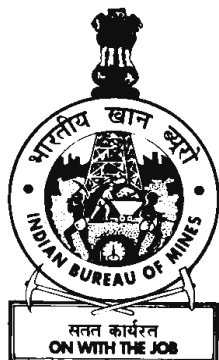


SULPHUR AND PYRITES



# Indian Minerals Yearbook 2014 (Part- III : Mineral Reviews)

**53<sup>rd</sup> Edition**

**SULPHUR AND PYRITES**

**(FINAL RELEASE)**

**GOVERNMENT OF INDIA  
MINISTRY OF MINES  
INDIAN BUREAU OF MINES**

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**July, 2016**

# 46 Sulphur and Pyrites

In India, there are no mineable elemental sulphur reserves. Pyrites was used as a substitute for sulphur in the manufacture of sulphuric acid by M/s Pyrites Phosphates and Chemicals Ltd (PPCL). There was no production of pyrites since 2003.

The domestic production of elemental sulphur is limited to by-product recoveries from petroleum refineries and fuel oil used as feedstock for manufacturing fertilizer. The sulphide ores contain sulphur and during the production of metal from sulphide ores, sulphur is released as SO<sub>2</sub> which is used to produce sulphuric acid. The sulphuric acid thus produced contains about 32.7% of sulphur and contributes in the industries which otherwise would have used elemental sulphur.

## RESOURCES

Resources of sulphur (native) were estimated in the inferred (STD333) category. The resources are located in Jammu & Kashmir and are placed at 0.21 million tonnes as on 1.4.2010 as per UNFC System.

Total resources of pyrites in the country as per UNFC system as on 1.4.2010 are placed at 1,674 million tonnes. There are no reserves and all

resources are grouped under 'remaining resources' category. Of these, about 27 million tonnes are under feasibility (STD211) category. Out of the total resources, beneficiable grade resources are 62 million tonnes, low grade 1,555 million tonnes and soil reclamation grade resources are about 6 million tonnes. Balance of about 51 million tonnes resources fall under unclassified/not-known grades. Major resources are located in Bihar and Rajasthan (Table- 1).

## PRODUCTION & STOCKS

### Sulphur

The production of sulphur recovered as by-product from fertilizer plants and oil refineries was 390 thousand tonnes in 2013-14 as against 449 thousand tonnes in the preceding year.

The oil refineries in public sector reported production of sulphur during the year 2013-14. Indian Oil Corporation Ltd contributed about 85.89% of the total production during the year. Among the states, Haryana accounted for 43.68%, Gujarat 19.49%, Maharashtra 13.14%, West Bengal 10.73%, Uttar Pradesh 9.06%, Bihar 2.63% and the remaining 1.27% was contributed by Assam (Tables- 2 to 4).

**Table – 1 : Reserves/Resources of Pyrites as on 1-4-2010  
(By Grades and States)**

(In '000 tonnes)

Grade/State	Reserves Total (A)	Remaining resources					Total (B)	Total (A+B)
		Feasibility STD211	Pre- feasibility STD222	Measured STD331	Indicated STD332	Inferred STD333		
<b>All India: Total</b>	–	<b>27129</b>	<b>32597</b>	<b>9590</b>	<b>77729</b>	<b>1527356</b>	<b>1674401</b>	<b>1674401</b>
<b>By Grades</b>								
Soil Reclamation	–	–	3000	–	–	3024	6024	6024
Beneficiable	–	27129	29597	–	–	4902	61628	61628
Low	–	–	–	9590	26310	1519430	1555330	1555330
Unclassified	–	–	–	–	51419	–	51419	51419
<b>By States</b>								
Andhra Pradesh	–	–	–	–	–	880	880	880
Bihar	–	13462	9680	–	51419	1500000	1574561	1574561
Himachal Pradesh	–	–	–	–	–	2560	2560	2560
Karnataka	–	–	–	–	–	3000	3000	3000
Rajasthan	–	13667	22917	9590	26310	18392	90876	90876
Tamil Nadu	–	–	–	–	–	24	24	24
West Bengal	–	–	–	–	–	2500	2500	2500

Figures rounded off.

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**Table - 2 : Principal Producers of Sulphur, 2013-14**

Name & address of producer	Location of plant/refinery	
	State	District
Indian Oil Corporation Ltd, (Refineries Division), Scope Complex, Core-II, 7, Institutional Area, Lodhi Road, New Delhi- 110 003.	Assam	Guwahati Digboi
	Bihar	Chirang Begusarai
	Gujarat	Vadodara
	Haryana	Panipat
	Uttar Pradesh	Mathura
	West Bengal	Midnapur
Numaligarh Refinery Limited, 122S, G. S. Road, Christanbasti, Dist: Guwahati, Assam- 785 699.	Assam	Golaghat
Bharat Petroleum Corporation Ltd, Bharat Bhavan, 4 & 6, Currimbhoy Road, Ballard Estate, Mumbai- 440 001, Maharashtra.	Maharashtra	Mumbai

**Table – 3 : Production of By-product Sulphur 2011-12 to 2013-14 (P) (By States)**

(In tonnes)

State	2011-12	2012-13	2013-14 (P)
<b>India</b>	<b>381146</b>	<b>449004</b>	<b>390325</b>
Assam	4968	3706	4950
Bihar	9329	12345	10253
Gujarat	65923	74697	76088
Haryana	174915	218633	170471
Maharashtra	54850	46991	51301
Punjab	3407	12676	-
Uttar Pradesh	36005	43574	35361
West Bengal	31749	36382	41901

**Table – 4 : Production of By-product Sulphur 2012-13 and 2013-14 (P) (By Sectors/States/Districts)**

(In tonnes)

State/District	2012-13		2013-14 (P)	
	No. of units	Quantity	No. of units	Quantity
<b>India/Public sector</b>	<b>11</b>	<b>449004</b>	<b>10</b>	<b>390325</b>
<b>Assam</b>	<b>3</b>	<b>3706</b>	<b>4</b>	<b>4950</b>
Chirang	-	-	1	397
Digboi	1	30	1	34
Guwahati	1	552	1	749
Golaghat	1	3124	1	3770
<b>Bihar/Begusarai</b>	<b>1</b>	<b>12345</b>	<b>1</b>	<b>10253</b>
<b>Gujarat/Vadodara</b>	<b>1</b>	<b>74697</b>	<b>1</b>	<b>76088</b>
<b>Haryana/Panipat</b>	<b>2</b>	<b>218633</b>	<b>1</b>	<b>170471</b>
<b>Maharashtra/Mumbai</b>	<b>1</b>	<b>46991</b>	<b>1</b>	<b>51301</b>
<b>Punjab/Roopnagar</b>	<b>1</b>	<b>12676</b>	<b>-</b>	<b>-</b>
<b>Uttar Pradesh/Mathura</b>	<b>1</b>	<b>43574</b>	<b>1</b>	<b>35361</b>
<b>West Bengal/Midnapur</b>	<b>1</b>	<b>36382</b>	<b>1</b>	<b>41901</b>

In addition, refineries of Hindustan Petroleum Corp. Ltd and RIL also recover by-product sulphur which is in turn used as feedstock in manufacturing fertilizers and pharmaceuticals. The Vadinar refinery of Essar Oil Ltd is also reported to produce by-product sulphur.

During the production of non-ferrous metals from sulphide ores, sulphur is recovered in the form of by-product sulphuric acid. HZL (Vedanta) and HCL together produced about 1.31 million tonnes and 1.20 million tonnes by-product sulphuric acid from indigenous lead-zinc and copper ores in 2011-12 and 2012-13, respectively, equivalent to about 428,000 tonnes and 392,000 tonnes of contained sulphur assuming 32.7% of sulphur in sulphuric acid. In addition, about 2.17 million tonnes and 2.20 million tonnes sulphuric acid equivalent to 710,000 tonnes and 719,000 tonnes of contained sulphur was indigenously produced from imported copper and zinc concentrates as by-product by Sterlite Industries, Binani Zinc Ltd and Hindalco Industries Ltd during 2011-12 and 2012-13, respectively. The total production of sulphuric acid from sulphide ores was thus about 3.48 million tonnes and 3.40 million tonnes, respectively, equivalent to about 1,138,000 tonnes and 1,111,000 tonnes of sulphur during 2011-12 and 2012-13, respectively (Table-5).

In fertilizer industry, the sulphuric acid is further used for manufacturing phosphoric acid and single superphosphate (SSP) from rock phosphate which is imported from Jordan, Egypt, Morocco, Togo, Israel, etc.

### Pyrites

Pyrites Phosphates and Chemicals Ltd (PPCL) had two pyrites production units located at Amjhore (Bihar) and Saladipura (Rajasthan) besides phosphorite division in Dehradun. The Government approved closure and hiving off of these two units in July 2002 and Amjhore unit in June 2003. Hence, there was no production of pyrites since 2003.

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**Table – 5 : Production of By-product Sulphuric Acid, 2011-12 and 2012-13 (By Principal Producers)**

(In tonnes)

Name of Producer	Production	
	2011-12	2012-13
Hindustan Copper Ltd	3,539	6,304
Hindustan Zinc Ltd	1310,000	1193,478
<b>A. Total : From Indigenous Ores</b>	<b>1313,539</b>	<b>1199,782</b>
Sterlite Industries (India) Ltd	1026,471	1060,519
Binani Zinc Ltd	43,207	47,130
Hindalco Industries Ltd	1097,158	1097,158 <sup>e</sup>
<b>B. Total : From Imported Ores</b>	<b>2166,836</b>	<b>2204,807</b>
<b>Grand Total : ( A + B )</b>	<b>3480,375</b>	<b>3404,589</b>

Source: Annual Reports 2012-13 of Respective Producers except Hindalco Industries Ltd.

Note: The data of 2013-14 is not available, hence data till 2012-13 given in table.

## APPLICATIONS & USES

One of the direct uses of sulphur is in vulcanisation of rubber. Sulphur is a component of gunpowder. It reacts directly with methane to give carbon disulphide, which is used to manufacture cellophane and rayon.

Elemental sulphur is mainly used as a precursor to other chemicals. Most of the sulphur is converted to sulphuric acid (H<sub>2</sub>SO<sub>4</sub>), which is of prime importance to the world economy. The production and consumption of sulphuric acid is an indicator of a nation's industrial development. The principal use of the sulphuric acid is in the manufacture of phosphatic fertilizer. Almost all trials responded to sulphur fertilizer with increase in crop yield from 14% to 60%.

Other applications of sulphuric acid include oil refining, waste water processing and mineral extraction. Sulphur compounds are also used in detergents, fungicides, dyestuffs and agrichemicals. In silver based photography, sodium and ammonium thiosulphate are used as "fixing agents". Sulfites, derived from burning sulphur, are used to bleach paper. They are also used as preservatives in dried fruit and processed fruit products.

Sulphur is used as a light-generating medium in the rare lighting fixtures known as "sulphur lamps". The sulphur lamp is a highly efficient full-spectrum electrodeless lighting system whose light is generated by sulphur plasma that has been excited by microwave radiation.

## CONSUMPTION

The total consumption of elemental sulphur in 2013-14 was about 2 million tonnes. The main

consumer of sulphur was fertilizer industry which accounted for about 77%. Chemical industry, the next important consuming industry, accounted for about 14% consumption for manufacturing carbon disulphide & dye-stuffs. Other industries like explosives, iron & steel, paint, paper, pesticides, pharmaceuticals and sugar consumed about 9% (Table - 6).

**Table – 6 : Consumption of Sulphur\* 2011-12 to 2013-14 (P) (By Industries)**

Industry	Production		
	2011-12	2012-13(R)	2013-14(P)
<b>All Industries</b>	<b>1774100</b>	<b>1960600</b>	<b>2005300</b>
Alloy steel	3600(3)	3600(3)	3600(3)
Chemical	271100(34)	272800(34)	272800(34)
Explosive	1200(2)	1200(2)	1200(2)
Fertilizer	1306800(34)	1503400(35)	1552900(36)
Iron & steel**	24400(3)	16900(3)	16100(3)
Paint	2200(2)	2000(2)	2000(2)
Paper	3800(5)	3800(5)	3800(5)
Pesticide	24600(6)	24600(6)	24600(6)
Pharmaceutical	4100(5)	4100(5)	4100(5)
Rubber	2000(12)	2000(12)	2000(12)
Sugar	130000 <sup>(e)</sup>	125900 <sup>(e)</sup>	121100 <sup>(e)</sup>
Others	300(10)	300(10)	300(10)
(Abrasive, asbestos products, dry cells battery, electrical & glass)			

Figures rounded off.

Figures in parentheses denote the number of units in organised sector reporting\* consumption.

(\*Includes actual reported consumption and/or estimates made wherever required).

\*\* The consumption relates to manufacturing sulphuric acid in the steel plants.

(e) estimate based on sugar production.

## SULPHUR AND PYRITES

### TRADE POLICY

Imports of sulphur of all kinds other than colloidal sulphur, precipitated sulphur and sublimed (flowers) sulphur under heading No. 2503 are allowed freely under the Foreign Trade Policy, 2009-14. Similarly, the imports of unroasted pyrites under heading No. 2502 are allowed freely.

### WORLD REVIEW

Reserves of sulphur in crude oil, natural gas and sulphide ores are large. Because most sulphur production is a result of the processing of fossil fuels, supplies should be adequate for the

foreseeable future. Because petroleum and sulphide ores can be processed long distances from where they are produced, sulphur production may not be in the country to which the reserves were attributed. For instance, sulphur reserves from Saudi Arabia may be recovered at oil refineries in the United States or elsewhere in the world.

In 2013, the world production of sulphur was estimated at 76.0 million tonnes and that of pyrites at 8.2 million tonnes in terms of sulphur content. China (16%), USA (12%), Russia (9%) and Canada (8%) were the major producers of sulphur. China (94%) and Finland (4%) were the major producers of pyrites (Table - 7).

**Table – 7 : World Production of Sulphur & Pyrites  
(By Principal Countries)**

Country	2011	2012	2013
	(In '000 tonnes of sulphur content)		
<b>World: Total (Sulphur)</b>	<b>73000</b>	<b>75300</b>	<b>76000</b>
<b>(Pyrites)</b>	<b>7500</b>	<b>8000</b>	<b>8200</b>
Abu Dhabi (Sulphur)	1875	2200	2510
Australia <sup>@#</sup> (Sulphur)	1026	975	902
Brazil (Sulphur)	460	478	547
(Pyrites)	18	22	20 <sup>e</sup>
Canada (Sulphur)	6608	6259	6365
China (Sulphur)	11026	11889	12491
(Pyrites)	6964	7464	7704
Chile (Sulphur)	1650	1650	1514
Finland (Pyrites)	338	375	347
(Sulphur)	1073	1112	1077
Iran (Sulphur)	1575	1660	1600
Germany (Sulphur)	2007	1805	1720
Japan (Sulphur)	3382	3503	3465
Kazakhstan (Sulphur)	2860	2739	3057
Korea, Rep. of (Sulphur) <sup>e</sup>	2428	2603	2678
Mexico (Sulphur)	1482	1566	1584
Poland (Sulphur)	1227	1272	1117
Russia (Sulphur)	7504	7451	7096
(Pyrites) <sup>e</sup>	71	71	71
Saudi Arabia (Sulphur)	3300	4092	3900
South Africa (Sulphur)	337	257	250 <sup>e</sup>
(Pyrites)	-	-	-
USA (Sulphur)	8950	8996	9150 <sup>e</sup>
Other countries (Sulphur)	14230	14793	14977
(Pyrites)	109	68	58

*Source : World Mineral Production, 2009-2013.*

*@ : Including New Zealand.*

*# Australia includes Australia and New Zealand.*

## SULPHUR AND PYRITES

Elemental sulphur is obtained from ores by conventional mining or by the Frasch method of mining or as a by-product of sour natural gas processing, sour crude refining, tar sand processing and stack gas clean-up (recovered sulphur). Recovered sulphur production accounted for over 98% world elemental sulphur production.

In Frasch method, three concentric pipes are used. The outermost pipe contains superheated water, which melts the sulphur, and the innermost pipe is filled with hot compressed air, which serves to create foam and pressure. The resulting sulphur foam is then expelled through the middle pipe. The Frasch process produces sulphur with 99.5% purity content, and it needs no further purification. Frasch sulphur production on a commercial scale was operated in Brazil and Mexico. Elemental/native sulphur was mined in China, Poland and Russia.

### Canada

Canada ranked fourth in the world in sulphur production. In 2013, sulphur production in Canada was 3% higher than it was in 2012.

At year end 2013, sulphur inventory in Western Canada was estimated to be 11 million tonnes. About 9.7 million tonnes of the sulphur stocks was stored at Syncrude Canada Ltd's Fort McMurray, Alberta, oil sand operation. Fort McMurray is so remote that transporting the sulphur to market is extremely difficult and expensive. Only about 1.3 million tonnes of the sulphur from central Alberta was easily marketable.

In September, North West Redwater Partnership, a 50-50 joint venture between North West Upgrading Inc. and Canadian Natural Resources Ltd, began construction on the first phase of a 150,000 bbl/d refinery at a cost of Can \$ 5.7 billion. The plant was located north of Edmonton, Alberta, in Sturgeon County. The project would process bitumen (a heavy black viscous oil) primarily to produce ultra-low-sulphur diesel fuel for local use and export.

### China

China was the leading producer of sulphur in all forms. It was also the world's leading producer of pyrites, with about 56% of its sulphur in all

forms coming from that source. The country was the leading sulphur importer, with 10.6 million tonnes representing 34% of the global imports. Imports represented about 70% of elemental sulphur consumption in China, with the Middle East as the leading source of the imports, followed by Kazakhstan and Japan. Fertilizer production consumed about two-third of the sulphuric acid produced in China.

### Vietnam

Construction of a 200,000 bbl/d Vietnamese oil refinery in Nghi Son Economic Zone in Thanh Hoa Province was scheduled to begin in July 2013. The refinery was expected to cost \$9 billion and was to be supplied by heavy crude oil from Kuwait.

## FOREIGN TRADE

### Exports

Exports of sulphur (excluding sublimed, precipitated and colloidal) increased sharply to 577,695 tonnes in 2013-14 from 369,960 tonnes in the previous year. Exports were mainly to China (80%), UAE (11%) and Lebanon (2%).

Exports of sulphur (sublimed, precipitated and colloidal) sharply increased to 14,516 tonnes in 2013-14 from 11,155 tonnes in the previous year. Sulphur (sublimed) alone accounted for 99% whereas the colloidal and precipitated sulphur together shared remaining 1% exports in 2013-14. Exports were mainly to Germany (17%), Thailand (9%), South Africa (8%), Portugal (7%) and Turkey (6%), etc. (Tables- 8 to 12).

### Imports

Imports of sulphur (excluding sublimed, precipitated and colloidal) decreased sharply to 12.90 lakh tonnes in 2013-14 from 15.47 lakh tonnes in the previous year. Imports were mainly from Saudi Arabia (35%), UAE (26%), Qatar (21%) and Kuwait (11%).

Imports of sulphur (sublimed, precipitated and colloidal) increased sharply to 5,550 tonnes in 2013-14 from 4,738 tonnes in the previous year. Out of the total imports, 2,763 tonnes was precipitated sulphur, 2,749 tonnes sublimed sulphur and 38 tonnes colloidal sulphur (Tables-13 to 17).

## SULPHUR AND PYRITES

**Table – 8 : Exports of Sulphur (Excl. Sublimed, Precipitated & Colloidal) : Total  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>369960</b>	<b>3367801</b>	<b>577695</b>	<b>3949918</b>
China	329334	2926687	464851	3125300
UAE	62	1709	65068	340417
Singapore	-	-	7428	129324
Lebanon	-	-	13267	88059
Mozambique	13267	127136	6595	55559
Pakistan	1770	17812	6512	53869
South Africa	20020	168862	8976	46642
Bangladesh	2720	71472	1841	44301
Sri Lanka	683	13518	903	16406
Sudan	191	3878	610	15356
Other countries	1913	36727	1644	34685

**Table – 9 : Exports of Sulphur (Sublimed, Precipitated & Colloidal) : Total  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>11155</b>	<b>1344068</b>	<b>14516</b>	<b>1782638</b>
Germany	3430	436747	2713	365361
Thailand	516	61856	1368	165669
South Africa	1056	140907	1122	151612
Portugal	821	98267	1008	130993
Turkey	394	51731	829	109520
Spain	417	56235	711	97000
UK	371	46476	708	92732
Iran	437	60065	726	84864
Russia	156	20090	564	76552
Indonesia	606	66153	715	76261
Other countries	2951	305541	4052	432074

**Table – 10 : Exports of Sulphur (Colloidal)  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>79</b>	<b>4353</b>	<b>90</b>	<b>4711</b>
Moracco	-	-	35	2125
Lebanon	42	3327	23	1764
Nepal	37	1017	26	619
Kenya	-	-	5	162
Congo, D. Rep.	-	-	1	21
UAE	-	-	++	16
Algeria	-	-	++	3
Zambia	-	-	++	1
Mauritius	-	-	++	++
Other countries	++	9	-	-



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**Table - 11 : Exports of Sulphur (Precipitated)  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>104</b>	<b>2868</b>	<b>92</b>	<b>1872</b>
Nepal	13	810	82	1593
Sri Lanka	22	534	10	278
UAE	++	6	++	1
Other countries	69	1518	-	-

**Table – 12 : Exports of Sulphur (Sublimed)  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>10972</b>	<b>1336847</b>	<b>14334</b>	<b>1776055</b>
Germany	3430	436747	2713	365361
Thailand	516	61856	1368	165669
South Africa	1056	140907	1122	151612
Portugal	821	98267	1008	130993
Turkey	394	51731	829	109520
Spain	417	56235	711	97000
UK	371	46476	708	92732
Iran	437	60065	726	84864
Russia	156	20090	564	76552
Indonesia	606	66153	715	76261
Other countries	2768	298320	3870	425491

**Table – 13 : Imports of Sulphur (Excl. Sublimed, Precipitated & Colloidal): Total  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>1547267</b>	<b>17358957</b>	<b>1289979</b>	<b>11002926</b>
Saudi Arabia	284353	3144240	446640	3544750
UAE	322556	3796321	333156	2652907
Qatar	216596	2436985	268346	2466142
Kuwait	211579	2302307	146906	1418740
Bahrain	108670	1196359	59998	458063
Iran	304433	3381835	27499	223086
Japan	2	238	24002	192874
Oman	13730	165525	2297	30674
Russia	1800	19264	1079	10224
USA	71	3344	24	2488
Other countries	83477	912539	32	2978

**Table – 14 : Imports of Sulphur (Sublimed, Precipitated & Colloidal): Total  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>4738</b>	<b>399917</b>	<b>5550</b>	<b>612338</b>
USA	1443	167209	1690	218734
UAE	-	-	2200	177737
Malaysia	1158	141156	898	118970
Japan	80	9788	329	40429
China	349	31970	217	20668
Chinese Taipei/ Taiwan	33	7869	50	13312
Germany	52	10179	46	8833
Belgium	++	8	14	2229
UK	5	385	21	2120
Unspecified	-	-	59	7392
Other countries	1618	31353	26	1914

**Table – 15 : Imports of Sulphur (Precipitated)  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>2850</b>	<b>338262</b>	<b>2763</b>	<b>358999</b>
USA	1428	166228	1492	192761
Malaysia	1014	124675	754	100589
Japan	80	9751	263	32755
China	264	23724	180	17053
Chinese Taipei/ Taiwan	33	7869	40	10494
Germany	29	5017	31	4808
Korea, Rep. of	1	160	2	282
Australia	1	336	1	257
Other countries	++	502	-	-

**Table – 16 : Imports of Sulphur (Colloidal)  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>1635</b>	<b>35208</b>	<b>38</b>	<b>5302</b>
Germany	22	4915	14	3811
Korea, Rep. of	7	278	23	1345
Japan	++	37	1	137
USA	++	89	++	8
Other countries	1606	29889	++	1



SULPHUR AND PYRITES

**Table – 17 : Imports of Sulphur (Sublimed)  
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>253</b>	<b>26447</b>	<b>2749</b>	<b>248037</b>
UAE	-	-	2200	177737
USA	15	892	198	25965
Malaysia	144	16481	144	18381
Japan	-	-	65	7537
China	85	8246	37	3615
Chinese Taipei/ Taiwan	-	-	10	2818
Belgium	++	2	14	2229
UK	5	385	21	2120
Germany	1	247	1	214
Unspecified	-	-	59	7392
Other countries	3	194	++	29

(2012-17) has recommended that taxation policy intervention should be introduced to recover the sulphur going as gaseous emissions in the refinery and petro-chemical industries.

Recovered sulphur output was expected to increase significantly worldwide. Increased production, was expected to come from Russia's increased sulphur recovery from natural gas and Asia's improved sulphur recovery at oil refineries and new development of sour gas deposits. Refineries in developing countries were expected to improve environmental protection measures and eventually, compare with the environmental standards of plants in Japan, North America and Western Europe in future. Higher sulphur recovery is likely to result from several factors, viz, higher refining rates, higher sulphur content in crude oil, lower allowable sulphur content in finished fuels, and reduced sulphur emissions mandated by regulations.

## FUTURE OUTLOOK

Country being deficient in sulphur and pyrites which are essential for fertilizer industry, the Working Group on Mineral Exploration & Development ( other than Coal & Lignite) for the 12<sup>th</sup> Five Year Plan

Some of the future gas production is expected to come from unconventional natural gas resources such as tight gas, shale gas, and coal bed methane. Use of unconventional gas resources will certainly affect the sulphur supply outlook for the future as these gases have low sulphur content.