52 Lead & Zinc

Lead and zinc are among the most widely used non-ferrous metals in the world. Galvanising is by far the most important zinc consuming industry and battery sector is the prime lead-consuming industry. With the operation of the integrated project of Rampura-Agucha mine and Chanderiya lead-zinc smelter by HZL, the supply position of zinc and lead in the country has improved considerably and the dependence on imports has reduced. The project has come at a time when Indian lead industry was on the threshold of multifarious changes with respect to demand, capacity and regulations. The secondary production is one of the added advantages for supply. Recovery of secondary zinc and lead is economically more attractive because of certain advantages, like energy consumption, low capital cost, less environmental hazards and high metal contents.

HZL is a major producer of primary lead and zinc metals in the country based on indigenous ores. The Government of India disinvested its 26% stake in the equity capital of HZL along with transfer of management control in favour of Strategic Partner (SP); i.e., M/s Sterlite Opportunities and Ventures Ltd (SOVL), a Vedanta Group Company, w.e.f. 11 April 2002. Its mining operations are concentrated in Rajasthan while those in Andhra Pradesh and Orissa are closed. In 2007-08, the domestic production of primary lead metal and zinc metal increased by about 31% and 20%, respectively.

RESOURCES

The total resources of lead and zinc ores as on 1.4.2005, as per UNFC system, are estimated at 522.58 million tonnes. Of these, 125.75 million tonnes (24%) fall under 'reserves' while balance 396.83 million tonnes (76%) are classified as 'remaining resources'. The resources of ore containing +10% Pb & Zn were estimated at 86.82 million tonnes, ore containing 5 to 10% Pb & Zn were 144.68 million tonnes and ore containing less than 5% Pb & Zn were 291.08 million tonnes.

The total metal content in resources is 7.21 million tonnes lead and 24.26 million tonnes zinc. Besides, 118.45 thousand tonnes lead+zinc metal resources are available. In terms of reserves, 2.59 million tonnes of lead metal and 11.09 million tonnes of zinc metal are estimated. Rajasthan is endowed with the largest resources of lead-zinc ore amounting to 468.51 million tonnes (90%), followed by Bihar 11.43 million tonnes (2%), Maharashtra 9.272 million tonnes (2%), Madhya Pradesh 6.920 million tonnes (1%) and Andhra Pradesh -6.620 million tonnes (1%). Resources are also established in Gujarat, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttarakhand and West Bengal (Table-1).

EXPLORATION & DEVELOPMENT

During the year 2006-07, GSI carried out exploration for base metals in Biskhan and Muariya block in Betul district, Belkhedi area in Chhindwara district, Madhya Pradesh and re-assessed resources of base metals ore to a tune of 1.32 million tonnes with 7.60% Zn, 1.73% Pb, 0.75% Cu, 13 ppm Cd and 77 ppm Ag in Muariya block. MECL carried out exploration for lead & zinc in Kolari-Bhanori (Zone-III), Nagpur district, Maharashtra; Banskhapa-Piparia block, Betul district, Madhya Pradesh and Central Sub block (North Sindesar Ridge) and Latio-ka-Khera, Rajsamand district, Rajasthan. About 3.84 million tonnes of Pb-Zn resources were established in Central Sub-block of North Sindesar ridge and 7.32 million tonnes in Latio-ka-Khera blocks. Similarly, in Kolari-Bhaneri areas of Nagpur district, Maharashtra about 3.17 million tonnes of zinc ore resources were estimated.

During the year 2007-08, GSI carried out exploration, geophysical survey for lead & zinc mineralisation in Ambata area, Sirmaur district Matipur Narang area, Solan district, Himachal Pradesh and Biskhan-Khari area, Betul district, Jangaldehri-Chordongri area, Khirki, Kaneri, Borkhap area in Chhindwara district, Madhya Pradesh.

DMG, Rajasthan carried out exploration near villages Tankarwar, Kanpura, Atalpur,Teh. Hurra, Bhilwara district, Rajasthan. The details of exploratory activities are given in Table-2.

Table – 1 : Reserves/Resources of Lead & Zinc Ore as on 1.4.2005
(By Grades/States)

(In '000 tonnes)

Grade/State	Reserves				Remaining resources							Total resources (A+B)
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility STD222	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
		STD121	STD122									
All India : Total												
Ore	62860	6574	56320	125754	3375	13572	12193	161985	202361	3340	396826	522580
Lead metal	1262.98	130.21	1197.36	2590.55	85.39	306.35	244.37	1601.86	2378.73	-	4616.70	7207.25
Zinc metal	5503.16	282.11	5307.62	11092.89	269.32	631.45	535.06	5271.77	6357.54	101.65	13166.79	24259.68
Lead & zinc metal	-	-	-	-	-	-	-	-	118.45	-	118.45	118.45
By Grades												
Ore with (+)10% Pb & Zn	22623	-	32839	55462	-	-	-	11100	20259	-	31359	86821
Ore with 5-10 % Pb & Zn	40237	6574	23481	70292	3375	13572	7587	13713	36138	-	74385	144677
Ore with (-)5% Pb & Zn	-	-	-	-	-	-	4606	137172	145964	3340	291082	291082
Lead metal	1262.98	130.21	1197.36	2590.55	85.39	306.35	244.37	1601.86	2378.73	-	4616.70	7207.25
Zinc metal	5503.16	282.11	5307.62	11092.89	269.32	631.45	535.06	5271.77	6357.54	101.65	13166.79	24259.68
Lead & zinc metal	-	-	-	-	-	-	-	-	118.45	-	118.45	118.45
By States												
Andhra Pradesh												
Ore	686	-	105	791	-	-	1000	4159	670	-	5829	6620
Lead metal	25.9	-	3.96	29.86	-	-	28.7	119.53	21.74	-	169.97	199.83
Zinc metal	-	-	-	-	-	-	12.4	43.57	7.19	-	63.16	63.16
Bihar												
Ore	-	-	-	-	-	-	-	435	11000	-	11435	11435
Lead metal	-	-	-	-	-	-	-	-	24	-	24	24
Zinc metal	-	-	-	-	-	-	-	14.75	24	-	38.75	38.75
Gujarat												
Ore	-	4955	845	5800	-	-	129	-	200	-	329	6129
Lead metal	-	104.37	17.81	122.18	-	-	3.9	-	-	-	3.9	126.08
Zinc metal	-	224.04	39.37	263.41	-	-	1.1	-	-	-	1.1	264.51
Lead & zinc metals	-	-	-	-	-	-	-	-	0.9	-	0.9	0.9
Madhya Pradesh												
Ore	-	-	-	-	-	-	1510	-	2260	3150	6920	6920
Lead metal	-	-	-	-	-	-	26.12	-	-	-	26.12	26.12
Zinc metal	-	-	-	-	-	-	114.76	-	123.45	101.12	339.33	339.33

(Contd.)

Table - 1 (Concld.)

Grade/State	Reserves				Remaining resources							Total resources (A+B)
	Proved STD111	Probable STD121	Probable STD122	Total (A)	Feasibility STD211	Pre-feasibility STD222	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
Maharashtra												
Ore	-	-	-	-	-	-	1967	6305	1000	-	9272	9272
Zinc metal	-	-	-	-	-	-	133.56	428.11	28	-	589.67	589.67
Meghalaya												
Ore	-	-	-	-	-	-	-	880	-	-	880	880
Lead metal	-	-	-	-	-	-	-	16.5	-	-	16.5	16.5
Zinc metal	-	-	-	-	-	-	-	14	-	-	14	14
Orissa												
Ore	961	-	119	1080	-	-	-	-	670	-	670	1750
Lead metal	34.32	-	4.25	38.57	-	-	-	-	38.39	-	38.39	76.96
Rajasthan												
Ore	61213	1183	55187	117583	3375	12172	3917	145855	185416	190	350925	468508
Lead metal	1202.76	18.94	1169.66	2391.36	85.39	283.25	44.54	1319.13	2275.1	-	4007.41	6398.77
Zinc metal	5503.16	45.19	5265.11	10813.46	269.32	562.57	107.27	4597.05	6133.22	0.53	11669.96	22483.42
Lead & zinc metals	-	-	-	-	-	-	-	-	117.55	-	117.55	117.55
Sikkim												
Ore	-	436	64	500	-	-	300	-	150	-	450	950
Lead metal	-	6.9	1.68	8.58	-	-	-	-	-	-	-	8.58
Zinc metal	-	12.88	3.14	16.02	-	-	3	-	1.05	-	4.05	20.07
Tamil Nadu												
Ore	-	-	-	-	-	-	200	590	-	-	790	790
Lead metal	-	-	-	-	-	-	2.26	5.48	-	-	7.74	7.74
Zinc metal	-	-	-	-	-	-	11.76	24.76	-	-	36.52	36.52
Uttarakhand												
Ore	-	-	-	-	-	1400	3170	390	660	-	5620	5620
Lead metal	-	-	-	-	-	23.1	138.85	11.15	9.5	-	182.60	182.60
Zinc metal	-	-	-	-	-	68.88	151.21	19.11	27.63	-	266.83	266.83
West Bengal												
Ore	-	-	-	-	-	-	-	3371	335	-	3706	3706
Lead metal	-	-	-	-	-	-	-	130.07	10	-	140.07	140.07
Zinc metal	-	-	-	-	-	-	-	130.42	13	-	143.42	143.42

Figures rounded off.

Table – 2 : Details of Exploration for Lead-Zinc, 2006-07 and 2007-08

Agency/ State/District	Location	Mapping		Drilling		Sampling (No.)	Remarks
		Scale	Area (sq km)	No. of boreholes	Metres		
2006-07							
GSI							
Madhya Pradesh							
Betul	Biskhan area	-	-	1	-	-	Massive sphalerite bands hosted in biotite rich quartz muscovite schist have been intersected between i) 41.10 m and 41.16 m and ii) 46.72m and 46.80m depth.
Betul	Muaria block	-	-	-	-	-	Total resources of basemetal ore has been re-assessed from 0.80 million tonnes to 1.32 million tonnes with 7.60% Zn, 1.73% Pb, 0.75% Cu, 131 ppm Cd and 77 ppm Ag.
Chhindwara	Belkhedi area	1:12500	-	-		Soil & bed rock samples	Dissemination of sphalerite, galena and chalcopyrite have been observed.
MECL							
Madhya Pradesh							
Betul	Banskhapa Piparia block	1:10,000	1	6	1250	-	Presence of lean grade Pb-Zn mineralisation established.
Maharashtra							
Nagpur	Kolari-Bhaneri (Zone-III)	1:1000	2	14	2264	942	Three major bands identified over a cumulative strike length of 940 m with 250 m depth. About 3.14 million tonnes of zinc ore resources with Zn: 7.93% estimated. Also established tungsten resources.
Rajasthan							
Rajsamand	Central sub-block (North Sindesar Ridge)	1:1000	1	11	3900	960	Two major lodes have been identified, ore reserves of 3.84 million tonnes with1.60%Pb and 3.76% Zn have been estimated over 60m strike length.
-do-	Latio-ka-Khera	1:2000	0.92	11	3235	150	Exploration revealed lodes over promising 800 m strike length. A resource of 7.32 million tonnes with Pb:1.20% and Zn: 4.92% was estimated. The ore contains Cd:230 ppm, Ag: 57 ppm.
HZL							
Rajasthan							
Rajsamand	Rajpur-Dariba mine	1:200 (U/G)	679 m	28	3126.15	1132	About 16.82 million tonnes of resources containing 2.12% Pb and 7.71% Zn were estimated.

(Contd.)

Table-2 (Concld.)

Agency/ State/District	Location	Mapping		Drilling		Sampling (No.)	Remarks
		Scale	Area (sq km)	No. of boreholes	Metres		
2007-08							
GSI							
Himachal Pradesh							
Sirmour	Ambota area, Tons Valley	-	-	-	1	-	Detailed investigation for lead-zinc mineralisation. Geophysical survey by SP, IP and magnetic methods picked up two anomaly zones. One near Ambota has strike extension of 100 m to 150 m. First borehole intersected six mineralised zones between 57.15m and 84.0 m depth.The Zn+Pb values varies between 2 to 3% (VE).
Solan	Motipur, Narang area	-	-	1	-	-	The test borehole intersected sporadic disseminations of galena & pyrite between 21.00 m and 58.30m depth.
Madhya Pradesh							
Betul	Biskhan -Khari-area	-	-	3	-	-	Two boreholes intersected mine-ralised zone from 49.70 m to 63.70m (13m true thickness) with 0.3% Zn and from 120 m to 163 m (43m) with 0.5 to 1.5% Zn (VE) respectively.One borehole intersected low grade mineralisation with 0.1% to 0.2% Zn (VE).
Chhindwara	Jangaldehri-Chordongri area	-	-		-	-	The type rock of Betul belt was surveyed using IP/resistivity surveys. Zn values up to 6100 ppm and lead values upto 1100 ppm were recorded in soil.
-do-	Khirki, Kaneri, Borkhap area	Detailed mapping large scale mapping		-	-	-	Host rock for base metals measuring 600 x 70m has been delineated. Soil sampling on 100 m x 20 m grid shows Zn value from 10 ppm to 1500 ppm average - 300 ppm o 400 ppm. Trench samples analysied 980 ppm to 1700 ppm Zn.
DMG, Rajasthan							
Bhilwara	N/V Tankarwar,1: 10,000 Kanpura, Atalpur,1:2000 Teh. Hurra			10 1		122	-

In addition to this HZL concentrated its exploration at Sindesar Khurd and Rampura-Agucha Mines. During the year, 2008 the company drilled a total of 65,800 metres-an increase of 55.6% over 2006-07. The drilling programme successfully increased the strike length at Sindesar Khurd from 300 metres to 1600 metres averaging 5.8% zinc, 3.8% lead and 215 grams/tonne of silver. At Rampura Agucha, 2800 metres of drilling in 32 boreholes were carried out to outline mineralisation below a depth of 550 metres. Of these, 29 holes intersected ore width with significant grades averaging 15.5% zinc and 2% lead.

PRODUCTION AND STOCKS

Lead & Zinc Ores and Concentrates

The production of lead and zinc ore at 5.82 million tonnes in 2007-08 increased by about 13% as compared to that in the previous year.

The metal content of lead and zinc in the ore produced in 2007-08 worked out to 115,595 tonnes and 607,146 tonnes, respectively as against 1,03,081 tonnes and 5,57,358 tonnes, respectively, in the previous year. During the year under review, 5.60 million tonnes of lead & zinc ore was treated as against 5.14 million tonnes in 2006-07.

The production of lead concentrates in 2007-08 at 1,25,756 tonnes increased by about 17% as copmpared to the previous year. Among the states, Rajasthan continued to be the only producer of lead concentrates accounting for the entire production.

The production of zinc concentrates increased from 947,387 tonnes in 2006-07 by 9% to 1,035,827 tonnes in 2007-08. The entire production of zinc concentrates was reported from Rajasthan. The entire output of lead and zinc ores and concentrates in both the years was reported by mines owned by HZL, a private sector unit.

Grade Analysis

All-India average metal content of ore treated in 2007-08 worked out to 12.13% (2.01% Pb and 10.12% Zn) as against 12.79% (1.99% Pb and 10.80% Zn) in 2005-06. The metal content of ore treated from Rampura-Agucha mine in Bhilwara district of Rajasthan was the highest at 14.96% (1.9% Pb and 13.05% Zn). The lead concentrates produced in Rajasthan in 2007-08 was of grade 61.74% Pb as against 62.76% Pb in 2006-07. Metal content of zinc concentrates produced in Rajasthan worked out to 53.21% Zn in 2007-08 as against 53.30% Zn in the previous year (Tables - 3 to 9).

Stocks

Mine-head stocks of lead concentrates at the end of the year were 53,640 tonnes as against 81,710 tonnes at the beginning of the year. The entire stocks at the end of the year were held in Rajasthan (Table-10).

Mine-head stocks of zinc concentrates at the end of year were 96,946 tonnes as against 162,012 tonnes at the beginning of the year. The entire stocks were held in Rajasthan (Table-11).

Employment

The average daily labour employed in lead and zinc mines during the year under review was 4,280 as against 3,914 in 2006-07.

Table – 3 : Producers of Lead & Zinc Metals 2007-08

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

Table – 4 : Production of Lead and Zinc Ore, 2006-07 & 2007-08
(By State)

(In tonnes)

State	2006-07			2007-08(p)		
	Ore produced	Metal content		Ore produced	Metal content	
		Lead	Zinc		Lead	Zinc
India/ Rajasthan	5139915	103081	557358	5817059	115596	607147

Table – 5 : Lead and Zinc Ore Treated, 2006-07 and 2007-08
(By State)

(In tonnes)

State	2006-07			2007-08(p)		
	Ore treated	Metal content		Ore treated	Metal content	
		Pb	Zn		Pb	Zn
India/ Rajasthan	5141229	102796	555281	5600656	112618	566728

Table – 6 : Production of Lead Concentrates, 2006-07 to 2007-08
(By States)

(Quantity in tonnes; value in Rs. '000)

State	2005-06		2006-07		2007-08 (p)	
	Quantity	Value	Quantity	Value	Quantity	Value
India/Rajasthan	95738	768073	107334	1331434	125756	1421788

The Graphical Represention has been deleted

Table – 7 : Production of Lead Concentrates 2006-07 and 2007-08
(By Sector/State/Districts)

(Quantity in tonnes; value in Rs. '000)

State/District	2006-07				2007-08 (p)			
	No. of mines	Production			No. of mines	Production		
		Quantity	Pb%	Value		Quantity	Pb%	Value
India	**7**	**107334**	**62.76**	**133143**	**7**	**125756**	**61.74**	**1421788**
Private sector	7	107334	62.76	1331434	7	1125756	61.74	1421788
Rajasthan	**7**	**107334**	**62.76**	**1331434**	**7**	**125756**	**61.74**	**1421788**
Bhilwara	1	69905	64.87	654858	1	74874	63.39	473668
Rajsamand	2	12210	46.89	218250	2	23707	50.98	356896
Udaipur	4	25219	64.61	458326	4	27175	66.59	591224

Table – 8 : Production of Zinc Concentrates, 2005-06 to 2007-08
(By State)

(Quantity in tonnes; value in Rs. '000)

State	2005-06		2006-07		2007-08	
	Quantity	Value	Quantity	Value	Quantity	Value
India/Rajasthan	889007	5719678	947387	9714664	1035827	9375366

Lead and Zinc Metals

The production of primary lead in 2007-08 increased to 58,246 tonnes from 44,627 tonnes in the previous year, an increase of about 30.5%. The entire output of primary lead was contributed by HZL from Chanderiya smelter (Table - 12).

The production of zinc metal at 457,075 tonnes in 2007-08 increased by 20% as compared to that in the previous year (Table-13). HZL contributed 93% of the total output. Remaining production was from Binani Zinc Ltd.

Annual average prices of lead and zinc metals are furnished in Table-14.

Table – 9 : Production of Zinc Concentrates, 2006-07 & 2007-08 (By Sector/State/Districts)

(Quantity in tonnes; value in Rs. '000)

State/District	2006-07				2007-08 (p)			
	No. of Mines	Production			No. of Mines	Production		
		Quantity	Zn%	Value		Quantity	Zn%	Value
India/Private sector	@	947387	53.30	9714664	@	1035827	53.21	9375366
Rajasthan	@	**947387**	**53.30**	**9714664**	@	**1035827**	**53.21**	**9375366**
Bhilwara	@	851089	53.52	7972857	@	914917	53.50	7382547
Rajsamand	@	49644	48.25	893911	@	66234	48.20	1040238
Udaipur	@	46654	54.60	847896	@	54676	54.50	952581

@ *Associated mines with lead concentrates.*

Table – 10 : Mine-head Stocks of Lead Concentrates, 2007-08 (By States)

(In tonnes)

States	Stocks at the	
	Beginning of the year	End of the year
India	**81710**	**53640**
Rajasthan	81710	53640

Table – 11 : Mine-head Stocks of Zinc Concentrates, 2007-08 (By State)

(In tonnes)

States	Stocks at the	
	Beginning of the year	End of the year
India	**162012**	**96946**
Rajasthan	162012	96946

Table – 12 : Production of Lead Metal, 2005-06 to 2007-08

(Quantity in tonnes; value in Rs.'000)

Year	Lead Primary	
	Quantity	Value
2005-06	23817	702220
2006-07	44627	1315781
2007-08 (p)	58246	7566718

Table – 13 : Production of Zinc Metal, 2005-06 to 2007-08

(Quantity in tonnes; value in Rs.'000)

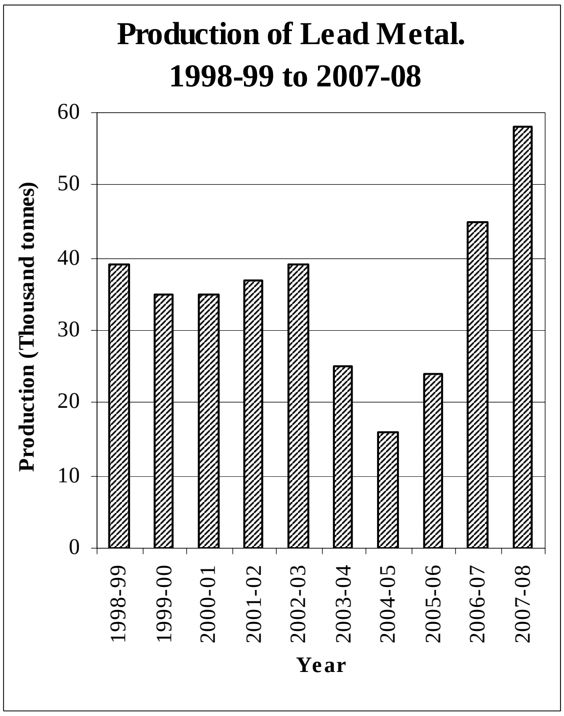
Year	Lead Primary	
	Quantity	Value
2005-06	296460	12059202
2006-07	380945	19088619
2007-08 (p)	457075	62236418

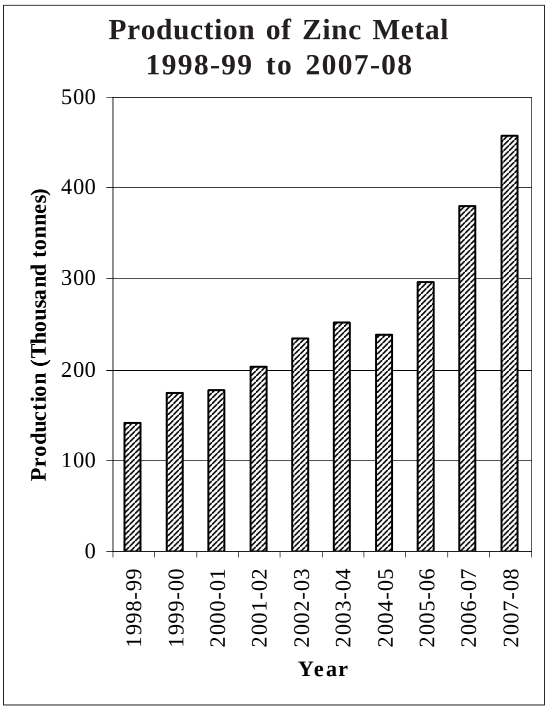
Table –14 : Annual Average Prices of Lead and Zinc, 2005-06 to 2007-08 (Domestic Markets)

(In Rupees per quintal)

Grade	Market	2005-06	2006-07	2007-08(p)
Lead				
Ingot	Mumbai	6281	8745	12974
Soft	Delhi	5557	10259	11916
Zinc				
Ingot	Mumbai	12969	18355	13416
Soft	Delhi	12824	19395	14389
Dross	Delhi	9890	14105	11205

Source: *Minerals and Metals Review.*





MINING & MILLING

HZL, is the only integrated lead and zinc producer in the country. Its operation can be classified into mining and smelting. It has four mining operations and three smelting operations. All except one operation are located in Rajasthan. One smelting operation is located in Visakhapatnam, Andhra Pradesh. The company's mining operations are located in Rampura-Agucha (Bhilwara district), Rajpura Dariba and Sindesar Khurd (both in Rajsamand district) and Zawar (Udaipur district), Rajasthan. Rampura-Agucha is the third largest opencast mine for zinc and lead, with a capacity of 5 million tpy lead zinc ore after a recent expansion. It is also one of the lowest cost zinc mines in the world, and has a 5S certification and a four star rating from the British Safety Council. The other three mines viz, Sindesar Khurd, Rajpura Dariba, and Zawar are underground mines with an annual capacity of 0.3 million tonnes, 0.6 million tonnes and 1.2 million tonnes of lead & zinc ore capacity. The average grade of Rampura-Agucha mine is zinc 12.97% and Pb 1.94%, Sindesar Khurd (Zn 5.32%, Pb - 2.08%), Rajpura Dariba mine (Zn - 6.23%, Pb 1.51%) and Zawar mines (Zn 3.88% and Pb 2.09%). Sargipalli mine in Sundergarh district of Orissa, having a capacity of 500 tpd lead ore has not reported production for the last few years (Table-15).

Table – 15 : Ore Production Capacity of HZL Mines

Mine	Ore	Capacity (million tpy)
Total		**7.1**
Zawar Mines Dist. Udaipur, Rajasthan.	Zinc-Lead	1.2
Rajpura-Dariba, Dist. Rajsamand, Rajasthan.	Zinc-Lead	0.6
Sindesar Khurd Mine, Dist. Rajsamand, Rajasthan	Zinc-Lead	0.3
Rampura-Agucha, Dist. Bhilwara, Rajasthan.	Zinc-Lead	5.0
Sargipalli, Dist. Sundergarh Orissa	Lead	Closed

All the mines of Zawar Group are mechanised. The Group has underground mining complex consisting of four underground mines and one concentrator for all mines. Transverse sublevel stoping, sublevel top slicing are being used with stope lengths up to 100 m and height 60 m because of extremely complex nature of rock structure. Sublevel drives are developed depending upon the type of drilling machinery. Normally, 57 mm dia holes at trough level and 114 mm dia holes at sublevel are drilled. ANFO is predominantly used as column charge as explosives along with anodets (non-electric delay detonators). In watery holes, slurry/emulsion explosives are used. Mucking is done by power-LHDs, transported through ore chute and to skip through vibrating feeder belt conveyor & measuring bins. Diesel power locos are used for further transportation of ore through a train of granby mine-cars of 5-tonne capacity to surface stockpile.

The Rajpura-Dariba mine of HZL is an undergound mine with onsite concentrator and two vertical access shafts. Mining is done through vertical crater retreat and blasthole stoping. Ore is crushed underground before hoisting and stock piling for secondary and tertiary crushing.

Sindesar-Khurd mine, located near Rajpura-Dariba is an underground mine having access through a decline and service incline. Mining is done through Blast Hole stoping Method. Ore produced is hauled up to surface stock pile and crushed and then transported to RDM concentrator for secondary crushing.

Rampura-Agucha mine is an opencast mine. Good mineralogy leads to higher recovery and overall low production cost. Onsite concentrator produces lead and zinc concentrates. The mining machinery deployed include excavators up to 9 cu m capacity, drill machines for 165mm dia holes, 78 tonne dumpers, 28 kl-capacity water sprinklers, etc. Output per man-shift (O.M.S.) is around 23 tonnes (ore basis). The concentrators installed at HZL mines have a combined milling capacity of 10,140 tpd ore. In-stream analyser and computerised process control system were installed at Mochia and Dariba beneficiation plants. This system, already in operation at Balaria plant, improved operational efficiency, such as higher grade concentrate, reduction in consumption of reagents and higher metal recovery.

HZL plans possible hiving off the Sargipalli mine in Orissa as it has become economically unviable. Agnigundala (Bandalmottu) in Guntur district of Andhra Pradesh, had a capacity of 240 tpd lead ore. Mining and allied operations at Bandalmottu lead mine were discontinued w.e.f. November 2002 and mine owner submitted notice of abandonment in May 2003. Mining lease was surrendered and the site was abandoned in 2004.

After detailed surface investigation and mapping on 1:1000 scale, surface exploratory drilling at Bara (Zawar lease hold, block -3) was taken up in 2005. Ten boreholes with 2,370 m of surface drilling had been completed till March, 2006 intersecting mineralisd zones ranging in width from 2-15 m with 2-4% Pb and 1-2% Zn. Drilling was still in progress and final decision to start a mine will be taken after completion of exploratory drilling.

Besides, SMC's Bhotang mine having a capacity of 100 tpd and Pacheykhani mine having 20 tpd capacity used to produce a small quantity of low- grade polymetallic ore, mostly copper. SMC, since its inception, was with the Department of Mines, and w.e.f. 21.12.2001 had been transferred to the Department of Development of North-East Region. The capital mine development was being done in deeper level (below 5th level) below river Tista for increasing ore reserve base.

INDUSTRY

The smelting capacity for lead (primary) in the country was 85,000 tpy and for zinc (primary) 707,000 tpy in 2006-07.

Primary lead was produced entirely by HZL which operated smelters having an aggregate capacity of 85,000 tpy lead metal. The Vizag lead smelter having 22,000 tpy metal capacity was closed down on 24.1.2001 while Tundoo lead smelter has been closed from May 2003 for economic reasons. For producing secondary lead, Indian Lead Ltd (ILL), a private sector company, has two units, one at Kolkata and other at Thane (Maharashtra), each having 12,000 tpy capacity. Both the units are based on imported concentrates/scrap.

The smelting capacity of HZL for zinc is distributed between HZL smelters at Debari 88,000 tpy, Visakhapatnam 56,000 tpy and Chanderiya 525,000 tpy. BZL's plant at Binanipuram (Alwaye), Kerala having a capacity of 38,000 tpy produces zinc from imported concentrates. Besides lead & zinc capacities, Chanderia smelting complex has a capacity to produce 150 tonnes of silver.

BZL does not have captive mines. The company produces zinc by procuring zinc concentrates from abroad/indigenously at its plant at Alwaye (Kerala). Companywise smelting capacity of lead and zinc smelters is furnished in Table - 16.

Table – 16 : Companywise Capacity and Production of Primary Lead and Zinc

(In tonnes)

Smelter	Lead capacity	Production		Zinc capacity	Production	
		2006-07	2007-08		2006-07	2007-08
Total	**85000**	**44627**	**58246**	**707,000**	**380945**	**457075**
Hindustan Zinc Ltd	85000	44627	58246	669000	348321	425170
Binani Zinc Ltd	-	-	-	38000	32624	31905

Besides these units, both zinc and lead are produced through secondary routes from scrap, dross, residue, etc. Most of the secondary producing units, especially in lead, were in the unorganised sector for which data are not available.

The Chanderia zinc smelter complex has three zinc smelters, namely, lead zinc smelter using Imperial Smelting Technology, UK, Hydrometallurgical zinc smelter,Hydro-I and Hydro-II using Roast leach Elecrowinning Technology with conversion process and lead smelter using TSL Technology from Ausmelt, Australia and Cansol Technology for sulphur recovery.

The Debari zinc smelter and Vizag zinc smelter are hydrometallurgical zinc smelters using Roast Leach Electrowinning Technology with conversion process. The product range of HZL constitute two grades, namely, special High Grade zinc (SHG) 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 1000 kg and PW Jumbo weighing 600 kg. Lead is available as HZL Grade containing 99.99%, Pb (min) in the form of slab weighing 25 kg.

HZL has announced a list of new projects in mining smelting and captive power plants which will be made operational by 2010. The expansion will take total integrated zinc-lead metal capacity to 1,064,000 tpy by 2010 with fully integrated mining and captive power generation capacity, thereby making HZL world's largest integrated zinc-lead producer. The plans include: Rampura-Agucha ore production capacity expansion from 5 million tpy to 6 million tpy, Sindesar Khurd expansion from 0.3 million tpy to 1.5 million tpy and opening up of new mine at Kayar, Rajasthan with an initial capacity of 0.3 million tpy in mining; setting up of a 210,000 tpy zinc hydrometallurgical plant and a 100,000 tpy lead plant at Rajpura Dariba in smelting. The company is also planning to set up a captive power plant of 2 X 80 MW capacity at Rajpura Dariba in addition to existing 234 MW coal based captive power plant at Chanderiya smelter complex.

POLLUTION CONTROL & ENVIRONMENTAL MANAGEMENT EFFORTS

In order to regulate the reuse/reprocessing of recyclable waste in an environmentally sound manner, the Government had decided, with effect from 31 December 1999, to auction old/used lead-acid batteries and other non-ferrous metal waste to users only who were enlisted with Ministry of Environment & Forest (MOEF) as 'actual users' and were having facilities for environmentally sound management of waste processing.

All the units of HZL have achieved certification by International Occupational Health and Safety Management System OHSAS 18001, ISO 9001 and ISO 14001. Debari and Vizag smelters have obtained SA 8000 certificate for the social accountability. In view of severe scarcity of water in Rajasthan, zero discharge of desliming hydrocyclones was introduced in the tailing circuit to increase the recovery of water from the tailings. This has resulted in reducing the fresh water consumption. The sewage treatment plants at Debari and Chanderiya smelters were operated continuously and the effluents were reutilised in the smelter and for plantation in the colony.

HZL has entered into a charter for 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.

CONSUMPTION

Lead

Reported consumption of lead metal and scrap collected on non-statutory basis in 2006-07 was 90,153 tonnes increased from 831,911 tonnes in 2005-06. During 2007-08 there was a slight increase in consumption at 90,739 tonnes. In 2007-08, storage battery industy was the largest consumer of lead and consumed about 86% of the total consumption at 77,595 tonnes, followed by cable sheathing 3,603 tonnes (4%), Paints 2,668 tonnes, chemicals 2,586 tonnes (3% each) and alloys and others 2% each. The component of scrap in total consumption was 4.6% in 2005-06, 0.95% in 2006-07 and 0.70 % in 2007-08 (Table-17). The apparent consumption of lead in various industries during the year 2006-07 and 2007-08 was computed on the basis of production of lead (primary), imports of lead (scrap), Pig lead and Refined lead (unwrought) and export of Refined lead (unwrought), lead refined NES, Pig lead and lead waste & scrap. The apparent consumption thus arrived at was 180,308 tonnes in 2006-07 and 145,955 tonnes in 2007-08 (Table-18).

Zinc

Reported consumption of zinc and scrap compiled on non-statutory basis in 2006-07 was 412,804 tonnes increased from 140,619 tonnes in 2005-06, an increase of about 194%. However in 2007-08, the consumption of zinc was 405,626 tonnes, slightly lower than the preceding year. The consumption in principal end-use industries in 2007-08 was 267,929 tonnes (66%) in galvanising, 50,432 tonnes (12%) in Semis & alloys, 35,701 tonnes (9%) in dry battery, 15,185 tonnes (4%) in chemicals, 26,176 tonnes (6%) in other industries. The component of scrap in the entire zinc consumption was only 5% in 2005-06, which decreased to 1% in 2006-07 and 2% in 2007-08. Reported end-use consumption of zinc and zinc scrap is furnished in Table-19. The apparent consumption of zinc in various industries during 2006-07 and 2007-08 was computed on the basis of production of zinc (ingots), imports of zinc (ingots), zinc spelter, and zinc scrap and exports of zinc spelter and zinc scrap. The apparent consumption thus arrived at was 402,178 tonnes in 2006-07 and 477,426 tonnes in 2007-08 (Table-20).

Table – 17 : Reported Consumption of Lead and Lead Scrap

(In tonnes)

End use	2005-06	2006-07 (p)	2007-08 (p)
Total	**83191**	**90153**	**90739**
A. Lead Metal			
Cable sheathing	3202	3661	3603
Storage Battery	69865	77828	77595
Paints	1434	2119	2668
Chemicals	2415	2586	2586
Alloys	971	1338	2129
Others*	1436	1760	1519
B. Lead Scrap	**3868**	**861**	**639**

* *Others include galvanizing, auto ancillary, electrical, man made fibre, defence, railway and miscellaneous.*

Table – 18 : Apparent Consumption of Lead (Based on Production of Lead (Primary), Imports and Exports)

(In tonnes)

Item	2006-07	2007-08 (p)
(i) Total production Lead (primary)	44627	58246
(ii) Total imports *	140725	95683
(iii) Total exports **	5044	7974
(iv) Apparent consumption	180308	145955

* *Lead (scrap), pig lead and refined lead (unwrought).*
** *Refined lead (unwrought), lead refined (NES), pig lead and lead waste and scrap.*

Table – 19 : Reported Consumption of Zinc and Zinc Scrap

(In tonnes)

End use	2005-06	2006-07	2007-08 (p)
Total	**140619**	**412804**	**405626**
A. Zinc Metal			
Galvanising	69472	277185	267929
Dry battery	29777	37865	35701
Alloys	19081	52291	50432
Chemical	8517	13096	15185
Die-casting	2430	1327	1176
Others*	7771	24998	26176
B. Zinc Scrap	**3571**	**6042**	**9027**

* *Others include electrical, man made fibre, defence, railway and miscellaneous.Estimation has been made for non reporting units during the months.*

Table - 20 : Apparent Consumption of Zinc (Based on Production of Zinc (Ingots), Imports and Exports)

(In tonnes)

Item	2006-07	2007-08 (p)
(i) Total production Zinc (ingots)	380945	457075
(ii) Total Imports *	160617	92003
(iii) Total exports **	139384	71652
(iv) Apparent consumption	402178	477426

* *Zinc ingots, zinc spelter and zinc scrap.*
** *Zinc spelter and zinc scrap.*

SUBSTITUTES & TECHNICAL POSSIBILITIES

Lead

Battery replacements include batteries of nickel-zinc, zinc chloride, lithium sulphide or nickel 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 and operating problems.

In Construction applications, plasting 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 shot 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-knock additive is rapidly being phased out, a process hastened 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 antioxidant 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 developing and will 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 and agriculture sectors has created shortage in country.

Zinc

Aluminium, magnesium and plastic compete in some die-casting applications. Ceramic and plastic coatings, electroplated cadmium and 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

RESOURCES

Lead

The world's reserve base of lead is estimated at 170 million tonnes. Australia leads with 35% world reserve base of lead, followed by China (21%), USA (11%) and Kazakhstan (4%) (Table - 21).

Zinc

The world's reserve base is estimated at 480 million tonnes. Australia accounts for 21% of world's zinc reserve base, followed by China and USA (19% each), Kazakhstan (7%), Canada (6%), Mexico and Peru (5% each) (Table - 22).

PRODUCTION

Lead

The world mine production of lead increased to 3.6 million tonnes in 2006 and remained static in 2007. China was the leading producer accounting for about 38% world production, followed by Australia (18%), USA (12%), Peru (9%) and Mexico (4%) (Table-23).

Zinc

The world mine production of zinc increased to 10.4 million tonnes in 2007 from 10.1 million tonnes in 2005 and further increased to 11 million tonnes in 2007. China, Australia and Peru were the leading producers, contributing 27%, 14% and 13%, respectively, followed by USA (7%), Canada (6%), India (5%), and Mexico (4%) in 2007 (Table - 24).

WORLD PRICES

Annual average prices of lead and zinc recorded at the London Metal Exchange (LME) during 2003 to 2007 are given in Table - 25.

Table – 21 : World Resources of Lead (By Principal Countries)

(In '000 tonnes of lead content)

Country	Reserve base
World : Total (rounded)	**170000**
Australia	59000
Canada	5000
China	36000
Kazakhstan	7000
Mexico	2000
Morocco	1000
Peru	4000
Poland	5400
South Africa	700
Sweden	1000
USA	19000
Other countries	30000

Source : *Mineral Commodity Summaries, 2008.*

Table – 22 : World Resources of Zinc (By Principal Countries)

(In '000 tonnes of zinc content)

Country	Reserve base
World : Total (rounded)	**480000**
Australia	100000
Canada	30000
China	92000
Kazakhstan	35000
Mexico	25000
Peru	23000
USA	90000
Other countries	87000

Source: *Mineral Commodity Summaries, 2008.*

Table - 23 : World Mine Production of Lead (By Principal Countries)

(In '000 tonnes of metal content)

Country	2005	2006	2007
World : Total	**3500**	**3600**	**3600**
Australia	767	668	641
Canada	79	83	75
China	1142	1330	1360
India*	62	69	81
Irish Republic	72	62	53
Kazakhstan	45	48	40
Mexico	134	135	137
Morocco	46	41	42
Poland	80	77	74
Peru	319	313	329
South Africa	42	48	41
Sweden	60	56	63
USA	437	429	434
Other countries	215	241	230

Source *: World Mineral Production,2003-2007.*

* *India's production of primary lead in 2005-06, 2006-07 and 2007-08 was 23.8 thousand tonnes, 44.6 thousand tonnes and 58.2 thousand tonnes, respectively.*

Table – 24 : World Production of Zinc (By Principal Countries)

(In '000 tonnes of metal content)

Country	2005	2006	2007
World : Total	**10100**	**10400**	**11000**
Australia	1367	1362	1514
Canada	667	638	623
China	2548	2844	2950
India*	472	503	558
Irish Rep.	445	426	401
Kazakhstan	364	405	386
Mexico	476	479	452
Peru	1202	1203	1444
USA	748	727	803
Other countries	1811	1813	1869

Source: *World Mineral Production, 2003-2007.*

* *India's production of primary zinc in 2005-06, 2006-07 and 2007-08 was 296.5 thousand tonnes, 380.9 thousand tonnes and 457.1 thousand tonnes, respectively.*

Table – 25 : Average London Metal Exchange Prices of Lead and Zinc, 2003 to 2007

(US $ per tonne)

Year	Lead	Zinc
2003	515.66	828.39
2004	888.33	1047.83
2005	975.65	1381.55
2006	1287.49	3272.62
2007	2594.96	3250.30

Source : *World Metal Statistics.*

Lead

Australia

Perilya Ltd is undertaking the staged development of its Potosi project at Broken Hill in New South Wales, and access to the high grade Potosi North area is expected to deliver ore to the Broken Hill concentrator. The resource currently amounts to some 1.6 million tonnes at 13.0% Zn, 3.1% Pb and 43.1 g/t Ag . The underground operation could produce about 50,000 t/y lead.

Bolivia

San Cristobal open-pit mine, owned by Apex Silver Mines Ltd (65%) and Sumitomo Corpn. (35%) was about to commence production. The approximate proven and probable mineable reserves in open pit are placed at 231 million tonnes with 470 million ounces of silver, 3.6 million tonnes of zinc and 1.36 million tonnes of lead. The mine is expected to produce around 84,000 tpy of lead.

Canada

Acadian Gold Corp. brought its Scotia lead-zinc mine at Gays River in Nova Scotia into production. The mine is designed to produce around 20,000 tonnes of lead per year.

China

Xiacun mine in Sichuan Province having a capacity of 25,000 tpy of lead was opened in July 2006.

Sasa mine in **Macedonia** having a capacity of 20,000 tpy of lead was re-opened. The Rubtsovsky mine with 20,000 tpy of lead capacity in Altai region of **Russia** started production. The Duddar deposit in **Pakistan** is expected to produce 10,000 tonnes of lead.

Zinc

Australia

Century mine in Queensland owned by Zinifex is Australia's largest zinc mine, based on concentrate production. It produced 140,505 tonnes zinc concentrate April-June 2007 due to improved concentrator.

Lennard Shelf mine in the Kimberley region of Western Australia restarted by Teck is the world's second largest zinc mine.

Jaguar Project owned by Jabiru Metals Ltd started producing zinc concentrate with a higher grade of 48% Zn as against the expected 45% Zn grade in feasibility report.

Canada

Wolverine zinc-silver project of Yukon Zinc Corp. is about to start its development. The mine has measured and indicated resources of 4.46 million tonnes grading 12.14% Zn, 354.8 g/t silver, 1.16% copper, 1.69 g/t gold and 1.58% lead. It is expected to produce 1,440 tpd ROM feed and 1,250 tpd of ore feed.

Peru

The Cerro Lindo Polymetallic mine owned by Cia Minera Milpo at Chavin is situated 2,000 m above sea level. It is designed to produce 146,000 tpy of zinc concentrates, 14,800 tpy of lead concentrates and 39,500 tpy of copper concentrates. The mine commenced production in July 2007.

Portugal

The feasibility study has been completed at the recently discovered Lombador massive sulphide zone at the Neves-Corvo mine. The mine is expected to start production by 2011 and will enhance the production of zinc ore production from 400,000 tpy to 2.4 million tonnes per year. Another mine namely, Lundin's Aljustrel is expected to produce 80,000 tonnes of contained zinc,17,000 tonnes of contained lead and 1.25 million ounces of silver.

USA

Red Dog mine in Alaska is the world's largest producer of contained zinc with a production capacity of 600,000 tpy.

Yemen

The government granted the first large scale mining licence to ZincOx Resources plc to produce zinc from Jabali Zinc project. Jabali is designed to produce about 70,000 tpy of zinc oxide. The measured and indicated resources are estimated at 10.8 million tonnes at an average grade of 8.7 % Zn, 1.2% Pb and 68 g/t Ag.

FOREIGN TRADE

Lead

Exports

Exports of lead ores and concentrate rose to 1,102,514 tonnes in 2007-08 as compared to 75,410 tonnes in the previous year. China was the single largest importer accounting for about 98%. Exports of lead and alloys including scrap increased to 19,806 tonnes in 2007-08 from 15,535 tonnes in the previous year. Out of total exports, bulk quantity i.e. 19,733 tonnes were of lead and alloys in 2007-08 while those of lead (scrap) was merely 73 tonnes. Exports were mainly to Oman (19%), Saudi Arabia (17%), Sri Lanka and USA (12% each) and Indonesia (7%) (Tables - 26 to 29).

Imports

Imports of lead ores & concentrate decreased by 29% to 5,685 tonnes in 2007-08 as compared to 8,032 tonnes in 2006-07. Imports were mainly from Nigeria (34%), Morocco (24%) and Greece (17%). Imports of lead & alloys including scrap decreased to1,54,292 tonnes in 2007-08 from 1,84,021 tonnes in the previous year. Out of total imports, bulk quantity i.e.1,37,823 tonnes was of lead and alloys in 2007-08 while lead (scrap) imports were only 8,372 tonnes. Imports were mainly from Australia (21%), UAE (12%), China (11%), Rep.of Korea (9%) and Pakistan (7%) (Tables - 30 to 34).

Zinc

Exports

Exports of zinc ores and concentrates decreased by 84% in 2007-08 to 5,06,774 tonnes from 3,174,196 tonnes in 2006-07. China was the major importer and accounted for 71% followed by Rep. of Korea (28%). Exports of zinc and alloys including scrap decreased sharply to 81,536 tonnes in 2007-08 from 1,89,249 tonnes in the previous year. Out of total exports, bulk quantity i.e. 81,274 tonnes was of zinc & alloys while those of zinc (scrap) was only 262 tonnes. Exports were mainly to Turky, Indonesia and Italy (9% each), Nigeria, Belgium and UAE (8% each) (Tables -35 to 38).

Imports

Imports of zinc ores and concentrates decreased to 49,493 tonnes in 2007-08 from 52,003 tonnes in the previous year. Imports were mainly from Australia (58%), and Peru (42%). Imports of zinc and alloys including scrap decreased sharply to 1,06,214 tonnes in 2007-08 from 1,79,034 tonnes in the previous year. Out of total imports, bulk quantity i.e. 73,642 tonnes was of zinc & alloys (69%) while those of zinc (scrap) was 32,572 tonnes (31%). Imports were mainly from Republic of Korea (19%), Kazakhastan and Iran (12%each), UAE and Australia (6% each) (Table - 39 to 43).

Table – 26 : Exports of Lead Ores & Conc.
(By Countries)

Country	2006-07		2007-08	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	**75410**	**4426791**	**1102514**	**2879336**
China	75408	4426777	1076500	2705346
Netherlands	-	-	26000	173864
Sri Lanka	2	14	13	117
South Africa	-	-	1	9

Table – 27 : Exports of Lead and Alloys Incl. Scrap : Total (By Countries)

Country	2006-07		2007-08	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	**15535**	**1232327**	**19806**	**2222252**
Oman	1261	99632	3767	424410
Saudi Arabia	4	419	3268	386692
Sri Lanka	2420	161141	2471	306872
USA	3024	246938	2313	178295
Indonesia	283	13644	1403	170499
Bangladesh	177	12439	581	89752
UAE	1869	105278	886	89024
Netherlands	1595	139089	835	50826
UK	1137	112299	341	31192
Israel	875	82101	73	7875
Other countries	2890	259347	3868	486815

Table – 28 : Exports of Lead & Alloys (By Countries)

Country	2006-07		2007-08	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	**15167**	**1223259**	**19733**	**2215620**
Oman	1261	99632	3767	424410
Saudi Arabia	4	419	3268	386692
Sri Lanka	2420	161141	2471	306872
USA	2994	246345	2313	178295
Indonesia	283	13644	1403	170499
Bangladesh	177	12439	581	89752
UAE	1869	105278	874	88442
Netherlands	1595	139089	835	50826
UK	1137	112299	341	31192
Israel	875	82101	73	7875
Other countries	2552	250872	3807	480765

Table – 29 : Exports of Lead & Waste & Scrap (By Countries)

Country	2006-07		2007-08	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	**368**	**9068**	**73**	**6632**
Zaire Rep/Congo Democratic Rep.	-	-	36	3672
Spain	50	1045	25	2378
UAE	-	-	12	582
Australia	270	6625	-	-
Cuba	18	756	-	-
Denmark	0	49	-	-
USA	30	593	-	-

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

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**8032**	**175833**	**5685**	**234234**
Morocco	1208	41451	1343	92911
Nigeria	1094	25175	1942	75157
Greece	595	10067	942	26542
Senegal	2785	52995	239	6802
Malaysia	626	12479	178	6370
Gambia	346	5937	143	4683
Indonesia	-	-	210	4634
UAE	478	10129	191	4612
Ivory Coast	-	230	3632	
USA	205	4973	37	1672
Other countries	695	12627	230	7219

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

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**184021**	**10718814**	**154292**	**15706501**
Australia	42920	2692268	32010	3556018
China	41230	2523834	17660	1783905
UAE	9312	390248	17910	1730042
Korea, Rep. of	13147	935484	13505	1614387
Pakistan	5839	328374	10438	967926
UK	4256	241547	8029	929530
Iran	15587	897935	7997	847840
Nigeria	5693	290980	6089	528095
Sri Lanka	3769	220878	4266	409853
Saudi Arabia	2769	129184	4322	404919
Other countries	39499	2068082	32066	2933986

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

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**159848**	**9680518**	**137823**	**14466770**
Australia	41194	2619612	31497	3515220
China	41108	2516506	17509	1770468
Korea, Rep. of	13147	935484	13505	1614387
UAE	4933	235902	14401	1540254
Pakistan	4838	278304	10368	962911
Iran	15396	888691	7997	847840
UK	2537	161017	4683	608991
Nigeria	4507	230901	5814	508504
Sri Lanka	3683	216813	4249	408998
Turkey	6549	341243	1995	169411
Other countries	21956	1256045	25805	2519786

Table – 33 : Imports of Lead (Scrap) (By Countries)

Country	2006-07 Qty. (t)	2006-07 Value (Rs. '000)	2007-08 Qty. (t)	2007-08 Value (Rs. '000)
All Countries	**24173**	**1038296**	**16469**	**1239731**
UK	1719	80530	3346	320539
UAE	4379	154346	3509	189788
USA	3108	138097	2679	181646
Saudi Arabia	1313	56866	720	56922
Georgia	521	22272	744	56091
Mexico	514	25297	547	44308
Australia	1726	72656	513	40798
Singapore	821	37735	477	35729
Nigeria	1186	60079	275	19591
France	1676	75789	395	17562
Other countries	7210	314629	3264	276757

Table – 34 : Imports of Lead (By Items)

Item	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Items	**184021**	**10718814**	**154292**	**15706501**
Lead & alloys: unwrought	158632	9610210	136345	14301458
Pig lead	16875	905522	7385	679467
Unrefined lead, NES	5908	300264	8893	776179
Refined lead, unwrought	99677	6235359	71829	7921272
Antimonial lead	969	67455	1192	133226
Lead & alloys unwrought, NES	35203	2101610	47046	4791314
Lead & alloys: worked (bars, rods, plates, etc.)	1216	70308	1478	165312
Lead scrap	24173	1038296	16469	1239731

Table – 35 : Exports of Zinc Ores & Conc. (By Countries)

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**3174196**	**17337315**	**506774**	**12879413**
Australia	104550	810705	-	-
China	2174369	7774982	357569	9053146
Germany	4	37	-	-
Japan	50000	814328	-	-
Korea, Rep. of	745273	7068907	143755	3524322
Nepal	-	-	40	196
Nigeria	-	-	200	3402
Saudi Arabia	-	-	10	27
Spain	100000	868356	-	-
Switzerland	-	-	5200	298320

Table – 36 : Exports of Zinc and Alloys Including Scrap : Total (By Countries)

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**189249**	**32663605**	**81536**	**12387574**
Belgium	29653	5955950	6349	1248219
Italy	53449	10333471	7384	1239822
Indonesia	2214	461884	7502	1144632
Turkey	4507	825993	7685	1109550
Nigeria	2072	343147	6629	1091980
UAE	5210	933626	6361	869348
USA	21772	4166580	3193	624320
Spain	1997	429273	3597	576915
China	27611	2670022	3318	237269
Netherlands	15460	1863028	540	92610
Other countries	25304	4680631	28978	4152909

Table – 37 : Exports of Zinc & Alloys (By Countries)

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**188730**	**32613492**	**81274**	**12322091**
Belgium	29603	5949989	6349	1248219
Italy	53425	10329906	7384	1239822
Indonesia	2214	461884	7502	1144632
Turkey	4507	825993	7685	1109550
Nigeria	2072	343147	6629	1091980
UAE	5045	918026	6263	860372
USA	21772	4166580	3193	624320
Spain	1997	429273	3597	576915
China	27611	2670022	3318	237266
Netherlands	15460	1863028	540	92610
Other countries	25024	4655644	28814	4096405

Table – 38 : Exports of Zinc (Scrap) (By Countries)

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**519**	**50113**	**262**	**65483**
Nepal	34	1010	++	40706
Germany	-	-	122	11601
UAE	165	15600	98	8976
Pakistan	50	7077	18	2507
Fiji	28	1287	11	929
South Africa	14	727	1	57
Belgium	50	5961	-	-
Canada	21	1252	-	-
Chinese Taipei/ Taiwan	110	12091	-	-
Italy	24	3565	-	-
Other countries	23	1543	12	707

Table – 39 : Imports of Zinc Ores & Conc. (By Countries)

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**52003**	**3450170**	**49493**	**2846124**
Australia	38305	2517541	28476	2045745
Peru	11027	772496	20957	799454
Ethiopia	-	-	39	465
South Africa	-	-	21	460
Germany	60	3090	-	-
Indonesia	55	2235	-	-
Japan	18	279	-	-
Turkey	2538	154529	-	-

Table – 40 : Imports of Zinc & Alloys Including Scrap : Total (By Countries)

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**179034**	**24695652**	**106214**	**12996924**
Korea, Rep. of	15329	2479332	20259	2840681
Kazakhstan	13141	2319808	12665	1750758
Iran	36700	5929265	12659	1464351
Australia	15298	2200253	6153	844931
UAE	5825	591010	6710	719587
Belgium	10370	809109	5535	620127
Uzbekistan	6486	1302632	5722	551420
Germany	5629	582217	3668	538749
China	21709	3699959	2792	437771
UK	5152	408003	2787	321341
Other countries	43395	4374064	27264	2907208

Table – 41 : Imports of Zinc & Alloys (By Countries)

Country	2006-07 Qty (t)	2006-07 Value (Rs. '000)	2007-08 Qty (t)	2007-08 Value (Rs. '000)
All Countries	**130564**	**21229156**	**73642**	**9766971**
Korea, Rep. of	15222	2470394	20133	2827354
Kazakhstan	13141	2319808	12665	1750758
Iran	36653	5924843	12615	1459732
Australia	14241	2126501	5451	773544
Uzbekistan	6486	1302632	5722	551420
China	21636	3694407	2791	437715
Belgium	2060	273278	2641	366046
UAE	1977	245009	2982	340209
Germany	1212	207352	597	182742
Russia	2770	445259	1061	127380
Other countries	15166	2219673	6984	950071

Table – 42 : Imports of Zinc (Scrap)
(By Countries)

Country	2006-07		2007-08	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	**48470**	**3466496**	**32572**	**3229953**
UAE	3848	346001	3728	379378
Germany	4417	374865	3071	356007
Saudi Arabia	1725	151672	3124	333768
Belgium	8310	535831	2894	254081
UK	4334	279536	2177	210176
Netherlands	2313	186651	1365	142019
USA	2594	165424	1506	140034
Singapore	1050	89334	1382	120802
Malaysia	1471	102216	1216	101706
France	3626	216020	909	84232
Other countries	14782	1018946	11200	1107750

Table - 43 : Imports of Zinc
(By Items)

Item	2006-07		2007-08	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Items	**179034**	**24695652**	**106214**	**12996924**
Zinc & alloys	130564	21229156	73642	9766971
Zinc or spelter	107538	17679908	55343	7129163
Mazak	4609	659285	4088	550084
Zinc & alloys, NES	8580	1451667	5839	918839
Zinc & alloys: worked (bars, rods, plates, etc.)	9837	1438296	8372	1168885
Zinc scrap	48470	3466496	32572	3229953

FUTURE OUTLOOK

As per the overview of Report of the Working Group on Mineral Exploration and Development (other than coal and lignite) for the XIth Five Year Plan, it is observed that at the present scale of operation and mine expansion under execution, the resource position will become critical to meet the concentrate requirement for the zinc metal production capacity which is projected at 9% growth rate (CAGR) during XIth Plan and beyond. Accordingly, it requires to achieve new economic discoveries.

The demand of zinc is riding the steel industry growth, mainly driven by the production of galvanised sheets. Similarly, with the growth in the automotive, information and communication technology sectors, the demand for lead is poised to increase. It is expected that down-stream industry development, improvement in standard of living and consumer awareness is set to further increase the demand of zinc and lead in the forthcoming years. Domestic demand for zinc and lead is projected to grow at CAGR of 8% and 10%, respectively,during XIth Plan period.

It is also recommended that in order to develop the Indian zinc-lead industry certain factors such as market development and development of newer applications; infrastructure development; focus on safe and eco-friendly recycling; creating capacities with focus on global cost competitiveness and value addition; and focussed R&D efforts for recovery of minor/trace metals and development of cost effective new applications, etc. require specific attention.