

# INDUSTRIAL SECTOR



**MAHAN ALUMINIUM**  
**Dist. Singrauli (Madhya Pradesh)**

**Unit Profile**

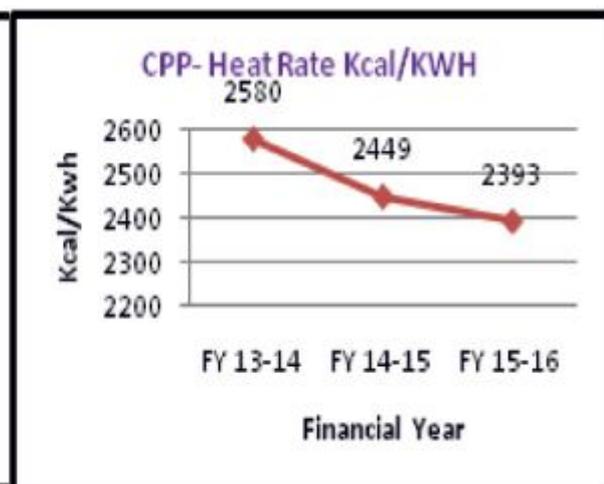
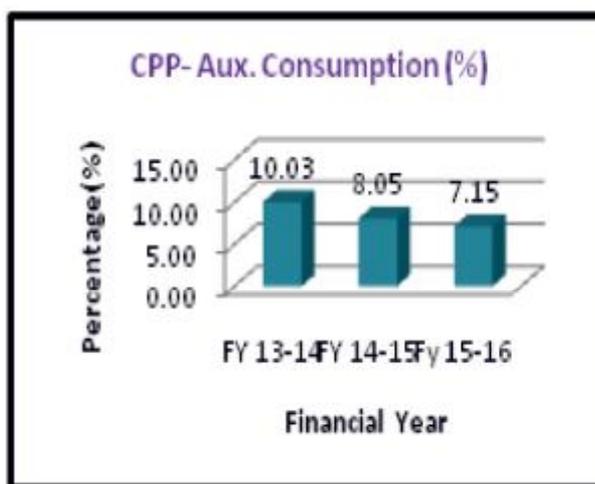
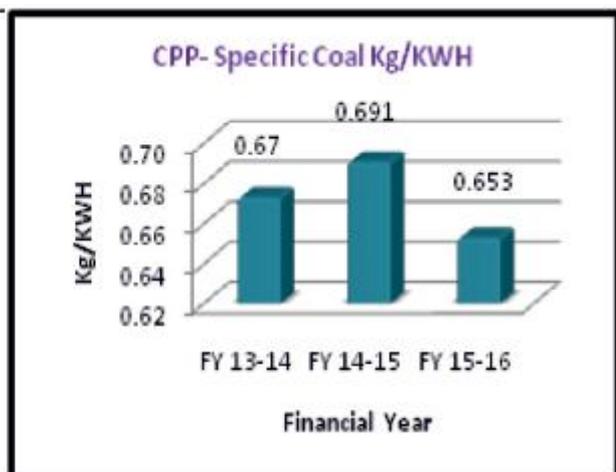
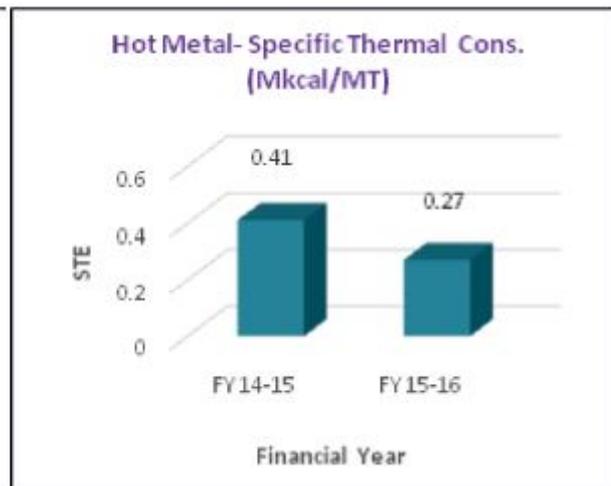
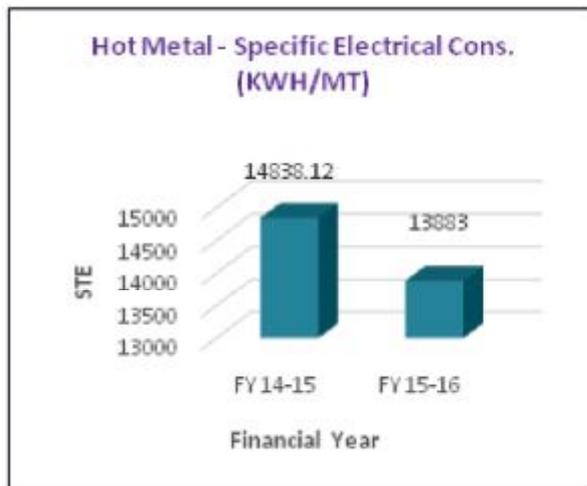
A US \$41 billion corporation, the **Aditya Birla Group** is in the League of Fortune 500. It is anchored by an extraordinary force of over 120,000 employees, belonging to 42 different nationalities. It is a premier conglomerate of leading companies in various businesses like aluminum, cement, copper, fertilizer, viscose staple fiber, textiles, power, telecommunications and financial services.

**HINDALCO** industries limited is one of the largest manufacturers of Alumina & Aluminum in the world.

The Foundation stone of Mahan Aluminium was laid on 9th July 2009. The plant consists of state of the art Smelter unit ( 360 pots – Aluminum Pechiney AP 36 technology AP-36 ) with Captive Power Plant ( 6 units of 150 MW capacity – Operating philosophy 5 + 1 ). The first pot in smelter unit was energized on 19th April 2013 and last one (360th pot ) was commissioned on 28th Aug 2015. The plant is spread over an area of 3357 acres near village Bargawan in the Singrauli District of Madhya Pradesh.



## Energy Consumption Trend



## Energy Conservation initiatives undertaken

S. No	Energy Conservation Initiatives taken FY -15-16	Auxiliary Saving (MU)	Annual Saving (Rs Lacs)
1	On account of several process optimization measures at pot room they have been able to reduce Dc power consumption by 388 Kwh/t.	130.656	4481.52
2	Reduced operation of electrical heaters by not operating the heaters of ICM furnaces in melt mode: 600 MWh per annum	0.6	20.58
3	By using centralized compressed air for operation of Nitrogen plant instead of operating standalone dedicated compressor. Annual energy saving – 50 MWh per annum	0.05	1.72
4	Energy saving in cable cellar by operating less no's of light-( Total saving – 44.9 MWh per annum)	0.045	1.54
5	By managing dilution damper opening based on bag filter inlet temperature resulted in less load on ID fans- 3888 MWh/ Annum	3.888	133.36
6	Stoppage of 1 No. Station ACW Pump which was used for cooling of all compressors, saving by 45 kw.	0.197	6.76
7	Stoppage of 2 No. ACW Pump which was used for cooling of main plant auxiliary cooling, saving by 60 kw.	2.102	72.11
8	Implementing Medium Voltage VFD in CEP's (CEP-1B, CEP-2B, CEP-3B ,CEP-4B and CEP-5B) -Before the installation of VFD's the control valve was 45% throttled and CEP discharge pressure was 22KG/cm <sup>2</sup> and after taking the CEP motor in VFD mode control valve was fully opened (100%) and discharge pressure came down to 11Kg/Cm <sup>2</sup> . Due to reduction in discharge pressure from 22Kg/Cm <sup>2</sup> to 11Kg/Cm <sup>2</sup> saving of power in each CEP is 180 KW/Hour. Total energy saved in each CEP Motor is 180 KW/hr.	5.184	177.81
9	666 KVAR Capacitor Bank installed at BhikhaJhariya Pump House in order to improve the power factor in June-2015. Now a PF=0.998 has been achieved, so net revenue saved is around 3 Lac/ Month in term of Power factor reward.		36.00
	<b>Grand Total</b>	<b>142.723</b>	<b>4931.40</b>

### ***Energy Conservation Approach***

1. Involvement of teams in Mahan in Energy Conservation activities through SGA ( Small Group Activity )
2. Benchmarking and continual improvement in energy consumption is an ongoing journey for us.
3. Employees are also involved in energy saving projects like Water conservation, Air conservation etc.
4. Group has Knowledge Acquisition Point where we can share & implement the Best practices of energy saving projects from other units of ABG.
5. Giving extra weightage to energy efficient product during procurement
6. ABG group has well defined the sustainability framework having one group policy on "Energy & Carbon".
7. Central Technical & Engineering Service monitors the Energy Management system of the Group, with conceptual ideas of STRIDE (Successful transformation & recognition of inspiring deployment in Energy Efficiency)
8. A dedicated team for focused approach in the energy Saving Projects at Mahan plant as well as group level
9. Plant has a system of continuous monitoring the potential energy saving projects from the KAIZEN on quarterly basis.

### ***Other ENCON projects implemented***

1. Initiation of Process optimization measures in Pot Room resulting into reduction in DC energy ( 338 kwh/t )
2. Optimization of dilution damper opening
3. Transducer current control optimization
4. Installation of Capacitor banks for Power factor improvement.
5. Optimization of running hours of pumps and motors.
6. Installation of Efficient LED lights in place of Conventional lighting.
7. Phase wise replacement of Standard motor with Energy efficient motors.
8. Installation of VFD in Pumps and Blowers wherever Energy saving potential was.

## Energy & Carbon Policy



HINDALCO MANAGEMENT FRAMEWORK  
*excellence by design*

### ENERGY AND CARBON POLICY

We, at Hindalco Industries Limited, operating across the process chain from mining to semi-fabricated products in non-ferrous metals, understands that energy consumption and carbon emissions are the two most important issues that currently concern the Country and the Planet. We shall take responsible actions within the company and work with our stakeholders for prudent and efficient use of energy sources to achieve continual improvement of our energy and carbon performance.

To achieve this, we shall

- Meet legal compliance for energy and carbon regulations across all our operating units.
- Raise awareness on the responsible use of energy resources at all levels of our operations and encourage efficient utilization of such resources with focus on reducing the energy intensity of our operations.
- Allocate sufficient resources such as organizational structure, technology, and finance for implementation of the policy and regular monitoring of its performance.
- Explore and utilize renewable energy, waste heat and clean fuel wherever techno economically feasible across our operations.
- Adopt economically viable new / efficient clean technologies and best practices for improving energy efficiency and emitting less carbon.
- Continually improve energy performance and carbon management in our units by adopting nationally / internationally accepted management systems, including setting and reviewing targets and monitoring, measuring and reporting their progress.
- Work in partnership with regulatory authorities, relevant suppliers, contractors and all stakeholders, as applicable, to understand and initiate improvement actions.
- Measure, monitor and report direct and indirect energy usage and carbon emissions in accordance with internationally recognized protocols and set up system for comparison and benchmarking across our units and operations.

This policy shall be made available to all employees, suppliers, customers, community and other stakeholders, as appropriate.

*D. Bhattacharya*

**D. Bhattacharya**  
Managing Director

11<sup>th</sup> December 2014

**HINDALCO INDUSTRIES LIMITED**

**VEDANTA LIMITED**  
**Lanjigarh (Odisha)**

**Unit Profile**

Vedanta Ltd, Lanjigarh (VLL) is a subsidiary of global mining behemoth Vedanta Resources PLC. Vedanta Resources plc is a diversified metals and mining company with revenues in excess of US\$10 billion and is the first Indian manufacturing company to be listed on the London Stock Exchange.

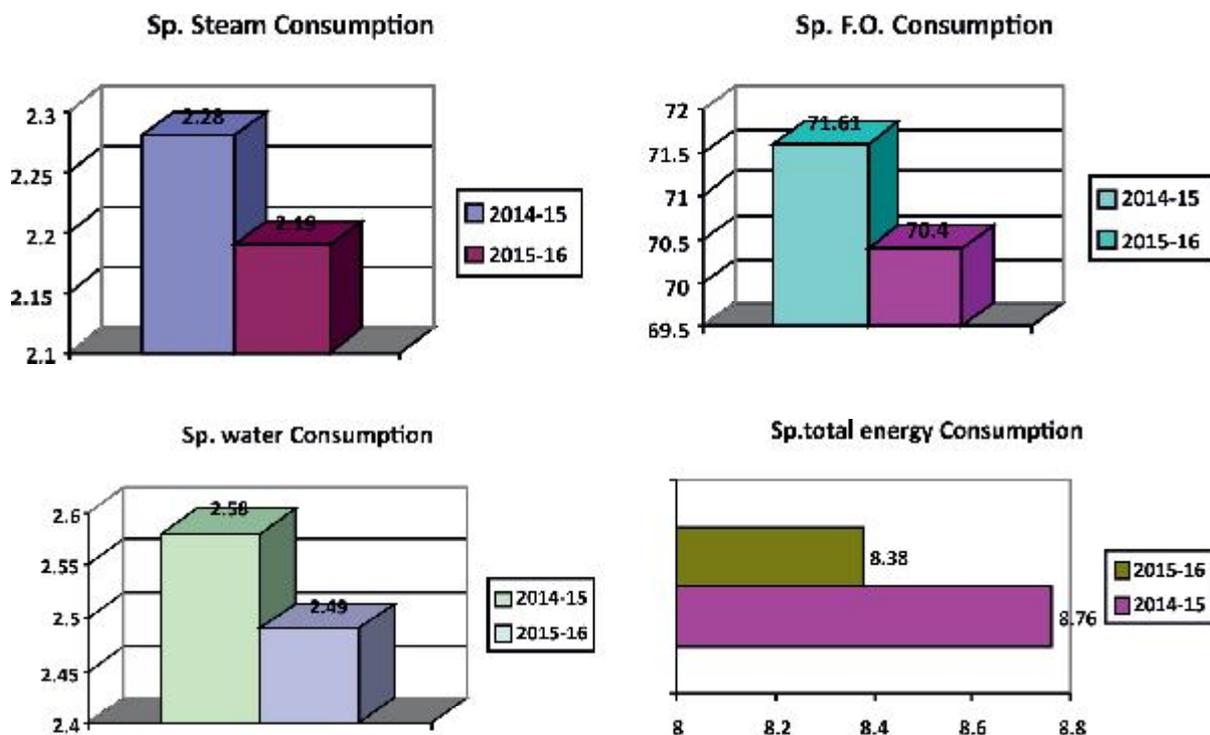
Originally incorporated in 2001, VLL is a leading producer of metallurgical grade alumina and other aluminium products, which cater to a wide spectrum of industries. VLL has carved out a niche for itself in the aluminium industry with its superior product quality based on state-of-the-art technology. The firm operates a 1 mtpa Greenfield alumina refinery and an associated 75 MW captive power plant at Lanjigarh in the state of Odisha.

VLL Lanjigarh is the first Alumina Refinery in India to adopt the Zero Discharge System. The plant is an ISO 9001 and ISO 14001 certified. The refinery commands a high plant availability factor of 92% and is driven by self-sustained power supply from the 75 MW captive power plant. The organization is first in the country to adopt filtration unit for red mud to produce red mud cake instead of wet red mud disposal system.



## Energy Consumption

DESCRIPTION	UNIT	2014-15	2015-16
Annual production (calcinated Alumina)	MT	976915	970893
Specific steam consumption	MT/MT	2.28	2.19
Specific F.O consumption	Kg/MT	71.61	70.4
Specific water consumption	M3/MT	2.58	2.49
Specific energy consumption	GJ/MT	8.76	8.38



### Energy Consumption trend

## Energy Conservation

- First alumina refinery in the country to have ISO: 50001 certification since 2011.
- A dedicated energy management cell to have focused approach on energy conservation activities.
- First refinery in the country to implement the state of the art Red Mud Filtration technology for dry mud disposal.
- VL has a well-defined sustainability framework having 8 policies, 14 management standards and 22 technical standards in place. This also includes a dedicated policy for Energy & Carbon for the group.

## Energy Conservation Projects Implemented

### 1. Improvement in overall power factor of refinery

The average power of refinery was 0.84, resulting in energy loss. After a detail study recommended capacitor banks of both HT (6.6KV) and LT (415V) are installed in all substation and the overall power factor improved to 0.92.

### 2. Installation of VFDs

Installations of VFDs in five numbers of critical equipment for better process control and energy saving.



### 3. Replacement of conventional lights with LED lights

The conventional SV 150W street lights were replaced by energy efficient 90W LED street lights. Apart from energy saving the project has intangible gains in terms of reduction in maintenance cost in regular replacement of luminaries and other accessories. The illumination levels have also increased providing a better work place to work.



### 4. Rural electrification through solar power

The biggest challenge faced by India after 70 years of independence is the fact that there are still hundreds of villages primarily inhabited by schedule tribes and schedule castes which continue to live in dark. The un-electrified or poorly electrified villages slog on all indices of human development. Green Energy is sustainable source of power. Solar energy is next generation renewable power resource. Vedanta Limited Lanjigarh has made a humble effort to bring green clean sustainable energy to 1973 households in remote foothill villages of Lanjigarh, Muniguda and Kalayansingpur block in Kalahandi and Rayagada districts respectively.



### 5. Coal Mill Modification for minimizing rejected coal.

High coal rejection in Mill rejection system was minimized which resulted in:

- Reduction in rejection quantity
- Increase in Grind ability
- Increase in mill outlet temperature
- Reduced spare consumption and increase in grinding roller life period

Coal rejection rate improved from 1.3% to 0.3%.

### **Other Energy Conservation Initiative taken in 2015-16**

- Vacuum Pump Gland cooling line modification by Bypassing of 90Kw motor pump

- Auto Drain valve Installation for Condensate and moisture separation from compressed air system to save compressed air
- Diversion of red mud filtrate (RMF) line from wash water tank (WWT) to W-4/5.
- Main burner nozzle replacement in calcination area.
- Downsizing of Cooling water pump motor in calcination
- Running hour optimization in water spray system in calciner
- Energy saving in weak wash system in calciner area.
- Pulley Modification in Ball Mill Liquor Pump Motor
- Replacement of ISC motor with energy efficient Motor
- Delta-Star Conversion of Inclined conveyor in RMF
- Caustic Cleaning of HID with series arrangement of CCL pumps.
- Pulley modification in secondary feed pump for single stream operation.
- Mill-3 throughput increment from 200TPH to 300TPH
- Optimization in operation of Circulating pump during single boiler operation
- Two coal Mill operation instead of design 3 Mill operation

## Energy Policy



**Vedanta Limited, Lanjigarh**

**ENERGY AND CARBON POLICY**

We are committed to mitigate and/or minimize the impact of climate change through our progressive energy & carbon programme that forms an integral part of our vision for sustainable development & is consistent with our overall business vision & mission.

Vedanta Limited, Lanjigarh strives to:

- Adopt and maintain global best practices on carbon and energy management and minimising greenhouse gas emissions throughout our operations. Continually measure, evaluate, record, review and control the direct energy usage and carbon emissions, and maintain year-on-year efforts to reduce the energy consumption and carbon emission across operations;
- Report carbon emissions in compliance with the internationally recognised protocols and work closely with other stakeholders to reduce energy consumption and carbon intensity;
- To support NMEEE, develop energy management system to identify access & efficiently manage all forms of energy in compliance with all applicable legal & other requirements;
- Foster research and innovatory techniques within our operations leading to optimal utilisation of resources with continuous focus on minimising energy consumption, along with advocating effective energy and carbon emissions management with a commitment to ensure availability of information and reallocation of resources to drive performance improvement projects;
- Invest in clean energy and maximise benefits from energy by waste recovery; Devise & attain optimum conditions for best energy performance through energy audit, review & establishing energy baseline to meet our commitment for clean development mechanism & set targets comparable with world best benchmark in our field;
- Consider energy efficiency and life cycle costs as an assessment parameter while procuring energy consuming equipment, raw materials, process changes;
- Communicate our approach and achievements actively to stakeholders, and work closely with policymakers to encourage effective and equitable abatement policies within our operational geography along with providing training to make them aware and accountable for actions influencing Energy Management Systems;
- Consider carbon emissions for all the projects and R&D investments in line with Group sustainable development commitments;
- Work with staff, supply chain, wider communities & other stake holders to demonstrate our commitment to energy conservation & greenhouse gas emission reduction principles & practices;

The content & implementation of the policy will be reviewed once in three years & actions will be taken accordingly including the sharing of good practices throughout the organisation.

Date: 5<sup>th</sup> Nov 2016  
Place: Lanjigarh



**Bimalananda Senapati**  
Head - Vedanta Limited, Lanjigarh