

LEAD & ZINC



# Indian Minerals Yearbook 2021

(Part- II :Metals and Alloys)

60<sup>th</sup> Edition

**LEAD & ZINC**

**(ADVANCE RELEASE)**

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

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# 10 Lead & Zinc

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**L**ead is a soft, heavy, toxic and highly malleable metal. It is bluish white when freshly cut, but tarnishes to dull grey when exposed. Both lead & zinc are found to occur together in ore along with other metals like silver and cadmium. Zinc is a silvery blue-grey metal with a relatively low melting and boiling point.

The largest single use of lead worldwide today is in the manufacture of lead-acid storage batteries which is about 74%, while the single largest use for zinc is in the Galvanising Industry which is about 50%.

Zinc is the fourth most widely used metal across the globe, trailing only steel, aluminium and copper. The country has the self-sufficiency in respect of zinc. In contrast, there is short supply of lead vis-a-vis the demand in the country.

The ever increasing demand for lead especially from Lead Acid Battery Sector is met by the thriving market of lead scrap recycling. The Government of India has enacted Battery Management and Handling Rule (BMHR), 2002, in order to enable further increase in the availability of scrap from the Organised Sector. It is estimated that 56% of refined lead produced worldwide is from recycled material. Producing lead through this route requires around one-third of the energy needed to extract it from its ores. Recovery of secondary zinc and lead is economically more attractive because of certain advantages. Besides lower energy consumption, it also entails low capital cost, less environmental hazards and high metal contents.

HZL is the only producer of primary lead and primary zinc in 2020-21 due to shut down of the operation of Edayar Zinc Limited (EZL).

## RESERVES/RESOURCES

The total reserves/resources of lead and zinc ore as on 1.4.2020 as per NMI database based on UNFC system have been estimated at 766.49 million tonnes. Of these, 103.27 million tonnes (13.47%) fall under 'Reserves' category while the balance 663.22 million tonnes (86.53%) are classified as 'Remaining Resources'.

The total/resources of ore containing + 10% Pb & Zn were estimated at 97.52 million tonnes (12.72%), ore containing 5 to 10% Pb & Zn were 280.05 million tonnes (36.53%) and ore containing less than 5% Pb & Zn were 388.90 million tonnes (50.73%).

The total metal content in total/resources of lead is 12.86 million tonnes and that of zinc is 33.17 million tonnes and for lead & zinc metal is 0.14 million tonnes. In terms of reserves, 1.90 million tonnes of lead metal and 7.43 million tonnes of zinc metal have been estimated. Rajasthan is endowed with the largest reserves/resources of lead – zinc ore amounting to 684.65 million tonnes (89.32%), followed by Andhra Pradesh 22.69 million tonnes (2.96%), Madhya Pradesh 19.06 million tonnes (2.48%), Bihar 11.43 million tonnes (1.49%) and Maharashtra 9.27 million tonnes (1.20%). Resources are also established in Gujarat, Meghalaya, Odisha, Sikkim, Tamil Nadu, Uttarakhand and West Bengal (Table-1).

## DEVELOPMENT

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

**Table – 1 : Reserves/Resources of Lead & Zinc Ore as on 1.4.2020 (P)  
(By Grades/States)**

(In '000 tonnes)

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						
<b>All India</b>													
<b>Ore</b>	<b>28791</b>	<b>63331</b>	<b>11153</b>	<b>103275</b>	<b>4627</b>	<b>23663</b>	<b>13784</b>	<b>51613</b>	<b>196911</b>	<b>368094</b>	<b>4530</b>	<b>663222</b>	<b>766497</b>
Lead metal	503.70	1188.47	208.02	1900.19	140.42	534.83	286.02	1117.33	2283.43	6607.77	-	10969.80	12869.99
Zinc metal	2356.56	4592.03	489.46	7438.05	448.15	1121.12	599.62	3540.38	5840.74	14080.66	101.65	25732.32	33170.37
Lead & Zinc metal	-	-	-	-	-	-	-	-	-	120.76	22.37	143.13	143.13
<b>By Grades</b>													
Ore with (+)10%	14500	24600	-	39100	155	148	81	9900	3920	44225	-	58429	97529
Ore with 5-10 %													
Pb & Zn	13310	28600	8580	50490	3223	7991	10796	35987	52913	118658	-	229569	280059
Ore with (-)5%													
Pb & Zn	981	10131	2573	13685	1249	15524	2907	5726	140078	205211	4530	375225	388909
Lead metal	503.70	1188.47	208.02	1900.19	140.42	534.83	286.02	1117.33	2283.43	6607.77	-	10969.80	12869.99
Zinc metal	2356.56	4592.03	489.46	7438.05	448.15	1121.12	599.62	3540.38	5840.74	14080.66	101.65	25732.32	33170.37
Lead & Zinc metal	-	-	-	-	-	-	-	-	-	120.76	22.37	143.13	143.13
<b>By States</b>													
<b>Andhra Pradesh</b>													
Ore	-	-	-	-	-	-	-	1000	4159	17530	-	22689	22689
Lead metal	-	-	-	-	-	-	-	28.70	119.53	688.65	-	836.88	836.88
Zinc metal	-	-	-	-	-	-	-	12.40	43.57	7.19	-	63.16	63.16
<b>Bihar</b>													
Ore	-	-	-	-	-	-	-	-	435	11000	-	11435	11435
Lead metal	-	-	-	-	-	-	-	-	-	24	-	24	24
Zinc metal	-	-	-	-	-	-	-	-	14.75	24	-	38.75	38.75
<b>Gujarat</b>													
Ore	-	-	-	-	2013	2371	969	129	-	200	-	5682	5682
Lead metal	-	-	-	-	81.94	88.2	34.41	3.90	-	-	-	208.45	208.45
Zinc metal	-	-	-	-	111.73	111.44	37.13	1.10	-	-	-	261.40	261.40
Lead & Zinc metal	-	-	-	-	-	-	-	-	-	0.9	-	0.9	0.9
<b>Madhya Pradesh</b>													
Ore	-	-	-	-	129	117	-	1510	6396	7765	3150	19067	19067
Lead metal	-	-	-	-	-	-	-	26.12	5.13	5.04	-	36.29	36.29
Zinc metal	-	-	-	-	5.20	4.71	-	114.76	44.67	200.07	101.12	470.53	470.53
<b>Maharashtra</b>													
Ore	-	-	-	-	-	-	-	1967	6305	1000	-	9272	9272
Zinc metal	-	-	-	-	-	-	-	133.56	428.11	28	-	589.67	589.67

(Contd)

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Grade/State	(In 000' tonnes)											
	Reserves					Remaining Resources					Total Resources (A+B)	
	Proved STD111	Probable STD121	STD122	Total (A)	Feasibility STD211	Pre-feasibility STD221	STD222	Measured STD331	Indicated STD332	Inferred STD333		Reconnaissance STD334
<b>Meghalaya</b>												
Ore	-	-	-	-	-	-	-	-	880	-	-	880
Lead metal	-	-	-	-	-	-	-	-	16.50	-	-	16.50
Zinc metal	-	-	-	-	-	-	-	-	14.00	-	-	14.00
<b>Odisha</b>												
Ore	-	-	-	-	-	961	119	-	-	670	-	1750
Lead metal	-	-	-	-	-	34.32	4.25	-	-	38.39	-	76.96
<b>Rajasthan</b>												
Ore	28791	63331	11153	103275	2485	19779	12632	43337	172985	328784	1380	581381
Lead metal	503.70	1188.47	208.02	1900.19	58.48	405.41	245.68	917.50	1972.47	5832.19	-	9431.73
Zinc metal	2356.56	4592.03	489.46	7438.05	331.22	992.09	559.35	3112.59	5052.47	13779.72	0.53	23827.97
Lead & Zinc metal	-	-	-	-	-	-	-	-	-	119.86	22.37	142.23
<b>Sikkim</b>												
Ore	-	-	-	-	-	436	64	300	-	150	-	950
Lead metal	-	-	-	-	-	6.9	1.68	-	-	-	-	8.58
Zinc metal	-	-	-	-	-	12.88	3.14	3	-	1.05	-	20.07
<b>Tamil Nadu</b>												
Ore	-	-	-	-	-	-	-	200	590	-	-	790
Lead metal	-	-	-	-	-	-	-	2.26	5.48	-	-	7.74
Zinc metal	-	-	-	-	-	-	-	11.76	24.76	-	-	36.52
<b>Uttarakhand</b>												
Ore	-	-	-	-	-	-	-	3170	1790	660	-	5620
Lead metal	-	-	-	-	-	-	-	138.85	34.25	9.50	-	182.60
Zinc metal	-	-	-	-	-	-	-	151.21	87.99	27.63	-	266.83
<b>West Bengal</b>												
Ore	-	-	-	-	-	-	-	-	3371	335	-	3706
Lead metal	-	-	-	-	-	-	-	-	130.07	10.00	-	140.07
Zinc metal	-	-	-	-	-	-	-	-	130.42	13.00	-	143.42

Figures rounded off

## PRODUCTION & STOCKS

### Lead & Zinc Ores and Concentrates

The entire output of lead & zinc ore and concentrates in 2019-20 and 2020-21 was reported by mines owned by Hindustan Zinc Ltd, a Private Sector company.

The production of lead and zinc ore at 15.46 million tonnes in 2020-21 increased by 7% as compared to previous year. The metal content of lead and zinc in the ore produced in 2020-21 works out to 2,74,933 tonnes and 8,42,470 tonnes respectively as against the corresponding figures 2,57,268 and 8,24,820 tonnes in the preceding year (Tables-2 & 3).

During the year 2020-21, 15.46 million tonnes of lead & zinc ore was treated as against 14.40 million tonnes in 19-20 (Table-4).

The production of lead concentrates in 2020-21 at 3,76,924 tonnes increased by 7% as compared to the previous year. Entire production of lead concentrates was reported from Rajasthan (Tables-5 & 6).

The production of zinc concentrates increased to 15,13,996 tonnes in 2020-21 from 14,46,824 tonnes in 2019-20. The entire production of zinc concentrates was reported from Rajasthan (Tables - 7 & 8).

### Grade Analysis

All India average metal content of ore treated during 2020-21 worked out to be 7.23% (1.78% Pb and 5.45% Zn) as against 7.42% (1.77% Pb and 5.65% Zn) in 2019-20. The metal content of ore treated at Rampura Agucha mine in Bhilwara district of Rajasthan was the highest at 11.08% (1.43% Pb & 9.65% Zn). The lead concentrates produced during 2020-21 was of grade 57.38% Pb as against 56.03% Pb in 2019-20. Metal content of zinc concentrates produced in Rajasthan

worked out to 49.94% Zn in 2020-21 as against 49.71% Zn in the previous year.

### Stock

Mine-head closing stocks of lead concentrates in 2020-21 were 2447 tonnes as against 17,735 tonnes in 2019-20. The entire quantity of the stocks at the end of the year was held in Rajasthan (Table-9).

Mine-head closing stocks of zinc concentrates in 2020-21 were 28,926 tonnes as against 25,929 tonnes in 2019-20. The entire quantity of the stocks was held in Rajasthan (Table-10).

### Employment

The average daily labour employed in lead and zinc mines during the year 2020-21 was 9557 as against 10,396 in 2019-20.

### Lead and Zinc Metals

The production of primary lead during 2020-21 increased to 2,14,399 tonnes from 1,81,365 tonnes during 2019-20. The entire output of primary lead was from Chanderiya and Dariba smelters of Hindustan Zinc Ltd.

The production of zinc ingot metal at 7,15,445 tonnes in 2020-21 increased by 4% from 6,88,282 tonnes in the previous year. Hindustan Zinc Ltd, contributed 100% of the total output. (Tables - 11 to 14).

**Table - 2 : Producers of Lead & Zinc Ore, Concentrates & Metals, 2020-21**

Name and address of the producer	Location	
	State	District
Hindustan Zinc Ltd, Yashad Bhavan, Udaipur - 313 004, Rajasthan.	Rajasthan	Ajmer Bhilwara Rajsamand Udaipur

**Table - 3 : Production of Lead and Zinc Ore, 2019-20 and 2020-21 (By State)**

(In tonnes)

State	2019-20			2020-21 (P)		
	Ore Produced	Metal content		Ore Produced	Metal content	
		Lead (Pb)	Zinc (Zn)		Lead (Pb)	Zinc (Zn)
<b>India</b>	<b>14479032</b>	<b>257268</b>	<b>824820</b>	<b>15455343</b>	<b>274933</b>	842470
Rajasthan	14479032	257268	824820	15455343	274933	842470

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**Table – 4 : Lead and Zinc Ore Treated, 2019-20 and 2020-21  
(By State)**

(In tonnes)

State	2019-20			2020-21 (P)		
	Ore Treated	Metal content		Ore Treated	Metal content	
		Lead (Pb)	Zinc (Zn)		Lead (Pb)	Zinc (Zn)
<b>India</b>	<b>14401132</b>	<b>254580</b>	<b>813115</b>	<b>15458066</b>	<b>274977</b>	<b>842273</b>
Rajasthan	14401132	254580	813115	15458066	274977	842273

**Table – 5 : Production of Lead Concentrates, 2018-19 to 2020-21  
(By State)**

(Quantity in tonnes; Value in ₹'000)

State	2018-19		2019-20		2020-21 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>India</b>	<b>358369</b>	<b>16316914</b>	<b>351746</b>	<b>18260832</b>	<b>376924</b>	<b>20416324</b>
Rajasthan	358369	16316914	351746	18260832	376924	20416324

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

(Quantity in tonnes; Value in ₹'000)

State/District	2019-20				2020-21 (P)			
	No. of mines	Production			No. of mines	Production		
		Quantity	Pb%	Value		Quantity	Pb%	Value
<b>India</b>	<b>10</b>	<b>351746</b>	<b>56.03</b>	<b>18260832</b>	<b>10</b>	<b>376924</b>	<b>57.38</b>	<b>20416324</b>
<b>Public Sector</b>	<b>2</b>	-	-	-	<b>2</b>	-	-	-
Private Sector	8	351746	56.03	18260832	8	376924	57.38	20416324
<b>Rajasthan</b>	<b>10</b>	<b>351746</b>	<b>56.03</b>	<b>18260832</b>	<b>10</b>	<b>376924</b>	<b>57.38</b>	<b>20416324</b>
Ajmer*	1	-	-	-	1	-	-	-
Bhilwara	1	73839	54.93	2929685	1	79537	56.97	3147437
Rajsamand	3	185895	55.27	8319263	3	194850	55.78	8768404
Sirohi	1	-	-	-	1	-	-	-
Udaipur	4	92012	58.43	7011884	4	102537	60.75	8500483

\*: 34RAJ01001 - Reported production of lead and zinc ore only and processing is done along with ore produced from Rampura Agucha mine at Bhilwara.

34RAJ24001 reported employment but no production.

34RAJ27007 has not submitted Annual Returns for both years. Estimation is done from Monthly Returns. It has reported employment but no production.

**Table – 7 : Production of Zinc Concentrates, 2018-19 to 2020-21  
(By State)**

(Quantity in tonnes; Value in ₹'000)

State	2018-19		2019-20		2020-21 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>India</b>	<b>1456804</b>	<b>56083827</b>	<b>1446824</b>	<b>60438504</b>	<b>1513996</b>	<b>66668989</b>
Rajasthan	1456804	56083827	1446824	60438504	1513996	66668989

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**Table – 8 : Production of Zinc Concentrates, 2019-20 & 2020-21  
(By Sector/State/Districts)**

(Quantity in tonnes; Value in ₹'000)

State/District	No. of mines	2019-20			2020-21 (P)			
		Production			Production			
		Quantity	Zn%	Value	Quantity	Zn%	Value	
<b>India</b>	@	<b>1446824</b>	<b>49.71</b>	<b>60438504</b>	@	<b>1513996</b>	<b>49.94</b>	<b>66668989</b>
Private Sector	@	1446824	49.71	60438504	@	1513996	49.94	66668989
<b>Rajasthan</b>	@	<b>1446824</b>	<b>49.71</b>	<b>60438504</b>	@	<b>1513996</b>	<b>49.94</b>	<b>66668989</b>
Bhilwara	@	904023	49.79	33291114	@	943093	49.98	34787718
Rajsamand	@	403559	48.91	16992620	@	400197	48.99	16801729
Sirohi	@	-	-	-	@	-	-	-
Udaipur	@	139242	51.47	10154770	@	170706	52.00	15079542

\*: 34RAJ01001 - Reported production of lead and zinc ore only and processing is done along with ore produced from Rampura Agucha mine at Bhilwara.

**Table – 9 : Mine-head Closing Stocks  
of Lead Concentrates,  
2019-20 & 2020-21  
(By State)**

State	(In tonnes)	
	2019-20	2020-21 (P)
<b>India</b>	<b>17735</b>	<b>2447</b>
Rajasthan	17735	2447

**Table – 11 : Production of Lead Metal,  
2018-19 to 2020-21**

(Quantity in tonnes; Value in ₹'000)

Year	Lead Primary	
	Quantity	Value
2018-19	197839	33814419
2019-20	181365	29111241
2020-21 (P)	214399	34531700

**Table – 10 : Mine-head Closing Stocks  
of Zinc Concentrates,  
2019-20 & 2020-21  
(By State)**

State	(In tonnes)	
	2019-20	2020-21 (P)
<b>India</b>	<b>25929</b>	<b>28926</b>
Rajasthan	25929	28926

**Table – 12 : Production of Zinc Metal,  
2018-19 to 2020-21**

(Quantity in tonnes; Value in ₹'000)

Year	Zinc Ingots	
	Quantity	Value
2018-19	696283	153894301
2019-20	688282	137840297
2020-21 (P)	715445	147976396

**Table – 13 : Production of Lead (Primary), 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
<b>India</b>		<b>181365</b>	<b>29111241</b>	<b>214399</b>	<b>34531700</b>
Rajasthan	HZL Chanderiya/ Dariba	181365	29111241	214399	34531700

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**Table – 14 : Production of Zinc (Ingots), 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
<b>India</b>		<b>688282</b>	<b>137840297</b>	<b>715445</b>	<b>147976396</b>
Rajasthan	HZL Chanderiya/ Debari/Dariba	688282	137840297	715445	147976396

**MINING & MILLING**

HZL is the only integrated lead and zinc metal producer in the country. Its operations can be classified into mining and smelting. At present, HZL's eight mines and all mining operations are located in Rajasthan. The eight mines are Rampura Agucha mine (Bhilwara district), Kayad mine (Ajmer district), Rajpura Dariba mine, Sindesar Khurd mine (both in Rajsamand district) and Zawar group of mines (4 mines in Udaipur district i.e. Mochia, Balaria, Zawarmala and Baroi), Rajasthan. All the mines of HZL undertake underground mining operations. Rampura Agucha mine was completely turned to underground mine with an annual production capacity of 5 million tonnes of lead & zinc ore. Sindesar Khurd mine is highly mechanised and the largest ore producing underground mine with annual production capacity of 6 million tonnes. The other six mines viz, Rajpura Dariba, Zawar group of mines (Mochia, Balaria, Zawarmala and Baroi) and Kayad mine are underground mines with an annual production capacity of 1.08 million tonnes, 4.0 million tonnes and 1.2 million tonnes of lead & zinc ore respectively (Table-15).

Zawar group of mines is a cluster of four underground mines viz. Mochia, Balaria, Zawarmala and Baroi mines and one beneficiation plant for all mines commissioned in the year 1966. Zawar group of mines, one of the oldest mines is located about 40 km south of Udaipur. Lead & Zinc ore of the mines is divided into stope blocks which are drilled and blasted using sub-level open stoping mining method. Loading and transportation are done using combination of LHDs, LPDTs, LOCO and shaft hoisting to surface. The ore is further crushed and passed through a flotation process to produce concentrate. In 2020-21, the Zawar group of mines produced 3.9 million tonnes ore.

**Table – 15 : Ore Production Capacity of  
HZL Mines**

Mine	Ore	Capacity (million tpy)
<b>Total</b>		<b>17.28</b>
Zawar Mines, Distt Udaipur, Rajasthan.	Zinc-lead	4.00
Rajpura Dariba, Distt Rajsamand, Rajasthan.	Zinc-lead	1.08
Sindesar Khurd Mine, Distt Rajsamand, Rajasthan.	Zinc-lead	6.00
Rampura Agucha, Distt Bhilwara, Rajasthan.	Zinc-lead	5.00
Kayad Distt Ajmer Rajasthan.	Zinc-lead	1.20

*Source : HZL Annual Report 2020-21*

The Rajpura Dariba mine is an underground lead & zinc mine where mining operations began in 1983. It is located at 75 kilometers north-east of Udaipur, Rajasthan. Mining is carried out by using Blasthole stoping method with hydraulic filling. Mined out stopes are backfilled with cement tailings. During the year 2020-21, Rajpura Dariba Mine produced 1.2 million tonnes ore. 1.18% Pb feed-grade. Presently, the mine is accessed via decline and two shafts. As RDM ore body also allows for multiple production centres, the mine is poised to produce at the capacity of 2 million tonnes per annum of ore in future with new level of mechanisation & automation. Mine has achieved highest truck filling hours and exploration



drilling resulting in its readiness for expansion.

Rampura Agucha mine is located at 230 km north of Udaipur in Bhilwara district, Rajasthan and it was commissioned in 1991. It has high zinc-lead reserve grades averaging 15.4%. In 2019-20, the production of ore was carried out by underground mining at 4.3 million tonnes. Until 2017-18 the production of ore from the mine was by surface mining and the mine has been fully transformed into an underground mine. Two ventilation shafts (North and South) each with diameter of 7.5 m and 450 m depth are in operation. The main hoisting shaft of 7.5 m diameter has been sunk and furnished to its final depth of 950 m and winders, skip loading & surface conveyors have been installed, while off-shaft development activities to commission underground crushing and conveying system are under progress. Paste-Fill plant has been established in the mine area. Underhand stoping method has been adopted which will use mine tailings to fill stopes after ore extraction.

Sindesar Khurd mine is located at 6 km NNE of Rajpura Dariba mine and 82 km north-east of Udaipur. It is an underground mine, commissioned in 2006. The average reserve grade of Sindesar Khurd mine is 7% with its silver-rich lead-zinc deposit. The mine lies on the same geological belt as the Rajpura Dariba mine. During the year 2020-21, Sindesar Khurd mine produced 4.8 million tonnes ore.

Kayad mine is a newly developed underground mine near Ajmer, Rajasthan. It was commissioned in 2014 having small but high-grade ore at 6.3% Pb & Zn ore deposit. In Kayad mine, 21 tonnes capacity of LHD and 65 tonnes capacity of LPDT are used to produce 1.2 million tonnes of ore per annum. The mine has access through a single decline from surface portal to the top of the orebody and split in two declines 75 meters below surface.

Longitudinal Long-Hole Open Stopping method is used for the steeper and thinner portion of ore body and Transverse Long-Hole Open Stopping method for flatty dipping and thick portion of the ore body. In the year 2020-21, the Kayad mine produced 1.2 million tonnes ore. The ore from Kayad mine is treated at Rampura Agucha's beneficiation plant.

## SMELTING

Primary lead was produced entirely by HZL which operated smelter at Chanderiya and Dariba having capacity of 90,000 tonnes and 1,20,000 tonnes per annum of lead metal, respectively. Thus, the smelting capacity for lead (primary) in the country presently is 2,10,000 tonnes per annum. Company-wise smelting capacity of lead and zinc smelters is furnished in Table-16.

The smelting capacity of HZL for zinc is distributed between three smelters at Debari (88,000 tonnes), Chanderiya (5,85,000 tonnes) and Dariba (2,40,000 tonnes). Edayar Zinc Ltd's plant at Binanipuram (Aluva), Kerala, has capacity of 38,000 tonnes per annum. Thus, the smelting capacity for zinc in the country is 9,51,000 tonnes per annum. EZL produced zinc from imported concentrates but since the Company has been declared as sick unit, it did not operate its plant. Besides lead & zinc capacities, HZL has capacities to produce 800 tonnes per annum of silver. HZL is India's largest manufacturer of sulphuric acid which is by-product of its smelting operations. In 2019-20, HZL produced 1.24 million tonnes of sulphuric acid, as compared to 1.28 million tonnes in the previous year.

Edayar Zinc Ltd (EZL) has been incurring huge fixed costs due to shutdown of the plant from April, 2014 onwards, except for a brief period of 59 days when the plant operated. The company entered into a One Time Settlement (OTS) with the Lenders and payments are being made under the sanctioned OTS. Due to Covid-19 and consequent lockdown, Company sought extension of time for payment under the settlement. Settlement with the statutory authorities and Government agencies is underway. The Company is hopeful that Lenders, Creditors and Authorities will take a measured stand to safeguard interest of all stakeholders.

Chanderiya lead-zinc smelting complex is located at 110 km North of Udaipur in Chittorgarh district, Rajasthan. It was commissioned in 1991 with an initial production capacity of 70,000 tonnes per annum. Chanderiya lead-zinc smelting complex comprises one zinc Pyro-metallurgical smelter having production capacity of 1,05,000 tonnes zinc, one lead Pyrometallurgical smelter having production capacity

**Table – 16 : Company-wise Capacity and Production of Primary Lead and Zinc**

(In tonnes)

Company	Lead capacity tpy	Production		Zinc capacity tpy	Production	
		2018-19	2019-20 (P)		2018-19	2019-20 (P)
Hindustan Zinc Ltd	210000	197839	132316	913000	696283	516316
Edayar Zinc Ltd	-	-	-	38000	-	-
<b>Total</b>	<b>210000</b>	<b>197839</b>	<b>132316</b>	<b>951000</b>	<b>696283</b>	<b>516316</b>

of 90,000 tonnes lead and one Hydro-metallurgical zinc smelter having production capacity of 4,80,000 tonnes zinc. It employs Roast-Leach Electro-winning technology in its Hydro-metallurgical smelters, Imperial Smelting process in lead-zinc smelter and Top Submerged Lance Technology (Designed by M/s Ausmelt Ltd, Australia) coupled with Cansolv Technology for its lead smelter. In the year 2019-20, Chanderia lead-zinc smelter produced 4,25,780 tonnes of zinc and 94,916 tonnes of lead as compared to 4,24,803 tonnes of zinc and 85,916 tonnes of lead in the previous year.

Zinc fuming is a process that recovers valuable metals from zinc residue and will help in higher recovery of zinc, lead and silver. At the Hydro plant, Hydro-2 cell house was upgraded from 192 kA to 200 kA for enhancing zinc output.

Zinc Smelter Debari was commissioned in the year 1968 with an initial production capacity of 92,000 tonnes per annum of zinc. The present capacity has now reached 88,000 tonnes per annum of zinc. It is located at about 13 km north of Udaipur, Rajasthan. Zinc smelter Debari employs Roast-leach Electro-winning Technology at its Hydro-metallurgical zinc smelter. The plant has three roasting facilities, leaching & purification section, electrolysis, melting and casting sections. It produced surplus calcine, an intermediate product, which is supplied to the rest of the Hydro-metallurgical zinc smelter. In the year 2019-20, Zinc Smelter Debari produced 62,817 tonnes of zinc as compared to 67,968 tonnes of zinc in the previous year.

Dariba smelting complex is located at 75 km north-east of Udaipur near to Rajpura Dariba mine and 7 km from Sindesar Khurd mine in Rajsamand district, Rajasthan. The zinc smelter at Dariba was commissioned in March 2010 and has a capacity of

2,40,000 tonnes per annum while lead smelter was commissioned in July, 2011 and has a capacity of 1,20,000 tonnes per annum. Dariba smelting complex employs Roast-Leach Electro-winning technology at its Hydro-metallurgical zinc smelter. The plant has two roasting facilities, a leaching & purification section and a cell house. The lead smelter employs SKS bottom blowing technology. The plant consists of SKS furnace–bottom blowing, blast furnace, electric arc furnace & fuming furnace and electro-refining. Fuming furnace is also installed to produce zinc oxide from blast furnace slag. In the year 2019-20, the smelter produced 2,00,689 tonnes of zinc and 86,454 tonnes of lead metal as compared to 2,03,512 tonnes of zinc and 1,11,922 tonnes of lead metal in the previous year. Dariba Smelting Complex lead plant steam was utilised in Dariba Smelting Complex Captive Power Plant (CPP) for reducing the auxiliary steam consumption. In 2019-20, Dariba Smelting Complex produced 4,26,623 tonnes of sulphuric acid as compared to that of 4,77,217 tonnes in the previous year.

The product range of HZL constitutes two grades, namely, Special High Grade (SHG) zinc containing 99.995% Zn (min.) and Prime Western (PW) containing 98.65% Zn (min.). Both these products are available in the form of slabs weighing 25 kg, SHG Jumbo weighing 1,000 kg and PW Jumbo weighing 600 kg. Lead is available as HZL Grade containing 99.99% Pb (min.) in the form of slab weighing 24 kg. In October, 2016, a new zinc alloy value-added product, HZDA or Hindustan Zinc Die-cast Alloy was added to the Company's portfolio from Chanderiya Lead-Zinc Smelter.

## **POLLUTION CONTROL & ENVIRONMENTAL MANAGEMENT EFFORTS**

The standard for Emission or Discharge of Environment Pollutant from lead & zinc smelting is prescribed in Schedule-I of the Environment (Protection) Rules, 1986. The standards for Particulate Matter Emission in concentrator for lead & zinc smelter is 150 mg per normal cubic metre and the standard for emission of oxides of sulphur in smelter & convertor is that off-gases must be utilised for sulphuric acid manufacture. The limit of sulphur dioxide emission from stock shall not exceed 4 kg per tonne of concentrate (one hundred per cent acid produced).

At underground mines, the tailings generated after beneficiation is utilised to backfill the underground mined stopes and the remaining tailings is stored in tailing dam at various mines location. During the process of recovery of metal at smelters, waste is generated. The waste contains toxic element, i.e., waste water effluent sludge, smelter slag leach residues, Suspended Particulate Matter (SPM), SO<sub>2</sub>, NOX and toxic metal fumes which are harmful at low exposure generated during the production of lead & zinc metal.

Smelting and mining operations of HZL are working on zero discharge principle and the Company is committed for efficient utilisation of waste generated at its mines and smelter. The Company has adopted Fumer technology to reduce jarosite generation, which is known to be successful in a few Chinese and Korean Zinc Plants.

Hindustan Zinc Limited runs a 25 MLD STP in Udaipur for treating municipal sewage. The enhancement of capacity of STP to 45 MLD and establishment of another STP of 15 MLD capacity is in progress. This STP is a unique PPP initiative of the Company and is counted among the best functioning STPs in the country.

HZL is using internal waste for paste filling of stopes in mines. Remote operations and autonomous fleet in mines keep people away from risk. Some other initiatives in pipeline include ventilation on demand in mines to reduce energy consumption and use of advance flotation & ore retreatment technology to

increase ore-to-metal ratio which is aimed at reducing waste and increasing output.

The sewage treatment plants at Debari and Chanderiya smelters were operated continuously and the recovered water was reutilised in the smelter and for plantation in the colony. Over the years, the Company has been voluntarily filing Carbon Disclosure Project (CDP) responses as a proactive step towards reporting carbon footprint emissions.

HZL has entered into a charter on Corporate Responsibility for Environmental Protection (CREP) with MoEF, Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs) for achieving a quantum jump in its environmental performance in the coming years.

Many of the secondary lead producing units have operated in the Unorganised Sector and they create major pollution by emission of lead vapour and SOX. The small-scale units generally do not control process parameters, such as, smelting temperature, charge to fuel ratio, leakages in the body, etc. As per the National Ambient Air Quality standards, the permissible concentration of lead in ambient air is 0.50 µg/m<sup>3</sup> while the permissible limit for SOX is 50 µg/m<sup>3</sup>.

## **RECYCLING OF LEAD & ZINC**

### **Lead**

The storage battery scrap is the main source of secondary lead production. Lead is one of the highest recycled metals. It can be re-melted any number of times, and provided enough processes to remove impurities are performed, the final product (termed secondary lead) is indistinguishable from primary lead produced from ore. The amount of lead recycled is about 75% of the total lead production in India. More than 80% of lead consumed in the country goes for manufacturing of lead batteries.

The Government of India enacted Battery Waste Management Rules, 2020 and issued Gazette Notification No. S.O. 770 (E) dated 20<sup>th</sup> Feb. 2020 to organise the recycling of lead acid batteries and to make available raw material to the lead reproducers. The said Rules are in supersession of the Batteries (Management and Handling) Rules, 2001, published

vide number S.O.1035(E) dated 16<sup>th</sup> May 2001. At present, 672 units are registered as lead recycling units with CPCB for processing used lead batteries with the production capacity of 3.53 million tonnes per annum in India. CPCB has also developed online web-based application “Batteries (Importer) Registration Management” for registration /renewal of registration for import of new lead acid batteries.

Lead when used as metal in batteries, cable sheathing and sheathing for containing radiation is fully recyclable and it does not lose its properties. There is indeed a thriving industry that recycles lead in the country. However, due to the health risk involved in lead recycling the Central Pollution Control Board issues licences to the lead-reprocessors to ensure adherence to environmental norms.

### Zinc

The largest consumer of zinc is the Galvanising Industry. The zinc once used for galvanising as well as for brass making is not recoverable. Hence, the quantum of zinc recycling is comparatively small as compared to lead recycling. The secondary zinc was recovered from pure zinc scrap in the form of sheet cutting, zinc roofings, old zinc anodes and alloys containing zinc as a major constituent.

## CONSUMPTION

Consumption of lead and zinc in various industries is not available readily. However, it is known that lead and zinc are consumed in the form of metals as well as in the form of compounds and oxides.

### Lead

The Battery Industry consumes about 80% of lead and remaining 20% is consumed in pigments & compounds, rolled & extruded products, alloys, cable sheathing and other industries.

The apparent consumption of lead during the year 2018-19 and 2019-20 was calculated on the basis of production of lead (primary) and imports & exports of refined lead (unwrought). The apparent consumption thus arrived at was 1,13,225 tonnes in 2019-20 and 1,78,297 tonnes in 2018-19 (Table-17). In addition to this, it is understood that large quantities of recycled lead were also consumed in certain other industries.

**Table – 17 : Apparent Consumption of Lead (Based on Production of Lead (Primary), and Imports & Exports of Refined Lead, Unwrought)**

Item	(In tonnes)	
	2018-19	2019-20
Total Production Lead (Primary)	197839	132316
Total Imports*	118072	103604
Total Exports*	137614	122695
Apparent Consumption (Primary)	178297	113225

\* DGCI & S, Kolkata

### Zinc

Owing to its corrosion resistance in varied types of environment, zinc is used for protecting steel by way of galvanising. The Galvanising Industry alone consumes about 57% of zinc, followed by coatings (16%), die-casting alloys (14%), oxides & chemicals (7%) and extruded products (6%). The apparent consumption of zinc during the year 2018-19 and 2019-20 was calculated on the basis of production of zinc, import & export of zinc (not alloyed). The apparent consumption, thus arrived at was 6,22,188 tonnes in 2018-19 and 4,24,605 tonnes in 2019-20 (Table-18). The data on trade of zinc (not-alloyed) was taken from DGCI&S (HS Code 79011100). In addition to this, some quantities of recycled zinc are also consumed in certain other industries.

**Table – 18 : Apparent Consumption of Zinc (Based on Production of Zinc (Ingots) and Imports & Exports of Zinc (not alloyed))**

Item	(In tonnes)	
	2018-19	2019-20
Total Production Zinc	696283	516316
Total Imports*	111013	107453
Total Exports*	185108	199164
Apparent Consumption	622188	424605

\*DGCI&S, Kolkata

## **SUBSTITUTES & TECHNICAL POSSIBILITIES**

### **Lead**

Battery replacements include batteries of nickel-zinc, zinc lithium chloride, sulphide or nickel lithium hydride. The large-scale commercial use of any of these four possible substitutes was so far precluded by cost and operating problems. Polyethylene and other materials work as substitute in some cable applications.

In construction applications, in place of galvanised sheets, copper and aluminium are alternatives. In corrosive chemical environment, stainless steel, titanium, plastics and cements are substitutes. Tin, glass, plastics and aluminium are alternatives in tubes and containers; iron & steel or bismuth in shots for ammunition; and tin in solder. In Electronic Industry, there has been a move towards lead-free solders with varying compositions of tin, bismuth, silver and copper.

Environmental concerns for lead are limiting the uses, particularly in gasoline, where its use as an anti-knocking agent was phased out by the introduction of catalytic converters. Storage batteries for industrial load levelling, mains power management and electric vehicles have growing markets. The continued search for weight reduction is reducing the amount of lead per battery, and battery lives are being extended. Possible new developments include the use of lead as an anti-oxidant in asphalt, as a shielding material in nuclear waste, in protection of buildings against radon gases and as a sound buffer. Environmental legislation will inhibit the growth of new uses and possibly eliminate lead from many existing uses. The Organisation for Economic Cooperation &

Development (OECD) is actively examining possible restrictions on uses of lead. New techniques to recover lead from concentrates and from scrap are being developed and are bound to become more important in future. Recycling of lead and zinc through environmentally safe processes needs to be encouraged as the growing use of lead and zinc in railway electrification as well as in road transport vehicles have created shortage of these metals in the country.

### **Zinc**

Aluminium, magnesium and plastic compete in some die-casting applications. Ceramic and plastic coatings, electroplated cadmium & aluminium and special steel compete in some galvanising applications. Aluminium, magnesium and titanium can replace zinc in chemicals and pigments. Zirconium is an alternative in ceramic and enamel applications. New alloys, e.g. superplastic alloys of zinc and aluminium could be developed. Many elements are substitutes for zinc in chemical, electronic and pigment uses.

## **WORLD REVIEW**

### **Lead**

The world's reserves of lead were estimated at 90 million tonnes in terms of lead content. Australia possesses 41% of the world's reserves followed by China (20%), Peru (7%), Mexico & USA (6% each) and Russia (5%). (Table- 19).

### **Zinc**

The world's reserves of zinc were estimated at 250 million tonnes of zinc content. Australia accounts for 27% of world's zinc reserves, followed by China (18%), Russia (9%), Kazakhstan (5%), USA (4%), etc. (Table-20).

**Table – 19 : World Reserves of Lead  
(By Principal Countries)**

(In '000 tonnes of lead content)

Country	Reserves
<b>World: Total (rounded off)</b>	<b>90000</b>
Australia <sup>(a)</sup>	<sup>8</sup> 37000
Bolivia	1600
China	18000
India*	2500
Kazakhstan	2000
Mexico	5600
Peru	6400
Russia	4000
Sweden	1100
Tajikistan	NA
Turkey	860
USA	5000
Other countries	5900

**Source:** USGS, Mineral Commodity Summaries, 2022.  
(a) For Australia, Joint Ore Reserve Committee-compliant reserves were about 12 million tonnes.  
\* India's total reserve/ resources of lead & zinc as per National Mineral Inventory based on UNFC as on 01.04.2020 are 766.49 million tonnes.

**Table – 20 : World Reserves of Zinc  
(By Principal Countries)**

(In '000 tonnes of zinc content)

Country	Reserves
<b>World: Total (rounded off)</b>	<b>250000</b>
Australia <sup>(a)</sup>	<sup>11</sup> 69000
Bolivia	4800
Canada	5400
China	44000
India*	9400
Kazakhstan	12000
Mexico	1900
Peru	1900
Russia	22000
Sweden	3700
USA	9000
Other countries	34000

**Source:** USGS, Mineral Commodity Summaries, 2022.  
(a) For Australia, Joint Ore Reserve Committee-compliant reserves were about 25 million tonnes.  
\* India's total reserves/ resources of lead & zinc as per National Mineral Inventory based on UNFC as on 01.04.2020 are 766.49 million tonnes.

**PRODUCTION****Lead**

World mine production of lead in terms of metal content was about 4.54 million tonnes in the year 2020 which is 6% more as compared to 4.81 million tonnes in the previous year. China is foremost amongst producing countries with about 1.97 million tonnes (43%) followed by Australia (11%), USA & Mexico (6% each), and Peru (5%). (Table-21).

**Zinc**

World mine production of zinc ore was at 11.53 million tonnes in terms of zinc content in the year 2020 which was slightly decreased by 7% from 12.48 million tonnes in the year 2019. China is at top position with 3.20 million tonnes (27%) followed by Peru & Australia (11% each), USA, India & Mexico (6% each), Canada (4%), etc. (Table- 22).

**Table – 21 : World Mine Production of Lead  
(By Principal Countries)**

(In '000 tonnes of metal content)

Country	2018	2019	2020
<b>World: Total (rounded off)</b>	<b>4471639</b>	<b>4818746</b>	<b>4543981</b>
China	1892173	2006000	1970000
Australia	446571	500985	494271
USA	271000	266000	297000
Mexico	230869	372106	260390
Peru	289123	308116	241548
India* <sup>(c)</sup>	207067(c)	202964(c)	217787
Russia	206100	207900*	200000
Turkey	76000*	71500*	81500
Iran	49600	72500*	70000
Poland	70340	69860	65660
Other countries	732796	740815	645825

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

\* India's production of primary lead in 2018-19, 2019-20 and 2020-21 was 181 thousand tonnes and 214 thousand tonnes respectively.  
(c) Year ended 31<sup>st</sup> March following that stated  
(d) Metal content of ore  
(e): Estimated

**Table – 22 : World Mine Production of Zinc  
(By Principal Countries)**

(In '000 tonnes of metal content)			
Country	2018	2019	2020
<b>World:Total(rounded off)</b>	<b>12227675</b>	<b>12483251</b>	<b>11530291</b>
China	3721100*	3700000*	3200000
Peru	1474383	1404382	1334570
Australia	1146781	1337321	1314910
India*(b)	728402(b)	723412(b)	756998
USA	824000	753000	718000
Mexico	662355	859194	688461
Canada	304964	323019	371491
Bolivia	519630	527521	358411
Kazakhstan	346000	321900	335400
Russia	288000	275400*	280000
Other countries	2212060	2258102	2172050

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

\* India's production of primary zinc in 2018-19, 2019-20 and 2020-21 was 696 thousand tonnes, 688 thousand tonnes and 715 thousand tonnes respectively.

(b) Year ended 31<sup>st</sup> March following that stated

(e): Estimated

## Lead

As per USGS Minerals Yearbook, world refined lead production (including secondary production) was 11.40 million tonnes in which secondary lead production was 6.6 million tonnes in the year 2018. Secondary lead production represented about 58% of total refined lead production worldwide in 2018 which was 55% in 2017. The global production of refined lead in the year 2018 is the same as that of the previous year. China is the largest producer of refined lead with 4.91 million tonnes in the year 2018 and contributed 43 % of world refined lead production followed by USA (10%), Republic of Korea (7%), India (5%), Mexico (4%), etc.

World consumption of refined lead was 11.87 million tonnes in the year 2018 (including secondary lead) which is 1.2% more than that of the previous year. China is the largest refined lead consuming country with 4.9 million tonnes consumption during the year 2018 which was 42% of world refined lead consumption followed by European countries (17%), USA (14%), Republic of Korea & India (5% each), etc. After falling by 3.9% in 2020, International Lead & Zinc Study Group (ILZSG) forecasted the global demand for refined lead metal to rise by 5.5% to 12.39 million tonnes in this year and by 1.7% to 12.61 million tonnes in 2022.

A generalised view of the development in various countries along with the country-wise description sourced from latest available publication of Minerals Yearbook of 'USGS', 2016 & 2017 is furnished as below.

## Australia

In 2016, lead mine production in Australia decreased by 31% as a result of the closure of Glencore plc's (Switzerland) Black Star Mine, which had a lead production capacity of 75,000 t/yr and was a part of the Mount Isa mining complex. Black Star was placed on care-and-maintenance status in November 2016 owing to reserve depletion.

## China

In 2016, China continued to be the leading global producer and consumer of lead and the leading producer of lead-acid batteries. China produced 4.67 Mt of refined lead, essentially unchanged from that in 2015 and accounting for about 42% of global refined lead. China's secondary lead production was about 28% of total secondary world refined lead production in 2016, slightly less than that in 2015. China's refined lead production consisted of 64% primary and 36% secondary lead production. In 2016, two lead refineries opened a 40,000 t/yr secondary smelter owned by Yunnan Xiangyun Feilong Nonferrous Metal Co. Ltd in China and Aqua Metal's 30,000 t/yr secondary plant in the United States (International Lead and Zinc Study Group, 2017). Lead in concentrate production in 2016 was estimated to be about 2.34 Mt, unchanged from that in 2015. According to the ILZSG, consumption of lead in China decreased slightly to 4.64 Mt in 2016 from 4.71 Mt in 2015.

## USA

In 2017, domestic mine production of recoverable lead was 3,02,000 tonnes, 10% less than that in 2016. There were 9 lead producing mines operating in the United States in 2017. Alaska and Missouri accounted for most of the US mine output of lead. Lead was also mined in Idaho and Washington. Domestic mine production data were collected by the U.S. Geological Survey (USGS) from a voluntary survey of lode mines. Eight lead-producing mines responded to the survey in 2017, accounting for about 90% of US production.

According to the ILZSG, global consumption of refined lead in 2017 was 11.7 Mt, 5% more than that in 2016. The leading refined-lead-consuming countries in 2017 were China (42%), USA (15%), India (5%), Republic of Korea (5%) and Germany (3%).

## Zinc

As per USGS Minerals Yearbook, world refined zinc production was 13.7 million tonnes in the year 2019 which increased by 3% from that of the previous year.

China was the largest producer of refined zinc with 6.16 million tonnes in the year 2019 which contributed 45% of world refined zinc production followed by Republic of Korea (7%), Canada & India (5% each), Japan (4%), Australia (3%), etc.

The world consumption of refined zinc was 13.69 million tonnes in the year 2018 which is 2% less than the previous year. China was the largest refined zinc consuming country with 6.52 million tonnes in 2018 which accounted for 48% of world consumption followed by European countries (18%), USA (6%), India (5%) and Republic of Korea (4%), etc.

ILZSG forecasts that world demand for refined zinc metal will rise by 6.2% to 14.09 million tonnes in 2021 and will further increase by 2.3% to 14.41 million tonnes in 2022.

A summary of generalised view of the development in various countries in respect of zinc, which include country-wise description sourced from latest available publication of Minerals Yearbook of 'USGS', 2017 is furnished as below.

### Australia

Zinc mine production in Australia decreased by 5% in 2017 as compared with that of 2016 mainly as result of several mine closures. Three mines opened in Australia in 2017 and therefore it is expected that production would increase in 2018. During the second quarter of 2017, Auctus Minerals Pty. Ltd, restarted production at 20,000 tonnes per annum Mungana zinc mine in Northern Queensland. In September, 2017, Red River Resources Ltd restarted production at 21,000 tonnes per year from Thalang zinc-copper-lead mine in Queensland. The mine was placed on care-and-maintenance status in 2012 and reopened after the processing plant was refurbished.

Minerals and Metals Group opened Dugald River zinc mine in North western Queensland and commercial production was expected to commence in 2018 at 1,70,000 tonnes per year.

### Canada

Zinc mine production in Canada was 3,44,000 tonnes in 2017, 7% more than that in 2016. Production increased in 2017 owing mostly to an increase in zinc production at Trevali Mining Corp.'s Caribou Mine. In October 2017, Coeur Mining Inc. acquired the Silvertip silver-zinc-lead mine in British Columbia and production was expected to commence in the first quarter of 2018. Zinc smelter production in Canada was at 6,08,000 tonnes in 2017, 12% less than that in 2016. Smelter production decreased mainly as a result of the nine month strike at Noranda Income Fund's zinc refinery in Salaberry-de-Valleyfield, Quebec. During the strike, the facility operated at a partial production level, although the reduced rate was not disclosed.

### China

Zinc mine production in China decreased by 8% in 2017 from that of 2016 to 4.4 million tonnes. According to Beijing Antaika Information Development Co. Ltd, decreased production was attributed to the closure of mines owing to increased environmental protection measures, lower than expected production from new mines and a decrease in ore grades. As a result of the decrease in mine production, China's net imports of zinc in concentrate increased by 22% in 2017 to about 2.4 million tonnes. About 60% of China's zinc concentrate imports (gross weight) were sourced from Australia, Peru and Russia.

Zinc metal production in China decreased slightly in 2017 from that of 2016 to 6.14 million tonnes. Despite the slight production decrease, two smelters of 1,00,000 tonnes per year capacity opened in China, i.e., Hualian Zinc and Indium Co.'s Hualian zinc smelter in Yunnan Province and Huili Lead and Zinc Co.'s Huili zinc smelter in Sichuan Province. Antaika attributed the decrease in zinc smelter production to refinery maintenance, a shortage of zinc concentrates and stricter environmental regulations.

China's net imports of refined zinc increased by 67% in 2017 to about 0.66 million tonnes. Increased imports were attributed to the tight domestic supply. About 66% of China's refined zinc imports were sourced from Australia, Kazakhstan and Spain.



China's zinc consumption increased in 2017 from that of 2016. ILZSG reported a 4% increase in zinc consumption in 2017 as against 9% increase in 2016.

### **Cuba**

In 2017, construction was completed on the Castellanos lead and zinc mine near Santa Lucia, Pinar del Rio. This was the first new mining project in Cuba in more than 20 years. The mine, operated by Empresa Minera del Caribe, was expected to commence commercial production during the first half of 2018. Trafigura reported that the mine was expected to ramp up throughout the year and produce 1,00,000 tonnes of zinc concentrate when it reached full capacity.

### **Peru**

Zinc mine production in Peru increased by 10% in 2017 from that of 2016 as a result of increased production at the Antamina copper-zinc mine and the opening of two mines. Zinc production nearly doubled at Antamina in 2017 to 3,72,100 tonnes, primarily as a result of increased processing of copper-zinc ores and significantly higher zinc grades and recoveries. Copper and zinc production at Antamina can vary significantly from year to year, owing to the geology of the deposit and the proportion of copper to copper-zinc ore produced.

In 2017, a new mine and a capacity expansion opened in Peru. In January, Compania de Minas Buenaventura S.A.A. commissioned the 10,000 tonnes per year Tambomayo Mine near Chilcaymarca, Arequipa. In May 2017, Shougang Group Co. Ltd added 30,000 tonnes per year of capacity by reprocessing the tailings at the Marcona Mine near San Juan de Marcona. The Company also planned to produce copper and iron.

### **Thailand**

Zinc mine production ceased in Thailand in 2017 after closure of Padaeng Industry Public Co. Ltd's Mae Sod Mine in 2016. The mine closed owing to the depletion of reserves and ceased operations by the end of 2017. In 2017, zinc metal production decreased by 73% from that of 2016. Padaeng Industry's smelter in Tak Province processed the remaining zinc concentrate from Mae Sod in 2017 and operations at the plant ceased in the second quarter of 2017. The refinery had a production capacity of 1,05,000 tonnes per year.

## **FOREIGN TRADE**

### **Lead**

#### **Exports**

Exports of lead from the country are in the form of ore & concentrates, lead & alloys including scrap, lead waste & scrap, lead unrefined, refined lead unwrought, pig lead, lead & alloys worked and others.

Exports of lead ores and concentrates which were 3 tonnes in 2019-20 increased to 9 tonnes in 2020-21. Bangladesh is the sole country which imports lead ores & concentrates from India.

Exports of lead & alloys including scrap increased slightly by 1% to 176601 tonnes during 2020-21 as compared to 174939 tonnes in the preceding year. Similarly, export of lead and alloys also increased by 1% to 176569 tonnes in 2020-21 as compared to 174936 tonnes in the previous year. Exports of refined lead unwrought also increased by 2% to 125041 tonnes in 2020-21 as compared to 122693 tonnes in the previous year. (Tables- 23 to 29).

#### **Imports**

Imports of lead in India are in the form of lead ores & concentrates, lead & alloys including scrap, refined lead/ unwrought, pig lead, refined lead & alloys (bars, rods, plates, etc.), lead unrefined etc.

Imports of lead ores & concentrates increased to 5473 tonnes in 2020-21 as compared to 3283 tonnes in 2019-20. Imports were mainly from UAE (40%), Turkey (28%), Sudan (6%) and Morocco (5%). The total imports of lead & alloys including scrap decreased marginally by 10% in 2020-21 with 314954 tonnes as compared to 348747 tonnes during 2019-20, of the total imports of lead and alloys including scrap. Imports of lead and alloys during 2020-21 were 245841 tonnes as compared to 256132 tonnes in 2019-20. (Tables- 30 to 36).

### **Zinc**

#### **Exports**

Exports of zinc are in the form of ores & concentrates, zinc & alloys including scrap and zinc & alloys in the form of bars, rods & plates.

Exports of zinc ores & concentrates increased to 399 tonnes in 2020-21 as against 317 tonnes in the previous year. China is the main export destination

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of zinc ores & concentrates and accounted for 63% of all the exports of zinc ores & concentrates followed by Cuba (37%).

Exports of zinc & alloys including scrap during 2020-21 were 300018 tonnes as against 212702 tonnes in the preceding year. Almost entire exports during 2020-21 were of zinc & alloys while those of scraps were nominal. Malaysia (32%), Singapore (25%), Republic of Korea (6%), Taiwan (10%), China (15%) and Thailand (5%) were the main export destinations for zinc alloys & scrap. Exports of zinc (scrap) were at 82 tonnes in 2020-21 as compared to 119 tonnes in the preceding year (Tables- 37 to 40).

### Imports

Imports of zinc in the country are in the form of zinc ores & concentrates, zinc & alloys including

scrap, zinc or spelter and zinc & alloys in the forms of bars, rods, plates, mazak, etc.

Imports of zinc ores & concentrates during 2020-21 were at 804 tonnes as against 101 tonnes import during the previous year. Imports were mainly from Belgium (59%), Imports of zinc & alloys during 2020-21 were at 139679 tonnes as compared to 173997 tonnes in 2019-20. Imports of zinc (scrap) were 49428 tonnes during 2020-21 as compared to 75505 tonnes in 2019-20. Imports of zinc or spelter were at 118333 tonnes in 2020-21 as compared to 145138 tonnes during the previous year. The major suppliers of zinc & alloys including scrap during 2020-21 were Republic of Korea (47%), Japan (17%), USA (5%) and UAE (5%) (Tables- 41 to 45).

**Table – 23 : Exports of Lead and Alloys  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>174936</b>	<b>26421811</b>	<b>176569</b>	<b>25841849</b>
Korea, Rep. of	53405	7940557	69336	9803170
Thailand	25498	3821467	17440	2645595
Vietnam	28491	4310715	16591	2430259
Taiwan	10465	1608589	14250	2031656
Bangladesh	11744	1737394	13326	1988441
U A E	11892	1798359	11540	1819996
Malaysia	1218	196121	10544	1497810
Singapore	254	55151	6202	851671
Oman	5840	917069	4584	692525
Japan	2286	355846	3066	520185
Other countries	23843	3680543	9690	1560541

*Figures rounded off*

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**Table – 24 : Exports of Lead Ores & Concentrates  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>3</b>	<b>202</b>	<b>9</b>	<b>1076</b>
Bangladesh	3	178	9	700
Sri Lanka	-	-	++	176
Canada	-	-	++	110
Iraq	-	-	++	59
South Africa	-	-	++	24
U S A	-	-	++	7
Nepal	++	24	-	-

**Table – 25 : Exports of Lead & Alloys Including scrap  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>174939</b>	<b>26422498</b>	<b>176601</b>	<b>25845466</b>
Korea, Rep. of	53405	7940557	69336	9803170
Thailand	25498	3821467	17440	2645595
Vietnam	28491	4310715	16591	2430259
Taiwan	10465	1608589	14250	2031656
Bangladesh	11744	1737394	13326	1988441
UAE	11892	1798366	11540	1820001
Malaysia	1218	196121	10544	1497810
Singapore	254	55151	6202	851671
Oman	5840	917069	4584	692525
Japan	2286	355846	3066	520185
Other Countries	23846	3681223	9722	1564153

*Figures rounded off***Table – 26 : Exports of Lead and Waste & Scrap  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>3</b>	<b>687</b>	<b>32</b>	<b>3617</b>
U K	-	-	27	2491
Nepal	3	680	4	913
Uganda	-	-	++	118
Bhutan	-	-	1	90
U A E	++	7	++	5
Mozambique	++	++	-	-

*Figures rounded off*

## LEAD &amp; ZINC

**Table – 27 : Exports of Refined Lead Unwrought  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>122693</b>	<b>18128632</b>	<b>125041</b>	<b>17711659</b>
Korea, Rep. of	37909	5561918	57095	8010251
Taiwan	10457	1599104	14249	2031320
Vietnam Soc Rep	22932	3438337	11555	1646508
Thailand	19434	2824753	10384	1480455
Malaysia	999	145578	10127	1409221
Singapore	++	53	6032	810675
Bangladesh	7416	1085177	4725	692814
UAE	4073	593575	4206	627828
Turkey	5847	849106	1711	249713
Qatar	644	95136	1550	235663
Other countries	12982	1935895	3407	517211

*Figures rounded off***Table – 28 : Exports of Lead & Alloys Unwrought, NES  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>34926</b>	<b>5603892</b>	<b>31878</b>	<b>5105512</b>
Korea, Rep. of	13057	2026225	9163	1348577
Thailand	5783	947651	6923	1141307
Oman	3673	599639	3615	548344
U A E	4403	667661	2982	521682
Vietnam	2988	476240	3220	512255
Bangladesh	1249	191108	2517	390239
Japan	371	66441	1174	225339
Indonesia	1413	225604	903	145148
Belgium	183	47054	744	144470
Australia	219	36288	152	24936
Other countries	1587	319981	485	103218

*Figures rounded off***Table – 29 : Exports of Lead (Pig Lead)  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>1</b>	<b>88</b>	-	-
Nepal	1	80	-	-
Bhutan	++	8	-	-

*Figures rounded off*

## LEAD &amp; ZINC

**Table – 30 : Imports of Lead Ores & Conc.  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>3283</b>	<b>166725</b>	<b>5473</b>	<b>325104</b>
Turkey	25	1107	1574	146234
U A E	1192	56676	2196	101447
Morocco	380	23721	276	19963
Mozambique	686	41725	274	16161
Sudan	98	4330	316	12421
Argentina	-	-	212	8710
Ghana	-	-	322	7141
Kuwait	50	2029	152	6343
Jordan	64	3111	101	4385
Yemen Rep. of	23	923	50	2284
Other countries	765	33103	++	15

*Figures rounded off***Table – 31 : Imports of Lead and Alloys Including Scrap : Total  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>348747</b>	<b>49923441</b>	<b>314954</b>	<b>45882809</b>
Korea, Rep.of	68876	10913957	64132	10047758
U S A	31192	4246560	29942	4125992
U A E	27657	3884470	27109	3952987
Australia	15330	2215733	24631	3597602
Malaysia	32955	4673445	20411	2925282
Vietnam	23196	3299440	20436	2915131
U K	31520	4232373	17340	2414745
Singapore	8587	1271828	15612	2312748
Japan	5468	830031	7483	1165366
Philippines	7562	1082965	6485	930088
Other countries	96399	13272639	81373	11495110

*Figures rounded off*

## LEAD &amp; ZINC

**Table – 32 : Imports of Lead & Alloys  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>256132</b>	<b>37990315</b>	<b>245841</b>	<b>36498550</b>
Korea, Rep. of	68780	10902383	64132	10047758
U A E	23788	3405218	25190	3689200
Australia	11258	1667801	21298	3154063
Vietnam	23196	3299440	20436	2915131
Malaysia	30824	4413631	19727	2835078
Singapore	8049	1199770	14944	2222329
Japan	5294	806262	7399	1153717
Philippines	7467	1069360	6295	904353
Tanzania	6892	973831	5471	768310
Mozambique	5374	740356	5333	725802
Other countries	65210	9512263	55616	8082809

*Figures rounded off***Table – 33 : Imports of Lead and Waste & Scrap  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>92615</b>	<b>11933126</b>	<b>69113</b>	<b>9384259</b>
USA	29818	4050544	29111	4008027
UK	22765	2902236	14957	2034671
Australia	4072	547932	3333	443539
Venezuela	606	126345	1326	296140
U A E	3869	479252	1919	263787
Canada	1693	223558	1758	232161
Spain	1688	224209	1707	226882
Belgium	424	54148	1807	212306
Saudi Arabia	332	45268	1245	168766
Netherlands	2708	341659	1113	139473
Other countries	24640	2937975	10837	1358507

*Figures rounded off*

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**Table – 34 : Imports of Lead (Pig Lead)  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>3049</b>	<b>435541</b>	<b>3091</b>	<b>446955</b>
UAE	2224	318017	2393	347242
South Africa	450	63870	384	55459
Nepal	-	22218	169	23913
Turkey	-	-	94	12990
Oman	-	-	51	7351
Taiwan	99	13755	-	-
Myanmar	50	7824	-	-
Singapore	49	7006	-	-
U S A	20	2851	-	-

*Figures rounded off***Table – 35 : Imports of Lead Unrefined, NES  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>52369</b>	<b>7459331</b>	<b>76691</b>	<b>1883029</b>
Vietnam	16992	2428886	17825	2549515
UAE	6818	977842	13370	1925738
Singapore	5002	738455	6375	923452
Philippines	2286	324116	4781	687182
Tanzania	831	117121	4635	647258
Mozambique	852	118358	4075	553340
Malaysia	5282	325287	3036	433410
Sanegal	1052	146258	2604	347763
Saudi Arabia	1058	147573	2289	342534
Japan	496	70187	2027	287490
Other countries	14700	2065248	15602	2185347

*Figures rounded off***Table – 36 : Imports of Refined Lead Unwrought  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>103602</b>	<b>15394884</b>	<b>89777</b>	<b>13415047</b>
Korea, Rep. of	45756	6956160	44988	6773388
Australia	6707	975249	15764	2302577
Japan	2418	384525	4663	718114
U A E	7397	1047041	4216	615859
Malaysia	12827	1825824	3707	541480
Singapore	1777	272555	2623	407586
U K	3648	952326	2378	370189
Sri Lanka	3400	489024	2225	318846
Russia	2179	298878	1770	278778
Myanmar	3500	520040	1550	228847
Other countries	11294	1673262	5893	859383

*Figures rounded off***Table – 37 : Exports of Zinc Ores & Concentrates  
(By Countries)**

Country	2019-2020 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>317</b>	<b>15828</b>	<b>399</b>	<b>20716</b>
Cuba	100	10896	150	17276
China	199	4078	249	3440
UAE	4	636	-	-
South Africa	13	196	-	-
Japan	1	14	-	-
Finland	++	6	-	-
Nepal	++	2	-	-

*Figures rounded off*

## LEAD &amp; ZINC

**Table – 38 : Exports of Zinc & Alloys Including Scrap : Total  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>212702</b>	<b>40372945</b>	<b>300018</b>	<b>55103971</b>
Malaysia	10189	1893547	95207	15880500
Singapore	26607	4807449	72651	13296034
Taiwan	33646	6381708	30349	5684418
Korea, Rep. of	35929	6670090	19462	3619387
Thailand	12331	2393846	14109	2832734
UAE	10707	2234539	13401	2594864
Nepal	17062	3184485	12622	2457205
Kenya	4587	882776	8137	1575005
Indonesia	7478	1441091	7749	1469272
China	32318	5869960	6044	1122759
Other countries	21848	4613454	20287	4571793

*Figures rounded off***Table – 39 : Exports of Zinc & Alloys  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>212592</b>	<b>40361623</b>	<b>299936</b>	<b>55094321</b>
Malaysia	10189	1893547	95207	15880500
Singapore	26607	4807449	72651	13296034
Taiwan	33646	6381708	30349	5684418
Korea, Rep. of	35929	6670090	19462	3619387
Thailand	12331	2393846	14109	2832734
U A E	10707	2234539	13401	2594864
Nepal	17062	3184428	12618	2456700
Kenya	4587	882776	8137	1575005
Indonesia	7478	1441091	7749	1469272
China	32318	5869960	6018	1119820
Other countries	21738	4602189	20235	4565587

*Figures rounded off*



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**Table – 40 : Exports of Zinc (Scrap)  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>119</b>	<b>11322</b>	<b>82</b>	<b>9650</b>
Hong Kong	-	-	52	6206
China	-	-	26	2939
Nepal	++	57	4	505
USA	40	3948	-	-
Italy	25	3769	-	-
Belgium	27	2675	-	-
Bangladesh	10	621	-	-
Bhutan	8	172	-	-
Saudi Arabia	++	74	-	-
Canada	++	4	-	-
Other countries	++	2	-	-

*Figures rounded off***Table – 41 : Imports of Zinc Ores & Conc.  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>101</b>	<b>2667</b>	<b>804</b>	<b>9530</b>
Belgium	-	-	804	9513
USA	++	++	++	17
Ethiopia	60	1630	-	-
U A E	21	610	-	-
U K	20	424	-	-
China	++	3	-	-

*Figures rounded off***Table – 42 : Imports of Zinc and Alloys Including Scrap: Total  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>249502</b>	<b>46153989</b>	<b>189197</b>	<b>34313169</b>
Korea, Rep. of	111254	21809467	88877	16988711
Japan	25287	4907877	31867	6297778
USA	18918	3040874	9544	1472753
UAE	15287	2546126	9788	1463781
Australia	5642	1087263	3936	772291
Italy	6870	1168592	3999	693321
Malaysia	4511	778874	3341	539389
Saudi Arabia	4107	622820	3273	471652
Netherlands	1964	321859	3048	465791
Germany	2713	510349	2637	437731
Other countries	52949	9359888	28887	4709971

*Figures rounded off*

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**Table – 43 : Imports of Zinc & Alloys  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>173997</b>	<b>34384910</b>	<b>139769</b>	<b>27338160</b>
Korea, Rep. of	111118	21787036	88866	16987074
Japan	25164	4889761	31643	6267634
Australia	5190	1013880	3848	760630
U A E	6827	1244854	3411	602970
China	1403	576739	909	419540
Switzerland	780	156479	1879	385274
U S A	1526	300448	1091	229504
Italy	119	86692	606	199346
Belgium	2764	597158	816	191588
Myanmar	4306	832663	998	189027
Other countries	14800	2899200	5702	1105573

*Figures rounded off***Table – 44 : Imports of Zinc or Spelter  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>145138</b>	<b>27974586</b>	<b>118333</b>	<b>22644454</b>
Korea, Rep. of	93379	18155565	73744	13989990
Japan	24881	4809588	31372	6189217
Australia	4721	921055	3844	759038
U A E	6077	1134815	2325	433102
Switzerland	248	50332	1829	374946
Myanmar	4306	832663	998	189027
Italy	49	9103	553	112908
Kenya	200	30333	672	107305
Russia	688	141126	590	103276
U S A	1150	192728	484	71918
Other countries	9439	1697228	1922	313727

*Figures rounded off*

**Table – 45 : Imports of Zinc (Scrap)  
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>75505</b>	<b>11769079</b>	<b>49428</b>	<b>6975009</b>
USA	17392	2740426	8453	1243249
UAE	8460	1301272	6377	860811
Italy	6751	1081900	3393	493975
Saudi Arabia	3941	593340	3269	470225
Netherlands	1515	227533	2808	426371
Malaysia	2476	368805	2503	364714
Germany	1955	309729	2397	346003
Indonesia	2113	318293	1996	261024
U K	3615	559797	1782	243296
Mexico	2460	389926	1638	223535
Other countries	24827	3878058	14812	2041806

*Figures rounded off*

## FUTURE OUTLOOK

International Lead & Zinc Study Group (ILZSG) forecasted the global demand for refined lead metal to rise by 1.7% to 12.61 million tonnes in 2022. ILZSG also forecasted that world demand for refined zinc metal would rise by 6.2% to 14.09 million tonnes in 2021 and would further increase by 2.3% to 14.41 million tonnes in 2022. These projections would be due to a number of new projects and expansions in existing capacity in India, Kazakhstan, Mexico and Portugal.

HZL has ambitious plans to expand in mining extraction & production of zinc, depending on the country's need while in lead, the recycling sector is likely to emerge as the major sector in future.

As per Ministry of Mines report on "National Non-Ferrous Metal Scrap Recycling Framework, 2020", Lead finds its use in storage batteries, also dubbed lead acid batteries. India is likely to witness a substantial growth in the demand for lead batteries given that several sectors, including automotive, telecommunication, railways and defence, are set to expand in the years ahead. As

a battery ingredient, lead is increasingly used in inverters, UPS and similar energy storage devices. The Indian market for lead acid batteries is currently estimated at US\$7 billion, driven by the Automotive Sector, which consumes ~60% of lead acid batteries. The demand of Lead has been increasing with a CAGR of 3.8%, while there has been a consistent level of imports over last 5 years.

In case of zinc, the demand has increased at CAGR 1.89% in last five years. The production, however has declined and has a negative, -1.3% CAGR. Dependence on imports has grown over the years at the rate of CAGR 2.10%. To meet the demand domestically in view of low production trend and higher imports, recycling can be a good alternative.

As every major national plan sees continuous rise in the power generation capacity of the country, the demand for galvanised transmission tower is also expected to increase by about 4 to 5% along with increasing necessity of erection of mobile towers for which higher investment in infrastructure would have to met. Railways will also lead in the use of galvanised steel.