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Indian Minerals Yearbook 2021

(Part- II :Metals and Alloys)

60th 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 1.4.2020 as per NMI database based on UNFC system are estimated at 1.66 billion tonnes. Of these, 163.89 million tonnes (9.87%) fall under 'Reserves category' while the balance 1.50 billion tonnes (90.13%) are placed under 'Remaining Resources' category. Gradewise there are no reserves with 1.85% or more copper grade. However, 163.89 million tonnes reserves fall under 1% to below 1.85% Cu grade. Of the total ore resources 8.28 million tonnes (0.49%) comprise ore containing 1.85% Cu or more and 587 million tonnes (35.33%) resources fall under 1% to below 1.85% Cu grade.

The total metal content out of the total copper

resources is 12.20 million tonnes of which 2.16 million tonnes constitute reserves.

Largest reserves/resources of copper ore to the tune of 868 million tonnes (52.25%) are in the State of Rajasthan followed by Jharkhand with 251 million tonnes (15.14%) and Madhya Pradesh with 387 million tonnes (23.28%). 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 9.33% 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 3.38 million tonnes in 2020-21 decreased by 14% as compared to that in the previous year.

The metal content in the ore produced in 2020-21 works out to 26462 tonnes as against 29,502 tonnes in 2019-20. During the year under review, 3.44 million tonnes of ore were treated for obtaining copper concentrates as against 3.88 million tonnes in 2019-20 (Tables - 2 to 4).

Production of copper concentrates at 1,08,719 tonnes in 2020-21 decreased by about 13% as compared to that in the previous year. Madhya Pradesh was the leading producer State of copper concentrates accounting for about 60% of the production during 2020-21, followed by Rajasthan with 39% and Jharkhand with 1 per cent. The number of reporting mines was five in both the years, i.e., 2019-20 and 2020-21 (Tables-5 & 6).

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Table - 1: Reserves/Resources of Copper as on 1.4.2020 (P)
(By Grades/Stages)

(In '000 tonnes)

Grade/State	Reserves				Remaining Resources						Total Resources (A+B)		
	Proved STD111	Probable STD121 STD122	Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334		Total (B)	
					STD221	STD222							
All India: Total													
Ore	128267	20045	15580	163891	83102	111376	41368	135884	340902	778987	5360	1496979	1660870
Metal	1664.12	313.64	183.81	2161.57	873.59	428.09	246.48	1655.35	2748.95	4051.37	31.69	10035.52	12197.09
By Grades													
Ore with 1.85% & Above Cu	-	-	-	-	-	62	-	2520	2645	2186	870	8283	8283
Ore With 1.00 % to below 1.85 % Cu	128267	20045	15580	163891	69113	7372	14977	86623	112772	132046	-	422903	586795
Ore with (+) 0.50% to below 1.00% Cu	-	-	-	-	3070	103942	11596	46741	94495	534442	3620	797906	797906
Ore with (-) 0.50% Cu	-	-	-	-	10919	-	14795	-	130990	110312	870	267886	267886
Metal	1664.12	313.64	183.81	2161.57	873.59	428.09	246.48	1655.35	2748.95	4051.37	31.69	10035.52	12197.09
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	-	-	-	-	2013	2371	969	129	-	7131	-	12613	12613
Metal	-	-	-	-	31.2	35.8	19.67	0.69	-	113.38	-	200.74	200.74
Haryana													
Ore	-	-	-	-	-	2230	-	-	20900	30686	-	53816	53816
Metal	-	-	-	-	-	11.82	-	-	73.19	94	-	179.01	179.01
Jharkhand													
Ore	6150	-	3000	9150	10445	2804	3988	87330	99890	37855	-	242313	251463
Metal	72.08	-	35.37	107.45	115.59	29.98	45.9	1002.92	1023.12	454.7	-	2672.21	2779.66
Karnataka													
Ore	-	-	-	-	867	1301	3114	1750	6833	27634	-	41499	41499
Metal	-	-	-	-	-	-	15.28	22	65.77	142.81	-	245.86	245.86
Madhya Pradesh													
Ore	107773	-	12580	120353	55777	100411	8824	23062	300	77938	-	266312	386665
Metal	1422.6	-	148.44	1571.04	686.05	321.31	27.35	207.45	9.78	843.88	-	2095.82	3666.86

(Contd)

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Table - 1: (Concl'd)

Grade/State	Reserves			Remaining Resources							Total Resources (A+B)	
	Proved STD111	Probable		Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334		Total (B)
		STD121	STD122		STD221	STD222						
Total (A)												
Maharashtra												
Ore	-	-	-	-	-	-	-	5831	11774	150	17755	17755
Metal	-	-	-	-	-	-	-	58.36	99.18	0.54	158.08	158.08
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	-	-	-	-	-	-	1340	2306	8345	-	11991	11991
Metal	-	-	-	-	-	-	20.63	20.14	56.26	-	97.03	97.03
Rajasthan												
Ore	14344	20045	-	34388	13314	1148	18603	197078	573814	5200	833461	867849
Metal	169.44	313.64	-	483.08	33.87	12.2	338.66	1385.88	2214.46	31.13	4152.52	4635.6
Sikkim												
Ore	-	-	-	-	-	445	300	-	150	-	958	958
Metal	-	-	-	-	-	7.86	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 2020-21, the average copper content in the ore produced was 0.78% Cu as against 0.75% in the previous year. All India average metal content of ore treated during the year works out to 0.77% Cu and 0.75% Cu for 2020-21 and 2019-20, respectively. The copper content in the ore treated varies from State to State. The average metal content in the concentrate produced works out to 23.20% Cu in 2020-21 as against 22.87% Cu in the previous year.

The average daily employment of labour in copper mines in 2020-21 was 2,766 as against 3,928 in the preceding year.

Copper Metal

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

There is nil production of copper blister in 2020-21 and copper continuous cast wire rods registered a decrease of 2% only in 2020-21 as compared to the previous year. The production of copper cathodes decreased by 11%. 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, 2020-21

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

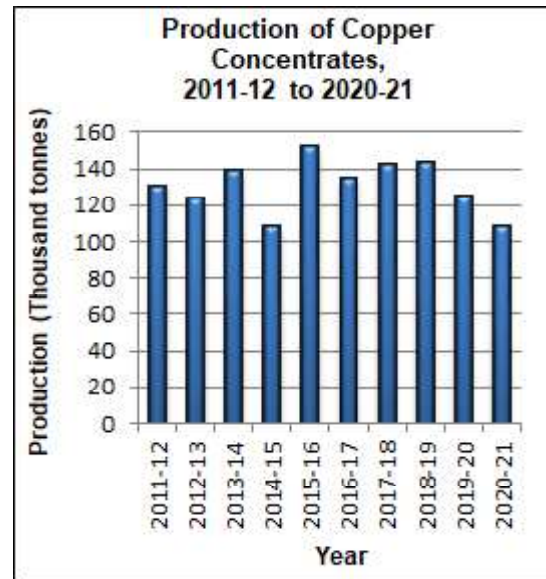


Table – 3: Production of Copper Ore, 2019-20 and 2020-21 (By States)

(In tonnes)

State	2019-20			2020-21 (P)		
	Ore produced	Cu%	Metal content	Ore produced	Cu%	Metal content
India	3952472	0.75	29502	3377850	0.78	26462
Jharkhand	288477	0.78	2247	41772	0.72	301
Madhya Pradesh	2544472	0.69	17526	2344087	0.76	17889
Rajasthan	1119523	0.87	9729	991991	0.83	8272

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**Table – 4: Copper Ore Treated, 2019-20 and 2020-21
(By States)**

(In tonnes)

State	2019-20			2020-21 (P)		
	Ore treated	Cu%	Metal content	Ore treated	Cu%	Metal content
India	3879453	0.75	29042	3439116	0.77	26413
Jharkhand	269568	0.78	2099	47291	0.61	287
Madhya Pradesh	2479185	0.69	17106	2384025	0.75	17810
Rajasthan	1130700	0.87	9837	1007800	0.83	8316

**Table – 5: Production of Copper Concentrates, 2019-20 to 2020-21
(By States)**

(Quantity in tonnes; Value in ₹'000)

State	2018-19		2019-20		2020-21 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	143668	8846151	124586	8448405	108719	8633968
Jharkhand	6594	529620	7660	604135	1209	23707
Madhya Pradesh	70999	4000290	65094	4750125	64920	5238309
Rajasthan	66075	4316241	51832	3094145	42590	3371952

**Table – 6: Production of Copper Concentrates, 2019-20 and 2020-21
(By Sector/States/Districts)**

(Quantity in tonnes; Value in ₹'000)

State/District	2019-20			2020-21 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	5	124586	8448405	5	108719	8633968
Public Sector	5	124586	8448405	5	108719	8633968
Jharkhand	2	7660	604135	2	1209	23707
Singhbhum (East)	2	7660	604135	2	1209	23707
Madhya Pradesh	1	65094	4750125	1	64920	5238309
Balaghat	1	65094	4750125	1	64920	5238309
Rajasthan	2	51832	3094145	2	42590	3371952
Jhunjhunu	2	51832	3094145	2	42590	3371952

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Table – 7: Producers of Copper Metal, 2020-21

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	Singhbhum (East)
Hindalco Industries Ltd, Century Bhawan, Dr Annie Besant Road, Mumbai –400 030, Maharashtra.	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, 2018-19 to 2020-21

(In tonnes)

Year	Copper blister	Copper cathodes	Copper Electrolytic Wirebars	Copper CCWR
2018-19	13293	454337	-	354146
2019-20	3997	408003	-	349475
2020-21 (P)	0	363609	-	341563

Table – 9: Production of Copper (Blister), 2019-20 and 2020-21 (By State/Plant)

(Quantity in tonnes; Value in ₹'000)

State	Plant	2019-20		2020-21 (P)	
		Quantity	Value	Quantity	Value
India		3997	N.A.	0	N.A.
Jharkhand	Surda ICC	3997	N.A.	0	N.A.

Table – 10: Production of Copper (CCWR), 2019-20 and 2020-21 (By States/Plants)

(Quantity in tonnes; Value in ₹'000)

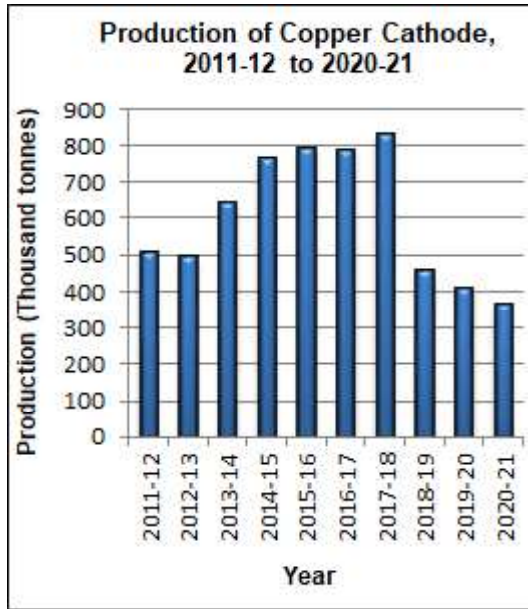
State	Plant	2019-20		2020-21 (P)	
		Quantity	Value	Quantity	Value
India		349475	155090811	341563	188445400
Gujarat	Hindalco	245108	108804500	219171	122004100
Maharashtra	HCL Taloja	4153	1884911	0	0
Tamil Nadu	Vedanta Ltd	0	0	0	0
Dadra & Nagar Haveli	Vedanta Ltd	100214	44401400	122392	66441300

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Table – 11: Production of Copper (Cathodes), 2019-20 and 2020-21 (By States/Plants)

(Quantity in tonnes; Value in ₹'000)

State	Plant	2019-20		2020-21 (P)	
		Quantity	Value	Quantity	Value
India		408003	176011710	363609	190616200
Gujarat	Hindalco	325567	139788500	262174	136047000
Jharkhand	Surda ICC	4948	2225010	-	-
Tamil Nadu	Vedanta Ltd	-	-	-	-
Dadra & Nagar Haveli	Vedanta Ltd	77488	33998200	101435	54569200



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, Malanjkhanda Copper Project (MCP) at Malanjkhanda 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.

Malanjkhanda Copper Project (MCP) 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 3.0 and 4.35 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 the 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 the 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 the existing 1.1 to 5.0 million tonnes per annum in two phases. Mine-wise status is described below:

At Kolihan mine, environmental clearance for shaft sinking & creation of ore handling facilities below 0 mRL (meter reduced level) to augment the production capacity to 1.5 MTPA was obtained on 2.2.2015. To establish the ore bodies at depth, 1,650 m of Diamond drilling work was undertaken. In 2019-20, a total of 308.4 m of drilling have been completed. Further drilling has been undertaken to establish mineralisation corresponding to (-) 120 mRL and 6,298 meter of surface exploratory drilling have been completed in 2019 -20. Further drilling is in progress. After proving of continuity of ore body in depth, proposal will be undertaken.

At Khetri mine, contract was awarded during 2011-12 to augment ore production capacity of Khetri mine from 0.5 MTPA to 1.5 MTPA under Phase II through deepening of existing shaft and other related activities. However, during execution of the contract, the work was badly affected at the initial stage due to extremely bad ground / fault zone encountered while making approach cross cut to reach below the existing Production Shaft area for setting up winding arrangement for sinking of shaft further. Despite many efforts made by the contractor the problem persisted and finally the contract was terminated in January, 2017 as per terms and conditions of the contract.

At Banwas Mine, mine construction work got completed in February, 2017. The Company has appointed contractual agency for ore production, the contractual agency has produced 2,43,942 tonnes of ore in FY 2019-20 and the target production ramp will be achieved by 2023-24.

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 furnished as below:

Kendadih mine was re-opened in December, 2017 after all the mine-related equipping work including mine dewatering was completed. Mine development work is in progress. Equipment were mobilised in a phased manner and mine had production of 43,200 MT

of ore during 2019-20 was to have been treated in Mosaboni Concentrator Plant.

At Rakha mine, considering the change in market scenario, the Company proposes to implement the project through an EPC route and has plans to augment production capacity to 1.5 MTPA of ore by reopening and expanding the closed Rakha mine. 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.

Chapri-Sideshwar mine falls within the Rakha and Kedadih mining lease area. All mine plans and schedules were updated. The EC and Stage II FC for Kendadih was obtained in the year 2015 and 2017, respectively. Tender floated by the Company for mine development and production from Chapri mine was discharged despite several attempts due to high price quoted by bidders and poor response. In view of this, the Company is exploring to engage contractor through MDO (Mine Developer-cum-Operator) route for re-opening and expansion of Rakha Copper Mine. Development of a new underground mine at Chapri-Sideshwar and erection & commissioning of a new Concentrator Plant at ICC is in progress and the process of floating tender for engagement of MDO agency is underway. Meanwhile, surface exploratory drilling has been undertaken at Chapri Block of Rakha Mining Lease and 5,243.5 m of drilling has been done during the year 2019-20. The Company envisages augmentation of ore production capacity in 1st phase to 12.2 MTPA by 2028-29 in stages. The Company will take up enhancement of ore production capacity to 20.2 MTPA in 2nd phase after successful completion of 12.2 million tonnes per annum capacity plan.

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° to 75° 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 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 (2nd 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 2nd 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 and a contract for ore production from developing underground mine through decline has been awarded in July, 2019 and it is expected that production will commence in 2020-21. 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 has been completed up to 2,975 m and 2,103 m respectively. The development work of North and South Ventilation shaft has been completed up to 372 m and 475 m respectively.

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 that which would enable 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 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. Hindalco at Dahej in Gujarat and 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 reflected in Table-12. Company-wise details of copper smelters and refineries are given below:

1. Hindustan Copper Ltd

a) Khetri Copper Complex (KCC)

The KCC smelter, located at Khetri in Jhunjhunu district, Rajasthan, had a capacity of 31,000 tonnes refined copper per annum. In addition, KCC has sulphuric acid and phosphatic fertilizer plant facilities. KCC's smelter halted its operations 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.

b) 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 2019-20, copper cathode production at ICC was 4,948 tonnes, which is less by 64% as compared to 13,782 tonnes in the preceding year.

c) 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 sub-optimal operations.

d) 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.

e) 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.

During the year, HCL has not made any additional investment in its subsidiary viz. Chhattisgarh Copper Ltd (CCL). The total paid up capital of CCL as on 31.3.2020 is ₹.25 lakh out of which 74% equity is held by HCL and remaining 26% is held by Chhattisgarh Mineral Development Corporation Ltd.

f) 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

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

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.

Information in respect of Subsidiary, Associate and Joint Venture

During the year, HCL has invested ₹75 lakh in the equity shares of Khanij Bidesh India Ltd (KABIL), a JV company between NALCO, HCL and MECL incorporated on 8.8.2019 with the objective to identify, acquire, develop, process and make commercial use of strategic and other minerals in overseas locations for

supply in India and boost “Make in India” campaign. The shareholding of NALCO, HCL and MECL in the JV Company is in the ratio of 40:30:30.

2. Sterlite Industries (India) Ltd

The Sterlite Industries (India) Ltd, a prominent Private Sector plant, has an installed smelter capacity of 4,00,000 tonnes per annum copper anodes and 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.

3. Hindalco Industries Ltd (Birla Copper)

The Company with smelter facility 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, Peru, Canada, Saudi Arabia, 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 2019-20 is at 0.5 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 ICSG the world Copper Factbook 2020 most cars contain an average of 23 kg copper and luxury & hybrid vehicles contain about 40 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 2019-20, the imports of refined copper were more than the exports. The availability of refined copper increased from 4,98,710 tonnes in 2018-19 to 5,23,008 tonnes in 2019-20 (Table-13).

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

Item	(Quantity in tonnes)	
	2018-19	2019-20 (P)
I) Total Production* (Cathodes)	454337	408003
II) Total Imports (copper refined)	92290	151964
III) Total Exports (copper refined)	47917	36959
IV) Apparent Availability	498710	523008

* 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 880 million tonnes of copper content. Chile has the largest share, accounting for about 23% of world reserves, followed by Peru (9%), Australia (11%) Russia (7%), Mexico & USA (6% each), Poland (4%) and China (3%), Congo (Kinshasa), Kazakhstan & Zambia (2% each). Remaining about 29% was contributed by other countries (Table-14).

The world mine production of copper remains same at 20.6 million tonnes of metal content in 2020 as compared to previous year. Chile continued to be the largest single producer of copper in 2020 with 28% share followed by Peru (10%), China (8%), Dem. Rep. of Congo (7%) and USA (6%) (Table-15).

As per BGS world refined copper production was 24.1 million tonnes in the year 2018 which showed an increase of 1.26% from 23.80 million tonnes in the previous year. China was the largest producer of refined copper with 9.78 million tonnes in the year 2019 (41% of world production) followed by Chile (9%), Japan 1.49 million tonnes (6%), Dem. Rep. of Congo 1.16 million tonnes (5%) and USA & Russia (4% each), etc.

In 2018, China accounted for 51% of world apparent consumption, which rose by 3% to a record high 24.4 million tonnes from 23.7 million tonnes in 2017 as per International copper Study Group (ICHG).

Australia

Mineral copper production in Australia increased by 7% to 920000 tonnes in 2018 from 8,56,000 tonnes in 2017. Newerest Mining Ltd increased copper production at the Cadia Valley Mine by 19,100 tonnes (34%) from that in 2017, when an earthquake disrupted operations for several months. The

Capricorn copper project (owned by EMR Capital Pty Ltd) commenced production in late 2017 and was ramping up to an annual capacity of 30,000 tonnes (department of Industry, Innovation, and Science, 2018).

Production statistics at the mine level were not available for two of the leading copper operations in Australia. the Mount Isa and Olympic Dam complexes. Glencore plc produced 1,52,000 tonnes of refined metal at mount Isa, a decreased of 8% from 1,65,000 tonnes in 2017. At Olympic Dam, BHP Group produced 1,47,000 tonnes of electrolytic and electrowon copper cathode in 2018, an increase of 4% from 1,42,000 tonnes.

Canada

In 2018, production decreased at nearly all copper mines in Canada, and total mine output fell by 9% to 543,000 tonnes of copper from 595,000 tonne in 2017. The largest declines in production took place at the Sudbury complex (owned by Vale S.A.), where output decreases by 26,000 tonnes; at the Voisey's Bay Mine (Vale), by 7,800 tonne; and at the Gibraltar Mine, by 7,260 tonnes. Vale attributed the decreases at the Sudbury complex and the Voisey's Bay Mine to a strategic decision to deprioritize its nickel operations, resulting in lower production of copper byproduct.

Chile

In 2018, 7 of the leading 20 copper mines in the world were located in Chile, the first-ranked global producer of mined copper since 1982. Mined copper production in Chile increased by 6% to 5.83 million tonnes from 5.50 million tonnes in 2017. At the Escondida Mine production rose by 34% to 1.21 million tonnes from 903,000 tonnes in 2017. At the Collahuasi Mine production was 559,000 tonnes in 2018, up by 7% from 524,000 tonnes because of higher ore grades and improved copper recovery rates following planned maintenance and the installation of 24 new flotation cells in the first half of the year. Owing to higher ore grades, output rose by 20% at the Los Bronces Mine.

In 2018, the state-owned Corporation Nacional del Cobre de Chile (Codelco) operated 7 mines in the country, 3 of which were ranked among the 20 leading

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

(Quantity in '000 tonnes of copper content)

Country	Reserves
World: Total (rounded off)	880000
Australia	93000
Canada	9800
China	26000
Chile	200000
Congo (Kinshasa)	31000
Germany	–
Indonesia	24000
Japan	–
Kazakhstan	20,000
Korea	–
Mexico	53000
Peru	77000
Poland	31000
Russia	62000
USA	48000
Zambia	21000
Other countries	180000

Source: USGS, Mineral Commodity Summaries, 2022, (a): For Australia, Joint Ore Reserves Committee Compliant reserves were about 22 million tonnes.

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

(In tonnes of metal content)

Country	2018	2019	2020
World Total (rounded off)	20600000	20600000	20600000
Chile	5831600	5787400	5733100
Peru	2437035	2455440	2150126
China	1615234	1683700	1723100
Congo, Dem. Rep. of	1225227	1420386	1587459
USA	1220000	1260000	1200000
Russia	870500	812400	924100
Australia	910896	925157	879522
Zambia	851089	797518	869061
Mexico	696580	713704	732863
Canada	548011	560781	584608
Other countries	4383048	4153202	4251834

Source: BGS, World Mineral Production, 2016-20.

global copper mines. An overall decrease of 3% in mined copper production at Codelco's operations, to 1.68 million tonnes compared with 1.73 million tonnes in 2017, partially offset the increases at other major copper mines in Chile. The company attributed the decline to lower copper ore grades.

China

Beijing Antaika Information Co., Ltd estimated that refined copper capacity in China increased by about 1.2 million tonnes in 2018 to 12.2 million tonnes. New capacity came online at a minimum of seven refineries in the country, either through the opening of new facilities or upgrades at existing facilities. Most notably, Chinalco Southeast Copper Co., Ltd. finished construction of a new refinery with an annual cathode production capacity of 400,000 tonnes, and Guangxi Nanguo Copper Co. completed a 300,000 tonnes per year expansion.

Congo (Kinshasa)

Owing primarily to the restart of ore processing operations at the Kamoto complex, output of mined copper in Congo (Kinshasa) increased by 12% to 1.23 million tonnes in 2018 from 1.09 million tonnes in 2017, and refined copper production rose by 15% to 953,000 tonnes from 830,000 tonnes. From September 2015 until November 2017, ore processing at Kamoto was suspended while Katanga Mining completed the first phase of a capacity expansion project. Cathode production resumed in December 2017, and the final components of the second phase of expansion were completed and began ramping up in the fourth quarter of 2018. Output of SX-EW cathode increased by 150,000 tonnes in 2018 and was expected to increase by roughly 135,000 tonnes in 2019.

Indonesia

In December 2018, Freeport reached an agreement with the Government of Indonesia for an extension of the mining license at the Grasberg Mine (third-ranked) through 2031, which had been set to expire in 2021. The license would be valid through 2041

once the company constructed a new smelter in Indonesia and fulfilled other fiscal obligations. As part of the agreement, Freeport divested a portion of its 90.64% ownership in the mine to PT Inalum, an Indonesian state-owned firm, and held a 48.76% stake following the transaction. The company's license to export copper concentrates would require approval by the Government of Indonesia every 6 months, depending on smelter construction progress. Production of mined copper at Grasberg increased by 18% to 526,000 tonnes in 2018 from 446,000 tonnes in 2017, when operations were affected by multiple disruptions related to restrictions on copper concentrate exports. Freeport expected production from the underground portion of the mine to commence in the first half of 2019 and anticipated that mine output would be lower than that in 2018 during the transition from open pit to underground operations in 2019 and 2020.

Panama

A partial strike at the Cobre Panama project began on March 9 and ended on March 26. First Quantum had previously anticipated that the mine (the only copper operation in Panama and the only major worldwide copper project expected to initiate production in 2018) would begin ramping up in the fourth quarter of the year. The project was nearing completion at year-end 2018, with first production expected in early 2019. First Quantum projected that Cobre Panama would produce 300,000 tonnes per year of copper in concentrates by 2021.

Peru

In 2018, 4 of the leading 20 copper mines in the world were located in Peru, and mine production of copper was essentially unchanged at 2.44 million tonnes. At the Antamina Mine, copper output rose by 6% (23,600 tonnes) to 446,000 tonnes because of increased copper ore grades compared with those in 2017. Higher production at Antamina was offset by reduced output from other leading copper mines in Peru. Owing to lower copper recovery rates, production at the Cerro Verde Mine.

Russia

Refined copper production rose by 8% in 2018 to an estimated 1.03 million tonnes from 956,000 tonnes in 2017. PJSCMMC Norilsk Nickel, which owned multiple refineries that accounted for roughly 40% of the refined copper capacity in Russia, reported refined output of 426,000 tonnes from its Russian operations, an increase of 47,300 tonnes (13%) from that in 2017.

Zambia

In 2018, output of mined copper increased by 60,000 tonnes (8%) to 854,000 tonnes from 794,000 tonnes in 2017. Production at some of the leading copper mines in Zambia was as follows: the Kansanshi Mine, Sentnel Mine and Lumwana Mine. The combined output of these three operations was equivalent to 68% of the country's total mined copper in 2018 and rose by 19,200 tonnes compared with production in 2017.

FOREIGN TRADE

Exports

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

Exports of copper ores & concentrates decreased considerably by 39% to 82,463 tonnes during 2020-21 from 2,12,659 tonnes in 2019-20. The export were mainly

to China (98%) followed by Rep. of Korea (2%). Exports of refined copper increased substantially by 23% to 88,359 tonnes in 2020-21 from 36,957 tonnes in 2019-20. Exports of refined copper were mainly to China (99%) and Bangladesh (1%). The total exports of copper & alloys (including brass & bronze) were at 2,09,332 tonnes in 2020-21 as against 1,41,010 tonnes in 2019-20. Export of copper (scrap) were at 7,290 tonnes in 2020-21 as against 7,736 tonnes in 2019-20 (Tables-16 to 32).

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 2020-21, imports of copper ores & concentrates decreased by very narrow margin to 4,15,136 tonnes as compared to 8,21,555 tonnes in 2019-20. Chile with a share of 59% was the leading supplier followed by Indonesia (29%), Malaysia and Canada (5% each) and Saudi Arabia (2%). While imports of refined copper increased drastically by 65% to 1,55,038 tonnes in 2020-21 from 1,51,964 tonnes in 2019-20. Japan was the leading supplier of refined copper with share of 82% followed by UAE (10%) and Tanzania (3%). Out of the total imports in 2020-21, copper & alloys comprised 4,96,358 tonnes and copper (scrap) 90,604 tonnes (Tables - 33 to 42).

COPPER

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	212659	20450948	82463	7689376
China	159572	13723814	81060	7590259
Korea, Rep. of	3181	215992	1403	99117
Canada	-	-	++	++
Malaysia	28733	3792338	-	-
Taiwan	21046	2713968	-	-
Vietnam	109	3536	-	-
Thailand	18	1295	-	-
UK	++	2	-	-
USA	++	2	-	-
Australia	++	1	-	-

Figures rounded off

COPPER

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	36957	15257396	88359	43312924
China	35516	14629645	87429	42824386
Bangladesh	1042	436308	509	281143
France	201	104079	123	73934
Hong Kong	24	9678	94	46837
Germany	-	-	98	40333
Thailand	++	50	45	21291
Malaysia	++	5	26	10795
Finland	-	-	9	4995
Nepal	14	5378	21	3738
Bhutan	++	343	1	977
Other countries	160	71910	4	4495

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	140857	60527102	209332	102064524
China	52403	18935979	138740	57637004
USA	19370	11091382	14536	12160651
UAE	6332	3270705	4664	2680903
Saudi Arabia	5143	1855274	3301	2232114
Korea, Rep. of	5197	886479	9679	2185298
UK	4884	2040595	2081	1887684
Germany	4192	1806984	1885	1608456
Qatar	3147	1386327	2690	1459572
Malaysia	1206	565288	2715	1366837
Nepal	3092	1382266	2710	1301752
Other countries	35891	17305823	26331	17544253

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	7736	2777611	7290	2977834
China	2257	911846	2252	1172553
Korea, Rep. of	1048	281557	2953	938544
Japan	894	291003	634	246012
Malaysia	41	17819	432	223770
Spain	76	29876	555	217431
Germany	402	125086	95	40957
Taiwan	88	32275	109	40392
UAE	521	220712	88	34568
Italy	-	-	62	24104
Russia	-	-	50	17497
Other countries	2409	867437	60	22006

Figures rounded off

COPPER

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	81388	35989492	139540	67619065
China	40791	15168684	100047	44731757
USA	7930	5704049	7848	6306411
UAE	3770	1618762	2787	1546714
Qatar	2889	1275618	2501	1309383
Korea Rp	3681	451579	6401	1128242
Nepal	2666	1169871	2025	1010269
Sri Lanka Dsr	971	430700	1709	942990
UK	1116	747377	945	820074
Saudi Arabia	1969	714286	1221	817185
Thailand	882	473273	1445	791623
Other countries	14723	8235293	12611	8214420

*Figures rounded off***Table – 22: Exports of Brass & Bronze (Scrap)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1064	312010	1484	511456
Malaysia	439	121784	504	180003
Korea, Rep. of	348	97361	294	98250
China P Rp	-	-	270	79750
Spain	-	-	189	69627
Hong Kong	-	-	83	32957
Germany	175	58817	77	30869
UAE	++	165	50	12146
Taiwan	-	-	9	3413
Japan	2	682	6	2921
Nepal	1	360	1	380
Other countries	99	32841	1	1140

*Figures rounded off***Table – 21: Exports of Brass & Bronze
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	50669	21447989	61018	30956169
China	9355	2855449	36171	11652944
USA	11421	5377055	6685	5853235
Saudi Arabia	3153	1132083	2080	1414865
UAE	2041	1431066	1739	1087478
UK	3718	1273734	1136	1067610
Indonesia	1359	870288	1316	914448
Germany	2352	957536	933	904192
Canada	326	262848	516	473011
Italy	1197	388198	528	417890
Netherlands	841	424746	464	396470
Other countries	14906	6474986	9450	6774026

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

Country	2019-20(R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	8812	5462095	8547	563860
USA	1596	1116202	1541	1286505
UAE	1718	894988	1549	859494
Korea	94	75810	685	385456
Canada	245	204815	445	314201
Thailand	481	231686	373	216899
Oman	402	237263	353	213009
Nigeria	295	169169	297	155844
Saudi Arabia	166	109614	213	131814
Malaysia	257	144594	210	130081
Nepal	339	160677	211	120316
Other countries	3219	2117277	2670	1824941

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	7728	670705	16307	1572663
China	4029	299829	10721	986780
Korea, Rep. of	3569	361526	5341	574265
Thailand	54	583	244	11281
Kenya	-	-	1	245
Sri Lanka	++	28	++	70
Nepal	++	5	++	14
Germany	-	-	++	8
Spain	76	8701	-	-
Bangladesh	++	30	-	-
Canada	++	3	-	-
Other countries	++	++	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	18172	10325520	14934	11103826
USA	6129	4452655	6176	4943763
Saudi Arabia	1715	548039	938	637328
UK	800	553689	659	623998
Thailand	338	234990	771	534777
Peru	1847	884606	997	457824
Germany	917	454224	461	455155
UAE	1400	407411	712	432449
Australia	169	134356	314	223086
Columbia	48	24230	328	185839
Canada	174	146705	196	182351
Other countries	4635	2484615	3382	2427256

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1156	197213	353	211413
Brazil	303	174468	290	195963
Thailand	5	2877	10	6154
UAE	++	5	49	5733
Bangladesh	2	742	3	708
South Africa	++	3	1	488
USA	++	159	++	444
Japan	++	747	++	427
Malaysia	++	271	++	298
Australia	-	-	++	236
Egypt	++	315	++	173
Other countries	846	17626	++	789

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	5	1027	491605
China	-	-	1027	491605
Oman	++	4	-	-
UK	++	1	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	226	1	351
Bangladesh	-	-	1	220
Austria	-	-	++	131
Indonesia	++	164	-	-
Singapore	++	62	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	387	154727	937	391076
China	139	51183	608	239809
Sri Lanka	107	46721	114	58548
Taiwan	14	5863	75	31144
Malaysia	26	10454	42	18095
Italy	1	1553	26	10797
Spain	-	-	24	10458
Jordan	-	-	20	7292
Nepal	++	276	14	5279
Japan	++	748	1	2476
Togo	-	-	3	2051
Other countries	100	37929	10	5127

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	9831	2958841	36524	11593935
China	9073	2628033	35669	11237540
Taiwan	117	43245	275	93528
Thailand	338	140234	177	64265
USA	103	43986	82	38153
Nepal	11	5141	87	32014
Japan	-	-	40	15931
UAE	25	12862	24	13864
UK	1	1109	5	12675
Italy	++	1255	28	12174
Mexico	41	18468	25	11892
Other countries	122	64508	112	61899

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	367	4	1066
Korea, Rep. of	-	-	4	948
Nigeria	-	-	++	50
South Africa	-	-	++	39
Kazakistan	-	-	++	17
Australia	-	-	++	12
Qatar	++	367	-	--

Figures rounded off

**Table – 32 : Exports of Copper & Alloys
(Excluding Brass & Bronze and Scrap)
(By Items)**

Item	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All items	81388	35989492	139540	67619065
Blister & Other Unrefined Copper	++	5	1027	491605
Copper & Alloys :Workerd (Bars, Rods, Plates, etc.)	8812	5462095	8547	5638560
Copper & Alloys :Worked, Nes	18172	10325520	14934	11103826
Copper Alloys: Unwrought Excl.Brass & Bronze	387	154727	937	391076
Copper Mattes	7728	670705	16307	1572663
Copper Powder & Flakes	1156	197213	353	211413
Copper Refined Copper Worked	7361	3523722	8687	4705513
Electroplated Anode of Nickel	5	3185	64	31638
Master Alloys of Copper	810	394924	325	159847
Refined Copper	36957	15257396	88359	43312924

Figures rounded off

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**Table – 33: Imports of Copper Ores & Concentrates
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	821555	86675247	415136	59071579
Chile	520728	56127386	245238	29065049
Indonesia	30150	4932740	119609	21391418
Malaysia	-	-	19821	3974697
Canada	20398	2590179	20386	2969661
Saudi Arabia	31389	3142310	10046	1667131
UK	-	-	24	1969
USA	++	14	10	869
Bosnia-Herzegovina	-	-	2	785
Peru	97175	8748942	-	-
Australia	71973	6170829	-	-
Other countries	49742	4962847	-	-

Figures rounded off

**Table – 34: Imports of Refined Copper
(By Countries)**

Country	2019-20 (R)		2020-21(P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	151963	67289144	155038	78258449
Japan	116158	51690905	127811	64345604
UAE	21868	9604118	15051	7771508
Tanzania	695	301693	4736	2451911
Indonesia	1266	545875	2444	1240156
Thailand	1628	671491	1471	700847
South Africa	104	42459	1147	603482
Malaysia	3618	1531001	968	439346
Germany	722	330898	381	198253
Vietnam Soc Rep	72	31568	303	140540
Luxembourg	674	280966	249	106039
Other countries	5158	2258170	477	260763

Figures rounded off

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**Table – 35: Imports of Copper & Alloys
(Including Brass & Bronze) : Total
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	896848	361304774	744819	341717156
Japan	131396	59756787	143670	73323543
South Africa	11881	4558381	71269	37370877
UAE	111440	46828568	66135	32035807
Tanzania Rep	5994	2564223	58541	30001251
Vietnam	67460	31632493	36163	20580074
Thailand	42411	1953706	31124	16491527
Malaysia	86879	38375543	26219	13755862
China	28857	12599647	25903	12376742
Germany	32906	10027517	34242	11519130
USA	58553	17873331	35088	11430483
Other countries	319071	117551178	216465	82831860

Figures rounded off

**Table – 36: Imports of Copper & Alloys
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	616456	280500278	496358	261483027
Japan	127093	57661706	140585	71641305
South Africa	8570	3686974	70647	37179074
Tanzania Rep	5956	2553419	58289	29931494
UAE	94407	41655987	51803	26747022
Vietnam	67398	31594109	36077	20525043
Thailand	40459	18691840	29056	15512568
Malaysia	79345	35698690	20433	11444563
China	25164	10609734	22019	10023048
Mozambique	3439	1450519	13646	6308248
Zambia	116786	51117159	12304	5265397
Other countries	47839	25780141	41499	26905265

Figures rounded off

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**Table – 37 : Imports of Copper (Scrap)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	112714	29265171	90604	28462247
Saudi Arabia	10929	4342309	12315	5966405
USA	17635	4588537	12540	3452407
UAE	8490	2801587	7388	3194766
Kuwait	5541	2325013	6191	2755410
UK	15509	2386811	12402	2329223
Australia	8465	1651500	5706	1498850
Germany	14222	2255962	8419	1476016
Netherlands	3382	815990	4306	1001698
Canada	3401	1058148	1976	715362
Malaysia	1390	540926	1321	640121
Other countries	23750	6498388	18040	5431989

*Figures rounded off***Table – 38 : Imports of Brass & Bronze
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	23552	12369100	19468	11486251
China	3667	1980711	3847	2339606
Korea, Rep. of	3005	1402274	3693	1828557
Malaysia	4728	1726446	3173	1265470
Japan	2501	1644253	1650	1232034
Germany	1286	976411	1290	1083767
Thailand	1799	792446	1547	759946
USA	374	748805	520	432978
Italy	404	284006	362	373538
Nepal	1172	470317	546	247350
Taiwan	673	302310	442	243415
Other countries	3943	2041121	2398	1679590

Figures rounded off

COPPER

**Table – 39 : Imports of Brass & Bronze (Scrap)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	144126	39170225	138189	40285631
USA	39543	11080135	20949	6210740
Germany	12890	3455378	21183	6114950
Saudi Arabia	11752	3177036	12329	3670926
UK	6646	1724629	12427	3667903
Netherlands	4446	1209506	8779	2540524
UAE	8479	2338901	6920	2080389
Belgium	2077	547791	4889	1382706
Sweden	6115	1468727	4866	1296978
Poland	5551	1483319	4210	1170937
Denmark	3395	905930	3516	985599
Other countries	43232	11778873	38321	11163979

Figures rounded off

**Table – 40 : Imports of Copper (Cement Copper Precipitated)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	763	39	5489
Australia	-	-	39	5471
China	-	-	++	18
Germany	-	-	++	++
France	++	670	-	-
USA	++	80	-	-
UK	++	13	-	-

Figures rounded off

**Table – 41 : Imports of Copper & Alloys
(Excluding Brass & Bronze and Scrap)
(By Items)**

Item	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All items	616456	280500278	496358	261483027
Blister & Other Unrefined Copper	103618	45396612	77702	39937454
Copper & Alloys :Workered (Bars, Rods, Plates, etc.)	100361	49227407	83438	44695904
Copper & Alloys :Worked, Nes	10200	7044868	6334	6448830
Copper Alloys: Unwrought Excl.Brass & Bronze	1277	662652	993	587326
Copper Mattes	++	9	3	1159
Copper Powder & Flakes	645	447429	702	563996
Copper Refined Copper Worked	217031	96866798	93319	50376605
Electroplated Anode of Nickel	31222	13449229	78724	40534144
Master Alloys of Copper	139	116130	105	79160
Refined Copper	151963	67289144	155038	78258449

Figures rounded off

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**Table – 42 : Imports of Copper & Alloys : Worked (Bars, Rods, Plates, etc.)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	100361	49227407	83438	44695904
Vietnam	41305	20228333	35758	20342324
China	18242	7159227	19324	7628556
Malaysia	19350	9817651	11231	6363215
Thailand	7209	3584499	4773	2485366
Germany	2800	1987953	2142	1541451
Korea, Rep. of	2761	1246925	2743	1307888
Hong Kong	1823	785658	1616	921410
Taiwan	2274	819269	2035	751076
Japan	881	725463	702	688367
USA	402	789016	379	642923
Other countries	3314	20834113	2735	2023328

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 3.95 to 20.2 million tonnes per annum in next six years with a capital layout of ₹ 5,500 crore. The company targets to complete the first phase of the plan, which will take its capacity to 12.2 mtpa by 2028-29. Copper demand in India is expected to grow at 6–7% due to increased thrust of Government of India towards "Make in India" and "Smart City" programmes and increased investments in railways, power, defence and infrastructure sectors would drive the demand for 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 vigorously 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 0.5 kg to 1 kg by 2025. The per capita copper consumption of China is 6 kg and world average is 3.2 kg.

The market for Electric Vehicles (EVs) and renewable energies are 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 the demand for copper. The projected demand for copper due to electric vehicles is expected to increase by 1.7 million tonnes by 2027. A new generation of high performance copper alloy wire is attracting attention of the electronic industry.