



INDIA'S MINING INDUSTRY ANALYSIS 2017-18



LSI Financial Services Pvt. Ltd.
Creating Value, Partners in Growth

Contents

Section	Slide No.
Economic & Mining Sector Overview Global & India	3
Coal	14
Bauxite & Aluminium	24
Zinc & Lead	34
Copper	42
Mining Industry Driver, Challenges & Opportunities	46
Peer Analysis & Strategic Recommendation	53



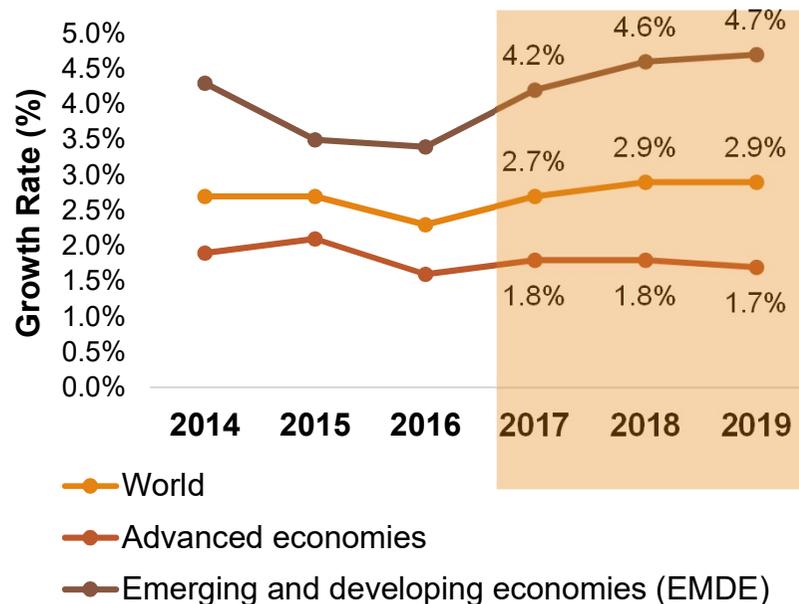
Global Economy At a Glance, 2016

Despite the uncertainty, the global economic growth in 2017 is forecasted to rise to 2.7% from 2.3% in 2016.

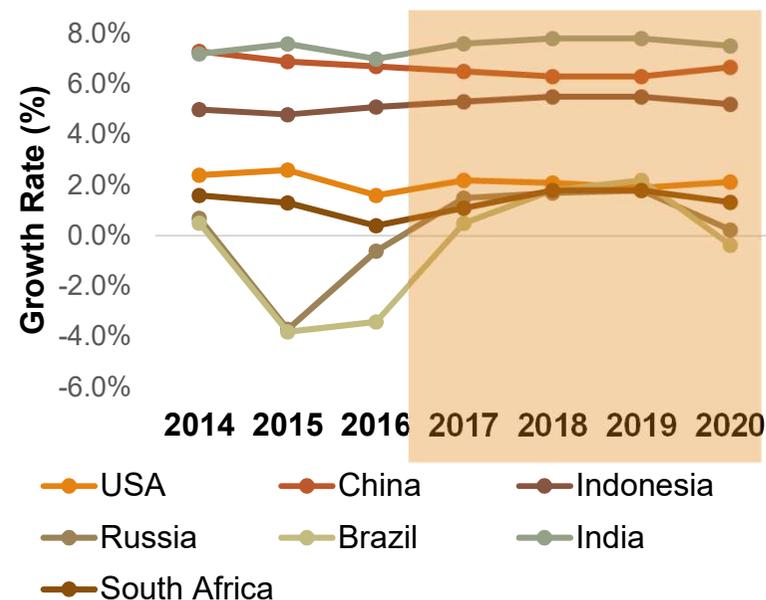


- Heightened policy uncertainty, stagnated global trade and subdued investments insinuates towards another difficult year for the global economy.
- Emerging and developing economies are expected to contribute approximately 60% to global growth in 2017.

Annual Growth Rates (%), Regional, 2014-2019



Annual Growth Rates (%), Selected Countries, 2014-2020



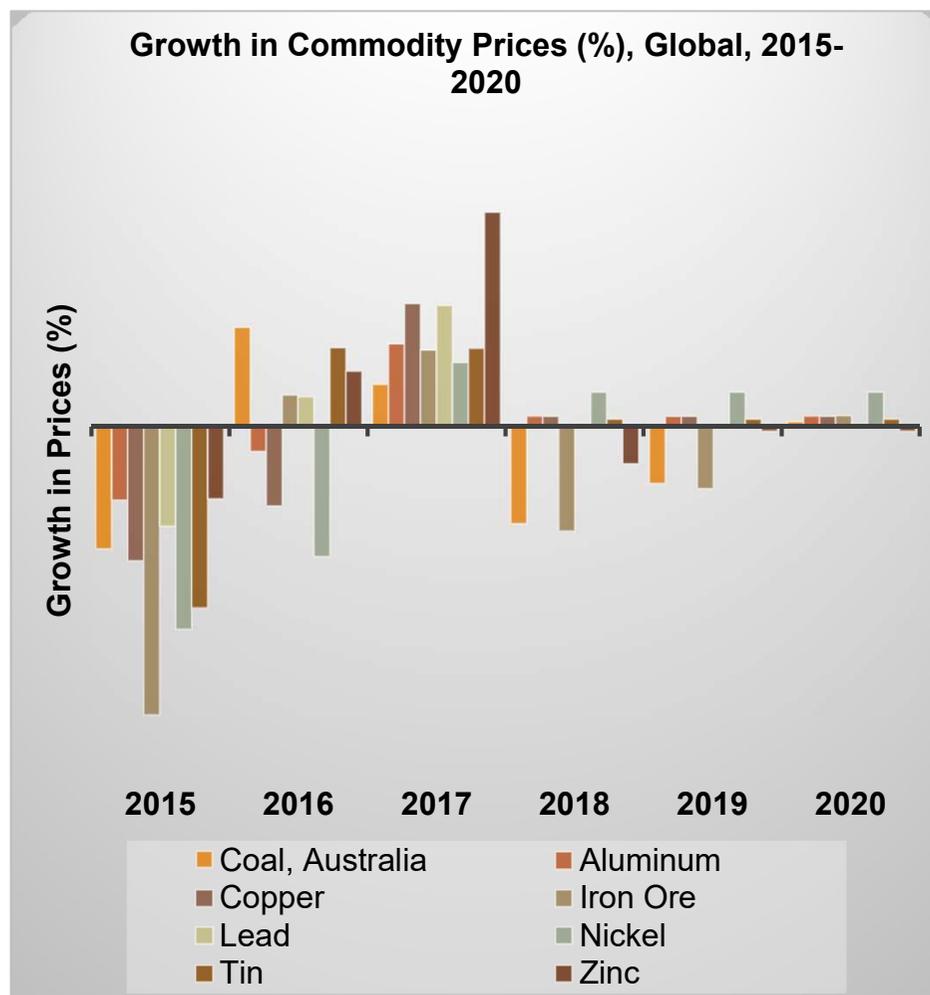
Note: The US projections do not account for the policy changes by the new administration as their overall scope and form are still uncertain. The shaded portion depicts forecasts.

Source: World Bank Group, LSI Research



Global Energy and Metals Prices, 2016

The period 2014-2016 experienced sharp decline in energy prices. However, the projections for 2017 look positive.



Source: World Bank, LSI Research

- Energy prices are expected to **increase by 26% in 2017** and by an **additional 8% in 2018**. Metal prices have undergone a drastic slowdown lately.
- Metal prices posted a **decline of 6% in 2016**. However, metal prices are likely to **climb 11% in 2017** due to tightening markets for most metals.
- In Q1 of 2017, **energy prices rose 6%** while, **coal prices fell 13%** as supplies rebounded after China relaxed production limits. The prices of **metals surged by 10%**, driven by strong demand and various supply constraints.

Important Global Factors Impacting the Future Coal and Metals Industry

Demand from China accounts for more than 50% of global metals consumption and therefore, the **Protectionist Trade Policies** particularly from China might negatively affect demand.

Greater infrastructure emphasis particularly in the U.S. will put an upward pressure on metal prices.

Direction of U.S. policies by the new administration will induce volatility in metal prices.

Market tightening may initiate rise in coal and metal prices. **Asia and China's attempt to reduce excess capacity** in steel, aluminium, and coal may positively impact the prices of the commodities.

Specific Metal Price Forecast, Global, 2017

Zinc and Lead will experience the largest gains of 27% and 18% respectively. This is primarily due to mine supply closures and discretionary shut-ins in several countries.

Copper prices will increase by 18% as a result of various disruptions at some of the world's largest mines.

Aluminium, Iron ore and Tin are expected to have double digit gains as well.

Source: World Bank, Business Standard, LSI Research



Economic Facts & Figures, India, 2016–2017

The government is providing a modest boost to the economy. It is targeting to control the budget deficit and inflation levels.



Economic Growth Rate
7.1%



Unemployment Rate
4.9%



Current Account Deficit
3.5% of GDP

Source: India Brand Equity Foundation (IBEF), Trading Economies

Sectoral Contribution to GDP:



Services: 45.4%



Industry: 29.8%



Agriculture: 16.5%



Government Debt as % of GDP
69.5%



CPI Inflation (y-o-y)
2.23%



Corporate earnings in India are expected to grow by over 20% in FY2017.



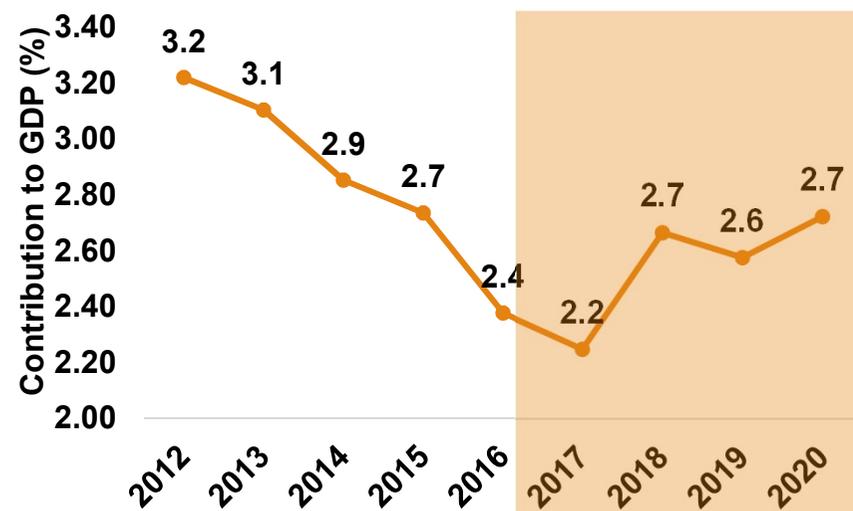
The tax collection figures between April 2016 and January 2017 have shown an increase in Net Indirect taxes by 16.9% and an increase in Net Direct taxes by 10.79% y-o-y.



Mining Sector – India

The domestic mining sector currently contributes about 10% -11% to the industrial sector and about 2.2% - 2.5% to the economy's GDP.

Contribution Of Mining & Quarrying to GDP (%), India, 2011-2019



- The economy is endowed with vast reserves of key metallic and non-metallic minerals including iron ore, bauxite, coal, limestone and manganese. India is among the top 10 producers for these ores globally.
- The mining and quarrying sector's contribution to the GDP is forecasted to be 2.66% for FY2017 from 2.25% in FY2016. current FY2017. The government is to allot around 280 mines this fiscal.
- The states of Chhattisgarh, Jharkhand and Orissa are the most mineral rich regions in the economy.

Production Trend Of Principal Minerals Apart From Coal (in MT), India, 2015 - 2016

MINERAL	2015	2016	Y-o-Y growth (%)
LIMESTONE	2,93,273	3,03,815	3.6
BAUXITE	22,494	28,134	25.1
COPPER	3,505	3,908	11.5
LEAD AND ZINC	9,363	10,453	11.6
MANGANESE ORE	2,369	2,148	-9.3
IRON ORE	1,29,321	1,55,910	20.6

Source: Ministry of Mines, Ministry of Statistics and Program Implementation, LSI Research



India's Mining & Industrial Sector, 2016–2017

Growth rate of industrial sector is to moderate to 5.2% in 2016-17 from 7.4% last fiscal.



Link Between Industrial And Mining Sector

Mining is one of the core sectors that drive growth in an economy. Not only does it contribute to GDP, it also acts as a catalyst for the growth of other core industries like power, steel, cement, etc., which, in turn, are critical for the overall development of the economy. For every 1% increment in the growth rate of mining and quarrying results in 1.2 – 1.4% increment in the growth rate of industrial. Both the sectors are largely complementary and influence one another.

Industrial Output expanded by 5% in 2016-2017. Industrial production in India averaged 6.11% from 1994 until 2017.

During April-November 2016, growth of 0.4% has been observed in the Index of Industrial Production (IIP) due to strong growth in electricity generation. This growth was offset by moderation in mining and manufacturing.

India is expected to become the fifth largest manufacturing country in the world by the end of 2020. The Government of India has set an ambitious target of increasing the contribution of manufacturing output to 25% of Gross Domestic Product (GDP) by 2025, from 16% currently. This growth in the manufacturing sector will also lead to the growth of the mining sector as the outputs of the mining sector act as inputs for the manufacturing sector. As the manufacturing sector expands, it is expected that even the mining sector will expand because of the domino effect.

Source: IBEF, LSI Research



Mining & the Index of Industrial Production (IIP), India

- The Index of Industrial Production (IIP) is a good composite indicator that measures the changes in volume of production basket of industrial products. It comprises of manufacturing, mining and electricity.
- The eight core Infrastructure-supportive industries coal, crude oil, natural gas, refinery products, fertilizers, steel, cement and electricity - that have a total weight of nearly 38% in the IIP, registered a cumulative growth of 1.9% during April-Dec.'16.

Inefficiencies In The Indian Mining Industry

Mining in India has not achieved the optimal potential yet and the reserves to production ratios remain low. Over 80% of the mining in India is done in coal which has never been opened to commercial mining. Illegal mining, unsustainable mining activities, limited explorations, social and political land acquisition issues constrain the supply of the minerals.

Growth of Index of Industrial Production (IIP) (%), India, 2015, 2016 and 2017

	Weight	2015	2016	Jan 2017	Feb 2017
Mining	141.57	1.5	2.2	5.3	3.3
Manufac.	755.27	2.3	2.0	2.9	-2.0
Electricity	103.16	8.4	5.7	3.9	0.3
General Index	1000.00	2.8	2.4	3.3	-1.2

Weights For The Calculation of IIP, India

SECTOR	WEIGHTS
Manufacturing	75.52%
Mining	14.16%
Electricity	10.32%
IIP	100.00%

Source: Office of Government Adviser, Central Statistics Office (CSO), LSI Research



2017 Union Budget Highlights Pertaining to the Mining Sector



Macroeconomic Targets For The Year- 2017

- ✓ The Government of India has pegged the fiscal deficit target at 3.2% for 2017-18 and 3% for the following year.
- ✓ The GDP growth rate is expected to be at 7.6% in 2018 and 7.8% in 2019. Against this backdrop, growth for South-Asia is forecasted to accelerate to 5.5% in 2017 from 5.3% in 2016.

Budget Highlights Pertaining to the Mining & Energy Sector

- Import duty on aluminium ores and concentrates raised to 30% from nil presently.
- INR1.26 thousand crore received as energy production based investments.
- Trade infra export scheme will be launched 2017-18.

Issues Pertaining To The Mining Sector Which Were Unaddressed by the Union Budget, 2017

- The total effective import duty on coking coal (raw material) is still higher than the import duty on coke (finished product).
- The customs duty on copper remains at 5% only. This will lead to rise in imports from FTA countries impacting existing excess capacity.
- Basic customs duty on downstream aluminium and primary aluminium has not been increased. The imports of aluminium products could continue to rise which could lead to low capacity utilization.

Source: World Bank, Ministry of Mines, Reserve Bank of India, India Brand Equity Foundation (IBEF), LSI Research



Goods & Service Tax Applicable on the Mining Sector

Pre GST Tax Liability & Cenvat Credit Available

Particulars	Merchant Mining		Mining Cum Manufacturing	
	Tax Levied	*Cenvat Credit	Tax Levied	Cenvat Credit
Exploration	✓	✗	✓	✓
Handling	✓	✗	✓	✓
Transportation	✓	✗	✓	✓
Grant for Lease	✓	✗	✓	✓
Excise duty	✗	✗	✓	✓
VAT	✓	✓	✓	✓

The mining sector incurred Service Tax and Royalty as the procurement costs.

*CENVAT credit is a credit in respect of central excise on inputs purchased for the manufacture or duty paid in relation to the manufacture of the final product.

Conclusion

Under the earlier regime tax at the rate of 15% was implemented, whereas under GST a tax rate of around 18% will be implemented. Thus there will be additional cash requirement of 3%. However, as there are several credits available all across, the net tax cost of the final product should decrease under GST.

Source: GST Idea; LSI Research

Post GST Tax Liability & Cenvat Credit Available

Particulars	Merchant Mining		Mining Cum Manufacturing	
	Tax Levied	Cenvat Credit	Tax Levied	Cenvat Credit
Exploration	✓	✓	✓	✓
Handling	✓	✓	✓	✓
Transportation	✓	✓	✓	✓
Grant for Lease	✓	✓	✓	✓
Outward supply Intra state	✓	✓	✓	✓
Outward supply Inter state	✓	✓	✓	✓

The lease holder to the State Government for the grant of the lease of the mines in form of Royalty would be chargeable to GST. However, it is yet to be whether royalty is a tax or not. Thus, if it concluded that is it in the nature of tax, GST on same cannot be levied as there can be no tax on tax.

It is advisable that the Royalty shall be considered as part of GST enabling business entity to claim its set off against their GST liability to avoid cascading effect.



Goods & Service Tax Applicable on Coal & Metals

Commodity	GST Rate Slab	Current Tax Incidence	Change in Tax Impact Post GST
Coal	5%	11.69%	↓
All Aluminium Items (including utensils, table or kitchen or other household items of aluminium, etc.)	12%	Excise duty of 12.5%, VAT of 4% and a further CST of 2%.	↓
All Lead Items (unwrought lead, waste and scrap, lead plates, sheets, strip and foil, lead powders and flakes, other articles made of lead including sanitary fixtures and Indian lead seals, etc.)	18%		Almost nil
All Zinc Items (unwrought zinc, waste and scrap, dust, powder, flake, bars, rods, profiles and wire, plates, sheets, strip, foil, other articles including sanitary fixtures, etc.)	18%		Almost nil
All Copper Utensils and table or kitchen or other household articles of copper	12%		↓
Other Copper Items (copper mattes, unrefined copper, refined copper, copper waste, foil, tubes, pipes, copper anodes, alloys, cement copper, etc.)	18%		Almost nil
All Base Metals Goods (base metals such as Tungsten, Tantalum, Magnesium, Cobalt, Titanium, Antimony, Manganese, Chromium, Gallium, etc.)	18%		Almost nil

Source: How to Import Export; The Economic Times; LSI Research



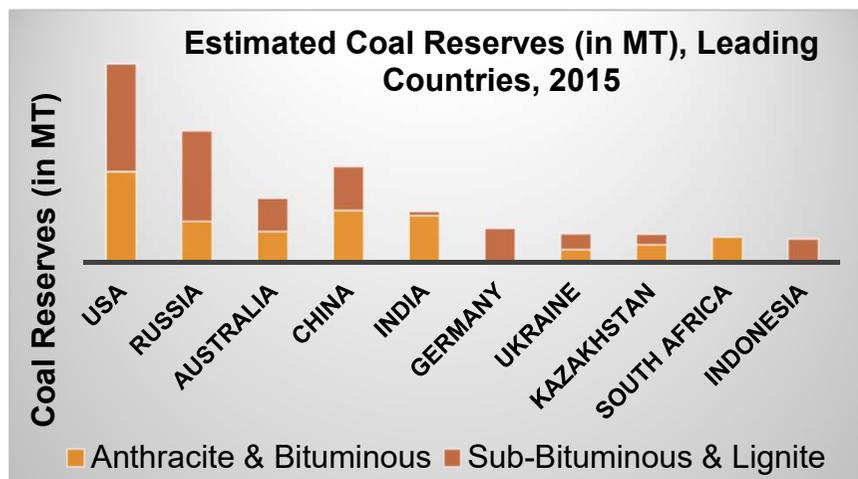
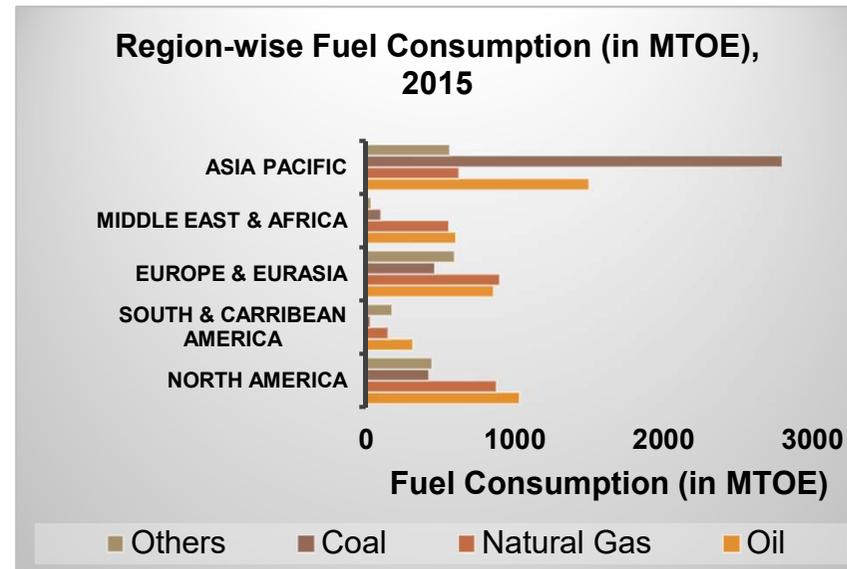
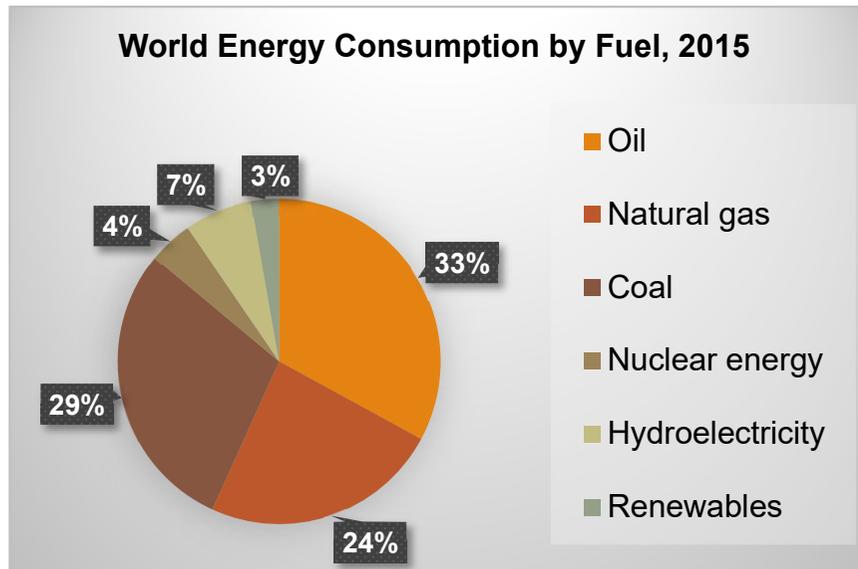


Coal



Global Coal Industry

Coal as a primary source of energy globally. It provides 30% of global energy needs and generates 41.1% of world's electricity.



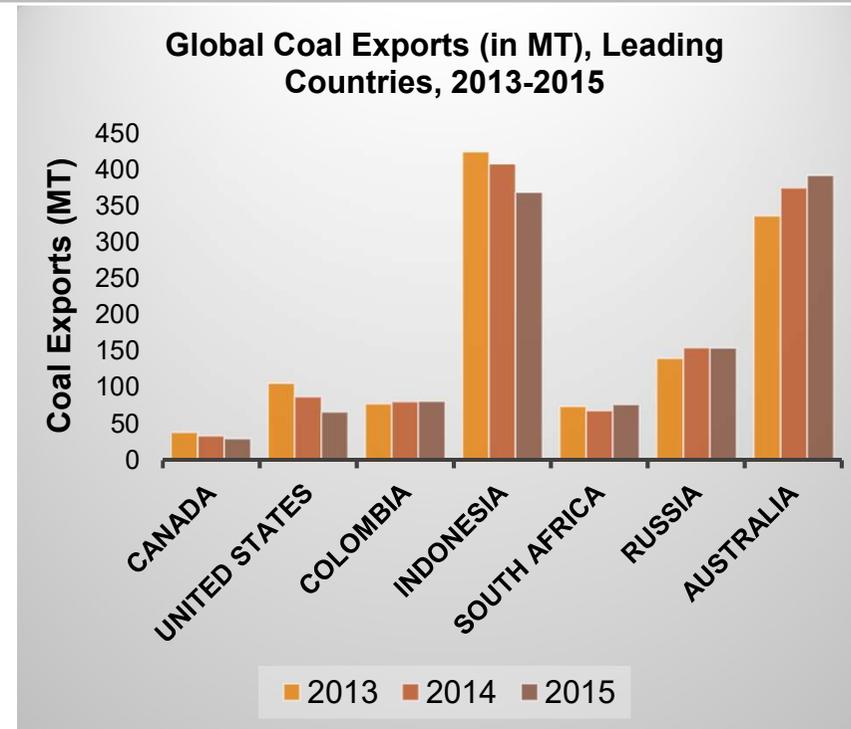
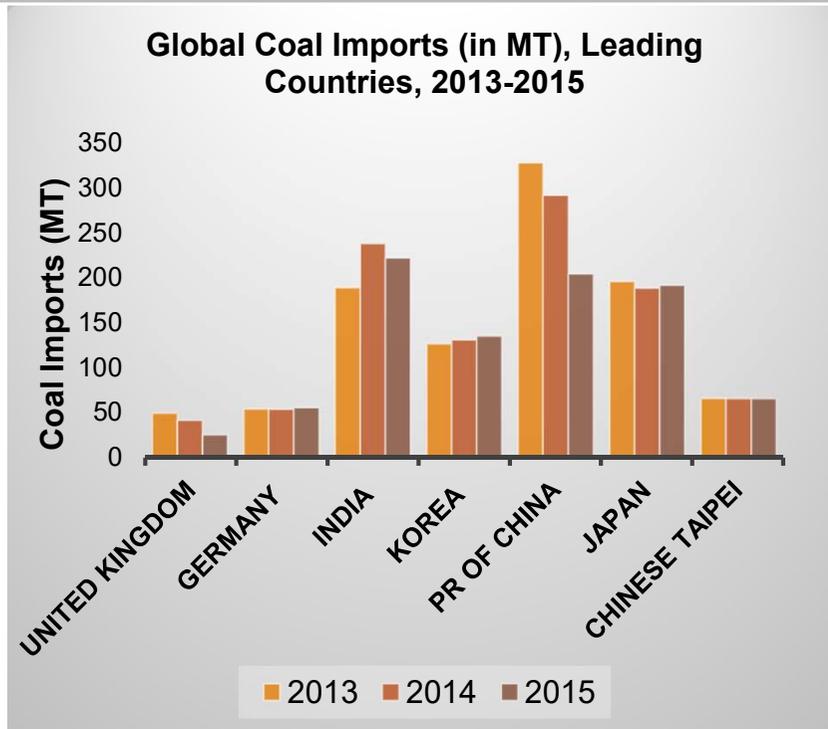
China has been the largest coal producer for the past three decades. India is the 3rd largest producer and consumer of coal globally.

More than 80% of the world reserves are located in just 10 countries.

Source: British Petroleum (BP) 2015, LSI Research



Imports and Exports of Coal – Global Context



- Oceania which includes Australia and New Zealand has the largest share in global coal exports.
- Asia and Europe account for approximately 25% and 18% respectively.
- India was the largest coal importer in 2015 surpassing even China.
- The imports by the PR of China have been on a steady decline as the demand has stabilized and is met by domestic supply.

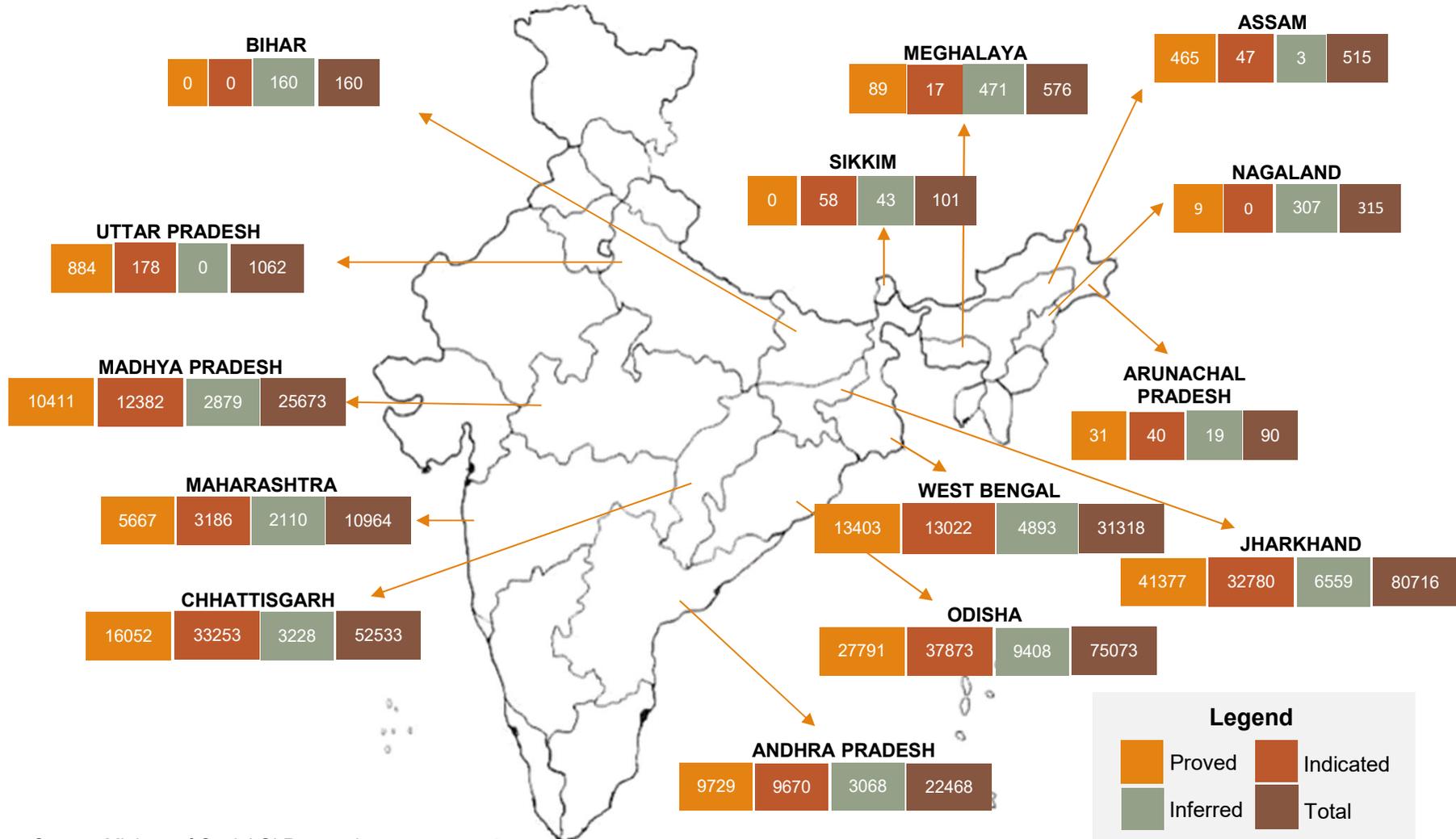
Source: European Association for Coal & Lignite, Energy Impact Association (EIA), LSI Research



Coal Reserves

Coal contributes to 58% of total primary energy requirement of India. A total of 306.60 billion tonnes of coal reserves are estimated in India as on 01.04.2015. The state of Jharkhand has the largest reserves in the country.

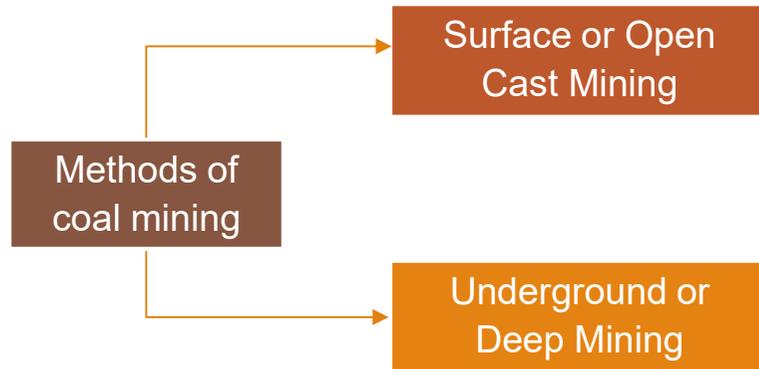
State-wise Coal Reserves (in MT), India, 2014



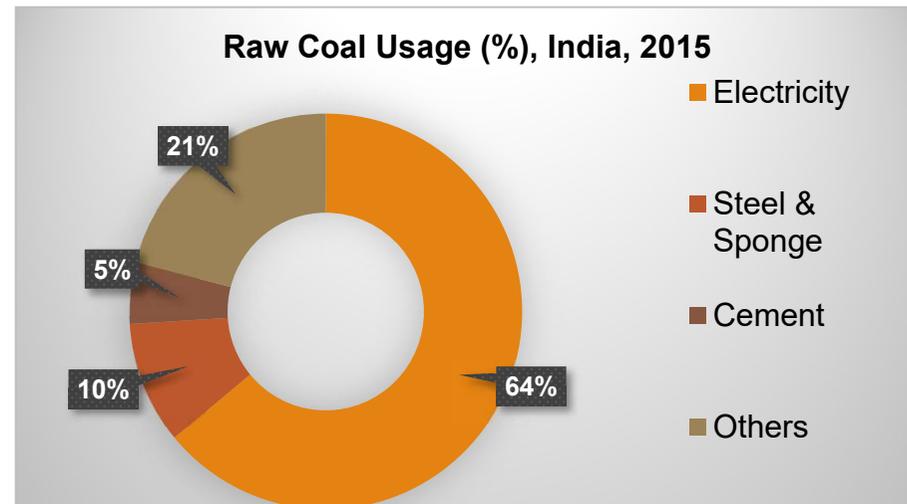
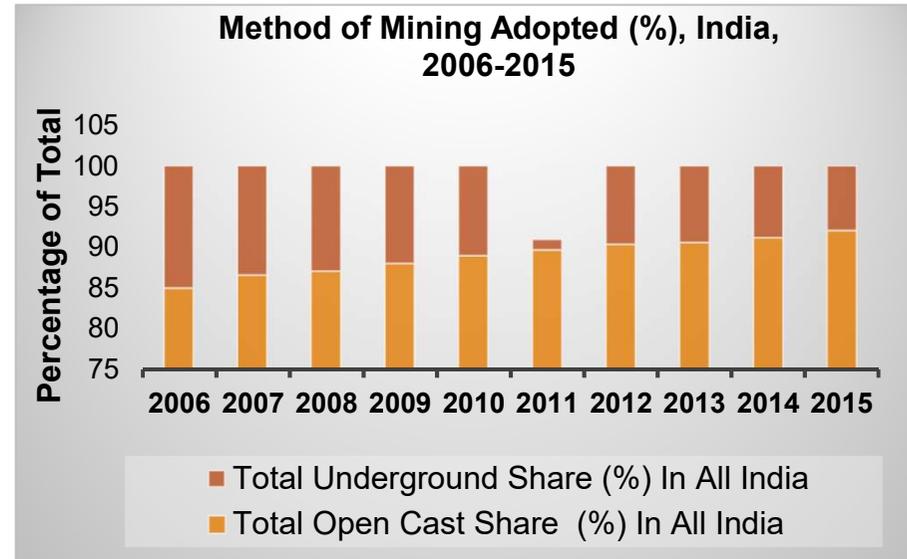
Source: Ministry of Coal, LSI Research



Mining Methods and Usage of Coal



- The method of coal mining adopted is largely determined by the geology of the coal deposits. In India, only 10% of the coal is produced via underground mining whereas, in China, around 95% of the coal is produced employing underground mining.
- Since the nationalisation of coal mines in early 1970s, there has been a gradual and consistent decline of coal production from underground mines. Surface mining dominates in meeting the coal/energy demand of the Indian economy.



Source: Ministry of Statistics and Program Implementation (MOSPI)
Energy Statistics, Ministry of Coal, LSI Research



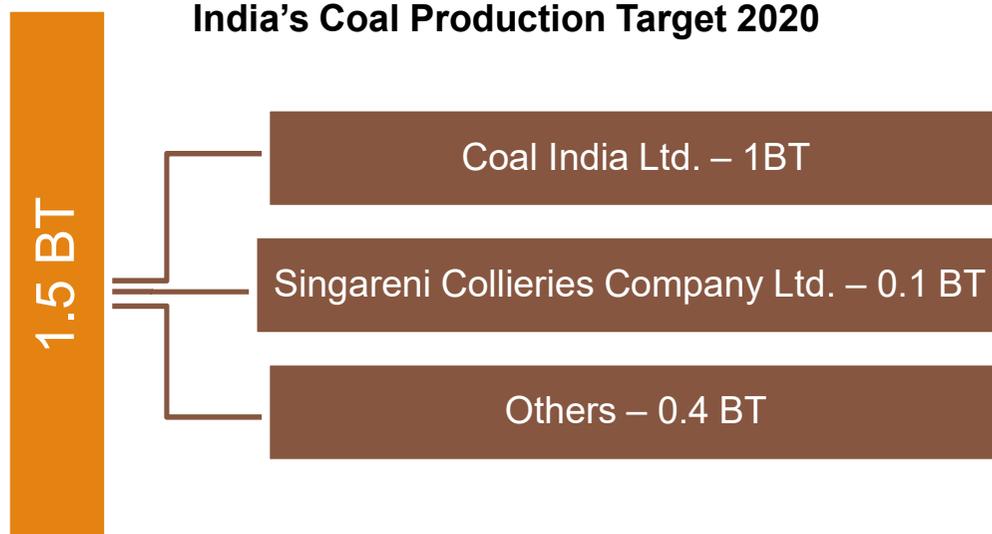
Production of Coal

There are reports that Coal India Ltd. (CIL) is opening mines at the rate of one per month so that government plans to boost power capacity can be met.

Production of Coal (in MT), India, 2015-16 And 2016-17

Name of Company	2015-16 Production	Apr-Dec. 2016 Production (Actual)	Growth (%) (Apr-Dec. 2016)	Jan-March 2017 (Anticipated)
CIL	538.7	377.8	1.2	220.8
SCCL	60.4	42.4	-2.0	15.6
Captive	28.8	24.7	14.5	21.4
Others	11.3	8.1	-11.9	13.9
Total	639.2	453.1	1.3	271.6

India's Coal Production Target 2020



- In India, 90% of the coal is produced by public sector while only 10% is produced by the private sector.
- The total coal produced by the Indian public units was 600.03MT in 2015-16 while the private players manufactured 32.139MT of coal in 2015-2016.
- Given the demand for coal in the economy, the Ministry of Coal, has targeted to double the coal production in the country and reach
- During the decade of FY2006-2015, China's coal production grew at a CAGR of 4.3%.
- India, the third largest coal producer in FY2015, produced 639.2MT of coal; representing a y-o-y growth of 4.7%.

Source: Ministry of Coal, Government of India, LSI Research



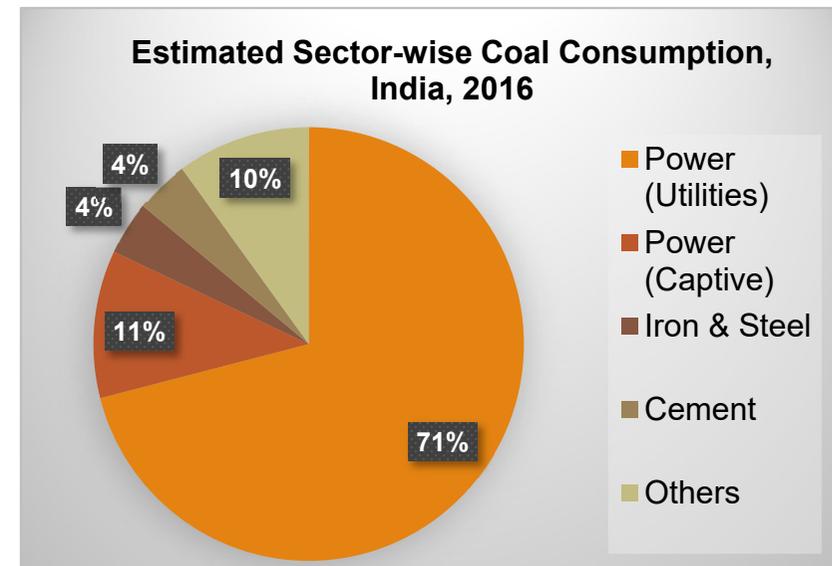
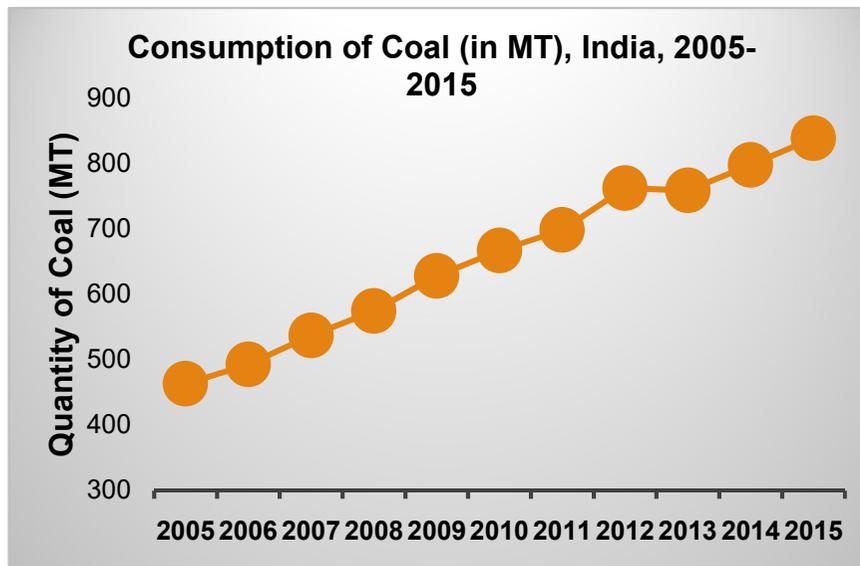
Consumption Demand & Supply of Coal

The power industry accounts for over 70% of the coal consumption in the Indian economy. 74.2% of the coal consumed in India is domestic while the remaining is imported.

Coal Consumption Growth, Selected Economies, 2010 - 2015

Country	China	USA	Russia	S. Africa	India	Indonesia	Australia	World
CAGR% (2010-15)	1.63	(4.61)	(0.36)	(1.47)	7.74	12.56	(1.40)	1.6

In India, the end-use sectors of coal mainly include electricity, iron and steel and cement. Demand from the unorganised small scale sector comprising primarily of the brick and ceramic industry is also relatively large.



Source: British Petroleum (BP), Coal Controller India's, Coal Directory of India, Ministry of Coal Annual Plan Documents, LSI Research



Coal Pricing: A Global Comparison

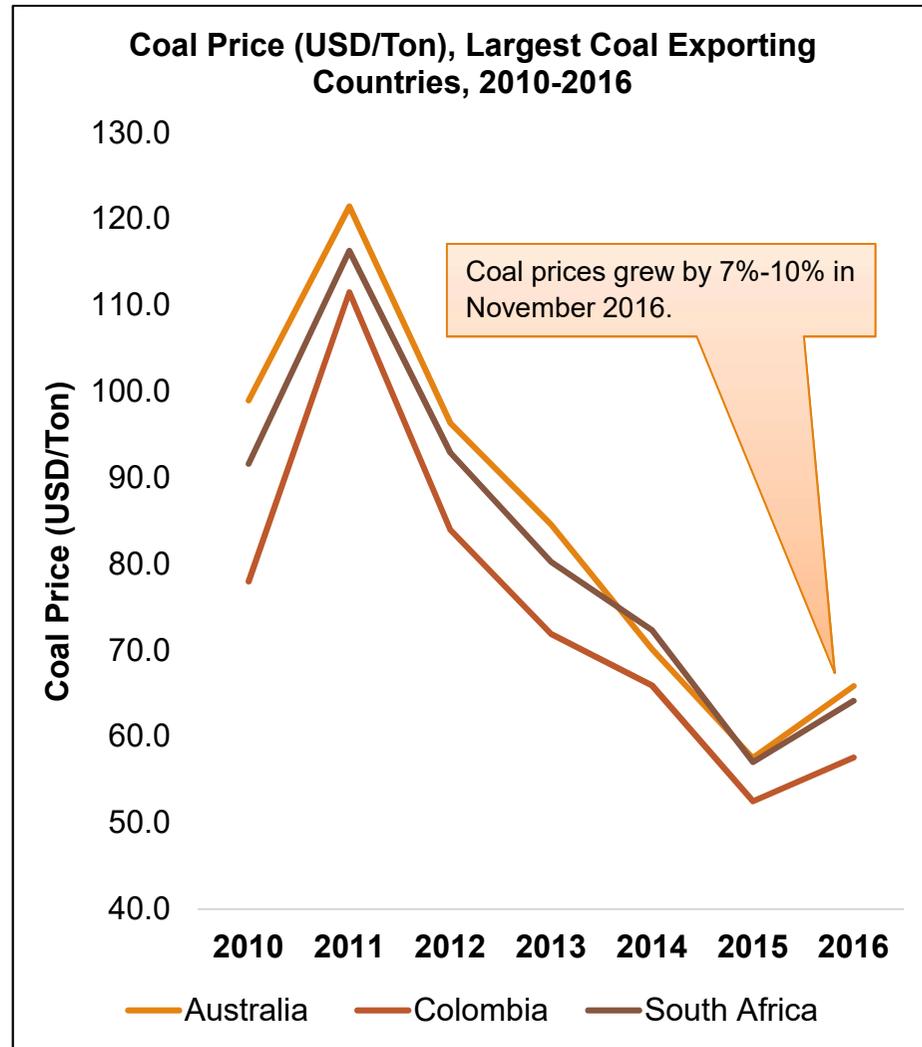
As per forecasted data, it is estimated that the price for coal will fall to \$58.8/MT in 2017 and will grow slowly from 2018.

Calorific Value and Price of Coal, China, USA and India, 2015

COUNTRY NAME	CALORIFIC VALUE Kcal/Kg	PRICE (USD/Tonne)	PRICE (INR/Mk Cal)
CHINA	5000-6000	70.0	636.0
USA	5000-6000	40.0	363.0
INDIA	3500-4000	26.0	342.0

- There are several political and economic factors that influence the price of coal. China is a massive influencer of coal prices owing to its status as the largest producer and consumer of coal. The Chinese policy fuelled a massive rise in thermal coal prices across the Asian market in the second half of 2016.

Source: CIL, Open Government Data (OGD) India, LSI Research



Coal Trade Movements—India

One-fourth of its domestic coal consumed (based on tonnage) is imported by India. India imports most of the coal from Indonesia, usually of low quality which is then blended with high quality coal prior to burning.

Major Coal Import Destinations, India, 2016

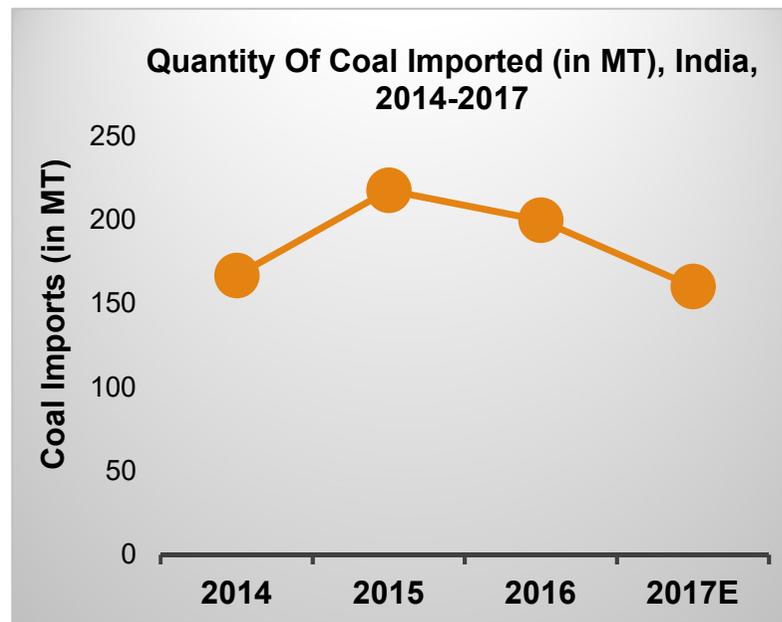
Countries	Percentage (%)
Colombia, Mozambique, USA and Canada	8.0%
South Africa	14.0%
Indonesia	55.0%
Australia	23.0%

Import of Coal and Products, India, 2011-2017

Coal	2012	2013	2014	2015	2016	2017*
Coking	31.8	35.6	36.9	43.7	43.7	5.8
Non-Coking	71.0	110.2	130.0	174.1	156.4	29.3
Total	102.8	145.8	166.9	217.8	199.9	35.1
Coke	2.37	3.1	4.2	3.3	..	0.8

*Imports up to May, 2016

Source: Ministry of Mines, Ministry of Coal, LSI Research



The figure shows a declining trend in the quantity of coal imported since 2014. As per the initial estimate, the demand for coal in 2016 is appropriated to be 884.87MT and the supply is expected to be 724.71MT. Thereby, a demand supply gap of 160.16MT had to be met via imports.

Coal Industry Challenges

There is one potential challenge on the horizon on account of over production as India's demand may decline. There is a surplus of 50MT. Lower grade coal, higher delivery costs and logistical challenges will limit India's ability to export coal efficiently in large quantities.

Ecological Impact and Increased Scrutiny



It is expected that there would be increased oversight and more stringent standards for pollution monitoring, imposing costs on generation companies and also impacting coal quality requirements.

Renewable Energy Capacity Increase



The solar costs and wind energy costs are plunging, electricity from new coal-fired thermal plants is losing its historical cost advantage.

Railways Capacity Shortfall



The increase in coal is heavily dependent on transport capabilities of which a big chunk is railways. If the railway's logistical abilities are not in place, it is highly improbable for coal to move from mines to destined locations.

Access to Finance



The financial sector of the economy is under great stress with a huge pile up of non-performing assets in the public-sector banks. There is a lack of liquidity

Imports to Specifications



Import of prime coking coal which is used mostly by the non-power sector, is not expected to end any time soon. The coal produced using underground technologies in India is going to be expensive and will have to be subsidized so to compete with imports.

Private Merchant Mining



The private sector mining is behind schedule with an unrealistic growth rate expectation. The depressed commodities market with low coal prices implies that pressure on imports will continue.

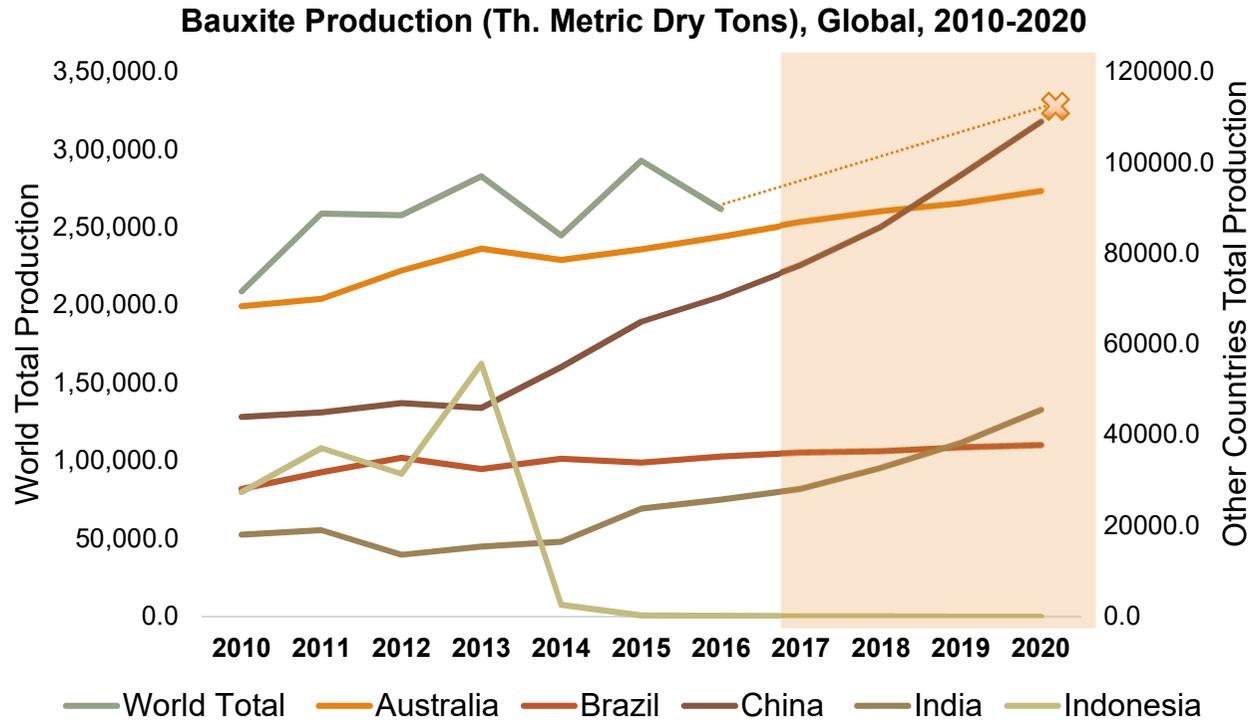


Bauxite & Aluminium



Bauxite, Global Overview, 2016

It is expected that global bauxite production will witness a compound annual growth rate (CAGR) of around 5% from 2016 to 2020.



Bauxite Reserves (Th. Metric Dry Tons), Global, 2016

Country	Bauxite Reserves
Guinea	74,00,000
Australia	62,00,000
Brazil	26,00,000
Vietnam	21,00,000
Jamaica	20,00,000
Indonesia	10,00,000
China	9,80,000
Greece	9,80,000
Guyana	8,50,000
India	5,90,000
Suriname	5,80,000
Others	27,20,000
Total	2,80,00,000

- Global bauxite ore production is set to experience solid growth driven by a robust project pipeline and reach 321.3MT in 2020.
- Guinea possesses the world’s largest known bauxite reserves and its potential is being unlocked by investment from Asia and the Middle East.

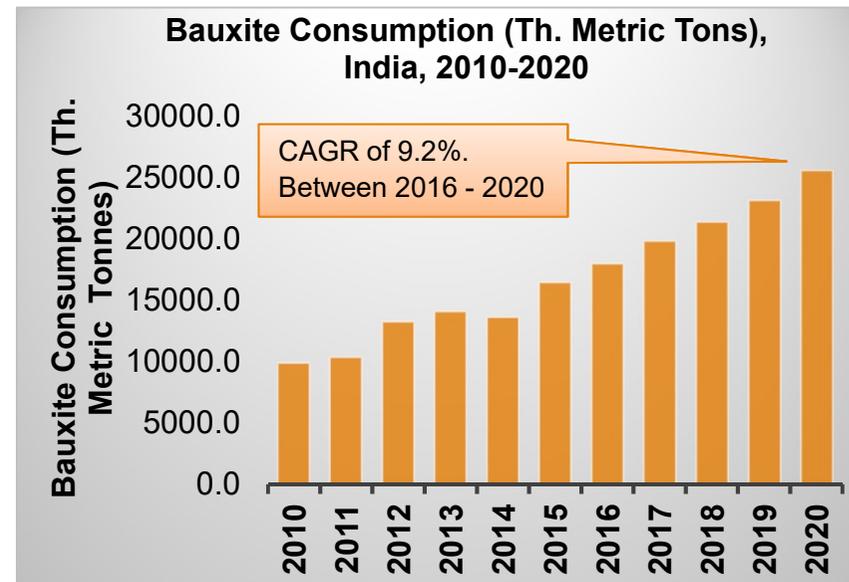
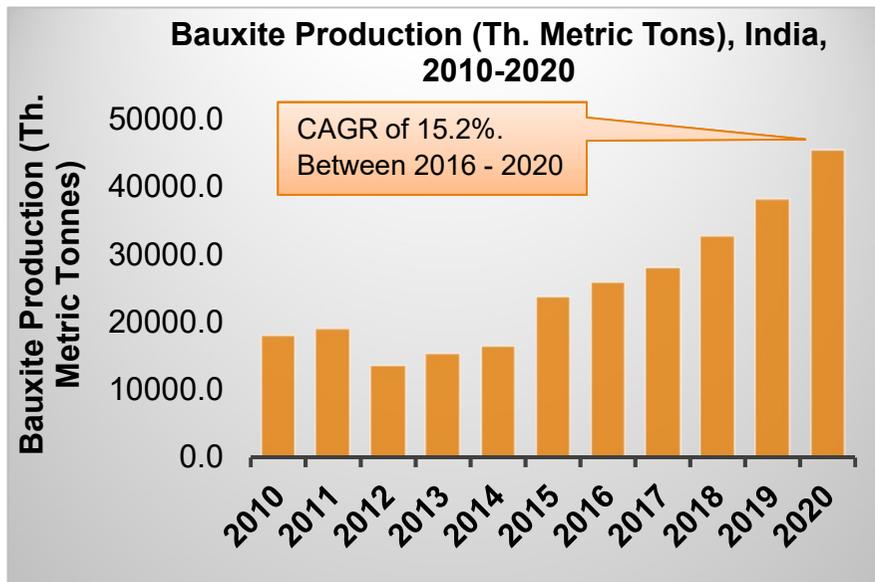
Source: U.S. Geological Survey (USGS), Cru International, LSI Research



Bauxite Mining in India

The Indian bauxite reserves account for 2% of the global reserves. The country produces 5% of the global bauxite and ranks 6th globally in its production.

- India has the 8th largest reserves of bauxite (3BT) globally. India’s bauxite production accounts for 5% globally. The bauxite Ore is primarily used to produced Aluminium.
- The Indian bauxite reserves are expected to last for 300 years at the current rate of mining.
- Over 80% of these reserves are located in Odisha and Andhra Pradesh. Therefore, all the integrated alumina and aluminium plants are in the east and central regions of the country.
- Though the export duty on bauxite was reduced by 5% to 15% in the Union Budget of 2016-2017, the raw material remains uncompetitive in the global markets due to high price.
- The aluminium industry consumes nearly 90% of the bauxite mined and the remaining is used in abrasives, cement, ceramics, chemicals, metallurgical flux, refractory products, and miscellaneous products.



Source: USGS, Bureau of Mines India, LSI Research



Global Aluminium Industry Overview

- Aluminium is the most abundant metallic element. It makes up 8% of the total Earth's crust and is derived from mining Bauxite. It is a strong metal and light in weight. Aluminium is largely recyclable and is referred to as the material of the future.
- The metal is facing a global surplus due to recessive growth in demand (increasing traction in automotive applications) accompanied with slower cutbacks in its production levels.
- Aluminium is facing a downward price pressure as China continues to invest in new smelting capacity. The global growth for aluminium is about 3-4% while in India its approx. 8% annually. India produces around 2MT of aluminium annually.

Production of Primary Aluminium

On an average, 5 - 7 metric tons of bauxite along with large amounts of energy (fossil fuel), lime and caustic soda, water and chemicals are needed to manufacture 1.95 metric tons of alumina. This alumina is then processed along with 437kg of carbon anodes and 15,200kWh of electricity to produce 1 metric ton of primary aluminium.

Production of Secondary/Recycled Aluminium

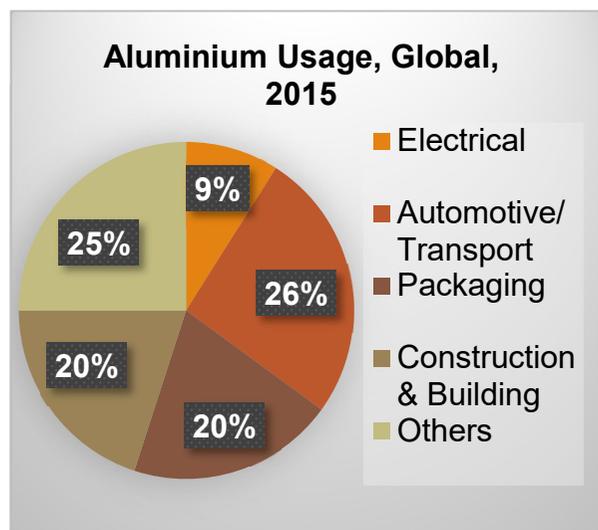
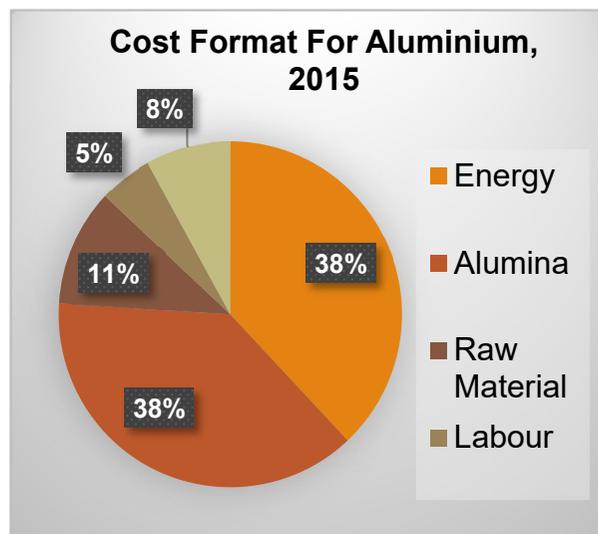
Secondary aluminium on the other hand is produced from scrap metal and uses less than 5% of the energy needed to produce primary aluminium. Aluminium can be endlessly recycled without loss in quality and therefore the world's stock of aluminium in use is like a resource bank. Around 75% of the aluminium ever produced is still in use and some of it has been through countless recycle loops.

Source: Aluminium Insider, LSI Research



Aluminium: Global Cost and End-Use

The energy costs can be as high as 40% of the overall cost of primary aluminium production. The raw materials used in the production of aluminium apart from alumina would include caustic soda, carbon anodes etc.



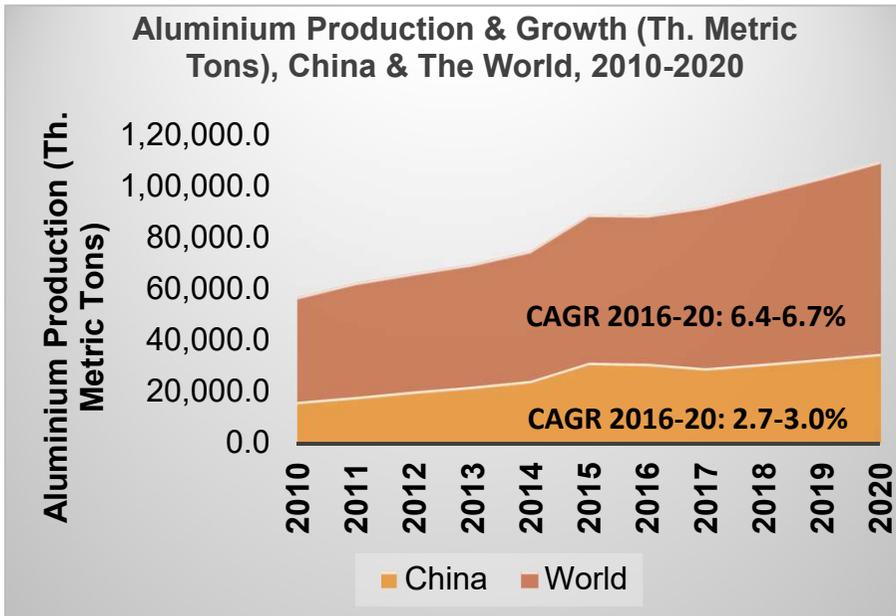
Regions/Countries with the Lowest Production Costs	Regions/Countries with the Highest Production Costs
SMELTERS	
Persian Gulf, Canada, Russia, Iceland and South Africa have the lowest smelter costs ranging between US\$1,100-1,450/MWh.	China, Australia and South Eastern Europe have the highest smelter costs.
POWER/ELECTRICITY	
Middle East faces a cost of US\$20/MWh, while USA and Europe's cost ranges between US\$35-40/MWh.	China tops the cost curve in this case with the cost being US\$50.4/MWh.
LABOUR	
Labour costs are the lowest in China and India.	Australia, North America, Norway and the European Union face high labour costs.

In the short/near term, Russia and the Middle East will build up new production capacities while in the long run, Malaysia, Paraguay, Angola and Greenland are expected to build their production capacities.

Source: Wood Mackenzie, Aluminium Insider, LSI Research

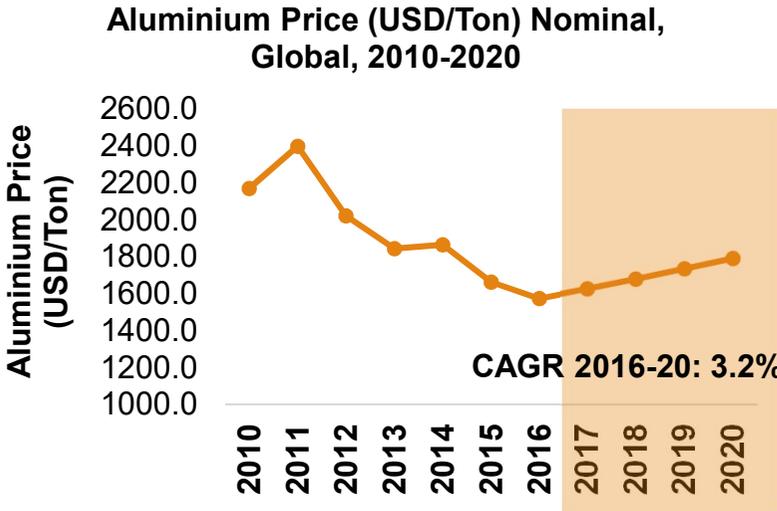
Aluminium: Production and Price

World aluminium production is currently around 55 million tons and is expected to grow with a CAGR of 6.7% till 2020.



Chinese aluminium production will contribute roughly 56% to the global production in 2020. Application of aluminium in auto body sheets and increasing substitution of aluminium in copper applications, is expected to sustain demand growth through 2020. The growth in production will be stimulated by the growth in India (11%), China (10%), Middle East (8%), Brazil (7%), Africa (5%) and return of growth in US (4%).

In 2016, world aluminium prices declined by 5% to average around \$1,575/metric tonne. There was a production surplus in 2016. Despite recent production cuts, new smelter capacity against the backdrop of weak demand could cause prices to remain depressed. While some higher cost capacity has been closed, new low-cost capacity continues to ramp-up in China and is boosting excess supplies.

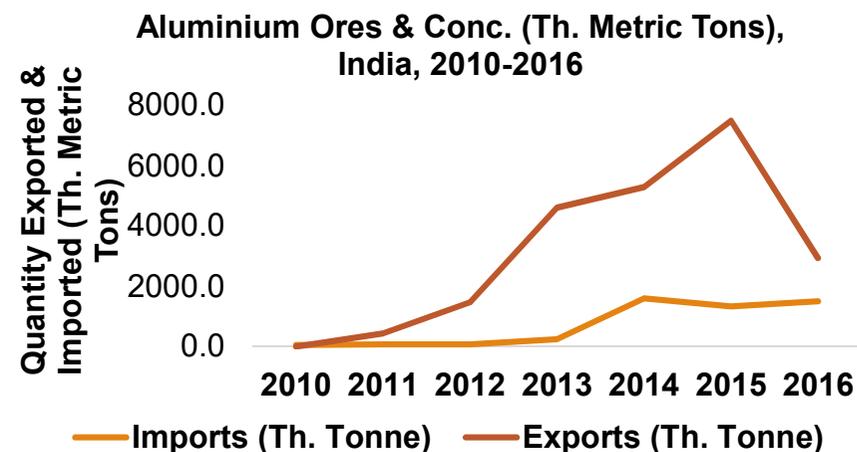
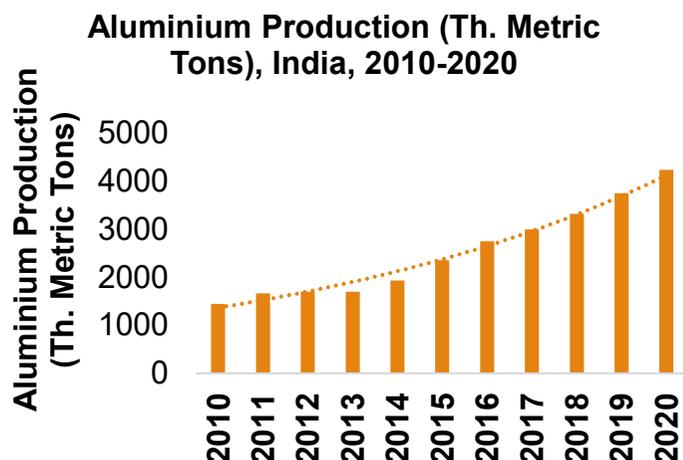


Source: USGS, Ernst & Young (E&Y), The World Bank: Global Economic Monitor, LSI Research

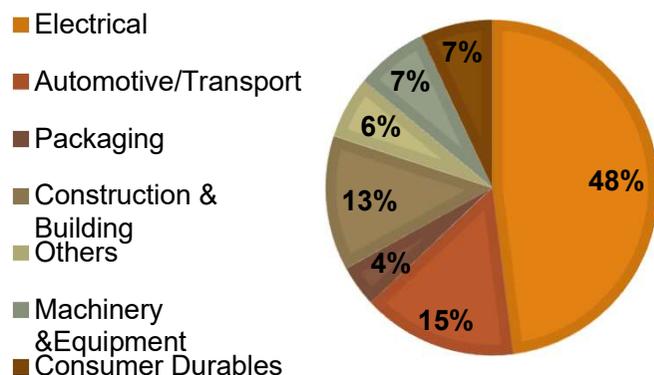


Indian Aluminium Industry

India's rich bauxite mineral base renders a competitive edge to the industry as compared to its counterparts globally; placing India at 5th place in aluminium production.



ALUMINIUM USAGE, INDIA, 2015



- With major ramp-ups and new projects underway, total installed production capacity in the country is set to increase at a CAGR of 8% between 2015 and 2020. During the same period, production is expected to increase at a CAGR of over 11%.
- Four major primary producers, National Aluminium Co. Ltd (NALCO), Hindalco Industries Ltd, Bharat Aluminium Co. Ltd and Vedanta Aluminium Ltd (VAL) are at the forefront of aluminium production.

Aluminium consumption in India is poised to grow drastically by 2020 riding on a host of government initiatives like, Make in India, Smart Cities, Housing for all, rural electrification, and freight corridors.

Source: USGS, E&Y, United Nations, National Aluminium Company Limited (NALCO), LSI Research



Indian Aluminium Industry: Opportunities

Indian Aluminium Industry is one of the lowest cost producers of alumina (approx. US\$118 per ton) and aluminium (approx. US\$1020 per ton) in the world.



Growing Consumption: India's aluminium consumption is expected to 3.2MT by 2018. The aluminium demand in the country is poised to log a CAGR of 10% in the next five years, bettering the global run rate of 6% year-on-year growth.



Investment in the Indian Power and Infrastructure Sector: The demand for aluminium wire rods is driven by investments in the power transmission and distribution networks. More than 70% of aluminium demand from the electrical sector (which accounts for 48% of overall aluminium demand) is for manufacturing wire rods. The current power deficit in the country is likely to drive capacity additions in India. Furthermore, India's demand for housing, retail and office space is expected to increase swiftly which augurs well for aluminium demand.



Growth of Indian Consumer Durables Industries: Encouraged by the robust growth of the consumer durables industry in the last six years, companies such as LG, Sony, Videocon and Samsung are planning to ramp up production capabilities and investments in the country. The increased production of consumer durables is expected to lead to increased demand for aluminium in India.



Policy Incentives: The recent Union Budget 2017, imposed export duty on aluminium ores. An export duty of 15% has been imposed on aluminium ores including laterite which was zero earlier. This export duty will conserve the domestic reserve. In 2016, India exported 8.75MT bauxite and in 2017, India's bauxite export is expected to remain at 1.8MT.

Indian Aluminium Industry: Challenges



Threat of Imports: The consumption in the domestic market grew at a healthy rate in 2016, driven mainly by the power generation sector. Though the increased demand was met to a certain extent by domestic production, however, imports continue to dominate the domestic market both in the form of scrap as well as ingots.



Falling International Prices: The aluminium market has been highly volatile lately. The over-supply of the metal, particularly in China has dragged international aluminium prices to its present low levels. Price of aluminium traded at the London Metal Exchange (LME) fell to the six-year low in December 2015 before gaining some stability between in January-February 2016. Low international prices would impact the profitability of domestic players since domestic prices are derived from landed costs of imported metal.



Draining of Bauxite-Raw Material for the Aluminium Industry: China is the chief importer of Indian bauxite exports. China dumps the finished product back in the form of aluminium and other finished products. This has strained domestic manufacturers of aluminium. The proposal to ban exports of bauxite, the key raw material in aluminium production, is one of the flagship demands of the domestic producers.



The key challenge facing domestic primary aluminium producers is that despite abundant reserves of bauxite in the country, producers are unable to secure bauxite to operate smelters at full capacity. The industry is unfortunately facing a barrage of issues, including depressed realizations, increased imports and difficulty in accessing critical resources like coal and bauxite due to delayed clearances. The industry looks forward to support from the government during this critical phase to maintain its viability and to protect its growth plans.

Indian Aluminium Industry: Future Outlook and Latest Updates

India's primary aluminium production capacity is expected to increase from 1.8MT per annum (mtpa) at present to 4.7mtpa by end of 2017. The majority of aluminium produced in India is expected to be consumed domestically, with exports to countries in America, Asia-Pacific, and the Middle-East. The primary aluminium demand in India is expected to reach 6MT by 2025, which equates 4.1kg of per capita aluminium consumption in 2025.

With the gibbsitic bauxite resources in the world depleting, vast gibbsitic deposits in India assume particular interest because of its ease in processing.

India's state-owned aluminium firm National Aluminium Company Limited (Nalco) announced a plan to build a 150-mW wind power farm in Odisha. Nalco's plans for expansion in Odisha, shall not only boost the development of the State but also help the country achieve new milestones in the field of aluminium industry across the globe.

Nalco also announced that it is planning to boost production in the coming fiscal year. Nalco's overall production will boost to over 7.3MT.

Finished aluminium products are gaining currency in several key markets including India. The secondary aluminium players in India can innovate to meet the emerging needs for aluminium in sectors like packaging, transportation, building and construction, and national infrastructure. Automotive light-weighting offers a huge opportunity for downstream that cater to vehicles of the future. Another big opportunity is in India's penchant for high speed rail networks where aluminium components in rail applications promise a cut in weight of 20-30%.

Mumbai's aluminium manufacturing firm Hindalco Industries Ltd. plans to invest US\$75 million to US\$105 million in a debottlenecking project at its Utkal alumina refinery. It to increase refining capacity from its current 1.5MT per annum to 2.25MT per annum.



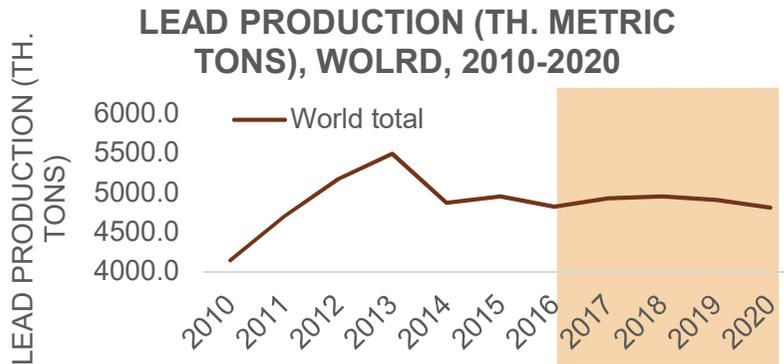


Zinc & Lead



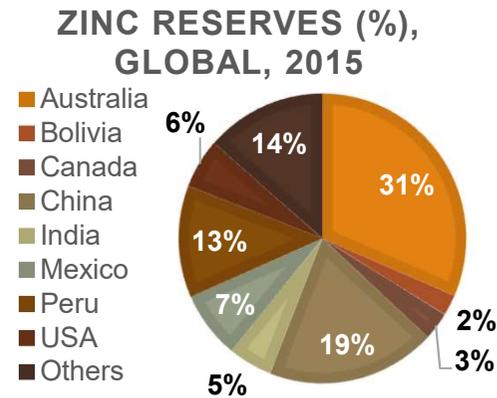
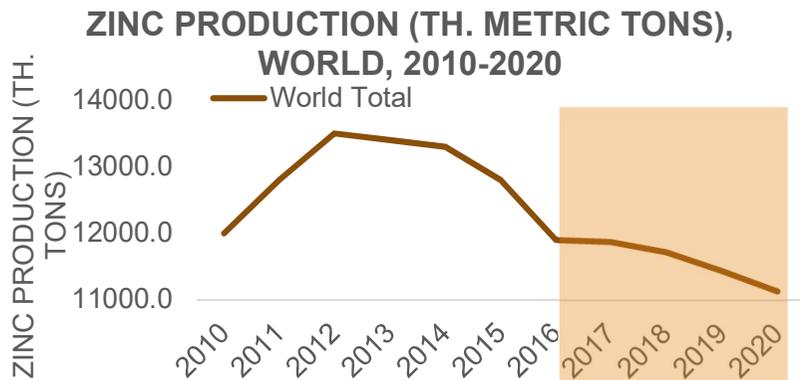
Global Zinc and Lead: Overview

Lead and Zinc occur together in the ore form. The world's reserves of Lead were estimated at 89MT in terms of lead content. The world's reserves of Zinc were estimated at 200MT.



Global lead mine production declined slightly in 2016, partially owing to declines in Australia and USA.

The global lead production is to experience deaccelerating CAGR of around 0.7% for the period between 2015-2020.



Opening of a few new big mines in 2018 is expected to help improve the supply of zinc concentrate.

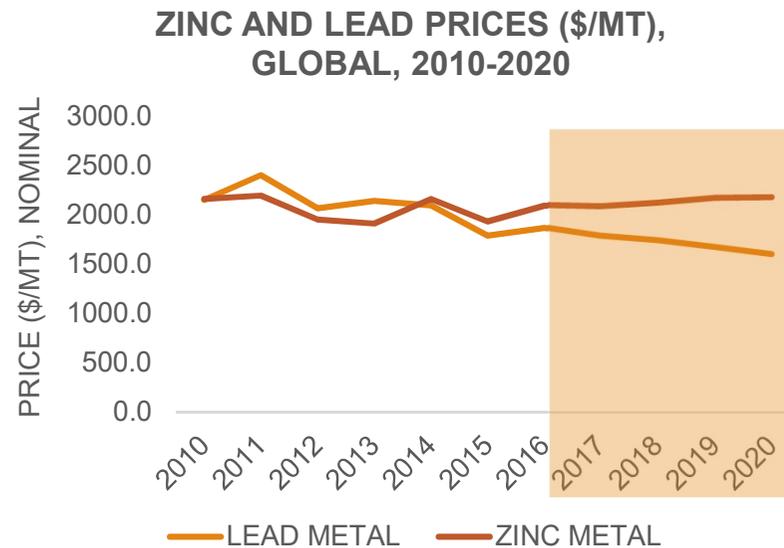
Overall refined zinc production is expected to increase at a CAGR of 2.7% between 2015-2020.

Source: Indian Bureau of Mines, Ministry of Mines, USGS LSI Research



Global Zinc and Lead Demand and Price

Lead is mostly used in the manufacture of lead-acid storage batteries and Zinc is used majorly in the galvanizing industry.



The global demand for refined zinc metal in 2017 is forecast to total 2.6% higher over the previous year. The demand from the European region is likely to remain more or less stable in 2017. The apparent usage by the US will recover. China and India will see rise in refined zinc metal demand, whereas Thailand is likely to report fall in demand. The demand may remain stable in Japan and Korea.

Interestingly, base metal prices rose significantly despite analysts ruling out major appreciation due to a slowdown in China’s GDP growth rate and an increase in base metal production toward the second half of 2016.

The global demand for refined lead metal in 2017 is forecast to total 2.3% higher over the previous year. The demand growth will be mainly driven by Chinese demand, which is expected to grow by 4.3% over the previous year. The lead metal usage by Europe, Japan and Korea is forecast to remain flat. Both India and the US is expected to record demand growth of nearly 1.5% in 2017.

In the base metals complex, Zinc was the top performer with over 60% return. It was followed by lead, nickel, copper and aluminium. The biggest trigger for rise in base metal prices was the credit-fuel.

Source: The Standing Committee of the International Lead and Zinc Study Group (ILZSG), Global Economic Monitor, LSI Research

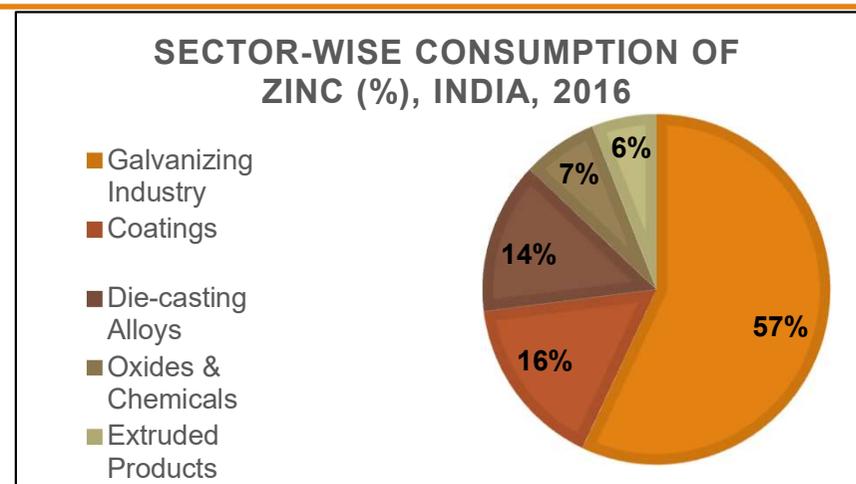
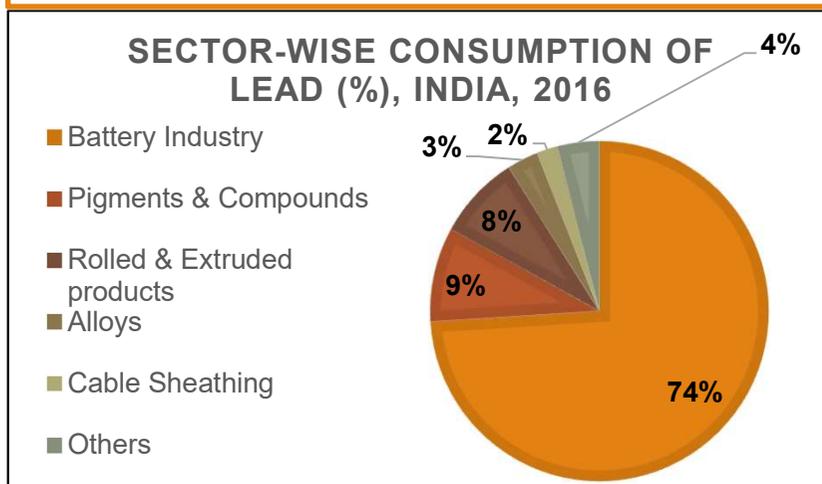
Indian Zinc and Lead Industry: Resource Distribution and Usage

STATE	PERCENTAGE (%)
Rajasthan	88.8%
Andhra Pradesh	3.2%
Madhya Pradesh	2.1%
Bihar	1.6%
Maharashtra	1.3%
Others	3.0%

The total reserves/resources of Lead and Zinc ores as in 2013 are estimated at 709.04MT. Of these, 14.5% fall under 'reserves' category while balance 85.5% are classified as 'remaining resources'.

The total reserves of Lead metal in the country is at 2.11MT and Zinc metal is at 10.89MT as in 2015. Rajasthan is the largest producer of Lead and Zinc in the country. The production of Lead and Zinc ore in Rajasthan in 2015 stood at 10453Th. Tons compared to 7102Th. Tons in 2010.

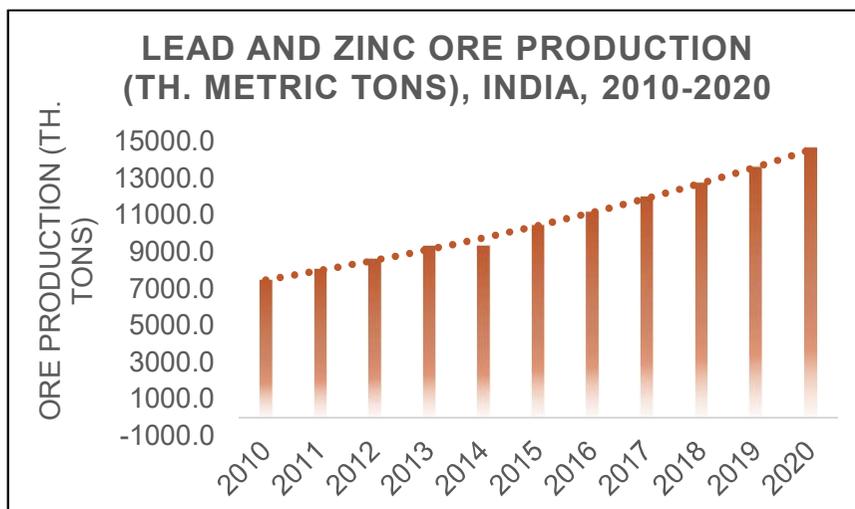
The country enjoys self-sufficiency in respect of Zinc. In fact, Production of Zinc is more than its consumption. The country is also more or less self-sufficient in meeting the demand for Lead.



Source: Ministry of Mines, Indian Bureau of Mines, LSI Research



Indian Zinc and Lead Industry: Production and Consumption



The only integrated producer of zinc and lead in the country is Hindustan Zinc Ltd. (HZL).

Lead consumption in India for the same period is at 1.1MT. In the case of Lead, about 80% gets consumed in lead batteries and the remainder goes for the manufacture of alloys, chemicals, semis, shots, etc. However, the use of lead in several industries have been replaced due to the metal's toxic properties. Lead is irreplaceable when it comes to the battery sector.

India is the 5th largest producer of zinc concentrate, and has the world's largest zinc mine Rampura Agucha owned by Hindustan Zinc Limited (HZL). HZL is the sole integrated zinc producer in the country and dominates the zinc smelting industry representing more than 96% of total domestic output. Zinc and Lead production in the country is expected to grow at a robust CAGR of 6.8% between 2016 to 2020 as HZL aggressively expands production capacity.

About 75% zinc gets consumed in the hot dip galvanizing sector. The balance zinc gets consumed in zinc die casting, dry cell batteries, alloys, chemicals, zinc wire etc.

It is expected that the consumption will grow at par with production but it is difficult to make concrete predictions as consumption data is not easily available.

Source: Indian Bureau of Mines, LSI Research



Indian Zinc and Lead Industry:

Imports (Lead Ores & Concentrates), India, 2010-2015						
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Quantity (Tons)	..	30282.0	56049.0	33405.0	39441.0	5334.0
Value (INR crore)	..	191.5	759.1	388.1	384.7	26.4
Imports (Zinc Ores & Concentrates), India, 2010-2015						
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Quantity (Tons)	..	63194.0	111912.0	33113.0	35696.0	385.0
Value (INR crore)	..	239.6	499.7	156.2	169.4	1.9

India imports lead ores and concentrates from USA, Turkey, Qatar, Saudi Arabia and Yemen. Zinc ore and concentrates are imported from USA, Ethiopia and UAE.

Exports (Lead Ores & Concentrates), India, 2010-2015						
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Quantity (Tonnes)	..	10226.0	14.0	7.0	509.0	..
Value (INR crore)	..	139.0	0.03	0.02	2.3	0.02
Exports (Zinc Ores & Concentrates), India, 2010-2015						
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Quantity (Tonnes)	..	5591.0	75870.0	45660.0	41.0	558.0
Value (INR crore)	..	1.42.0	295.8	162.0	0.07	1.1

Exports of lead ore and concentrates are mainly to Sri Lanka while that of zinc ore and concentrates are to China.

Source: Indian Mineral Bureau, LSI Research



Indian Zinc and Lead Industry: Key Drivers and Challenges

The **key drivers** for Zinc demand are the infrastructural sectors, building and construction, intensity of steel usage and of course the extent of corrosion in the region concerned. Fortunately, in India the zinc production has been substantial all these years and hence zinc availability is no issue at all. For Lead, the key drivers are automobile production, power shortages, growth in computers as well as telecom sectors. Here again, in view of the continued growth in automobiles, inverters, computers and telecom during the last few years, more and more used lead batteries are available for lead recycling after 2 or 3 years. Therefore, lead availability also is not a constraint in India, as secondary recycled lead production has been continuously increasing.

Slow renewal of mining licences:

This has historically impacted zinc and lead production in India. Looking at the present scale of operations, zinc and lead resource position will become critical after some 10 years. Therefore, there is a strong need to focus on exploration activities in the country.

New Substitutes for Zinc:

Given the long-term mine supply constraint and potential for price increase, there has been an ongoing R&D for substitutes. The reductions could amount to almost 33% by weight, which would translate into significant reduction in zinc consumption by a sector that accounts for 21% of worldwide use of zinc.

Zinc prices to remain under pressure:

Though the price of zinc improved at the LME in 2016, they are expected to remain under pressure, given the uncertain demand outlook. HZL, was under pressure in Q3 2016 as domestic realizations suffered with the fall in zinc prices, in line with the global trend.

Indian Zinc and Lead Industry: Future Outlook

The lead & zinc downstream industry needs to offer durable, defect free products, with assured performance and delivery at competitive prices.

India has transformed itself from being a net importer 12 years ago to become a net exporter of zinc. Similarly, the demand for lead is poised for further increase in the future. It is expected that the demand for zinc and lead in the forthcoming years is set to move further.

- Due to accelerated developments of the downstream industries, improvement in standard of living and consumer demands & sensitivities, the demand for zinc and lead in the forthcoming years is set to move further.
- The huge investments in highways and smart cities development would lead to more and more usage of galvanized guard rails/ crash barriers, street lamp poles, high mast lighting columns, road signage etc.
- Similarly, the increasing penetration of mobile phones in tier-II cities and rural areas, after its successful acceptance in metro cities, have resulted in more demand for galvanized telecom towers in rural areas.
- There is also an increased activity in solar and wind energy generation capacity in the country; the support structures for solar panels and wind mill tower members are usually galvanized.
- Recently, the government has announced a series of support measures, incentives etc., as a result of which electric vehicles will see a steady growth in the coming years across the country. All the factors would spur the demand for zinc in the domestic economy. Similarly, the massive investments under the Jawaharlal Nehru Solar Energy Mission would result in increased demand for storage of energy where lead batteries are the natural choice



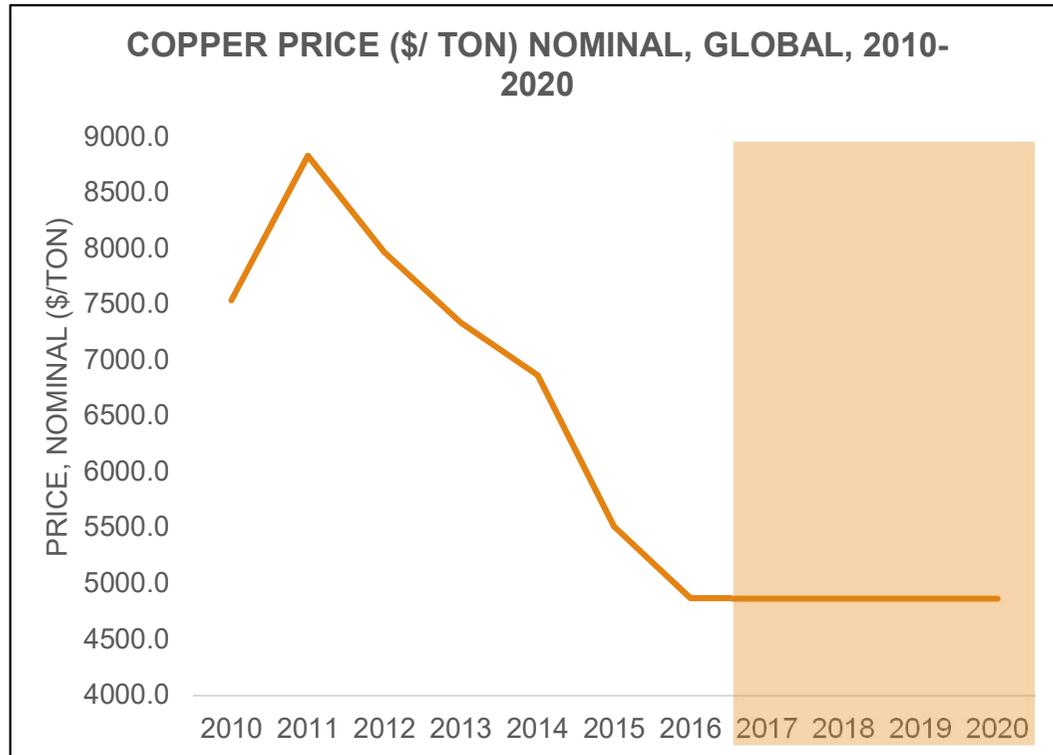
Copper



Copper Industry: Global Overview

The world reserves of copper metal are assessed at 720MT of copper content. Chile has the largest share accounting for about 29.2% of world reserves. In 2015, world apparent usage of copper was estimated to have contracted by 1.5% to 16.8MT because of a de-growth of consumption in Japan and the European region. Although apparent demand growth was marginally positive in China at 0.5%, a large build-up of copper inventory in the country's exchange warehouse indicates that actual consumption could have contracted in reality.

In 2016, copper consumption remained tepid following the overall weak macroeconomic trends in major consuming regions. Price of copper traded at the LME has remained under pressure for the last one and a half years. The price averages around the level of \$4,500/Tonne currently, after declining from \$7,000/Tonne in June 2014. However, the risk of a further slide remains, with the recent commissioning of a large copper mine in Peru, which may increase supply in the market.



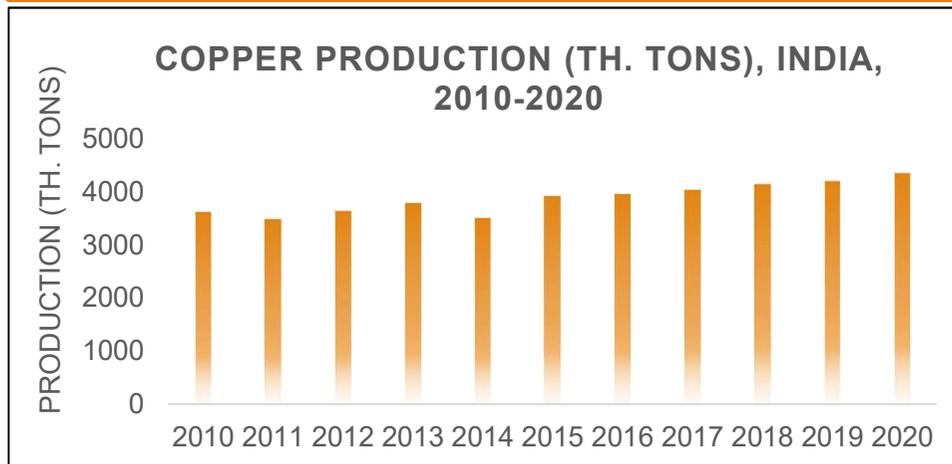
Source: Global Economic Monitor, LSI Research



India's Copper Industry

The total resources of copper ore as on 2013 are estimated at 1.5BT. Largest resources of copper ore are in the state of Rajasthan (53.5%) followed by Jharkhand (19.6%).

India is not self-sufficient in the production of copper ore. In addition to domestic production of ore and concentrates, India imports copper concentrates for its smelters. The domestic demand of copper and its alloys is met through domestic production, recycling of scrap and by imports. Hindustan Copper Limited (HCL), a Public-Sector Undertaking, is the only integrated company in the country that is involved in mining & beneficiation of ore and is engaged in smelting, refining and casting of refined copper.



In the domestic market, growth in copper consumption was strong at 8% during Q1 of 2016. However, operating margin of the integrated player, Hindustan Copper Ltd (HCL), was under pressure as domestic realizations suffered, in line with the global trend.

Consumption of refined copper is growing and at present ore reserves are limited, therefore, there is an urgent need to increase the resources base of copper within the country by increased investment in exploration as well as investment in other geographies to acquire mining assets. Looking at the long term international scenario, there could be restrictions in sourcing copper concentrates from the international market leading to difficulties on these fronts.

Source: Indian Bureau of Mines, LSI Research



India's Copper Industry: Future Outlook and Concluding Remarks

FUTURE OUTLOOK

- India's copper market has huge potential for growth, given that its per capita consumption is significantly lower than the world average at 0.6kg and is expected to increase to 3kg by the year 2025.
- Rapid rates of industrialization and urbanization have created a need for expansion and investment in the country's electrical and power infrastructure.
- According to the Twelfth Five Year Plan (2012–17), the Government is targeting a 43% increase in power generation capacity. Moreover, the Government has planned to set up five ultra-mega power projects of 4,000MW each. This is expected to spur copper demand as the electrical and power sectors account for nearly one-third of the refined copper consumption.
- Demand from other industries such as transport, consumer and electronic goods and industrial machinery is also expected to remain strong on the back of increased end-user demand and increasing investments. For instance, the Government announced an investment of US\$137 billion to upgrade India's rail network over the next five years.

CONCLUSION

The copper industry in India accounts for 3% of the world copper market. Although India is among the top-10 exporters for refined copper, it imports 94% of the concentrate to feed its smelters. This creates huge dependency on imports and also highlights the need for potential increase in copper mining capacity. The Government is focussing on resolving the electricity supply shortages and raising heavy investments toward building the power generation capacity in order to ensure that all citizens have access to electricity, which will in turn, boost the demand for copper in the medium term.

Source: Indian Bureau of Mines, LSI Research





Mining Industry Driver, Challenges & Opportunities



Mining Technology and Innovations: India's Adaptability Scenario

Indian mining operations are very conventional even today with limited penetration of modern technology.

TECHNOLOGY USED IN THE MINING SECTOR, INDIA, 2015-16---2016-17:

SURFACE v/s UNDERGROUND MINING

Mining in India is dominated by surface mining. About 92% of the coal is obtained from opencast mining. Iron ore, bauxite, limestone, and several other major and minor minerals are entirely mined from surface mining methods. As Costs of mining through open pits is are relatively lower, the technology is relentlessly used in India. However, surface mining is now failing. The challenges of lower grades, increasing depths of the deposits and rising concerns of forest depletion and issues of land make underground mining inevitable.

MINING TECHNOLOGY

Technologies for efficient production are available globally however, for their adoption in India massive investments are required. Only longwall mining has been implemented so far for the production of coal by SCCL.

SCALE OF MINING OPERATIONS AND SIZE OF EQUIPMENT

The largest shovels employed in India are the size of 42 cubic meters' bucket capacity and dumpers are of 240 tonne. Though these are better than what was being used in the past, they are still relatively smaller than the largest available globally. Highest capacity of the dumper that is being used globally is around 400 tons. Large equipment provides economies of scale while smaller capacity equipment provides flexibility in operations and cost efficiencies due to lower capital costs and fuel consumption. There is a discernible trend in the use of lower capacity excavators and trucks in mining projects in India.

CONTINUOUS v/s BATCH MINING

Mining in India is still done in the traditional manner: drilling, blasting, loading, and haulage to crushing and mineral processing. Batch processing dominates the mining sector in India. There is a need from within the mining equipment industry and mining companies to speed up technological development and find new solutions to develop a continuous mining process.

It is the need of the hour to collaborate with global technology providers which can enhance greater application of underground methods.



Mining Technology and Innovations: India's Adaptability Scenario

REQUIREMENTS IN TECHNOLOGY ADOPTION, INDIA, 2016—2017:

- In open cast mining, there is a need for using bigger size equipment.
- For underground mining, there is a need for adoption of continuous miner technology to improve productivity.
- Increasing use of IT and automation in mining operations is needed. These could help in better management of operations, reduce pilferage, and improve safety.
- The sector requires innovative solutions for sustainable mining.
- Adoption of selective blasting techniques could help increase the metal content of the ore, reduce the waste to be processed, save energy, and reduce greenhouse gas emissions

CHALLENGES IN TECHNOLOGY ADOPTION, INDIA, 2016—2017:

- The focus on short term cost versus long term realization of benefits. The investments provide returns in varying lengths of payback period and therefore patience is the essence of technology adoption.
- Corruption is another barrier which has led to inappropriate selection of technology and equipment.
- Underground mining productivity needs to increase. However, various challenges in underground mining have deterred companies from investing in this area.
- Genuine geo-technical difficulties present challenges in adoption of technologies in India.

The key solution is to collaborate with global mining companies, manufacturers of equipment, global technical experts and consultants, and scientific and regulatory institutions in India and abroad. Collaborative efforts are likely to see better technology adoption in India. The appointment of mine developers and operators (MDOs) is one of the approaches being preferred by the Indian market. MDOs can bring in the latest technologies and mine management practices, and lead to improved efficiency in mining operations.



Policy Drivers

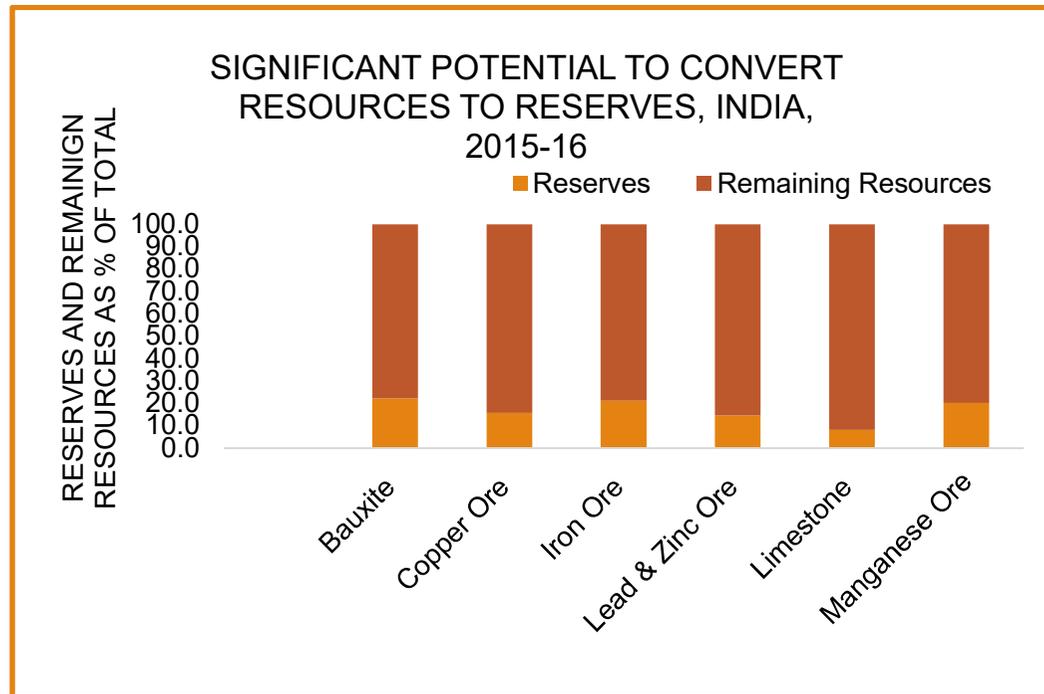
POLICY DRIVERS, INDIAN CONTEXT

- **FY2015:** The ordinance amending the MMDR Act of 1957 paved the way for the introduction of competitive bidding for the allocation of iron ore and non-coal mines, thereby promoting greater transparency.
- **FY2016:** The government continued to take steps to transform the Indian mining sector. The new mineral exploration policy (NMEP) was launched in July 2016. NMEP recognizes the need to incentivize private sector participation and has various provisions for that. Up to November 2016, 83 coal mines were allocated out of which 31 were allocated through auctions. Till December 2016, the Ministry of Mines auctioned 19 mineral blocks and 7 coal mines were allocated for commercial mining.
- **FY2017:** The government has proposed the opening of commercial mining to the private sector. This move will drive industry growth and the demand for new equipment and technologies also. Commercial mining of coal by private players will be thrown open for the first time in four decades. This will help move the world's third biggest coal importer towards energy self-sufficiency. The main motive behind this policy shift by the government is to increase competition in the coal sector which will help reduce power tariff. Sustainable and efficient mining and not revenue maximization is the idea behind commercial coal auction.



Opportunities

OPPORTUNITIES



Future Scope for Investments:

India’s geological domains are well endowed with mineral resources however, they are yet to be fully explored, assessed and exploited. The following table shows the mineral resources in the country and the ratio of reserves to resources. Currently (2015-16), only 10% of the 8-lakh sq. km resource-bearing area in India has been explored, this presents a huge upside opportunity in the sector.

The investment decisions are based on both the mineral potential of the jurisdiction and the policy perception of the jurisdiction. Fraser’s annual policy index ranks India at 88 out of 104 mining provinces surveyed in 2016. The NMEP 2016 and its robust execution can improve India’s ranking in the policy perception index and help the country become an attractive destination for mineral exploration.

Source: Indian Bureau of Mines, LSI Research



Opportunities

FDI (Foreign Direct Investment) Flows:

The mining sector in India is allowed 100% FDI under the automatic FDI route. Though the FDI has increased recently, however it still remains weak and is still only around 0.8% of the total FDI. FDI flow in the mining industry picked up in FY2014 and leaped by almost a 100%. FDI flow in the Indian mining industry in FY2014 was US\$684.39 million. However, in the following financial year it dropped to US\$520.67 million.



The mining industry has a massive domino effect and impacts several stakeholders, triggers various downstream economic activities and has a multiplier effect on the economy. With the right policy initiatives, the mining sector can not only boost the national GDP but also provide large scale employment especially to the population in the remote areas of the country.

India could witness the highest demand growth over the next few years indicating good investment opportunities in the value chain. Opportunities to invest into sorting technology to make returns of the higher consumer used scrap being available in the market from the next decade. India has a good potential for Indian copper demand growth, but absolute volumes may be held back by a preference for aluminium cables.



Challenges

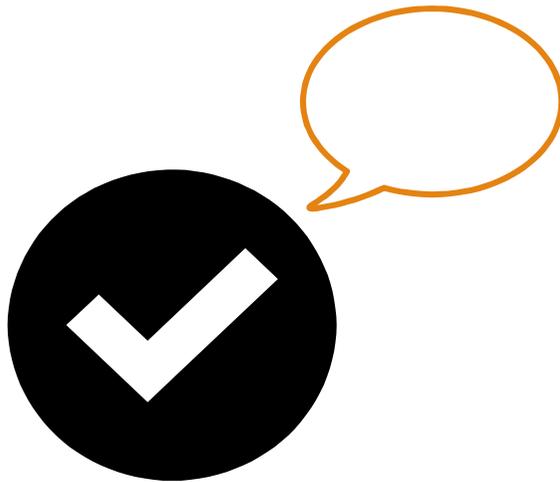
CHALLENGES

- India's mining sector contribution to GDP is low compared to major mining countries such as China, the United States, Australia, Brazil and Chile. India currently ranks low on both policy potential index and mineral potential, making it unattractive as a mining investment destination. It is ranked 59 out of 96 mining jurisdictions on composite mineral and policy potential.
- Generation of baseline data to promote exploration activity, led by the Geological Survey of India (GSI), is far from being complete. Aeromagnetic survey has covered only 18% of the India's total area in contrast to 90% of Australia's total area covered since 1990.
- Traditionally India's exploration spend has been low compared to other mining economies. India accounts for only 0.4% of the world exploration budget India needs to increase its exploration spend to keep reserve development in line with production.
- At present, it takes five years or more to obtain mining lease/ prospecting lease permit in India. This is much longer than the processing time in other mining geographies, for e.g., it takes less than two months in Canada and Australia. Long processing times may discourage applications for new rights.
- Mine closure is a critical area for sustainable development and needs to be enforced through regulatory measures. Currently, the financial guarantee for mine closure is very low in India and does not sufficiently deter defaulters.
- India is dependent on imports to a large extent of nonferrous mineral and is thus vulnerable to supply/price fluctuations. The Indian mining sector is facing challenges in the wake of low commodity prices, forcing companies to keep costs under check.



Peer Analysis

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**Strategic
Recommendation**



Peer Analysis

SNAPSHOT OF PEER COMPANY ANALYSIS (2015-2016)			
Particulars	Coal India Ltd. (CIL)	National Aluminium Company Ltd. (NALCO)	Hindustan Zinc Ltd. (HZL)
Production of Mineral/Metal	538.7MT	Bauxite: 63,40,142.0 MT Alumina Hydrate: 19,53,000.0 MT Aluminium: 3,72,183.0 MT	Zinc and Lead: 144,653.0 MT
Gross Sales	INR 1,08,150.0 crores	INR 7,157.0 crores	--
Pre-tax Profit	INR 21,589.1 crores	INR 1,103.0 crores	INR 8,610.0 crores
Post tax Profit (Net Profit)	INR 14,274.3 crores	INR 731.0 crores	INR 8,167.0 crores
Net profit to net worth	42%	5.70%	21.80%
Net Worth	INR 33,879.0 crores	INR 12,907.0 crores	INR 37,385 crores
Net Current assets	INR 41,051.2 crores	INR 7,182.02 crores	INR 37,089.4 crores
Aggregate borrowings	INR 269.8 crores	--	--
Yearend man power	3,22,404	7,100	17,100
Average per man per year	1,671.0 tonnes	--	--
Total paid up capital as on 31.03.2016	--	INR 1,288.6 crores	--

Source: CIL, NALCO, HZL, LSI Research



Strategic Recommendations for the Mining Industry



- India should craft an integrated roadmap for mining, production and usage of the minerals.
- In order to gain access to raw materials in world markets, India could enter into bilateral agreements with countries, to secure supply for both the short term and long term. Moreover, India can create a national body which is responsible for the national sourcing of raw materials.
- India should incentivize the production of metals through fiscal measures. The government needs to create an environment where the domestic producers are encouraged to produce these metals. Most of these metals can be produced as a by-product of the base metal production process, but it appears that the current quantities are low.
- Increase resource efficiency, promoting recycling and technological innovation should be increased. Investing in research so that substitutes can be found. Recycling is another important way to fulfil a part of the demand of these metals.
- In order to keep prices under control, and to meet demand in case of exigencies, India should build a national stockpile.