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Indian Minerals Yearbook 2017

(Part- II : Metals & Alloys)

56th Edition

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**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

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5 Copper

Copper is a soft, malleable, and ductile metal with very high thermal and electrical conductivity. copper is one of the few metals that occurs in nature in directly usable metallic form (native metals) and is an important non-ferrous base metal having wide industrial applications, ranging from defence, space programme, railways, power cables, mint, telecommunication cables, etc. India is not self-sufficient in the production of copper ore. In addition to domestic production of ore and concentrates, India imports copper concentrates for its smelters. The domestic demand for copper and its alloys is met through domestic production, recycling of scrap and by imports.

Hindustan Copper Limited (HCL), a Public Sector Undertaking, is the only integrated company in the country that is involved in mining & beneficiation of ore and is engaged in smelting, refining and casting of refined copper.

Hindalco Industries Ltd and Vedanta Limited are the major copper producers in the Private Sector that mainly rely on imported copper concentrates. These companies own copper mines in other countries.

RESERVES/ RESOURCES

The total reserves/resources of copper ore as on 1.4.2015 as per NMI database based on UNFC system are estimated at 1.51 billion tonnes. Of these, 207.77 million tonnes (13.74%) fall under

'reserves category' while the balance 1.30 billion tonnes (86.25%) are 'remaining resources' category. Gradewise there are no reserves with 1.85% or more copper grade. However, 203.83 million tonnes reserves fall under 1% to below 1.85% Cu grade. Of the total ore resources 8.28 million tonnes (0.55%) comprise ore containing 1.85% Cu or more and 657.92 million tonnes (43.53%) resources fall under 1% to below 1.85% Cu grade.

The total metal content out of the total copper resources is 12.16 million tonnes of which 2.73 million tonnes constitute reserves.

Largest reserves/resources of copper ore to a tune of 813 million tonnes (53.81%) are in the state of Rajasthan followed by Jharkhand with 295 million tonnes (19.54%) and Madhya Pradesh with 283 million tonnes (18.75%). Copper reserves/resources in Andhra Pradesh, Gujarat, Haryana, Karnataka, Maharashtra, Meghalaya, Nagaland, Odisha, Sikkim, Tamil Nadu, Telangana, Uttarakhand and West Bengal accounted for remaining 7.9% of the total all India resources (Table-1).

EXPLORATION & DEVELOPMENT

The exploration & development of copper is furnished in the review on "EXPLORATION & DEVELOPMENT" in GENERAL REVIEWS.

**Table - 1: Reserves/Resources of Copper as on 1.4.2015
(By Grades/States)**

(In '000 tonnes)

Grade/State	Reserves			Remaining Resources						Total Resources			
	Proved	Probable		Feasibility (A)	Pre-feasibility	Measured	Indicated	Inferred	Reconnaissance	Total	Total Resources (B)		
		STD121	STD122									STD123	STD221
All India: Total													
Ore	162972	-	44796	44925	31090	59209	158300	232654	772912	4640	1303730	1511498	
Metal	2127.9	-	606.72	382.18	324.55	585.42	1950.87	2050.98	4100.36	29.17	9423.53	12158.15	
By Grades													
Ore with 1.85% & Above Cu	-	-	-	-	62	-	2520	2645	2186	870	8283	8283	
Ore With 1.00 % to below 1.85 % Cu	159595	-	44238	30883	28798	42311	130591	78410	143098	-	454091	657925	
Ore with (+)0.50% to below 1.00% Cu	3376	-	557	3124	2230	2103	25189	91989	525510	3620	653764	657698	
Ore with (-)0.50% Cu	-	-	-	10919	-	14795	-	59610	102118	150	187592	187592	
Metal	2127.9	-	606.72	382.18	324.55	585.42	1950.87	2050.98	4100.36	29.17	9423.53	12158.15	
By States													
Andhra Pradesh													
Ore	-	-	-	686	-	105	-	5791	1000	-	7582	7582	
Metal	-	-	-	6.88	-	1.05	-	97.45	8.32	-	113.7	113.7	
Arunachal Pradesh													
Ore	-	-	-	-	-	-	-	-	-	10	10	10	
Metal	-	-	-	-	-	-	-	-	-	0.02	0.02	0.02	
Gujarat													
Ore	-	-	-	2470	3010	1380	129	-	7131	-	14120	14120	
Metal	-	-	-	30.13	36.72	29.04	0.69	-	113.38	-	209.96	209.96	
Haryana													
Ore	-	-	-	-	2230	-	-	-	30678	-	32908	32908	
Metal	-	-	-	-	11.82	-	-	-	101.8	-	113.62	113.62	
Jharkhand													
Ore	5374	-	1940	13195	24511	3990	101168	103484	41726	-	288074	295389	
Metal	61.33	-	20.54	142.08	255.74	45.92	1183.99	1058.42	507.38	-	3193.53	3275.4	
Karnataka													
Ore	314	-	557	64	-	2445	1750	6833	22701	-	33793	34665	
Metal	3.52	-	4.19	0.49	-	16.04	22	65.77	117.49	-	221.79	229.5	
Madhya Pradesh													
Ore	141950	-	12580	17400	-	-	31560	550	79389	-	128899	283429	
Metal	1887.93	-	148.44	189.66	-	-	320.84	4.13	867.5	-	1382.13	3418.5	

(Contd.)

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Table - I: (Concl'd.)

Grade/State (A+B)	Reserves				Remaining Resources						Total Resources (B)		
	Proved	Probable		Feasibility (A)	Pre-feasibility	Measured	Indicated		Inferred	Reconnaissance			
		STD11	STD12				STD21	STD22		STD31		STD32	STD33
Maharashtra		STD121	STD122	STD221	STD222								
Ore	-	-	-	-	-	-	9399	4841	150	14390	14390	14390	14390
Metal	-	-	-	-	-	-	89.65	47.48	0.54	137.67	137.67	137.67	137.67
Meghalaya													
Ore	-	-	-	-	-	-	880	-	-	880	880	880	880
Metal	-	-	-	-	-	-	9	-	-	9.00	9.00	9.00	9.00
Nagaland													
Ore	-	-	-	-	-	-	-	2000	-	2000	2000	2000	2000
Metal	-	-	-	-	-	-	-	15.00	-	15.00	15.00	15.00	15.00
Odisha													
Ore	-	-	-	-	-	-	1420	2536	2095	6051	6051	6051	6051
Metal	-	-	-	-	-	-	21.69	21.06	20.69	63.44	63.44	63.44	63.44
Rajasthan													
Ore	15333	29718	45051	11110	228	51226	18603	102088	580541	4480	768276	813327	813327
Metal	175.12	433.55	608.67	12.94	3.29	492.46	338.66	699.24	2291.94	28.61	3867.14	4475.81	4475.81
Sikkim													
Ore	-	-	-	-	445	63	300	-	150	-	958	958	958
Metal	-	-	-	-	7.86	0.91	8.47	-	4.23	-	21.47	21.47	21.47
Tamil Nadu													
Ore	-	-	-	-	-	-	200	590	-	-	790	790	790
Metal	-	-	-	-	-	-	1.08	2.73	-	-	3.81	3.81	3.81
Telangana													
Ore	-	-	-	-	666	-	-	-	-	-	666	666	666
Metal	-	-	-	-	9.12	-	-	-	-	-	9.12	9.12	9.12
Uttarakhand													
Ore	-	-	-	-	-	-	3170	390	660	-	4220	4220	4220
Metal	-	-	-	-	-	-	53.45	1.44	5.15	-	60.04	60.04	60.04
West Bengal													
Ore	-	-	-	-	-	-	113	-	-	-	113	113	113
Metal	-	-	-	-	-	-	2.09	-	-	-	2.09	2.09	2.09

Figures rounded off.

PRODUCTION & PRICES

Copper Ore and Concentrates

The production of copper ore at 3.85 million tonnes in 2016-17 decreased by 2% as compared to that in the previous year.

The metal content in the ore produced in 2016-17 works out to 33,673 tonnes as against 34,535 tonnes in 2015-16. During the year under review, 3.83 million tonnes of ore was treated for obtaining copper concentrates as against 3.9 million tonnes in 2015-16 (Tables - 2, 3 & 4).

Production of copper concentrates at 1,34,788 tonnes in 2016-17 decreased by about 11% as compared to that in the previous year. Madhya Pradesh was the leading producer of copper concentrates, accounting for about 51% of the production during 2016-17, followed by Rajasthan with 42% and Jharkhand with 7% production. The number of reporting mines in 2015-16 were five as same as in the previous year (Tables- 5 to 6).

Grade Analysis

During the year, the average copper content in the ore produced was 0.88% Cu as same as that in the year 2015-16. All India average metal content of ore treated during 2016-17 works out to 0.87% Cu and 0.89% Cu for 2015-16. The

average copper content in the ore treated varies from State to State. It was 0.87% Cu in Jharkhand, 0.80% Cu in Madhya Pradesh and 1.01% Cu in Rajasthan. The average metal content in the concentrate produced works out to 23.74% Cu in 2016-17 as against 21.40% Cu in the previous year.

The average daily employment of labour in copper mines in 2016-17 was 2,820 as against 3,285 in the preceding year.

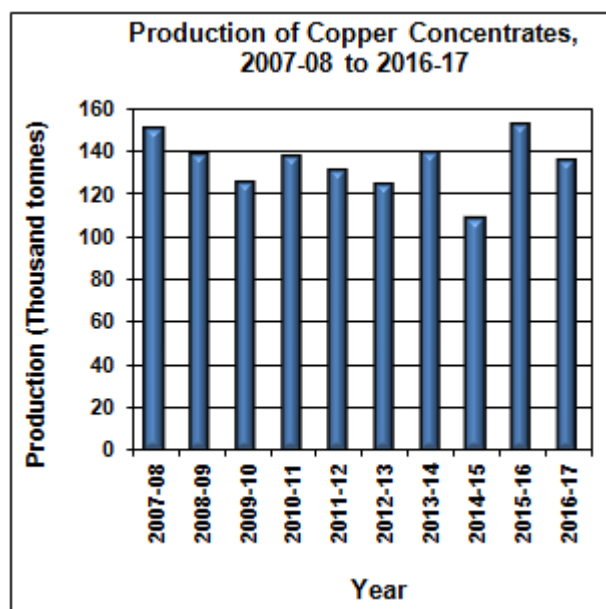
Copper Metal

Hindustan Copper Ltd produces copper metal from the ore produced at their captive mines. Sterlite Industries (India) Ltd and Hindalco Industries Ltd produce copper metal from imported copper concentrates (Table-7).

The production of copper blister decreased by 10% and copper continuous cast wire rods registered a decrease of 5% in 2016-17 as compared to the previous year. The production of copper cathodes also marginally decreased by 0.3 percent. Production of copper electrolytic wire bars was not reported for more than seven years (Tables-8 to 11). Prices of copper are furnished in the general review on 'Prices'.

Table – 2: Principal Producer of Copper Concentrates, 2016-17

Name and address of the producer	Location of mine	
	State	District
Hindustan Copper Ltd, Tamra Bhavan, 1, Ashutosh Choudhury Avenue, Kolkata – 700 019. West Bengal.	Jharkhand	Singbhum (East)
	Madhya Pradesh	Balaghat
	Rajasthan	Jhunjhunu



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**Table – 3: Production of Copper Ore, 2015-16 and 2016-17
(By States)**

(In tonnes)

State	2015-16			2016-17 (P)		
	Ore produced	Cu%	Metal content	Ore produced	Cu%	Metal content
India	3907823	0.88	34535	3846427	0.88	33673
Jharkhand	267251	0.88	2342	313856	0.87	2732
Madhya Pradesh	2536580	0.81	20546	2415330	0.81	19617
Rajasthan	1103992	1.06	11647	1117241	1.01	11324

**Table – 4: Copper Ore Treated, 2015-16 and 2016-17
(By States)**

(In tonnes)

State	2015-16			2016-17 (P)		
	Ore treated	Cu%	Metal content	Ore treated	Cu%	Metal content
India	3891715	0.89	34754	3832066	0.87	33160
Jharkhand	267145	0.88	2351	313101	0.87	2725
Madhya Pradesh	2507415	0.82	20561	2406210	0.80	19181
Rajasthan	1117155	1.06	11842	1112755	1.01	11254

**Table – 5: Production of Copper Concentrates, 2014-15 to 2016-17
(By States)**

(Quantity in tonnes; Value in ₹'000)

State	2014-15		2015-16		2016-17 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	107604	5289409	151837	6548318	134788	6403534
Jharkhand	5903	198641	8574	286142	9803	334348
Madhya Pradesh	57551	2480829	79281	3315629	68187	3023674
Rajasthan	44150	2609939	63982	2946547	56798	3045512

**Table – 6: Production of Copper Concentrates, 2015-16 and 2016-17
(By Sector/States/Districts)**

(Quantity in tonnes; Value in ₹'000)

State/District	No. of mines	2015-16		No. of mines	2016-17 (P)	
		Quantity	Value		Quantity	Value
India	5	151837	6548318	5	134788	6403534
Public Sector	5	151837	6548318	5	134788	6403534
Jharkhand	2	8574	286142	2	9803	334348
Singhbhum (East)	2	8574	286142	2	9803	334348
Madhya Pradesh	1	79281	3315629	1	68187	3023674
Balaghat	1	79281	3315629	1	68187	3023674
Rajasthan	2	63982	2946547	2	56798	3045512
Jhunjhunu	2	63982	2946547	2	56798	3045512

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Table – 7: Producers of Copper Metal, 2016-17

Name and address of the producer	Location	
	State	District
Hindustan Copper Ltd, Tamra Bhavan, 1, Ashutosh Chowdhury Avenue, Post Box No.10224, Kolkata-700 019, West Bengal.	Jharkhand	Singhbhum (East)
	Maharashtra	Raigad
Hindalco Industries Ltd, Century Bhawan, Dr. Annie Besant Road, Mumbai -400 030, Maharashtra.	Gujarat	Bharuch
Vedanta Ltd, Sesa Ghor, 20 EDC Complex, Patto, Panaji - 403 001, Goa.	Tamil Nadu	Thoothukudi
	Dadra & Nagar Haveli	Chinchpada (Silvassa)

Table – 8: Production of Copper Metal, 2014-15 to 2016-17

(In tonnes)

Year	Copper blister	Copper cathodes	Copper Electrolytic Wirebars	Copper CCWR
2014-15	16471	765568	-	337713
2015-16	16692	790372	-	389587
2016-17 (P)	14956	787657	-	371917

**Table – 9: Production of Copper (Blister), 2015-16 and 2016-17
(By State/Plant)**

(Quantity in tonnes)

State	Plant	2015-16		2016-17 (P)	
		Quantity	Value	Quantity	Value
India		16692	N.A.	14956	N.A.
Jharkhand	Surda ICC	16692	N.A.	14956	N.A.

**Table – 10: Production of Copper (CCWR), 2015-16 and 2016-17
(By States/Plants)**

(Quantity in tonnes; Value in ₹'000)

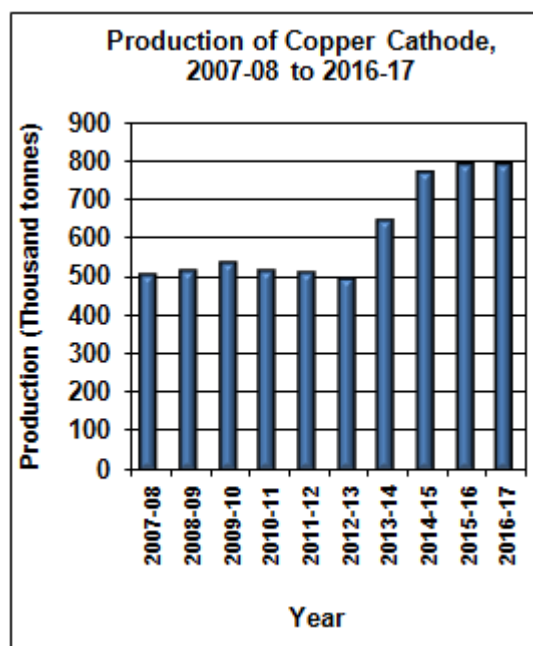
State	Plant	2015-16		2016-17 (P)	
		Quantity	Value	Quantity	Value
India		389587	135417380	371917	130233969
Gujarat	Hindalco	157514	59164704	147328	55157621
Maharashtra	HCL Taloja	21274	8087176	17059	6604148
Tamil Nadu	Vedanta Ltd	68684	22297900	71178	23499400
Dadra Nagar Haveli	Vedanta Ltd	142115	45867600	136352	44972800

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**Table – 11: Production of Copper (Cathodes), 2015-16 and 2016-17
(By States/Plants)**

(Quantity in tonnes; Value in ₹'000)

State	Plant	2015-16		2016-17 (P)	
		Quantity	Value	Quantity	Value
India		790372	265282521	787657	268895193
Gujarat	Hindalco	389301	135830439	377381	133930306
Jharkhand	Surda ICC	17026	6351282	7544	2798787
Tamil Nadu	Vedanta Ltd	201865	64792400	216119	70792800
Dadra Nagar Haveli	Vedanta Ltd	182180	58308400	186613	61373300



MINING & MILLING

HCL's mines and plants are spread across four operating units, the Indian Copper Complex (ICC) at Ghatsila in Jharkhand, the Khetri Copper Complex (KCC) at Khetrinagar in Rajasthan, Malanjkhand Copper Project (MCP) at Malanjkhand in Madhya Pradesh and Taloja Copper Project (TCP) at Taloja in Maharashtra. HCL operates three underground mines and one opencast mine, with a combined ore production capacity of about 3.5 million tonnes per year.

Malanjkhand Copper Project is the largest copper ore producing mine with 2.0 million tonnes production capacity per year. Khetri Copper Complex and Indian Copper Complex have production capacities 1.1 and 0.4 million tonnes per annum, respectively.

Hindustan Copper Ltd

Khetri Copper Complex (KCC), Khetrinagar, Jhunjhunu District, Rajasthan

The operation unit at Khetri Copper Complex (KCC) comprises two underground mines, namely, Khetri mine & Kolihan mine and one beneficiation plant. Earlier, KCC also had smelting and refining facility. But owing to economic consideration, the Company had to suspend this operation w.e.f. December 2008. Mining methods adopted in Khetri and Kolihan underground mines of HCL are sub-level open stoping and blasthole stoping. In sub-level open stoping, sub-levels are developed at vertical intervals of 20 to 25 m and a crown level is developed 15 m below upper main level. Sub-level open stoping method has two variations, namely, longitudinal stoping and transverse stoping. Longitudinal stoping is adopted where the thickness of the orebody is small to moderate. In this method, an extraction drive is developed from the main footwall drive at extraction level and a trough drive is developed in the orebody along the strike. Draw points at 9 m interval are also developed from extraction drive connecting the trough drive. A slot raise is made from the main level to top of the ore block to be extracted. Slot crosscuts are made in the sub-levels and extraction level. The slot crosscut exposes the orebody from hangwall to the footwall. Parallel holes are drilled (115 mm or 57 mm diameter depending on the orebody width) in the slot crosscut and are blasted against the pre-face of the slot raise. This provides an opening throughout the height of ore covering the entire width of the orebody. Rings of holes, drilled in the trough drive and sub-levels, are blasted against pre-face of the slot. The broken ore falls into the trough where it is loaded into the track mounted Gran-By Cars by loading equipment such as LHD and Loaders.

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In transverse stoping, the basic design remains the same. But, the development is done across the orebody and stoping advances from hangwall to the footwall. Slot drive is developed along strike.

Another mining method used is blasthole stoping method, wherein, a drill level is prepared between two main levels leaving a crown pillar of 9 to 15 m. Slot raise, slot, stope and rib pillar are drilled by Cubex 165 mm diameter machine. Trough, sill and crown pillar drilling are done by BBC120F drifter machine. Sequence of blasting remains the same as in the sub-level open stoping method.

The proposed expansion of Khetri & Kolihan mine and development of Banwas deposit will increase the ore production from existing one million tonne to 3.1 million tonnes per annum. The Engineering Procurement & Construction (EPC) agency for executing the Khetri mine expansion project had been appointed on 15.07.2011 and the work at site started from 16.9.2011. Independent waste handling system commissioned, deepening of production and service shaft had been initiated. During execution, bad ground / fault plane encountered at (-) 120 mRL near production shaft. Contract period ended on 14.1.2017. New contract for tacking bad ground for deepening of the existing shaft and other related activities are under process.

In Kolihan mine, environment clearance for shaft sinking and creation of ore handling facilities below 0 mRL has been obtained on 02.02.2015. Action for floating tender is under process. Further 2000 m of Diamond drilling work has been undertaken to establish the ore body at depth.

In the year 2016-17, the following underground mining operations as per the Annual Return were carried out in Kolihan mine. They are - Driving in ore 621 m, Cross Cutting/Footwall Drives (in barren) 739 m, Raising 186 m, Stope preparation 1567 m, etc.

In the year 2016-17, the following underground mining operations as per the Annual Return were carried out in Khetri mine. They are - Driving in ore 217 m, Cross Cutting/Footwall Drives (in barren) 650 m, Winzing 34 m, Raising 487 m, Shaft sinking 11 m, Stope preparation 1934 m, etc.

Indian Copper Complex (ICC), Ghatsila, East Singhbhum District, Jharkhand

The Indian Copper Complex (ICC) comprises mines, beneficiation plant and smelting & refining facility. India Resources Limited (IRL) of Monarch Gold Company Ltd, Australia, through its alliance with Hindustan Copper Ltd (HCL) operates the Surda Copper Mine and Mosabani Concentrator Plant. At present, IRL has a term contract with HCL which began in 2007 and is expected to be extended up to May 2017, as recommended by a committee of HCL and IRL executives for operating and maintaining Surda Copper Mine. Surda is one of the several copper deposits which has been mined since ancient time and it lies along the shear zone. The orebody of the mine has a strike length of 2.2 km and is currently at a maximum depth of 450 m. The width of the orebody varies from a few metres up to 60 m in thickness as the copper mineralisation occurs in pinches and swells. Most of the mining is done by using horizontal cut-and-fill method. The extraction of ore, i.e., cut takes place by drilling and blasting which leaves void that needs to be filled with tailings to provide for platform so that mining activity could be taken up further to the next cut up. The mine operations of Surda mine have been stopped on 08.09.2014 due to state government orders pursuant to Hon'ble Supreme Court judgement on operation of mines on deemed renewal basis. Terms of References were received from Ministry of Environment & Forests (MoEF). Public hearing for Environment Clearance was held on 15.12.2015. Final EIA report prepared and being uploaded to MoEF website. The Plan envisages increase in the depth of the mine and enhancement of production capacity from 0.4 million tonnes per annum to 0.9 million tonnes per annum. On 19-20 September 2016, Expert Appraisal Committee of Ministry of Environment, Forest and Climate Change (MoEFCC) has recommended the proposal for Environment Clearance subject to clarification regarding forest clearance for forest land involved in underground mining. Matter is under scrutiny at Forest Clearance division of MoEFCC.

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Company initiated action to re-open closed mines at Singhbhum Copper Belt of ICC namely, Kendadih and Rakha mines to produce 0.21 million tonnes and 1.5 million tonnes of ore per annum, respectively. Mine-wise status is given below:

1. Kendadih mine: The contract for reopening and allied mine development has been awarded to the successful bidder on 4.2.2012. Environmental clearance from MoEFCC obtained on 20.1.2015, Stage II FC for the project has been obtained on 28.11.2016.

2. Rakha mine: Considering the change in market scenario, the Company will implement the project through a mine developer-and-operator route. Environmental Clearance of Rakha mining lease obtained on 1.8.2014, Stage - II Forest Clearance for the project has been obtained on 15.9.2016.

3. Chapri Sideswar (Jharkhand) : Considering the change in market scenario, the Company will implement the project through a mine-developer-and operator route. Environmental clearance has been obtained on 1.8.2014, stage -II Forest Clearance obtained. Chapri-Sideswar mine fall within the Rakha and Kedadih mining lease.

Malanjkhand Copper Project (MCP), Malanjkhand, Balaghat District, Madhya Pradesh

MCP has the largest copper ore producing open-pit mechanised mine in the country with an annual capacity to produce 2 million tonnes ore along with a matching concentrator plant. Prominent deposits in MCP are Malanjkhand, Shitalpani, Gidhri Dhorli, Jatta and Garhi Dongri. Currently, this mine contributes to around 70% of HCL's copper production. The deposit is estimated at average grade of 1.31% Cu with 0.45% cut-off grade. The strike length of the deposit is 2.6 km in North-South direction with a dip of 65° to 75° degree towards the East and the average width is 70-75 m. Mining is carried out by deployment of large capacity electric rope shovels having 10 m³ bucket capacity and hydraulic excavators having 5-10 m³ bucket capacity

in combination with 60, 85 and 100 tonnes capacity dumpers. The bench height and diameter of blastholes is 12 m and 165 mm, respectively. Site Mixed Slurry explosives are used for primary blasting and Cartridge explosives are used for secondary/ pre-split blasting.

In the year 2016-17, the following opencast mining operations were carried out in the mine. They are - 1. in ore - Number of Benches 18, Average height 12 m, Depth of the deepest working from adjacent ground 240 m, and 2. in Overburden/Waste - Number of Benches 8, Average height 12 m, Depth of the deepest working from adjacent ground 240 m, etc.

The Cabinet Committee on Economic Affairs (CCEA) had approved the investment of ₹1856.74 crore for the expansion of MCP from 2 million tonnes per annum to 5 million tonnes per annum by developing an underground mine below the existing opencast mine. To improve the physical condition, the company has redesigned the Malanjkhand open pit mine in consultation with IIT Kharagpur. All the approvals are in place, Environment Clearance (EC) and clearance from National Board for Wild Life (NBWL) have been obtained in 2014-15. Sinking of north ventilation shaft and south ventilation shaft has commenced during the year. The activities are progressing to complete the project on schedule time of March 2020.

In the year 2016-17, the following underground mining operations were carried out in the mine. They are - Driving in ore 678 m, Shaft sinking 90 m, etc.

SMELTING

HCL has two smelting & refining plants at KCC and ICC with installed capacity of cathode 31,000 tonnes and 20,500 tonnes per annum, respectively. However, due to economic considerations the Company suspended KCC's smelting and refinery operation from December 2008. HCL also has one continuous casting plant of copper wire rod, namely, Taloja Copper Project (TCP) with 60,000 tonnes per annum capacity at Taloja, Maharashtra.

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Apart from HCL, two other major players dominate the Indian Copper Industry, namely, Hindalco and Sterlite Industries which are under the Private Sector. M/s Hindalco at Dahej in Gujarat and M/s Sterlite Industries in Thoothukudi in Tamil Nadu have set up port-based smelting and refining plants which depend on imported copper concentrates either from their own mines abroad or other overseas sources with annual production capacity of 500 thousand tonnes and 400 thousand tonnes, respectively. Besides, there are few small companies which produces Electrowon copper but their capacities are very low and production is inconsistent.

Jhagadia Copper Ltd (formerly SWIL Ltd) has a plant with a capacity of 50,000 tonnes per annum copper cathodes. The total installed capacity of copper smelter in the country is one million tonne per annum. Details regarding capacity of copper smelter are given in Table-12.

Besides, continuous cast wire rod plants are operated by HCL, Sterlite and Hindalco. In addition, TDT formerly Alchemist Metals Ltd, Rewari, Haryana and Finolex also have continuous cast wire rod plants that are based on imported copper cathodes.

1. Hindustan Copper Ltd

i) *Khetri Copper Complex (KCC)*

The KCC smelter is located at Khetri in Jhunjhunu district, Rajasthan having a capacity of 31,000 tpy. In addition, KCC has sulphuric acid and phosphatic fertilizer plant facilities. At present, KCC's smelter has been closed due to economic considerations since December, 2008.

ii) *Indian Copper Complex (ICC)*

ICC has the smelting & refining facility of 20,500 tonnes per annum capacity. Smelter is located at Ghatsila, East Singhbhum district, Jharkhand. In addition, the Complex consists of 8,400 tpy wire bar casting plant, 54,000 tpy

Table – 12 : Capacity of Copper Smelters

Smelter/Location	Annual Capacity (Quantity in '000 tonnes)
TOTAL	1001.5
1. Hindustan Copper Ltd	51.5
i) Khetri Copper Complex, Distt. Jhunjhunu, Rajasthan.	31
ii) Indian Copper Complex Distt. East Singhbhum, Jharkhand.	20.5
2. Sterlite Industries (India) Ltd, Thoothukudi, Tamil Nadu.	400
3. Hindalco Industries Ltd, Dahej, Distt. Bharuch, Gujarat.	500
4. Hindustan copper Ltd., (Formerly Jhagadia Copper Ltd), Distt. Bharuch, Gujarat.	50

sulphuric acid plant and a brass rolling mill. There is also a precious metal recovery plant for recovery of gold, silver, selenium, tellurium, nickel sulphate, copper sulphate, etc. A pilot plant with a capacity to produce one tonne nickel cathodes per month was also set up at ICC. The plant is currently being scaled up to a production capacity of 5 tonnes per month of nickel cathodes. Copper cathode production at ICC is less in 2014-15 as compared to previous year due to planned shutdown of Ghatsila Smelter & Refinery Plant for 75 days.

iii) *Gujarat Copper Project (GCP)/ Jhagadia Copper Ltd (formerly SWIL Ltd)*

HCL has acquired the assets of Jhagadia Copper Ltd (renamed as GCP) situated at 747, Jhagadia Industrial Estate, Bharuch, Gujarat through Asset Reconstruction Company (India) Ltd (ARCIL) during April 2015. The plant is designed to produce 50,000 tonnes LME A-grade cathode through secondary route based on Outokumpu Technology AB (formerly Bolidewen Contech AB), Sweden.

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iv) *Taloja Copper Project (TCP)*

The plant with a capacity of 60,000 tonnes per annum continuous cast wire rods (CCWR) is located at Taloja in Maharashtra. It uses the SCR 2000 system of the world renowned South Wire Co., USA. It produces rods of 8 mm, 11 mm, 12.5 mm and 16 mm diameters and meet most precise standards conforming to ASTM B 49/98 &/ or IS 12444/1988. The Plant commenced commercial production in April 1991. The installed capacity could further be increased to 80,000 tpy in the future. The unit also undertakes tolling of cathodes.

v) **New Development**

The Company has plans to set up a plant of capacity 1.0 lakh tonne per annum to manufacture copper cathode through cost effective hydro-metallurgy technology. The site of the project has been finalised and investment in the project is ₹3,025 crore. The investment proposal after approval of the Board has been sent to the Ministry of Mines to obtain CCEA approval.

The Company has awarded contract to install and commission a commercial scale plant of capacity 3.3 million tonnes per annum at Malanjkhanda at cost of ₹200 crore to extract valuable minerals and metals from copper ore tailings.

The status of Private Sector smelter plants is as follows:

2. **Sterlite Industries (India) Ltd**

The Sterlite Industries (India) Ltd having an installed smelter capacity of 4,00,000 tonnes per annum copper anodes is located at Thoothukudi in coastal Tamil Nadu. It is based on 'Isasmelt' technology using imported concentrates. The Company is investing ₹ 3,300 crore for expansion to double its copper production capacity at the plant. After expansion the plant will be Asia's largest copper manufacturing facility in a single location. Sterlite copper has two units in Silvassa in the Union Territory of Dadra & Nagar Haveli where it operates two copper Rods plants (one in Chincpada and another in Piparia). Anodes from Thoothukudi are refined at Silvassa for domestic market. Besides copper, the Company also

manufactures sulphuric acid, phosphoric acid, gold and silver as by-products.

3. **Hindalco Industries Ltd (Birla Copper)**

The Company's smelter located at Dahej, Bharuch district, Gujarat, has a capacity of 5,00,000 tpy. The smelter is based on Outokumpu technology. The cathodes produced are mostly used for production of continuous cast wire rods. In the process of extraction of copper metal, sulphuric acid, phosphoric acid, gold and silver are also recovered as by-products. The entire requirement of copper concentrates was met through imports from many countries, namely, Chile, Australia, Indonesia, Papua New Guinea, Brazil, Peru and Canada.

RECYCLING OF COPPER

Copper scrap is traded in the form of new scrap generated from copper smelters, copper workings as well as old scrap recovered from electrical motors, electronic equipment, cables, wires, utensils, etc.

Copper is one of the most recycled metal of all the metals. The recycling of copper scrap is gaining importance worldwide simply because of the fact that recovery of copper metal from scrap requires much less energy than its recovery made from primary source. Besides, it enables conservation of natural resources.

In Indian condition, however, collection of scrap is in the Unorganised Sector and there is paucity of factual data in this regard. Still, as per the licences granted by Central Pollution Control Board as on 13.5.2010, there were 35 Units operating in different States with a combined capacity of 2.42 lakh tpy for handling different types of scrap.

In addition, there are 132 Units with combined capacity of 5.17 lakh tpy which recover copper along with other metals. As per the estimates made in the recently published Market Survey on Copper by IBM, production of 1.07 lakh tpy of secondary copper was reported and all of which have been in Organised Sector, in the country.

COPPER

USES

The per capita consumption of copper in India during the year 2016 is at 0.6 kg which is very low in comparison to countries like Russia 3.3 kg, China 5.4 kg, USA 5.5 kg, Italy 8.9 kg and Germany 13.6 kg. The average per capita consumption of copper in developed nations works out to 10 kgs. India's per capita consumption is likely to be moderate and has many strides to cover so as to match that of China. Electrical/Electronic Industry is by far the largest consumer of copper, where it is used in the form of cables, winding wires as it is the best non-precious metal conductor of electricity as it encounters much less resistance and is safe for electrical distribution system from high voltage transmission cables to micro-circuits. Copper also has relatively high creep strength as compared to other commonly used materials. In Electronic Industry, semi-conductor manufacturers have launched a revolutionary 'copper chip'. By using copper for circuitry in silicon chips, microprocessors are able to operate at higher speeds using less energy. Copper heatsinks help remove heat from transistors and enable computer processors operate at peak efficiency. Copper is used in Construction Industry as plumbing, taps, valves and fittings components. In Transportation Industry, copper is used in various components. According to an estimate by ICSG, most cars contain an average of 20 kg copper and luxury & hybrid vehicles contain about 45 kg copper. Copper is extensively used in industrial machinery and equipment. It is used in a number of consumer products, such as, coinage, utensils, fixtures, etc. Large quantities of copper are consumed in making copper-based alloys, such as, brass and bronze.

CONSUMPTION

As per the estimate of ICSG, the share of Electrical and Telecommunication Industry in total consumption is 56%, followed by Transport (8%), Consumer Durables (7%), Building & Construction (7%), General Engineering goods (6%) and other industries including Process

Industries (16%). The apparent availability of copper for internal consumption in various industries have been computed on the basis of production of refined copper (cathodes) and from the imports and exports data of copper (refined). Copper is also traded in the form of alloys but have not been considered for arriving at apparent availability of copper. During 2015-16, the exports of refined copper was more than the imports, and the availability of refined copper increased from 4,35,153 tonnes in 2014-15 to 5,03,263 tonnes in 2015-16 (Table-13).

Table – 13: Apparent Availability of Copper for Domestic Consumption (Based on Production of Refined Copper, Imports and Exports)

(Quantity in tonnes)

Item	2014-15	2015-16 (P)
I) Total Production* (Cathodes)	765568	790372
II) Total Imports (copper refined)	37610	32492
III) Total Exports (copper refined)	368025	319601
IV) Apparent Availability	435153	503263

* Primary.

SUBSTITUTES

Copper is vulnerable for substitution on grounds of price, technical superiority or weight. Aluminium is used as substitute for copper in various products such as, electrical power cables, electrical equipment, automobile radiators and cooling/refrigeration tubing. Optical fiber has substituted copper in some telecommunication applications and plastics are used as substitute for copper in water pipe, plumbing, fixtures and many structural applications.

WORLD REVIEW

The world reserves of copper metal is assessed at 790 million tonnes of copper content. Chile has the largest share, accounting for about 22% of world reserves, followed by Australia (11%), Peru (10%), Mexico & USA (6% each) and China (3%) (Table-14).

The world mine production of copper increased by 3.34% at 19.15 million tonnes in 2015 as compared to 18.53 million tonnes during previous year. Chile continued to be the largest single producer of copper in 2015 with 30.1% share followed by China & Peru (8.9% each), USA (7.2%) and Australia (5%) (Table-15).

Table – 14: World Reserves of Copper (By Principal Countries)

(Quantity in '000 tonnes of copper content)

Country	Reserves
World: Total (rounded)	790000
Australia	88000
Canada	11000
Chile	170000
China	27000
Congo (Kinshasa)	20000
Indonesia	26000
Mexico	46000
Peru	81000
USA	45000
Zambia	20000
Other countries	260000

Source: Mineral Commodity Summaries, 2018.

Table – 15: World Mine Production of Copper (By Principal Countries)

(In '000 tonnes of metal content)

Country	2013	2014	2015
World: Total	18301	18534	19153
Australia	1001	966	964
Brazil	271	301	346
Canada	653	673	697
Chile	5776	5750	5764
China	1715	1777	1706
Congo, Dem.P.R.	922	1030	1039
Indonesia	509	377	577
Iran	223	217	245
Kazakhstan	454	472	474
Mexico	480	515	540
Peru	1376	1378	1701
Poland	429	421	426
Russia	725	740 ^e	740 ^e
USA	1250	1360	1380
Zambia	760	707	719
Other countries	1757	1851	1833

Source: World Mineral Production, 2011-2015.

World refined copper production was 23.05 million tonnes in the year 2015 which showed an increase of 0.6% from that of the previous year. China was the largest producer of refined copper with 7.96 million tonnes in the year 2015 (34.5% of world production) followed by Chile (11.6%), Japan (6.4%), USA (4.9%), and Russia (3.8%), etc.

The world consumption of refined copper was 22.65 million tonnes in the year 2015. China is the largest refined copper consuming country with 11.35 million tonnes (50.1% of world consumption) followed by USA (7.5%), Germany (5.4%), Japan (4.4%), and South Korea (3.1%).

International Copper Study Group (ICSG) estimated that world refined copper production would increase up to 23.6 million tonnes in 2017 and may further increase to 24.6 million tonnes in 2018. The ICSG expects world apparent demand in 2017 to remain essentially flat because China's apparent demand is expected to be flat (+0.5%). For 2017, the apparent growth in world demand is expected at around 1% with underlying Chinese Industrial demand growth expected at around 1%.

Argentina

Mine production at Argentina's only copper mine, the Alumbra Mine decreased by 40% to 61,800 tonnes in 2015 from 103,000 tonnes in previous year. Goldcorp cited higher gypsum content of ore, lower grindability of ore, and high stripping activity at the Bajo el Durazno pit as the reasons for the decrease in production.

Brazil

Copper mine production in Brazil increased significantly to 1,55,000 tonnes due to a 58% increase in copper output at the Salobo Mine (Vale S.A.) from 98,000 tonnes in 2014. Vale completed a mine and concentrator expansion project at Salobo in the first half of 2014, which doubled the mine's production capacity of copper in concentrate to 2,00,000 tonnes per annum.

Chile

The National Copper Corporation of Chile, a Chilean state-owned company, operated seven mines that produced a combined total of 1.7 million tonne of mined copper and accounted for 30% of total mined copper production in Chile. The Escondida

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Mine (BHP Billiton Ltd, 57.5%; Rio Tinto plc, 30%; consortiums of Japanese of total mined copper production in Chile. The rest of Chile's mined copper output came from 17 other mines. The Ministro Hales Mine (Codelco), which began production in 2013, ramped up production by 69% to 2,38,000 tonnes in 2015 from 1,41,000 tonnes in 2014. In its second year of production, the Sierra Gorda Mine (KGHM International Ltd, 55%; Sumitomo Metal Mining, 31.5%; Sumitomo Corp., 13.5%) increased output to 87,900 tonnes from 12,700 tonnes in 2014. These production increases were partially offset by smaller decreases in output at a number of mines. Refined copper production decreased by 2% (41,000 tonnes) to 2.69 million tonnes due to a 4% decrease in electrowon production, which was partially offset by a 3% increase in electrolytically refined copper production

China

Mined copper output in China decreased by 4% in 2015 compared with that of 2014 as mines with higher production costs reduced output after copper prices fell midway through 2015. Smelter and refined copper production, however, increased by 6% and 4%, respectively, owing to increase in smelting capacity during the previous years. In response to falling copper prices, 10 leading Chinese copper producers agreed to cut refined copper production in 2016 by 3,50,000 tonnes. The copper producers also announced that they would close high-cost and outdated operations over the next several years and proposed that the Government of China undertake programme to support the copper industry, such as purchasing surplus copper production and suspending the issuance of licenses for new copper smelters.

Indonesia

Mine production in Indonesia increased by 54% owing to increased production at PT Freeport Indonesia's mines in the Grasberg minerals district and at PT Newmont Nusa Tenggara's Batu Hijau Mine. PT-FI increased production by 16% in 2015 from that of 2014 to 3,41,000 tonnes of recoverable copper (2,95,000 tonnes in 2014 and 4,21,000 tonnes in 2013). Production was interrupted in 2014 in response to a Government-

imposed export tax. In January 2014, the Government of Indonesia announced that exports of copper concentrate would be banned beginning in January 2017 and, from that time on, copper concentrates would need to be processed into metal before being exported. It was also announced that before January 2017, a gradually increasing export duty would be applied to copper concentrate.

PT-FI agreed to develop new copper smelting capacity in Indonesia and provided a \$115 million assurance bond to go towards the development of a copper smelter. PTNNT more than tripled mined copper output to 2,24,000 tonnes in 2015 (71,000 tonnes in 2014 and 73,000 tonnes in 2013) mainly due to higher ore grades as the company accessed phase 6 ore for the first full year and higher metal recovery and throughput.

In April 2014, Finders Resources Ltd (Australia) commissioned a 3,000 tonnes per annum SX-EW demonstration plant on Wetar Island and was in the process of building a 25,000 tonnes per annum SX-EW facility. By year end 2014, Finders Resources produced 1,400 tonnes of copper at Wetar, and in 2015 it produced 1,200 tonnes. The company projected that the mine would produce 1,55,000 tonnes of cathodes over a 10.5 years mine life.

In 2015, electrolytically refined copper production at PT Smelting (Mitsubishi Materials Corp., 60.5%; PT-FI, 25%; Mitsubishi Corporation Unimetals Ltd, 9.5%; JX Nippon Mining and Metals Corp., 5%), which was Indonesia's only electrolytic refinery, decreased by 14% to 1,98,000 tonnes from 2,32,000 tonnes in 2014. Operations at PT Smelting were suspended from July to September 2015 for maintenance work and, once production restarted, output was only 80% of capacity until November so that repairs could be made to an acid plant cooling tower.

Kazakhstan

The 1,00,000 tonnes (33%) increase in refinery production was thought to be a result of increased refinery production at the Zhezkazgan refinery, although reported production data were not available for that refinery for 2015. In October 2014, Kazakhmys plc (United Kingdom) completed restructuring that included selling some of its assets in Kazakhstan, including the Zhezkazgan

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refinery to Cuprum Holding (the Netherlands). At that time, Kazakhmys changed its name to KAZ Minerals plc.

Mexico

The Buenavista Mine (Southern Copper Corp.) increased copper in concentrate output by 22% to 1,62,000 tonnes and electrowon output by 31% to 1,23,000 tonnes in 2015 and accounted for 58,000 tonnes of the 79,000 tonnes increase in total mine production in Mexico. Production increased at Buenavista as a result of a capital investment program, which added a third SX–EW plant in June 2014 and a new concentrator that began production in September 2015.

Mongolia

Oyu Tolgoi produced 2,02,000 tonnes of copper in 2015, 36% more than that in 2014 as the mine continued to ramp up production. Turquoise Hill forecast the mine's copper production to range between 1,75,000 and 1,95,000 tonnes in 2016.

Peru

The Antamina Mine (BHPBilliton, 33.75%; Glencore, 33.75%; Teck Resources Ltd, 22.5%; Mitsubishi Corp., 10%) increased copper in concentrate production by 13% to 3,91,000 tonnes in 2015 from 3,45,000 tonnes in 2014 due to higher mill throughput. Output of copper in concentrate at the Antapaccay Mine (Glencore) increased by 21% to 2,02,000 tonnes in 2015 from 1,67,000 tonnes in 2014 due to the restart of the Tintaya mill in May 2015. The Cerro Verde Mine (FCX, 53.56%; SMM Cerro Verde Netherlands B.V., 21.0%; Compania de Minas Buenaventura S.A.A., 19.58%; other shareholders, 5.86%) increased production of combined copper in concentrate and electrowon copper by 9% to 2,47,000 tonnes from 2,27,000 tonnes in 2014 due to the completion of a mine expansion project in September 2015. The Toromocho Mine (Chinalco Mining Corporation International), which was commissioned in 2013, ramped up production of copper in concentrate by 159% to 1,82,000 tonnes of copper in concentrate in 2015 compared with 70,300 tonnes in 2014.

The Constancia Mine (HudBay Minerals Inc.) began commercial production in the second quarter of 2015 and produced 1,06,000 tonnes of copper concentrate by year end. Hud Bay purchased the Constancia project in 2011, and the company projected that the mine would produce an average of 82,000 tonnes per annum of copper in concentrate over a mine life of 22 years

FOREIGN TRADE

Exports

The exports of copper from India is in various forms, such as, copper ores & concentrates, refined copper, copper & alloys, brass & bronze, scrap, cement copper, mattes and powder & flakes.

Exports of copper ores and concentrates were 22,711 tonnes in 2016-17. China was the sole exporter country.

Exports of copper ores and concentrates drastically increased by manifolds to 11,432 tonnes in 2015-16 as against only one tonne in 2014-15. China was the sole exporter country. Exports of refined copper decreased to 3,19,601 tonnes in 2015-16 from 3,68,025 tonnes in 2014-15. Export of refined copper mainly to China (67%), Malaysia (12%), Singapore (7%), and UAE (6%). Export of copper and alloys (including brass & bronze) was at 4,15,782 tonnes in 2015-16 as against 4,62,183 tonnes in 2014-15. Export of copper (scrap) were at 3,091 tonnes in 2015-16 as against 4,037 tonnes in 2014-15 (Tables-16 to 24).

Imports

The imports of copper in the country are in the form of copper ore & concentrates, refined copper, copper & alloys, brass & bronze, scrap, cement copper, mattes, blister, worked (bars, rods & plates), etc.

During the year 2016-17, imports of copper ores and concentrates were 1.14 million tonnes. Chile with a share of 33% was the leading supplier followed by Indonesia (20%), Australia (15%), Peru (13%), etc.

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During the year 2015-16, imports of copper ores and concentrates increased to 1.89 million tonnes as compared to 1.70 million tonnes in 2014-15. Chile with a share of 38.7% was the leading supplier followed by Indonesia (13.4%), Australia (10.5%), Brazil (8.3%) and Canada (7.9%). Imports of refined copper decreased in 2015-16 to 32,492 tonnes as against 37,610 tonnes in 2014-15. Japan (32%), Congo (18%), Malaysia (16%) and Chile (8%) were the main supplier of refined copper. Out of total imports in 2015-16, copper & alloys comprised 4,09,387 tonnes and copper (scrap) 58,777 tonnes. (Tables - 25 to 34).

Table – 16 : Exports of Copper Ores & Conc. 2016-17 (P)
(By Countries)

(Qty in tonnes; Values in ₹' 000)		
Country	Qty	value
India	22710	10,54323
Canada	++	-
China	22,708	10,53908
France	++	75
Germany	++	80
Iran	1	259
UK	++	-

Source: Ministry of Commerce, Export-Import Data Bank (HS code : 26030000)

Table – 17: Exports of Copper Ores & Conc. (By Countries)

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1	10	11432	712919
China	-	-	11431	712910
Finland	1	9	1	7
Netherlands	-	-	-	2
UK	++	1	-	-

Table – 18: Exports of Refined Copper (By Countries)

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	368025	149495221	319601	111740622
China	280068	114722238	213971	73875814
Malaysia	31201	12135316	38307	14400164
Singapore	6998	2558891	22496	7917257
UAE	16285	6537005	19271	6521045
ChineseTaipei/				
Taiwan	1698	644955	8631	3053794
Saudi Arabia	2009	783990	4791	1621523
Thailand	350	140393	3897	1435772
Oman	6	2655	3618	1327689
Vietnam	5447	2216529	3904	1327318
Korea, Rep. of	-	-	300	115681
Other countries	23963	9753249	415	144565

Table – 19: Exports of Copper & Alloys (Including Brass & Bronze) : Total (By Countries)

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	462183	205730340	415782	161726798
China	283827	115629118	219655	74889851
UAE	33717	23982915	31542	17012138
Malaysia	33318	13396122	39840	15032550
USA	17123	8406894	15051	9369921
Singapore	8314	3857438	23650	8952773
Saudi Arabia	6354	3615763	9094	4329165
Chinese Taipei/				
Taiwan	1802	701653	8996	3204767
Qatar	579	438887	5594	2087593
Thailand	1312	661498	5080	2058713
UK	3382	2348851	3081	2039415
Other countries	72455	32691201	54199	22749912

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**Table – 20: Exports of Copper (Scrap)
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4037	1485483	3091	985340
Germany	2064	730625	882	241284
Japan	566	209255	588	188585
UAE	72	27689	411	133217
China	167	70095	317	122160
ChineseTaipei/ Taiwan	38	13898	197	73378
Philippines	327	121767	134	45745
UK	92	34512	127	42014
Spain	344	148006	74	25739
Latvia	-	-	72	23296
Portugal	146	55371	77	20435
Other countries	221	74265	212	69487

**Table – 21: Exports of Copper & Alloys
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	419833	175408914	379489	137136897
China	283180	115317727	219031	74575742
Malaysia	31924	12677913	38729	14638505
UAE	22791	11785236	23978	9443533
Singapore	7728	3171642	22915	8112141
USA	9817	4252898	7986	4699994
ChineseTaipei/ Taiwan	1746	676970	8786	3123530
Saudi Arabia	4424	2204027	7074	2788028
Thailand	1208	597978	4920	1977696
Qatar	463	331729	5429	1972908
Oman	801	403068	4291	1632560
Other countries	55751	23989726	36350	14172260

**Table – 22: Exports of Brass & Bronze
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	37033	28447662	31917	23316754
UAE	10829	12163420	7135	7431763
USA	7303	4153260	7065	4669604
Saudi Arabia	1929	1411190	2020	1540773
UK	1764	1173209	1836	1269442
Singapore	536	667959	728	836968
Germany	1139	740245	1201	754453
Netherlands	1160	702926	1145	625498
Australia	654	328404	562	313808
Iran	484	332914	469	311553
Sweden	256	186299	381	305799
Other countries	10979	6587656	9375	5257093

**Table – 23: Exports of Brass & Bronze (Scrap)
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1228	355853	1285	287807
Malaysia	534	148988	686	157850
Germany	234	85068	190	57121
Korea, Rep. of	118	31150	197	41477
Hong Kong	98	10599	165	16051
France	32	13382	21	7273
Singapore	7	957	7	3664
UAE	25	6570	18	3625
Japan	-	-	1	435
Saudi Arabia	-	-	++	160
Australia	++	4	++	43
Other countries	180	59135	++	108

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**Table – 24: Exports of Copper
(Cement Copper Precipitated)
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	41	13	7520
Thailand	-	-	13	7520
Malta	++	41	-	-

**Table – 25 : Import of Copper Ores &
Concentrates, 2016-17 (P)
(By Countries)
(Qty in tonnes; Values in ₹' 000)**

Country	Qty	value
India	1,143,215	1,829,86972
Argentina	21,680	27,07538
Australia	176,152	238,01022
Brazil	49,733	83,90173
Canada	20,805	43,95782
Chile	376,236	611,46504
Congo, D. Rep.	9,476	28,58617
Eritrea	14,431	19,02060
Indonesia	226,271	408,34076
Lao, Pd Rep.	59,854	54,66185
Madagascar	50	1686
Mexico	9,791	25,86883
Papua New Guinea	2,714	7,83917
Peru	144,013	232,46802
Saudi Arabia	31,964	48,63230
Tanzania	44	2121
Turkey	2	376

Source: Ministry of Commerce, Export-Import Data Bank

(HS code : 26030000)

**Table – 26: Imports of Copper Ores & Concentrates
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1702247	285028249	1886199	262965392
Chile	927084	153102437	730694	105454397
Indonesia	115603	23463018	252949	41733553
Australia	157642	33691521	198170	28087129
Canada	87681	14062273	148448	20068679
Brazil	90929	14013835	155803	16930280
Peru	131856	14129783	92409	12129995
Eritrea	63789	13016312	73462	9877503
Lao, PD. Rep	24724	3813330	32792	3536507
Mexico	-	-	17774	3287729
Unspecified	-	-	127329	14779231
Other countries	102939	15735740	56369	7080389

**Table – 27: Imports of Refined Copper
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	37610	16010904	32492	12201780
Japan	2998	1312243	10253	3741835
Congo	7324	3014646	5820	2233127
Malaysia	5579	2347191	5274	1940834
Chile	6710	3036702	2500	1047330
UAE	1513	615637	2003	674863
Hong Kong	-	-	1010	488187
South Africa	1842	782140	1104	378353
Tanzania	2156	944252	1052	370113
Congo Dem. Rep.	1421	559883	562	220972
Australia	249	111136	504	187405
Other countries	7818	3287074	2410	918761

**Table – 28: Imports of Copper & Alloys
(Including Brass & Bronze) : Total
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	490190	196576602	619885	215201927
UAE	98410	39045124	103616	35718559
Zambia	34559	14216217	92613	29168207
Malaysia	38274	16597262	62469	23118170
Russia	43485	18919025	51500	18888574
China	28700	12448722	25628	10695518
Germany	24293	10210218	24852	9255582
Saudi Arabia	24854	8598667	27640	8743978
Thailand	14326	6711661	18613	7620399
Vietnam	9218	4370256	19030	7544338
UK	20644	5845625	26146	6801093
Other countries	153427	59613824	167778	57647509

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**Table – 29: Imports of Copper & Alloys
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	298967	133578287	409387	154428569
Zambia	34456	14173858	92613	29168207
UAE	67094	28352754	74221	26960949
Malaysia	29447	13620381	50031	19599606
Russia	43450	18908541	51462	18873619
China	24295	10590920	19396	8947454
Vietnam	9171	4347120	18973	7515706
Thailand	9933	5073604	14813	6277670
Japan	13794	6413153	14415	5822659
Indonesia	4274	1860972	13110	5020359
Congo P. Rep.	10905	4463276	11718	4371386
Other countries	52148	25773708	48635	21870954

**Table – 30: Imports of Copper (Scrap)
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	53848	21283695	58777	20062953
Saudi Arabia	14021	5687812	18057	6390121
UAE	16538	6603105	17634	5848600
Kuwait	1834	749376	3248	1098283
Qatar	2774	1132558	2765	992525
Thailand	2427	934945	1882	697691
South Africa	1675	538981	2034	672616
Malaysia	1462	594902	1655	563674
Germany	890	316656	1255	435975
Jordan	1055	408256	840	306152
USA	1124	379274	1110	289136
Other countries	10048	3937830	8297	2768180

**Table – 31: Imports of Brass & Bronze
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	24369	10868131	28597	10903116
Malaysia	5142	1769128	6163	1859814
China	4404	1857308	6232	1748064
Germany	2872	1650170	2703	1403098
USA	572	353855	2075	1040727
Japan	2785	1561475	1695	914233
Nepal	1915	725542	1828	625746
Korea, Rep. of	798	357300	1404	593798
Thailand	1572	589171	1562	559871
Chinese Taipei/ Taiwan	1237	498537	1409	463600
Netherlands	254	126005	639	286832
Other countries	2818	1379640	2887	1407333

**Table – 32: Imports of Brass & Bronze (Scrap)
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	113006	30846271	123124	29807289
UK	19087	5103368	22668	5395901
USA	10044	2930298	14005	3557830
Germany	12881	3442301	13787	3260318
UAE	13888	3764119	11406	2787642
Saudi Arabia	10809	2901851	9577	2351164
Malaysia	2223	612851	4620	1095076
Netherlands	2755	771296	3979	956415
Poland	4742	1248682	3363	778739
Spain	3325	891606	2802	691436
South Africa	722	199937	2478	599880
Other countries	32530	8979962	34439	8332888

**Table – 33: Imports of Copper (Cement Copper
Precipitated)
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹ 000)	Qty (t)	Value (₹ 000)
All Countries	5	3089	-	-
Thailand	5	3009	-	-
Malaysia	++	80	-	-

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**Table – 34: Imports of Copper & Alloys
(Excluding Brass & Bronze and Scrap)
(By Items)**

Item	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Items	298967	133578287	409387	154428569
Blister & Other Unrefined Copper	37337	15279121	88791	27906082
Copper & Alloys: worked (Bars, Rods, Plates, etc.)	71534	33688427	72470	31265622
Copper & Alloys: Worked, Nes	6064	4866604	6340	5322650
Copper & alloys: unwrought Excl, Brass & Bronze	1590	734872	1600	628063
Copper Mattes	21	13652	15	9811
Copper Powder & flakes	653	457788	748	471737
Copper Refined: Copper Worked	132815	57843552	187673	70001302
Electroplated Anode of Nickel	11303	4638979	19026	6582214
Master Alloys of Copper	40	44388	232	39308
Refined Copper	37610	16010904	32492	12201780

FUTURE OUTLOOK

HCL, a sole public sector company has taken up an expansion projects of its mines namely Malanjkhanda, Khetri, Kolihan, etc. as well as extraction of copper metal & other associated metals from ores and tailing also which is going to be completed by 2020. Further, increased urbanisation in India from 30% to 34% by 2020 and beyond is likely to push the demand for copper higher. Thus, copper demand in India should grow at 6% to 7% per annum over the coming two decades. It will be continuously met by a combination of improving technology, exploration of newer deposits and recycling, as

copper does not lose any of its physical and chemical properties on recycling. As per Government publication "Technology Roadmap Materials", India could be the 2nd largest copper market by 2025, with a market size of 2.7 million tonnes pegged Government of India has as the Electrical Sector growth rate at 12-15%, Transport Sector at growth rate of 45%, Air conditioning & Refining Sector at 10% growth rate and other newer sector (copper motor rotor, medical gas supply, water meters, desalination, tubing in geothermal heat pumps, solar heating system, etc.) at 15% growth rate.

