

STATE REVIEWS



Indian Minerals Yearbook 2018

(Part- I)

57th Edition

STATE REVIEWS
(Gujarat)

(FINAL RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

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GUJARAT

Mineral Resources

Gujarat is the sole producer of chalk and is the principal producer of clay (others), fluorite (graded), kaolin, silica sand, lignite, petroleum & natural gas and marl in the country. The State is the sole holder of the country's chalk, marl and perlite resources and possesses 66% fluorite, 28% diatomite, 25% bentonite, 18% granite, 12% wollastonite, 10% limestone and 9% bauxite resources.

The important mineral occurrences in the State are: **bauxite** in Amreli, Bhavnagar, Jamnagar, Junagadh, Kheda, Kachchh, Porbandar, Sabarkantha and Valsad districts; **ball clay** in Banaskantha, Bharuch, Kachchh and Patan districts; **bentonite** in Amreli, Bhavnagar, Jamnagar, Kachchh and Sabarkantha districts; **china clay** in Amreli, Banaskantha, Bhavnagar, Jamnagar, Junagadh, Kachchh, Mahesana and Sabarkantha districts; **chalk** in Porbandar district; **diatomite** in Bhavnagar district; **dolomite** in Bhavnagar and Vadodara districts; **fireclay** in Bharuch, Kachchh, Mehsana, Rajkot, Sabarkantha, Surat and Surendranagar districts; **fluorite** in Vadodara and Bharuch districts; **gypsum** in Bhavnagar, Jamnagar, Junagadh, Kachchh and Surendranagar districts; **lignite** in Bharuch, Bhavnagar, Kachchh and Surat districts;

limestone in Amreli, Banaskantha, Bharuch, Bhavnagar, Jamnagar, Junagadh, Kheda, Kachchh, Panchmahal, Porbandar, Rajkot, Sabarkantha, Surat, Vadodara and Valsad districts; **marl** in Amreli, Junagadh and Porbandar district; **ochre** in Banaskantha, Bhavnagar and Kachchh districts; **perlite** in Rajkot district; **petroleum and natural gas** in oil fields of Ankaleshwar, Kalol, Navgam, Balol and Cambay in Cambay onshore and offshore basins; **quartz/silica sand** in Bharuch, Bhavnagar, Dahod, Kheda, Kachchh, Panchmahal, Rajkot, Sabarkantha, Surat, Surendranagar, Vadodara and Valsad districts; and **talc/soapstone/steatite** in Sabarkantha district.

Other minerals that occur in the State are: **apatite** and **rock phosphate** in Panchmahal district; **calcite** in Amreli and Bharuch districts; **copper ore** in Banaskantha district; **granite** in Banaskantha, Mahesana and Sabarkantha districts; **graphite** in Panchmahal district; **lead-zinc** and **marble** in Banaskantha and Vadodara districts; **manganese ore** in Panchmahal and Vadodara districts; **vermiculite** in Vadodara district; and **wollastonite** in Banaskantha district. The lignite resources are located in Bharuch, Bhavnagar, Kachchh and Surat districts (Tables - 1 and 2).

Exploration & Development

The details of exploration activities conducted by GSI and various State Government agencies during 2017-18 are furnished in Table - 3.

Table – 2 : Reserves/Resources of Lignite as on 1.4.2018 : Gujarat

District	Proved	Indicated	Inferred	Total
Total	1278.65	283.70	1159.70	2722.05
Bharuch	724.76	118.59	491.23	1334.58
Bhavnagar	-	-	299.17	299.17
Kachchh	335.61	56.40	33.09	425.10
Surat	218.28	108.71	336.21	663.20

Source: Coal Directory of India, 2017-18

Table – 1 : Reserves/Resources of Minerals as on 1.4.2015 : Gujarat

Mineral	Unit	Reserves					Remaining Resources					Total resources (A+B)		
		Proved STD 111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333		Reconnaissance STD334	Total (B)
			STD121	STD122			STD221	STD222						
Apatite	tonne	-	-	-	-	-	-	-	-	-	351000	351000	351000	
Ball clay#	tonne	20900	-	20900	342169	-	-	403801	-	49670	-	795640	816540	
Bauxite	'000 tonnes	154911	2094	28229	17324	35470	3925	28953	22107	56857	710	165347	350581	
Bentonite	tonne	9221227	-	9221227	6838864	-	12460170	2163813	1904	113259150	-	134723901	143945128	
Calcite#	tonne	-	-	-	-	-	-	-	-	12380	-	12380	12380	
Chalk#	'000 tonnes	4215	529	319	741	331	151	196	-	269	-	1687	6751	
China clay#	'000 tonnes	54111	3486	19671	77268	25378	4790	1663	4198	49337	4114	118021	195289	
Copper														
Ore	'000 tonnes	-	-	-	2470	3010	1380	129	-	7131	-	14120	14120	
Metal	'000 tonnes	-	-	-	30.13	36.72	29.04	0.69	-	113.38	-	209.96	209.96	
Diatomite	'000 tonnes	-	-	-	-	-	-	-	-	811	-	811	811	
Dolomite#	'000 tonnes	34862	15934	20829	11947	27064	68785	20263	63780	280592	-	472431	544056	
Fire clay#	'000 tonnes	231	-	56	287	1193	664	2120	1053	53526	-	59522	59809	
Fluorite	tonne	-	-	-	4279230	-	-	-	5723360	2001920	-	12004510	12004510	
Granite														
(Dim. stone)	'000 cu m	-	-	-	-	-	-	-	-	8501947	-	8501947	8501947	
Graphite	tonne	-	-	-	-	-	-	-	2520805	835000	-	3355805	3355805	
Gypsum#	'000 tonnes	4	5	24	33	4	-	616	308	15446	-	16374	16407	
Laterite#	'000 tonnes	36019	-	399	36418	8095	-	-	-	-	-	9562	45981	
Lead-zinc														
Ore	'000 tonnes	-	-	-	2470	3010	1380	129	-	200	-	7189	7189	
Lead metal	'000 tonnes	-	-	-	74.10	90.30	41.40	3.90	-	-	-	210	210	
Zinc metal	'000 tonnes	-	-	-	123.5	150.5	69	1.10	-	-	-	344.	344.	
Lead & zinc metal	'000 tonnes	-	-	-	-	-	-	-	-	0.90	-	0.90	0.90	

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Table - 1 (Concl'd)

Mineral	Unit	Reserves			Remaining resources				Total resources (A+B)				
		Proved STD 111	Probable STD121	STD122	Total (A)	Feasibility STD211	Pre-feasibility STD221	Measured STD331		Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)
Limestone	'000 tonnes	750236	173244	76324	999804	277146	159554	120210	906641	18772852	-	20257514	21257318
Manganese ore	'000 tonnes	708	-	-	708	-	-	-	-	2180	-	2180	2888
Marble	'000 tonnes	-	-	-	-	-	26571	45000	17129	34871	-	123571	123571
Marl	tonne	117115856	4650000	2090000	123855856	11704870	-	-	-	-	-	11704870	135560726
Ochre#	tonne	37862	-	75703	113565	-	32699	4303	-	3016066	-	3053068	3166633
Perlite	'000 tonnes	-	-	-	-	140	683	595	-	-	988	2406	2406
Quartz-silica sand#	'000 tonnes	27892	5617	15260	48769	26742	6681	17809	3371	26099	21	83656	132425
Phosphorite/Rock phosphate	tonne	-	-	-	-	-	-	-	-	314820	-	314820	314820
Talc/soapstone/steatite#	'000 tonnes	-	4	4	4	-	20	9	-	4	-	33	37
Vermiculite	tonne	-	-	-	-	-	-	-	-	1960	-	1960	1960
Wollastonite	tonne	-	-	-	-	-	-	-	-	1990000	-	1990000	1990000

Figures rounded off

Declared as Minor Mineral vide Gazette Notification dated 10.02.2015.

Note: The proved and indicated balance recoverable reserves of crude oil and natural gas as on 1.4.2018 in the State are 118.20 million tonnes and 58.23 billion cu m, respectively.

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Table – 3 : Details of Exploration Activities in Gujarat, 2017-18

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI							
Base metals							
Sabarkantha	Around Vadali Area	1:12500	100	-	-	28	Reconnaissance survey for base metals in the area involved large-scale mapping of 100 sq.km area on 1:12500 scale along with 15 lkm of geophysical survey. A total of 28 pegmatite samples for REE/ RM analysis and 27 BRS for Nb-Ta analysis were collected. Two heavy minerals samples were also collected for base metal analysis. The main lithology of the study area is calc-silicate rocks.
REE							
Chhota Udepur	Ambadongar carbonative complex, Saidiwasan area	1:12500	100	8	1075	258	Reconnaissance survey for REE mineralisation and other RM was carried out in Godhra Granitoids of Chhota Udepur district. The survey involved mapping of 100 km ² on 1:12500 scale and 100 BRS, 50 SS, 10 regolith, 50 PTS, 30 PS, 8 OM, and 10 XRD samples were collected. Preliminary exploration for REE and other RM was carried out in Ambadongar Carbonatite Complex, Kawant Taluka, Chhota Udepur district. The area comprises different varieties of carbonatite, carbonate sandstone, phonolite, basalt, dolerite dyke and quartz veins. A total of eight boreholes were drilled up to a cumulative depth of 1,075 m and 928 core samples were collected. The analytical results of sample showed encouraging value (0.3% average grade with 0.25% cutoff) for REE and Nb (300 ppm average grade with 200 ppm cut-off) concentration.
Gold and associated minerals							
Jamnagar	Jamjodhpur Block (Alech Hills),	1:12500	100	-	-	-	Reconnaissance survey for Gold and associated minerals in Jamjodhpur Block (Alech Hills), involved mapping of 100 sq. km on 1:12500 scale and collection of 25 pitting/ channel/ groove samples and 108 BRS was carried out. A total of 6 carbonate veins/ dyke have been delineated and channel samples at regular interval were collected. Samples both from basalt and granophyre near the basalt-granophyre contact were also collected. A few shining minerals, white in colour, visible through pocket lens, were observed within

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Table - 3 (Concl'd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							basalt at the granophyre and basalt contact near Bhojakua ness, north of Malvada village. A small chert vein got exposed around south of Andhariya Ness within the Rhyolite which extended up to Bochvdi Ness. Systematic sampling with 10 m interval was carried out.

Production

Production of many important minerals like lignite, natural gas (utilised), petroleum (crude), bauxite, manganese ore, limestone, marl, sulphur etc. was reported from Gujarat during the year 2017-18.

The value of minor minerals production was estimated at ` 5,775 crore for the year 2017-18.

The number of reporting mines in the State was 181 in 2017-18 in case of MCDR minerals (Table-4).

Mineral-based Industry

The present status of each Mineral-based Industry is not readily available. However, the important mineral-based industries in organised sector in the State are furnished in Table-5.

**Table – 4 : Mineral Production in Gujarat, 2015-16 to 2017-18
(Excluding Atomic Minerals)**

		(Value in `000)								
Mineral	Unit	2015-16			2016-17			2017-18 (P)		
		No. of mines	Quantity	Value ^{\$}	No. of mines	Quantity	Value ^{\$}	No. of mines	Quantity	Value ^{\$\$}
All Minerals		230		67313486	212		66321679	181		64524717
Lignite	'000 t	-	10123	-	-	10546	-	-	13392	-
Natural Gas (ut.)	m cu m	-	1490	-	-	1580	-	-	1607	-
Petroleum (crude)	'000 t	-	4458	-	-	4605	-	-	4591	-
Bauxite	t	115	10387092	4857172	92	5881257	3127056	74	3101577	1598056
Manganese Ore	t	2	46153	19633	2	43057	20605	1	18362	11183
Fluorite (graded)	t	1	-	-	1	-	-	-	-	-
Limestone	'000 t	112	25622	4370924	117	25813	5110332	106	24948	4884583
Marl	t	-	2389707	319957	-	2203700	317886	-	1822514	285095
Sulphur [#]	t	-	101743	-	-	100952	-	-	95343	-
Minor Minerals [@]		-	-	57745800	-	-	57745800	-	-	57745800

Note : The number of mines excludes Petroleum (crude), Natural Gas (utilised), Fuel Minerals and Minor Minerals.

\$ Excludes the value of Petroleum (crude) & Natural Gas (utilised)

\$\$ Excluding Fuel minerals.

Recovered as by-product from oil refineries.

@ Figures for earlier years have been repeated as estimates, wherever necessary, because of non-receipt of data.

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Table – 5 : Principal Mineral-based Industries in Gujarat

Industry/plant	Capacity ('000 tpy)
Abrasives	
Carborandum Universal Ltd, Okha, Distt Jamnagar.	NA
Carborandum Universal Ltd, Bhatia, Distt Jamnagar.	NA
Flexo-Plast Abrasives, Ahmedabad.	NA
Emery (I) Pvt Ltd, Badeshwar, Distt Jamnagar.	7
Asbestos Products	
Gujarat Composite Ltd, Digvijaynagar, Distt Jamnagar.	98
Ramco Industries Ltd, Singura, Distt Kachchh.	72
Sanghi Industries Ltd, Sanghipuram, Distt Kachchh.	36
U.P. Asbestos Ltd, Valsad.	36
Cement	
Ambuja Cements Ltd, Ambuja Nagar, Distt Junagadh.	4500
Ambuja Cement Ltd, Magdalla, Distt Surat (G).	1000
Gujarat Sidhee Cements, Sidheegram, Distt Junagadh.	1200
Hi Bond Cement, Gondal.	1200
J. K. Laxmi, Kalol, Distt Ganghinagar (G).	550
Sanghi Industries Ltd, Sanghipuram, Distt Kachchh.	3000
Shree Digvijay Cement Co. Ltd, Digvijaygram, Distt Jamnagar.	1075
Saurashtra Cements Ltd, Ranavav, Distt Junagadh.	1500
Tata Chemicals Ltd, Mithapur, Distt Jamnagar.	490
UltraTech Cement Co. Ltd, Pipavav, Distt Amreli.	5800
UltraTech Cement Ltd, (Narmada Cement), Jafrabad, Distt Amreli.	500
UltraTech Cement (formerly a unit of JCCL), Sewagram, Distt Kachchh.	2400
UltraTech Cement (formerly a unit of JCCL), Wanakbori, Distt Kheda (G).	2400
UltraTech Cement Ltd, Magdalla (G).	700

(Contd)

Table - 5 (Contd)

Industry/plant	Capacity ('000 tpy)
Chemical	
Baroda Rayon Corpn. Ltd, Surat.	26 (yarn) 21.8 (H ₂ SO ₄) 2.2 (sodium sulphate)
Century Chemicals, Nava Nanga, Distt Jamnagar.	108 (refined salt)
Gujarat Alkalies & Chemicals Ltd, Baroda.	14.9 (caustic soda)
Gujarat Alkalies & Chemicals Ltd, Dahej, Distt Bharuch.	242.6 (caustic Soda) 151.4 (Cl) 26.7 (phosphoric acid)
Indian Rayon Industries Ltd, Veraval, Distt Junagadh.	16 (yarn) 35.7 (H ₂ SO ₄) 10 (carbon disulphide) 9.3 (sodium sulphate) 91.3 (caustic soda)
Navin Fluorine Industries Ltd, Surat.	22(HF)
Saurashtra Chemicals Ltd, Porbandar, Distt Porbandar.	365 (soda ash) 20.4 (caustic soda) 26.4 (refined bicarbonate)
Shree Sulphurics Pvt. Ltd, Ankleshwar, Distt Bharuch.	58 (H ₂ SO ₄) 12 (chloro-sulphuric acid)
Tata Chemicals Ltd, Mithapur, Distt Jamnagar.	875 (soda ash)
Copper Smelter	
Hindalco Industries Ltd, Birla Copper, Dahej, Distt Bharuch.	500 (copper smelting) 1670 (H ₂ SO ₄) 15 tonnes (Au) 150 tonnes (Ag)
HCL, Gujarat Copper Project, Jhagadia, Distt Bharuch.	50 (electrolytic copper) 20 (copper anodes)
Fertilizer	
Aarti Fertilizers, Vapi, Valsad.	132 (SSP)
Coromandel International Ltd (Formerly Liberty Phosphate Ltd), Nandesari, Vadodara.	100 (SSP)
GSFC, Vadodara.	370.6 (Urea) 165 (DAP) 200 (Complex) 228 (AS)
GSFC, Sikka (Sikka - I & II), Jamnagar.	722 (DAP)
GNFC, Bharuch.	636.9 (Urea) 142.5 (Complex)

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Table - 5 (Contd)

Industry/plant	Capacity ('000 tpy)
Hindalco Industries Ltd, Dahej, Distt Bharuch.	400 (DAP/Complex)
IFFCO Ltd, Kandla, Distt Kachchh.	1200 (DAP) 1215.4 (NP/NPKs)
IFFCO Ltd, Kalol, Distt Gandhinagar.	544.5 (Urea)
Khaitan Chemicals & Fertilizers Ltd, Dahej, Bharuch.	181.5 (SSP)
KRIBHCO Ltd, Hazira, Distt Surat.	2195 (Urea)
Narmada Agro Chemicals Pvt. Ltd, Mangrol, Junagadh.	15 (SSP)
Narmada Bio-chem Pvt Ltd, Kalyangadh, Ahmedabad.	132 (SSP)
Nirma Ltd, Moraiya, Ahmedabad.	100 (SSP)
Sona Phosphates Ltd, Sarigam, Valsad.	15 (SSP)
T J Agro Fertilizers Pvt. Ltd, Navsari.	22 (SSP)
Foundry	
Steelcast Ltd, Ruvapuri Road, Bhavnagar.	NA
Iron & Steel	
Essar Steel Ltd, Hazira, Distt Surat.	6800 (Sponge iron) 8540 (Crude/Liquid steel)
Ferro Alloys	
Baroda Ferro Alloys Ltd, Panchmahals.	3.5
Essel Mining & Industries Ltd, Vapi, Distt Valsad.	2.1
Electro Ferro Alloys Ltd, Ahmedabad.	0.3
Sponge Iron	
Electrotherm India Pvt Ltd, Samakhalli, Distt Kachchh.	75
Gallant Metal Ltd, Samakhialli, Distt Kachchh.	170
Global Hi-Tech Industries Ltd, Bhuji, Distt Kachchh.	105
Glass	
Alembic Glass Industries Ltd, Baroda.	35.0
Bhagwati Glass Containers Ltd, Kalol.	8.7
Bharat Glass Tube Ltd, Bharuch.	7.2

(Contd)

Table - 5 (Concl'd)

Industry/plant	Capacity ('000 tpy)
Gobind Glass & Industries Ltd, Kadi.	NA
Gopal Glass Works Ltd, Budasan, Distt Mehsana.	40.6
Gujarat Borosil Ltd, Govali, Distt Bharuch.	62.5
Gujarat Guardian Ltd, Ankaleshwar, Distt Bharuch.	150 (float glass)
Piramal Glass Ltd, Jambusar.	355 (tpd)
Piramal Glass Ltd, Kosamba.	340 (tpd)
Haldyn Glass (Gujarat) Ltd, Padra, Vadodara.	43
Prestige Glass Industries Pvt Ltd, Vagra.	11.5
Petroleum Refinery	
IOCL, Koyali.	13700
RPL, Jamnagar	33000
RPL, Jamnagar (SEZ).	27000
Essar Oil Ltd, Vadinar.	20000
Refractory	
Shri Natraj Ceramics & Chemical Industries Ltd, Khambhaliya, Distt Jamnagar.	28
Meenal Ceramics Pvt. Ltd, Chattral, Distt Kalol.	12
VRW Industries Ltd, Ahmedabad.	24
Calcined Bauxite	
Bombay Minerals Ltd, Jamkhambhaliya.	96
Saurashtra Calcine Bauxite & Allied Industries Ltd, Bhatia.	39
Birla VXL Ltd, Porbandar.	36
Shri Natraj Ceramics & Chemical Industries Ltd, Khambhaliya.	24

G: Grinding Unit

Note: (i) Jhagadia Copper (acquired by HCL in 2015) has not reported copper production since 2010-11.

(ii) Data, not readily available for Fertilizer and Cement Industries on respective websites, is taken from Indian Fertilizer Scenario, 2016/FAI Statistics, 2015-16 and Survey of Cement Industry & Directory, 2016 respectively.