Indian Minerals Yearbook 2013

(Part- I General Reviews)

52nd Edition

MINERAL-BASED INDUSTRIES

(FINAL RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

Indira Bhavan, Civil Lines,
NAGPUR – 440 102

PHONE/FAX NO. +91712 – 2565471,2562216
PBX : +91712 - 2562649, 2560544, 2560648
E-MAIL : cme@ibm.gov.in
Website: www.ibm.gov.in

September, 2015

7 Mineral Based Industries

Minerals are vital raw materials for many basic industries and are major components for growth and industrial development. The management of mineral resources, hence, has to be closely integrated with the overall strategy for development and exploitation of minerals, which must be aimed at long-term national goals. In tune with the Economic Liberalisation Policy adopted in July 1991, the National Mineral Policy which was announced in March 1993 has opened the mineral sector for private entrepreneurs, both domestic and foreign. The changing global scenario necessiated revision in the National Mineral Policy which, subsequently in 2008 was revised with a purpose to overhaul the development of mineral resources in the country.

Capacity and production of important mineral-based products are detailed in Table-1.

FERROUS METALS

India is poised for brownfield expansion of existing steel plants, backward integration of re-rollers, forward integration of DRI or pig iron producers unfolding of a few greenfield projects. The NSP has set up a target of 110 million tonnes of domestic steel production by 2020. The total production of finished steel for sale during 2012-13 stood at 81.68 million tonnes as against 75.69 in the previous year.

In view of the long-term demand projection of steel, the Government adopted a two-pronged strategy for increasing steel production in the country through modernisation and expansion of existing Public Sector steel plants in the country and encouraging creation of new steel capacities in Private Sector.

Pig Iron

Pig iron is the intermediate product of smelting of iron ore with a high-carbon fuel such as coke and charcoal and is the basic raw material in Foundry and Casting Industry for the manufacture of various types of castings required for engineering sector. Pig iron usually has very high carbon content of 3.5% to 4.5%. The main sources of pig iron have traditionally been the integrated steel plants of SAIL besides plants of Tata Steel and Rashtriya Ispat Nigam Ltd. The domestic production of pig iron did not keep pace with the demand. Efforts were, therefore, made to increase pig iron manufacturing facilities in the secondary sector.

As a result of various policy initiatives taken by the Government, Private Sector did show considerable interest in setting up new pig iron units, specially in the post-liberalised period. Of the total 6.87 million tonnes production in 2012-13, the Private Sector accounted for over 90% of the total production for sale of pig iron in the country.

In 2012-13, 6.87 million tonnes pig iron was produced against 5.37 million tonnes in 2011-12. Location and capacity of principal pig iron units in Private Sector are furnished in Table-2. M/s Usha Martin Industries Ltd, M/s Jindal Steel & Power Ltd have integrated mini-blast furnaces (MBF) for manufacture of steel through Electric Arc Furnace (EAF). M/s Hospet Steel (a joint venture of Kalyani and Mukand) and M/s Southern Iron & Steel Co. Ltd had integrated their MBF with energy optimising furnace to produce steel. Besides MBF, M/s JSW Steel Ltd (formerly Jindal Vijaynagar Steel Ltd) had commissioned a Corex Plant (alternate to conventional MBF/BF) along with downstream basic oxygen furnace (BOF) for steel making to supplement production of pig iron. The KIOCL is now in the process of setting up a 100,000 tpy capacity ductile iron spun pipe plant. The Pig iron Industry is confronted with problems of rising production cost due to price escalation of imported metallurgical coke.

Sponge Iron

Commercial production of sponge iron in India commenced in 1980. Sponge Iron India Ltd was first to set up a plant in 1980 at Palwancha of Khammam district in Andhra Pradesh with a capacity of 0.039 million tonnes/year.

In the last few years, combined use of hot metal and sponge iron in electric arc furnace have been in practice for production of liquid steel, consequently production of sponge iron too went up substantially to meet the demands. The installed capacity of sponge iron increased from 1.52 million tonnes per annum in 1990-91 to 37.30 million tonnes per annum in 2012-13. The production also increased from 0.9 million tonnes in 1990-91 to 23.01 million tonnes in 2012-13.

Out of the total 324 Sponge Iron Units, 3 are gas-based Hot Briquetted Iron (HBI) units that accounted for 9.6 million tonnes per annum capacity. The capacity of gas-based sponge iron plant of Essar Steel Ltd, the world's largest sponge iron producer has risen to 6.8 million tpy. The coal-based sponge iron capacity, on the other hand, accounts for about 25.79 million tonnes. Plantwise details as available in respect of principal sponge iron units are furnished in Table-3.

Table – 1 : Capacity and Production of Important Mineral-based Products, 2011-12 and 2012-13

Mineral-based product	Unit of quantity	Annual Installed capacity	Production	
			2011-12	2012-13(P)
Ferrous Metals				
Sponge iron	'000 tonnes	34900	24971	23006
Crude/liquid steel	"	72963	74291	78416
Ferro-alloys				
Ferro-chrome/Charge-chrome	"	1600	943	944
Ferro-manganese	"	2750	517	518
Silico-manganese	"	-	201.07	236.54
Ferro-silicon	"	250	89	90
Noble ferro-alloys	"	50	42	NA
Non-ferrous Metals				
Aluminium	"	1907	1654	1720
Copper #	"	1001.5	504.68	493.52
Lead (primary)	"	185	92.1	118.32
Zinc Ingots	"	917	783.65	704.23
Refractories	"	2015	1415	1283
Cement	million tonnes	356.28	230.6	235
Ceramic(e)				
Ceramic tile	million sq m	2100	450	513
Sanitaryware	'000 tonnes	196	530	583
Crockeryware (Potteryware)	"	343	85	92
Fertilizers				
DAP	lakh tonnes	83.32	39.63	36.47
Complex fertilizers	"	64.33	77.70	61.80
SSP	"	77.13	43.24	44.14
Chemicals				
Aluminium fluoride	'000 tonnes	27	7.3	NA
Sulphuric acid	"	NA	NA	NA
Caustic soda	"	2647	2215	NA
Calcium carbide	"	142.4	66.39	NA
Soda ash	"	2951	2410	NA
Synthetic rutile	"	243	NA	NA
Titanium dioxide pigment	"	75	52	NA
Red phosphorus	"	0.48	0.56	NA
Crude Throughputs in Refineries	"	193390	211424	219211

Figures rounded off.

Sources: 1. *Ministry of Steel Annual Report, 2012-13 and JPC Bulletins.*
2. *Ministry of Commerce & Industry, Department of Industrial Policy & Promotion and Annual Report, 2012-13*
3. *Ministry of Chemicals & Fertilizers, Department of Chemicals & Petrochemicals, Annual Report, 2012-13.*
4. *Basic Statistics on Indian Petroleum & Natural Gas, 2012-13.*
5. *Indian Ferro Alloys Producers' Association (IFAPA), Mumbai.*
6. *Cement Manufacturers, Association.*
7. *Indian Refractory Makers' Association, Kolkata.*
8. *Department of Atomic Energy.*
9. *Information received from individual plants in organised sector.*
\# *Production relates to copper cathodes (figures rounded off).*
MSMP - 2013-14
CSO New Delhi.
(e) Estimates

Table – 2 : Location and Capacity of Principal Pig Iron Units

(In lakh tonnes)

Sl.No.	Unit	Location	Capacity
1.	Lanco Industries Ltd	Chittoor, Andhra Pradesh	2.25
2.	Sathavahana Ispat Ltd	Anantapur, Andhra Pradesh	1.20
3.	Jayaswal NECO Industries Ltd	Raipur, Chhattisgarh	7.50
4.	Sesa Goa Ltd	Bicholim, Goa	1.80
5.	Usha Martin Industries	Jamshedpur, Jharkhand	1.10
6.	JSW Steel Ltd	Bellary, Karnataka	7.20
7.	Kalyani Ferrous Industries Ltd	Koppal, Karnataka	1.20
8.	Kirloskar Ferrous Industries Ltd	Koppal, Karnataka	2.40
9.	KIOCL Ltd	Mangaluru, Karnataka	2.27
10.	Usha Ispat Ltd	Redi, Maharashtra	3.00
11.	JSW Ispat Steel Ltd	Dolvi, Raigad, Maharashtra	20.00
12.	Kalinga Iron Works	Barbil, Keonjhar, Odisha	1.70
13.	Kajaria Iron Castings Ltd	Durgapur, West Bengal	1.10
14.	Electrosteel Castings Ltd	Khardah, West Bengal	1.10
15.	Tata Metaliks Ltd	Kharagpur, West Bengal	0.90
16.	Sona Alloys Pvt. Ltd	Satara, Maharashtra	3.14
17.	Aparant Iron & Steel Pvt. Ltd	Sanguem, Goa	1.55

Source: *Development Commissioner for Iron & Steel, Ministry of Steel, Kolkata, and individual plants.*

Table – 3 : Capacities of Principal Sponge Iron (DRI) Plants

(In lakh tonnes)

Unit	Location	Capacity
Gas-based		
Essar Steel Ltd	Hazira, Gujarat	68.00
Welspun Maxsteel Ltd (formerly Vikram Ispat)	Salav, Raigad, Maharashtra	9.00
JSW Steel (formerly Ispat Industries Ltd)	Geetapuram, Dolvi, Raigad, Maharashtra	16.00
Coal-based		
Action Ispat & Power Pvt. Ltd	Marakuta & Pandaripathar, Jharsuguda, Odisha	2.50
Adhunik Metaliks Ltd	Chandrihariharpur, Sundargarh, Odisha	1.80
Alliance Integrated Metallics Ltd	Bemta, Raipur, Chhattisgarh	5.00
Anjani Steel Ltd	Ujalpur, Raigarh, Chhattisgarh	1.02
API Ispat Powertech Pvt. Ltd	IGC Siltara, Raipur, Chhattisgarh	1.05
Beekay Steel & Power Ltd	Uliburu, Barbil, Odisha	1.05
Bhushan Steel & Strips Ltd	Meramandali, Dhenkanal, Odisha	2.80
Bihar Sponge Iron Ltd	Chandil, Singhbhum, Jharkhand	2.10
Crest Steel & Power Pvt. Ltd	IGC Borai, Durg, Chhattisgarh	1.15
Deepak Steel & Power Ltd	Topadihi, Keonjhar, Odisha	1.44
Gallant Metal Ltd	Samakhilai, Kachchh, Gujarat	1.70
Global Hi-tech Industries Ltd	Gandhidham, Gujarat	1.05
Goa Sponge Iron & Power Ltd	Santona, Sanguem, Goa	1.00
Godawari Power & Ispat Ltd	IGC Siltara, Raipur, Chhattisgarh	4.95
Goldstar Steel & Alloys Ltd	Srirampuram, Vizianagaram, Andhra Pradesh	2.20

(Contd.)

Table - 3 (Concld.)

Unit	Location	Capacity
Ind Synergy Ltd	Kotmar, Raigarh, Chhattisgarh	3.00
Jai Balaji Sponge Ltd	Baktarnagar, Raniganj, West Bengal	1.05
Jai Shri Balaji Steel Pvt. Ltd (HEG Ltd)	Borai, Durg, Chhattisgarh	1.20
Jayaswal NECO Industries Ltd	IGC Siltara, Raipur, Chhattisgarh	2.55
Janki Corporation Ltd	Sidiginamola, Bellary, Karnataka	1.80
Jindal Steel & Power Ltd	Kharsia Road, Raigarh, Chhattisgarh	13.70
Lloyds Metals & Engineering Ltd	Ghuggus, Chandrapur, Maharashtra	2.70
Mastek Steels Pvt. Ltd	Holakundi, Ballari, Karnataka	1.05
MGM Steels Ltd	Chintapokhri, Dhenkanal, Odisha	1.00
Monnet Ispat Energy Ltd	Chandkhuri Marg, Hasaud, Raipur, Chhattisgarh	3.00
Monnet Ispat & Energy Ltd	Naharpalli, Raigarh, Chhattisgarh	5.00
MSP Steel & Power Ltd	Jamgaon, Raigarh, Chhattisgarh	1.92
Nalwa Steel & Power Ltd	Taraimal, Raipur, Chhattisgarh	1.98
Nova Iron & Steel Ltd	Dagori, Bilaspur, Chhattisgarh	1.50
OCL Iron & Steel Ltd	Lamloi, Sundargarh, Odisha	1.20
Orissa Sponge Iron Ltd	Palaspanga, Keonjhar, Odisha	2.50
Prakash Industries Ltd	Champa, Janjgir Champa, Chhattisgarh	4.50
Rungta Mines Ltd	Karakola and Kamando, Sundergarh, Odisha	3.30
Sarda Energy & Minerals Ltd	IGC Siltara, Raipur, Chhattisgarh	2.10
Scaw Industries Pvt. Ltd	Gundichapara, Dhenkanal, Odisha	1.00
Shivshakti Steel Ltd	Chakradharpur, Raigarh, Chhattisgarh	1.00
Shri Bajrang Power & Ispat Ltd	Urla, Raipur, Chhattisgarh	2.10
Shri Hare Krishna Sponge Iron Ltd	Siltara, Raipur, Chhattisgarh	2.10
Shraddha Ispat Pvt. Ltd	Santona, Sanguem, Goa	0.60
Shyam Sel Ltd	Dewabdighi, Burdwan, West Bengal	1.00
Singhal Enterprises Pvt. Ltd	Taraimal, Bilaspur, Chhattisgarh	1.56
Sree Metaliks Ltd	Loidapada, Keonjhar, Odisha	1.74
S.K.S. Ispat & Power Ltd	Raipur, Chhattisgarh	2.70
Sunflag Iron & Steel Co Ltd	Bhandara, Maharashtra	1.50
Sunil Ispat & Power Ltd	IGC Siltara, Raipur, Chhattisgarh	1.15
Sunil Sponge Iron Ltd	Chiraipani, Raigarh, Chhattisgarh	1.05
Tata Sponge Iron (Ipitata Sponge)	Joda, Keonjhar, Odisha	3.90
Topworth Steel Pvt. Ltd	IGC Borai, Durg, Chhattisgarh	0.60
Vandana Global Ltd	IGC Siltara, Raipur, Chhattisgarh	2.16
Vallabh Steels Ltd	Sahnewal, Ludhiana, Punjab	1.20
Visa Steels Ltd	KIC, Jajpur Road, Odisha	3.00
Zoom Vallabh Steels Ltd	Dughda, Saraikela-Kharswan, Jharkhand	1.20

I.G.C.: Industrial Growth Centre.

Source: *Sponge Iron Manufacturers' Association (SIMA) and individual plants.*

Finished Steel/Saleable Steel

Some significant facts on Indian Steel Industry are as follows:

1. The National Steel Policy (NSP) was announced in 2005. The NSP set a target of 110 million tonnes of domestic steel production by 2019-20. The Working Group on Steel for the 12th plan has projected that crude steel capacity in the country would touch 140 million tonnes by 2016-17. NSP 2005 is presently under review and Ministry of Steel has constituted a Committee in May 2012 to review the existing National Steel Policy, with a view to engender policy-framework for the rapidly developing domestic Steel Industry and in furtherance achieve the desired stability in the growth of Indian economy.
2. The total estimated volume of exports of finished steel increased to 4.04 million tonnes from 3.64 million tonnes and the imports increased to 6.83 million tonnes from 6.66 million tonnes.

The finished steel production for sale has grown from a mere 1.1 million tonnes in 1951 to 81.68 million tonnes in 2012-13. The growth in the Steel Sector in the initial decades since Independence was mainly in the Public Sector units set up during this period. The situation changed dramatically during the period from 1990 to 2000 with the Private Sector being the driving force in the growth story. Details about capacity and production of crude steel by main producers are furnished in Table-4.

Steel Companies Under Public Sector

Steel Authority of India Ltd (SAIL)

SAIL, a Public Sector Company, operates five integrated steel plants at Bhilai in Chhattisgarh, Bokaro in Jharkhand, Durgapur & Burnpur in West Bengal and Rourkela in Odisha. SAIL plants recorded crude steel production during the year 2012-13 of 13.35 million tonnes and13.41 million tonnes during the year 2011-12.

SAIL's plan to set up a 3 million tonnes/year capacity steel plant in Mongolia & Indonesia is aimed to spreading its imprints beyond the country.

The expansion and modernisation programme of SAIL is underway in all its steel plants to enhance the hot metal production capacity. The proposed production built-up is envisaged to go up to 26.18 million tonnes in a phased manner for hot metal and 21.4 million tonnes for crude steel and 20.2 million tonnes for saleable steel.

Rashtriya Ispat Nigam Ltd (RINL)

Rashtriya Ispat Nigam Ltd (Visakhapatanam Steel Plant), a Public Sector Company, has the first shore-based integrated steel plant which was commissioned in 1992 at Visakhapatanam, Andhra Pradesh. The installed capacity for the production of liquid steel and saleable steel was over 3 million tonnes each. The expansion of RINL for enhancing liquid steel capacity to 6.3 million tonnes has been completed.

Neelachal Ispat Nigam Ltd (NINL)

NINL, a joint venture company promoted by MMTC and Government of Odisha is the largest exporter of saleable pig iron in the country and is the leading supplier of LAM coke to most of SAIL's plants. It has set up 1.1 million tpy integrated steel plant at Kalinganagar, Duburi, Jajpur district, Odisha. The first phase that was commissioned in the recent past, presently produces pig iron through BF route with 1.1 million tpy hot metal capacity. Other operating facilities include a coke oven battery (0.81 million tpy), a sinter plant (1.71 million tpy), slag granulation plant (0.3 million tpy), a gas-based captive power plant with total 62.5 MW capacity and an ammonium sulphate plant (12,750 tpy). Expansion and addition of facilities in Phase-2, presently under implementation, comprise pig iron for sale (153 thousand tpy), a BOF & a ladle furnace of 110 t capacity each, continuous billet caster and a bar & rod mill. The production capacity after Phase-2 is expected to be: pig iron for sale (153 thousand tpy), wire rods (0.3 million tpy), billets for sale (175 thousand tpy) and straight, rounds & square bars (0.4 million tpy). NINL, in addition, & own a captive iron ore mine which is under development with a 2.5 million tpy raw material handling system (RMHS).

Steel Companies Under Private Sector

The Private Sector continued to play a dominant role in the production of steel and have been pivotal in the growth of Steel Industry in the country. The performance of major Private Sector producers is summarised below:

The Private Sector units consist of both major steel producers on one hand and relatively smaller & medium scale units such as sponge iron plants, mini-blast furnace units, electric arc furnaces, induction furnaces, re-rolling mills, cold rolling mills and coating units on the other. They not only play an important role in production of primary and secondary steel, but also contribute substantial value addition in terms of quality, innovation and cost-effectiveness.

Table – 4 : Installed Capacity and Production of Crude Steel (By Principal Producers)

(In '000 tonnes)

Producer	Annual Installed capacity (Crude/liquid steel)	Production 2011-12	2012-13(P)
Total Production	**-**	**74291**	**78416**
SAIL			
Bhilai Steel Plant, Bhilai, Dist. Durg, Chhattisgarh	3925	4901	5008
Rourkela Steel Plant, Rourkela, Dist. Sundargarh, Odisha	1900	2170	2209
Durgapur Steel Plant, Durgapur, Dist. Burdwan, West Bengal	1802	1914	2034
Bokaro Steel Plant, Bokaro, Dist. Bokaro, Jharkhand	4360	3647	3757
IISCO Steel Plant, Burnpur, Dist. Burdwan, West Bengal	500	330	135
Alloy Steel Plant; Durgapur Dist. Burdwan, West Bengal	264	200	131
Salem Steel Plant, Salem, Dist. Salem, Tamil Nadu	320	96	73
Visvesvaraya Iron & Steel Plant, Bhadravati, Dist. Shimoga, Karnataka	118	91	64
Total : SAIL	**13019**	**13349**	**13411**
RINL			
Visakhapatnam Steel Project, Dist. Visakhapatnam, Andhra Pradesh	2900	3128	3071
Total : Public Sector	**15929**	**16477**	**16482**
Private			
Tata Steel Ltd, Jamshedpur, Dist. Singhbhum, Jharkhand	9700	7128	8130
JSW Steel Ltd, Vijayanagar, Karnataka	6800	7442	8518
JSW Ispat Steel Ltd, Dolvi, Maharashtra	3000	2466	2711
ESSAR Steel Ltd, Hazira, Gujarat	4600	4348	4163
JSPL, Raigarh, Chhattisgarh	3000	2759	3031
Other Producers **(estimated)**	-	**24143**	**26553**

Figures rounded off.

Source: *Annual Report, of Ministry of Steel, 2012-13 and individual producers.*

Tata Steel Ltd (formerly TISCO)

The Company has been rechristened as Tata Steel Ltd (TSL). Tata Steel is the world's 7th largest steel maker and has completed its centenary on 10th December 2011 of its Jamshedpur Steel plant.

Tata Steel has an integrated steel plant having an annual crude steel production capacity of 9.7 million tonnes.

The Company has also embarked upon setting up various greenfield projects too. The project at Kalinganagar in Odisha envisages setting up of a 12.5 million tpy capacity integrated steel plant in two phases of 3 million tpy each. MoUs have been signed with the Government of Chhattisgarh for setting up of a 7.0 million tpy capacity steel plant at Jagdalpur in Bastar region of Chhattisgarh in 2 phases and with Government of Jharkhand for a 12 million tpy steel plant in 2 phases of 6 million tpy each in Manoharpur- Saraikela area to be set up in 2 phases with 6 million tpy each. The plants are to be set up subject to raw material linkages and receipt of all approvals.

JSW Steel Ltd

Erstwhile Jindal Vijayanagar Steel Ltd (JVSL) has conceived a technologically modern and efficient integrated steel plant. The plant adopts a process route consisting broadly of iron ore beneficiation-pelletisation-sintering-coke making iron making through BF as well as Corex process, which entails steel making through BOF-continuous casting of slabs- hot strip rolling-cold rolling mills. JSW Steel Ltd has an installed crude steel capacity of 6.8 million tpy, and is in the process of expanding its capacity to 9.6 million tonnes per year with value-added products that would constitute 1.8 million tpy spread across at its four locations i.e., Toranagallu (Vijayanagar Works), Salem (Salem Works), Vasind and Tarapur (downstream units). Vijayanagar works has integrated operations from beneficiation plant to 0.9 million tpy Cold Rolling Mill Complex. The slabs and HR coil produced at Vijayanagar works are further processed in downstream units at Vasind and Tarapur into value-added products, such as, cold rolling (1.0 million tpy), hot dip galvanising (HDG) (0.9 million tpy), colour coating (0.1 million tpy), CRCA products (0.1 million tpy) and hot rolled plates (0.3 million tpy). The Salem works has an integrated manufacturing facility with an overall crude steel capacity of 1 million tpy and comprises of sinter plant, blast furnace, EOF, billet caster, bloom caster and rolling with associated facilities such as, coke oven, power plant, oxygen plant, etc. Vijayanagar Works', from its existing operations also produces flat steel products, Salem Works' has its focus is only on long products and the downstream units produce CR/galvanised, colour coated, value-added flat products.

Two subsidiaries of the company M/s JSW Bengal Steel Ltd and M/s JSW Jharkhand Steel Ltd have been incorporated for setting up of greenfield steel plants with 10 million tpy capacity each in West Bengal and Jharkhand. The Company is in possession of the required land in West Bengal while in Jharkhand, it has obtained a mining lease for iron ore and approval of mining plan. JSW Steel offers an entire gamut of steel products and it is widely acclaimed as one of the low cost steel producers in the world. By 2020, the Company aims to produce 34 million tonnes of steel annually.

SISCOL, after its merger with JSW Group of Companies has been producing hot metal and pig iron (foundry and basic grades) through mini blast furnace. For steel making, the Company has installed an energy optimising furnace (EOF) and a ladle furnace of 30 t capacity each, besides a continuous casting machine to cast billets/ blooms. Additionally, the Company also has a bar & rod mill of 3,00,000 tpy capacity and a captive power plant of 7.7 MW. There is also a 425 tpd sinter plant to feed the blast furnace. The Company plans to enhance the capacity of the plant located near Mettur, Tamil Nadu, from the existing 0.3 million tpy to two million tpy after assessing the availability of iron ore. The Company also intends to set up a one million tpy slag grinding unit.

Jindal Steel & Power Ltd (JSPL), Raigarh

The Company has a sponge iron plant at Raigarh, Chhattisgarh with a capacity of 1.37 million tpy along with a 3 million tpy steel melting shop in addition to 2.5 lakh tpy capacity sinter plant, 8 lakh tpy coke oven plant and 12.5 lakh tpy blast furnace. This is the world's largest coal-based sponge iron facility. The crude steel capacity of JSPL is 3 million tpy with proposed expansion of capacity to 6 million tonnes at Raigarh, Chhattisgarh. A new steel shop (SMS-II) has been set up comprising two EAFs, a continous caster, a billet caster, etc. Capacity expansion to 7 million tpy is underway at Raigarh plant which includes 6 million tpy gas-based DRI plant (based on coal gasification), 4000 cu m blast furnace, 3 million tpy steel melting shop with EF route and 4 million tpy through BOF route along with 4 million tpy hot metal. Besides, thin slab caster, hot strip mill, cement plant (to consume BF slag) and additional 540 MW power plant are also planned. As a part of expansion, JSPL is also setting up a 6 million tonnes integrated steel plant at Angul in Odisha and 6 million tonnes integrated steel plant at Patratu in Jharkhand. It is proposed to implement these projects in phases. In addition JSPL is in the process of setting up a 10 million tpy pellet plant at Barbil, Odisha that would utilise the huge iron ore fines lying with various iron ore mines.

Jindal Stainless Ltd

The Company has a fully integrated stainless steel plant at Hisar in Haryana with a capacity of 8,00,000 tpy. The ferro-alloys plant of the Company is located at Jindalnagar, Kothavasala in district Vizianagaram, Andhra Pradesh. The plant has 40,000 tpy high carbon ferro-chrome capacity and caters to domestic markets and to other countries. The Company is also setting up a greenfield integrated stainless steel plant at Kalinganagar in Jajpur district, Odisha for production of ferro-alloys and stainless steel. The project will comprise 1.6 million tpy fully integrated stainless steel plant, a 500 MW captive power plant and a coke oven battery . The production from ferro-chrome furnace has been stabilised.

JSW Steels Ltd is the largest steel manufacturer in the Private Sector in terms of installed capacity and is one of the low cost steel producers in the world. By 2020, the Company aims to produce 34 million tonnes of steel annually with greenfield integrated steel plants being established in West Bengal and Jharkhand.

Essar Steel Limited (ESL)

The Company has a 6.8 million tpy gas-based sponge iron plant at Hazira, Gujarat. The state-of-the-art hot-rolled coil (HRC) steel plant has a capacity of 10 million tpy. The complex also houses a cold-rolled coil plant of 1.4 million tpy capacity. The Company has cold rolling plant of 0.6 million tonnes per annum capacity and 0.5 million tonnes per annum galvanising plant at Pune. It is the largest fully integrated manufacturer of high quality flat steel products in western India. The Company enjoys an edge with respect to its port-based location, which helps in bringing in raw materials and rendering better service to domestic and export customers. The Company has a captive port capable of handling up to 8 million tpy cargo with modern handling equipment like barges and floating cranes. The combined annual cargo handling capacity of all terminals would be 150 million tonnes. The Company has embarked upon procurement of DRI plant equipment, EAF with accessories, corex plant equipment, etc. from global suppliers with a view to expand present capacity. The Company has proposed greenfield project capacity of 6 million tonnes, 3.2 million tonnes and 6 million tonnes in the states of Odisha, Chhattisgarh and Jharkhand, respectively. The construction of 12 million tonnes per annum pellet plant at Paradip, Odisha is presently underway and the 6 million tonnes per year plant has become operational in April 2012. Post commissioning, the Company will have a total pelletisation capacity of 20 million tonnes per annum as it already has 8 million tonnes per annum pellet plant at Vizag in Andhra Pradesh. The Company has 8 million tonnes per annum iron ore beneficiation plant at Bailadila in Chhattisgarh, which supplies iron ore slurry through pipe line (267 km) to its pellet plant at Visakhapatnam (8 million tonnes per annum) which in turn supplies pellets to steel plant at Hazira. The Company also has 12 million tonnes per annum iron ore beneficiation plant at Dabuna in Joda-Barbil area in Odisha.

JSW Ispat Steel Ltd (formerly Ispat Industries Ltd)

JSW Ispat Steel Ltd with its associated Companies has set up one of the largest integrated steel plants in the Private Sector in India at Dolvi, Raigad district in Maharashtra, having a capacity to produce 3 million tpy of hot-rolled coils (HRC). It also has sponge iron and pig iron plant of 1.6 million tpy and 2 million tpy capacity, respectively, in the Dolvi Complex. The Company had recently commissioned 2.24 million tpy capacity sintering plant at Dolvi complex. The Company has a total installed capacity of 14.3 million tpy. The integrated steel plant is based on the electric arc furnace route to produce steel by using modern Twin Shell Electric Arc Furnace and CONARC process. The Company has combined the use of hot metal and DRI (sponge iron) in the electric arc furnace for production of liquid steel for the first time in India. For downstream casting and rolling of the liquid steel, it has incorporated state-of-the-art compact strip production (CSP) process installed for the first time in India. The process yields high quality and specifically very thin grades of HRC.

Bhushan Power & Steel Ltd (BPSL)

Bhushan Power & Steel Ltd, is a fully integrated 3.5 million tonnes per annum steel making Company with state-of-the-art plants at Chandigarh, Derabassi in Punjab, Kolkata and in the state of Odisha in the country. Its first integrated Steel Plant in Sambalpur district of Odisha is in operation with a total capacity of 0.68 million tpy DRI kilns; 0.70 million tpy blast furnace; 0.45 million tpy coke oven plant; 1 million tpy sinter plant; 1.2 million tpy steel making facility and 0.9 million tpy HR mill. The Company has further plans to add sponge iron capacity of 1.02 million tpy and one million tpy of hot metal production. The Company also operates a 38 MW power plant and a coal washery.

The current configuration of Integrated Steel Plant at Odisha is to manufacture 2.30 million tpy steel through Blast Furnaces of 1008 m^3 of 0.70 million tpy, with sinter plant of 1.00 million tpy DRI Sponge kilns of 1.40 million tpy, one coke oven plant of 0.45 million tpy, CSP plant (HR Mill) of 1.70 million tpy, wire Rod & Bar Mill of 0.45 million tpy and Billet caster. Presently, the Company is into manufacturing of Sponge iron, billets, pig iron, HR Coils and CR coils/sheets at its plant in Odisha.

Bhushan Steel Ltd

The Company, earlier known as Bhushan Steel and Strips Ltd, is engaged in steel making and processing and allied activities. Currently, the Company is in the process of implementing an integrated steel plant with 3 million tpy capacity and is expected to further enhance the steel capacity to 6 million tpy. The Company is a source for vivid variety of products like cold-rolled steel, galvanised coil & sheets, colour-coated coils, Galume sheets & coils (Al-Zn coated first time in India), billets, sponge iron, wire rod, etc. The Company has three manufacturing units each at Sahibabad in Ghaziabad district of Uttar Pradesh, Meramandali in Dhenkanal district, Odisha and at Khopoli in Raigad district of Maharashtra.

Monnet Ispat & Energy Ltd (MIEL)

The Company operates a plant at Raipur in Chhattisgarh with 1.0 million tpy of finished steel and at Raigarh with 1.0 million tpy of sponge iron. The Company is in the process of expanding its Raigarh Steel Complex to 3 million tpy. The entire facility will be integrated with primary steel manufacturing of one million tpy each of hot metal and DRI. It is setting up a 1.5 million tpy greenfield plant with a combination of plates, wire rods and also for catering to the high end construction sector. It has also plans to set up greenfield projects, viz, a 2 million tpy fully integrated steel plant in Angul, Odisha, where the work for Phase I is already under progress, and another one million tpy steel plant in Bokaro, Jharkhand. These plants will enhance the capacity to 5 million tpy.

Performance of the EAF/IF Industry is summarised below:

Electric Arc Furnace Industry (Mini Steel Plants)

Electric arc furnace industry (mini steel plants) has been playing an important role in overall production of steel in the country. There were 47 working units with 25.76 million tpy capacity and the production reported at 19.38 million tonnes during 2012-13 is marginally higher as compared to 19.13 million tonnes reported during the previous year.

Induction Furnace

During 2012-13 about 1321 units with an installed capacity of 33.95 million tpy which produced about 25.69 million tonnes of steel have been reported.

Modernisation and Other Capital Schemes

The Board of SAIL has accorded in principle approval to a proposal for modernisation and capacity expansion of Bhilai Steel Plant to 7.5 million tonnes of hot metal and 7 million tonnes of crude steel per annum. Other proposed expansions of hot metal capacities include Bokaro - 7.44 million tpy; Rourkela - 4.50 million tpy; Durgapur -3.50 million tpy; IISCO plant - 2.91 million tpy; and VISL - 0.33 million tpy.

New Steel Projects

The National Steel Policy announced in November 2005 contained within it a basic blue print for growth of a self-reliant and globally competitive Steel Sector that in the long term would ensure establishment of a modern and efficient Steel Industry of world standards and that which would, cater to diversified steel demand. In conformance with the National Steel Policy several new projects have been commissioned. Pohang Steel Company (POSCO) have been granted clearance for setting up 12 million tpy capacity steel plant in Odisha. The final clearance and approval from the Environment Ministry was accorded in 2011 to the Government of Odisha to allocate 1,253 ha (3100 acres) of forest to POSCO for its plant, with a condition to regenerate an equal area of forest in an area decided by Government of Odisha. Conditions were also laid for acquiring lands on payment basis and for ensuring that the project would not be detrimental to ecology & local livelihood. Other new steel plants for which MoUs have been signed, include Plants of Tata Steel at Kalinganagar, Odisha (6 million tpy); Bastar, Chhattisgarh (5 million tpy) Manoharpur/Saraikela, Jharkhand (12 million tpy) and plants of Jindal Steel & Power Ltd in Odisha (6 million tpy) & Jharkhand (5 million tpy). Similarly, Bhushan Steel is reported to be setting up a 2 million tpy plant in West Bengal with a likely expansion to 5 million tpy in the next five years along with a 500 thousand tpy cold rolling mill and galvanising unit for production of autograde steel. JSW Bengal Steel is in the process of setting up a 3 million tpy steel project in West Bengal. Arcelor Mittal has tentatively selected 3 sites for its L40,000 crore mega steel project in Jharkhand and a similar project in Odisha. Visa Steel Ltd (VSL) that operates 0.5 million tpy special steel long product plant, and 400,000 tpy coke oven plant at Kalinganagar, Jajpur district, Odisha, has expansion plans which include 180,000 tpy ferro-chrome plant, a 3 lakh tpy coal-based sponge iron plant using Lurgi technology and an integrated 0.5 million tpy special and stainless steel plant and 425,000 tpy iron plant at Kalinganagar, Jajpur district, Odisha. The Company also has chrome ore beneficiation plant and chrome ore grinding plant of one lakh tpy capacity, each. Visa Steel has signed an MoU with the Govt. of Chhattisgarh for setting up a 2.5 million tonnes integrated carbon steel plant at Kotarlia in Raigarh district. Land acquisition process was underway.

With the setting up of these new steel plants, contribution of Private Sector units is bound to gradually increase and this trend is expected to continue in the forthcoming years as well.

National Mineral Development Corp. Ltd (NMDC)

NMDC Ltd is a 'Navratna' Public Sector Company under the Ministry of Steel, Govt. of India. Infrastructural works related to NMDC's Iron & Steel Plant (NISP) near Nagarnar, Jagdalpur, Bastar district, Chhattisgarh are in progress. The 3 million tonnes integrated steel plant will be backed by development of iron ore deposits in the same state. NMDC has for consideration the techno-economic feasibility of setting up a two million tpy steel plant in Karnataka, through a joint venture with Russia's Severstal. NMDC is in the process of expanding its business through forward integration in both Greenfield and Brownfield projects by setting up (a) 2.0 million tpy pellet plant at Nagarnar in Chhattisgarh, (b) 1.2 million tpy pellet plant at Donimalai in Karnataka, (c) 0.36 million tpy BHJ ore beneficiation plant at Donimalai, Karnataka. NMDC is also in a process of securing mining leases for iron ore in the states of Jharkhand and Karnataka and is looking forward for leases/acquiring properties in foreign countries.

KIOCL Ltd

KIOCL Ltd (formerly Kudremukh Iron Ore Company Limited) was renamed with effect from 22.1.2009. In addition to its present 2.275 lakh tpy pig iron plant with 350 cubic meter, BF capacity at Panambur, New Mangalore port and the Ductile Iron Spun Pipe (DISP) project of 1,00,000 tpy capacity, the Company was also in the process of selecting a joint venture partner for an integrated steel plant to be set up in Karnataka. The pellet plant operated at Mangaluru has 3.5 million tonnes capacity and undertakes exports of iron ore pellets to China besides supplying to domestic units, such as, JSW Ispat Steel Ltd, SAIL and Rashtriya Ispat Nigam Ltd. Though the mining was stopped at Kudremukh w.e.f. 31.12.2005, the pellet plant is still operational with hematite iron ore being purchased from NMDC. The Company also has plans to create permanent railway siding facility at Mangaluru. The Company has MoU with Kerala State Industrial Development Corporation (KSIDL) for setting up of iron ore mining, beneficiation and pelletisation plant in Kerala.

FERRO-ALLOYS

The Indian Ferro-alloy Industry was established during the second Five-year plan as an ancillary Industry to cater to the growing needs of the domestic Steel Industry. As a de-oxidant and alloying agent, Ferro-alloys are in demand for crude steel & alloy steel production.

Bulk ferro-alloys of high carbon category were produced by large-scale industries. The noble ferro-alloys are of low carbon category and include ferro-vanadium, ferro-tungsten, ferro-niobium, ferro-molybdenum and ferro-titanium. There are also a number of units under the small-scale sector for the manufacture of ferro-alloys, particularly ferro-silicon, ferro-chrome and ferro-manganese.

There were about 156 units (including three 100% export-oriented units) having an estimated annual installed capacity of over 5.15 million tonnes, against which the production in 2012-13 was about 3 million tonnes. The Industry has already surplus capacity against the domestic demand. About 25% to 30% production is usually exported. India is an established regular exporter of silico-manganese and high-carbon ferro-chrome. The capacity of ferro-alloys is furnished in Table- 5. The details about ferro-alloys are discussed in the Review on Ferro-alloys in Vol.II of this publication (IMYB).

Table – 5 : Capacity of Ferro-alloys Industry

(In tonnes per annum)

Ferro-alloys	Units (No.)	Installed capacity
Total	**156**	**5150000**
Bulk Ferro-alloys : Total	**119**	**5100000**
Manganese alloys	64	3160000
Chrome alloys	26	1690000
Ferro-silicon	29	250000
Noble Ferro-alloys : Total	**37(e)**	**50000(e)**

Source: *Indian Ferro-alloys Producers' Association (IFAPA), Mumbai.*

Bulk Ferro-alloys

Ferro-manganese and Silico-manganese

Ferro-manganese is the most important ferro-alloy used in the Steel Industry. The country's total installed capacity for ferro- manganese is of 41.60 lakh tonnes.

MOIL has constructed a plant for direct utilisation of manganese ore fines to produce ferro-manganese. The plant having 10,000 tpy capacity is located near Balaghat manganese mines in Madhya Pradesh. The Company has signed a Memorandum of Understanding (MoU) for an agglomeration plant to utilise high grade (49% Mn) fines at Balaghat mines on a joint venture basis.

Chandrapur Alloys Ltd (formerly Maharashtra Electrosmelt Ltd), a subsidiary of SAIL (w.e.f 12.7.2011), situated in Chandrapur, Maharashtra, is a major producer of ferro-manganese and silico-manganese and other ferro-alloys for captive use in SAIL's plants across in the country. The latest technological development and the state-of-the-art "layer casting technology for casting molten ferro-alloys and ferro-alloys processing unit (Crusher)," the first of its kind in India, have been put into operation at this facility.

Ferro-chrome and Charge-chrome

The total combined capacity of ferro-chrome and charge-chrome is around 16 lakh tpy. Stainless and Alloy-steel Industry is the chief consumer of ferro-chrome.

The charge-chrome plants of Tata Steel, FACOR and Indian Charge-chrome Ltd have a total charge-chrome capacity of 1,82,500 tpy. All the three plants are 100% export- oriented units. FACOR is planning to set up a 5,00,000 tpy stainless steel plant to further integrate the present ferro-chrome production. Plantwise capacity of charge-chrome is provided in Table-6.

VISA steel has entered into a joint venture with Baosteel Resources Co. Ltd, and have formed the Company, VISA BAO Ltd, that proposes to set up a 1,00,000 tpy ferro-chrome plant in Odisha in which VISA Steel holding 65% stake.

Table – 6 : Capacity of Charge-Chrome Plants

Plant	Location	Installed Capacity (tpy)
Ferro-Alloys Corp. Ltd	Randia, Distt. Bhadrak, Odisha.	65,000
Tata Steel Ltd	Bamnipal, Distt. Keonjhar, Odisha.	55,000
Indian Charge Chrome Ltd	Choudwar, Distt. Cuttack, Odisha.	62,500
Total		**1,82,500**

Noble Ferro-alloys

Noble Ferro-alloys are one of the vital inputs required for producing special types of steel & alloy. The total capacity of noble ferro-alloys, was 50,000 tpy ferro-molybdenum, ferro-vanadium, ferro-tungsten, ferro-titanium, ferro-silico magnesium, ferro-aluminium, ferro-boron, etc. Mishra Dhatu Nigam (A Govt. of India Undertaking), with a capacity of 2,729 tpy produced different types of super-alloy, chiefly cobalt, molybdenum, titanium and tungsten-based super-alloys and products.

Electrolytic Manganese Dioxide (EMD)

EMD is consumed along with natural manganese dioxide for the manufacture of dry battery cells. There are two units, one owned by MOIL in Bhandara district of Maharashtra, having a capacity of 1,000 tpy and the other by the then Union Carbide Ltd (now Eveready Ltd) at Thane, Maharashtra, having a capacity of 2,500 tpy. MOIL has undertaken capacity expansion of the existing EMD plant to 1,500 tpy in view of the good demand for EMD in the domestic market. The plant of MOIL at Dongri Burug had produced 786 tonnes EMD in 2012-13. The Company has plans to set up 10,000 tpy capacity electrolyte manganese metal (EMM) plant and 5,000 tpy capacity potassium permanganate plant to engender diversification and production of value-added products.

NON-FERROUS METALS

Aluminium

There were five Companies with a total installed capacity of 1.91 million tpy in operation. NALCO, the only Public Sector Company in aluminium & alumina segment has an installed capacity of 4,60,000 tpy at Angul. NALCO has signed an MoU with Odisha Industrial Infrastructure Development Corporation (IDCO) for setting up of an aluminium park at Angul as Joint Venture. The new Joint Venture Company is named "Angul Aluminium Park Ltd" and has plans in place to set up an aluminium downstream & ancillary complex over an area of 200 acres. BALCO has an installed capacity of 3.45 lakh tpy at Korba. Three Companies with four plants in the Private Sector have a total capacity of 14.47 lakh tpy in operation. One unit at Korba of BALCO and the plant of MALCO have suspended operations and thereby accounted for a total of 1.40 lakh tpy of non-operational capacity.

The production of aluminium in 2012-13 was 17.20 lakh tonnes. The installed capacity and production of aluminium in 2011-12 and 2012-13 is enumerated in Table-7. The projected aluminium production at the end of 12th Plan Period is estimated to be 4.7 million tonnes.

Table – 7 : Capacity and Production of Aluminium, 2011-12 and 2012-13

(In '000 tonnes)

Producer	Annual Capacity	Production	
		2011-12	2012-13(P)
Total	**1907**	**1655**	**1720**
Public Sector			
National Aluminium Co. Ltd (Angul)	460	413	403
Private Sector			
Bharat Aluminium Co. Ltd	345*	247	248
Hindalco Industries Ltd	562	574	542
Madras Aluminium Co. Ltd	40#	-	-
Vedanta Aluminium Ltd (Jharsuguda)	500	421	527

Figures rounded off.
Source: *Information received from individual plants/ Annual reports*
**Korba Plant-1 (BALCO) capacity of 100 thousand tonnes per year is non-operational.*
 # Plant is lying closed.

Among the Private Sector Companies, Larsen & Toubro Ltd has plans to increase smelting capacity of their proposed aluminium plant in Odisha from 0.22 million tonnes per annum to 0.44 million tonnes per annum. L & T has formed a joint venture with Dubai Aluminium for its project.

Alumina

The production of alumina was 36.10 lakh tonnes in 2012-13. NALCO, accredited as one of the largest producers of alumina in Asia, has expanded its alumina refinery capacity to 1.575 million tpy. With further addition of capacity undertaken in the second phase by another 5,25,000 tonnes, the total capacity now stands at 2.1 million tpy. By 2014-15, after the 3rd phase of expansion, the total capacity is expected to touch 2.975 million tonnes. The details of alumina producers in the country, their capacities and production are provided in Table-8.

GMDC has plans to set up a 0.75 million tpy alumina plant and a company, namely, Gujarat Alumina & Bauxite Ltd has been formed. The viability report of the project has been prepared and formalities for acquiring land were in progress.The Company has a 50,000 tpy bauxite calcination plant located at Village Gadhshisha in Gujarat.

Hindalco's Renukoot Integrated Smelter uses alumina produced in their plant for producing aluminium. The production of alumina by the end of 12th plan period is projected at 13.3 million tonnes.

Table – 8 : Capacity and Production of Alumina, 2011-12 and 2012-13

(In '000 tonnes)

Producer	Annual Capacity	Production	
		2011-12	2012-13(P)
Total	**4885**	**3931**	**3610**
Public Sector			
National Aluminium Co. Ltd (Damanjodi)	2100	1648	1763
Private Sector			
Bharat Aluminium Co. Ltd	200#	Nil	Nil
Hindalco Industries Ltd	1500	1355	1320
Madras Aluminium Co. Ltd	85#	Nil	Nil
Vedanta Aluminium Ltd (Lanjigarh)	1000*	928	527

Figures rounded off.
Source: Information received from individual plants/ Annual reports.
 # Plants remained non-operational during the year.
** Proposed expansion to 5 thousand tonnes per year.*

National Aluminium Co. Ltd

The present capacity of bauxite mines of 4.8 million tpy, is being expanded to 6.3 million tpy in 2nd phase expansion. Alumina refinery capacity is augmented to 2.1 million tonnes per annum and smelter to 4.6 lakh tpy. The second phase of expansion of bauxite mines and alumina refinery to 6.325 million and 2.275 million tpy, respectively, by upgrading 4th line to 7,00,000 tonnes , is underway. The plant is scheduled for attainment of stabilisation shortly. The Company also produces special grade alumina and hydrate as also TPA detergent grade zeolite. These plants with 26,000 tpy and 10,000 tpy capacity, respectively, are integrated with the main stream at Damanjodi refinery. The generation of power from the captive power plant has been augmented from 960 MW to 1,200 MW. The Company also proposes to set up 1.4 million tpy alumina refinery near Vizag, Andhra Pradesh based on the acquisition of rights over two bauxite blocks in Andhra Pradesh, with 42 lakh tpy bauxite mining capacity. NALCO proposes to build a 5 lakh tpy aluminium smelter and 1260 MW power plant near Brajaraj nagar, Jharsuguda district, Odisha. NALCO is planning to set up one million tonne alumina refinery in Gujarat, based on supply of bauxite from Kachchh region by Gujarat Mineral Development Corporation. Preparation of detailed project report is in progress. In addition, an MoU has been signed with Nuclear Power Corporation of India Ltd (NPCIL) for establishment of Nuclear Power Plant (two units of 700 MW each) at Kakrapar in Joint Venture mode in Gujarat. The construction work has already started and the project is scheduled to be commissioned by December, 2015. NALCO has also forayed into wind power generation with establishment of 50.4 MW wind power plant at Gandikota in Andhra Pradesh. Additionally, NALCO is to set up a 47.6 MW plant in Rajasthan and one more plant in its own mined out area at Panchpatmali in Koraput district, Odisha.

Bharat Aluminium Co. Ltd (Vedanta Group)

The Government of India disinvested its 51% equity in BALCO along with the transfer of management control in favour of M/s Sterlite Industries (India) Ltd. BALCO is now a Private Sector Company with an integrated alumina/ aluminium complex at Korba in Bilaspur district in Chhattisgarh. The Company has two captive bauxite mines, one at Mainpat and other at Bodai Daldali. It also operates an alumina plant with 2 lakh tpy capacity also on Hungarian technology and an aluminium smelter of one lakh tpy capacity. The work on expansion from 2.50 lakh tpy to 3.50 lakh tpy smelter capacity has been completed along with establishment of 810 MW Captive Thermal Power Plant (CPP). Work on the new 325,000 tpy aluminium smelter is in progress. The downstream production facilities of BALCO included 1,11,500 tpy wire rods, 72,500 tpy rolled products, 8,000 tpy extrusions, 9,000 tpy other semi-finished products, etc. BALCO has another aluminium semis unit at Bidhanbag near Asansol in West Bengal. It has an installed capacity of 6,400 tpy which includes extruded and rolled products, foils and conductors.

Hindalco Industries Ltd

Hindalco Industries Ltd is Asia's largest integrated primary producer of aluminium. With the completion of brownfield expansion, the capacity of Renukoot aluminium smelter has risen to 3,45,000 tpy and that of alumina refinery to 7,00,000 tpy. The Company has 55 kg per year capacity of gallium recovery at Renukoot. The Company has two captive power plants at Renusagar and Hirakud with total generation capacity of about 1109 MW. Hindalco has initiated implementation of 1.5 million tonnes capacity Alumina Project in Rayagada district, Odisha under the aegis of Utkal Alumina Limited, and which is a joint venture with Alcan of Canada. The Land & all the statutory clearances have been obtained and mining lease for bauxite at Kodingamali has also been obtained. The Company has plans to establish a 3,59,000 tpy aluminium smelter near Bargawan in Sidhi district with 900 MW CPP in Mahan, Madhya Pradesh.

The Jharkhand Aluminium Project with 3,59,000 tpy capacity smelter and a 900 MW power plant has been initialised and processes for land acquisition & environmental clearance process have begun.

The Company's Aditya Alumina & Aluminium Project has 1.5 million tpy alumina refinery at Kansariguda and 3,60,000 tpy aluminium capacity smelter at Lapanga, Odisha.

All the business of INDAL, including Aluminium Foils Division at Kollur, Andhra Pradesh has been transferred by way of demerger to Hindalco. The Company has completed expansion of Muri refinery from 1,10,000 tpy to achieve 4,50,000 tpy alumina capacity, with backward integration of new bauxite mines in Odisha and Jharkhand. The augmentation of the smelting capacity at Hirakud to 1.61 lakh tpy was completed through Prebake technology. Further expansion to 2,17,000 tpy was scheduled for completion in the year 2013. With the commissioning of the second 100 MW captive power plant at Hirakud, dependence on grid power has been eliminated and this could result in significant cost savings. The Company has proposals to expand its Belgaum Refinery from 3,50,000 tpy to 6,50,000 tpy. Special alumina capacity at this plant has already been expanded to 1,38,000 tpy and is to be raised further to 3,16,000 tpy. The Company produces approximately 120 grades of speciality alumina products.

Recycling : Aluminium is recyclable without any loss of properties and comsumes only 5% of the total energy requirement compared with primary metal production. At present, in the Organised Sector, only Hindalco operates 25,000 tpy capacity recycling plant at Taloja in Maharashtra.

Vedanta Group

The alumina refinery at Lanjigarh, district Kalahandi in Odisha has 1.0 million tpy capacity and is located close to bauxite mines in Kalahandi district. Capacity augmentation to 5 million tpy is under consideration. However, work on the refinery expansion project at Lanjigarh presently has been put on hold as per the directives of the Ministry of Environment Forest and Climate Change. The company intends to fully integrate the aluminium smelting capacity to 2.6 million tonnes per year in the near future. Pechiney Aluminium Engineering of France is the technical collaborator for this project. The works on the new 1.25 million tonnes per annum aluminium smelter in Jharsuguda and 325 thousand tonnes aluminium smelter at Korba are in progress.

Ashapura Group

Ashapura Group is one of the significant global players in respect of bauxite & bentonite. Ashapura Minchem has plans for setting up an Alumina Complex at Ratnagiri, Maharashtra. The project has been granted 'Mega Project' status by Maharashtra Government and the proposed project will have 5 lakh tpy alumina refinery and 1.5 lakh tpy aluminium smelter and a 330 MW captive power plant. The Company intends to export alumina to Middle East countries.

Cadmium

Cadmium (99.95 min) is obtained as a by-product from zinc smelters of HZL at Debari, Visakhapatnam, Chanderiya and of BZL, Binanipuram. These together have an annual capacity of 913 tonnes. These by-products of cadmium are cast in the form of pencils weighing from 250 gm to 500 gm. In India, cadmium is consumed in industries like paint, glass and chemicals. The capacity and production of cadmium are furnished in Table-9.

Table – 9 : Capacity and Production of Cadmium

(In tonnes)

Producer	Annual capacity	Production	
		2011-2012	2012-13(P)
Total	**913**	**449**	**391**
HZL	833	392	318
Binani Zinc Ltd	80	57	73

Copper

HCL, a Public Sector Company, was the only integrated primary refined copper producer till 1997. The other two producers of primary copper based on imported concentrates are Hindalco Industries Ltd and Sterlite Industries of Vedanta Group, having annual capacities of 5,00,000 tonnes and 4,00,000 tonnes of refined copper, respectively. The other two smelters of Metdist and Jhagadia Copper Ltd (formerly SWIL) has a total capacity of 2 lakh tpy. The total installed capacity is thus 10,01,500 tpy. Details regarding capacity and production of copper are furnished in Table-10.

Production of refined copper (cathodes) in 2011-12 and 2012-13 was 5,04,680 tonnes and 4,93,520 tonnes (provisional), respectively.

Table – 10 : Capacity and Production of Copper

(In '000 tonnes)

Producer	Annual capacity	Production*	
		2011-12	2012-13(P)
Total	**1001.5**	**504.68**	**493.52**
Hindustan Copper Ltd**	51.5	18.20	17.28
Sterlite Industries (India) Ltd.	400	156.43	161.30
Hindalco Industries Ltd	500	330.05	314.94
Jhagadia Copper Ltd (formerly SWIL)	50	-	-

Figures rounded off.
** Relates to Copper cathodes.*
*** Metal capacity. However, the cathode capacity of HCL is 49,500 tonnes.*

As per the Working Group Report the demand for copper demand by 2015-16 is projected at 1.2 million tonnes as against projected production of 1.35 million tonnes of refined copper at GDP growth rate of 8%.

Hindustan Copper Ltd

Hindustan Copper Ltd is a Mini Ratna Govt. of India Enterprise under the administrative control of the Ministry of Mines. Copper is produced at two smelters of HCL at Indian Copper Complex (ICC), Ghatsila, East Singhbhum district in Jharkhand and Khetri Copper Complex (KCC), Khetrinagar, Jhunjhunu districts, Rajasthan. The aggregate capacity of the two smelters for copper cathode production is 51,500 tpy. Refinery at ICC also has a Wire Bar Casting Plant with a capacity of 8,400 tpy and a Brass Rolling Mill that manufactures brass sheets by using copper produced at ICC. The aggregate installed capacity of wire bars is 39,400 tpy and wire rod capacity is 60,000 tpy at HCL. It has also a precious metal recovery plant for the recovery of gold, silver, selenium, tellurium and nickel sulphate and copper sulphate at Ghatsila. Trials runs for recovering cobalt, nickel & copper powder from converter slag are presently underway. A pilot plant with a capacity to produce one tonne nickel cathode per month was also set up at ICC. The plant is currently being scaled up to a production capacity of 5 tonnes per month of nickel cathodes. The Company has prepared action plan to expand its mining capacity from the existing level of 3.4 million tonnes/annum to 12.4 million tonnes per annum by 2016-17.

The capacity of Khetri Copper Complex (KCC) smelter is 31,000 tpy. However, HCL has shut down the Khetri refining plant due to economic reasons. KCC has a concentrator plant at Khetri in Jhunjhunu district, Rajasthan, having a capacity of 2.02 million tpy. KCC & ICC Ghatsila, Jharkhand with 1.55 million tpy each and Malanjkhand, Madhya Pradesh with two million tpy capacity also operates a sulphuric acid plant.

Continuous Cast Copper Wire Rods Project, (TCP) Taloja, Maharashtra: This project has a capacity of 60,000 tpy continuous cast copper wire rods (CCWR). The plant is based on the Southwire SCR-2000 technology of the USA, which uses natural gas as fuel and imported copper cathodes.

Sterlite Industries (India) Ltd (SIIL)

It is India's largest Non-ferrous metals and Mining Company with interests and operations in aluminium, copper, zinc, lead & power. The smelter and refinery of Sterlite Industries (India) Ltd are located at Thoothukudi in coastal belt of Tamil Nadu and Silvassa, Dadra & Nagar Haveli and has a total installed capacity of 4 lakh tpy each. The unit is based on 'ISASMELT' technology from MIM, Australia, using imported concentrates. A Cathode Refinery of 2,05,000 tpy capacity and 90,000 tpy Copper Rod Plant have been built at Thoothukudi with a view to undertaking export operations from the nearby port. The 1,80,000 tpy copper cathode refinery of Sterlite is located in Chinchpada at Silvassa in the Union Territory of Dadra & Nagar Haveli which predominantly caters to the domestic market and also has a 150,000 tpy rod mill. The copper anodes at Sterlite are refined into cathodes at Silvassa for domestic markets, while anodes are refined to cathodes at Thoothukudi itself for exports. The technology for refineries and Continuous Cast Copper Rod Plant is of MIM, Australia and Continuous Properzi, Italy, respectively. The imported copper concentrates for smelters are obtained from captive mines in Australia through long-term contracts with producers in Chile and Indonesia, as also through spot purchases. The Company is the largest producer of Continuous Cast Copper Rods (CCR) in India. The CCR plants have total annual capacity of 2,68,000 tpy. The Company has sulphuric acid plant of 1.3 million tpy and phosphoric acid plant of 2,30,000 tpy.

Hindalco Industries Ltd (Birla Copper)

The Company's three copper smelters located at Dahej, Lakhigam, Bharuch district, Gujarat has an installed capacity of 500 thousand tpy. The copper operations consist of producing copper through smelting, refining copper from imported copper concentrates and converting refined copper cathode into continuous cast rod. It is now one of the world's largest smelters at a single location. It is based on Outokumpo technology. The Company also produces continuous cast copper rods (CCR) with an annual capacity of 97,200 tonnes. In the process of extraction of copper metal, by-products that are recovered and include sulphuric acid (1.67 million tpy), phosphoric acid (1,80,000 tpy), di-ammonium phosphate (DAP) & complex fertilizers (4,00,000 tpy), gold (15 tpy), silver (150 tpy) and selenium. The entire requirement of copper concentrates is met through imports supported by the Company's two copper mines in Australia.

Jhagadia Copper Ltd (formerly SWIL Ltd)

It is located at Jhagadia in Bharuch district, Gujarat. It is a scrap-based electrolytic smelter that produces cathodes with a capacity of 50,000 tpy and additional 20,000 tpy of copper anodes. The plant was in technical collaboration with Outokumpu Technology (formerly Boliden Contech AB), Sweden. The precious metals like gold, silver, platinum, palladium, etc. are also recovered as part of anode slime during the refinery process. The refinery is based on ISA-Technology from Mount ISA Mines Ltd, Australia.

Recycling of Copper

As per the licences granted by Central Pollution Control Board as on 13.5.2010 there were 35 units operating in different states with a combined capacity of 2.42 lakh tpy for handling different types of scrap.

As per the estimates made in the recently published Market Survey on Copper by IBM, production of 1,06,573 tonnes of copper has been reported as secondary copper in the Organised Sector.

Lead

The total installed capacity of lead smelting was 1,85,000 tpy excluding secondary lead which was 24,000 tpy. Primary lead was produced entirely by HZL at lead-zinc smelter at Chanderiya, Chittorgarh district, and Rajpura-Dariba Plant, Udaipur district, Rajasthan. Tundoo lead smelter, Dhanbad district, Jharkhand with capacity of 8,000 tpy was decommissioned by HZL in May 2003 due to economic non-viability.

Secondary lead capacity is held by the Indian Lead Pvt. Ltd at its two units at Thane in Maharashtra and Kalipark in West Bengal. The installed capacity of these two plants is 24,000 tpy. There are a number of other secondary producing units in the Organised and Unorganised Sector.

As per the estimates made in the recently published Market Survey on lead & zinc by IBM, production of 88,000 tonnes of lead has been estimated in 2010-11 as secondary lead.

Zinc

India has a total installed zinc capacity of 9,17,000 tpy distributed between HZL smelters at Debari, Visakhapatnam, Chanderiya, Dariba and Binani Zinc Ltd's (BZL) plant at Aluva in Kerala. HZL's Dariba hydro-zinc smelter with 2,10,000 tpy capacity was commissioned in March 2010. BZL has an annual installed capacity of 38,000 tonnes zinc along with 80 tonnes cadmium and about 53,000 tonnes sulphuric acid.

Debari and Vizag zinc smelters of HZL have a capacity of 88,000 tpy and 56,000 tpy, respectively. The primary product of Debari and Vizag smelters is high-grade zinc while cadmium is recovered as by-product. Chanderiya smelter complex with a total capacity of 5,25,000 tpy of zinc is the world's largest single location zinc smelting complex. Besides lead and zinc, HZL also produces silver, cadmium, copper and sulphuric acid as by-products. The annual installed capacities for these by-products are: 518 tonnes silver, 913 tonnes cadmium ingots, 100 million tonnes copper cathode and 1.74 million tonnes sulphuric acid. The Visakhapatnam zinc smelter, apart from utilising imported concentrates also undertakes processing of sludge that, contain about 16% zinc, and that which are produced by the existing zinc smelters at Debari and Aluva.

HZL in its Phase-II expansion projects, undertook completion of 170,000 tpy hydro metallurgical zinc smelting plant along with matching mine expansion and establishment of one 80 MW captive power plant.

Besides, there are secondary zinc producing units in the Unorganised Sector with capacity of 45,000 tpy. However, production related data from these units is not available.

The data on total capacity and production of primary lead and zinc ingots in 2012-13 and 2013-14 are furnished in Table-11.

Table – 11 : Capacity and Production of Primary Lead and Zinc Ingots

(In tonnes)

Producer	Lead capacity (tpy)	Production		Zinc capacity (tpy)	Production	
		2011-12	2012-13(P)		2011-12	2012-13(P)
Hindustan Zinc Ltd	185000	92100	118317	879000	758717	676921
Binani Zinc Ltd	–	–	-	38000	24930	27307
Total	**185000**	**92100**	**118317**	**917000**	**783647**	**704228**

Source: *Annual Report, HZL, 2011-12 and 2012-13.*

ABRASIVES

Natural abrasives, which include calcite, emery, diamond, zircon, corrundum, novaculite, pumice, etc. are generally sold as dressed stones. Synthetic abrasives include borazon, ceramic, dry ice, glass powder, silica carbide, etc. Commercial abrasives are manufactured in many shapes as bonded or coated abrasives including belt discs, wheels, sheets, blocks, rods & loose grains. A large number of units exist in the Unorganised Sector. However, important producers of coated abrasives are Grindwell Norton Ltd, Mora, Uran, Raigad district, Maharashtra; Flexoplast Abrasives (India) Ltd, Aurangabad, Maharashtra; Associated Abrasives Ltd, Nashik, Maharashtra; Carborundum Universal Ltd, Chennai, Tamil Nadu; Cutfast Abrasives Tools Pvt. Ltd, Chennai, Tamil Nadu; and John Oakey and Mohan Ltd, Ghaziabad, Uttar Pradesh. Important producers of bonded abrasives (grinding wheels) are Associated Abrasives Ltd, Nashik, Maharashtra; Carborundum Universal Ltd, Chennai, Tamil Nadu; Cutfast Abrasives Tools Pvt. Ltd, Chennai, Tamil Nadu and K.L. Thirani & Company Ltd, Kolkata, West Bengal.

Silicon Carbide (SiC)

Silicon Carbide (SiC) is a synthetic material most commonly produced by the so called Archean process in electrical resistance furnaces. SiC does not occur naturally except in some types of pre-solar metorites, along with diamonds. SiC can be produced either black or green depending on the raw material, SiC products have applications in metallurgical refractories, abrasives, slurry wire sawing, and for technical ceramics.

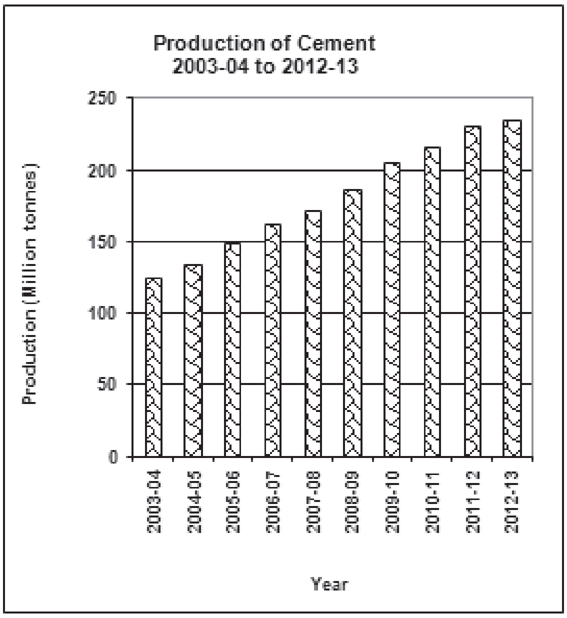
Major producers of silicon carbide are Grindwell Norton Ltd, Renigunta, Telangana and at Bengaluru, Karnataka; Indian Metals & Carbide Ltd, Therubali, Odisha; Carborundum Universal Ltd, Tiruvottiyur, Chennai district, Tamil Nadu, and Speedfam (India) Pvt. Ltd, Navi Mumbai, Maharashtra.

CEMENT

The Cement Industry , which is one of the key infrastructure industries, recorded exponential growth pattern in successive years since the introduction of partial decontrol in 1982, total decontrol in 1989 and post delicensing of the Industry and Policy Reforms initiated in 1991. In 2012-13, the Cement Industry comprised 178 large cement plants with an annual installed capacity of about 318.94 million tonnes, in addition to mini/white cement plants with total estimated capacity of about 6 million tonnes per annum. Thus, the overall installed capacity for cement in the country was about 324.94 million tonnes per annum. Most of these capacities are modern and based on the energy efficient dry process technology. The number of plants and capacity are more in the southern region (Andhra Pradesh, Tamil Nadu, Karnataka and Kerala) of the country. CCI, a Public Sector undertaking operates three units at Bokajan, Rajban and Tandur units, the rest 7 of its units are non-operational due to various reasons. The CCI was revived in light of Public Sector Policy under the National Common Minimum Programme (NCMP) and accordingly the restructuring/revival plan duly approved by the Government has been taken up for implementation. Technology upgradation of Tandur unit and expansion of Bokajan has been taken up for implementation as part of the sanctioned scheme. Besides, there are 5 large cement plants owned by various State Government Undertakings and as many as 112 plants with a million tonnes or more capacity. The total production of cement (all kinds) in 2012-13 was about 235 million tonnes, which includes the 6 million tonnes production of mini and white cement plants. The Cement Industry has thus recorded a positive growth during 2012-13. JSW Cement has a 0.7 million tpy grinding facility to produce portland slag cement (PSL) and Granulated Blast Furnace slag (GBS) adjacent to JSW Cement plant, Vijaynagar, Ballari district of Karnataka.

The Cement Industry produces a variety of cement to suit a host of applications. Cement Industry which was branded as a highest polluter of environment, now meets better pollution standards and contributes to environmental cleanliness by consuming fly ash from thermal power plants and slag produced by steel manufacturing Units.

The Working Group on Cement Industry constituted by the Planning Commission for the 12th Plan period has projected a demand growth for cement at the rate of 10.75% per annum based on expected GDP growth rate of 9%. The additional cement capacity requirement during 12th Plan is projected as 139.7 million tpy by 2017 and about 1035 million tonnes by 2027. The annual capacity and production of cement by the end of 12th Plan are estimated at 479.3 million tonnes and 407.4 million tonnes, respectively, with 85% capacity utilisation.



ASBESTOS-CEMENT PRODUCTS

The installed capacity of asbestos-cement pressure pipes in the Organised Sector was 1,49,640 tpy. Production capacity of asbestos cement sheets was not available.

Industries that deal with asbestos-cement products include Everest Building Products Ltd which has Units located at Kymore in Madhya Pradesh and at Podanur in Tamil Nadu. Similarly, Hyderabad Industries Ltd, has three plants at Sanatnagar, Ranga Reddi district in Andhra Pradesh, Jasidih in Jharkhand and Ballabhgarh in Haryana; Ramco Industries Ltd has three plants at Arakkonam, Vellore district, Tamil Nadu, Karur in Dharwad district, Karnataka and Maksi in Shajapur district, Madhya Pradesh; Southern Asbestos Cement Ltd has two plants at Karur in Dharwad district, Karnataka and Arakkonam, Vellore district in Tamil Nadu; Shree Pipes Ltd Hamirgarh, Bhilwara district, Rajasthan; Malabar Building Products Ltd, Malakunnathukavu, Thrissur district, Kerala; Konark Cement and Asbestos Industries Ltd at Bhubaneswar in Odisha; Shri Digvijay Cement Co. Ltd, Digvijaynagar, Ahmedabad in Gujarat; Uttar Pradesh Asbestos Ltd, Mohanlalganj, Lucknow district, Uttar Pradesh; Assam Asbestos Ltd, Bonda, Narangi, Guwahati district, Assam; Utkal Asbestos Ltd, Dhenkanal in Odisha and Visaka Asbestos, Pattencheru (Medak) in Andhra Pradesh.

Besides, Swastik Industries, Pune in Maharashtra; Kalani Asbestos, a Division of Kalani Industries Pvt. Ltd, Pitampur, Dhar district in Madhya Pradesh; Tamil Nadu Asbestos (Pipes), a unit of Tamil Nadu Cement Corp. Ltd, Mayanur, Tiruchirapalli district in Tamil Nadu and Ganga Asbestos Cement Ltd, Rae Bareli in Uttar Pradesh produced only asbestos pressure pipes. The present status of all these asbestos cement units is not available with Indian Bureau of Mines.

REFRACTORY INDUSTRY

Refractory Units fall under medium and Small-scale Sectors. This Industry has been facing recession mainly because of shift in demand from conventional refractories to sophisticated refractories. Steel Industry is the biggest group of customers of this Industry, which consumes about 70-80% of total refractory production, followed by aluminium, power and cement. The estimated annual installed capacity of all types of refractory was 2,015 thousand tonnes and the production in 2012-13 of all types of refractories was 1,283 thousand tonnes as which is less as compared to 1,415 thousand tonnes in 2011-12. Bharat Refractories Ltd (BRL), a Govt. of India Undertaking, has four units that are engaged in the manufacture & supply of various kinds of refractories not only to the integrated steel plants but also to smaller steel plants. BRL's merger with SAIL is under progress. The Salem Refractory Unit of Burn Standard Co. Ltd (BSCL) became a wholly owned subsidiary of SAIL w.e.f. December 16th 2011. The Unit has now been named as SAIL Refractory Co. Ltd (SRCL).

With the modernisation and renovation of steel plants, the requirements for various types of refractories have undergone revolutionary changes. The stress is now on for more sophisticated products like precast monolithics. The domestic Refractory Industry, taking cue of this change, has acquired the technical know-how for production of sophisticated refractories, such as, magnesia carbon bricks, new generation sliding-gate plate refractories, for ladles, gunning materials and castables. Manufacture of carbon bonded silicon carbide crucible and clay graphite foundry products is continuously done with constant upgradation for production of improved products. The use of these special refractories has brought down the consumption of refractories per tonne of steel production. However, the customers are benefited by way of improved performance, lower shut down time and savings on energy. About 30 kg refractory was consumed per tonne of liquid steel a decade ago has now come down to around 7-8 kg per tonne of crude steel. By some leading players. The specific consumption of refractories at present in integrated steel plants varies from 8 to 19 kg/tonne of crude steel as compared to 6-8 kg/tonne of crude steel in advanced countries.

The price and supply of imported raw materials are subjected to international demand and supply situation and most of the refractory makers are completely dependent on imported raw materials, especially for making high-end products.

TRL Krosaki refractories Ltd, has commissioned a state-of-the-art new Taphole clay plant of 18,000 tpa capacity at Belpahar in Odisha. The plant will produce both tar-based/resin based clay for blast furnaces.

IRMA has entered into a formal collaboration with JPC for making demand forecast of refractories as well as crude steel as a part of 12th Five Year Plan for Steel & Allied Industries. The estimated annual installed capacity of different kinds of refractories and production is highlighted in Table-12.

Table – 12 : Annual Installed Capacity and Production of Refractories 2011-12 & 2012-13 (By Types)

(In '000 tonnes)

Refractory item	Annual capacity	Production	
		2011-12	2012-13
Firebricks refractories	560	316	262
High alumina refractories	554	350	299
Silica refractories	58	63	66
Basic refractories	454	242	214
Special products	46	61	60
Others (incl.Monolithics)	343	383	382
Total	**2015**	**1415**	**1283**

Source: *Indian Refractory Makers' Association (IRMA) journal.*

CERAMIC & GLASS INDUSTRY

Ceramic Industry

Ceramic Industry in India is about 100 years old. India ranks 5th in world in terms of production of ceramics and 513 million sq metres of ceramic tiles were estimated to be produced in 2012-13 as against global production of over 9,000 sq.m. Ceramic products are made from clay and felspar and are manufactured in large and small-scale sectors with wide variations in type, range, quality and standard. Ceramic items have properties, such as glassy smooth finish, high thermal shock resistance, poor thermal and electrical conductivity, high abrasion resistance, acid resistance and weather resistance. During the last two decades, there has been a phenomenal growth in the field of ceramics to meet specific demands of industry, such as, high alumina ceramics, cutting tools and other structural ceramics. The state-of-the-art technology of international standards are adopted today for production of high quality, ceramic goods in the country. The major industries include Kajaria Ceramics, Somani Ceramics, Asian Granite India, Orient Ceramics & Industries, Nitco, Regency Ceramics, Euro Ceramics, Bell Ceramics, etc. The per capita consumption of ceramic tiles in the country was about 0.3 sq. m which is comparatively lower as compared to 2 sq.m in China and 5-6 sq m in Europe. Ceramics Technological Institute (CTI), Bengaluru, a National Level Institute for R & D in BHEL, offers the much-needed technical support for product development by enabling the Indian Ceramic Industry to adopt a modernised technology for development of new and advanced ceramics. Areas of research are Nano-technology, separation technology, microwave processing, etc.

Ceramic Tiles

Following the development and growth of the Building Industry, ceramic glazed tiles producing industries too flourished considerably during the last decade. There were 16 units in the Organised Sector with an installed capacity of 21 lakh tonnes that accounted for about 2.5% of the world ceramic tile production. Besides, there are about 200 units in the SSI sector. The domestic Ceramic Tile Industry has been growing at about 15% per annum. Indian tiles are competitive in the international market and are chiefly exported to East and West Asian countries. In India, both traditional methods of manufacturing (tunnel) as well as the latest single fast firing methods are in vogue in manufacturing of ceramic tiles.

Sanitarywares

Sanitarywares are ceramic products used for sanitation purposes, like wash basins. The basic raw materials for sanitaryware are felspar, ball clay, kaolin and quartz. There were 7 units with installed capacity of 143 thousand tpy in the Organised Sector while around 210 plants with a capacity of 53,000 tpy exist in the small-scale Sector. Some units have either been closed or merged with the other existing ones. This Industry has been reporting a growth rate of about 5% per annum. The major manufactures of sanitaryware include Hindustan Sanitary Industries Ltd, Roca Bathroom Products, Cera Sanitaryware, Neycer India, etc.

Potterywares

Potterywares include crockery and tableware and its manufacturers part of an age old handicraft in the country. Produced both in the Large-scale and the Small-scale Sectors, there were 16 units in the Organised Sector with a total installed capacity of about 43,000 tpy while the Small-scale Sector, there were over 1,400 plants with a capacity of 3 lakh tpy. Out of these, over 600 units are located in Uttar Pradesh.

Glass Industry

The Glass Industry includes manufacaturing unit that make glass products, such as, glass containers and hollow-wares, tablewares, flat glass (including float, sheet, figured, wired and safety, mirror glass), vacuum flasks, refills, laboratory glasswares, fibre glass, hollow-ware containers, etc. Principal raw materials used in the manufacture of glass are silica sand, soda ash, calcite, dolomite, etc.

Glass Industry is delicensed and manufacturing units are spread all over India. The large-scale producers are located mostly at Mumbai, Kolkata, Bengaluru, Hyderabad and in Gujarat and are equipped mostly with modern melting furnace technology, The Medium and Small-scale Industries on the other hand include cottage industries that still use outdated technology for production of glass products. There is considerable scope in demand for glass fibre products, particularly due to growth in petrochemical sector, solar products, packaging industry and allied products. Glass Industry in India remained in the form of Cottage Industry till the beginning of 20th century. First glass plant in India was set up in August 1908 by freedom fighter Lokmanya Bal Gangadhar Tilak at Talegaon in the state of Maharashtra. Glass Industry in India has made a steady progress since then, particularly after independence. Firozabad, known as glass city of India, continues to be a place of master craftsmen and entrepreneurs where traditional processes are still used for production of a wide variety of glass items. Today, there are sophisticated and modern plants inside the country produces glass containers, float glass, etc. by the use of latest technology. The major players include Saint-Gobain Glass India, Asahi India Glass, Gujarat Guardian, Alembic glass Industries Ltd, etc.

The per capita consumption of glass in India is about 0.4 kg, which is on the lower side when compared to 3.5 kg in a country like Indonesia.

Glass Containers and Hollow-wares

Presently, 43 units in the Organised Sector are engaged in the manufacture of glass containers and hollow-wares, with an installed capacity of around 15 lakh tonnes per year. Glass containers are ideal packaging medium, but are increasingly being replaced by other packaging materials like plastic, PET, aluminium and tetrapack. The per capita consumption of container glass in India is 1.4 kg as compared to 27.5 kg in USA & 10.2 kg in Japan. The major producers include Hindustan National Glass & Industries, Piramal Glass, Haldyu Glass Gujarat, La Opala RG, Mohan Meakin, Gujarat Glass, Associated Glass Industries (AGI), etc.

Laboratory Glasswares

There were six units in this Sector which manufacture neutral glass tubing, laboratory glasswares and chemical process equipment. The installed capacity of neutral glass tubing was 46,600 tpy. The data on production are not available. The demand for natural glass tubing has not picked up due to sizeable switch over from glass items to plastic items.

Flat Glass

Silica sand, dolomite, limestone are some of the mineral ingredients used in the manufacture of flat glass. The term flat glass includes float glass, sheet glass or plate glass, figured and wired glass. These are further processed into mirror, toughened glass, laminated glass, double glazing, etched glass, glass doors, etc. There were thirteen units in flat glass sector with a total production capacity of 135 million sq m. Out of these, there are 8 float glass lines with total installed capacity of 4700 t/day. Hindustan National Glass and Industries Ltd, (HNG) has a new plant being set up Naidupeta in Andhra Pradesh and is undertaking expansion of capacity at its Nashik (Maharashtra) plant to add 1000 t/day from the existing capacity of 3000 t/day. The major consumers of flat glass are Architectural (85%) and Automotive (10%). The per capita consumption of float glass in India is 0.88 kg as against 12 kg in China, 9 kg in Thailand, 13 kg in Malaysia and 4 kg in Indonesia. There has been growing acceptability of the Indian flat glass products in the global market.

Vacuum Flasks and Refills

There were eight units in the Organised Sector that manufacture vacuum flasks and refills, with an installed capacity of 36 million numbers per annum.

Fibre Glass (Glass-reinforced plastic)

Silica sand, limestone, kaolin, fluorspar, dolomite, etc. are some of the important minerals used in manufacturing fibre glass. Fibre glass is highly capital and technology-intensive Industry. Fibre glass is lighter than aluminium but stronger than steel. Moreover, being an inorganic material, it does not pose any health hazard. There are five units with production capacity of 55,000 tpy, while the production hovered around 39 thousand tonnes. Presently, India exports about 80% of its glass fibre production.

GRANITE INDUSTRY

Granite is used in monuments, building slabs, tiles, surface plates, etc. Over 160 varieties of granite with exotic colours/shades have been identified as products that could be exported after processing.

Granite is a minor mineral as defined under Section 3(e) of MMDR Act, 1957, and as per Section 15 of MMDR Act, 1957, all powers to make rules and grant of Mineral Concessions for minor minerals have been entrusted with concerned State Government. Granite Conservation and Development Rules, 1999 were notified separately on 1.6.1999 for ensuring systematic/scientific exploitation and conservation of granite resources of the country. The deposits are dispersed widely in all parts of the country.

Granite is a Non-scheduled Industry and the processing of granite is a phenomenon that was started in 1930s. The mining and processing techniques of granite adopted in the country have improved over the years. Entrepreneurs are required to submit only Industrial Entrepreneur Memorandum to Secretariat for industrial assistance. Looking at its export potential, the Government of India has been encouraging setting up of 100% EOU in this Sector to promote export of value-added granite products. The total value of granite production during 2011-12 was 5,420 crore rupees as against 2,653 crore rupees during 2010-11. Exports of granite are freely allowed. The total granite exports during 2012-13 was 6.06 million tonnes as against 4.6 million tonnes in 2011-12. Aro Granite Industries, Pokarna Tamil Nadu Minerals, Madhav Marbles & Granites Limited are some of the major players.

CHEMICALS

Caustic Soda (Sodium hydroxide)

Caustic soda is a basic inorganic chemical prepared by electrolysis of salt brine and is used in the manufacture of pulp and paper, viscose rayon, textile, vanaspati & other chemicals and in aluminium extraction. A significant quantity of caustic soda is used in the manufacture of other inorganic chemicals and dyestuffs, in metallurgical operations and in petroleum refining. The major Indian producers are Gujarat Alkalies & Chemicals, Grasim Industries, DCM Shriram Consolidated, DCW, Reliance Industries, Aditya Birla Chemicals (India), etc. NALCO has plans to set up a proposed caustic soda plant of 2 lakh tonnes per annum capacity at Dahej in Gujarat as joint venture with Gujarat Alkali and Chemicals Ltd (GACL).

Soda Ash

Soda ash is an important chemical used widely as a raw material in the manufacture of glass and glassware, sodium silicate, textile, paper & pulp and in, metallurgical industries, desalination plants and in the preparation of a host of chemicals. Soda ash is an essential ingredient in the manufacture of detergent, soap, sodium salts and dyes. The major soda ash producers are Tata Chemicals, Gujarat Heavy Chemicals Ltd, Nirma, Saurashtra Chemicals, DCW, etc. The manufacture of soda ash in India started in 1932 at Dhrangadhra in Gujarat with installed capacity of 50 tpd.

RSPL- Jamnagar Greenfield Soda ash plant, Gujarat is a project that involves construction of a greenfield soda ash plant with a production capacity of 5,00,000 tonnes of light soda ash per year at Village Kuranga in Dwarka, Jamnagar district.

The installed capacity of soda ash as on 31.3.2014 was 30.76 lakh MTPA. The production of soda ash during the year 2013-14 was 23.75 lakh tonnes.

Bleaching Powder (Chlorinated lime)

Seven units were engaged in the production of stable bleaching powder. There were three units engaged in the manufacture of liquid bleaching powder.

Calcium Carbide

Calcium carbide is used in the manufacture of acetylene gas for rubber, synthetic and plastic Industry. It is also used as a raw material for manufacturing various rubber goods. It is self-reinforcing filler. It is also used for cutting & welding of metals.

Nickel Sulphate

Ghatsila copper smelter of HCL produces nickel sulphate as a by-product from electrolytic copper spent solutions. The annual capacity of HCL smelter for the production of nickel sulphate is 390 tonnes. However, no production has been reported since 2004-05 onwards. Jhagadia Copper Ltd (formerly SWIL Ltd) has plans to recover nickel sulphate at its copper metal plant at Jhagadia, Bharuch district, Gujarat. The Thoothukudi plant of sterlite has developed innovative method to produce pure commercial grade nickel sulphate from electrolyte by solvent crystallisation. The pilot-scale trials are in progress.

Synthetic Cryolite (Na_3AlF_6)

Navin Fluorine Industries, Bhestan, Gujarat, is an important producer of synthetic cryolite. Other producers are Tanfac Industries Ltd, Cuddalore, Tamil Nadu; (Aditya Birla Group) and Adarsh Chemicals and Fertilizers Ltd, Udhna, Gujarat. GMDC, Gujarat has 500 tpd fluorite beneficiation plant at Village Kadipani that produces 96% CaF_2 acid-grade & 90% CaF_2 metallurgical grade concentrate. The acid-grade finds use in Aluminium fluoride, synthetic rutile & fluorine chemicals.

Aluminium Fluoride

Sterlite Industries India Ltd is setting up a 13,000 tpy aluminium fluoride plant as a joint venture of Sterlite Ind. (part of Vedanta Group) & Maya Rasayan Ltd. The aluminium fluoride produced by the Company will be utilised in the aluminium smelters of Vedanta Group. Other important units produces aluminium fluoride include Navin Fluorine Industries, Maya Rasayan Ltd, Mumbai, Tanfac Industries Ltd, SPIC and Aegis Chemical Industries Ltd. The installed capacity of aluminium fluoride was about 27 thousand tpy.

Titanium Dioxide

Four plants that reported an installed capacity of 243 thousand tpy produce synthetic rutile, while other four plants with total installed capacity of about 75 thousand tpy produce titanium dioxide pigment. IREL has not reported synthetic rutile production in recent years. Kerala Mineral & Metals Ltd (KMML) has plans to set up a 500 tpy titanium sponge plant with DMRL technology with plans to further expand the capacity to 1000 tpa (Table - 13). KMML has proposals to augment its capacity of titanium dioxide by 20,000 tonnes per annum to take the total capacity to 60,000 tonnes per annum. An investment of 38 crore for this project has been announced by Clariant chemicals (India) Ltd (CCIL) vide its communication dated Sept. 1, 2013.

Sulphuric Acid

There were 104 units with an annual capacity of more than 6 million tonnes that manufactures sulphuric acid in the Organised Sector based on sulphur as a raw material. In addition, Sulphuric acid is also recovered at HCL. Hindalco and Sterlite during lead-zinc smelting at HZL and BZL during lead-zinc smelting.

Table –13 : Installed Capacity and Production of Synthetic Rutile/Titanium Dioxide Pigment 2010-11 to 2012-13

(In tonnes)

Plant	Location	Specification	Installed capacity (tpy)	Production		
				2010-11	2011-12	2012-13
Total			**243000** (Synthetic rutile)	**80936**	**75331**	**59426**
			85600 (TiO_2 Pigment)	**64393**	**54768**	**23459**
IREL	Orissa Sands Complex, Distt. Ganjam, Odisha.	90.5% TiO_2 (min)	100000 (Synthetic rutile)	-	–	–
KMML	Chavara, Distt. Kollam, Kerala.	92%-93% TiO_2	50000/40000@ (Synthetic rutile/TiO_2) (TiO_2-Chloride Process)	36879	29117	*
DCW Ltd	Sahupuram, Distt. Thoothukudi, Tamil Nadu.	95% TiO_2	48000 (Synthetic rutile)	44761	47331	40696
CMRL	Edayar, Distt. Ernakulam, Kerala.	96.5% TiO_2	45000 (Synthetic rutile)	36175	28000	18730
TTPL	Kochuveli, Distt. Thiruvananthapuram, Kerala.	97.5% TiO_2	17000 (TiO_2-Sulphate Process)	15749	12701	11550
VVTi Pigments Pvt. Ltd* (formerly Kilburn Chemicals)	Thoothukudi, Tamil Nadu.	98% TiO_2 (min)	25000 (TiO_2-Sulphate Process)	11441	12122	11909
Kolmak Chemicals Ltd	Kalyani, Distt. Nadia, West Bengal.	NA	3600 (TiO_2-Sulphate Process)	324	828	NA

Source: *Department of Atomic Energy, Mumbai and individual companies.*
Note: *KMML captively consumes synthetic rutile while CMRL and DCW export synthetic rutile.*
** Data relates to calendar year. @ Under expansion to 60,000 tpy capacity.*
The estimated production of synthetic rutile and TiO_2 pigment is about 1 lakh tpa, & 60 tpa respectively.

Phosphoric Acid

RSMML has set up a beneficiation plant for processing 9 lakh tonnes of low-grade ore per annum at Jhamarkotra, Rajasthan. Important units that produces phosphoric acid of various grades, such as, pharma-grade, food-grade, technical-grade, analytical reagent grade, etc. include Gujarat State Fertilizer Company, Vadodara, Gujarat; Fertilizers and Chemicals Travancore Ltd (FACT), Udyogmandal, Kochi, Kerala; Sterlite Industries India Ltd (Vedanta); HCL, Khetri, Rajasthan; HZL, Udaipur, Rajasthan; Southern Petrochemical Industries Corp. Ltd, Thoothukudi, Tamil Nadu; EID Parry (India) Ltd, Ennore, Tamil Nadu; Star Chemical Ltd, Mumbai, Haldia, West Bengal; Ballarpur Industries Ltd, Karwar, Karnataka; Hindalco Industries Ltd, Dahej, Gujarat; and Paradeep Phosphates Ltd, Paradeep, Odisha. The important uses of phosphoric acid are in the manufacture of phosphatic fertilizers, agricultural feed, waxes, polishes, soaps & detergents, and in waste water treatment, tea-leaf processing, sugar refining, as well as anodising & stabilising agent.

Ferro-phosphorus (FeP)

Ferro-phosphorus is obtained as by-product during steel manufacturing during the production of yellow phosphorus or is smelt by phosphate rock & ferro-rock in blast furnace. It is used as an ingredient in high strength low-alloy steel, foundry products, as de-oxidiser in Metallurgy Industry & as a brake liner with 23% min. phosphorus and 1% max. carbon. Ferro-phosphorus is also used as a drying agent and as additive in metallic paints.

Red Phosphorus

Star Chemicals (Bombay) Pvt. Ltd and United Phosphorus Ltd, Gujarat are the leading manufacturers and suppliers of red phosphorus in the country. It is mainly consumed in the Match Industry for making strike plate of match box. Besides, in Agriculture Industry it is used as fumigant and in the making of pesticides. Red phosphorus finds application in the manufacture of phosphoric acid, semi-conductors and also as flame retardant for polymers. It is also used in pharmaceuticals for synthesis of drugs.

Borax

Borax is used as a component of glass, ingredient in enamel glazes, pottery & ceramics. The main manufacturers of borax is Borax Morarji Ltd, Ambarnath, Maharashtra. The plant has an installed capacity of 25,000 tpy borax and 8,000 tpy boric acid. The plant uses imported crude sodium borate concentrates (rasorite) and crude calcium borate (colemanite) as these are not produced indigenously. National Peroxide Ltd, Kalyan, Maharashtra, has 1,200 tpy combined installed capacity that produces other boron compounds; namely, sodium perborate-tetrahydrate and monohydrate. Indo-Borax & Chemical Ltd also operates borax and boric acid plants at Pithampur, Madhya Pradesh. The capacity of the plant, however, is not available. As a thumb rule, for one tonne production of boric acid, about 2 tonnes of boro-gypsum is produced. However, boro-gypsum does not have ready market for its disposal.

Besides the above listed chemicals, activated bleaching earth, fluorochemicals, alumina ferric and sodium silicofluoride were the other mineral-based products.

CHEMICAL FERTILIZERS

In India, the Agricultural Sector plays a vital role in the economic development of the country as securing food for 1.2 billion plus population is a humongous task. To maximise agricultural output it is imperative that better agricultural methods, and greater, but judicious use of fertilizers be put to effect. The application of fertilizers has been known well over a hundred years, but the use of chemical fertilizer started in the beginning of this century. The first phosphate fertilizer plant in India went on stream in 1906. Since then, the Phosphatic Fertilizer Industry has grown considerably but the growth has not been able to keep pace with the ever increasing demand.

According to the Department of Fertilizer, at present there are around 56 large size fertilizer units in India that manufactures a wide range of nitrogenous and phosphatic/complex fertilizers. There are 19 units which manufacture DAP & complex fertilizers, besides, 91 medium and small scale units in operation manufacturing Single Super Phosphate (SSP).

As per Fertilizer Association of India, the total installed capacity of P_2O_5 almost stood at 6.37 million tonnes, of which the capacity of SSP plants was around 1.45 million tonnes, constituting about 29% of the total capacity of phosphatic fertilizers (Fertilizer Statistics 2012-13). The major raw materials for Single Super Phosphate (SSP) are rock phosphate and sulphur. Besides containing 16%-20% phosphorous, Single Super Phosphate (SSP) also contains 11%-12% sulphur and 16%-21% calcium. This provides an advantage in the form of improving agricultural productivity since large areas in the country are deficient in sulphur and calcium.

Though the bulk of rock phosphate is used in the manufacture of water soluble phosphatic fertilizers, small quantitites of suitable grades are also used directly in acidic soils. When a phosphatic fertilizer is soluble in water, the product is called water soluble phosphate. If it is soluble in water but does so in 2 per cent neutral ammonium citrate, the product is called citrate soluble phosphate. The sum total of the water soluble and citrate soluble values is termed as 'available phosphates'. A fertilizer in which phosphate is not soluble either in water of 2 per cent neutral ammonium citrate, is termed insoluble. the sum of the available phosphate and the insoluble phosphate is termed as 'total phosphate'. The major criterion for the agronomic effectiveness of phosphatic fertilizer is the water soluble P_2O_5 content of fertilizer. Generally, those fertilizers which contain all or most of the P_2O_5 in water soluble form are agronomically more efficient than those having partially water soluble P_2O_5. However, it has recently been found that phosphatic fertilizers having 80 per cent or more water soluble P_2O_5 are generally as efficient as those containing almost all of its phosphate in a water soluble form. The only exception, where phosphatic fertilizer containing citrate soluble P_2O_5 or even water insoluble P_2O_5 is effective as those containing fully water soluble P_2O_5 is in the case of acid soils but provided the fertilizer should be suitably applied.

Different types of straight and complex fertilizers are manufactured from rock phosphate. In the category of straight fertilzers, single superphosphate (SSP) and triple superphosphate (TSP) which together contribute approximately 11 per cent of total P_2O_5 have been used as fertilizer in India in the year 2013-14. The remaining 89 per cent is contributed by complex fertilizers like ammonium phosphate, diammonium phosphate (DAP), mono ammonium phosphate, nitrophosphate, urea ammonium phosphate and N:P:K fertilizers.

The SSP is still an important fertilizer source in the country. However, the trend is towards the production of complex fertilizers having the total P_2O_5 in water soluble form. The DAP and SSP contribute 34 and 17 per cent, respectively, of the total P_2O_5 consumed in India, the balance comes from various other fertilizers.

In the absence of commercially exploitable resources of potash in the country, the entire demand of potassic fertilizers is met through imports. The fertilizer plant operators in the country have fully absorbed and assimilated the latest technological developments incorporating environment-friendly process technology and are in a position to operate and maintain the plants at their optimum levels on international standards in terms of capacity utilisation, specific energy consumption and pollution standards. The Fertilizer Industry is carrying out debottlenecking and energy saving schemes in the existing plants to enhance capacity and to reduce specific energy consumption. Companies are also planning to convert existing naptha-based fertilizer plants to liquified natural gas (LNG)/natural gas (NG)-based ones.

Types of fertilizers produced in India are detailed below :

A) Straight Nitrogenous Fertilizers :

1) Ammonium Sulphate (AS)
2) Calcium Ammonium Nitrate (CAN)
3) Ammonium Chloride
4) Urea

B) Straight Phosphatic Fertilizers :

1) Single Super Phosphate (SSP)
2) Triple Super Phosphate (TSP)

C) NP/NPK Complex Fertilizers :

1) Urea Ammonium Phosphate
2) Ammonium Phosphate Sulphate
3) Diammonium Phosphate (DAP)
4) Mono Ammonium Phosphate (MAP)
5) Nitro Phosphate
6) Nitro Phosphate with Potash
7) NP/NPKs

Source : *Department of Fertilizers.*

The capacity and production of different types of fertilizers is provided in Table-14.

Table – 14 : Installed Capacity and Production of Various Types of Fertilizers

(In lakh tonnes)

Products	No. of Units	Total Installed Capacity	Production	
			2011-12 (R)	2012-13 (P)
Urea	30	215.97	219.84	225.75
DAP	12	83.32	39.63	36.47
Complex Fertilizers	19	64.53	77.70	61.80
SSP	85	77.13	43.24	44.14

Source : *Department of Fertilizers & Fertilizers Association of India.*

As per the Working Group Report on Fertilizer Industry for 12th Plan period, the all India demand forecast of fertilizer products by the end of the year 2017-18 would be 33.75 million tonnes of urea, 12.76 million tonnes of DAP, 11.84 million tonnes of NP/NPKs and 6.48 million tonnes of Single Super Phosphate (SSP).

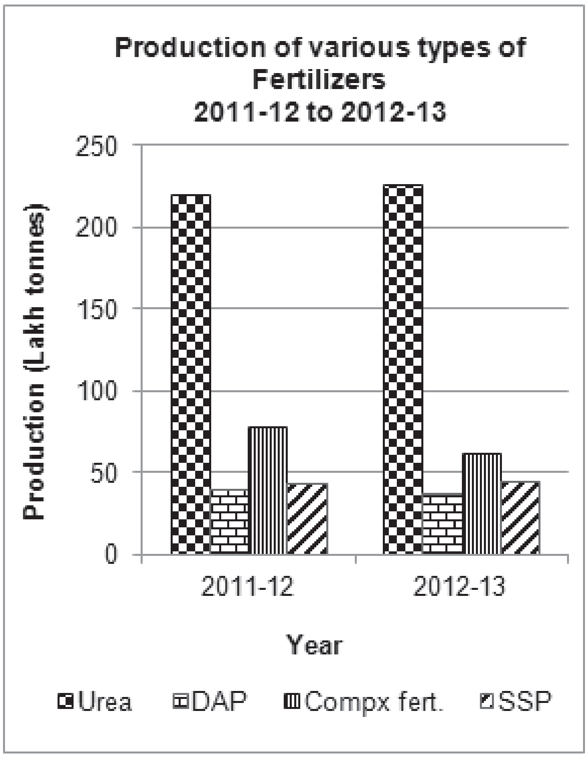
The principal list of Fertilizer Plants is furnished in Table - 15.

Table – 15 : Principal Fertilizer Plants

Sl. No.	Plant	Location
Public Sector		
1.	National Fertilizer Ltd	Nangal-II and Bhatinda (Punjab), Panipat (Haryana), Vijaipur, Vijaipur Expansion (Madhya Pradesh)
2.	Brahmaputra Valley Fertilizer Corp. Ltd	Namrup- II and III (Assam)
3.	Fertilizers & Chemicals Travancore Limited	Udyogmandal and Cochin-II (Kerala)
4.	Rashtriya Chemicals & Fertilizers Limited	Trombay and Trombay IV, V and Thal (Maharashtra)
5.	Madras Fertilizers Ltd	Chennai (Tamil Nadu)
6.	Steel Authority of India Ltd	Rourkela (Odisha)
7.	Hindustan Copper Ltd	Khetrinagar (Rajasthan)
Private Sector Large Units		
8.	Gujarat State Fertilizers Co. Ltd	Vadodara and Sikka I & II (Gujarat)
9.	Shriram Fertilizers & Chemicals	Kota (Rajasthan)
10.	DIL (Duncan Industries Ltd)	Kanpur (Uttar Pradesh)
11.	Zuari Agro Chemicals Ltd	Zuari Nagar (Goa)
12.	Coromandal Fertilizers Ltd	Visakhapatnam and Kakinada (Andhra Pradesh), Ennore (Tamil Nadu)
13.	Mangalore Chemicals & Fertilizers Limited	Mangaluru (Karnataka)
14.	Gujarat Narmada Valley Fertilizers Company Limited	Bharuch (Gujarat)
15.	Southern Petrochemicals Industrial Corp.	Thoothukudi (Tamil Nadu)
16.	Tata Chemicals Ltd	Haldia (West Bengal), Babrala (Uttar Pradesh)
17.	Punjab National Fertilizers and Chemicals Ltd	Nangal (Punjab)
18.	Deepak Fertilizers & Petrochemicals Corporation	Taloja (Maharashtra)
19.	Tuticorin Alkali	Thoothukudi (Tamil Nadu)
20.	Indo-Gulf Fertilizers & Chemicals Corp. Ltd	Jagdishpur (Uttar Pradesh)
21.	Nagarjuna Fertilizers & Chemicals Limited	Kakinada I & II (Andhra Pradesh)
22.	Godavari Fertilizers & Chemicals Ltd	Kakinada (Andhra Pradesh)
23.	Hin. Ind. Ltd	Dahej (Gujarat)
24.	Chambal Fertilizers & Chemicals Ltd	Gadepan I & II (Rajasthan)
25.	KSF Ltd	Shahjahanpur (Uttar Pradesh)
26.	Paradeep Phosphates Ltd	Paradeep (Odisha)
Co-operative Sector		
27.	Indian Farmers' Fertilizers Co-operative Ltd	Kalol and Kandla (Gujarat), Aonla I & II, Phulpur I & II (Uttar Pradesh), Paradeep (Odisha)
28.	Krishak Bharti Co-operative Ltd	Hazira (Gujarat)

Paper & Paper Board Industry

The Indian Paper Industry is among the top 15 global players with a projected demand of 14 million tonnes by 2015-16. There are about 666 units manufacturing pulp, paper, paper board and news print. The total installed capacity is nearly 89 lakh tonnes. The Indian Paper Industry is in a fragmental structure, consisting of small, medium and large paper mills, having capacities ranging from 5 to 800 tonnes per day. Paper Industry is based on 30% by Wood & Chemical- based Industry, 32% by Agro-residue and the remaining by recycled fibre-based Industry. As a thumb rule, in Paper Industry, cost of energy is nearly 25% of cost of production. Hence, energy management is an important aspect in Paper Industry. Import of pulp and paper products is likely to show a growing trend. Minerals like china clay, limestone, talc, salt, sulphur, etc. besides coal as fuel are used for purposes such as filler, coating & surface sizing, etc., in this Industry and also play vital role in quality control.



PAINT & ALLIED PRODUCTS INDUSTRY

The Paint & Allied Products Industry comprises paints, enamels, varnishes, pigments, printing inks, etc. Approximately, 60% of the production is contributed by the Organised Sector.

The total Indian paint demand by 2013 was projected as 2.7 million tonnes and the main market is expected for decorative coatings. India is self-sufficient in the production of paints. Barytes, bentonite, calcite, china clay, mica powder, rutile, talc/steatite/soapstone, ochre, silica & dolomite powder are some of the important minerals consumed in Paint Industry.

With large number of residential and commercial projects underway, the outlook for Indian Paint Industry appears brighter.

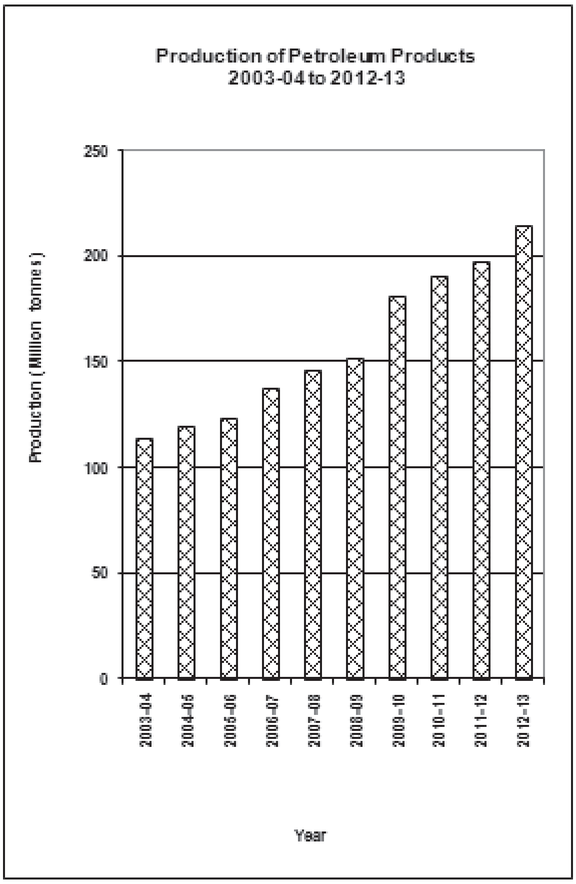
PETROLEUM REFINERIES

There were 22 refineries operating in the country (19 in Public/Joint Sector and 3 in Private Sector).

Installed capacity and crude throughputs of refineries are provided in Table-16.

The total refining capacity in the country as on 1.4.2013 is around 215 million tpy. The total crude throughput increased to 219.21 million tonnes in 2012-13 from 204.12 million tonnes in 2011-12. Production of petroleum products from crude oil was 213.2 million tonnes in 2012-13. Besides, 2.170 million tonnes LPG was produced from natural gas in 2012-13. The total exports of petroleum crude during 2012-13 was negligible. Import of petroleum crude during the same period was 19.22 million tonnes. During 2012-13, crude oil production in the country was at 37.9 million tonnes, while the natural gas (utilised) production was at 40,679 million cubic metres (m cum). Natural gas is also being imported to bridge the gap of demand and supply of natural gas and the imports during 2012-13 stood at 13.14 million tonnes.

India has a near self-sufficiency in the refinery sector. The details of capacity expansion and development are reflected in the Review on Petroleum and Natural Gas of this publication.



FOUNDRY

The Indian Foundry Sub-sector is the key feeder to the Engineering Industry. Foundry Industry on the advice of National Manufacturing Competitiveness Council (NMCC), New Delhi under Department of Industrial Policy & Promotion, Ministry of Commerce and Industry has prepared draft vision document 2020 in which it is envisaged that there must be doubling of production with enhanced energy efficiency, technological modernisation and green field expansion to realise for achieving the vision.

There are more than 5,000 foundry units in India, having an installed capacity of approximately 7.5 million tonnes per annum. However, the majority of the foundry unit falls under the category of Small-scale Industry.

Typically, each foundry cluster is known to cater to specific end-use markets. The Coimbatore cluster is famous for pump-sets castings; Kolhapur and Belgaum cluster for automotive castings; Rajkot cluster for diesel engine castings and Butala-Jalandhar cluster mainly for machine parts and agricultural implements.

Although intermediate mineral-based products like pig iron, scrap of metals and ferro-alloys, etc. are main inputs for foundry, minerals like bentonite, coke, coal, fireclay, fluorite, iron ore, limestone, silica sand, zircon flour, etc. are also being consumed by the Foundry Industry.

Table – 16 : Installed Capacity and Crude Throughputs in Refineries

(In '000 tonnes)

Refinery	Annual installed capacity (as on 1.4.2013)	Refinery Crude throughput		
		2010-11	2011-12(R)	2012-13(P)
Total	**215066**	**196989**	**202074**	**208575**
Public/Joint Sector	**120066**	**115311**	**120895**	**120303**
IOCL, Guwahati, Assam	1000	1118	1058	956
IOCL, Barauni, Bihar	6000	6207	5730	6344
IOCL, Koyali, Gujarat	13700	13561	14253	13155
IOCL, Haldia, West Bengal	7500	6878	8072	7490
IOCL, Mathura, Uttar Pradesh	8000	8880	8202	8561
IOCL, Dibgoi, Assam	650	651	622	660
IOCL, Bongaigaon, Assam	2350	2008	2188	2356
IOCL, Panipat, Haryana	15000	13660	15496	15126
BPCL, Mumbai, Maharashtra	12000	13020	13355	13077
BPCL (formerly KRL), Kochi, Kerala	9500	8699	9472	10105
HPCL, Mumbai, Maharashtra	6500	6638	7506	7748
HPCL, Vizag, Andhra Pradesh	8300	8200	8682	8028
CPCL, Manali, Tamil Nadu	10500	10104	9953	9105
CPCL, Narimanam, Tamil Nadu	1000	703	611	640
MRPL, Mangaluru, Karnataka	15000	12662	12798	14415
NRL, Numaligarh, Assam	3000	2255	2825	2478
ONGC, Tatipaka, Andhra Pradesh	66	69	69	57
Joint Venture				
Bharat Oman Refineries Ltd, Bina @	6000	-	2048	5732
HPCL, Bhatinda,	9000			4904
Private Sector	**80000**	**81678**	**81179**	**88274**
RPL, Jamnagar, Gujarat	33000	31198	32497	32613
RPL (SEZ), Jamnagar, Gujarat*	27000	35607	35186	35892
Essar Oil Ltd, Vadinar, Gujarat	20000	14873	13496	19769

Source: *Indian Petroleum and Natural Gas Statistics, 2012-13, Ministry of Petroleum & Natural Gas, (A.R. 2012-13), Government of India.*