

National Aluminium Company Limited (NALCO)

1. National Aluminium Company Limited (NALCO), was established on 7th January, 1981 in the Public Sector, with its registered office at Bhubaneswar, to exploit a part of the large deposits of bauxite discovered along the East Coast. Since inception, NALCO, has not only addressed the need for self-sufficiency in aluminium, but has also given the country a technological edge in producing this important metal at global standards. At present, NALCO is the only Central Public Sector Undertaking (CPSU) mining bauxite for production of alumina and aluminium. Navratna status has been conferred on NALCO on 28.4.2008.



Figure 1: NALCO Corporate Office

2. Presently, Government of India holds 81.06% share of NALCO. It is an integrated and diversified mining, metal and power group 'A' CPSE with annual gross sales of Rs.7247 crore in financial year 2012-13. The Company has bulk shipment facilities at vizag port. Besides this the company is utilizing the shipment facilities at Kolkata and Paradeep ports.



Figure 2 : Port Facilities, Vizag

3. NALCO is the first Public Sector Company in the country to venture into international market in a big way with London Metal Exchange (LME) registration since May, 1989. Export sales account for almost 45% of its turnover with business in more than 15 countries in recent past. Its alumina also enjoys premium in world market on account of quality and international standard. NALCO is one of the lowest-cost producers of alumina in the world.
4. The Company is listed at Bombay Stock Exchange (BSE) since 1992. Besides, ISO 9002, ISO 14001, OHSAS 18000 & SA 8000 certification; the Company has also adopted ISO 50001 standards, for energy management system.
5. For its genuine concern and care for the locals, the Company has endeared itself to the people of the State of Odisha, where its area of activity is mainly focused at present. For its care for ecology and environment, the Company has received the coveted 'Indira Priyadarshini Vrikshamitra Award' and 'Indira Gandhi Paryavaran Puraskar' in past.
6. In addition to existing operations, the Company has taken up steps for development of the allotted captive coal block (Utkal-E in Odisha) at a project cost of Rs 338 crore.
7. To harness the non-conventional energy source, the Company has set up a Wind Power Project of 50.4-MW capacity at Gandikota in Andhra Pradesh and the 2nd Wind Power Plant of 47.6 MW has been commissioned at Jaisalmer, Rajasthan.
8. For the proposed alumina refinery project, having an estimated project outlay of Rs 6263 crore in Gujarat, detailed project report (DPR) has been prepared.

9. In October, 2012, Government of Odisha conveyed certain conditions to be fulfilled before recommending Pottangi mining lease to Government of India. NALCO has agreed to those conditions in November, 2012 and awaiting the recommendation of Govt. of Odisha.

Existing Operations & Their Locations

Bauxite Mines

10. The Company has its bauxite mines situated on a plateau in Damanjodi, Koraput, in the State of Odisha. This bauxite deposit is mined by a fully mechanised system having a capacity of 6.8 MT per year. Panchpatmali plateau stands at an elevation of 1154 m to 1366 m above mean sea level. Bauxite occurs over the full length of the Panchpatmali plateau, which spans over 18 km.



Figure 3 : Bauxite Mines, Damanjodi

Alumina Refinery

11. The alumina refinery is located at Damanjodi, Odisha, approximately 14 km from the bauxite mine at Panchpatmali. The mined-out bauxite is transported from captive mine to refinery by a 14.6-km-long single-light multi-curve 1800 tonnes-per-hour (TPH)- capacity cable belt conveyor. The alumina produced is transported to aluminium smelter at Angul (Odisha) and to Vizag (Andhra Pradesh) port by rail.



Figure 4 : Alumina Refinery, Damanjodi

Operations

12. The present capacity of alumina refinery is 2.1 millions tonnes per annum with four production lines of 525,000 tonnes each per annum. The capacity is under augmentation to 2.275 millions tonnes per annum by upgrading the 4th line to 700,000 tonnes per annum at an estimated cost of Rs 409 crore., which is likely to be completed by May,2014. Alumina produced is used to meet Company's requirements for production of primary aluminium at smelter. The surplus alumina that remains after internal consumption is sold to third parties in the export markets. A small portion is also sold to the domestic market.

Aluminium Smelter

13. The aluminium smelter is located at Angul, Odisha, approximately 699 km from the refinery and 5 km away from the captive thermal power plant. The aluminium produced at the smelter is transported to Vizag port (548 km away), Kolkata Port (526 km away) and Paradeep port (183 km away) by rail for export. Aluminium in the forms of ingots, sow ingots, tee ingots, billets, wire rods, cast strips, alloy ingots and chequered sheets is also sold in the domestic market.



Figure 5 : Aluminium Smelter, Angul

Operations

14. The aluminium smelter entered into production progressively from 1987. The present capacity of smelter is 4.60 lakh tonnes per year. Alumina is converted into primary aluminium through a smelting process using electrolytic reduction. From the pot-line, the molten aluminium is routed to either the casting units, where the aluminium can be cast into ingots, sow ingots, tee ingots, billets, wire rods, cast strips and alloy ingots, or to holding furnaces at flat aluminium products unit where the molten aluminium is rolled into various cold-rolled products or cast into aluminium strips.

Captive Power Plant

15. The aluminium smelter and coal-based captive power plant at Angul are strategically located. The Plant is located approximately 5 km away from aluminium smelter.

16. The location of captive thermal power plant at Angul is also strategic to the availability and supply of coal. NALCO sources its major coal requirement for captive thermal power plant from the Talcher coalfields of Mahanadi Coalfield Ltd. (a subsidiary of Coal India Ltd.), located approximately 15 km from Angul. The 18.5-km captive railway system links the captive thermal power plant to the Talcher coalfields, enabling transport of the critical and bulk requirement of coal.



Figure 6 : Captive Power Plant, Angul

Operations

17. The captive thermal power plant commenced operations in 1986. Presently the captive thermal power plant has a generation capacity of 1200 MW by way of 10 turbogenerators, each rated at 120 MW. While the captive thermal power plant provides entire electric power requirement of aluminium smelter, it also provides for approximately 35 MW of the power requirement to the alumina refinery.

Physical Performance, Financial Performance and Sale Performance are presented at Table 1, Table 2 and Table 3.

Table 1
Physical Performance of NALCO

Production	Unit	2010-11 Actual	2011-12 Actual	2012-13 Actual	MOU Target for 2013-14	2013-14 Actual
Bauxite	Lakh MT*	48.24	50.03	54.19	64.50	62.93
Alumina/ Hydrate	Lakh MT*	15.56	16.87	18.02	21.50	19.25
Aluminium Metal Production	Lakh MT*	4.44	4.13	4.03	4.05	3.16
Net Power Generation	MU	6,608	6,200	6,076	6,341	4,989

*metric tonne

Table 2
Financial Performance of NALCO

(Rs in crore)

Sl. No	Particulars	2010-11 Actual	2011-12 Actual	2012-13 Actual	Annual Budget Estimate (2013-14)	Actual upto Dec.2013	Estimated total for 2013-14
1.	Income	6410	7154	7427	7908	5365	7373
2.	Operating Cost*	4464	5488	6010	6405	4317	5925
3.	Interest & Transaction Loss	-	1	7	-	-	-
4.	Depreciation & Amortization	422	467	505	531	384	511
5.	Net Profit before Income tax and Dividend	1524	1198	905	972	664	937

*includes exceptional expenditure of Rs.22 crore in 2011-12.

Table 3
Sales Performance of NALCO

SALES	Unit	2010-11 Actual	2011-12 Actual	2012-13 Actual	Target for 2013-14	2013-14 Actual
Total Alumina/ Hydrate Sale	Lakh MT*	6.82	8.42	9.83	13.52	13.42
Aluminium Export	Lakh MT	0.98	0.98	1.44	1.40	1.01
Domestic Aluminium Sale	Lakh MT	3.41	3.18	2.59	2.65	2.18
Total Aluminium Sale	Lakh MT	4.39	4.16	4.03	4.05	3.20

* metric tonne

On-Going Projects

Utkal-E Coal Block

18. Ministry of Coal, Govt. of India had allocated Utkal-E Coal Block to meet the coal requirement for 9th & 10th unit having 120 MW each as well as proposed 11th & 12th Captive Power Plant Units at Nalco, Angul. The total mineable reserve of Utkal-E Coal Block is 67.49 million tons. The mine life is 36 years at the target production of 2.0 million tons per year. The estimated cost of the Project is Rs. 338 crore at May, 2011 price level.

Present Status

Major milestones achieved:

- Mining plan was approved by Ministry of Coal on 31st July, 2006.
- Environmental Clearance (EC) was accorded by MoEF on 10th December, 2009.
- Mining Lease was sanctioned by Ministry of Coal, Government of India on 14th June, 2011.
- A presentation on Mine Closure Plan was made to Ministry of Coal, Government of India, New Delhi in April, 2012 and resubmitted in August, 2012 complying to the observations.
- Disbursement of compensation for acquisition of private and commenced in April, 2012 and more than 60% compensation has been disbursed till Jan'14.
- A presentation was made before Inter-Ministerial Group (IMG) (on the show cause notice issued in May, 2012) on 10th October, 2012.
- DGPS Survey for Mining Lease area and obtaining Forest Right Certificate for 169.1779 Ha out of 197.787 Ha of forest land have been achieved.

4th Stream Upgradation Project of Alumina Refinery

19. Capacity upgradation of 4th stream of alumina refinery from 5.25 lakh tonnes per year (TPY) to 7.0 lakh TPY and that of bauxite mines from 6.3 million TPY to 6.825 million TPY at an estimated project cost of Rs 409 crore is in progress since August, 2008. Commissioning of the project started in Dec'12 and the plant is under stabilisation.

Wind Power Plants

20.A 50.4MW wind power plant was commissioned in Dec,2012 at Gandikota, Andhra Pradesh. The 2nd wind power plant of 47.6MW at Jaisalmer, Rajasthan was commissioned in Jan, 2014.

Computerisation

21. NALCO has a strong usage of Information and Communication

Technology (ICT) for its day to day activities. NALCO's SAP applications cover Materials & Contracts (MM), Sales & Distribution (SD), Production Planning (PP), Finance & Controlling (FICO) and Human

Resource Management (HR) modules. These

modules are implemented organization-wise including all its Work sites, Offices and facilities. For Maintenance Management, NALCO uses the Ramco e-apps maintenance module.

22. In the area of e-governance, biometric based attendance solutions have been implemented for contract labour and is progressively under implementation for employees. E-tendering for export sales operates with standard security measures like SSL and Digital signature systems. Materials procurement has been given a technical boost with launch of online bidding through SRM 7 module of SAP. Steps are underway to implement e-bidding for Works/Service tenders using CPP portal of



Figure 7 : Wind Power Plant, Jaisalmer

Govt. of India. In the area of HR, GET recruitment has been partially made online, with the application phase in internet mode and written test scores uploaded from GATE results.

The SAP application is hosted in the in-house state of the art Data Centre with standard facilities. This is being further strengthened with a Disaster Recovery site shortly so as to effectively implement Business Continuity Plan for the IT based processes.

Action Taken on Pollution Control and Environment

23. All the units of NALCO are certified to International Standard ISO14001: 2004 - Environmental Management System. NALCO is proactive and has adopted preventive strategies like 3 R principle of Reduce, Reuse and Recycle.

NALCO has optimised its resource consumption thereby minimising the waste and optimising the operating efficiency in all its units. It has eliminated the use of ozone-depleting substances in its operation substituting them with better technology like Vapour Absorption Machines (VAM)-based chiller plant in CPP, CFC-free Cabin Air conditioning system in PTMs & high-efficiency fume treatment centre at the smelter plant.

24. All the units of NALCO have adopted zero discharge with respect to waste water management. The waste water is treated in effluent treatment plants and then is reused in the process. All units of NALCO are provided with Sewage Treatment Plants and the treated water is being used for horticulture and gardening purposes.

25. NALCO has adopted rain-water harvesting system in all its units. Electrostatic precipitators with advanced intelligent control equipments in its power plants are being retrofitted by adding one more pass to achieve higher efficiency in SPM emission level. Same has been incorporated in one of its units (Unit#6) at CPP. Implementations of the same in other units are in progress. NALCO has adopted highly efficient ESPs of 80 mg/NM³ in its new units of CPP which shows NALCO's proactive approach for abating pollution.

26. NALCO has taken up pilot scale-cum demonstration project for carbon sequestration at its captive power plant which is unique in the country. For management of hazardous wastes, NALCO has taken utmost care as per the guidelines provided by statute. NALCO is having land fill for disposal of hazardous wastes like spent pot lining materials, incinerators, etc.

Research & Development

27. Thrust has been laid on patenting of process know-how developed in the Company

either through in-house or collaborative R&D efforts. Till date 26 patents have been sent for filing which include 1 patent filed in the current year. Board-level technology committee meetings are held to review the R&D activities of the Company. Innovative modifications are carried out in different units. One patent has been granted and one R&D process titled Heat treatment process for destruction of toxic cyanide present and recovery of valuables from spent potlining material has been commercialized during the year.

28. Some benefits derived as a result of the above R&D (in-house & collaborative):

- Use of slotted anodes and anodes with higher stub hole depth in potlines have given a benefit of approx Rs 12 crore per year due to reduction in DC energy consumption by 100-150 KWH/T metal.
- Due to R&D effort good quality coke has been used in carbon plant. Financial benefit derived this year is approx Rs 3 crore per year compared to last year, due to reduction in consumption of coal tar pitch and calcined petroleum coke.
- Inclusion analysis and metallographic studies have helped to improve product quality.
- Regular analysis of baked anodes has helped to improve anode quality.

Industrial Relations

29. The general industrial relation climate in the Company remained cordial throughout the year, which helped the organisation achieve excellent physical performance. Some important cost control and operational decisions were taken in the participative management forum leading to effective implementation of these decisions. A new and path breaking culture of energy conservation was introduced through meter based domestic electricity consumption. Compliance of various statutory provisions and grievance handling remained two important focal points of industrial relation activities of the Company during the year.

The Company has adopted the principle of equal opportunity to the women employees in the matter of employment and the Company has 352 no. of women employees at different levels and categories.

The Presidential Directives issued from time to time on reservation of SC/ST persons in employment has been scrupulously followed by the Company. There are exclusive Cells constituted for the welfare of the SC/ST employees Welfare Associations which meet and discuss their view points at regular intervals both at Complex level as well as Corporate level.

30. NALCO has produced 62,92,677 tonnes of bauxite, 19,25,000 tonnes of alumina and 3,16,492 tonnes of aluminium in 2013-14. It has achieved a gross turnover of Rs 5,143 crore and a profit after tax of Rs 470 crore during 2013-14 (up to December, 2013). The Company is likely to achieve gross turnover of Rs.7010 crores during the year 2013-14.

31. Under the Foreign Trade Policy 2009-10, NALCO has been granted with 'Premier Trading House Status' for achievement in export target. Certificate of recognition as Premier Trading House has been issued on 30.9.2009 which is valid upto 31.3.2014. Premier Trading House status is the highest status awarded to any Export House by Govt. of India. NALCO has achieved export earnings of Rs. 3410 crore in the year 2012-13 and Rs. 3,719 crore (prov.) during the year 2013-14.

32. MOU rating of NALCO during the last three years

Year	Composite Score	Grade
2010-11	2.464	Very Good
2011-12	2.49	Very Good
2012-13	1.50	Excellent

Aluminium Industry in India

33. In India, the electrical sector is the largest consumer of aluminium. Bulk of the aluminium **usage** is in overhead conductors and power cables used in generation, transmission and distribution of electricity. Aluminium is used in switchboards, coil windings, capacitors—and many other applications as well.

34. The global aluminium production which was 47.72 million tonnes in 2012 increased to 50.11 million tonnes in 2013, as per CRU Monitor-Aluminium. The world aluminium consumption in 2012 and 2013 was 47.26 million tonnes and 50.15 million tonnes respectively. India produced 17.24 lakh tonnes in 2012-13 and 17.30 lakh tonnes in 2013 -14 which was approximately 3.4% of world production.

35. India is endowed with rich bauxite reserves of 2300 million tonnes (approx. 6.76% of the world total) and ranks 5th in the world bauxite reserve base. The primary aluminium industry in India consists of three producers viz. National Aluminium Company Limited (NALCO), HINDALCO Industries Limited and The Sesa Sterlite (Vedanta Group) comprising Bharat Aluminium Company Limited (BALCO), Madras

Aluminium Company Limited (MALCO) and Vedanta Aluminium Limited (VAL). VAL started its operations in April, 2008. Out of these companies, only NALCO is in the Public Sector. The production of aluminium by primary aluminium producers in the years 2011-12 to 2013-14 is at **Table 4**.

Table 4
Production of Aluminium in India

(Unit in tonnes)

Name of the Company	2011-12	2012-13	2013-14
Nalco	4,13,089	4,03,384	3,16,492
Hindalco	5,81,985	5,47,416	6,18,286
Vedanta Group	6,76,380	7,73,946	7,95,355
Total	16,71,454	17,24,746	17,30,133

The sales figures of aluminium in the years 2011-12 to 2013-14 is at Table 5.

Table 5
The sales figures of aluminium during the period 2011-12 to 2013-14

(Unit in tonnes)

Items	2011-12	2012-13	2013-14
Domestic sales	13,64,701	13,78,718	12,39,322
Export sales	3,09,897	3,44,759	4,87,081
Total sales	16,74,598	17,23,477	17,26,403

36. The price of aluminium fixed by the primary producers is generally aligned to the London Metal Exchange (LME) prices. During financial year 2012-13, the average LME aluminium price was USD 1976 per metric tonne (MT) which was around 15% lower than the average LME aluminium price of USD 2318 per MT during 2011-12. During 2013-14, the LME aluminium prices fell from USD 1857 during April, 2013 to USD 1704 during Mar, 2014 with the average LME price during the year 2013-14

being 1773 per MT.

37. The aluminium prices were affected by sluggish macro-economic condition, negative economic expectations and poor market fundamentals. Supply is outpacing demand and stocks are rising. The market is over supplied which is putting pressure on prices.