Rs. 1,077 crore or 2.36%, copper (concentrate) Rs. 545 crore or 1.58%, silver Rs. 1,195 crore or 3.72%, gold Rs. 361 crore or 1.0%, while the remaining was shared by lead concentrate and tin concentrates.

14: The production of **iron ore** at about 128.91 million tonnes in 2014-15 registered a decrease of 15% over the previous year. About 46% of the total production was shared by Public Sector Companies like NMDC, SAIL and Orissa Mining Corporation etc. The share of Private Sector was 54% which includes Tata Steel (TISCO). During the year Odisha was the leading producer of Iron Ore accounting for 40% of the total production followed by Chhattisgarh (23%), Karnataka (16%),Jharkhand (15%), and remaining (6%) production was reported from Andhra Pradesh, Madhya Pradesh, Maharashtra, Rajasthan and Telangana.

15: The production of **copper** concentrate at 108 thousand tonnes in 2014-15 decreased by about 23% as compared to the previous year. The average metal content in copper concentrate was 23.13% Cu.

16: The production of **chromite** at 2,164 thousand tonnes in 2014-15 decreased by

25% as compared to the previous year. Odisha reported almost entire output of chromite (99.95%) in the country. A nominal production was reported from Karnataka. Three public sector companies, namely Odisha Mining Corporation (OMC), Mysore Mineral Limited (MML) and Industrial Development Corporation of Odisha Limited (IDCOL) together reported 37 % of the total production and the remaining 63 % was contributed by private sector mines.

17: The production of **manganese** ore at 2,345 thousand tonnes in 2014- 15 decreased by 11% compared to that in the previous year. MOIL continues to be the largest producer of manganese ore with a share of 49% of the total production in 2014-15. Of the total production of manganese ore in 2014-15, Madhya Pradesh contributed 37.68%, Maharashtra 28.56%, Odisha 13.90%, Andhra Pradesh 10.82% and the remaining production was from Karnataka, Telangana, Jharkhand and Rajasthan.

18: The production of primary **gold** at 1,440 kg (excluding by-product gold recovery from imported concentrates) in 2014-15 registered decrease of about 8% as compared to the previous year. Karnataka was the leading producer of gold accounting for 99% of the total production. The remaining production was reported from Jharkhand.

19: The production of **bauxite** at 22.23 million tonnes in 2014-15 decreased marginally by 0.4% as compared to the previous year. NALCO, Utkkal Alumina Industrial Ltd., HINDALCO and BALCO. are the major companies engaged in the mining of bauxite in the country in 2014-15.Odisha accounted for 42% of the total production of **bauxite** during 2014-15 followed by Gujarat 25%, Maharashtra 12%,Jharkhand 9% Chhattisgarh 7%, and Madhya Pradesh 4%.

20: During 2014-15, the production of **lead** concentrate at 198 thousand tonnes increased by 2% and that of **zinc** concentrate at 1,502 thousand tonnes also increased by 1% over the previous year. Average metal content in lead concentrate was 56.29% Pb and that in zinc concentrate was 51.48% Zn. Rajasthan accounted for the entire production of lead concentrate and zinc concentrate during 2014-15.

Non-Metallic Minerals

21: The value of production of non-metallic minerals at Rs. 7,323.42 crore during 2014-15 decreased by 3% as compared to the previous year. limestone retained its leading position by contributing 68.30% of the total value of non-metallic minerals in 2014-15. The other non-metallic minerals in the order of importance were phosphorite/ rock phosphate (6.33%), barytes (4.74%), dolomite (3.57%), gypsum (2.06%), kaolin (1.65%), garnet (abrasive) (1.48%), ball clay (1.40%), talc/ soapstone/ steatite (1.31%) and Silica Sand (1.29%). The remaining was from other non-metallic minerals.

22: The production of **limestone** was at 293 million tonnes in 2014-15 an increase by 4% as compared to that in the previous year. Limestone is widely produced in India. As much as 87.22% of the total output in 2014-15 was contributed by eight principal States; viz, Rajasthan (21.02%), Madhya Pradesh (13.31%), Andhra Pradesh (12.10%), Gujarat (8.79%), Karnataka (8.21%), Telangana (8.18%), Chhattisgarh (8.03%) and Tamil Nadu (7.58%). The remaining 12.78% of the total production was shared by other limestone producing states. About 54% of total production was reported by principal producers, namely, Ultra Tech Cement Limited (16%), ACC Limited and Ambuja Cement (7% each), Jaiprakash Associates Limited & Shree Cement Limited (6% each), The India Cement Limited, Century Textiles & Industries Ltd., The Ramco Cements Ltd. and Lafarge India Pvt. Ltd. (3% each).

23: The production of phosphorite/rock phosphate at 1580 thousand tonnes, increased by 9% in 2014-15, as compared to that of the previous year. The 91% production was from Public Sector. Jhamarkotra mine of Rajasthan State Mines & Minerals Ltd. (RSMML) alone accounted for 86% of the total production in India during 2014-15. Rajasthan and Madhya Pradesh contributed 95.09 and 4.91% of the production respectively.

24: The production of dolomite at 6,209 thousand tonnes in 2014- 15 (upto January) registered 15% decrease as compared to the 2013-14. Steel Authority of India Ltd. Is the major producer of dolomite accounting 13% of total production followed by the Rastriya Ispat Nigam Ltd. 7%, South West Mining 6%, A.N. Patnaik and Manish Singh Banafer (3% each) during 2014- 15 (upto January). Chhattisgarh (39%), Andhra Pradesh (11%), and Karnataka (9%), were the principal producing States of dolomite. The remaining 41% was contributed by eight states during the year, namely, Madhya Pradesh, Telangana, Odisha,Gujarat, Rajasthan, Jharkhand, Maharashtra and Uttarakhand.

25: The production of kaolin in 2014-15(upto January) at 3,861 thousand tonnes decreased by 20% as compared to that in the previous year. Nearly 63.62% of total output of kaolin in 2014-15(upto January) was reported from Gujarat followed by Rajasthan (16.40%), by Kerala (14.54%) and West Bengal (2.1%) while remaining (3.33%) was contributed jointly by Andhra Pradesh, Jharkhand, Karnataka and Madhya Pradesh.

26: Production of **gypsum** at 2,478 thousand tonnes in 2014-15(upto January) registered a decrease of 20% as compared to the previous year. By and large, the entire production of gypsum was reported from Rajasthan (98.84%) and the remaining was from Jammu & Kashmir. Two Public Sector Companies namely, RSMML and Fertilizer Corporation of India Ltd. accounted for almost the entire production.

27: The production of **magnesite** at 276 thousand tonnes during 2014-15 increased by 40% as compared to the previous year.

28: The production of **talc/soapstone/steatite** in 2014-15(upto January) at 774 thousand tonnes decreased by about 13% over the previous year. Rajasthan, the principal State accounted for 81.78% of the total production in 2014-15(upto January). Five principal producers contributed 60% of the total production of steatite. They are Associated Soapstone Distributing Co. (P) Ltd. (26.40%), Udaipur Mineral Development Syndicate (P) Ltd. (23.76%), Ratanlal Deedwaniya (3.58%),P.S Ahluwalia (3.24%) and Rajasthan Minerals & Company(3.23%) of total production of talc/soapstone/ steatite in 2014-15(upto January).

Minor Minerals

29: The value of production of minor minerals was estimated at Rs. 46,678 crore in 2014-15. Andhra Pradesh with share of 29.59% in the value of minor minerals produced in the country occupied the top position. Gujarat was at second place with a share of 20.24% in the value of minor minerals. Next in the order was Rajasthan 16.19%, Maharashtra 12.64%, Uttar Pradesh 8.3%, Karnataka 3.45%,Kerala 2.98%, Jammu & Kashmir 1.13% and Madhya Pradesh 1.03%.The contribution of remaining states and UTs was less than one percent each. Item-wise analysis revealed that building stone had the largest share of 25.7% to the total value of minor minerals followed by road metals 23.9%, brick-earth 15.5%, ordinary sand 14.0%, marble 4.1%, gravel 3.5%, kankar 2.7%, limestone 2.6%, murrum 2.4%, quartzite & sand stone 1.6%, and ordinary earth 1.4 percent. The individual share of remaining minerals was less than 1.0% which together contributed 2.6 percent of value of minor minerals.

Scenario of Index of Mineral production and value of mineral production after the amendments in MMDR Act 1957

30: The mineral sector has shown 2.3% positive growth in nine months of current financial year (April, 2015 to December, 2016) as compared to the same period during the previous year (April, 2014 to December, 2015). The minerals under MCDR 1988 have also reported positive growth of 10.4 % as compared to that in the previous year owing to increase in production of bauxite, chromite, iron ore limestone and phospherite.

State-wise Mineral Scenario

31: Status of Mineral Production in 11 Mineral rich States of India is at **Table 10**.

Scenario of Mineral Rich States

Table 10

Sl. No.	Name of the State	Value of mineral production in 2014-15 (Rs. In crore)	% Change in value as compared to previous year	Leading minerals produced in the State*	Value of minor minerals production in 2014-15 (` In crore)#	No. of reporting mines during 2014-15	index of mineral production during 2014-15 (base 2004-05 = 100), (Previous year's index in parenthesis	Share of the State in country's production of certain minerals
1	2	3	4	5	6	7	8	9
1	Andhra Pradesh	7,945.18	– 8.38	natural Gas(ut.), limerstone, petroleum (crude), barytes, manganese ore, dolomite, iron ore, garnet (abrasive),laterite	5,914.00	470.00	166.79 (221.30)	mica (crude) and apatite 100% each, barytes 97.4%, vermicilite 85.6%, quartzite 78.3%, garnet (abrasive) 70.7%, sillimanite 51.2%,silica sand 40.8%,laterite 37.9% and quartz 36.8%
2	Chhatisgarh	19,854.93	5.03	coal, iron ore, limestone, dolomite and bauxite	439.04	215.00	175.61 (167.62)	tin conc. and moulding sand 100% each, dolomite 39.3%, iron ore 22.8%,coal 22.0%,,limestone 8.0% and bauxite 7.0% .
3	Goa	446.63	– 0.46	Bauxite	443.35	71.00	0.00 (0.00)	bauxite 1.1%.
4	Gujarat	21,079.44	– 4.21	petroleum (crude), natural Gas (ut.), lignite, limestone and bauxite	9,449.03	410.00	74.70 (81.03)	chalk 100%, marl 99.9%, clay (others) 67.4%, kaolin 63.6%,silica sand 28.7%, lignite 25.6%,bauxite 24.8%, petroleum (crude) 12.4%, limestone 8.8% and quartz 7.5%.
5	Jharkhand	29,052.86	8.52	coal, iron ore, bauxite, limestone, copper conc. and dolomite	40.14	224.00	156.58 (144.23)	flint stone 100%, graphite (r.o.m.) 35.6%, coal 20.4%,iron ore 14.9% and bauxite 9.2%.
6	Karnataka	8,072.94	8.03	limestone, iron ore, olomite, gold ore, manganese ore and dolomite	1,608.30	183.00	58.50 (54.43)	felsite 100%, gold 99.2%, shale 23.1%, iron ore 15.6%,dolomite 10.0%,manganese ore 8.3%, limestone 8.2%, and quartz 6.4%
7	Madhya Pradesh	14,843.66	10.39	coal, limestone, manganese ore, copper conc., iron ore, diamond and bauxite	480.46	376.00	160.46 (143.82)	diamond 100%, pyrophyllite 78.5%, copper ore 68.6%, copper conc. 53.5%, manganese ore 37.7%,clay (others) 16.3%, coal 14.0% and shale 13.8%

Scenario of Mineral Rich States

Table 10 Contd..

Sl. No.	Name of the State	Value of mineral production in 2014-15 (Rs. in crore)	% Change in value as compared to previous year	Leading minerals produced in the State*	Value of minor minerals production in 2014-15 (Rs in crore)#	No. of reporting mines during 2014-15	Index of mineral production during 2014-15 (base 2004-05 = 100), (Previous year's index in parenthesis	Share of the State in country's production of certain minerals
1	2	3	4	5	6	7	8	9
8	Maharashtra	12,961.95	2.52	coal,manganese ore, iron ore, limestone, bauxite and silicasand.	5,898.15	162.00	113.20 (109.40)	fluorite (graded) 100% , kynite 29.7%, manganese ore 28.6%, sand (others) 13.9%, bauxite 11.8%,shale 10.5% and quartzite 10.3%.
9	Odisha	29,570.23	– 10.70	iron ore, coal, chromite, bauxite, manganese ore and limestone	85.68	172.00	138.72(158.25)	chromite 99.9%,bauxite 41.5%, iron ore 40.4%, sillimanite 27.7% , coal 20.2%, garnet(abrasive) 15.2%, manganes ore 13.9%, and dolomite 6.7%
10	Rajasthan	32,621.96	– 0.72	petroleum (crude), limestone, lead & zinc conc.,natural gas (ut.), silver and phosphorite.	7,576.11	541.00	227.17 (211.57)	selenite, wollostonite, lead and zinc conc. 100% each, silver 99.9%, gypsum 98.8%, calcite 95.5%, phosphorite 95.1%,ball clay 92.2%, ochre 89.5% steatite 81.8%, copper conc 41.1%, petroleum(crude) 23.6%, limestone 21.0%, lignite 19.5% and natural gas 3.3%
11	Tamil Nadu	6,896.26	2.29	lignite, natural gas (ut.), limestone, petroleum (crude) and magnesite.	409.35	292.00	117.76 (117.26)	lime kankar 100%, dunite 98.5%, magnesite 78.1%,graphite (r.o.m.) 62.6%, lignite55.0%, fireclay 23.8% ,vermiculite 14.4% ,garnet (abrasive) 13.2% and limestone 7.6% .
12	Telangana	16,075.21	1.77	coal, limestone, dolomite, laterite	7,897.30	154.00	"NA"	sand (others) 84.7%, laterite 40.87%, felspar 29.9%, quartz 26.6%, coal 8.6%, limestone 8.2% and dolomite 7.8%

** Except minor minerals.*

 # Figures of 2013-14 repeated due to non-availability of data from State Governments.

Extracted by **Shri S C Suri, Hon. Member, IIM** from Annual Report of Ministry of Mines 2015-16

Operational efficiency via tech optimisation key to sustainable development

"When the going gets tough, the tough gets going." This fourth quarter results season, for the steel industry, seems to be written in red. The scenario seems grim for steel majors and the industry's fortune cookie predicts that if the integrated manufacturers have to return to profit, the only way forward is to stress on increasing operational efficiency. Since the topline is not increasing because of lack of demand, the only way to boost the bottomline is technological optimisation for achieving operational efficiency and thereby cutting costs.

Interestingly, at a time when many metals and minerals companies have been brought to their knees by a downturn in the commodities cycle and an adverse turn in the regulatory tide, forcing some to sell their crown jewels, one corporate group has emerged relatively unscathed from all this, and is, in fact, looking to pick up some prime assets on the cheap.

This approach seems to be just what the doctor ordered!

That entity – the Sajjan Jindal-owned JSW Group – has been well served by its prudent invest-what-you-save strategy. The group may be debt-heavy and may have gone on an acquisition spree, but it has managed to meet most of its capital requirements across its operations – steel, energy, ports and cement – through cost savings, by improving operational efficiency and preserving cash for future expansion. Today, while its peers are selling their assets to retire debt, JSW is on a bargain-hunt: it is looking to acquire power projects and has even made an exploratory bid for rival Tata Steel's loss-making assets in the UK.

The sector had been fraught with a lot of trouble in the recent years. In 2011, the metal industry was caught unaware when the Supreme Court, in an effort to root out illegal practices, issued a blanket ban on mining. Domestic economic growth also failed to keep pace with capacity expansion. The clampdown and the strictures by the Supreme Court led the government to enact the Mining and Mineral Development and Regulation Act, which effectively pushed up the cost of mining in India.

Adding fuel to the fire, cheap imports from China and from trade partners such as Japan, Russia and South Korea rattled the steel companies already groaning under debt.

Reacting to the large-scale dumping, the government levied a "safeguard duty" and fixed a Minimum Import Price (MIP) on steel imports.

While JSW Steel has so far managed to wade through the troubled waters that have swirled around the sector, its ability to take advantage of the anticipated revival in steel demand will face a reality check.

However, all said and done, JSW has courageously fought the difficulties with a robust operational efficiency programme it has adopted over the years.

Profit when other incur losses

This has resulted in JSW Steel reporting an over two-fold jump in consolidated net profit at Rs 171.25 crore for the March quarter and chalking out capex of Rs 7,000 crore over the next two years while others reported losses.

India's largest domestic steel-maker, SAIL, reported a standalone net loss of Rs 1,230.93 crore in the March quarter hit by challenging market conditions and decline is sales realisation. Tata Steel also posted a fourth quarter consolidated net loss of Rs 3,279 crore (compared to Rs 5,702 crore).

Jindal Steel and Power (JSPL) narrowed its consolidated net loss to Rs 371 crore in the January-March quarter of 2015-16, helped by higher steel sales and cost optimisation measures. The Naveen Jindal-led firm had posted a net loss of Rs 519 crore in the year-ago period.

Cost optimisation & operational efficiency

Not everyone has a sanguine view of JSW's debt burden. Just last month, credit rating agency Fitch Ratings downgraded the group's flagship JSW Steel, citing declining profits and rising leverage during a prolonged period of weak international steel prices, coupled with debt-funded investment in capacity expansion.

However, Seshagiri Rao, Joint Managing Director of JSW Steel and Group CFO, who spearheads the group's strategy, is not excessively worried

about the Rs 38,460-crore debt (as of the March quarter). In fact, even after adding 4 million tons to take its annual steel capacity to 18 million tons in the past two years, the company's debt level has come down.

"We are absolutely comfortable with the current debt level. Despite massive capacity expansion, our debt position has remained almost stagnant as we are raising fresh funds only to the extent of the loans we repay," he said.

In fact, he added, the company has prepaid a few rupee loans to raise fresh funds and bring down the overall cost of borrowing by 60 basis points.

"We can free up more cash for expansion by focusing on efficient use of working capital. We have reduced our inventory by 1.40 lakh tons to free up working capital for new projects. Going ahead, we intend to borrow only to the extent of our loan repayment," he said.

Although the extent of JSW Steel's leverage will moderate when newly added capacity goes on-stream, Fitch expects the company to be hit if it goes on a debt-funded expansion and the government decides to lift the regulatory protection. Given the heightened competition among domestic producers to support utilisation rates, the rating agency sees constraints on further steel price hikes in the near term.

The past hangover

Banking on buoyant global and Indian economic growth, metal companies made huge investment in expansion and acquired assets overseas with borrowed money.

In 2007, JSW bought three pipe and plate mills owned by Sajjan's elder brother, P R Jindal, for $940 million and followed it up with the acquisition of iron ore and coal mines in Chile and the US.

Unfortunately, the global acquisitions have not added any meaningful profit to JSW's bottomline. In fact, the situation would have been worse if the company had acquired Italian steel maker Lucchini SpA in 2014.

Much of the debt on JSW Steel's books has been inherited from the sick companies it acquired over the years. In 2010, JSW bought debt-ridden Ispat Steel at Dolvi in Maharashtra with a capacity of 3.3 million tons and subsequently merged it with itself to claim deferred tax benefits of over Rs 2,088 crore. In a bid to secure the raw material needs of the Dolvi units, JSW bought over sponge iron unit Welspun Maxsteel in an all debt-deal of Rs 1,000 crore.

New plans to increase operational efficiency

JSW has added 2 million ton capacity at Vijaynagar and Dolvi units each. The installed capacity of the company has increased by about 25 percent from 14.3 million tons per annum to 18 million tons per annum with the completion of these low-cost and returns-accretive projects.

The company has earmarked capex of Rs 7,000 crore over the next two years and will invest Rs 4,300 crore this year and Rs 2,700 crore next year, which includes setting up of a 200,000 tons tin plate unit at Tarapur in Maharashtra, estimated to cost Rs 650 crore.

The firm is also investing Rs 550 crore to resolve the water shortage issue.

Continuous operational improvement

JSW Steel is the first Indian company to use the Corex technology to produce hot metal. The company opted for this technology although it was untested in Indian conditions due to its benefits to the environment.

Corex is a smelting-reduction process developed by VAI, for cost-efficient and environmentally friendly production of hot metal from iron ore and low grade coal. The process differs from the conventional blast furnace route in that low grade coal can be directly used for ore reduction and melting work, eliminating the need for coke making units. The use of lump ore or pellets also dispenses with the need for sinter plants.

All metallurgical work is carried out in two separate process reactors – the reduction shaft and the melter gasifier. Lump ore, sinter, pellets or a mixture are charged into a reduction shaft where they are reduced by a gas to direct-reduced iron (DRI). Discharge screws convey the DRI from the reduction shaft into the melter gasifier where final reduction and melting takes place in addition to all other metallurgical and slag reactions.

In recent years though, steel-making companies around the world have looked for solutions to new-age problems. Setting up steel plants takes a lot of time and money. And once the plant is put up, more investment are needed to source raw materials, mainly iron ore and coal. The process of first getting molten iron from the ore and then converting it to steel also generates a lot of

carbon dioxide, causing pollution. In India, the new steel projects face an additional problem – delay in getting land. And traditional steel plants need huge tracts of land, as much as 5,000 acres for a 5-million tons per annum facility.

That's why state-run SAIL is looking for new technologies that could replace the traditional blast furnace route to make steel. It is in talks with two steel companies that are known for their technical expertise – Kobe Steel of Japan and POSCO of South Korea. Over the last few years, both these companies have developed a new steel-making technology – Kobe's ITMK3 and POSCO's Finex – that promises to make steel-making both Green and less expensive.

In the traditional blast furnace route, iron ore and coal (as fuel) are fed into a furnace from which molten iron comes out. This hot metal is then passed through a converter to produce finished steel. In India, most steel companies follow this method. "But the blast furnace route needs high grade iron ore with an iron content of over 62 percent. As a result, a lot of lower grade iron ore lies unused," says an industry insider. Almost 60 percent of the iron ore mined in India constitutes of these low grade iron ore, or fines, which are either exported to China or are left unused, causing environment harm.

Following calls to limit export of iron ore and fines, as a better economic sense, attempts have been made to process these fines into pellets. These pellets can be used in plants that make DRI or sponge iron, another steel raw material. POSCO's earlier technology called Corex also uses pellets instead of iron ore. Its new Finex technology claims to go a step further. Under it, fines can be directly fed into the plants. Kobe's ITMK3 also promises the same. These technologies help in consuming the unused fines, and also do away with the need to set up a processing plant to upgrade these low grade iron ores.

This also makes the two technologies cheaper. A conventional steel plant using the blast furnace route costs more than Rs 4,500 crore per ton to set up. Industry experts say plants using the new technologies will be "much cheaper". The two technologies also use lower grade coal and experts say steel plants can save as much as 20 kg of coal per ton. One argument in favour of these technologies is the lower emission of greenhouse gasses in the plants using them. Both POSCO and Kobe have tested these technologies in pilot projects. POSCO operates a 1.5-million tons a year capacity in South Korea using Finex technology. Kobe has set up two pilot projects, in Japan and the US.

"While these two technologies have promise, they are yet to be tested using raw material found in India. Iron ore and coal differ in grade and properties in each country. So before they are used in India, this check is needed," say a steel technology provider.

That may not be the only shortcoming. Steel companies are looking to build mega plants for economies of scale, and experts say the benefits of the new technologies might erode if the facility's capacity crosses a million tons. "In fact, as you increase the scale of the production unit, the blast furnace route turns out to be more cost-effective on a per ton basis," says another expert in the subject.

However, the companies should master the new technologies before adopting these on a full-fledged basis. Otherwise, they will burn their fingers as such technology providers seek higher equity involvement for sharing their expertise.

India aiming high on steel

India is the world's third-largest producer of crude steel (up from 8th in 2003) and is expected to become the second-largest producer by 2016. The growth in the Indian steel sector has been driven by domestic availability of raw materials such as iron ore and cost-effective labour. Consequently, the steel sector has been a major contributor to India's manufacturing output.

The Indian steel industry is very modern with state-of-the-art steel mills. It has always strived for continuous modernisation and up-gradation of older plants and higher energy efficiency levels.

India's crude steel capacity reached 110 million tons in 2014-15. Production of crude steel grew by 0.9 percent year-on-year to 89.77 mt. Total finished steel production for sale was at 90.39 mt and consumption of total finished steel increased 4.6 percent year on year to 80.45 mt.

The steel sector in India contributes nearly 2 percent of the country's gross domestic product (GDP) and employs over 600,000 people. The per capita consumption of total finished steel in the country has risen from 51 kg in 2009-10 to about 59 kg in 2014-15.

According to data released by the Department of

Industrial Policy and Promotion (DIPP), the Indian metallurgical industries attracted foreign direct investment (FDI) to the tune of US$ 8.7 billion, respectively, in the period April 2000-September 2015.

The National Mineral Development Corporation (NMDC) has planned to invest Rs 40,000 crore US$6.1 million) in the next 8 years to achieve mining capacity of 75 million tons per annum (mtpa) by FY2018-19 and 100 mtpa by FY2021-22, compared to the current 48 mtpa capacity.

PSOCO, the multinational Korean steel company, has signed an agreement with Shree Uttam Steel and Power (part of the Uttam Galva Group) to set up a steel plant at Satarda in Maharashtra.

Iron ore output in India is expected to increase to 170-175 million tons in FY2017, which, in turn, will help reduce iron ore imports by two-thirds to 5 mt. SAIL plans to invest US$23.8 billion to increase steel production to 50 mtpa by 2025.

ArcelorMittal, the world's leading steel-maker, has agreed on a joint venture with SAIL to set up an automotive steel manufacturing facility in India.

Public sector mining giant NMDC Ltd is set up a greenfield 3-million ton per annum steel mill in Karnataka jointly with the state government at an estimated investment of Rs 18,000 crore (US$ 2.8 billion).

JSW Steel has announced plans to add capacity to make its plant in Karnataka the largest at 20 mt by 2022 and Tata Steel has set up its 3-million tons flat products plant in Kalinganagar in Odisha.

The Government of India is aiming to scale up steel production in the country to 300 mt by 2025.

The Ministry of Steel has announced plans to invest in modernisation and expansion of steel plants of SAIL and Rashtriya Ispat Nigam Limited (RINL) in various states to enhance the crude steel production capacity in the current phase from 12.8 mtpa to 21.4 mtpa and from 3 mtpa to 6.3 mtpa respectively.

The government has planned special purpose vehicles (SPVs) with four iron ore-rich states – Karnataka, Jharkhand, Orissa, and Chhattisgarh – to set up plants having capacity of 3-6 mtpa.

SAIL plans to invest US$ 23.8 billion for increasing its production to 50 mtpa by 2025. SAIL is currently expanding its capacity from 13 mtpa to 23 mtpa, at an investment of US$ 9.6 billion.

A Project Monitoring Group (PMG) has been constituted under the Cabinet Secretariat to fast track various clearances/ resolution of issues related to investments of Rs 1,000 crore (US$ 152 million) or more.

SRTMI to spearhead research

The Ministry of Steel is facilitating setting up of an industry-driven Steel Research and Technology Mission of India (SRTMI) in association with the public and private sector steel companies to spearhead research and development activities in the iron and steel industry at an initial corpus of Rs 200 crore (US$31.67 million).

A corpus of over Rs 200 crore has been created for setting up of SRTMI, with the objective of making India self-reliant in special steels and making the country a metallurgical hub.

While the Government of India, through the Steel Development Fund of the steel ministry has contributed Rs100 crore to this corpus, the rest of the funds has come through contributions from various steel companies in the country.

SRTMI is aimed at making India a metallurgical hub and self-reliant in various special steels that the country requires, be it in Defence, space or civilian applications.

The Indian steel industry played a critical role in supply of special steels required to indigenously develop the aircraft carrier, INS Vikrant, to be rolled out in 2016-17 from the Cochin Shipyard.

Indian steel-makers, including SAIL, could meet the requirement of about 40,000 tons of special grade steels required to build the aircraft carrier, now at an advanced stage of completion.

The Ministry of Steel, and major steel companies, including Tata Steel, JSW Steel, RINL, JSPL, NMDC and MECON, had entered into an agreement in April 2015 to take forward this initiative, conceptualised by a task force under the steel ministry. Its focus would be on addressing priority areas of national importance.

High-value steel products may stem Chinese onslaught

Steel producers in high-cost countries say their best hope for surviving the global glut is to develop higher value specialised products. But they are still facing a tough time competing with low-cost Chinese producers that are breathing down their necks.

The announcement that India's Tata Steel is abandoning Britain has hammered home the threat to developed countries' steel industries from a glut caused by over-capacity in China, which has led to a collapse in the global prices of the commodity used mainly in construction.

Firms from Europe, Japan and South Korea say they are trying to keep afloat by increasing the share of higher-value products in their output, focusing on specialty steels used mainly in manufacturing, which command a premium over lower grades.

Some companies are venturing further down the supply chain to make their own aircraft or auto parts to customise products as much as possible to get a higher value. Others are forming tighter relationships with their customers as a way to keep their order books full.

"Sticking to technological and quality leadership will be the only solution for steel producers to secure profitability and future growth," said an industry source.

Some European steel mills are aiming to become less dependent on traditional steel markets by raising production of finished parts for the aerospace, rail and automotive industries. The auto sector alone generates around 30 percent of group sales.

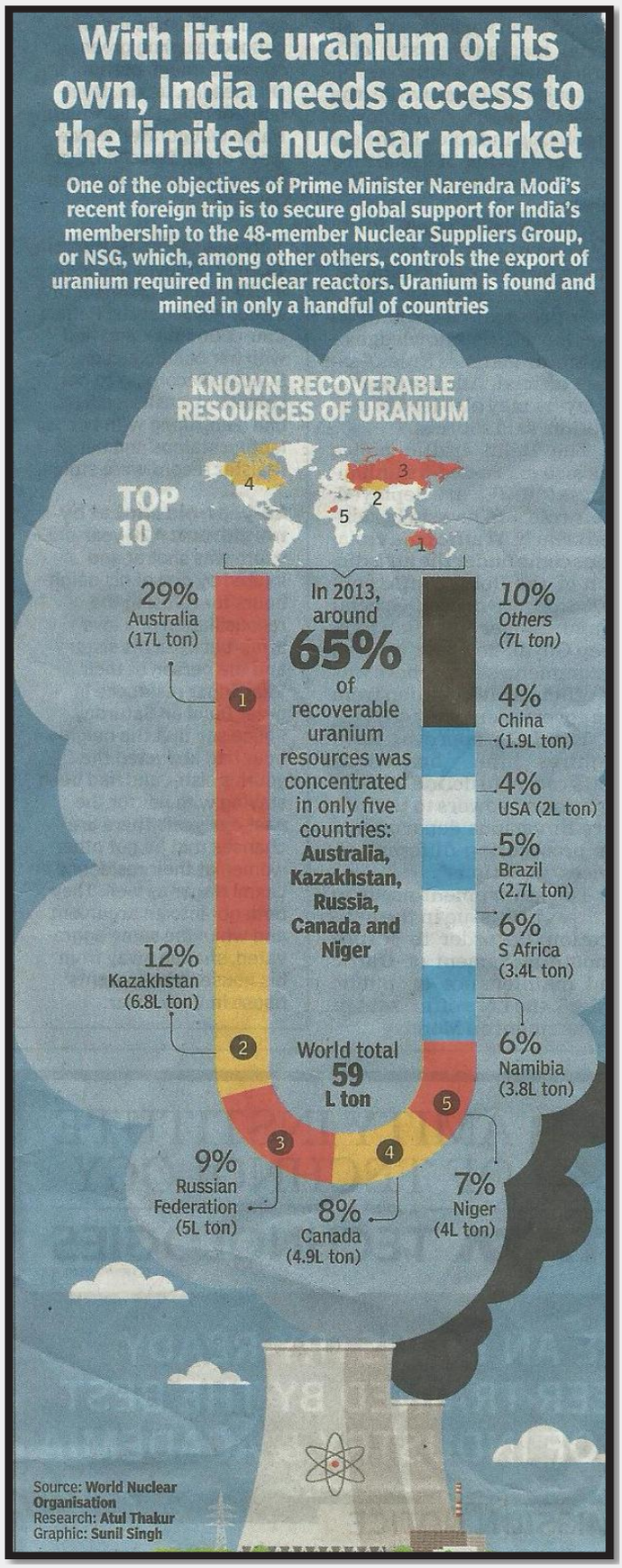
Some companies like Europe's Voestalpine's strategy is to essentially provide an engineering service, a solution to a manufacturing process. It is not just selling steel.

But, on the flip-side, even at a high level of sophistication, the Chinese can catch up.

Some steel analysts say specialty steel will help companies survive for a few years, but eventually the Chinese will probably be able produce the more bespoke, more tailored steel.

High-value specialty products by themselves can't save steel-makers, says European steel association Eurofer. It want Brussels to do more to protect the industry from what it says is dumping by China. To be cost effective, a steel-maker still needs to produce large quantities of the lower-margin commodity product, and needs a market for it.

Steel-making isn't on the whole that cost effective if you only concentrate on the high grade or speciality product lines. High end is also usually lower volume, and the rest of the balance sheet is made up of a diverse range of lower grade or non-speciality products, said an industry expert.



Another steel industry insider said an integrated steel plant only makes sense at a scale of at least 3 million tons, and must be used to full capacity to be cost-effective.

For the world's No. 2 steel producer, Japan's Nippon Steel and Sumitomo Metal Corp, increasing the volume of high-value products is part of a strategy that also includes boosting volumes of mid-range steel.

In India, there is also a shift towards producing more high value-added steel.

"Clearly the world is moving in that direction," said a Mandi Govindgarh based steel-maker.

Seshagiri Rao, Joint Managing Director at India's JSW Steel Ltd, said: "Every steel company, particularly the major companies, are looking at value addition, meaning high-end value-added steel products – tin plates or automotive steel, or high-strength steel or electrical steel."

Meanwhile, Chinese firms are moving up the value chain too. Baoshan Iron and Steel Co. Ltd, China's biggest listed steel-maker, experts its huge, modern Zhanjiang steel production base with annual capacity of about 9 million tons, which it calls its "dream factory", to start operating later this year.

Tata Steel's Kalinganagar plant is yet another milestone in its journey of sustainable and value-accretive growth.

It is not possible to perfectly time the market, especially with greenfield projects that take a long time to implement. However, Tata Steel's new capacity at Kalinganagar will enhance the company's portfolio by producing high-grade flat products for sectors like lifting and excavation, ship-building, Defence equipment, energy and power, infrastructure, etc.

The company has already seeded the market and is confident that it will be able to sell the volumes it produces. "In the global cost curve, the Indian steel industry is fairly competitive but when imports come in without regard to a sustainable pricing structure, capturing all the factors of production, including capital costs, we have an unfair and unsustainable trade, which must be acted upon by the national government," said an industry source.

For iron ore, Tata Steel continues to remain fully integrated and its entire requirement of the raw material for its Kalinganagar project is proposed to be sourced from captive mines and the company is ramping up mining capacity to meet the incremental demand. However, in coal, its integration level would come down from the current levels as the company would be sourcing externally the additional requirement for the Kalinganagar project.

Tata Steel has been in mining for over a century now and, as an institution, it has seen several commodity cycles. Over decades, the company has invested in assets, infrastructure, capabilities and communities in its mining locations in Jharkhand and Odisha. Its mining practices are very efficient in spite of the fact that Indian ores are not the best in the world.

The plant locations in Jamshedpur and Kalinganagar were also planned to be near the raw material sources to be logistically efficient and operating practices on captive raw material usage have also been uniquely adapted to the available resources. So, as a long-term mining and steel player, Tata Steel has an embedded strategic and structural view that captive sourcing especially in India creates long-term systemic value across cycles even if the current commodity cycle can potentially be lower and longer than the last one. The company will always look for first quartile mining options in India and overseas for long-term sustenance.

Sourcing Chinese technology

Top Indian steel manufacturing firms are eyeing Chinese technology and low-cost equipment.

"We will need Chinese equipment and technology suppliers for our steel industry's growth, since China has a mature steel industry after decades of development," said a steel industry veteran.

China is now facing severe overcapacity in the steel industry, which has been hit by weak demand and continued losses.

"For Chinese steel companies facing overcapacity problems in their domestic market, it can be a good idea to invest in India," said the industry expert, adding that India's steel market is open to foreign investors.

Indian and Chinese businesses looked to enhance tie-ups, especially against the backdrop of improved relations as well as high profile visit of Chinese President Xi Jinping to India during which the country committed US$ 20 billion of investments to build two industrial parks as well as

in modernisation of railways.

Chinese equipment, stated to be cheaper compared to other countries, may have good chance to play a big part in the high cost Indian steel manufacturing expansion.

It costs about US$ 1 billion to add one million ton of capacity, and equipment accounts for 30 percent of that cost, which means India will create a market valued at US$ 66 billion for steel production equipment in the next 15 years, if one considers that India aims to produce over 300 mt by 2025.

Normally, India's steel companies buy equipment from Europe. Since many European companies are producing in China, they can purchase directly from China in the future, sources said.

Tata Steel Managing Director T V Narendran was quoted recently as saying that the company will strengthen its sourcing relationship with China in the next few years.

Narendran said about 10 percent of the company's equipment – mostly coking ovens and reheating furnaces – comes from Chinese suppliers, and Tata Steel's intention is to increase the amount to 30-40 percent in the next 3-5 years.

"To achieve that goal, we will form a team of 10 to 15 people, based in Beijing or Shanghai, to source in China," Narendran said.

In the past 20-25 years, China's infrastructure construction developed rapidly, which created huge demand for steel and brought a "golden age" for its domestic steel mills.

China can be an important partner for India in the manufacturing and infrastructure sectors, where it has rich experience and excess capacity, said an industry expert.

"China's capital and capacity offer potential co-operation opportunities for the two countries," said another source.

India is set to follow a path similar to China's in terms of industrialisation, which means growing steel demand in future years.

Developing regions, including the Middle East, Africa, South East Asia and Eastern Europe all offer potential opportunities for Chinese steel equipment investors.

Operational efficiency: The way forward

In the past, too, the Indian steel industry had faced oversupply and below-cost product prices, resulting from large new domestic capacity coming in a bunch. But, that crisis was not that severe compared to the present one.

Currently, the sector is facing a double whammy of cheap Chinese imports and a debt burden. Banks with exposure to steel have debts of around Rs 3 lakh crore weighing on their books and they, along with the steel companies, have both suffered heavy losses in the fourth quarter of 2015-16.

SAIL Chairman Prakash Singh said the loss of his company was primarily because of a fall in net sales realisation on a year-on-year basis. He said, what was particularly disturbing about the period was the industry's inability to recover production cost from sale of some steel products. The crisis is not, however, country-specific. The toxic cocktail of sluggish demand and chronic overcapacity is taking a toll on steel-makers across the globe. China alone has a capacity surplus of 300 million tons.

Seshagiri Rao, Joint Managing Director of JSW Steel, said: "Nobody in steel is making money." He quoted the Chinese Iron & Steel Association to say the industry in China is "losing $ 11 billion at the operating level for the past 11 months."

Lakshmi Mittal, who believed he had achieved invincibility by acquiring the European Arcelor at a hefty premium, with implied racial innuendos, had the mortification of seeing the 2015 net loss of the merged ArcelorMittal rising to a record $ 7.9 billion. A big net debt is also hanging around the neck of ArcelorMittal, which is sought to be lowered to less than $ 12 billion by way of new capital raising of $3 billion and sale of its $1-billion stake in automotive group Gestamp.

Since the 2008 high of Euro 60.55, ArcelorMittal shares have skidded to Euro 3.71 at present. In the process, the Mittal family, with a holding of 37.38 percent in the company, has lost an enormous amount of paper wealth.

Mittal has earlier said: "2016 will be another difficult year" for the industry. He must be finding it upsetting that ArcelorMittal's announcement of cost-cutting and focusing on high-margin products under the 'Action 2020' plan to improve core profits by $ 3 billion a year has failed to convince independent observers. This is largely due to the industry losing pricing power in an oversupply situation.

Moreover, shaving cost is a continuous programme with most makers over the world, including India. Regrettably, in the current high-import regime, producers must pass on cost savings to buyers.

The price outlook here has started improving on the back of New Delhi first introducing the safeguard duty and then the MIP on 173 steel products. The provocation of raising the tariff barrier was to give local producers protection from foreign origin steel coming in at lower prices. Rao has said, "It is unlikely that (steel) prices will move up to the MIP level unless supply-demand dynamics change with robust demand."

New capacity is constantly getting created. Tata Steel recently commissioned a 3-mt plant at Kalinganagar in Odisha. SAIL is ramping up saleable steel production from 13 mt to 20 mt.

"The industry is pinning hope on the renewed government focus on infrastructure development and making a success of its Make in India programme," said SAIL's Singh. The Budget provision of nearly Rs 1 lakh crore for road construction, development of greenfield sea ports and revival of old airports lying unused, should create good demand for steel.

Whatever it is, the near- to medium-term outlook for the metal remains grim. This is a compelling message to banks to give stern messages to defaulting steel companies to put their house in order. Steel companies need to be pushed to sell unrelated assets built injudiciously in the past, frittering away resources that should have been preserved to see them through bad times.

However, the government is constantly taking various initiatives like establishment of SRTMI, skill development initiatives and has mooted a perspective plan to boost domestic steel capacity to 300 mt per annum by 2025.

In tandem, with a strong economic outlook and plans to expand steel production, it is likely that India will be on a fast-track growth path in steel production to become the second-largest steel producer within a few years if it adopts proper operational efficiency-increasing measures.

Source: Steel Insights

Operational efficiency: Need of the hour

Around 15 years back, the Indian steel industry had faced a crisis of oversupply and below-cost product prices, resulting from large new capacity coming in a bunch. But, that scenario pales into insignificance when compared with the present state of the industry, burdened as it is with banks debts of around 3 lakh crore and heavy losses incurred in the fourth quarter of 2015-16.

What was particularly disturbing about the period was the industry's inability to recover production cost from sale of some steel products. The crisis is not, however, country-specific. The toxic cocktail of sluggish demand and chronic overcapacity is taking a toll on steel-makers across the globe.

Measures of cost-cutting and focusing on high-margin products to improve core profits has failed to improve the situation due to the industry losing pricing power in an oversupply situation.

At this juncture constant operational efficiency measures are the need of the hour. It is important to find out the different operational efficiency measures that can be adopted to cope with the

current mess in the overall economic situation.

Resource efficiency

Resource efficiency means using natural resource (raw materials, energy, water and land) responsibly and efficiently, so that more value is created with less input.

Steel's two key components are iron – one of Earth's most abundant elements – and recycled (scrap) steel. Once steel is produced it becomes a permanent resource for society – as long as it is recovered at the end of each product life cycle – because it is 100 percent recyclable without loss of quality and has a potentially endless life cycle. Its combination of strength, recyclability, availability, versatility and affordability makes steel unique.

Globally, steel is produced via two main routes: The blast furnace-basic oxygen furnace (BF-BOF) route and the electric arc furnace (EAF) route. Variations and combinations of production routes also exist.

The key difference between the routes is the type of raw materials they consume. For the BF-BOF route these are predominantly iron ore, coal, and recycled steel, while the EAF route produces steel using mainly recycled steel and electricity. Depending on the plant configuration and availability of recycled steel, other sources of metallic iron such as direct-reduced iron (DRI) or hot metal can also be used in the EAF route.

About 70 percent of steel is produced using the BF-BOF route. First, iron ores are reduced to iron, also called hot metal or pig iron. Then the iron is converted to steel in the BOF. After casting and rolling, the steel is delivered as coil, plate, sections or bars.

Steel made in through EAF uses electricity to melt recycled steel. Additives, such as alloys, are used to adjust to the desired chemical composition. Electrical energy can be supplemented with oxygen injected into the EAF. Downstream process stages, such as casting, reheating and rolling, are similar to those found in the BF-BOF route. About 29 percent of steel is produced via the EAF route.

Another steelmaking technology, the open hearth furnace (OHF), makes up about 1 percent of global steel production. The OHF process is very energy-intensive and is in decline owing to its environmental and economic disadvantages. Only four furnaces of this type are known to be in operation.

Most steel products remain in use for decades before they can be recycled. Therefore, there is not enough recycled steel to meet growing demand using the EAF steel-making method alone. Demand is met through a combined use of the BF-BOF and EAF production methods.

All of these production methods can use recycled steel scrap as an input. Most new steel contains recycled steel.

Steel recycling

Steel products naturally contribute to resource conservation through their lightweight potential, durability and recyclability. Steel is 100 percent recyclable. It can be infinitely recycled without loss of key properties, ensuring that the resources invested in its production are not lost and can be infinitely reused. Steel recycling accounts for significant raw material and energy savings.

Due to its magnetic properties, steel is easy to separate from waste streams, enabling high recovery rates.

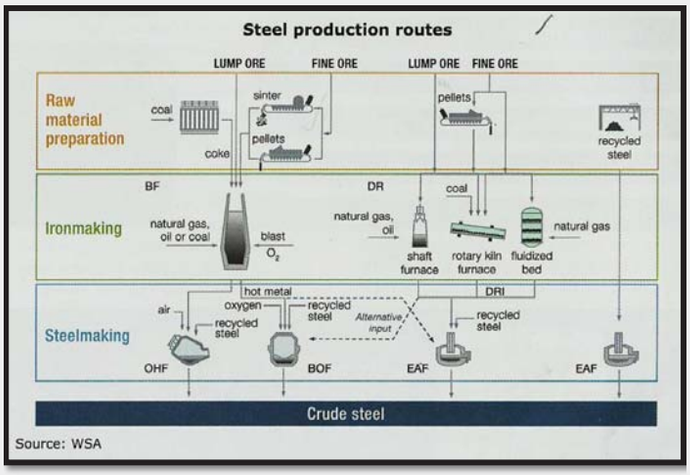
Recovery rates differ from recycling rates. For example, while about 85 percent of automobiles are recovered for recycling, nearly 100 percent of the steel in these recovered vehicles is recycled because steel's magnetic properties make it easy to separate from other materials. Over 1,400 kg of iron ore, 740 kg of coal, and 120 kg of limestone are saved for one ton of steel scrap made into new steel.

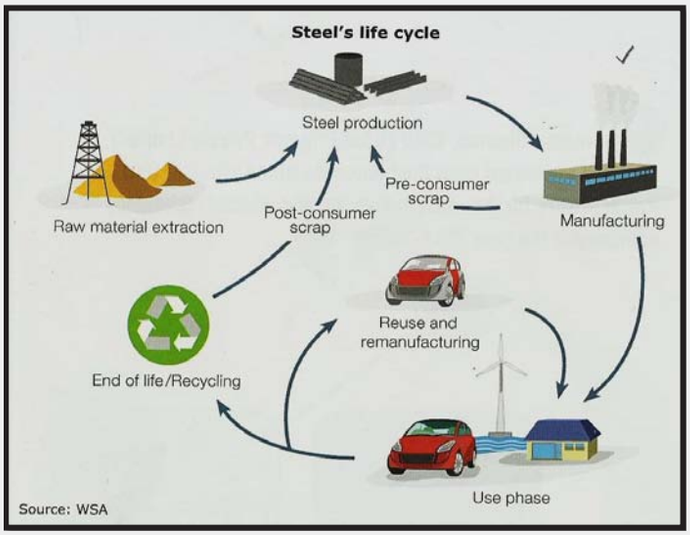
There are on-going joint activities with other metal industries, research institutes and academia to identify losses throughout the life cycle and see how they can be minimised to further improve steel recycling rates.

Steel is the most recycled industrial material in the world, with over 500 mt recycled annually, including pre- and post-consumer scrap. Over 22 billion tons of steel have been recycled worldwide since 1900 owing to steel's 100 percent recyclability.

Steel re-use

Re-use is a key aspect of sustainability. Steel reuse can be described as any process where end-of-life steel is not re-melted but rather enters a new product use phase.





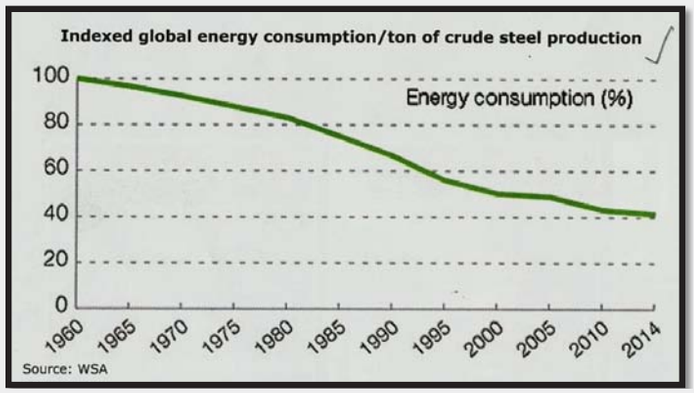
Steel's durability enables many products to be re-used. This extends the products life cycle and therefore conserves resources. Design is critical in saving resources and enhancing product re-use. Consequently, many steel companies and steel product manufacturers are increasingly designing products for re-use. Re-use is the best from of recycling as little or no additional energy is required for reprocessing.

For example:

- Steel construction components – roofing and wall elements, structural beams – are re-used and increasingly being designed for re-use.
- Steel barrels, or drums, have a typical life of six months. If they are used 10 times, however, that lifespan can be extended to 5 years.
- Automotive steel parts that are undamaged from vehicles that have reached the end of their useful lives are sold by car dismantlers as spare parts for vehicles still in use.
- Rail track is regularly re-used by swapping over the left and right rails on a track. When no longer suitable for mainline use, rails can be tested for cracks and then reused on secondary lines with lower traffic. They can also be recapped or redesigned to extend their useful life.
- Ships can be dismantled and steel parts can be re-rolled for re-use as rebar for construction. Steel shipping containers can also be re-used and converted into buildings.
- Older wind turbines in more mature markets that are replaced with newer, more powerful ones can be shipped to other locations for re-use. Re-manufacturing the used wind turbine extends the life of the wind turbine even further.

Energy efficiency

The efficient use of energy has always been one of the steel industry's key priorities. Cost is a key incentive for this, considering that energy purchases accounts for 20-40% in basic steel production. One worldsteel study estimates that steel companies have cut their energy consumption per ton of steel produced by 60 percent since 1960.



Energy use in steel-making

While existing production technologies are already very efficient, every steel company is at a different point of maturity and development. There are still potential improvements to be made through:

- Technology transfer – continued sharing and implementation of best practices.
- Optimisation of operations and controls –

including less electricity to power motor drive systems (MDSs). MDSs are needed in pumps, fans, forming and machining, handling equipment and compressors – and estimated to use 19 percent of primary energy in making steel products – including downstream manufacturing.

Material efficiency

Material efficiency has 3 major components: 1) the reduction of material inputs and waste, 2) the efficiency use of co-products and 3) recycling. The re-use of steel components from end-of-life products and light-weighting are strategies that aim to increase material efficiency.

Material efficiency makes metal management and recycling more efficient. Higher rates of material efficiency can be achieved by reducing the use of input materials and waste, reducing yield losses and by optimising product design for recycling.

Co-products use and recycling

Recovered co-products (a term used interchangeably with by products), can be recycled during the steel-making process or sold for use by other industries. Use of co-products supports the sustainability of the steel industry. It prevents landfill waste, reduces Co2 emissions and helps preserve natural resources. The sale of co-products is also economically sustainable. It generates revenues for steel producers and forms the base of a lucrative worldwide industry. Some companies report a co-products utilisation and recycling rate as high as 99 percent.

The main co-products from iron and crude steel production are slag, process gases, dusts and sludge.

More than 400 million tons of iron and steel slags are produced each year. Slags are a mixture of silica, calcium oxide, magnesium oxide and aluminium and iron oxides. During smelting, slagging agents and fluxes (mainly limestone or dolomite and silica sand) are added to the blast furnace or steel-making furnace to remove impurities from the iron ore, steel scrap and other ferrous feeds. As the slags are lighter than the liquid metal, they float and can be easily removed.

Slags are recognised as marketable products. The worldwide average recovery rate for slag varies from over 80 percent for steel-making slag to nearly 100 percent for iron-making slag. There is still much potential to increase the recovery and use of slags in many countries, especially for environmental and economic benefits. Gases from iron-making and steel-making, once cleaned, are used internally, reducing the demand for externally-produced electricity. Coke oven gas contains about 55 percent hydrogen and may prove an important hydrogen source in the future. It can be fully used within the steel-making plant, and can provide up to 40 percent of the plant's power.

The dust and sludge removed from the gases consist primarily of iron and can be used again in steel-making. Iron oxides that cannot be recycled internally can be sold to other industries for various applications, from Portland cement to electric motor cores. The EAF route may create zinc oxides that can be collected and sold as a raw material. In the BF-BOF route, cleaning the coke oven gas creates valuable raw materials for other industries, including ammonium sulphate (fertiliser), BTX (benzene, toluene and xylene – used to make plastic products), and tar and naphthalene (used to make pencil) pitch which, in turn, is used to produce electrodes for the aluminium industry, in plastics and paints).

Post-consumer steel product recovery rates by sector

Sector	Recovery rate 2007 (%)	Recovery 2050 (%)	Life cycle in years
Construction	85%	90%	40-70
Automotive	85%	90%	7-15
Machinery	90%	95%	10-20
Electrical and domestic appliances	50%	65%	4-10
Weighted global average	83%	90%	N/A

Source: Steel Insights

Make in India infrastructure push to drive steel demand: Platts

Prime Minister Narendra Modi's 'Make in India' programme, which has earmarked $87 billion worth of investment in new infrastructure and manufacturing projects over the next five years,

will benefit the country's steel and mining companies, a research report says. The initiative is likely to translate into meaningful steel demand after a gap of around 18 months, according to a report by research agency S&P Global Platts. "While the growth trajectory for India's economy and its steel sector is unarguably a positive one, patience will be required. India has routinely missed its targets and despite the efforts of the Modi government, limited access to land, approval delays and a lack of funding, all remain," Platt said in its metals special report. Yet the potential upside is enormous, Platts said, with new investments in roads, power and railways over next five years accounting for almost 60% of the total investment. The government wants to construct 10,000 km of highways in the current financial year. One positive sign is low level of resistance to reforms taken by the government in the last 32 months.

Steelmakers are already benefiting from higher road construction activity with consumption of rebar and wire rod increasing by 8.5% to 30.14 million tonne (mt) between April 2015 and February 2016, according to Joint Plant Committee data. Similarly, Railways plans to spend $128 billion on its network in the next five years, including $17.6 billion in FY17. Pace of building new railway lines is set to almost double from 7 km/day during FY17 to 13 km/day in FY18. Steel Authority of India — tipped to be one of the major beneficiaries of the rail network rollout — estimates an additional 118,000 tonnes of rail will be required during FY17 and 644,000 tonnes in total over the next three years. Other domestic steelmakers could also benefit from plans for three new railway freight corridors and double track laying, which has doubled demand for steel. Demand for steel from the Smart Cities programme is harder to quantify. A report by Confederation of Real Estate Developers' Associations of India estimated that $1.1billion have to date gone into developing the Smart Cities programme, Platts said.

Source: The Times of India

At home, Tata Steel outperformed peers

In the last 5 years, the company invested Rs 40,000 crore; further expansion in Jamshedpur in the works.

There are two sides to Tata Steel, a struggling European operation at the centre of attention since the $12-billion acquisition in 2007 and a consistently profitable Indian business that has managed to outperform not only its other half by far but also peers in the domestic market. In terms of profits, Tata Steel India has always been ahead of JSW Steel and Steel Authority of India Ltd (SAIL). The contrast got starker in financial year 2016, when the steel major recorded a net profit of Rs 4,901 crore as against a standalone loss of Rs 3,498 crore by JSW Steel and Rs 4,137 crore by SAIL. "Tata Steel India is one of the low-cost producers in the world. We have been for a while and will continue to be," said T V Narendran, managing director, Tata Steel India and South East Asia. Along with over companies has an edge over competitors by virtue of raw material linkages.

Tata Steel's coal security comes from west Bokaro division and the Jharia coalfields with estimated reserves of 287 million tonnes (mt). About 65 percent of coal requirement are, however, met through imports; iron ore needs are met by the Noamundi, Joda, Khondbond and Katamati mines. According to Narendran, raw material linkages help but the advantage is limited, given the raw material prices are low and the taxes on captive raw materials in India are high. "What drives our competitiveness is our relentless pursuit of cost efficiencies across the value chain. Today, only a few other steel companies who have a fully integrated value chain and operate in countries like Russia and Brazil and have benefitted from a weak currency over the last year or so, have a better cost position than us," he added.

Tata Steel India's stellar performance in FY16, comes at a time when competition from Chinese imports is growing at about 200 percent. Sales of 9.54 mt were the best ever for the steel major. "Domestic steel prices in India declined compared to previous quarter and the impact of the MIP (minimum import price) did not reflect in the market prices. There was strong growth across product/market segments," Narendran said.

Automotive and special products achieved highest ever sales of 1.43 mt and contributed to 15 percent of total sales; branded products and retail sales surged to 3.35 mt and contributed 35 percent. Tata Tiscon registered highest ever sales of 2.51 mt in FY16, a growth of 13 percent while retail customers increased to 3,00,000 households across India. The company is not resting on

its achievements. It is trying to consolidate its leadership position in the domestic automotive segment. The stabilisation and ramp-up process of the three-million-tonne Kalinganagar plant is currently underway. The facility will produce flat steel for high-end applications, enabling the company to expand its product portfolio in the shipbuilding, defence equipment, energy & power, oil & gas, infrastructure and aviation sectors. "In the last five years, Tata Steel has invested over Rs 40,000 crore, to increase capacity from seven mt to 13 mt in India," Narendran said. Simultaneously, the company is also working on expanding capacity at its Jamshedpur plants.

Source: Business Standard

Govt. measures taken to safeguard ailing steel industry

The Indian steel industry is currently passing through a severe downturn, according to Minister of Steel and Mines Narendra Singh Tomar. Globally, demand showdown and overcapacity have resulted in major steel producing countries like China, Japan and the Republic of Korea adopting predatory pricing strategy and dumping their products in India at prices often lower than their cost of production. Consequently, domestic producers have considerably reduced prices, thus eroding their profit margins. For reducing stress in the steel sector, RBI extended 5:25 scheme in July 2015, whereby longer amortisation period for loans to projects in infrastructure and core industries, say 25 years, based on the economic life or concession period of the project, with periodic re-financing, say every 5 years, is allowed. In order to protect the interests of country's steel industry, the government has taken the following steps:

Source: Steel Insights

Paradox of GDP growth vs steel demand

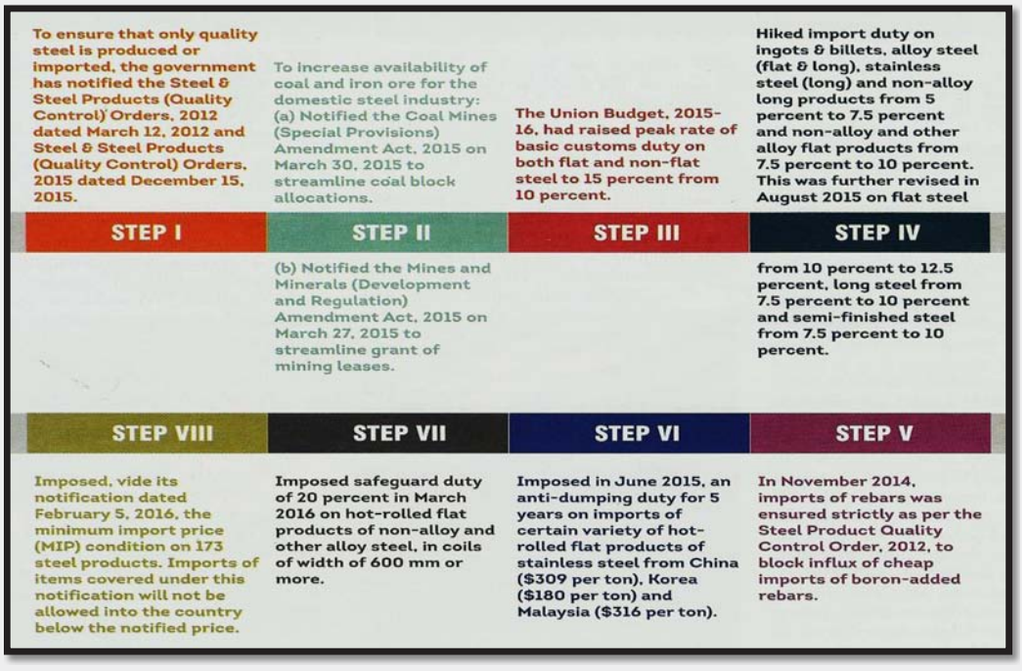
As an established thumb rule, typically, steel demand grows by 1.2 – 1.3 percent of the GDP growth. So, for example, if the GDP growth is 5 percent, it is expected that the steel demand should grow by 6 percent.

However, an analysis of the GDP growth in India and steel demand growth for the last six financial years presents a different ball game.

In 2010-11, India's GDP growth was 8.5 percent and steel demand growth was 10.6 percent. However, a closer look at the data shows that from 2011-12, steel demand growth started falling drastically and at a much faster rate than the fall in GDP growth, owing to the worldwide economic recession.

Steel demand growth reached a nadir of 0.6 percent even when GDP growth was 6.6 percent in 2013-14. In 2015-16 too, steel demand growth is lagging behind at 4.5 percent whereas GDP growth is at respectable levels of 7.6 percent.

According to industry analysts, not only GDP growth but GDP composition impacts steel consumption as



well. The stagnant share of the secondary and manufacturing sectors is what pulls down steel consumption growth in India.

There is also a widely-held perception that although the steel-GDP inter-relationship provides a long-term elasticity factor (based on the past series) that is used for projecting future demand for steel, there exists an inflection point in the GDP growth chart that explains the yearly fluctuating relationship between steel consumption and GDP growth.

If GDP growth exceeds this threshold, steel consumption growth would be higher due to higher GDP elasticity and if GDP falls below the level, steel consumption would drop down at a much higher rate.

This hypothesis owes its origin to another theory of relationship of steel consumption with growth of per capita income of a country.

Historically also it can be seen that in 1993-94, India's GDP grew by 5.7 percent, but steel consumption was a mere 1.9 percent. That year, the construction sector miserably failed at 0.6 percent which must have pulled down steel demand, considering the predominance of construction in India's economic growth in the early 90s.

India's GDP growth versus steel demand growth

Year	GDP growth %	Steel Consumption growth %	Actual Steel Consumption in million tons
2010-11	8.5	10.6	65.61
2011-12	6.5	6.8	70.91
2012-13	5.6	3.3	73.33
2013-14	6.6	0.6	73.89
2014-15	7.2	3.1	76.36
2015-16	7.6	4.5	80.45

GDP growth in 1993-94 was contributed by 7.4 percent growth in the tertiary sector. Next year being the watershed year for steel, it experienced a hefty 21.3 percent growth against 6.4 percent growth in GDP. Manufacturing went up by as high as 10.8 percent and boosted steel demand. Enhanced steel availability from emerging private sector steel plants had a positive impact on steel consumption.

It may be noted that the secondary sector went up by 9.2 percent in that particular year.

In 1996-97, the country witnessed 8 percent growth, but steel consumption went up by a meagre 4.1 percent as the construction sector grew disastrously at 1.9 percent.

In 1998-99, the GDP growth of 6.7 percent was accompanied by only 3.8 percent growth in steel consumption because manufacturing had dropped to 3.1 percent and the secondary sector to 4.1 percent.

In 2002-03, growth of GDP at 3.9 percent saw steel consumption grow by more than double the rate at 7.6 percent, pushed up by manufacturing and construction at 6.9 percent and 8.3 percent, respectively.

Top crude steel producing companies in 2015

Rank	Company	Tonnage (million tons)
1	ArcelorMittal	97.14
2	Hesteel Group	47.75
3	NSSMC	46.37
4	Posco	41.97
5	Baosteel Group	34.94
6	Shangang Group	34.21
7	Ansteel Group	32.5
8	JFE Steel Corp	29.83
9	Shoungang Group	28.55
10	Tata Steel group	26.31
11	Wuhan Steel Group	25.78
12	Shandong group	21.69
13	Hyundai Steel	20.48
14	Nucor Corporation	19.62
15	Maanshan Steel	18.82
16	Thyssenkrup	17.34
17	Gerdau	17.03
18	Tianjin Bohai Steel	16.27
19	NLMK	16.05
20	Jianlong group	15.14
21	Benxi Steel	14.99
22	Valin Group	14.87
23	China Steel Corp	14.82
24	US Steel Corp	14.52
25	EVRAZ	14.35
26	SAIL	14.34
27	IMIDRO	14.1
28	Rizhao Steel	14
29	Fangda Steel	13.21
30	JSW Steel	12.42

Source: WSA

The golden run of the economy during 2005-06 to 2010-11 witnessed manufacturing sustaining an average growth of 10.3 percent, with the construction sector growing at an average of 8.6 percent, yielding 8.8 percent average growth for the secondary sector.

In the last two years, a sharp fall in GDP was caused by a significant fall in industrial output with manufacturing turning negative and construction barely reaching the positive growth zone. An average growth of around 7 percent in the tertiary sector could not prevent the significant drop in the GDP.

Thus, projecting steel demand exclusively on the basis of long-term GDP elasticity needs to be cautiously dealt with suitable caveats and the role played by manufacturing and construction, supported by investment and positive industrial growth.

It is not advisable to determine that GDP growth rate would trigger off demand for steel, particularly in India, which has not fully followed the standard mode of economic development in the past decades.

Source: Steel Insights

Coal India annual profit rises 4%

Coal India Ltd (CIL) touched record production of 539 million tonnes (mt) in FY16. A fall in coal prices and increasing costs, however, played spoilsport. Net profit rose nearly four percent to Rs 14,274 crore for the year ended March 2016. Profit during 2014-15 was Rs 13,727 crore. Offtake was at a record high of 534 mt during 2015-16. Net sales increased five percent to Rs 75,644 crore. "Volume growth helped in reducing the overall cost per tonne and maintaining margins, despite a fall in average realisations," said CIL. Over-burden removal, a performance criterion in exposing seams for future mining, jumped 30 percent. During 2014-15, the growth was 9.9 percent. For the March quarter, net profit increased 0.2 percent to Rs 4,248 crore from Rs 4,239 crore during the corresponding period of 2014-15. Coal production increased 8.8 percent against 151.86 mt in the year-ago period.

However, CIL said its expenditure increased substantially and the price also with regard to volume came down. "As a substantial part of the total expenditure is fixed in nature and due to an increase in volume of production, the cost per tonne shows positive decline of 3.5 percent compared to the previous year," said CIL. Prices of coal fell in open market auctions and fuel supply agreements (FSAs). FSA prices declined to Rs 1,311 a tonne during FY16 against Rs 1,327 a tonne in the previous year. The e-auction price fell to Rs 1,858 a tonne against Rs 2,450 a tonne in FY15. "This, coupled with some decline in washed coal realisations, resulted in the overall price realisation reducing during the year to Rs 1,418 a tonne from Rs 1,475 a tonne in the previous year," said the company. The cost for CIL increased mostly due to corporate social responsibility expenses, ex gratia payment to employees and contractual expenses, among others. It, however, made major savings in costs from continuous reduction in manpower (by natural attrition) and softening of fuel prices like diesel.

Source: Business Standard

March off The Map

If you want to see if you can really swim, don't frustrate yourself with shallow water. "When a man has put a limit on what he will do, he has put a limit on what he can do." Life is too short to think small.

Most people could do more than they think they can, but they usually do less than they think they can. You never know what you cannot do until you try. "Moderation is a fatal thing. Nothing succeeds like excess." Everything is possible-never use the word never.

"Never tell a young person that something cannot be done. God may have been waiting for centuries for somebody ignorant enough of the impossible to do that thing." If you devalue your dreams, no one else will raise the price. You will find that great leaders are rarely "realistic" by other people's standards.

The answer to your future lies outside the confines that you have right now. "Any man who selects a goal in life which can be fully achieved has already defined his own limitations." "Be a history maker and a world shaker." Go where you have never gone before.

To believe an idea impossible is to make it so. Consider how many fantastic projects have miscarried because of small thinking or have been strangled in their birth by a cowardly imagination. I like how Marabeau responded when he heard the word "impossible": "Never let me hear that foolish word again."

"All things are possible until they are proved impossible-even the impossible may only be so as of now." Somebody is always doing what somebody else said couldn't be done. Dare to think unthinkable thoughts.

Develop an infinite capacity to ignore what others think can't be done. Don't just grow where you are planted. Bloom where you are planted and bear fruit. "There is always room at the top." No one can predict to what heights you can soar. Even you will not know until you spread your wings.

"You only become a winner if you are willing to walk over the edge." Take the lid off. Go out on a limb… that's where the fruit is! Spirella writes.

This is the Twenty-Fourth 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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16 COAL MINES TO BE ALLOTTED FOR COMMERCIAL MINING TO STATE GOVERNMENT-OWNED PSUs BY SEPT.

The Ministry of Coal expects to discover market-determined prices for coal for the first time in the country after it allots 16 coal mines to State government-owned companies for commercial mining. The allotments will be completed by September and production is expected to start in another year or two after that. Coal Secretary Anil Swarup said recently that there will be no restriction on where the coal is sold from these mines and the prices at which it is sold. "There will no restriction on pricing from our end. We hope this will lead to discovery of market determined pricing of coal for the first time in the country. Right now Coal India is determining the price. With another entity coming in, some sort of a market will be created and price discovery will happen," Swarup said adding that he expects the move to benefit small and medium enterprises. Out of the 16 mines identified for commercial coal mining by State government-owned companies, eight will be given to the host State and eight will be available for public sector companies of other States. The host States for which eight mines have been reserved are Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Telangana and West Bengal.

The 16 mines have geological reserves of 2.137 billion tonnes and are expected to add an additional 40 million tonnes of annual coal production in India. Swarup said the State government-owned companies can form joint ventures before applying for allocations, however, post allocation the entity cannot enter into any joint venture or transfer the mine. "The ownership of the entity applying for the allocation must be with the State government or State government-owned company. They can form a joint venture where they own 74 percent of the venture before applying for the allocation. However, post allocation transfer of mines will not be allowed," he said. While these 16 mines will take another year or two to come into production, Swarup said he expects the country's total coal production in the 2016-17 to be at 700 million tonnes. Out of this, 598 million tonnes are expected to come from coal India while the rest will come from the mines that were auctioned last year and Singareni Collieries Company Ltd.

No auction for now

With coal supply growing faster than the demand, Swarup said the Ministry does not plan to auction coal mines in the next 2-3 months and even commercial coal mining for the private sector will not be opened in the foreseeable future. "Right now, coal supply is growing at 9-10 percent while demand is growing at around 5 percent. The government is not opposed to commercial coal mining by private companies but right now there is no need to go ahead with it," he said.

Source: Business Line

JSW Steel to raise Rs 10,000 crore to boost capacity

JSW Steel, one of India's largest steel companies, plans to raise up to Rs 10,000 crore through foreign currency bonds to part finance its future growth plans, including having a steelmaking capacity of 40 million tonnes by 2025. It currently has an annual capacity of 18 million tonnes. The Mumbai-based company, which is also one of the bidders for buying Tata Steel Europe's UK business, said it will seek shareholders' approval at its forthcoming annual general meeting, to also raise Rs 4,000 crore through sale of shares or debentures to select institutional investors via the qualified institutional placement route. JSW Steel also intends to use part of the funds to reduce its Rs 31,171 crore debt. Once approved, JSW Steel's move to raise funds for capital expenditure will signal a revival of sentiment for Indian manufacturers, who have deferred fund-raising and capex plans due to the global slowdown. While the global steel industry is still grappling with dumping issues due to excess production by Chinese steelmakers, the Indian market is comparatively better placed. But the margins are yet to pick up for Indian mills.

Source: Hindustan Times

Copper to grow with focus on renewable energy: BHP

Renewable energy and China's economic shift toward consumer-led growth will be major catalysts for a new wave of copper demand that'll accelerate a shortage forecast to develop from 2019, according to BHP Billion Ltd., the world's largest mining company. "The real spark, though, is the demand for renewables," said Jacqui McGill, asset president for BHP's Olympic Dam copper mine, the world's fifth-largest deposit of the metal. "Regardless of where the

energy's coming from, it needs copper." Mining companies, including rival Rio Tinto Group, are racing to meet the forecast global deficit as output is constrained at existing mines on lower grades.

Source: MMR Weekly

Making aluminium semis straight from hot metal saves big energy

Aluminium is globally perceived as a 'green metal'. Not only because of its infinite recyclability but due to the way its growing application, particularly in the transport sector, and defence equipment is aiding in the reduction of carbon footprint of user industries. The silvery white metal replacing steel in vehicles at different price points has improved their fuel efficiency, cutting their carbon emissions. While all this finds favour with the green brigade, as long as bauxite mining in the upstream is done without polluting stream and river waters, Vedanta Aluminium chief executive officer Abhijit Pati says Indian producers should go a step further. And to facilitate making value-added products straight from primary hot metal received at aluminium parks adjacent to smelters. For value addition on a significant scale without going through the process of remelting ingots after moving these to distant conversion centres burning fossil fuel in the process, it is imperative to have aluminium parks. Such parks ideally large in size offering efficient infrastructure and logistics support are prospering in China and the West Asia to the benefit of small and medium converters. For these to become an integral part of an efficient "aluminium ecosystem, the government help should be available by way of cheap access to land, power and fiscal incentives to park promoters and metal converters," said Pati.

China is offering export incentives ranging from 11 to 13 percent to value-added aluminium products. This is to ensure progressive transition in exports from commodity metal to products. This is the way to capture value generated from the point of mining of bauxite through refining of intermediate product alumina to smelting of primary aluminium to making of semis. In fact, this is the reason why Pati is not enthused about India, endowed as it is with the world's fourth largest bauxite deposits and coal resources of 302 billion tonnes, building a smelter abroad and then feed it with alumina produced here. "What must not be lost sight of is maximum numbers of jobs are created at smelting and semis stages," he said.

India's demand registered growth of 10 percent in 2015 and this could further gain in momentum because of the push given to Make in India campaign, infrastructure building, including creation of smart cities and growing use of aluminium in the world's sixth largest automobile industry. The emerging demand scene makes it imperative that along with smelting capacity expansion, aluminium parks linked to smelters for transfer of hot metal are built. The central government owned National Aluminium Company (NALCO), which has a 460,000 tone smelter at Angul in Odisha, was the country's first to propose building a park in equal partnership with the state Industrial Infrastructure Development Corporation. More recently, Vedanta, which has built one of the world's largest single site smelters of 1.75 million tonne (mt) capacity, backed by a 3,600 Mw power complex, in Odisha's Jharsuguda is in discussions with the state government to build an aluminium park" on an ambitious scale that will house a large number of cables, conductors, extrusion, casting, metal powder and foundry alloy units," said Pati.

Parks of this kind offer, in industry lingo, "plug and produce" advantage meaning converters within get hot metal, electricity, water and logistics support on the tap leading to major improvements in cost efficiency. It takes about five hours for liquid aluminium to solidify. Well ahead of that, the liquid undergoes "treatment of aluminium through crucible process" and then immediately transferred to converting units in parks. No wonder coinciding with government earmarking land for building the parks, both Vedanta and Nalco are receiving investment proposals from foreign and domestic converters. An aluminium park recommends itself for economy in energy it offers to downstream converters. Ballpark figure is when aluminium products are made directly from hot metal avoiding remelting of ingots, there is energy saving of 30 percent. Moreover, as ingots are moved from a smelter to value addition centres. Vedanta says it will be ready to supply up to 15 percent of its hot metal to the proposed parks at Jharsuguda and Korba in Chhattisgarh. In China, almost 40 percent of annual aluminium production of over 31 mt is received by value adding units as hot metal. Ideally, we should build parks on the lines of Aluminium Bahrain and Sohar Aluminium.

Source: Business Standard

India to be Among Nations with Best Mining Data

Defence ministry lifts restrictions on digital data dissemination which is expected to boost pvt play.

India will soon figure among the best nations in terms of availability of data for mineral exploration, following the defence ministry's move to lift restrictions on dissemination of digital data that had discouraged private investment in the sector. The ministry has relaxed, with certain riders, restrictions imposed by it in a circular issued in 1969 that prohibited sharing of digital details for security reasons, a senior mines ministry official said. "With the defence ministry removing restrictions and the mines ministry preparing to upload about 6,000 digitised reports pertaining to mines, India will be on a par with the best in the world," the official said, requesting not to be identified. The digital map of more than 98% of the country is available on a desired scale, but it is accessible only to government agencies and has not been made public. So far, India has been able to carry out only 10% regional mineral exploration while countries such as Australia, which have similar geological endowment, have completed 100% of exploration.

The relaxation from the defence ministry will benefit the government's new mineral exploration policy under which it proposes to offer large tracts of land to private and public explorers. The policy proposes to incentivise explorers in case reserves are established and indemnify them when reserves are not found. Easy access to baseline data, geological, geochemical, geophysical and mineral exploration data in digital format is required to attract explorers, the official said. The new mineral policy proposes creation of a national geoscientific data repository by Geological Survey of India containing all baseline and mineral exploration information generated by various government agencies and mineral concession holders. The new policy aims to replace the earlier method of awarding reconnaissance permits by the government to private firms for preliminary prospecting of a mineral through regional, aerial, geophysical or geochemical surveys and geological mapping. The method failed, with only about 15 of the 401 reconnaissance permits issued during the 14-year period since 2015 converted to prospecting licences.

Meanwhile, Karnataka has issued tenders to auction 14 iron ore mines. Mines secretary Balvinder Kumar said Karnataka has through Cabinet approval amended stamp duty rules. Earlier the duty was chargeable on auction proceeds and would have run into crores of rupees. Madhya Pradesh has already put on offer four mines including one diamond mine and three limestone blocks, Rajasthan is soon likely to offer eight limestone blocks.

Source: Economic Times

Niobium: the commodity that no one knows about but everybody wants to buy

Niobium is 7 times more valuable than copper; China outbids 15 companies for rare chance to own Brazil mine.

The world's mines and steel plants got so devalued during the commodity slump that some were just given away by owners struggling to cut losses or debt. But there's at least one metal that's been attracting a lot of attention. Niobium – named for a Greek goddess who became a symbol of the tragic mourning mother – is used to produce stronger, lighter steel for industrial pipes and aircraft parts. It is mined in only three places on Earth, and the price of every kg is seven times higher than copper. China Molybdenum Co out-manoeuvred at least 15 companies recently to purchase Anglo American Plc's niobium and phosphate unit in Brazil, agreeing to pay $1.5 billion or 50 percent more than analysts expected. The buying frenzy that included Vale SA, Apollo Global Management LLC and X2 Resources showcased the growing appeal of a market that may be worth $4 billion for a soft, silvery metal many experts don't know much about.

"I didn't know what niobium was, and I had been in the minerals industry for 20 years before this opportunity came across my desk," said Craig Burton, the chairman of Cradle Resource Ltd., which is seeking to develop the $200-million Panda Hill niobium project in Tanzania. "I had to actually open up the periodic table just to double-check that it was an element. It definitely is a boutique space." Niobium is hard to find and hard to value. More than 80 percent of global supply comes from one company – Cia Brasileira de Metalurgia & Mineracao in Brazil. Metal Bulletin Ltd., which publishes prices for metals as obscure as bismuth and germanium to report one for niobium. The metal averaged about $40 a kg last

year, according to Cradle Resources, which is based in Perth, Australia.

An equivalent amount of copper on the London Metal Exchange fetched about $5.49. global demand for niobium is about 90,000 to 100,000 tonnes annually.

Market dominance

Still, prices fell last year because of the weak demand for steel, as slumping oil and gas markets led to fewer metal pipe purchases, according to Anglo American, which wants to raise cash to cut debt after a collapse in commodity prices. Almost all the metal comes from just three mines in Brazil and Canada, allowing dominant producer CBMM to match supply to demand and influence prices. Among the companies outbid by China Molybdenum were Mosaic Co., the world's largest producer of phosphate fertiliser, South32 Ltd. and Eurochem Group AG, people familiar with the process said. The sale was highly competitive, said two people involved. The winning offer exceeded the estimates of analysts at Bank of America Corp. and Investec Plc. RBC Capital Markets said the assets were among the best that London-based Anglo has offered. What makes the business so attractive is that there are only a few operating mines. Anglo and Niobec account for about 9 percent of production, and Brazil's CBMM supplies the rest, according to Argonaut Securities Pty. Both the US and Europe list niobium as a strategically important mineral.

Unique Business

"Niobium is a very unique business," said Kalidas Madhvpeddi, who heads the CMOC International unit of China Molybdenum. "We typically want to buy from people who regret selling it. We've been very carefully assembling a war chest in anticipation of a downturn in the industry." CBMM, controlled by the billionaire Moreira Salles family, has mostly dominated supply since starting operations five decades ago. It sold a 30 percent stake to a group of Asian steelmakers in two transactions valued at $3.9 billion in 2011. In another deal, Magris Resources Inc., founded by former Barrick Gold Corp. Chief Executive Officer Aaron Regent, agreed to pay $530 million for the Niobec mine in Canada in 2014. Unsuccessful bidders in Anglo's sale may turn their interest to Cradle's Panda Hill project in Tanzania, Argonaut said in a research report. Pending financing, it's expected to start producing in mid-2018. The sales "have brought a lot of participants in," Cradle's Burton said. "There was only one winner. That leaves lots of parties that might be interest in talking to us because we do need to raise some capital to bring this project on."

Source: Hindu Business Line

NMDC ties up with ISRO for mineral mapping

NMDC Ltd has teamed up with Indian Space Research Organisation (ISRO) to make use of satellite-based geological mapping capability for mineral exploration. A memorandum of understanding was signed between NMDC and ISRO's National Remote Sensing Centre here recently opening up the possibilities for NMDC to use satellite technology for mineral exploration and a host of other related ventures. NMDC becomes the first company under the Ministry of Steel to use satellite-based geological mapping. Under the memorandum, NMDC will establish a Remote Sensing and GIS Laboratory at its head office in Hyderabad for interpretation of satellite data.

Source: Hindu Business Line

Recycling helps Apple recover one tonne of gold

Apple has revealed it reclaimed almost one metric tonne of gold by recycling its own products in 2015. At current prices, that's equivalent to around £28 million worth of gold. The figure was revealed in Apple's recently-released environmental responsibility report, which details the results of the company's eco-friendly efforts in the last financial year. As well as the gold, Apple recovered three tonnes of silver (worth around £1.1 million at current prices), and over 1,300 tonnes of copper. Additionally, all of the company's data centres run on renewable energy.

Source: The Independent

Tin deficit to continue due to low supply – ITRI

The global tin market is expected to stay in deficit this year as the growth in supply is likely to have peaked, ITRI China chief representative Cui Lin said at the Shanghai Derivatives Market Forum. ITRI predicted that the global market will see a deficit of 10,900 tonnes in 2016, extending a shortage of 9,000 tonnes seen in 2015. Behind the

forecast, there are "risks" that supply could fall this year even though most mines are profitable for the time being, with those in Africa still having high operating costs.

Source: MMR Weekly

Now, private firms allowed to dig for mineral blocks

The Cabinet cleared recently a new mineral exploration policy, allowing private companies to carry out exploration for the first time. The National Mineral Exploration Policy (NMEP) will pave the way for auction of 100 prospective mineral blocks, boosting the country's mining potential. To encourage mineral exploration in the country, the mines ministry has already notified the National Mineral Exploration Trust (NMET). "The NMEP will encourage private sector investment" finance minister Arun Jaitley said after the Cabinet meeting. "There has not been adequate exploration of minerals in India. It is important to attract private investment in minerals exploration," steel and mines minister Narendra Singh Tomar said. According to the NMEP, private companies engaged in carrying out regional and detailed exploration would get a certain share in revenue (by way of royalty or premium accruing to the state government) in mining operation from the successful bidder after the e-auction of the mineral block. The revenue-sharing could be either in the form of a one-time payment of an annuity, to be paid throughout the period of mining lease with transferable rights. The selection of the private explorer is proposed to be done through a transparent process of competitive bidding through e-auction. For this, reasonable areas or blocks for regional exploration will be earmarked or identified by the government for auction.

Of India's entire obvious geological potential (OGP) area identified by the Geological Survey of India, only 10% has been explored, while mining work happens in 1.5% to 2% of the total area. The government is keen to get private firms to start exploring for more minerals, such as, diamonds and gold, where current mining is negligible, as part of Prime Minister Narendra Modi's ambition to make India a major mineral producer.

Source: Hindustan Times

SMEs backbone of manufacturing vision

Make in India is a vision to increase the share of manufacturing in the country's gross domestic product (GDP) and generate employment. It may attract Indian and foreign capital as well as technological investment across an array of 25 sectors in focus. Recognizing the natural, cultural as well as economic diversity including inherent advantages of specific regions, the Make in India initiative hopes to harness and develop relevant sectors in each state. Make in India initiative shall require a world-class infrastructure, especially of power, roads and transport. To achieve increased demand of power and commitment of our government to provide electricity on 24x7 basis, the government should focus on the power sector, especially thermal power plants to enhance their production of electricity so that electricity to the common man and the industry shall be provided at affordable rates. I believe Make in India will not only increase our GDP but also create millions of Jobs for our youth by developing world-class manufacturing set up.

Government should support SMEs on various issues which they face in form of seed capital, subsidy, reservation of certain industry in SME sector as I believe SMEs are the backbone of any manufacturing and industrial vision. Undeniably, what makes a nation a true economic powerhouse in the long run, is the quality of its manufacturing and services sectors. In this sense, the Make in India initiative is important and its success, imperative. While the above policy measures are undoubtedly in the right direction, they need to be supplemented by creation of an overall ecosystem that supports its growth and sustenance. With various important decisions on FDI by central government, today India is the most open economy of the world. Having opened its economy to the world, we hope that with the help of 'Skill India' and 'Digital India' schemes, the nation shall stand transformed into an innovation and manufacturing hub.

Source: Economic Times

The GST bill is like a cricket match that India needs to win

Imagine a nail-biting cricket match. The two Indian batsmen on the crease have to score a few runs to ensure victory. Only a few balls remain.

However, the two batsmen are competitive and don't like each other much. They don't want the other player to get the winning shot. As a result, whenever either batsman at the striker's end wants to run between the wickets, his runner doesn't co-operate and stays put. Soon, the balls run out. Guess what happens? Yes, India loses.

The above example tells you what is happening with the GST (Goods and Services Tax) bill. The two batsmen are the BJP and the Congress. At present, the BJP is in power, and the Congress is doing its best to prevent the GST Bill from being passed in the Rajya Sabha. However, when the Congress was in power, the BJP stalled Parliament. In fact, GST introduction was mooted in Parliament in 2007. Another version of the GST bill was circulated in 2011. It didn't pass, and ultimately lapsed as the Congress-led government dissolved. Now, it's the BJP's turn in power, and they have their own version of the bill. Congress and its supporters thus feel that stalling its isn't ethically wrong, it is just quid pro quo. In this internal war of the two batsmen, India is going to lose.

The GST bill is the single most important internal reforms idea on the table at the moment. It can have a huge effect on all Indians, and particularly job creation for the young generation. The sad part is this: GST as an issue is boring as hell. Hence, it gets tough to get people involved. But if people don't care, the two batsmen are going to keep fighting with each other and not let the bill pass. Hence, it is time all of us paid attention. Sometimes, what is boring is the most important.

So why is GST such a big deal? Three Indian internal policy reforms could significantly accelerate, labor reforms and GST Bills. India faltered on the first two, as the bills were seen as politically sensitive. Somehow we convinced ourselves that the Land Bill was anti-farmer (it wasn't; in fact, it encouraged companies to set up plants in the hinterland, the only way farmers' kids will get jobs). Ditto for labor reforms, which eventually increase jobs but our free market paranoia and socialist psyche stalled it as well. Sadly, farmers themselves will suffer because of this, and those in the labor market will have fewer jobs due to fewer investments.

Fortunately, the GST is not as politically sensitive. However, if we don't pass the GST, we are problem, which is a complicated indirect tax structure that makes India uncompetitive compared to China or other Asian markets. Make in India, which we all want, is currently unviable for the 'makers', both Indian and foreign, who frankly can and would rather make in other markets, or import goods.

The GST Bill replaces several taxes with one and reconfigures the taxation for the centre and the state. It brings Indian taxation in line with what is practiced in 130 countries across the world. Passing it is a monumental task. The bill requires Constitutional amendments, in over ten sections. Hence, both the Lok Sabha (where it passed) and Rajya Sabha (where it is currently stuck) have to pass it with two-thirds majority. After that, half the states have to pass it in their legislatures. It is a phenomenal exercise that requires almost all Indian state and central government entities to act as one. It isn't a BJP or Congress needs to stop stalling it. The BJP needs to forego some credit and share it with the Congress. We, the citizens, need to back it and put pressure on our lawmakers to pass it.

We risk losing jobs for an entire generation if we don't pass the GST bill soon. We have a majority government and this is as good a change as we will ever get for this reform. It is time the two batsmen get together on the field and score the runs. It doesn't matter who hits the winning shot, let's just make sure India wins!

Source: Times of India

Indian Oil to join Coal India, NTPC to revive 3 fertiliser plants

Indian Oil Corporation will join Coal India and NTPC Ltd to form a joint venture called Hindustan Urvarak and Rasayan Ltd. The new entity will revive three sick fertiliser plants at Sindri (Jharkhand), Gorakhpur (Uttar Pradesh), and Barauni (Bihar), at a total investment of around Rs 20,000 crore. Fertiliser Corporation of India Ltd will also have a small share in the venture. A senior government official said afew days back: "The government has decided that since Coal India, NTPC and Indian Oil are cash rich public sector enterprises, they will contribute equity to revive the three fertiliser plants. Initially, there was some delay on the part of Indian Oil, but now the Ministry of Petroleum and Natural Gas has conveyed that they will also be a part of the joint venture and their board will take up the matter shortly."

"We debated the idea whether to have three different joint ventures or one single venture.

Ultimately, it was decided to have one joint venture. While the overall investment will be around Rs 20,000 crore, they are looking at a debt-equity ratio of 1:3, meaning around Rs 6,000 crore will come from these entities," the official said, adding that commercial operation at these plants is expected to start by December 2020. Applications to the Ministry of Environment and Forests have also been made. The projects will be important for GAIL (India) Ltd as well. The fertiliser plants will be the anchor customers for the Phulpur-Dhamra-Haldia pipeline being built by the at a cost of over Rs 12,000 crore. The pipe-line is being built in three phases, slated for completion by December 2019.

Source: Our Bureau

EU, SCHENGEN AREA, EUROZONE, EEA, NATO

Which countries are a part of the European union that the British people have chosen to leave, and how does the EU differ from the other groupings of European countries?

EU:

The European Union (EU) is a club of 28 countries – 27 once the UK actually leaves. Seven others are "on the road to membership" – 5 (Albania, Montenegro, Serbia, Macedonia and Turkey) "candidate countries" and 2 (Bosnia and Herzegovina, and Kosovo) "potential candidates". The EU is descended from the European Economic Community (EEC), which was created in 1958 by six countries – Belgium, Germany, France, Italy,

Luxembourg and the Netherlands – with the goal of economic co-operation. The economic union rapidly spilt over to policy areas including climate, environment, health, security, justice and migration – and, in 1993, its name was changed from EEC to EU to reflect this broader scope. Within the EU, however, members have had different goals and differences over how much they want to do together. Britain has kept border checks in place and not jettisoned the pound for the Euro.

SCHENGEN:

Free movement across borders is allowed by 26 countries, which make up the so-called Schengen area. While some EU countries (such as Britain, Ireland, Romania, Bulgaria) are not part of the Schengen area, several non-EU countries are. In this group are Iceland, Liechtenstein, Norway and Switzerland.

EEA:

The Schengen area is somewhat similar to the European Economic Area (EEA). The EEA permits free trade and promotes other forms of cooperation in all 28 members of the EU, plus Iceland, Liechtenstein and Norway – but not Switzerland.

EUROZONE:

The Eurozone is made up of 19 countries whose currency is the Euro. It is confined to the EU, but not all EU or Schengen countries are part of the Eurozone. Sweden, Denmark, Poland and the Czech Republic are examples of countries that are part of the Schengen area but do not have the Euro as their currency. The UK has been a member of the EU, but not of the Eurozone of the Schengen area.

NATO:

The NATO military alliance is another important European club. It has 28 members that also includes the United States and Turkey. 6 EU states – Austria, Cyprus, Finland, Ireland, Malta and Sweden – are not members of NATO.

Source: India Express





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