

STATE REVIEWS



Indian Minerals Yearbook 2013 (Part- I)

52nd 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 agate, chalk, perlite and is the principal producer of fluorite (graded), china clay (kaolin), silica sand, lignite, laterite, petroleum & natural gas and marl in the country. The State is the sole holder of the country's perlite resources and is said to possess 66% fluorite, 28% diatomite, 24% bentonite, 18% granite and 12% wollastonite.

The important mineral occurrences in the State are: **agate** found in Deccan Trap flows in Bharuch district; **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; **fuller's earth** in Bhavnagar and Kachchh 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, Panchmahals, Porbandar, Rajkot, Sabarkantha, Surat, Vadodara and Valsad districts; **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, Panchmahals, 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 Panchmahals district; **calcite** in Amreli and Bharuch districts; **copper ore** in Banaskantha district; **granite** in Banaskantha, Mahesana and Sabarkantha districts; **graphite** in Panchmahals district; **lead-zinc** and **marble** in Banaskantha and Vadodara districts; **manganese ore** in Panchmahals and Vadodara districts; **vermiculite** in Vadodara district; and **wollastonite** in Banaskantha district (Table - 1). The lignite resources are located in Bharuch, Bhavnagar, Kachchh and Surat districts (Table - 2).

Exploration & Development

The details of exploration activities conducted by GSI & various agencies for the exploration for wollastonite and lignite during 2012-13 are furnished in Table - 3.

Table – 2 : Reserves/Resources of Lignite as on 1.4.2013 : Gujarat

(In million tonnes)

District	Proved	Indicated	Inferred	Total
Total	1180.65	791.30	1145.25	3117.20
Bharuch	724.76	118.59	491.23	1334.58
Bhavnagar	-	-	299.17	299.17
Kachchh	237.61	564.00	18.64	820.25
Surat	218.28	108.71	336.21	663.20

Source: Coal Directory of India, 2012-13.

STATE REVIEWS

Table – 1 : Reserves/Resources of Minerals as on 1.4.2010 : 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	-	-	-	-	-	-	249810	-	49670	-	299480	299480	
Bauxite	'000 tonnes	98794	4560	10407	113761	3359	20295	26593	22107	48019	-	122959	236720	
Bentonite	tonne	-	-	12460170	12460170	-	-	2163813	1904	119553173	-	121718890	134179060	
Calcite	tonne	-	-	-	-	-	-	-	-	12380	-	12380	12380	
Chalk	'000 tonnes	3266	528	4332	4332	184	5	-	-	269	-	585	4917	
China clay	'000 tonnes	34290	240	6232	40763	4654	856	-	878	40904	-	71425	112188	
Copper														
Ore	'000 tonnes	-	4955	845	5800	-	-	129	-	7131	-	7260	13060	
Metal	'000 tonnes	-	80.75	13.78	94.53	-	-	0.69	-	113.38	-	114.07	208.60	
Diatomite	'000 tonnes	-	-	-	-	-	-	-	-	811	-	811	811	
Dolomite	'000 tonnes	20130	1962	9803	31895	9556	26745	20263	63780	295948	-	493578	525473	
Fireclay	'000 tonnes	276	29	132	437	1175	635	638	962	53526	-	57859	58295	
Fluorite	tonne	4280000	-	-	4280000	-	-	-	5723360	2001920	-	7725280	12005280	
Granite	(Dim. stone)	'000 cu m	-	-	-	-	-	-	-	8501947	-	8501947	8501947	
Graphite	tonne	-	-	-	-	-	-	-	2520805	835000	-	3355805	3355805	
Gypsum	'000 tonnes	9	5	24	37	-	-	-	-	15138	-	15138	15175	
Laterite	'000 tonnes	9406	-	164	9570	-	-	-	-	-	-	-	9570	
Lead-zinc														
Ore	'000 tonnes	-	4955	845	5800	-	-	129	-	200	-	329	6129	
Lead metal	'000 tonnes	-	104.37	17.81	122.18	-	-	3.90	-	-	-	3.90	126.08	
Zinc metal	'000 tonnes	-	224.04	39.37	263.41	-	-	1.10	-	-	-	1.10	264.51	
Lead & zinc metal	'000 tonnes	-	-	-	-	-	-	-	-	0.90	-	0.90	0.90	
Limestone	'000 tonnes	542498	72263	195715	810475	60640	88866	18728	858265	18014634	-	19200681	20011157	
Manganese ore	'000 tonnes	-	-	-	-	-	-	-	-	2954	-	2954	2954	
Marble	'000 tonnes	-	-	-	-	-	26571	45000	17129	34871	-	123571	123571	
Marl	tonne	33236150	4650000	2090000	13997615	011704870	-	-	-	-	-	11704870	151681020	
Ochre	tonne	12243	32699	65047	109989	-	-	6971	6210	2906608	-	2946309	3056298	
Perlite	'000 tonnes	140	-	288	428	-	683	307	-	-	988	1978	2406	
Quartz-silica sand	'000 tonnes	16042	684	19256	35982	17133	5110	2144	2999	25629	-	64789	100771	
Phosphorite/Rock phosphate	tonne	-	-	-	-	-	-	-	-	314820	-	314820	314820	
Talc/soapstone/steatite	'000 tonnes	-	-	6	6	-	20	8	-	4	-	31	37	
Vermiculite	tonne	-	-	-	-	-	-	-	-	1960	-	1960	1960	
Wollastonite	tonne	-	-	-	-	-	-	-	-	1990000	-	1990000	1990000	

Figures rounded off.
The proved and indicated balance recoverable reserves of crude oil and natural gas as on 1.4.2013 in the State are 136.73 million tonnes and 77.53 billion cu m, respectively.

STATE REVIEWS

Table – 3 : Details of Exploration Activities in Gujarat, 2012-13

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI							
Wollastonite							
Banaskantha	Dhanpura-Ghoda area (Delhi Fold Belt)	1:10,000	33	-	-	-	Reconnaissance stage (G-4) investigation was carried out during F.S. 2012-13 in this area to assess the potentiality of wollastonite and search for other strategic minerals viz scheelite, REE, etc. Major parts of the mapped area are covered with different varieties of granites and Calc-Silicates. Wollastonite is developed at certain places viz. near Bhameriya, Ghoda and Village Dhanpura at the contact of granite and Calc-Silicates/calc-gneiss. The granites vary from dark grey to pink in colour, fine to very coarse grained and non-porphyrific to porphyritic in texture. Calc-silicate is composed of calcite, amphiboles, tourmaline, diopside and epidote with minor amount of wollastonite, garnet and iron oxides. It is intricately folded. The emplacement of granite into the calc silicate resulted in the development of skarn zones. The investigation will be continued in F.S.2013-14.
GMDC							
Lignite							
Kachchh	Mata No Madh mine	-	-	45	2647.0	150	About 5.19 million tonnes resources of lignite were estimated tentatively.
	Panandhro	1:5,000	-	-	-	-	Balance resources of lignite is approx. 6.85 million tonnes.
Surat	Tadkeshwar	1:5,000 1:3,000	-	29	2207	24	Total lignite resources were estimated at 70 million tonnes. Out of which 40 million tonnes & 31 million tonnes are placed under measured and recoverable categories, respectively.
	Bhavnagar Tagadi	-	-	-	-	-	Total 114.72 million tonnes of geological reserves (111) of lignite have been estimated in Block-A.

STATE REVIEWS

Production

The value of mineral production in Gujarat in 2012-13 at ₹25,477 crore decreased 2% as compared to that in the previous year. The state is ranked second in the country and accounted for 9% of the total value of mineral production during the year. Gujarat was the sole producer of agate and chalk; leading producer of marl (98%), clay (others) (64%) and kaolin (54%); second largest producer of lignite (31%), bauxite (20%), silica sand (23%) and sulphur (17%). It was also third leading producer of Petroleum (crude) (14%), Quartz (13%) and Natural Gas (ut.) (5%) in the country. The production of bauxite more than doubled in 2012-13 from that of the preceding year. The other minerals which have reported significant increase in production are clay (others)

45%, kaolin 31%, dolomite 17%, sulphur 13%, marl 9%, limestone 6% and agate 4%. However, fall in production was reported during 2012-13 in lignite (2%), natural gas (ut.) and chalk (7% each), petroleum (crude) (8%), steatite (12%), quartz (14%), ochre (15%), ball clay (16%), laterite (43%), silica sand (57%) and fire clay (69%) as compared to that of the previous year. (Table- 4).

The production value of minor minerals was estimated at ₹12,065 crore for the year 2012-13.

The number of reporting mines in the state was 447 in 2012-13 as compared to 441 in the previous year.

The index of mineral production in Gujarat (base 2004-05=100) was 86.1 in 2012-13 as compared to 91.9 in the previous year.

**Table – 4 : Mineral Production in Gujarat, 2010-11 to 2012-13
(Excluding Atomic Minerals)**

(Value in ₹'000)										
Mineral	Unit	2010-11			2011-12			2012-13 (P)		
		No. of mines	Qty	Value	No. of mines	Qty	Value	No. of mines	Qty	Value
All Minerals		429		262142077	441		260895535	447		254772214
Lignite	'000t	7	13064	13480300	7	14779	15249900	7	14528	14990900
Natural Gas (utilised)	m c m	-	2262	14479062	-	2173	15631080	-	2032	16804900
Petroleum(crude)	'000t	-	5905	107814553	-	5780	105010768	-	5331	96895046
Bauxite	t	100	938574	570664	79	847382	460722	67	3017709	1424645
Manganese Ore	t	1	245240	121639	1	40556	23928	1	-	-
Agate	t	1	19	10	1	476	238	1	493	247
Ball Clay	t	2	31140	2025	3	13527	1488	2	11402	1254
Chalk	t	129	177197	65799	128	178736	70458	111	166931	74562
Clay (others)	t	3	203291	12775	16	877579	85588	26	1271165	128919
Dolomite	t	12	244218	45935	20	334600	61149	19	391206	73784
Fireclay	t	10	145961	12484	10	120266	9338	7	37513	2670
Fluorite(graded)	t	1	52920	15876	1	1920	576	1	-	-
Gypsum	t	2	37	14	1	20	6	-	-	-
Kaolin	t	22	1251890	204177	35	1517504	278365	50	1989949	363655
Laterite	t	2	234548	15733	2	207998	17153	3	117830	10036
Limestone	'000t	114	22500	2773002	106	24098	2918566	114	25538	3010799
Marl	t	-	3738693	224314	-	3901296	245294	-	4262682	249339
Ochre	t	1	2719	299	2	5525	608	2	4690	516
Quartz	t	5	37540	4889	12	156248	27785	18	134521	20284
Silica Sand	t	16	1247949	94933	16	1959203	154387	17	844789	72162
Talc/soapstone/steatite	t	1	2316	289	1	2981	426	1	2626	784
Sulphur#	t	-	22436	-	-	65923	-	-	74697	-
Minor Minerals@		-		122203305	-		120647712	-		120647712

Note: The number of mines excludes petroleum (utilised), natural gas and minor minerals.

Recovered as by-product from oil refineries.

@ Figures for earlier years have been repeated as estimated.

STATE REVIEWS

Mineral-based Industry

The important large and medium-scale mineral-based industries in organised sector in the State are given in Table -5.

Table – 5 : Principal Mineral-based Industries in Gujarat

Industry/plant	Capacity ('000 tpy)
Abrasives	
Carborandum Universal Ltd, Okha, Dist. Jamnagar.	NA
Carborandum Universal Ltd, Bhatia, Dist. Jamnagar.	NA
Flexo-Plast Abrasives, Ahmedabad.	NA
Emery (I) Pvt Ltd, Badeshwar, Dist. Jamnagar	7
Asbestos Products	
Gujarat Composite Ltd, Digvijaynagar, Dist. Jamnagar.	98
Ramco Industries Ltd, Singura, Dist. Kachchh.	72
Sanghi Industries Ltd, Sanghipuram, Dist. Kachchh.	36
U.P. Asbestos Ltd, Valsad.	36
Cement	
Ambuja Cements Ltd, Ambuja Nagar, Dist. Junagadh.	4500
Grasim Industries Ltd, Sikka, Dist. Jamnagar.	1075
Gujarat Sidhee Cements, Sidheeagram, Dist. Junagadh.	1200
HMP Cements Ltd, Porbandar, Dist. Junagadh.	198
Sanghi Industries Ltd, Sanghipuram, Dist. Kachchh.	2600
Shree Digvijay Cement Co. Ltd, Digvijaygram, Dist. Jamnagar.	1075
Saurashtra Cements Ltd, Ranavav, Dist. Junagadh.	1164
Tata Chemicals Ltd, Mithapur, Dist. Jamnagar.	440
Ultra Tech Cement Co. Ltd, Pipavav, Dist. Amreli.	5300
Ultra Tech Cement Ltd (Narmada Cement), Jafrabad, Dist. Amreli.	400

(Contd.)

Table - 6 (Contd.)

Industry/plant	Capacity ('000 tpy)
Sunata Ceramics Pvt Ltd, Sabarkantha.	21.6
Suncity Ceramics, Morbi, Rajkot.	12
VAN Ceramics Ltd, Dalpur, Dist. Sabarkantha.	35.3
Varmora Granito Pvt Ltd, Duva, Rajkot.	24.8
Vrundavan Ceramics Ltd, Dhuva, Dist. Rajkot.	71.3
Chemical	
Baroda Rayon Corpn. Ltd, Surat.	26 (yarn) 21.8 (H ₂ SO ₄) 2.2 (sodium sulphate)
Century Chemicals, Nava Nanga, Dist. Jamnagar.	108 (refined salt)
Gujarat Alkalies & Chemicals Ltd, Baroda.	14.9 (caustic soda)
Gujarat Alkalies & Chemicals Ltd, Dahej, Dist. Bharuch.	242.6 (caustic Soda) 151.4 (Cl) 26.7 (phosphoric acid)
Indian Rayon Industries Ltd, Veraval, Dist. 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, Dist. Porbandar.	365 (soda ash) 20.4 (caustic soda) 26.4 (refined bicarbonate)
Shree Sulphurics Pvt. Ltd, Ankleshwar, Dist. Bharuch.	58 (H ₂ SO ₄) 12 (chloro-sulphuric acid)
Tata Chemicals Ltd, Mithapur, Dist. Jamnagar.	875(soda ash)
Copper	
Hindalco Industries Ltd, Birla Copper, Dahej, Dist. Bharuch.	500 (copper cathode) 1670 (H ₂ SO ₄) 400 (DAP) 15 tonnes (Au) 150 tonnes (Ag)
Jhagadia Copper Ltd, Jhagadia, Dist. Bharuch.	50 (electrolytic copper) 20 (copper anodes)
Fertilizer	
GSFC-Vadodara.	367 (urea) 108 (DAP) 196 (AS)

(Contd.)

STATE REVIEWS

Table - 6 (Contd.)

Industry/plant	Capacity ('000 tpy)
GSFC-Sikka, Jamnagar.	177.10 (N ₂) 452.70 (P ₂ O ₅)
GNVFC Ltd, Bharuch.	594 (urea) 142.5 (CAN) 142.5 (ANP)
HIL-Dahej, Dist. Bharuch.	72.00 (N ₂) 184.0 (P ₂ O ₅)
IFFCO Ltd, Kandla, Dist. Kachchh.	1215 (NPK) 1200 (DAP)
IFFCO Ltd, Kalol, Dist. Gandhinagar.	544.5 (urea)
KRIBHCO Ltd, Hazira, Dist. Surat.	1729.2 (urea)
Foundry	
Steelcast Ltd, Ruvapuri Road, Bhavnagar.	NA
Iron & Steel	
Essar Steel Ltd, Hazira, Dist. Surat.	5100 (HBI) 1000 (hot metal) 4600 (HRC) 1400 (CRC)
Ferro Alloys	
Baroda Ferro Alloys Ltd, Panchmahals.	3.5
Essel Mining & Industries Ltd, Vapi, Dist. Valsad.	2.1
Electro Ferro Alloys Ltd, Ahmedabad.	0.3
Sponge Iron	
Electrotherm India Pvt Ltd, Samakhalli, Dist. Kachchh.	75
Gallant Metal Ltd, Samakhialli, Dist. Kachchh	170
Global Hi-Tech Industries Ltd, Bhuj, Dist. Kachchh.	105
Glass	
Alembic Glass Industries Ltd, Baroda.	35.0
Bhagwati Glass Containers Ltd, Kalol.	8.7
Bharat Glass Tube Ltd, Bharuch.	7.2
Gobind Glass & Industries Ltd, Kadi.	NA
Gopal Glass Works Ltd, Budasan, Dist. Mahesana	40.6
Gujarat Borosil Ltd, Govali, Dist. Bharuch.	62.5
Gujarat Glass, Division of Nicholas Piramal, Mangrol.	80.3

(Contd.)

Table - 6 (Concl.)

Industry/plant	Capacity ('000 tpy)
Gujarat Glass, Division of Nicholas Piramal, Jambusar.	84
Gujarat Glass, Division of Nicholas Piramal, Kosamba.	12.8
Haldyn Glass (Gujarat) Ltd, Padra, Vadodara.	43
Prestige Glass Industries Pvt Ltd, Vagra.	11.5
Petroleum Refinery	
IOCL, Koyali.	13700
RPL, Jamnagar	33000
RPL (SEZ), Jamnagar.	27000
Essar Oil Ltd, Vadinar.	10500
Refractory	
Shri Natraj Ceramics & Chemical Industries Ltd, Khambhaliya, Dist. Jamnagar.	28
Meenal Ceramics Pvt. Ltd, Chatral, Dist. 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
Graphite Crucible	
Diamond Crucible Co. Pvt, Mahesana.	NA
S.D. Industries, Ahmedabad.	NA
Ahmedabad Carbon Products, Ahmedabad.	NA
Silicon Carbide Crucibles	
Vesuvius India Ltd, Mahesana.	1