Indian Minerals Yearbook 2019

(Part- II :Metals and Alloys)

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COPPER

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GOVERNMENT OF INDIA
MINISTRY 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 (13.75%) fall under 'Reserves category' while the balance 1.30 billion tonnes (86.25%) are placed under '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 the 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 the remaining 7.9% of the total All India resources (Table-1).

EXPLORATION & DEVELOPMENT

The exploration and development details, if any, are covered in the Review on "Exploration & Development" under "General Reviews".

PRODUCTION & PRICES

Copper Ore and Concentrates

The production of copper ore at 4.13 million tonnes in 2018-19 increased by 12% as compared to that in the previous year.

The metal content in the ore produced in 2018-19 works out to 36,169 tonnes as against 33,239 tonnes in 2017-18. During the year under review, 3.99 million tonnes of ore were treated for obtaining copper concentrates as against 3.70 million tonnes in 2017-18 (Tables - 2 to 4).

Production of copper concentrates at 1,55,435 tonnes in 2018-19 increased by about 9.5% as compared to that in the previous year. Madhya Pradesh was the leading producer State of copper concentrates accounting for about 53% of the production during 2018-19, followed by Rajasthan with 42% and Jharkhand with 4 per cent. The number of reporting mines was five in both the years, i.e., 2017-18 and 2018-19 (Tables-5 & 6).

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

(In '000 tonnes)

Grade/State	Reserves				Remaining Resources								Total Resources (A+B)
	Proved STD111	Probable STD121	Probable STD122	Total (A)	Feasibility STD211	Pre-feasibility STD221	Pre-feasibility STD222	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
All India: Total													
Ore	**162972**	**-**	**44796**	**207767**	**44925**	**31090**	**59209**	**158300**	**232654**	**772912**	**4640**	**1303730**	**1511498**
Metal	**2127.9**	**-**	**606.72**	**2734.62**	**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	203834	30883	28798	42311	130591	78410	143098	-	454091	657925
Ore with (+)0.50% to below 1.00% Cu	3376	-	557	3934	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	2734.62	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	7314	13195	24511	3990	101168	103484	41726	-	288074	295389
Metal	61.33	-	20.54	81.87	142.08	255.74	45.92	1183.99	1058.42	507.38	-	3193.53	3275.4
Karnataka													
Ore	314	-	557	872	64	-	2445	1750	6833	22701	-	33793	34665
Metal	3.52	-	4.19	7.71	0.49	-	16.04	22	65.77	117.49	-	221.79	229.5
Madhya Pradesh													
Ore	141950	-	12580	154530	17400	-	-	31560	550	79389	-	128899	283429
Metal	1887.93	-	148.44	2036.37	189.66	-	-	320.84	4.13	867.5	-	1382.13	3418.5

(Contd)

Table - 1: (Concld)

Grade/State	Reserves				Remaining Resources								Total Resources (A+B)
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
		STD121	STD122			STD221	STD222						
Maharashtra													
Ore	-	-	-	-	-	-	-	-	9399	4841	150	14390	14390
Metal	-	-	-	-	-	-	-	-	89.65	47.48	0.54	137.67	137.67
Meghalaya													
Ore	-	-	-	-	-	-	-	-	880	-	-	880	880
Metal	-	-	-	-	-	-	-	-	9	-	-	9.00	9.00
Nagaland													
Ore	-	-	-	-	-	-	-	-	-	2000	-	2000	2000
Metal	-	-	-	-	-	-	-	-	-	15.00	-	15.00	15.00
Odisha													
Ore	-	-	-	-	-	-	-	1420	2536	2095	-	6051	6051
Metal	-	-	-	-	-	-	-	21.69	21.06	20.69	-	63.44	63.44
Rajasthan													
Ore	15333	-	29718	45051	11110	228	51226	18603	102088	580541	4480	768276	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
Sikkim													
Ore	-	-	-	-	-	445	63	300	-	150	-	958	958
Metal	-	-	-	-	-	7.86	0.91	8.47	-	4.23	-	21.47	21.47
Tamil Nadu													
Ore	-	-	-	-	-	-	-	200	590	-	-	790	790
Metal	-	-	-	-	-	-	-	1.08	2.73	-	-	3.81	3.81
Telangana													
Ore	-	-	-	-	-	666	-	-	-	-	-	666	666
Metal	-	-	-	-	-	9.12	-	-	-	-	-	9.12	9.12
Uttarakhand													
Ore	-	-	-	-	-	-	-	3170	390	660	-	4220	4220
Metal	-	-	-	-	-	-	-	53.45	1.44	5.15	-	60.04	60.04
West Bengal													
Ore	-	-	-	-	-	-	-	-	113	-	-	113	113
Metal	-	-	-	-	-	-	-	-	2.09	-	-	2.09	2.09

Figures rounded off

Grade Analysis

During the year 2018-19, the average copper content in the ore produced was 0.87% Cu as against 0.90% in the previous year. All India average metal content of ore treated during the year works out to 0.89% Cu and 0.91% Cu for 2018-19 and 2017-18 respectively. The copper content in the ore treated varies from State to State. It was 0.79% Cu in Jharkhand, 0.86% Cu in Madhya Pradesh and 0.96% Cu in Rajasthan. The average metal content in the concentrate produced works out to 21.70% Cu in 2018-19 as against 22.22% Cu in the previous year.

The average daily employment of labour in copper mines in 2018-19 was 3,454 as against 2,442 in the preceding year.

Copper Metal

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

The production of copper blister decreased by 9% and copper continuous cast wire rods registered a decrease of 7% in 2018-19 as compared to the previous year. The production of copper cathodes decreased by 45%. 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, 2018-19

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	Singhbhum (East)
	Madhya Pradesh	Balaghat
	Rajasthan	Jhunjhunu

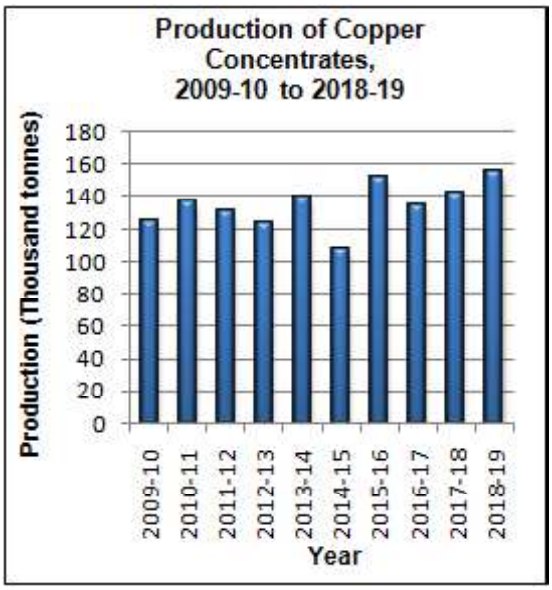


Table – 3: Production of Copper Ore, 2017-18 and 2018-19 (By States)

(In tonnes)

State	2017-18			2018-19 (P)		
	Ore produced	Cu%	Metal content	Ore produced	Cu%	Metal content
India	**3678002**	**0.90**	**33239**	**4134745**	**0.87**	**36169**
Jharkhand	178700	0.84	1500	243020	0.79	1929
Madhya Pradesh	2339035	0.88	20545	2542159	0.84	21310
Rajasthan	1160267	0.96	11194	1349566	0.96	12930

Table – 4: Copper Ore Treated, 2017-18 and 2018-19 (By States)

(In tonnes)

State	2017-18			2018-19 (P)		
	Ore treated	Cu%	Metal content	Ore treated	Cu%	Metal content
India	**3697916**	**0.91**	**33534**	**3985119**	**0.89**	**35426**
Jharkhand	167006	0.85	1420	233244	0.79	1851
Madhya Pradesh	2372110	0.88	20875	2442975	0.86	21018
Rajasthan	1158800	0.97	11240	1308900	0.96	12557

Table – 5: Production of Copper Concentrates, 2016-17 to 2018-19 (By States)

(Quantity in tonnes; Value in ₹'000)

State	2016-17		2017-18		2018-19 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	**134787**	**6506133**	**141989**	**7706611**	**155435**	**9395243**
Jharkhand	9802	332320	5072	173106	6595	529620
Madhya Pradesh	68187	3128301	75605	3486098	82945	4549382
Rajasthan	56798	3045512	61312	4047407	65895	4316241

Table – 6: Production of Copper Concentrates, 2017-18 and 2018-19 (By Sector/States/Districts)

(Quantity in tonnes; Value in ₹'000)

State/District	2017-18			2018-19 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	**5**	**141989**	**7706611**	**5**	**155435**	**9395243**
Public Sector	5	141989	7706611	5	155435	9395243
Jharkhand	**2**	**5072**	**173106**	**2**	**6595**	**529620**
Singhbhum (East)	2	5072	173106	2	6595	529620
Madhya Pradesh	**1**	**75605**	**3486098**	**1**	**82945**	**4549382**
Balaghat	1	75605	3486098	1	82945	4549382
Rajasthan	**2**	**61312**	**4047407**	**2**	**65895**	**4316241**
Jhunjhunu	2	61312	4047407	2	65895	4316241

Table – 7: Producers of Copper Metal, 2018-19

Name and address of the producer	Location	
	State	District
Hindustan Copper Ltd, Tamra Bhavan, II,Ashutosh Chowdhury Avenue, Post Box No.10224, Kolkata-700 019, West Bengal.	Jharkhand Maharashtra	Singhbhum (East) 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 Dadra & Nagar Haveli	Thoothukudi Chinchpada (Silvassa)

Table – 8: Production of Copper Metal, 2016-17 to 2018-19

(In tonnes)

Year	Copper blister	Copper cathodes	Copper Electrolytic Wirebars	Copper CCWR
2016-17	14956	787657	-	371917
2017-18	14611	830524	-	380489
2018-19 (P)	13293	454337	-	354146

Table – 9: Production of Copper (Blister), 2017-18 and 2018-19 (By State/Plant)

(Quantity in tonnes; Value in ₹'000)

State	Plant	2017-18		2018-19 (P)	
		Quantity	Value	Quantity	Value
India		**14611**	**N.A.**	**13293**	**N.A.**
Jharkhand	Surda ICC	14611	N.A.	13293	N.A.

Table – 10: Production of Copper (CCWR), 2017-18 and 2018-19 (By States/Plants)

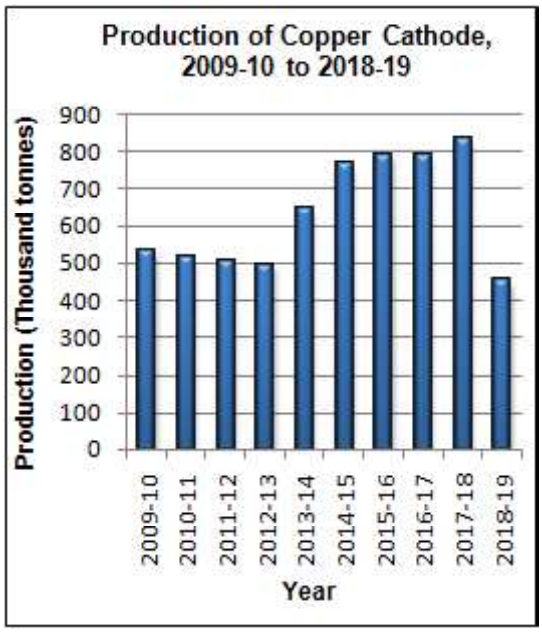
(Quantity in tonnes; Value in ₹'000)

State	Plant	2017-18		2018-19 (P)	
		Quantity	Value	Quantity	Value
India		**380489**	**160838279**	**354146**	**165324812**
Gujarat	Hindalco	155720	68686752	228894	107543400
Maharashtra	HCL Taloja	22233	10050727	14059	6662412
Tamil Nadu	Vedanta Ltd	67205	27176700	2279	1057600
Dadra & Nagar Haveli	Vedanta Ltd	135331	54924100	108914	50061400

Table – 11: Production of Copper (Cathodes), 2017-18 and 2018-19
(By States/Plants)

(Quantity in tonnes; Value in ₹'000)

State	Plant	2017-18 (R)		2018-19 (P)	
		Quantity	Value	Quantity	Value
India		**830524**	**342132570**	**454337**	**207019308**
Gujarat	Hindalco	413808	173741540	351041	160060400
Jharkhand	Surda ICC	13280	6059130	13782	6441908
Tamil Nadu	Vedanta Ltd	217020	87126300	2870	1305200
Dadra & Nagar Haveli	Vedanta Ltd	186416	75205600	86644	39211800



MINING & MILLING

HCL's mines and plants are spread across five 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, Taloja Copper Project (TCP) at Taloja in Maharashtra and Gujarat Copper Project (GCP) at Jhagadia in Gujarat. HCL operates four 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.

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 drifter machine. Sequence of blasting remains the same as in the sub-level open stoping method.

The proposed expansion of Khetri and Kolihan mine and development of Banwas deposit will increase ore production from existing 1.1 to 5.0 million tonnes per annum in two phases. Mine wise status is given below:

At Kolihan mine, additional shaft sinking & creation of ore handling facilities below 0 mRL have commenced; and environmental clearance was obtained on 2.2.2015. Further, 1,650 m of Diamond drilling work was undertaken to establish the ore body at depth and 959.6 m drilling has been completed. Further drilling is in progress.

At Khetri mine, the Engineering Procurement & Construction agency for executing the Khetri mine expansion project had started the work on 16.9.2011. Independent waste handling system was commissioned and deepening of production and service shaft had been initiated. During execution bad ground/fault plane was encountered at (-)120mRL near production shaft and other related activities are under process.

At Banwas Mine, mine construction work got completed in February, 2017. The Company has appointed M/s SMS Nagpur mine developer and operation agency for long-term operation of the Banwas mine. Production has reportedly commenced.

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

The Indian Copper Complex (ICC) comprises mines, beneficiation plant and smelting & refining facility. 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 Plan envisages increase in the depth of the mine and enhancement of production capacity from 0.4 million tonnes per annum to 1.0 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 & Department of Mines & Geology, Government of Jharkhand.

The 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 2.5 million tonnes of ore per annum, respectively. Mine-wise status is given below:

Kendadih mine was re-opened in December, 2017 after all the mining equipping work including mine dewatering work was completed. Mine development work is in progress. Equipment are mobilised in a phased manner and mine has produced 21,641 MT of ore during this financial year which has also been treated in Mosaboni Concentrator Plant.

At Rakha mine, considering the change in market scenario, the Company will implement the project through a EPC route. Environmental Clearance of Rakha mining lease was obtained on 1.8.2014 and Stage-II Forest Clearance for the project has been obtained on 15.9.2016. Mine dewatering arrangement & work schedules have been prepared and dewatering will be taken up on start of Chapri mine immediately.

Chapri-Sideshwar mine falls within the Rakha and Kedadih mining lease area. All mine plans and schedules were updated and tender for opening of Chapri mine has been initiated and Price Bid has been opened on 08.03.2019. Tender is under finalisation on EPC route.

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 64% 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 65^0 to 75^0 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 m^3 bucket capacity and hydraulic excavators having 5-10 m^3 bucket capacity in combination with 60, 85 and 100 tonnes capacity dumpers. The bench height and diameter of blastholes are 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.

At Malanjkhand Copper Project, work is under progress to expand the production capacity of Malanjkhand mine from present 2 million tonnes per annum to 5 million tonnes per annum (2^{nd} phase to 8 million tonnes per annum by FY 23-24) by developing an underground mine below the existing open-cast mine at an estimated cost of `1,856.74 crore (up to ` 2,900 crore in 2^{nd} phase). All the approval are in place, Environment Clearance and approval of National Board for Wild Life have been obtained in 2014-15 and EPC contractor for implementation of the project has been appointed. Scheduled Completion date is April, 2020. Sinking of Service Shaft (665.5 M) and Production Shaft (693.6 M) have been completed during May, 2018 and October, 2018 respectively. The development work of North Decline and South Decline is up to 2,461 m and 1,580 m respectively. The progress of underground development during the FY 2018-19 was satisfactory. Action has been initiated to commence production from the FY 2019-20.

Extraction of Minerals from Copper Ore Tails (MP):

The Company is in advance stage of erection of Copper Ore Tailing (COT) recovery facility of capacity 3.3 million tonnes per annum to recover the valuable metals and minerals from the tailing and reduce the mass in the existing tailing storage facility (TSF) so as to extend active life of TSF and unlock the value in the waste / Tailing at Malanjkhand Copper Project (MCP). The project besides generating additional revenue to the Company will also help to mitigate the risk to the environment. It is expected that the plant will be commissioned during the FY 2019-20.

SMELTING

HCL has two primary 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 has one secondary copper smelter in Bharuch district, Gujarat and is capable of producing 50,000 tonnes per annum of copper cathode conforming to LME-A grade. 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.

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 a few small companies which produce Electrowon copper but their capacities are very low and production is inconsistent.

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. Company-wise details of copper smelters and refineries are given below:

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 tonnes refined copper per annum. In addition, KCC has sulphuric acid and phosphatic fertilizer plant facilities. KCC's smelter has been closed due to economic considerations since December, 2008.

Operations of Khetri concentrator plant during the year was affected due to acute water shortage. Action to ensure supply of water from Kumbharam project of Government of Rajasthan has been taken in addition to ensuring intake of water from extra bore well.

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 tonnes per annum wire bar casting plant, 54,000 tonnes per annum 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. In 2018-19, copper cathode production at ICC was 13,782 tonnes. Cathode production during 2018-19 was less compared to last year due to shut-down of smelter plant at Indian Copper Complex (ICC), Ghatsila during the period from 3.5.2018 to 29.6.2018 for major overhauling of the plant. Plant at Gujarat Copper Project (GCP) to produce copper cathode through secondary route could not be operated at desired capacity due to non-availability of raw material of desired price.

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 Bolidewn Contech AB), Sweden.

Gujarat Copper Project of the Company consists of three units, namely, Anode Furnace (Smelter), Refinery and Kaldo Furnace valuing `27,214.50 lakh as on March 31,2019. The Anode Furnace and Refinery unit has been commissioned in October 2016 while Kaldo unit is yet to be commissioned. Since commissioning, the Anode Furnace and Refinery units are being operated at a sub-optimal level for want of feedstock. GCP being a secondary smelter, the feedstock are copper scrap, copper blister, liberator cathode etc. The Company has not been able to source these materials in the required quantity resulting in suboptimal operations.

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, 16 mm and 19.6 mm diameters and meets most precise standards conforming to ASTM B 49/2010 &/ or IS 12444/1988. The plant commenced commercial production in April 1991. The installed capacity could further be increased to 80,000 tonnes per annum in the future. The unit also undertakes tolling of cathodes.

v) Joint Venture with Chhattisgarh Copper Limited (CCL)

CCL was established on 21.05.2018 as a Joint Venture Company between Hindustan Copper Ltd and Chhattisgarh Mineral Development Corporation Ltd for exploration, mining and beneficiation of copper and its CCMDC associated minerals in the State of Chhattisgarh. The shareholding of HCL and CMDC is in the ratio of 74:26. CCL is a subsidiary company of HCL. After incorporation and examining the geological information available, the company has identified two blocks, i.e. Bodal Block (21.7559 km) and Hiddar Block (about 28 sq km located at

District Rajnandgaon.The Company has submitted application for area reservation for above blocks in the month of July, 2018 to the Ministry of Mines & Govt. of Chhattisgarh.

vi) New Development

The Company has plans to set up a plant of capacity 1.0 lakh tonnes per annum to manufacture copper cathode through cost-effective hydrometallurgy 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 proposal is under scrutiny of the Ministry.

The Company is in advance stage of erection of Copper Ore Tailing (COT) recovery facility of capacity 3.3 million tonnes per annum to recover the valuable metals and minerals from the tailing and reduce the mass in the existing tailing storage facility (TSF) so as to extend active life of TSF and unlock the value in the waste/Tailing at Malajkhand Copper Project(MCP). A contract has been awarded for the construction of the plant on EPC mode at a cost of ` 200 crore. It was expected that the plant would be commissioned by June, 2018.

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 Chinchpada 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. Sterlite Copper Plant at Thoothukudi has been closed since May, 2018 on State Govt. order.

Table – 12 : Capacity of Copper Smelters

(Quantity in '000 tonnes)

Smelter/Location	Annual Capacity
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

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, Canada, Saudi Arabia, Mexico, etc.

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 metals 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 13.05.2010, there were 35 units operating in different states with a combined capacity of 2.42 lakh per annum for handling different types of scrap.

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

USES

The per capita consumption of copper in India during the year 2017 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 nation works out to be 10 kg. 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 speeds using less energy, and 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 has 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 has not been considered for arriving at apparent availability of copper. During 2018-19, the imports of refined copper were more than the exports. The availability of refined copper increased from 4,96,213 tonnes in 2017-18 to 4,98,710 tonnes in 2018-19 (Table-13).

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

(Quantity in tonnes)

Item	2017-18	2018-19 (P)
I) Total Production* (Cathodes)	830524	454337
II) Total Imports (copper refined)	44244	92290
III) Total Exports (copper refined)	378555	47917
IV) Apparent Availability	496213	498710

* *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 fibre 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 are assessed at 870 million tonnes of copper content. Chile has the largest share, accounting for about 23% of world reserves, followed by Australia & Peru (10% each), Russia (7%), Mexico & USA (6% each) and Indonesia & China (3% each) (Table-14).

The world mine production of copper increased slightly by 2% at 20.6 million tonnes of metal content in 2018 as compared to 20.2 million tonnes of metal content during previous year. Chile continued to be the largest single producer of copper in 2018 with 28% share followed by Peru (12%), China (8%) and USA & Congo, Dem. R (6% each) (Table-15).

As per BGS world refined copper production was 23.9 million tonnes in the year 2018 which showed an increase of 0.4% from that of the previous year. China was the largest producer of refined copper with 9 million tonnes in the year 2018 (38% of world production) followed by Chile (10%), Japan (7%) and USA & Russia (4% each), etc.

The world consumption of refined copper was 23.3 million tonnes in the year 2017. China is the largest refined copper consuming country with 11.8 million tonnes (51% of world consumption) followed by USA (8%), Germany (5%), Japan (4%) and Republic of Korea (3%).

International Copper Study Group (ICSG) estimated that world refined copper production would increase up to 24.8 million tonnes in 2019 and may further increase to 26.2 million tonnes in 2020. The ICSG expects world apparent demand to increase by 2% in 2019 and 1.5% in 2020. Sustained growth in copper demand to continue because copper is essential to economic activity and even more so to the modern technological society. Infrastructure development in major countries, such as, China and India and the global trend towards cleaner energy will continue to support copper demand.

Generalised view of the development in various countries is presented below with information on countrywise description sourced from latest

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

(Quantity in '000 tonnes of copper content)

Country	Reserves
World: Total (rounded off)	**870000**
Australia[(a)]	87000
Chile	200000
China	26000
Congo (Kinshasa)	19000
Indonesia	28000
Kazakhstan	20,000
Mexico	53000
Peru	87000
Russia	61000
USA	51000
Zambia	19000
Other countries	220000

Source: *USGS, Mineral Commodity Summaries, 2020, (a): For Australia, Joint Ore Reserves Committee Compliant reserves were about 23 million tonnes.*

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

(In tonnes of metal content)

Country	2016	2017	2018
World Total	**2060000**	**20200000**	**20600000**
Chile	5552600	5503500	5831600
Peru	2353859	2445585	2436951
China	1900188	1706400	1591000
USA	1461900	1290000	1250000
Congo, Dem.R.	1023687	1094638	1225227
Australia	947555	849121	913336
Zambia	725359	797266	851089
Russia	702300	762300	785300
Mexico	766129	742246	696580
Indonesia	728000	622030	651136
Kazakhstan	474800	557800	635500
Canada	693059	597194	539473
Mongolia	516000	475000	458780
Poland	424000	419000	401300
Brazil	337600	38542	381000
Other countries	2005648	1986653	1965670

Source: *BGS, World Mineral Production, 2014-18.*

available publication of Minerals Yearbook of 'USGS' 2015.

Argentina

Mine production at Argentina's only copper mine, the Alumbrera 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 tonnes of mined copper and accounted for 30% of total mined copper production in Chile. The Escondida 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 to 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 programmes be undertaken by the Government of China to support the Copper Industry, such as, purchasing surplus copper production and suspending the issuance of licences 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 the end of year 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%; and JX Nippon Mining & 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 the 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 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 programme, 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 (BHP Billiton, 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 are in various forms, such as, copper ores & concentrates, refined copper, copper & alloys, master alloys of copper, blister & other unrefined copper, copper alloys, brass & bronze, scrap, cement copper, mattes and powder & flakes.

Exports of copper ores & concentrates almost trebled to 181,642 tonnes in 2018-19 from 61,005 tonnes in 2017-18. China was the major exporter country (86%) followed by Republic of Korea (10%). Exports of refined copper decreased to 47,917 tonnes in 2018-19 from 3,78,555 tonnes in

2017-18. Exports of refined copper were mainly to China (75%), Taiwan (13%), Malaysia & Republic of Korea (5% each) and Bangladesh (2%). Exports of copper & alloys (including brass & bronze) were at 1,34,608 tonnes in 2018-19 as against 5,11,485 tonnes in 2017-18. Export of copper (scrap) were at 5,077 tonnes in 2018-19 as against 3,273 tonnes in 2017-18 (Tables-16 to 31).

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), copper powder & flakes, etc.

During the year 2018-19, imports of copper ores & concentrates decreased drastically by 45% to 8,23,938 tonnes as compared to 14,88,163 tonnes in 2017-18. Chile with a share of 52% was the leading supplier followed by Indonesia & Australia (15% each), Peru (8%), Saudi Arabia (5%) and Brazil (2%) and Imports of refined copper by more than doubled in 2018-19 to 92,290 tonnes from 44,244 tonnes in 2017-18. Japan was the leading supplier of refined copper with share of 65% followed by Dem. Rep. of Congo (6%) Singapore (5%), UAE, Malaysia & Chile (4% each) and Tanzania (3%). Out of the total imports in 2018-19, copper & alloys comprised 5,97,929 tonnes and copper (scrap) 79,211 tonnes (Tables - 32 to 41).

Table – 16: Exports of Copper Ores & Conc.
(By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**61005**	**3805458**	**181642**	**16627621**
China	60731	3798071	156792	13968572
Taiwan	-	-	7191	1459397
Korea, Rep. of	274	7371	17659	1199609
Yemen Republic	-	-	++	43
USA	++	16	-	-

Figures rounded off

Table – 17: Exports of Refined Copper
(By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**378555**	**157011311**	**47917**	**21283026**
China	236828	98721533	35908	16013180
Taiwan	16006	6530180	6000	2600142
Malaysia	42474	17194340	2400	1049424
Korea, Rep. of	26851	11775801	2175	954806
Bangladesh	977	400569	1124	500821
France	_	_	265	142925
Iran	_	_	20	8740
Nepal	2	813	11	4688
Bhutan	++	155	5	3975
Saudi Arabia	++	143	7	3257
Other countries	55416	22387778	2	1068

Figures rounded off

Table – 18: Exports of Copper & Alloys (Including Brass & Bronze) : Total (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**511485**	**220350121**	**134608**	**70029622**
China	249401	99836982	39021	17255592
USA	16847	9723790	15245	10720162
Qatar	31215	13378353	9578	4489268
UAE	35348	21926911	4999	3555840
Taiwan	16106	6592094	6221	2723194
Germany	3180	1855087	3171	2187526
UK	2681	1877016	2779	2180981
Nepal	5747	2386223	4589	2091009
Korea, Rep. of	32023	12397828	9736	2071105
Saudi Arabia	3173	1968733	2467	2050969
Other countries	115765	48407102	36803	20703976

Figures rounded off

Table – 19: Exports of Copper (Scrap) (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**3273**	**1084926**	**5077**	**2003835**
China	-	-	1506	655392
Hong Kong	49	4455	833	281426
Korea, Rep. of	76	31044	655	261446
Japan	954	302125	535	220421
Spain	455	167624	488	188173
Germany	661	203924	506	179088
Malaysia	-	-	216	91969
UAE	615	227108	126	52766
Philippines	-	-	102	31405
Israel	199	61525	51	18844
Other countries	263	87122	60	22906

Figures rounded off

Table – 20: Exports of Copper & Alloys (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**471928**	**191305364**	**99279**	**46846435**
China	248098	99357331	36443	16120139
USA	10075	5207104	8028	5476066
Qatar	31106	13282747	9376	4379924
Taiwan	16021	6560172	6031	2643882
Nepal	5322	2185589	4174	1888578
Korea, Rep. of	31379	12184428	8558	1645713
UAE	26400	10736244	2768	1536048
Malaysia	50176	17436669	4361	1254841
Bangladesh	2052	879474	2298	1141177
UK	1031	700069	1162	931374
Other countries	50268	22775535	16080	9828693

Figures rounded off

Table – 21: Exports of Brass & Bronze (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**34238**	**27442014**	**28654**	**20698053**
USA	6768	4516025	7209	5241308
UAE	8322	10960853	2048	1942905
Saudi Arabia	1510	1169392	1487	1478850
UK	1542	1143427	1570	1231522
Germany	1221	863864	1362	1088650
Indonesia	505	280142	1405	918429
Netherlands	1055	608155	898	566829
China	1127	473232	1071	480061
Italy	476	318499	539	417560
Oman	1012	538900	682	404181
Other countries	10699	6569525	10383	6927759

Figures rounded off

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

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**2047**	**517817**	**1598**	**481299**
Malaysia	1022	270282	707	205799
Korea, Rep. of	539	148198	475	135193
Germany	163	56363	156	54923
Belgium	23	8004	118	37168
UAE	11	2706	58	24121
Hong Kong	66	12755	25	7231
Singapore	6	1772	15	5281
Taiwan	-	-	17	4844
Spain	-	-	7	2082
Qatar	3	1063	6	1649
Other countries	214	16673	13	3008

Figures rounded off

Table – 23: Exports of Copper & Alloys: Worked (Bar, Rod, Plates, etc) (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**9815**	**5331954**	**10389**	**6233885**
USA	1519	982540	1926	1431263
UAE	906	426077	1454	741233
Canada	264	163137	503	291678
Pakistan	396	190148	565	280451
Thailand	302	152149	404	225558
Germany	415	197704	330	189663
Oman	237	145814	247	174853
Kuwait	174	119821	258	169595
Italy	171	98683	271	165918
UK	178	103455	3983	2329642
Other countries	5254	2752424	-	-

Figures rounded off

Table – 24: Exports of Copper Mattes (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**20635**	**798387**	**8472**	**658253**
Korea Rp.of	4409	379433	6290	623781
Spain	661	100866	197	21295
Malaysia	7393	67955	1626	10018
China	7671	241433	356	1551
Nepal	-	-	2	1309
Sri Lanka	-	-	++	94
Bangladesh	1	457	++	79
Kuwait	-	-	++	75
USA	-	-	++	35
Malawi	-	-	++	14
Other countries	500	8242	++	1

Figures rounded off

Table – 25: Exports of Copper & Alloys: Worked, Nes (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**16728**	**9760617**	**14830**	**10268470**
USA	8154	4060625	5605	3821083
UK	730	537748	760	693539
Germany	619	485758	534	534038
UAE	786	449470	708	505441
Peru	455	575389	850	438439
Colombia	9	5946	802	427125
Saudi Arabia	805	431935	688	420117
Bangladesh	330	148597	713	388585
Thailand	618	375786	372	284129
Nepal	322	130346	467	191396
Other countries	3899	2559017	3331	2564578

Figures rounded off

Table – 26: Exports of Copper Powder & Flakes (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**2158**	**240979**	**455**	**267867**
Brazil	310	176385	387	224206
Mexico	2	1244	24	14562
Turkey	16	8902	18	10996
Thailand	17	6202	8	4379
Korea Rep	-	-	6	3936
Malaysia	3	1697	4	2552
Italy	-	-	1	1844
Canada	-	-	++	999
Bangladesh	5	1515	3	837
Serbia	++	73	1	789
Other countries	1804	44961	3	2766

Figures rounded off

Table – 27: Exports of Blister & Other Unrefined Copper (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**++**	**20**	**-**	**-**
USA	++	20	-	-

Figures rounded off

Table – 28 : Exports of Brass & Bronze : Bronze Powder (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**177**	**44492**	**97**	**30757**
USA	120	16761	63	8840
Thailand	10	5829	14	8733
Vietnam	5	2696	5	3133
Kuwait	4	2273	4	2496
Taiwan	4	1860	4	2411
UAE	12	7669	3	2045
Japan	2	1513	2	1555
Australia	++	43	2	1210
Luxembourg	-	-	++	187
China	++	++	++	137
Other countries	20	5848	++	12

Figures rounded off

Table – 29: Exports of Copper Alloys: Unwrought Excl. Brass & Bronze (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**164**	**59908**	**243**	**111364**
Sri Lanka	22	9004	50	22130
Singapore	71	23998	49	19040
UAE	++	45	25	13467
Sweden	-	-	25	10794
China	-	-	25	9991
USA	-	-	21	9197
Korea Rep. of	20	6690	20	8151
Pakistan	15	5999	16	6316
Germany	++	538	4	5045
Japan	1	653	1	2226
Other countries	34	12981	7	5007

Figures rounded off

Table – 30 : Exports of Brass & Bronze Unwrought (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**1936**	**673737**	**1490**	**560237**
China	716	195269	652	193998
Thailand	651	245979	296	126918
Taiwan	51	16764	163	66383
Netherlands	119	44190	50	22736
Belgium	48	16907	54	18350
USA	27	14295	35	18078
Pakistan	41	18699	28	14903
Indonesia	--	--	18	12468
Germany	86	29846	25	9831
Australia	48	17544	23	9285
Other countries	149	74243	147	67286

Figures rounded off

Table – 31: Exports of Copper (Cement Copper Precipitated) (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**161**	**7083**	**42**	**1916**
Korea, Rep. of	161	7083	42	1856
Qatar	-	-	++	58
Bhutan	-	-	++	2
France	-	-	++	++
Guinea	-	-	++	32

Figures rounded off

Table –32: Imports of Copper Ores & Concentrates (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**1488163**	**278344776**	**823938**	**121462018**
Chile	647799	112132002	428118	54090680
Indonesia	178387	46663852	125780	27258731
Australia	107367	21945154	123724	20249519
Peru	213016	34171949	68374	10336736
Saudi Arabia	47240	6081640	41280	4207153
Brazil	115118	24417207	16569	2294796
Philippines	-	-	10731	1983762
Thailand	-	-	9335	1038382
Madagascar	-	-	27	2255
USA	-	-	++	4
Other countries	179236	32932972	-	-

Figures rounded off

Table – 33: Imports of Refined Copper (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**44244**	**19039893**	**92290**	**42562869**
Japan	25091	11084779	59894	27799946
Congo,Dem. Rep. of	8187	3406804	5320	2420613
Singapore	75	30048	4235	1995003
UAE	490	192216	3974	1870284
Malaysia	4792	1942967	3801	1709266
Chile	329	128834	3271	1489840
Tanzania	236	87226	2988	1355733
South Africa	617	259152	2524	1149070
Switzerland	2	1480	1492	677613
Thailand	296	128160	1574	580850
Other countries	4129	1778227	3217	1514651

Figures rounded off

Table – 34 : Imports of Copper & Alloys (Including Brass & Bronze) : Total (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**710254**	**290730494**	**839518**	**368963428**
UAE	87622	35530867	116685	51957538
Malaysia	79310	35159554	89870	42085297
Japan	32861	15498137	70645	34705994
Vietnam	60729	27392019	69374	34143628
Zambia	140456	57272366	65858	29257249
Thailand	34234	15499789	45184	21937414
China	31458	14226377	32593	16281595
USA	18883	6644862	43480	15007118
Switzerland	3463	1103594	27026	12119227
Singapore	1196	474208	25496	11201752
Other countries	220042	81928721	253307	100266616

Figures rounded off

Table – 35: Imports of Copper & Alloys (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**504709**	**224760487**	**597929**	**287265273**
UAE	64874	28429752	97212	45407680
Malaysia	68252	31497495	80754	38667043
Vietnam	60696	27373025	69303	34104797
Japan	28373	13074739	66891	32239460
Zambia	140442	57268699	65842	29251338
Thailand	31690	14476147	43225	21078266
China	26372	11648105	27965	13691350
Switzerland	90	154152	25061	11466677
Singapore	175	114501	22996	10398541
Indonesia	26383	11504350	21528	10221680
Other countries	57362	29219522	77152	40738441

Figures rounded off

Table – 36 : Imports of Copper (Scrap) (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**45834**	**16741422**	**79211**	**24547762**
Saudi Arabia	13332	5337235	13023	5465156
UAE	10369	3585835	9197	3294106
USA	1034	307116	11258	2839238
Qatar	5124	1964661	4785	2043596
Kuwait	2635	1005721	3698	1686422
UK	1487	441428	8847	1670837
Australia	1250	291937	8136	1670774
Canada	198	72476	3012	889358
Bahrain	1020	394224	1285	588889
Germany	379	79016	3112	519158
Other countries	9006	3261773	12858	3880228

Figures rounded off

Table – 37 : Imports of Brass & Bronze (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**31109**	**14320496**	**29959**	**16093222**
China	5020	2556717	4537	2561598
Malaysia	7050	2418358	6641	2500466
Japan	4488	2423398	3692	2450499
Germany	2722	1593100	2396	1645173
Korea, Rep. of	2391	1070096	2922	1530883
Thailand	2314	947300	1848	835093
USA	319	488399	457	747077
Nepal	1342	529885	1390	578045
Sri Lanka	792	248508	1434	512351
Spain	237	114455	668	423312
Other countries	4434	1930280	3974	2308725

Figures rounded off

Table – 38 : Imports of Brass & Bronze (Scrap) (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**128597**	**34908098**	**132411**	**41057178**
USA	16132	4461960	30260	9561336
Germany	11778	3118315	13282	4082411
Saudi Arabia	11867	3266447	12340	3821329
UK	17802	4800433	10960	3361955
UAE	12194	3446796	10214	3227388
Netherlands	5443	1519390	6583	2059590
Sweden	1565	417679	5507	1482830
Poland	4266	1111345	4476	1344695
South Africa	4005	1118934	3371	1021867
Denmark	2074	552009	3106	963180
Other countries	41471	11094790	32312	10130597

Figures rounded off

Table – 39 : Imports of Copper (Cement Copper Precipitated) (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**-**	**-**	**++**	**5**
USA	-	-	++	5

Figures rounded off

Table – 40 : Imports of Copper & Alloys (Excluding Brass & Bronze and Scrap) (By Items)

Item	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All items	**504714**	**224760485**	**597928**	**287265270**
Blister & Other Unrefined Copper	71677	29409938	45875	20653167
Copper & Alloys :Worked (Bars, Rods, Plates, etc.)	86600	40235975	93758	48667650
Copper & Alloys :Worked, Nes	9095	6751544	9263	8059113
Copper Alloys:Unwrought Excl. Brass & Bronze	1373	627617	951	557231
Copper Mattes	271	90655	138	42820
Copper Powder & Flakes	791	533897	835	634277
Copper Refined Copper Worked	214834	95816116	268514	127579456
Electroplated Anode of Nickel	75779	32202897	86233	38397691
Master Alloys of Copper	51	51953	72	110997
Refined Copper	44245	19039893	92290	42562867

Figures rounded off

Table – 41 : Imports of Copper & Alloys : Worked (Bars, Rods, Plates, etc.) (By Countries)

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**86600**	**40235976**	**93757**	**48667652**
Vietnam	25937	12268916	30002	15433597
China	19712	7495909	22076	9561385
Malaysia	12714	6175445	14362	7753872
Thailand	8277	4082905	7210	3945653
Germany	3483	2086688	4260	2774687
Korea Rep. of	6643	2954947	5295	2673494
Taiwan	3556	1164864	3543	1360568
USA	441	662351	600	987097
Japan	857	605726	833	742654
Netherlands	882	434427	1040	670005
Other countries	4098	2303798	4536	2764640

Figures rounded off

FUTURE OUTLOOK

HCL, Public Sector company, undertook expansion projects in its mines, namely, Malanjkhand, Khetri, Kolihan, etc. To increase production, HCL has chalked out an expansion plan to increase mine production from 3.8 to 20.0 million tonnes per annum in next six years with a capital layout of ₹ 5,500 crore. Copper demand in India is expected to grow at 6-7% due to increased thrust of Govt. of India towards "Make in India" and "Smart City" programmes and increased investments in railways, power, defence and infrastructure sectors would upwardly drive the demand of copper in the country. Demand is expected to show significant growth considering the initiatives, such as, development of industrial corridors, smart city project, housing for all Indians by 2022, National Highway development project, Rail project, defence production policy to encourage indigenous manufacturing, India energy plan 2022 - 100 GW solar, 32 GW wind, 260 GW thermal & nuclear, 62 GW hydro etc. that are vigourosly pursued by the Government. In addition to this, there is plan for green energy corridor for transmission of renewable energy. The per capita copper consumption in India is expected to increase from the current level of 0.6 kg to 1 kg by 2025. The per capita copper consumption of China is 6 kg and world average is 2.7 kg.

The market for Electric Vehicles (EV) is expected to witness growth in coming years as Government incentives continue around the world. Copper is essential to EV technology and its supporting infrastructure. The evolving market will have a substantial impact on copper demand. The increase in the electric vehicles in the market will significantly impact copper. The projected demand for copper due to electric vehicles is expected to increase by 1.7 million tonnes by 2027.