

### 3.1 ANTIMONY

#### Introduction

Antimony is a strategic metal. Stibnite ( $Sb_2S_3$ , Sb 71.4%) is the predominant ore of antimony. Antimony in its elemental form is a silver-white, brittle, crystalline, solid metal that exhibits poor electrical and heat conductivity properties. Commercial forms of antimony are generally ingots, broken pieces, granular or cast cake. Estimates of abundance of antimony in earth's crust range from 0.2 to 0.5 parts per million. Antimony ores occur both in deposits associated with volcanic rocks and also more deep-seated veins formed under moderate to high temperatures and pressure. The metal is obtained commonly as a by-product in lead-zinc-silver smelting. The entire requirement of antimony in the country is met through imports of its ore and concentrates.

#### Basis of Grade Classification

The chief ore of antimony is stibnite ( $Sb_2S_3$ , Sb 71.4%). It is more commonly obtained as a by-product in lead-zinc-silver mines. The resources have been classified as Ore and Metal.

#### Basis of Categorisation of Resources

As per United Nations Framework Classification (UNFC), the resources are classified into 'reserves' and

'remaining resources'. According to norms of this system reserves of antimony has been placed under probable (122) category and the remaining resources of antimony has been placed under pre-feasibility (222) and inferred (333) categories.

#### Salient Features of the Inventory

The total resources of antimony in the country as on 01.04.2020 are placed at 18,683 tonnes ore and 254.92 tonnes metal. These resources have been estimated in two deposit; one each located in Lahaul and Spiti district in Himachal Pradesh & Damoh district in Madhya Pradesh.

All India resources of antimony ore and metal as on 01.04.2020 vis-a-vis 01.04.2015 are given in Tables - 1 to 2. It is noticed in NMI 2020 that the resources of antimony ore and metal increased by 8095 tonnes and 80.92 tonnes respectively due to reporting of one new leasehold private deposit in Damoh district of Madhya Pradesh. As regards the earlier freehold deposit in Lahaul & Spiti district of Himachal Pradesh, resources remain unchanged in inferred (333) category. The deposit in Damoh district of Madhya Pradesh has probable reserves (122) amounting 7503 of ore tonnes with 75 tonnes of metal and pre-feasibility resources (222) amounting 592 tonnes of ore with 5.92 tonnes of metal.

**Table – 2 : Total Resources of Antimony as on 01.04.2020 vis-à-vis 01.04.2015 (By States)**

State	Total Resources		Net Change
	(In Tonnes)		
	As on 01.04.2020	As on 01.04.2015	
All India : Total			
<b>Ore</b>	<b>18,683</b>	<b>10,588</b>	<b>(+)8,095</b>
<b>Metal</b>	<b>254.92</b>	<b>174</b>	<b>(+)80.92</b>
<b>Himachal Pradesh</b>			
Ore	10,588	10,588	No Change
Metal	174	174	No Change
<b>Madhya Pradesh</b>			
Ore	8,095	-	(+)8,095
Metal	80.92	-	(+)80.92

figures rounded off.

**Table - 1 : Reserves/Resources of Antimony as on 01.04.2020 vis-à-vis 01.04.2015**  
(By Lease Status/Grade)

Lease status/Grade	Reserves				Remaining resources				Total resources					
	01.04.2020		01.04.2015		01.04.2020		01.04.2015		01.04.2020		01.04.2015		Net change	
<b>All India : Total</b>	<b>7,503</b>	<b>-</b>	<b>(+) 7,503</b>	<b>-</b>	<b>11,180</b>	<b>10,588</b>	<b>(+) 592</b>	<b>18,683</b>	<b>10,588</b>	<b>(+) 8,095</b>	<b>10,588</b>	<b>10,588</b>	<b>(+) 8,095</b>	<b>(+) 8,095</b>
<b>Ore</b>	<b>75</b>	<b>-</b>	<b>(+) 75</b>	<b>-</b>	<b>179.92</b>	<b>174</b>	<b>(+) 5.92</b>	<b>254.92</b>	<b>174</b>	<b>(+) 80.92</b>	<b>174</b>	<b>174</b>	<b>(+) 80.92</b>	<b>(+) 80.92</b>
<b>Freehold</b>														
Ore	-	-	-	-	10,588	10,588	No Change	10,588	10,588	No Change	10,588	10,588	No Change	No Change
Metal	-	-	-	-	174	174	No Change	174	174	No Change	174	174	No Change	No Change
<b>Leaseholds (Private)</b>														
Ore	7,503	-	(+) 7,503	-	592	-	(+) 592	8,095	-	(+) 8,095	-	-	(+) 8,095	(+) 8,095
Metal	75	-	(+) 75	-	5.92	-	(+) 5.92	80.92	-	(+) 80.92	-	-	(+) 80.92	(+) 80.92

*figures rounded off.*

**Table -3 : District wise Reserves/Resources of Antimony as on 01.04.2020**

(In Tonnes)				
State	District	Reserves	Remaining Resources	Total Resources
<b>All India : Total</b>				
	<b>Ore</b>	<b>7,503</b>	<b>11,180</b>	<b>18,683</b>
	<b>Metal</b>	<b>75</b>	<b>179.92</b>	<b>254.92</b>
<b>Himachal Pradesh</b>				
	<b>Ore</b>	<b>-</b>	<b>10,588</b>	<b>10,588</b>
	<b>Metal</b>	<b>-</b>	<b>174</b>	<b>174</b>
	Lahaul & Spiti			
	Ore	-	10,588	10,588
	Metal	-	174	174
<b>Madhya Pradesh</b>				
	<b>Ore</b>	<b>7,503</b>	<b>592</b>	<b>8,095</b>
	<b>Metal</b>	<b>75</b>	<b>5.92</b>	<b>80.92</b>
	Damoh			
	Ore	7,503	592	8,095
	Metal	75	5.92	80.92

*figures rounded off.*

## 3.2 BAUXITE

### Introduction

Bauxite is basically an aluminous rock containing hydrated aluminium oxide as the main constituent with varying proportion of iron oxide, silica, titania and other impurities like phosphorous pentoxide and vanadium pentoxide. It is an essential ore of aluminium metal. Hydrated aluminium oxides present in the bauxite ore are gibbsite ( $\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ ), boehmite ( $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$  - alpha monohydrate) and diasporite ( $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$  - beta monohydrate).

Bauxite deposits occur as blanket, beds and lenses, pockets or irregular and detrital. The deposits of bauxite according to their mode of formation may be classified into two main types i.e. lateritic type and terra-rossa type. Indian bauxite deposits are formed from weathering of deccan trap basalt, archaean felspathic gneisses and granulites, etc.

Bauxite is the only mineral raw material from which aluminium is extracted economically. Its other important uses are in manufacture of refractory material, chemicals and abrasives. Low grade bauxite finds use in small

proportion in cement industry and high grade bauxite is used as fluxing material in steel melting shop, ferro-alloy industries, petroleum refineries, etc.

### Basis of Grade Classification

The grade classification adopted in the inventory as on 01.04.2020 is based on the report of the Expert Committee to review the classification of Minerals with regards to their Optimum Industrial Use (September, 2004). As per the recommendation of the committee, the specification for alumina and silica content has been revised downward for bauxite being used for metallurgical purpose. A limit of 35 to 40%  $\text{Al}_2\text{O}_3$  has been defined for bauxite to categorise it as low grade ore.

### Basis of categorisation of Resources

As per United Nations Framework Classification (UNFC), total resources are broadly classified into 'reserves' and 'remaining resources' category.

According to the norms of this system, reserves of bauxite have been placed under proved (111) and probable (121) & (122) categories.

### Basis of Grade Classification

1. Metallurgical Grade		
a) Metallurgical Grade – I (Predominantly Trihydrate)	$\text{Al}_2\text{O}_3$ Reactive Silica Total Silica	(+) 40% 2.8 % (max) 4% (max)
b) Metallurgical grade - II (Mixture of trihydrate and monohydrate)	$\text{Al}_2\text{O}_3$ Total Silica	(+) 40% 4% (max)
2. Refractory Grade	$\text{Al}_2\text{O}_3$ $\text{Fe}_2\text{O}_3$ CaO $\text{TiO}_2$	55% (min) 4.5% (max) 1.5% (max) 6% (max)
3. Abrasive grade	$\text{Al}_2\text{O}_3$ $\text{SiO}_2$	45% (min) 1% (max)
4. Chemical grade	$\text{Al}_2\text{O}_3$ $\text{Fe}_2\text{O}_3$	58% (min) 2.5% (max)
5. Low Grade	$\text{Al}_2\text{O}_3$ $\text{SiO}_2$	35 to 40% 10% (max)
6. Chemical/refractory mixed grade		
7. Metallurgical mixed grade		
8. Mixed grade excluding chemical and refractory		
9. Others - Estimation for marketable grades which could not be classified into above grades		
10. Unclassified - Minimum and maximum ranges of chemical constituents are too wide to be classified into any of the above grade.		
11. Not Known – Information on chemical constituents is not available or potential/actual use is not reported.		
12. Beneficiable	Aluminous laterite Bauxite	$\text{Al}_2\text{O}_3$ 20% (min) $\text{Al}_2\text{O}_3$ 30% (min) Silica reactive 5%(max.)

The remaining resources have been placed under feasibility (211), pre-feasibility (221) & (222), measured (331), indicated (332), inferred (333) and reconnaissance (334) categories.

### Salient Features of Inventory

The total resources of bauxite in the country as on 01.04.2020 are estimated at 4,958 million tonnes. These resources include about 646 million tonnes (13%) reserves and 4,312 million tonnes (87%) remaining resources. Out of the total resources, about 74% are in freehold areas and remaining 26% in leasehold areas.

All India scenario of bauxite reserves, remaining resources and total resources as on 01.04.2020 vis-a-vis 01.04.2015 have been given in Tables - 1 and 2. The tables give an idea about the changes in terms of increase or decrease of resources as per lease status, grades and state. In Table - 3, district wise reserves/resources as on 01.04.2020 have been given.

The country is endowed with huge quantities of metallurgical grade bauxite with resources of 3,931 million tonnes, about 79% of the total resources. Out of the total metallurgical grade, about 80% is metallurgical- I, 16% metallurgical - II and remaining 4% is metallurgical mixed grade.

The total resources of metallurgical grade-I bauxite has been increased by 772 million tonnes, metallurgical mixed grade by 29 million tonnes whereas metallurgical grade-II decreased by 14 million tonnes as compared to earlier inventory.

Although metallurgical grades bauxite is reported from almost all the states in the country, the major resources of metallurgical grades are concentrated in seven states namely, Odisha (1727 million tonnes), Chhattisgarh (913 million tonnes), Andhra Pradesh (615 million tonnes), Jharkhand (193 million tonnes), Gujarat (140 million tonnes), Maharashtra (138 million tonnes), Madhya Pradesh (118 million tonnes). They together account for 98% of the total metallurgical grades bauxite of the country. However, the resources of chemical, refractory and abrasive grades bauxite are very limited. The resources of abrasive grade bauxite have been mainly reported from Gujarat (1.9 million tonnes), chemical grade from Gujarat (15.1 million tonnes) and Maharashtra (3.9 million tonnes) and refractory grade from Gujarat (80.6 million tonnes), Chhattisgarh (44.8 million tonnes), Madhya Pradesh (7 million tonnes) and Jharkhand (4.5 million tonnes).

State wise, Odisha continued to have the largest share of 2,057 million tonnes (41%) of all India resources, followed by Chhattisgarh 993 million tonnes (20%), Andhra Pradesh 615 million tonnes (12%), Gujarat 397 million tonnes (8%), Jharkhand 289 million

tonnes (6%), Maharashtra 232 million tonnes (5%), and Madhya Pradesh 186 million tonnes (4%). The balance 188 million tonnes (4%) resources are accounted together by nine states viz Meghalaya, Goa, Karnataka, Tamil Nadu, Uttar Pradesh, Kerala, Bihar, Jammu & Kashmir and Rajasthan.

An overall increase of 1061 million tonnes of bauxite resources have been recorded in current NMI as compared to earlier inventory as on 01.04.2015.

During the five year span of National Mineral Inventory (NMI) i.e., from 01.04.2015 to 01.04.2020, thirty three new freehold and ten new private leasehold deposits were added. This has resulted in addition of about 981 million tonnes of resources in freehold and about 96 million tonnes of resources in private leasehold areas.

During the preparation of NMI as on 01.04.2020 it is observed that due to realignment of districts in Gujarat almost all deposits which were earlier in Jamnagar district are now placed in Devbhumi Dwarka district and a few deposits in Sabarkantha district have been placed in Aravali district. This has resulted in depletion of resources in Jamnagar district and equivalent increase in resources of Devbhumi Dwarka district and similarly depletion in Sabarkantha district & equivalent increase in Aravali district.

Of the total increase in resources of bauxite reported in current inventory, about 97% is accounted by four states namely Chhattisgarh (77%), Odisha (6%), Jharkhand & Maharashtra (5% each) and Gujarat (4%). In Chhattisgarh, an increase of about 819 million tonnes resources recorded due to addition of 9 new freehold deposits and re-estimation in resources of existing both freehold & leasehold deposits. Odisha state reported an overall increase of about 62 million tonnes resources mainly due to addition of 10 new freehold deposits and re-assessment of resources of existing freehold and leasehold deposits. In Jharkhand and Maharashtra, an increase of 50 million tonnes and 48 million tonnes resources have been reported due to addition of new 7 freehold & one leasehold and 3 freehold & 7 leasehold deposits, respectively. Besides, the re-assessment of resources in existing freehold and leasehold deposits also contributed in the increase of resources of these states. In Gujarat an increase of about 46 million tonnes resources reported in NMI 2020 due to addition of new two freehold deposits and also due to re-assessment of resources in existing leasehold deposits. The remaining increase of about 36 million tonnes (3%) is accounted by the states of Goa and Madhya Pradesh (13 million tonnes each), Kerala (5 million tonnes), Meghalaya (4 million tonnes) & Karnataka (one million tonnes). A negligible quantity of resources decreased in Tamil Nadu.

**Table - 1 : Reserves/Resources of Bauxite as on 01.04.2020 vis-à-vis 01.04.2015  
(By Lease Status/Grade)**

Lease status/Grade	(In '000 Tonnes)								
	Reserves			Remaining resources			Total resources		
	01.04.2020	01.04.2015	Net change	01.04.2020	01.04.2015	Net change	01.04.2020	01.04.2015	Net change
<b>All India : Total</b>	<b>646,493</b>	<b>656,422</b>	<b>(- )9,929</b>	<b>4,311,754</b>	<b>3,240,442</b>	<b>(+)1,071,312</b>	<b>4,958,248</b>	<b>3,896,864</b>	<b>(+)1,061,384</b>
Chemical	6,639	6,896	(- )257	15,405	13,393	(+)2,012	22,044	20,289	(+)1,755
Refractory Chemical/Refractory Mixed with others	42,363	67,158	(- )24,795	100,709	77,870	(+)22,839	143,072	145,027	(- )1,955
Metallurgical – 1	1,575	4,426	(- )2,851	24,786	15,278	(+)9,508	26,362	19,704	(+)6,658
Metallurgical – 2	507,527	439,093	(+)68,434	2,645,493	1,942,349	(+)703,144	3,153,020	2,381,442	(+)771,578
Metallurgical mixed	37,100	45,296	(- )8,196	585,786	592,016	(- )6,230	622,886	637,312	(- )14,426
Low Mixed Grade excluding Chemical/Refractory	8,783	15,080	(- )6,297	146,366	111,518	(+)34,848	155,149	126,598	(+)28,551
Abrasive	26,649	40,816	(- )14,167	521,473	281,922	(+)239,551	548,122	322,738	(+)225,384
Others	8,403	19,225	(- )10,822	66,576	44,092	(+)22,484	74,979	63,317	(+)11,662
Unclassified	-	721	(- )721	3,076	2,906	(+)170	3,076	3,627	(- )551
Not Known	4,047	11,685	(- )7,638	43,257	24,435	(+)18,822	47,304	36,120	(+)11,184
Beneficiable	2,576	5,789	(- )3,213	57,500	57,540	(- )40	60,076	63,329	(- )3,253
Freehold	-	236	(- )236	22,276	22,027	(+)249	22,276	22,263	(+ )13
Chemical	832	-	(+ )832	79,050	55,096	(+)23,954	79,883	55,096	(+)24,787
Refractory Chemical/Refractory Mixed with others	-	-	-	<b>3,648,349</b>	<b>2,533,979</b>	<b>(+)1,114,369</b>	<b>3,648,349</b>	<b>2,533,979</b>	<b>(+)1,114,369</b>
	-	-	-	12,272	12,272	No change	12,272	12,272	No change
	-	-	-	18,956	18,956	No change	18,956	18,956	No change
	-	-	-	12,102	12,765	(- )663	12,102	12,765	(- )663

(Contd.)

## National Mineral Inventory - An Overview

Table-1 (Contd.)

Lease status/Grade	Reserves			Remaining resources			Total resources		
	01.04.2020	01.04.2015	Net change	01.04.2020	01.04.2015	Net change	01.04.2020	01.04.2015	Net change
Metallurgical - 1	-	-	-	2,354,134	1,525,314	(+828,820)	2,354,134	1,525,314	(+828,820)
Metallurgical - 2	-	-	-	493,697	529,762	(-36,065)	493,697	529,762	(-36,065)
Metallurgical mixed	-	-	-	127,992	103,032	(+24,960)	127,992	103,032	(+24,960)
Low	-	-	-	459,127	243,350	(+215,777)	459,127	243,350	(+215,777)
Mixed Grade excluding Chemical/Refractory	-	-	-	29,436	29,436	No change	29,436	29,436	No change
Abrasive	-	-	-	2,392	2,392	No change	2,392	2,392	No change
Others	-	-	-	13,454	13,454	No change	13,454	13,454	No change
Unclassified	-	-	-	24,922	21,676	(+3,246)	24,922	21,676	(+3,246)
Not Known	-	-	-	21,570	21,570	No change	21,570	21,570	No change
Beneficiable	-	-	-	78,294	-	(+78,294)	78,294	-	(+78,294)
<b>Leasehold (Private)</b>	<b>439,602</b>	<b>493,549</b>	<b>(-53,946)</b>	<b>537,977</b>	<b>433,382</b>	<b>(+104,595)</b>	<b>977,579</b>	<b>926,931</b>	<b>(+50,645)</b>
Chemical	6,639	6,896	(-257)	3,133	1,121	(+2,012)	9,772	8,018	(+1,754)
Refractory	42,363	67,158	(-24,795)	81,753	58,914	(+22,839)	124,116	126,072	(-1,956)
Chemical/Refractory Mixed with others	1,575	4,426	(-2,851)	12,684	1,836	(+10,848)	14,259	6,262	(+7,997)
Metallurgical - 1	301,770	276,771	(+24,999)	172,813	220,397	(-47,584)	474,583	497,167	(-22,584)
Metallurgical - 2	36,798	45,296	(-8,498)	87,804	57,610	(+30,194)	124,602	102,907	(+21,695)
Metallurgical mixed	8,783	15,080	(-6,297)	18,374	8,486	(+9,888)	27,157	23,566	(+3,591)
Low	26,649	40,816	(-14,167)	61,188	37,414	(+23,774)	87,836	78,230	(+9,606)
Mixed Grade excluding Chemical/Refractory	8,403	19,225	(-10,822)	37,140	14,656	(+22,484)	45,542	33,881	(+11,661)

(Contd.)

## National Mineral Inventory - An Overview

Table-1 (Concl.)

Lease status/Grade	Reserves			Remaining resources			Total resources		
	01.04.2020	01.04.2015	Net change	01.04.2020	01.04.2015	Net change	01.04.2020	01.04.2015	Net change
Abrasive	-	721	(-)721	684	514	(+)170	684	1,235	(-)551
Others	4,047	11,469	(-)7,422	29,455	5,754	(+)23,701	33,502	17,223	(+)16,279
Unclassified	2,576	5,455	(-)2,879	32,244	26,224	(+)6,020	34,819	31,679	(+)3,140
Not Known	-	236	(-)236	706	457	(+)249	706	693	(+)13
<b>Leasehold (Public)</b>	<b>206,891</b>	<b>162,873</b>	<b>(+)44,019</b>	<b>125,428</b>	<b>273,081</b>	<b>(-)147,652</b>	<b>332,319</b>	<b>435,954</b>	<b>(-)103,634</b>
Chemical/Refractory Mixed with others	-	-	-	-	677	(-)677	-	677	(-)677
Metallurgical - 1	205,757	162,322	(+)43,435	118,546	196,639	(-)78,093	324,302	358,961	(-)34,659
Metallurgical - 2	302	-	(+)302	4,286	4,644	(-)358	4,588	4,644	(-)56
Low	-	-	-	1,158	1,158	No change	1,158	1,158	No change
Others	-	216	(-)216	348	5,226	(-)4,878	348	5,443	(-)5,095
Unclassified	-	334	(-)334	334	9,640	(-)9,306	334	9,974	(-)9,640
Beneficial	832	-	(+)832	756	55,096	(-)54,340	1,589	55,096	(-)53,507

*figures rounded off.*



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Of the total resources of bauxite, about 2,229 million tonnes (45%) have been estimated under inferred & reconnaissance categories. These resources are based on a limited and preliminary exploration. If these resources are examined for further detailed exploration, the confidence level of resource position of bauxite in the country may improve.

A total 965 deposits of bauxite have been covered in National Mineral Inventory as on 01.04.2020, of which 608 deposits are in freehold areas and 357 deposits in leasehold areas (Public leasehold 41 and private leasehold 316).

**Table – 2 : Total Resources of Bauxite as on 01.04.2020 vis-à-vis 01.04.2015  
(By States)**

State	Total Resources		Net Change
	As on 01.04.2020	As on 01.04.2015	
<b>All India : Total</b>	<b>4,958,248</b>	<b>3,896,864</b>	<b>(+) 1,061,384</b>
Andhra Pradesh	615,267	615,267	No Change
Bihar	4,114	4,114	No Change
Chhattisgarh	992,555	173,755	(+) 818,800
Goa	67,857	55,168	(+) 12,689
Gujarat	397,027	350,581	(+) 46,446
Jammu & Kashmir	2,725	2,725	No Change
Jharkhand	289,244	239,061	(+) 50,183
Karnataka	46,449	45,635	(+) 814
Kerala	19,449	14,096	(+) 5,353
Madhya Pradesh	186,259	173,388	(+) 12,871
Maharashtra	232,430	184,574	(+) 47,856
Meghalaya	4,300	-	(+) 4,300
Odisha	2,057,024	1,994,574	(+) 62,450
Rajasthan	528	528	No Change
Tamil Nadu	24,112	24,491	(-) 379
Uttar Pradesh	18,908	18,908	No Change

*figures rounded off.*

**Table - 3 : District wise Reserves/Resources of Bauxite as on 01.04.2020**

(In '000 Tonnes)

State	District	Reserves	Remaining Resources	Total Resources
<b>All India : Total</b>		<b>646,493</b>	<b>4,311,754</b>	<b>4,958,248</b>
<b>Andhra Pradesh</b>		-	<b>615,267</b>	<b>615,267</b>
	Godavari (East)	-	44,696	44,696
	Visakhapatnam	-	5,70,571	5,70,571
<b>Bihar</b>		-	<b>4,114</b>	<b>4,114</b>
	Monghyr	-	1,514	1,514
	Rohtas	-	2,600	2,600
<b>Chhattisgarh</b>		<b>23,695</b>	<b>968,860</b>	<b>992,555</b>
	Balrampur	12,085	8,201	20,286
	Bastar	-	41	41
	Bilaspur	-	4,412	4,412
	Dantewara	-	483	483
	Jashpur	-	765,844	765,844
	Kabirdham	2,848	34,727	37,575
	Kanker	-	47,065	47,065
	Kondagaon	-	988	988
	Korba	-	1,386	1,386
	Raigarh	-	3,950	3,950
	Surguja	8,762	101,763	110,525
<b>Goa</b>		<b>9,613</b>	<b>58,244</b>	<b>67,857</b>
	North Goa	-	10,440	10,440
	South Goa	9,613	47,804	57,417
<b>Gujarat</b>		<b>101,230</b>	<b>295,797</b>	<b>397,027</b>
	Amreli	1,846	194	2,040
	Aravali	47	568	614
	Bhavnagar	-	638	638
	Devbhoomi Dwarka	71,126	160,842	231,968
	Jamnagar	-	22,847	22,847
	Junagarh	-	18785	18785
	Kheda	2,563	4,396	6,959
	Kutch	24,053	58,335	82,389
	Porbandar	1,595	7,988	9,584
	Sabarkantha	-	20,820	20,820
	Valsad	-	384	384
<b>Jammu &amp; Kashmir</b>		-	<b>2,725</b>	<b>2,725</b>
	Udhampur	-	2,725	2,725
<b>Jharkhand</b>		<b>39,972</b>	<b>249,272</b>	<b>289,244</b>
	Dumka	-	12,830	12,830
	Godda	-	4860	4860
	Gumla	27,496	1,74,118	2,01,614
	Latehar	1,058	7,895	8,953
	Lohardaga	9,442	45,136	54,578
	Palamau	1,976	4,434	6,409

(Contd.)

## National Mineral Inventory - An Overview

Table-3 (Concl.)

State	District	Reserves	Remaining Resources	Total Resources
<b>Karnataka</b>		<b>5,207</b>	<b>41,242</b>	<b>46,449</b>
	Belgaum	5,207	3,559	8,766
	Chikmagalur	-	200	200
	North Kanara	-	19,687	19,687
	South Kanara	-	16,637	16,637
	Udupi	-	1,158	1,158
<b>Kerala</b>		<b>-</b>	<b>19,449</b>	<b>19,449</b>
	Kannur	-	7,620	7,620
	Kasargod	-	7,223	7,223
	Kollam	-	2,838	2,838
	Thiruvananthapuram	-	1,768	1,768
<b>Madhya Pradesh</b>		<b>18,564</b>	<b>167,695</b>	<b>186,259</b>
	Anuppur	4,885	872	5,757
	Balaghat	-	22,850	22,850
	Guna	-	49	49
	Jabalpur	2,117	5,532	7,649
	Katni	5,975	51,298	57,273
	Mandla	-	23,755	23,755
	Rewa	80	37,301	37,380
	Satna	4,052	19,882	23,935
	Shahdol	914	5,697	6,611
	Shivpuri	-	30	30
	Sidhi	541	419	960
	Vidisha	-	10	10
<b>Maharashtra</b>		<b>38,472</b>	<b>193,958</b>	<b>232,430</b>
	Kolhapur	13,261	91,626	104,887
	Raigad	11,213	43,788	55,001
	Ratnagiri	13,998	33,683	47,681
	Satara	-	22,110	22,110
	Sindhudurg	-	1,451	1,451
	Thana (Thane)	-	1,300	1,300
<b>Meghalaya</b>		<b>-</b>	<b>4,300</b>	<b>4,300</b>
	Khasi Hills West	-	4,300	4,300
<b>Odisha</b>		<b>409,740</b>	<b>1,647,284</b>	<b>2,057,024</b>
	Bargarh	-	129,850	129,850
	Bolangir	-	25,294	25,294
	Kalahandi	-	397,122	397,122
	Kandhamal	-	43,600	43,600
	Keonjhar	-	58,540	58,540
	Koraput	239,310	547,766	787,076
	Malkangiri	-	17,000	17,000
	Nawapara	-	2,000	2,000
	Raygada	169,794	396,683	566,477
	Sundargarh	636	29,429	30,065
<b>Rajasthan</b>		<b>-</b>	<b>528</b>	<b>528</b>
	Kota	-	528	528
<b>Tamil Nadu</b>		<b>-</b>	<b>24,112</b>	<b>24,112</b>
	Dindigul	-	1,119	1,119
	Namakkal	-	6,419	6,419
	Nilgiris	-	14,881	14,881
	Salem	-	1,693	1,693
<b>Uttar Pradesh</b>		<b>-</b>	<b>18,908</b>	<b>18,908</b>
	Banda	-	14,408	14,408
	Lalitpur	-	4,000	4,000
	Varanasi	-	500	500

Figures rounded of

### 3.3 COPPER

#### Introduction

Copper is an important non-ferrous metal having wide range industrial applications. The domestic demand of copper and its alloys is met through domestic production, recycling of scrap and by imports. Hindustan Copper Limited (HCL), a public sector undertaking, is the only integrated producer of primary copper in India. Other two primary producers of copper, viz HINDALCO (Unit of Birla Copper) and Sterlite Industries (India) Ltd., imports copper concentrates for feeding their smelters. They have their smelters located at Dahej, Bharuch district, Gujarat and Tuticorin in coastal Tamil Nadu, respectively. India, however is not self-sufficient in resources of copper ore.

Copper mineralisation occurs in a number of states but major and commercial deposits are located in the states of Madhya Pradesh, Rajasthan, Jharkhand, Gujarat, Andhra Pradesh, Karnataka and Odisha.

#### Basis of Grade Classification

The copper ore resources are classified on the basis of total metal content i.e. copper. On this basis, grade wise classification is made as follows :

1. Ore with 1.85% Cu and above
2. Ore with 1.0% to (-)1.85% Cu
3. Ore with 0.5 to (-) 1.0% Cu
4. Ore with (-) 0.5% Cu.

#### Basis of Categorisation of Resources

As per United Nations Framework Classification (UNFC), the total resources are broadly classified into 'reserves' and 'remaining resources' category.

According to norms of this system, 'reserves' of copper ore and corresponding metal has been placed under proved (111) and probable (121) and (122) categories.

The remaining resources have been placed under feasibility (211), pre-feasibility (221) & (222), measured (331), indicated (332), inferred (333) and reconnaissance (334) categories.

#### Salient Features of the Inventory

The total resources of copper ore in the country as on 01.04.2020 are estimated at 1660.87 million tonnes with about 12.19 million tonnes of copper metal. Of these,

163.89 million tonnes (9.86%) fall under reserve category containing 2.16 million tonnes of copper metal and the balance 1496.97 million tonnes (90.13%) are remaining resources containing 10.03 million tonnes of copper metal.

All India scenario of copper ore and metal reserves, remaining resources and total resources as on 01.04.2020 vis-a-vis 01.04.2015 have been given in Tables

- 1 and 2. The tables give an idea about the significant changes in terms of increase or decrease of resources as per lease status, grade and states. In Table-3 district-wise reserves/ resources as on 01.04.2020 have been given.

Of the total resources, the share of Public Sector is 36.15%, Private Sector 1.5% and quantities estimated in freehold areas are 62.30%.

By grades, of the total resources, 8.28 million tonnes (0.50%) comprise ore containing 1.85% Cu and above, 586.79 million tonnes (35.33%) of ore with 1% to below 1.85% Cu, 797.91 million tonnes (48.04%) of ore with 0.5% to (-)1% Cu and 267.88 million tonnes (16.12%) of ore with (-) 0.5% Cu.

Of the three major states, Rajasthan is credited with 867.85 million tonnes ore (52.25%) containing 4.64 million tonnes copper, Madhya Pradesh 386.66 million tonnes ore (23.28%), containing 3.67 million tonnes copper, Jharkhand 251.46 million tonnes ore (15.14%), containing 2.78 million tonnes copper and the rest 9.33% are accounted for by other states namely Andhra Pradesh, Arunachal Pradesh, Gujarat, Haryana, Karnataka, Maharashtra, Meghalaya, Nagaland, Odisha, Sikkim, Tamil Nadu, Telangana, Uttarakhand and West Bengal.

All India resources under 'remaining resources' category increased by 193.25 million tonnes. However, total resources under 'reserves' category recorded a decrease of 43.88 million tonnes.

Of the total increase of ore resources, 140.20 million tonnes comprise of ore containing ore with (+) 0.5% Cu to below 1% Cu and 80.29 million tonnes ore containing ore with (-)0.5% Cu. However, 71.13 million tonnes of ore containing ore with 1.0% Cu to below 1.85% Cu recorded decrease in resources in the inventory as on 01.04.2020 as compared to 01.04.2015.

An overall increase of about 149.37 million tonnes in ore resources with 38.94 thousand tonnes of metal recorded in comparison to the earlier inventory as on 01.04.2015. A total of 27 new freehold deposits having cumulative resources of 117.50 million tonnes ore containing 508.43 thousand tonnes metal has been reported in the inventory as on 01.04.2020.

In Rajasthan, a net increase of 54.52 million tonnes of ore containing 0.16 million tonnes metal resources is recorded mainly due to addition of 9 freehold deposits having 81.92 million tonnes ore containing 0.31 million tonnes metal. However, downward revision of resources has been reported in leasehold public sector deposits. The freehold deposits are reported from Jhunjhunu and Sikar districts.

In Haryana, an increase of 0.02 million tonnes ore with 0.0065 million tonnes metal has been recorded due to inclusion of 04 new deposits in freehold category.

In Madhya Pradesh, an increase of 103.24 million tonnes ore with 0.25 million tonnes metal is reported mainly due to upward revision of resources in Malanjkhand deposit, Balaghat district.

In Maharashtra, resources has been increased by 3.37 million tonnes ore containing 0.020 million tonnes of metal due inclusion of 2 new deposits in the present inventory.

In Karnataka, an increase of 6.84 million tonnes of ore with 0.02 million tonnes of metal has been recorded due to addition of one new freehold deposit.

In Odisha, a net increase of 5.94 million tonnes of ore with .03 million tonnes of metal attributed due to upward revision of resources in one existing deposit.

In Jharkhand, a decrease of 43.92 million tonnes of ore with 0.50 million tonnes of metal reported due to re-estimation of resources in 3 leasehold (Public) deposits.

As compared to inventory as on 01.04.2015, a decrease of 43.88 million tonnes in reserves and an increase of 193.25 million tonnes in remaining resources categories have been recorded as on 01.04.2020.

Of the total resources of copper ore, about 784 million tonnes (47%) resources have been estimated under inferred and reconnaissance categories. These resources are based on a very limited and preliminary exploration. If these areas are examined for further detailed exploration, the confidence level of resource position of copper ore in the country may improve.

In the inventory as on 01.04.2020, total 179 deposits have been covered, of which 164 deposits are in freehold areas and 15 deposits in leasehold areas (Public 14 deposits and Private 01 deposit).

**Table - 1 : Reserves/Resources of Copper as on 01.04.2020 vis-à-vis 01.04.2015  
(By Lease Status/Grade)**

Lease status/Grade	Reserves				Remaining resources				Total resources					
	01.04.2020		01.04.2015		01.04.2020		01.04.2015		01.04.2020		01.04.2015		Net change	
		Net change		Net change		Net change		Net change		Net change		Net change		Net change
<b>All India : Total</b>														
<b>Total Ore</b>	163,891	207,767	1,496,979	1,303,730	1,496,979	1,303,730	1,496,979	1,303,730	1,496,979	1,303,730	1,496,979	1,303,730	1,496,979	(+193,249)
<b>Total Metal</b>	2,161.57	2,734.62	10,035.52	9,423.53	10,035.52	9,423.53	10,035.52	9,423.53	10,035.52	9,423.53	10,035.52	9,423.53	10,035.52	(+1611.99)
Ore with 1.85% and above Cu	-	-	8,283	8,283	8,283	8,283	8,283	8,283	8,283	8,283	8,283	8,283	8,283	No change
Ore with 1.00 to below 1.85% Cu	163,891	203,834	422,903	454,091	422,903	454,091	422,903	454,091	422,903	454,091	422,903	454,091	422,903	(-31,188)
Ore with (+)0.5% to below 1.00% Cu	-	3,934	797,906	653,764	797,906	653,764	797,906	653,764	797,906	653,764	797,906	653,764	797,906	(+144,142)
Ore with (-) 0.5 % Cu	-	-	267,886	187,592	267,886	187,592	267,886	187,592	267,886	187,592	267,886	187,592	267,886	(+80,294)
<b>Freehold</b>														
<b>Total Ore</b>	-	-	1,034,755	933,297	1,034,755	933,297	1,034,755	933,297	1,034,755	933,297	1,034,755	933,297	1,034,755	(+101,458)
<b>Total Metal</b>	-	-	6,042.41	5,645.72	6,042.41	5,645.72	6,042.41	5,645.72	6,042.41	5,645.72	6,042.41	5,645.72	6,042.41	(+396.69)
Ore with 1.85% and above Cu	-	-	8,283	8,283	8,283	8,283	8,283	8,283	8,283	8,283	8,283	8,283	8,283	No change
Ore with 1.0% to below 1.85% Cu	-	-	207,108	205,135	207,108	205,135	207,108	205,135	207,108	205,135	207,108	205,135	207,108	(+1,973)
Ore with (+)0.5% to below 1.00% Cu	-	-	577,192	558,002	577,192	558,002	577,192	558,002	577,192	558,002	577,192	558,002	577,192	(+19,190)
Ore with (-) 0.5 % Cu	-	-	242,172	161,878	242,172	161,878	242,172	161,878	242,172	161,878	242,172	161,878	242,172	(+80,294)
<b>Leasehold (Public)</b>														
<b>Total Ore</b>	163,891	207,767	436,510	344,719	436,510	344,719	436,510	344,719	436,510	344,719	436,510	344,719	436,510	(+91,791)
<b>Total Metal</b>	2,161.57	2,734.62	3,967.41	3,752.11	3,967.41	3,752.11	3,967.41	3,752.11	3,967.41	3,752.11	3,967.41	3,752.11	3,967.41	(+215.30)
Ore with 1.0% to below 1.85% Cu	163,891	203,834	215,795	248,956	215,795	248,956	215,795	248,956	215,795	248,956	215,795	248,956	215,795	(-33,161)
Ore with (+)0.5% to below 1.00% Cu	-	3,934	220,715	95,763	220,715	95,763	220,715	95,763	220,715	95,763	220,715	95,763	220,715	(+124,952)
Ore with (-) 0.5 % Cu	-	-	-	-	-	-	-	-	-	-	-	-	-	No change
<b>Leasehold (Private)</b>														
<b>Total Ore</b>	-	-	25,714	25,714	25,714	25,714	25,714	25,714	25,714	25,714	25,714	25,714	25,714	No change
<b>Total Metal</b>	-	-	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	No change
Ore with (-) 0.5% Cu	-	-	25,714	25,714	25,714	25,714	25,714	25,714	25,714	25,714	25,714	25,714	25,714	No change

figures rounded off.

**Table – 2 : Total Resources of Copper as on 01.04.2020 vis-à-vis 01.04.2015  
(By States)**

(In '000 Tonnes)

State	Total Resources		Net Change
	As on 01.04.2020	As on 01.04.2015	
<b>All India : Total</b>			
<b>Ore</b>	<b>1,660,870</b>	<b>1,511,498</b>	<b>(+)149,372</b>
<b>Metal</b>	<b>12,197.09</b>	<b>12,158.15</b>	<b>(+)38.94</b>
<b>Andhra Pradesh</b>			
Ore	7,582	7,582	No Change
Metal	113.7	113.7	No Change
<b>Arunachal Pradesh</b>			
Ore	10	10	No Change
Metal	0.02	0.02	No Change
<b>Gujarat</b>			
Ore	12,613	14,120	(-)1,507
Metal	200.74	209.96	(-)9.22
<b>Haryana</b>			
Ore	53,816	32,908	(+)20,908
Metal	179.01	113.62	(+)65.39
<b>Jharkhand</b>			
Ore	251,463	295,389	(-43,926
Metal	2,779.66	3,275.4	(-)495.74
<b>Karnataka</b>			
Ore	41,499	34,665	(+)6,834
Metal	245.86	229.5	(+)16.36
<b>Madhya Pradesh</b>			
Ore	386,665	283,429	(+)103,236
Metal	3,666.86	3,418.5	(+)248.36
<b>Maharashtra</b>			
Ore	17,755	14,390	(+)3,365
Metal	158.08	137.67	(+)20.41
<b>Meghalaya</b>			
Ore	880	880	No Change
Metal	9	9	No Change
<b>Nagaland</b>			
Ore	2,000	2,000	No Change
Metal	15	15	No Change
<b>Odisha</b>			
Ore	11,991	6,051	(+)5,940
Metal	97.03	63.44	(+)33.59
<b>Rajasthan</b>			
Ore	867,849	813,327	(+)54,522
Metal	4,635.6	4,475.81	(+)159.79
<b>Sikkim</b>			
Ore	958	958	No Change
Metal	21.47	21.47	No Change
<b>Tamil Nadu</b>			
Ore	790	790	No Change
Metal	3.81	3.81	No Change
<b>Telangana</b>			
Ore	666	666	No Change
Metal	9.12	9.12	No Change
<b>Uttarakhand</b>			
Ore	4,220	4,220	No Change
Metal	60.04	60.04	No Change
<b>West Bengal</b>			
Ore	113	113	No Change
Metal	2.09	2.09	No Change

figures rounded off.

**Table - 3 : District wise Reserves/Resources of Copper as on 01.04.2020**

(In '000 Tonnes)				
State	District	Reserves	Remaining Resources	Total Resources
<b>All India : Total</b>				
	<b>Ore</b>	<b>163,891</b>	<b>1,496,979</b>	<b>1,660,870</b>
	<b>Metal</b>	<b>2,161.57</b>	<b>10,035.52</b>	<b>12,197.09</b>
<b>Andhra Pradesh</b>				
	<b>Ore</b>	-	7,582	7,582
	<b>Metal</b>	-	113.7	113.7
	<b>Guntur</b>			
	Ore	-	3,102	3,102
	Metal	-	43.62	43.62
	<b>Kurnool</b>			
	Ore	-	1,340	1,340
	Metal	-	12.93	12.93
	<b>Prakasam (Ongole H.Q)</b>			
	Ore	-	3,140	3,140
	Metal	-	57.15	57.15
<b>Arunachal Pradesh</b>				
	<b>Ore</b>	-	<b>10</b>	<b>10</b>
	<b>Metal</b>	-	<b>0.02</b>	<b>0.02</b>
	<b>East Kameng</b>			
	Ore	-	10	10
	Metal	-	0.02	0.02
<b>Gujarat</b>				
	<b>Ore</b>	-	<b>12,613</b>	<b>12,613</b>
	<b>Metal</b>	-	<b>200.74</b>	<b>200.74</b>
	<b>Banaskantha</b>			
	Ore	-	12,613	12,613
	Metal	-	200.74	200.74
<b>Haryana</b>				
	<b>Ore</b>	-	<b>53,816</b>	<b>53,816</b>
	<b>Metal</b>	-	<b>179.01</b>	<b>179.01</b>
	<b>Bhiwani</b>			
	Ore	-	2,230	2,230
	Metal	-	11.82	11.82
	<b>Mahendragarh</b>			
	Ore	-	51,586	51,586
	Metal	-	167.19	167.19
<b>Jharkhand</b>				
	<b>Ore</b>	<b>9,150</b>	<b>242,313</b>	<b>251,463</b>
	<b>Metal</b>	<b>107.45</b>	<b>2,672.21</b>	<b>2,779.66</b>

(Contd.)



## National Mineral Inventory - An Overview

Table-3 (Contd.)

State	District	Reserves	Remaining Resources	Total Resources
	<b>Hazaribagh</b>			
	Ore	-	571	571
	Metal	-	13.19	13.19
	<b>Singhbhum (East)</b>			
	Ore	9,150	241,742	250,892
	Metal	107.45	2,659.02	2,766.47
<b>Karnataka</b>				
<b>Ore</b>		-	<b>41,499</b>	<b>41,499</b>
<b>Metal</b>		-	<b>245.86</b>	<b>245.86</b>
	<b>Chikmagalur</b>			
	Ore	-	160	160
	Metal	-	0.4	0.4
	<b>Chitradurga</b>			
	Ore	-	3,665	3,665
	Metal	-	7.75	7.75
	<b>Gulbarga</b>			
	Ore	-	1,840	1,840
	Metal	-	11.04	11.04
	<b>Hassan</b>			
	Ore	-	5,324	5,324
	Metal	-	47.54	47.54
	<b>North Kanara</b>			
	Ore	-	500	500
	Metal	-	6.15	6.15
	<b>Raichur</b>			
	Ore	-	15,430	15,430
	Metal	-	122.13	122.13
	<b>Shimoga</b>			
	Ore	-	14,580	14,580
	Metal	-	50.85	50.85
<b>Madhya Pradesh</b>				
<b>Ore</b>		<b>120,353</b>	<b>266,312</b>	<b>386,665</b>
<b>Metal</b>		<b>1,571.04</b>	<b>2,095.82</b>	<b>3,666.86</b>
	<b>Balaghat</b>			
	Ore	120,353	186,564	306,917
	Metal	1,571.04	1,230.83	2,801.87
	<b>Betul</b>			
	Ore	-	4,329	4,329
	Metal	-	20.54	20.54
	<b>Jabalpur</b>			
	Ore	-	75,119	75,119
	Metal	-	840.97	840.97

(Contd.)

## National Mineral Inventory - An Overview

Table-3 (Contd.)

State	District	Reserves	Remaining Resources	Total Resources
	<b>Katni</b>			
	Ore	-	300	300
	Metal	-	3.48	3.48
<b>Maharashtra</b>				
<b>Ore</b>		-	<b>17,755</b>	<b>17,755</b>
<b>Metal</b>		-	<b>158.08</b>	<b>158.08</b>
	<b>Bhandara</b>			
	Ore	-	1,072	1,072
	Metal	-	13.76	13.76
	<b>Chandrapur</b>			
	Ore	-	11,675	11,675
	Metal	-	90.07	90.07
	<b>Gadchiroli</b>			
	Ore	-	1,680	1,680
	Metal	-	10.38	10.38
	<b>Nagpur</b>			
	Ore	-	3,328	3,328
	Metal	-	43.87	43.87
<b>Meghalaya</b>				
<b>Ore</b>		-	<b>880</b>	<b>880</b>
<b>Metal</b>		-	<b>9</b>	<b>9</b>
	<b>Khasi Hills (East)</b>			
	Ore	-	880	880
	Metal	-	9	9
<b>Nagaland</b>				
<b>Ore</b>		-	<b>2,000</b>	<b>2,000</b>
<b>Metal</b>		-	<b>15</b>	<b>15</b>
	<b>Phek</b>			
	Ore	-	2,000	2,000
	Metal	-	15	15
<b>Odisha</b>				
<b>Ore</b>		-	<b>11,991</b>	<b>11,991</b>
<b>Metal</b>		-	<b>97.03</b>	<b>97.03</b>
	<b>Mayurbhanj</b>			
	Ore	-	9,370	9,370
	Metal	-	71.57	71.57
	<b>Sambalpur</b>			
	Ore	-	2,621	2,621
	Metal	-	25.46	25.46
<b>Rajasthan</b>				
<b>Ore</b>		<b>34,388</b>	<b>833,461</b>	<b>867,849</b>
<b>Metal</b>		<b>483.08</b>	<b>4,152.52</b>	<b>4,635.60</b>

(Contd.)

## National Mineral Inventory - An Overview

Table-3 (Contd.)

State	District	Reserves	Remaining Resources	Total Resources
	<b>Ajmer</b>			
	Ore	0	9,340	9,340
	Metal	0	76.67	76.67
	<b>Alwar</b>			
	Ore	0	23,337	23,337
	Metal	0	182.26	182.26
	<b>Banswara</b>			
	Ore	0	8,513	8,513
	Metal	0	20.05	20.05
	<b>Bharatpur</b>			
	Ore	0	22	22
	Metal	0	0.24	0.24
	<b>Bhilwara</b>			
	Ore	0	31,158	31,158
	Metal	0	179.62	179.62
	<b>Bundi</b>			
	Ore	0	1,980	1,980
	Metal	0	18.22	18.22
	<b>Chittorgarh</b>			
	Ore	0	18,720	18,720
	Metal	0	158.48	158.48
	<b>Dausa</b>			
	Ore	0	4,600	4,600
	Metal	0	54.28	54.28
	<b>Dungarpur</b>			
	Ore	0	1,090	1,090
	Metal	-	13	13
	<b>Jaipur</b>			
	Ore	-	23,810	23,810
	Metal	-	113.43	113.43
	<b>Jhunjhunu</b>			
	Ore	34388	505,683	540,071
	Metal	483.08	2,482.49	2,965.57
	<b>Pali</b>			
	Ore	-	1,997	1,997
	Metal	-	16.58	16.58
	<b>Rajsamand</b>			
	Ore	-	26,800	26,800
	Metal	-	27.85	27.85
	<b>Sikar</b>			
	Ore	0	158,455	158,455
	Metal	0	627.14	627.14

(Contd.)

National Mineral Inventory - An Overview

Table-3 (Concl.)

State	District	Reserves	Remaining Resources	Total Resources
	<b>Sirohi</b>			
	Ore	-	7,673	7,673
	Metal	-	111.62	111.62
	<b>Udaipur</b>			
	Ore	-	10,283	10,283
	Metal	-	70.59	70.59
<b>Sikkim</b>				
<b>Ore</b>		-	<b>958</b>	<b>958</b>
<b>Metal</b>		-	<b>21.47</b>	<b>21.47</b>
	<b>Sikkim East</b>			
	Ore	-	958	958
	Metal	-	21.47	21.47
<b>Tamil Nadu</b>				
<b>Ore</b>		-	<b>790</b>	<b>790</b>
<b>Metal</b>		-	<b>3.81</b>	<b>3.81</b>
	<b>Villupuram</b>			
	Ore	-	790	790
	Metal	-	3.81	3.81
<b>Telangana</b>				
<b>Ore</b>		-	<b>666</b>	<b>666</b>
<b>Metal</b>		-	<b>9.12</b>	<b>9.12</b>
	<b>Khammam</b>			
	Ore	-	666	666
	Metal	-	9.12	9.12
<b>Uttarakhand</b>				
<b>Ore</b>		-	<b>4,220</b>	<b>4,220</b>
<b>Metal</b>		-	<b>60.04</b>	<b>60.04</b>
	<b>Almora</b>			
	Ore	-	500	500
	Metal	-	2.5	2.5
	<b>Dehradun</b>			
	Ore	-	390	390
	Metal	-	1.44	1.44
	<b>Pithoragarh</b>			
	Ore	-	3,330	3,330
	Metal	-	56.1	56.1
<b>West Bengal</b>				
<b>Ore</b>		-	<b>113</b>	<b>113</b>
<b>Metal</b>		-	<b>2.09</b>	<b>2.09</b>
	<b>Purulia</b>			
	Ore	-	113	113
	Metal	-	2.09	2.09

figures rounded off.

## 3.4 LEAD & ZINC

### Introduction

Lead & Zinc are strategic metals which have uses in non-ferrous and ferrous industries. Battery sector is known for prime lead consumption while galvanizing is the most important zinc consumer. Most of the Indian lead-zinc resources are confined to Proterozoic fold belt and Precambrians of the western part of the country.

Galena (PbS) is by far the most important ore of lead. Other commonly occurring minerals are Anglesite ( $\text{PbSO}_4$ ) and Cerusite ( $\text{PbCO}_3$ ). The principal ore of zinc is sphalerite ( $\text{ZnS}$ ). Other important minerals are Calamine ( $\text{ZnCO}_3$ ) and Hemimorphite ( $2\text{ZnOSiO}_2 \cdot \text{H}_2\text{O}$ ).

### Basis of Grade Classification

The grade classification as adopted in the inventory is based on the report of the committee constituted for revision of end-use grade classification (September, 2004). The lead & zinc ore resources are classified based on the total metal content (Pb+Zn) into three grades namely :

- i) Ore with (+) 10% Pb + Zn
- ii) Ore with 5-10% Pb + Zn
- iii) Ore with (-) 5% Pb + Zn

Presently, M/s Hindustan Zinc Ltd (HZL) is the private company holding largest resources of lead & zinc in the country. The leases of HZL are located at Kayad in Ajmer district, Rampura-Agucha in Bhilwara district, Bannikalan, Rajpura Dariba & Sindesar Khurd in Rajsamand district and Zawar group of mines in Udaipur district of Rajasthan state. Out of these Rampura-Agucha, Sindesar Khurd and Rajpura Dariba are the largest lead & zinc deposit in the country. Besides, there are 3 leasehold public deposits of lead & zinc, one each in Gujarat, Rajasthan and Sikkim which are not working.

### Basis of Categorisation of Resources

As per United Nation Framework Classification (UNFC), total resources are broadly classified into 'reserves' and 'remaining resources' category.

According to the norm of this system, reserves of lead & zinc ore and corresponding metal have been placed under proved (111) and probable (121) & (122) categories.

The remaining resources have been placed under feasibility (211), pre-feasibility (221 & 222), measured

(331), indicated (332), inferred (333) and reconnaissance (334) categories.

### Salient Features of the Inventory

The total resources of lead & zinc ore in the country as on 01.04.2020 are estimated at 766 million tonnes containing about 12.87 million tonnes of lead metal, 33.17 million tonnes of zinc metal and 0.14 million tonnes of lead & zinc metal. Of these, about 103 million tonnes (13.4%) of ore have been placed under reserve category containing 1.9 million tonnes of lead metal and 7.44 million tonnes of zinc metal, and the balance 663 million tonnes (86.6%) of ore under remaining resources with about 10.97 million tonnes of lead metal, 25.73 million tonnes of zinc metal and 0.14 million tonnes of lead & zinc metal.

All India resources of lead & zinc ore and metal with break-up into reserves, remaining resources and total resources as on 01.04.2020 vis-a-vis 01.04.2015 have been given in Tables - 1 and 2. These tables give an idea about the significant changes in terms of increase or decrease in resources as per lease status, grades and state. In Table-3, district wise reserves/resources as on 01.04.2020 have been given.

Of the total resources of lead & zinc ore in the country, about 384.84 million tonnes (50.21%) of ore containing 4.43 million tonnes lead metal, 9.11 million tonnes zinc metal and 0.14 million tonnes lead & zinc metal have been placed in freehold areas; while 381.66 million tonnes (49.79%) of ore containing 8.44 million tonnes lead metal and 24.06 million tonnes zinc metal have been placed in leasehold areas. In the present inventory as on 01.04.2020, a sizeable quantity of about 375.42 million tonnes (48.98%) of lead & zinc ore reported in leasehold private sector. While a meagre quantity of 6.24 million tonnes (0.81%) in leasehold public sector.

By grades, about 12.72% of the total resources of lead & zinc ore contains (+) 10% lead & zinc, 36.54% having 5-10% lead & zinc and the balance 50.74% ore have been estimated with (-) 5% lead & zinc.

About 89% of the country's total resources of lead & zinc ore are estimated in Rajasthan having about 685 million tonnes of ore containing 11.33 million tonnes of lead metal, 31.27 million tonnes of zinc metal and 0.14 million tonnes of lead & zinc metal. Besides, minor resources of lead & zinc ore have also been reported from Andhra Pradesh (22.69 million tonnes),

## National Mineral Inventory - An Overview

**Table - 1 : Reserves/Resources of Lead & Zinc as on 01.04.2020 vis-à-vis 01.04.2015**  
(By Lease Status/Grade)

Lease status/Grade	(In '000 Tonnes)					
	Reserves		Remaining resources		Total resources	
	01.04.2020	01.04.2015	Net change	01.04.2020	01.04.2015	Net change
<b>All India :</b>						
<b>Total : Ore</b>	103,275	106,116	(-),2841	663,222	643,343	766,497
Ore with (+) 10% Pb & Zn.	39,100	54,387	(-),15,287	58,429	69,839	97,529
Ore with 5-10% Pb & Zn.	50,490	51,729	(-),1,239	229,569	278,156	280,059
Ore with (-)5% Pb & Zn	13,685	-	(-),13,685	375,225	295,348	388,909
<b>Metal</b>						
Lead	1,900.19	2,482.34	(-),582.15	10,969.8	10,521.36	12,869.99
Zinc	7,438.05	9,999.52	(-),2,561.47	25,732.32	26,363.24	33,170.37
Lead & Zinc metal	-	-	-	143.13	143.13	143.13
<b>Freehold</b>						
<b>Total : Ore</b>	-	-	-	384,841	380,616	384,841
Ore with (+) 10% Pb & Zn	-	-	-	12,245	10,095	12,245
Ore with 5 - 10% Pb & Zn	-	-	-	73,509	75,419	73,509
Ore with (-) 5% Pb & Zn	-	-	-	299,088	295,102	299,088
<b>Metal</b>						
Lead	-	-	-	4,432.82	4,432.82	4,432.82
Zinc	-	-	-	9,112.47	9,095.68	9,112.47
Lead & Zinc metal	-	-	-	143.13	143.13	143.13
<b>Leasehold (Private)</b>						
<b>Total : Ore</b>	103,275	106,116	(-),2,841	272,144	254,984	375,419
Ore with (+) 10% Pb & Zn	39,100	54,387	(-),15,287	45,800	59,360	84,900
Ore with 5-10% Pb & Zn	50,490	51,729	(-),1,239	150,207	195,378	200,697
Ore with (-) 5% Pb & Zn	13,685	-	(+),13,685	76,137	246	89,822
<b>Metal</b>						
Lead	1,900.19	2,482.34	(-),582.15	6,298.91	5,849.22	8,199.10
Zinc	7,438.05	9999.52	(-),2,561.47	16,313.10	16,878.11	23,751.15
<b>Leasehold (Public)</b>						
<b>Total : Ore</b>	-	-	-	6,237	7,743	6,237
Ore with (+) 10% Pb & Zn	-	-	-	384	383	384
Ore with 5-10% Pb & Zn	-	-	-	5,853	7,360	5,853
<b>Metal</b>						
Lead	-	-	-	238.07	239.32	238.07
Zinc	-	-	-	306.75	389.45	306.75

figures rounded off.

National Mineral Inventory - An Overview

Madhya Pradesh (19.07 million tonnes), Bihar (11.44 million tonnes), Maharashtra (9.27million tonnes), Gujarat (5.68 million tonnes), Uttarakhand (5.62 million tonnes), West Bengal (3.7 million tonnes), Odisha (1.75 million tonnes), Sikkim (0.95 million tonnes), Meghalaya (0.88 million tonnes) and Tamil Nadu (0.79 million tonnes) (Table-2).

A net increase of about 17.04 million tonnes of ore resources have been recorded in inventory 2020 as compared to earlier inventory as on 01.04.2015. However, in terms of metals, a decrease of 0.13 million tonnes of lead metal and 3.19 million tonnes of zinc metal have been recorded in current inventory 2020 as compared to earlier inventory as on 01.04.2015. Rajasthan recorded a considerable increase of 14.31 million tonnes of lead & zinc ore. However, in terms of metal, a decrease of 0.13 million tonnes of lead metal and 3.12 million tonnes of zinc metal have been recorded in the current inventory as on 01.04.2020 owing to re-assessment of resources in existing five deposits located in Ajmer, Bhilwara, Rajsamand and Udaipur districts.

In Gujarat state, there is a decrease in resources of

lead & zinc ore by 1.50 million tonnes with corresponding decrease in lead metal by 1.25 thousand tonnes and zinc metal by 82.7 thousand tonnes due to downward revision of resources in existing deposits located in Banaskantha district.

In Madhya Pradesh, an increase of 4.22 million tonne of ore with 16.79 thousand tonnes of zinc metal was recorded due to addition of one new freehold deposit in Betul district in the present inventory with total resources of 1,257 thousand tonnes of ore containing 7 thousand tonnes of zinc metal and also upward revision of resource in two freehold deposits. All deposits of Madhya Pradesh are reported in freehold area.

Of the total resources of lead & zinc ore, about 373 million tonnes (48.61%) has been estimated under inferred (333) and reconnaissance (334) categories, which are based on a very limited and preliminary exploration. If these areas are examined for further detailed exploration the confidence level of resource endowment in the country may improve.

A total of 83 deposits of lead & zinc ore have been covered in the National Mineral Inventory as on 01.04.2020, of which 73 deposits are in freehold area and 10 deposits in leasehold area.

**Table – 2 : Total Resources of Lead & Zinc as on 01.04.2020 vis-à-vis 01.04.2015 (By States)**

State	Total Resources		Net Change
	As on 01.04.2020	As on 01.04.2015	
<b>All India : Total</b>			(In '000 Tonnes)
Ore	766,497	749,459	(+)17,038
Lead Metal	12,869.99	13,003.70	(-)133.71
Zinc Metal	33,170.37	36,362.76	(-)3,192.39
Lead & Zinc Metal	143.13	143.13	No Change
<b>Andhra Pradesh</b>			
Ore	22,689	22,689	No Change
Lead Metal	836.88	836.88	No Change
Zinc Metal	63.16	63.16	No Change
<b>Bihar</b>			
Ore	11,435	11,435	No Change
Lead Metal	24	24	No Change
Zinc Metal	38.75	38.75	No Change
<b>Gujarat</b>			
Ore	5,682	7,189	(-)1,507
Lead Metal	208.45	209.70	(-)1.25
Zinc Metal	261.4	344.10	(-)82.7
Lead & Zinc Metal	0.9	0.9	No Change
<b>Madhya Pradesh</b>			
Ore	19,067	14,841	(+)4,226
Lead Metal	36.29	36.29	No Change
Zinc Metal	470.53	453.74	(+)16.79
<b>Maharashtra</b>			
Ore	9,272	9,272	No Change
Zinc Metal	589.67	589.67	No Change

(Contd.)

National Mineral Inventory - An Overview

Table - 2 (Concl.d.)

State	Total Resources		Net Change
	As on 01.04.2020	As on 01.04.2015	
<b>Meghalaya</b>			
Ore	880	880	No Change
Lead Metal	16.5	16.5	No Change
Zinc Metal	14	14	No Change
<b>Odisha</b>			
Ore	1,750	1,750	No Change
Lead Metal	76.96	76.96	No Change
<b>Rajasthan</b>			
Ore	684,656	670,338	(+)14,318
Lead Metal	11,331.92	11,464.38	(-)132.46
Zinc Metal	31,266.02	34,392.50	(-)3,126.48
Lead & Zinc Metal	142.23	142.23	No Change
<b>Sikkim</b>			
Ore	950	950	No Change
Lead Metal	8.58	8.58	No Change
Zinc Metal	20.07	20.07	No Change
<b>Tamil Nadu</b>			
Ore	790	790	No Change
Lead Metal	7.74	7.74	No Change
Zinc Metal	36.52	36.52	No Change
<b>Uttarakhand</b>			
Ore	5,620	5,620	No Change
Lead Metal	182.6	182.6	No Change
Zinc Metal	266.83	266.83	No Change
<b>West Bengal</b>			
Ore	3,706	3,706	No Change
Lead Metal	140.07	140.07	No Change
Zinc Metal	143.42	143.42	No Change

figures rounded off.

Table - 3 : District wise Reserves/Resources of Lead & Zinc as on 01.04.2020

(In '000 Tonnes)				
State	District	Reserves	Remaining Resources	Total Resources
<b>All India : Total</b>				
	<b>Ore</b>	<b>103,275</b>	<b>663,222</b>	<b>766,497</b>
	<b>Lead Metal</b>	<b>1,900.19</b>	<b>10,969.80</b>	<b>12,869.99</b>
	<b>Zinc Metal</b>	<b>7,438.05</b>	<b>25,732.32</b>	<b>33,170.37</b>
	<b>Lead &amp; Zinc Metal</b>	<b>-</b>	<b>143.13</b>	<b>143.13</b>
<b>Andhra Pradesh</b>				
	<b>Ore</b>	<b>-</b>	<b>22,689</b>	<b>22,689</b>
	<b>Lead Metal</b>	<b>-</b>	<b>836.88</b>	<b>836.88</b>
	<b>Zinc Metal</b>	<b>-</b>	<b>63.16</b>	<b>63.16</b>

(Contd.)



## National Mineral Inventory - An Overview

Table - 3 (Contd.)

State	District	Reserves	Remaining Resources	Total Resources
	<b>Cuddapah</b>			
	Ore	-	4,310	4,310
	Lead Metal	-	95.16	95.16
	Zinc Metal	-	58.36	58.36
	<b>Guntur</b>			
	Ore	-	18,079	18,079
	Lead Metal	-	733.72	733.72
	Zinc Metal	-	4.8	4.8
	<b>Prakasam (Ongole H.Q)</b>			
	Ore	-	300	300
	Lead Metal	-	8	8
<b>Bihar</b>				
	<b>Ore</b>	-	<b>11,435</b>	<b>11,435</b>
	<b>Lead Metal</b>	-	<b>24</b>	<b>24</b>
	<b>Zinc Metal</b>	-	<b>38.75</b>	<b>38.75</b>
	<b>Banka</b>			
	Ore	-	435	435
	Zinc Metal	-	14.75	14.75
	<b>Rohtas</b>			
	Ore	-	11,000	11,000
	Lead Metal	-	24	24
	Zinc Metal	-	24	24
<b>Gujarat</b>				
	<b>Ore</b>	-	<b>5,682</b>	<b>5,682</b>
	<b>Lead Metal</b>	-	<b>208.45</b>	<b>208.45</b>
	<b>Zinc Metal</b>	-	<b>261.4</b>	<b>261.4</b>
	<b>Lead &amp; Zinc Metal</b>	-	<b>0.9</b>	<b>0.9</b>
	<b>Banaskantha</b>			
	Ore	-	5,482	5,482
	Lead Metal	-	208.45	208.45
	Zinc Metal	-	261.4	261.4
	<b>Vadodara</b>			
	Ore	-	200	200
	Lead & Zinc Metal	-	0.9	0.9
<b>Madhya Pradesh</b>				
	<b>Ore</b>	-	<b>19,067</b>	<b>19,067</b>
	<b>Lead Metal</b>	-	<b>36.29</b>	<b>36.29</b>
	<b>Zinc Metal</b>	-	<b>470.53</b>	<b>470.53</b>
	<b>Betul</b>			
	Ore	-	14,093	14,093
	Lead Metal	-	32.86	32.86
	Zinc Metal	-	408.25	408.25

(Contd.)

National Mineral Inventory - An Overview

Table - 3 (Contd.)

State	District	Reserves	Remaining Resources	Total Resources
	<b>Chhindwara</b>			
	Ore	-	4,498	4,498
	Zinc Metal	-	60.71	60.71
	<b>Katni</b>			
	Ore	-	476	476
	Lead Metal	-	3.43	3.43
	Zinc Metal	-	1.57	1.57
<b>Maharashtra</b>				
<b>Ore</b>		-	<b>9,272</b>	<b>9,272</b>
<b>Zinc Metal</b>		-	<b>589.67</b>	<b>589.67</b>
	<b>Nagpur</b>			
	Ore	-	9,272	9,272
	Zinc Metal	-	589.67	589.67
<b>Meghalaya</b>				
<b>Ore</b>		-	<b>880</b>	<b>880</b>
<b>Lead Metal</b>		-	<b>16.5</b>	<b>16.5</b>
<b>Zinc Metal</b>		-	<b>14</b>	<b>14</b>
	<b>Khasi Hills East</b>			
	Ore	-	880	880
	Lead Metal	-	16.5	16.5
	Zinc Metal	-	14	14
<b>Odisha</b>				
<b>Ore</b>		-	<b>1,750</b>	<b>1,750</b>
<b>Lead Metal</b>		-	<b>76.96</b>	<b>76.96</b>
	<b>Sundargarh</b>			
	Ore	-	1,750	1,750
	Lead Metal	-	76.96	76.96
<b>Rajasthan</b>				
<b>Ore</b>		<b>103,275</b>	<b>581,381</b>	<b>684,656</b>
<b>Lead Metal</b>		<b>1,900.19</b>	<b>9,431.73</b>	<b>11,331.92</b>
<b>Zinc Metal</b>		<b>7,438.05</b>	<b>23,827.97</b>	<b>31,266.02</b>
<b>Lead &amp; Zinc Metal</b>		-	<b>142.23</b>	<b>142.23</b>
	<b>Ajmer</b>			
	Ore	3,381	31,170	34,551
	Lead Metal	29.01	642.99	672
	Zinc Metal	163.25	1,513.34	1,676.59
	<b>Bhilwara</b>			
	Ore	39,100	78,533	117,633
	Lead Metal	632.15	1,408.18	2,040.33
	Zinc Metal	4,938.21	5,685.90	10,624.11
	Lead & Zinc Metal	-	24.68	24.68
	<b>Chittorgarh</b>			
	Ore	-	1,200	1,200
	Lead Metal	-	64.8	64.8
	Zinc Metal	-	4.8	4.8
	<b>Pali</b>			
	Ore	-	1,997	1,997
	Lead Metal	-	2.29	2.29
	Zinc Metal	-	106.25	106.25

(Contd.)

## National Mineral Inventory - An Overview

Table - 3 (Contd.)

State	District	Reserves	Remaining Resources	Total Resources
	<b>Rajsamand</b>			
	Ore	49,000	199,029	248,029
	Lead Metal	1,056.67	3,814.19	4,870.86
	Zinc Metal	1,927.56	8,311.12	10,238.68
	Lead & Zinc Metal	-	84.25	84.25
	<b>Sikar</b>			
	Ore	-	650	650
	Lead Metal	-	1.56	1.56
	<b>Sirohi</b>			
	Ore	-	6,604	6,604
	Lead Metal	-	24.94	24.94
	Zinc Metal	-	106.46	106.46
	Lead & Zinc Metal	-	33.30	33.30
	<b>Udaipur</b>			
	Ore	11,794	262,199	273,993
	Lead Metal	182.36	3,472.78	3,655.14
	Zinc Metal	409.03	8,100.1	8,509.13
<b>Sikkim</b>				
	<b>Ore</b>	-	<b>950</b>	<b>950</b>
	<b>Lead Metal</b>	-	<b>8.58</b>	<b>8.58</b>
	<b>Zinc Metal</b>	-	<b>20.07</b>	<b>20.07</b>
	<b>Sikkim East</b>			
	Ore	-	950	950
	Lead Metal	-	8.58	8.58
	Zinc Metal	-	20.07	20.07
<b>Tamil Nadu</b>				
	<b>Ore</b>	-	<b>790</b>	<b>790</b>
	<b>Lead Metal</b>	-	<b>7.74</b>	<b>7.74</b>
	<b>Zinc Metal</b>	-	<b>36.52</b>	<b>36.52</b>
	<b>Villupuram</b>			
	Ore	-	790	790
	Lead Metal	-	7.74	7.74
	Zinc Metal	-	36.52	36.52
<b>Uttarakhand</b>				
	<b>Ore</b>	-	<b>5,620</b>	<b>5,620</b>
	<b>Lead Metal</b>	-	<b>182.60</b>	<b>182.60</b>
	<b>Zinc Metal</b>	-	<b>266.83</b>	<b>266.83</b>
	<b>Dehradun</b>			
	Ore	-	2,290	2,290
	Lead Metal	-	36.75	36.75
	Zinc Metal	-	107.99	107.99

(Contd.)

## National Mineral Inventory - An Overview

Table - 3 (Concl.d.)

State	District	Reserves	Remaining Resources	Total Resources
	<b>Pithoragarh</b>			
	Ore	-	3,330	3,330
	Lead Metal	-	145.85	145.85
	Zinc Metal	-	158.84	158.84
<b>West Bengal</b>				
<b>Ore</b>		-	<b>3,706</b>	<b>3,706</b>
<b>Lead Metal</b>		-	<b>140.07</b>	<b>140.07</b>
<b>Zinc Metal</b>		-	<b>143.42</b>	<b>143.42</b>
	<b>Darjeeling</b>			
	Ore	-	3,706	3,706
	Lead Metal	-	140.07	140.07
	Zinc Metal	-	143.42	143.42

*figures rounded off.*

## 3.5 PLATINUM GROUP OF METALS

### Introduction

Platinum and Palladium are the commercially important rare metals of the Platinum Group of Metals (PGM), which include iridium, osmium, rhodium and ruthenium. In India, incidences of PGM have been reported from the Pre-cambrian mafic/ultramafic complexes in Sukinda and Nausahi sectors of Odisha, Sitampudi in Tamil Nadu, mafic/ultramafic complex of Shimoga schist belt in Karnataka and ultramafic rocks of Madawara igneous complex in Uttar Pradesh.

Since early times, the noble metals were valued as precious metals but their use as catalyst for control of emission especially from vehicle is now prominent. They are also used in electronics and medical field; viz dental and chemotherapy of cancer.

### Basis of Grade Classification

The exploration agencies have reported only metal content of the rocks in the areas under exploration and hence resources have been reported in the inventory as on 01.04.2020 in terms of metal only.

### Basis of Categorisation of Resources

As per United Nations Framework Classification (UNFC), total resources are broadly classified into 'reserves' and 'remaining resources' category.

Accordingly, remaining resources of PGM have been placed under indicated (332) inferred (333) and

reconnaissance (334) categories.

### Salient Features of the Inventory

The occurrence of PGM is rare and its incidence in country rocks is measured in parts per million or even billion. There is no commercial production of ore or extraction of these metals reported in India.

All India scenario of PGM reserves, remaining resources and total resources as on 01.04.2020 vis.a.vis 01.04.2015 have been given in Table-1 & 2. These tables give an idea of about changes in terms of increase or decrease of resources as per lease status, grades and states. In table-3, district wise reserves/remaining resources as on 01.04.2020 have been given.

A total 8 freehold deposits have been covered in the NMI as on 01.04.2020 which includes addition of Five new deposits in current inventory.

An increase of 5.21 tonnes of resources of PGM is reported in comparison to earlier inventory as on 01.04.2015. The increase in resource is primarily due to 5 new freehold deposits reported in the states of Kerala (1) and Tamil Nadu (4) accounting to an increase of 1.87 tonnes while resources in Uttar Pradesh increased by 3.34 tonnes due to re-estimation of resources in existing/old freehold deposit.

**Table - 1 : Reserves/Resources of Platinum Group of Metals as on 01.04.2020 vis-à-vis 01.04.2015  
(By Lease Status/Grade)**

Lease status/Grade	Reserves		Remaining resources		Total resources		Net change	Net change
	01.04.2020	01.04.2015	01.04.2020	01.04.2015	01.04.2020	01.04.2015		
<b>All India : Total</b>	-	-	<b>20.92</b>	<b>15.71</b>	<b>20.92</b>	<b>15.71</b>	<b>(+)5.21</b>	<b>(+)5.21</b>
Metal	-	-	20.92	15.71	20.92	15.71	(+)5.21	(+)5.21
<b>Freehold : Metal</b>	-	-	20.92	15.71	20.92	15.71	(+)5.21	(+)5.21

*figures rounded off.*

**Table – 2 : Total Resources of Platinum Group of Metals as on 01.04.2020 vis-à-vis 01.04.2015 (By States)**

(In Tonne)

State	Total Resources		Net Change
	As on 01.04.2020	As on 01.04.2015	
<b>All India : Total</b>	<b>20.92</b>	<b>15.71</b>	<b>(+) 5.21</b>
Karnataka	1.5	1.5	No Change
Kerala	0.18	-	(+) 0.18
Odisha	14.20	14.20	No Change
Tamilnadu	1.69	-	(+) 1.69
Uttar Pradesh	3.35	0.01	(+) 3.34

*figures rounded off.*

**Table - 3 : District wise Reserves/Resources of Platinum Group of Metals as on 01.04.2020**

(In Tonne)

State	District	Reserves	Remaining Resources	Total Resources
<b>All India : Total</b>		-	<b>20.92</b>	<b>20.92</b>
<b>Karnataka</b>		-	<b>1.5</b>	<b>1.5</b>
	Dawangere	-	1.5	1.5
<b>Kerala</b>		-	<b>0.18</b>	<b>0.18</b>
	Palakkad	-	0.18	0.18
<b>Odisha</b>		-	<b>14.2</b>	<b>14.2</b>
	Keonjhar	-	14.2	14.2
<b>Tamil Nadu</b>		-	<b>1.69</b>	<b>1.69</b>
	Erode	-	0.15	0.15
	Namakkal	-	1.54	1.54
<b>Uttar Pradesh</b>		-	<b>3.35</b>	<b>3.35</b>
	Lalitpur	-	3.35	3.35

*figures rounded off.*