

SUSTAINABILITY DRIVES BUSINESS EXCELLENCE



6th Sustainable Development Report
2016-17

नालको  **NALCO**

National Aluminium Company Limited

GRI G4 'In Accordance' - Core option

NALCO Sustainable Development Policy

Sustainable Development is an integral part of our business with specific focus on economic, social, environmental & energy related issues. We also dedicate ourselves to strive for continual improvements in our systems, processes, procedures and work ethos for enhancing satisfaction of all our stakeholders, guided by the following principles.

Guiding Principles:

- Relentless pursuit of holistic advancements in Quality, Productivity, Safety, Occupational Health, Innovation & Technology including adoption of Green Technology with a view to enhancing value creation for all stake holders.
- Embedding integrity, ethical 'Human Rights' practices, transparency, mutual trust and respect with commitment to social responsibility in all our operations for driving inclusive growth and harmonious socio-economic development of communities.
- Aligning our growth with preservation of natural resources; ecosystems & biodiversity; environmental excellence; waste utilisation; energy efficiency and reduction of Green House Gas emissions.

Commitment:

We are committed to continually improve with focus on issues pertaining to economic, social, energy conservation and environmental protection to ensure a better planet for future generations.



CONTENTS

ORGANIZATION & STRATEGY

1.1	Message from CMD	03
1.2	About the Report	05
1.3	Nalco & Its Units	06
1.4	Achievements 2016-17	08
1.5	Awards and Accolades	10
1.6	Contextual Inputs for Sustainability	12
1.7	Stakeholder Engagement & Materiality analysis	13
1.8	Key Sustainability targets and performance	19
1.9	Corporate Governance	20
1.10	Membership & Association	29
1.11	Business Development	30

ECONOMIC PERFORMANCE

2.1	Roboust performance	32
2.2	Local Employment Opportunity	36
2.3	Ancillary Development	37
2.4	Climate Change Imperatives	38

Environmental Excellence

3.1	Environmental Care	40
3.2	Pollution Control Measures	40
3.3	Plantation	42
3.4	Environmental Risk Management	42
3.5	Raw Material Sourcing and Conservation	44
3.6	Energy Efficiency	47
3.7	Water Stewardship	51
3.8	Waste Management	57
3.9	Responsible Mining	60

Human Resource Excellence

4.1	Participative Management	66
4.2	Management Employees Relationship	66
4.3	Employee Benefits	68

4.4	Enhancing Competency	69
4.5	Grievance Redressal Mechanism	70
	Occupational Health & Safety	
5.1	Occupational Health	72
5.2	Safety	73
5.3	Safety awareness & Training	73
	Human Rights	74
6.1	Policy & Practice	74
6.2	Screening during project & procurement	74
	Community Engagement	
7.1	Community Care	76
7.2	Major CSR initiatives	76
	a Health Care	77
	b Education	77
7.3	Case Study-1	77
7.4	Case Study-2	79
	Customer Focus	
8.1	Product Responsibility	81
8.2	Customer Satisfaction	82
	GRI sector supplement for Metals and Mining sector	83
	GRI Content Index	84



ORGANISATION & STRATEGY





Our Vision

To be a Premier and Integrated company in the Aluminium value chain with strategic presence in Mining both domestic & global, Metals and Energy sectors.

Our Mission

To sustainably grow multi-fold in Mining, Alumina and Aluminium business along with select diversification in Minerals, Metals and Energy sectors, while continuously improving on efficiency and business practices thus enhancing value for all stakeholders

Core Values: 'BEST'

- **B**enefitting Stakeholders
We provide our customers, suppliers and other stakeholders with utmost level of value, service and satisfaction.
- **E**xcellence and Quality
We ensure that our products, manufacturing & business processes adhere to the highest quality levels and standards.
- **S**ustainability
We relentlessly pursue sustainable practices and create a positive impact on the communities we engage with.
- **T**rust & Integrity
We conduct ourselves with dignity, integrity, equity, transparency and accountability to build trust.

Message from the CMD

“Our Organizational strategy is aligned to sustainable development goals to ensure a better planet for the future generation with focus on economic growth, social equity and environment protection”



Dear Stakeholders,

It gives me immense pleasure to present the 6th edition of SD Report of NALCO outlining the initiatives in the sustainability front during 2016-17.

Sustainable development is about implementing well-balanced strategies to achieve economic, environmental and social objectives to ensure long term growth of an organization. This report, prepared based on Global Reporting Initiative G4 Guidelines, is an attempt to share our sustainability performance with our stakeholders and the world at large. Corporate Governance has been the corner stone of our Sustainable Development and the saga of our growth-journey is worth-mentioning here. With the lofty objective of making India self-reliant in Aluminium, a strategic metal, NALCO was formed in 1981 to produce aluminium by using bauxite from Panchapatmali Mines in East Coast. It is a matter of great satisfaction to state that during this year, we have achieved 100% capacity utilization of Bauxite Mine and in the intervening period, NALCO has made immense contribution towards the country's journey of achieving self-sufficiency in Aluminium. In Asia, we are regarded as one of the giant alumina-aluminium complex having a global presence. We have also been rated as the lowest cost producer of alumina in the world in 2017 as per report of Wood Mackenzie, London, leaving other refineries in China, Australia, Brazil and other countries behind us. Another achievement to cherish is our Panchapatmali Bauxite Mines being rated as the 2nd lowest cost producer in the world in 2017 in the same report. We have also become the 2nd highest net foreign exchange earner in the country this year. Over the years, the company has grown from strength to strength and now the company has become a household name in Odisha, a blue chip company in India and a company of global-repute abroad. Our motto has been : **'when the going gets tough, the tough gets going'**. Our focus on 3 Ds: Dedication, Determination and Discipline, have made NALCO

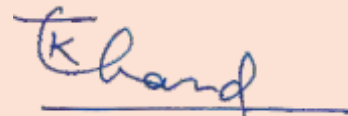
collective acclaimed across the industries . Pursuit of Business Excellence as a journey & not just a destination has been the hallmark of our strategy and this is reflected in strong performance in production, productivity and profitability as well as demonstrating sound corporate governance driving sustainable development. NALCO has been consistently, during the last couple of years, rated as Excellent in Corporate Governance. We believe in 'ATFR' – Accountability, Transparency, Fairness & Responsibility, the four pillars of Corporate Governance and cherish our core values 'BEST' – Benefiting stake holders, Excellence in quality, Sustainability & Trust and integrity.

Strong core values and sound corporate governance promotes sustainable development, a development that stand the test of the time. **NALCO's** role for promoting sustainable development through sound corporate governance becomes more pressing in the context of our country where sustainability faces serious challenge due to paucity – 18% of world population having a mere 4% of world resources, poverty – 30% of over 1.2 billion population living in extreme poverty, illiteracy – large population of women are illiterate, 50% of the population not having access to modern cooking energy and wide spread defecation in the open, malnutrition and similar weak economic indicators. NALCO, as a company has been a partner in progress, in bringing sustainable development in under-developed areas such as Damanjodi & Angul. Through its CSR activities, the organisation has brought cheers in the face of the weakest of the weak in the society. The Skill India mission is an opportunity for us to give some serious thought to play an impactful role in bridging the skills gap in the country. By leveraging, the Skill India mission and engaging with the government and implementation agencies, we plan to provide much – needed training programmes to the vast number of unskilled people, which will ultimately benefit industry and contribute to the growth and development of the country in the long – term.

In our efforts to combat climate change, we have enhanced our Green Energy generation capacity, operating 4 wind power plants with total generation capacity of 198.4 MW in different locations of India and installing solar power generation of 310 KWp. During the year, NALCO has generated 205.722 MU wind power & 0.294 MU Solar power. Deflouridisation plant utilising breakthrough Nano based Emiron technology to prevent fluoride contamination in surroundings of Smelter is a landmark initiative taken by us. The initiatives in the economic, environmental & social front are detailed out in the following pages.

But the journey is unending. We are committed to continuously work to realize the dream of the founding fathers. It will be quite befitting to conclude in the words of Robert Frost, the guiding philosophy for Pt. Jawaharlal Nehru , **'Woods are lovely, dark and deep, but I have promises to keep, And I have miles to go before I sleep,....'**

It is our firm resolve to take NALCO to new heights of growth through initiatives on sustainable development to provide clean environment, green earth and economic prosperity for all. I take this opportunity to congratulate all our esteemed stake holders for their unstinted support and trust and solicit their company in our journey of excellence.



With best compliments
(Dr. Tapan Kumar Chand)
 Chairman-cum-Managing Director

About the Report

Sustainable Development is integral to our ethos and we are committed to enhance our Triple Bottom Line performance. The sixth Sustainable Development (SD) report covers the sustainability performance for the Financial Year 2016-17. Annual reporting on sustainability has commenced in NALCO since 2011-12 and the first report was prepared based on the National Voluntary Guidelines of Govt. Of India. From subsequent years, reports on annual basis as a standalone document, are being prepared based on applicable international guidelines of Global Reporting Initiative (GRI). Since 2014-15, we are reporting our SD performance, based on the GRI G4 Guidelines, valid as of now. The SD Report for fiscal year 2016-17, is aimed at sharing our sustainability performance in a structured manner to reflect major financial, environmental and social impacts of our operations. Care is taken to present data based on measurements. In case of non availability of measured data, recourse is taken to use data calculated based on standard assumptions. Estimation and quantification of data is done with clear elucidation of assumptions made, empirical formula used and standardization applied. For calculation of carbon emissions, emission factors provided by IPCC and Central Electricity Authority of Government of India, have been used. Calculation of GHG emission is done based on emission factor given by IPCC.

Reporting Scope & Boundary

The report is pertaining to our production units i.e. Bauxite Mine, Alumina Refinery, Aluminium Smelter & Captive Power Plant in Odisha and the port facility at Vishakhapatnam. Other business operations i.e. joint ventures, subsidiaries, business partnership etc. are kept outside the boundary of reporting. The scope of the report is determined by selecting aspects found material in a structured materiality analysis exercise. Considering the impact, some aspects which are not material are also covered to required extend. The aspect boundary is ascertained considering location of their impact which is appropriately mentioned in the report. There were no significant changes during the reporting period in size, structure, ownership or reporting boundary. This report is prepared based on the GRI G4 Guidelines and is in accordance with the CORE option. Due care is taken to collect & present required data keeping in view the requirements of GRI-G4 Guidelines so that a transparent & balance picture of our performance can be presented in the report. No third party assurance is felt required, considering that the disclosed information and data are mostly based on documents reviewed by the Board i.e. Annual Report, Financial Statements etc. Overall this report is a balanced representation of our performance and achievement during the year on sustainability front.

We gladly solicit your remark and feedback on our report which will help us in further improvement of our report quality and coverage. You may send/email your feedback, comments or suggestions to:

Email: sustainability@nalcoindia.co.in
Postal Address: NALCO Bhawan, P/1, Nayapalli
Bhubaneswar-751 013, Odisha



NALCO and its Units

About NALCO

National Aluminium Company, a pioneer integrated Aluminium producer having pan India operation spanning from bauxite mining to metal production and associated captive power generation is a Navaratna Central Public Sector Unit of Govt. of India. The Company has 68.25 lakh TPA Bauxite Mine & 22.75 lakh TPA Alumina Refinery (Normative capacity 21lakh TPA) located at Damanjodi in Koraput dist. of Odisha, and 4.60 lakh TPA Aluminium Smelter & 1200MW Captive Power Plant located at Angul, Odisha. NALCO has bulk shipment facilities at Vizag port for export of alumina/aluminium and import of caustic soda and also takes advantage of the port facilities at Kolkata and Paradeep. The Corporate office of the company is located in the temple city Bhubaneswar, the state capital of Odisha, India with regional marketing offices strategically located in Delhi, Kolkata, Mumbai, Chennai and Bangalore. 11(eleven) stockyards are also operating at various locations in the country to facilitate domestic marketing.

From the days of first commercial operation since 1987, the company has continuously earned profit for last 30 years and is credited with many achievements in the field of Mines, Refinery & Smelter. It has not only addressed the need for self-sufficiency in aluminium, but has also given the country a technological edge in producing aluminium and alumina of global standards. The production units & Vizag Port Facilities are certified to ISO 9001, ISO 14001 & OHSAS 18001 standards. Energy intensive units, Smelter, CPP & Al. Refinery are also ISO 50001 certified. Corporate Office & the four production units are certified to SA8000. The Company is low cost producer of metallurgical grade alumina in the World as per Wood MacKenzie report. With its consistent track record in capacity utilization, technology absorption, quality assurance, export performance and profits generation, NALCO is a bright example of India's industrial might. Till date the Company has undergone three phases of expansion and the 4th phase expansion of the company is on the anvil. Besides NALCO has also diversified into wind energy and solar energy. We are also exploring the possibility of further upstream and downstream integration. Recent allocation of 2 coal blocks at Chendipada, Angul and bauxite deposit at Pattangi has secured the raw material demand of the company.

On the sales and marketing front, the success of NALCO starts concurrently with the beginning of commercial production and got augmented with its entry in to international market in May 1989 obtaining LME registration. NALCO is a prime player in global metal market with its products enjoying a good reputation in many countries. On the R&D front NALCO has filed 31 patents out of which 10 patents have been granted and 5 patents have been commercialised.

Bauxite Mine

The Bauxite mine of NALCO situated on the top of Panchpatmali hills near Damanjodi, Dist- Koraput, Odisha is a fully mechanised open cast Mine of capacity 68,25,000 ton/year. The bauxite content of mine is 90% gibbsitic having 45% alumina & 3% silica. After mining the ore is subjected to primary crushing and crushed ore is transported by a single flight multi curve fully covered cable belt conveyor over a distance of 14.6 Km to our Refinery unit situated at foothill of mines. The concurrent restoration of mined out area augmented with planned plantation has turned our mine to scenic greenery.

Alumina Refinery

Alumina Refinery to produce alumina is located at Damanjodi, at a distance of approximately 14 km from our mines. The plant currently has capacity of 22,75,000 tons per year (Normative capacity 21lakh TPA) with on going expansion for capacity addition of another 1,000,000 ton per year. Facility for production of speciality alumina & cogeneration of electrical energy also exists within the refinery complex. The alumina produced is transported by rail to our smelter plant located at Angul for metal production and excess alumina is sold in domestic market and exported through Vizag port.

Aluminium Smelter

Our Smelter plant of capacity 4.60 lakh ton per year is located at Angul, Odisha. The integrated facility at the plant include Anode production, Smelting, Casting and Rolling. Alumina is converted into primary aluminium through a smelting process by 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 RPU where the molten aluminium is rolled into various cold-rolled products or cast into aluminium strips. The finished products cater to different customers in domestic and overseas market.

Captive Power Plant

Smelting being a fairly energy intensive process and in order to have cost effective production and availability of uninterrupted power, we have our Captive Power Plant strategically located at Angul, Odisha near to coal mines of M/s Mahanadi Coalfields Limited, 5 km away from our Smelter Plant. The coal based CPP is of 1200 MW capacity (10 X 120MW). Besides providing power to our Smelter Plant, power is also supplied to Alumina Refinery by wheeling arrangement through state grid.

Port Facilities

For export of alumina and import of caustic soda and other raw materials by shipment, NALCO is having its own port facility on the northern arm of the inner harbour of Visakhapatnam Port on the Bay of Bengal with mechanised storage and ship handling facility. It can handle ships of 40,000 MT DWT. The current handling capacity of port is 14,00,000 Tons per year. NALCO also uses the ports of Paradeep and Kolkata for export of aluminium.

Products

NALCO is a prime producer of basic aluminium and other related value added product and one of the the largest exporter of alumina and aluminium in India. Apart from domestic market the market penetration for alumina includes countries like China, Egypt, Iran, UAE, Oman, Indonesia, Malaysia etc. Aluminium produced by NALCO finds market in many countries such as Brazil, Bangladesh, Korea, Malaysia, Singapore, Vietnam, Indonesia, Taiwan, Nepal etc. The major products of the company with their applications are given below.



The primary products of the company includes:

S.No	Product Category	Products	Applications
1	Aluminium products	Standard Ingots, Alloy Ingots, T ingots, Sow Ingots, Billets, Wire Rods, Chequered Sheet, Flat Rolled Products	<ul style="list-style-type: none"> ❖ Ingots used for electrical conductors, casting and other applications ❖ Billets are basic input for manufacturing high-quality extrusions ❖ Wire rod coils have wide applications in conductor & cable industries. ❖ Rolled & Chequered Sheets are used in manufacturing industries and automobile industries.
1	Alumina Products	Calcined Alumina, Alumina Hydrates, Speciality Alumina & Hydrate	<ul style="list-style-type: none"> ❖ Calcined Alumina is used in aluminium smelting, refractory, ceramics & high alumina cement ❖ Alumina Hydrate is used in alum, poly Aluminium Chloride & others speciality chemicals ❖ Speciality aluminas have applications in refractory, ceramic and abrasive industries ❖ Speciality hydrates is used as filler material in plastic, rubber, paper, fire retardant chemicals and manufacturing alumina chemicals

ACHIEVEMENTS 2016-17

- Alumina Refinery achieved the highest ever alumina hydrate production of 21.00 lakh MT which is 100% normative capacity utilisation of Refinery and a improvement of 7.53% over previous year production of 19.53 lakh MT.
- Aluminium Smelter produced 3.87 lakh MT cast metal surpassing previous year production by 4.03%.
- Mines achieved the highest ever bauxite production and transportation of 68.25 lakh MT as against 63.40 lakh MT achieved during the previous year, registering 7.65% growth. This is the 100% capacity utilisation of Mines.
- Steam Generation Plant (SGP) at Alumina Refinery achieved the highest ever net power generation of 453 Million Units (MU) surpassing previous best of 438 MU achieved last year.
- CPP generated 6066 MU net power registering a growth of 3.85% over previous year generation.
- Rs 3000.80 Lakh spent towards Corporate Social Responsibility (CSR) obligations against the mandated spending of Rs 2,756.55 Lakh.
- Wind Power Units at Gandikota, Andhra Pradesh; Devikot, Rajasthan; & Jaisalmer, Rajasthan has contributed 206 MU clean energy against last year production of 156 MU. With commissioning of 4th Wind Power Plant at Jath, Maharastra the non conventional green energy generation capacity is further augmented.

- Based on Memorandum of Understanding (MoU), signed with the Government of India for the Financial Year 2016-17 NALCO is placed in 'Vey Good' category.
- Expansion of Alumina Refinery with addition of 5th stream production line of 1.0 MTPY capacity is under execution at a estimated capital expenditure of Rs 5540 Crore. EPCM consultant for the project has been identified and Environmental Clearance from MoEF & CC and Consent to Establish (NOC) from Odisha State Pollution Control Board has already been obtained.



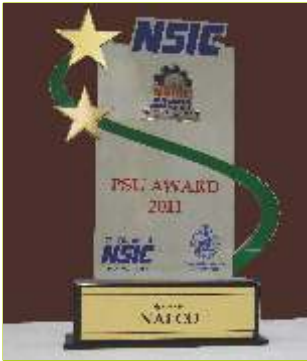
Scope Award for Excellence & Outstanding Contribution to public Sector Management - Institutional Category (Maharatna & Navratna PSES)

Awards and Accolades

During the year NALCO is honoured with many awards and accolades on various fronts. Some of the distinguished recognitions received are listed below for appreciation of stakeholders and public.

- The Panchpatmali Bauxite Mines of NALCO has been honored with the 5-Star Rating by the Ministry of Mines in February, 2017 for its effort and initiatives towards Sustainable Development Framework.
- 'Highest Export Award' by Chemical & Allied Products Export Promotion Council (CAPEXIL) in February, 2017, for its outstanding export performance in Minerals and Ores sector for the year 2014-15.
- Received 'Performance Excellence Award', from Indian Institution of Industrial Engineering (IIIE) in February, 2017.
- Received 'SCOPE Meritorious Award' for Corporate Social Responsibility & Responsiveness for the year 2014-15.
- 'SCOPE Excellence Award' in Institutional Category-I for Navratna and Maharatna Companies for the year 2014-15 awarded in FY 2016-17.
- DGMS awarded 1st Prize for safety & welfare of contractor's workers and 1st Prize for water management/monsoon preparation at Panchpatmali Bauxite mines, in July, 2016.
- 'India Pride Award' instituted by the Dainik Bhaskar Group for CSR, Environment Protection & Conservation for the year 2015-16, received in April, 2016.
- 'Outstanding CSR Practices in Community Development Award', during the Odisha CSR Summit 2016, jointly organized by KIIT School of Rural Management and Odisha LIVE at Bhubaneswar in April, 2016.
- 'CSR Excellence Award' in Gold category for the year 2015 by the Institute of Quality and Environment Management Services (IQEMS) in association with Rotary Club - Heritage, Bhubaneswar in May, 2016.
- 'Emerging Global Brand Award' by a leading web channel network Odisha Live, at Bhubaneswar in June, 2016.





- The Times of India Group felicitated NALCO for its CSR initiatives in August, 2016.
- 'Best Exporter Awards' consecutively for the years 2011-12, 2012-13 and 2013-14, under metallurgical products category in September, 2016 at Bhubaneswar.
- 'Best Mother Plant award' in the 30th Annual State Level Convention - 2016 organised by Odisha Assembly of Small & Medium Enterprises (OASME), in August, 2016



Appreciation Award in large mines category at the Confederation of Indian Industries (CII) Eastern Region Safety Health & Environment Excellence Awards 2016-17

Contextual Inputs for Sustainability

Being a global player sales turnover and rate of growth are of paramount importance to us in a competitive environment. Proper assessment of the external factors affecting our operations like market scenario & state of economy, provide a sound basis for sustainability enabling us to take up effective strategic initiatives addressing the market related issues.

Global Market Outlook

The global aluminium production outlook for 2017 remains generally bullish. Strong growth is expected in China with production reaching 36.6MT (registering a growth rate of about 15% y-o-y over 2016). With limited growth in production, annual production in the rest of the world is expected to reach 27.59 MT in 2017, a mere 2.2% y-o-y increase compared to 26.97 MT level in 2016. The strong growth of China will turn aluminium market surplus and may force closure of some production units.

On the demand front also China is expected to score better in year 2017 fueled by estimated GDP growth of 6.5%. The construction, transport and infrastructure development by Govt of China will support the demand growth. In the rest of the world, optimism has picked up for rolled products with key-end use sectors beginning to show firmer activity. Demand for extruded products has already picked up in 2017 across end use sectors, driven in particular by demand from the automotive market.

Weakening Chinese fundamentals may weigh down on prices during 2017. After averaging \$1,854/t in Q1 2017 and \$1,917/t in Q2 2017, LME 3-month price is forecast by, leading commodities analyst CRU, to average about \$1,910/t during Q3 2017. Further expected production cut in China due to stringent environmental measures and imposition of higher import duty by US to support their aluminium industry will have positive impact on price.

Domestic Market Outlook

In the year 2016-17 the total domestic production of aluminium metal was 2.86 MT compared to previous year production of 2.44 MT registering a growth rate of 17.5%. During 2016-17 total domestic consumption of primary metal has registered increase at the rate of 1.6% from previous year consumption of 3.24 MT to estimated 3.29 MT. Primary aluminium exports by Indian producers also registered substantial growth of 48% from 0.88 MT in 2015-16 to 1.31 MT in 2016-17.

Indian aluminium production is expected to rise further in 2017-18 driven by estimated GDP growth of 7.4% predicted by FICCI. On the demand front the stress given on higher spending on infrastructure in 2017 union budget and Governments vision of rural electrification by May-2018, will give a positive boost to domestic requirement for aluminium metal. The contribution from domestic transport sector on demand pattern will be positive and encouraging. Specific aluminium alloy use in aerospace and defense also holds promise for increase in utilization.



Stakeholder Engagement & Materiality Analysis

Stakeholders are our partners in our growth story and we value the importance of working synergistically with them for value creation in a stable environment. Depending on the issues, the affected stakeholders are identified and their perspectives are kept in focus through consultation & engagement process. The critical concerns of stakeholders emerging out of the engagement process are incorporated in the decision making. Stakeholder Engagement process also give us an opportunity to revisit our policy, procedures and performance, to find out gaps and to take remedial measures.

Stakeholder Engagement Approach

The identified stakeholders include government & regulatory authorities, employees, investors & shareholders, industry associations, customers, consumers, civil society organisations as well as suppliers & vendors. Engagement with stakeholders are effected through formal channels like vendors meet, suppliers meet, customers meet, training, knowledge sharing, CSR projects identification, regular communication with shareholders & investors, grievance handling & satisfaction survey and through informal channels like active involvement in industry associations and other membership based organizations, trade fairs, seminars and discussions on different issues. These formal & informal ways of capturing concerns of our stakeholders are continuously updated and new stakeholders are identified as per the changing requirement of the organisation. The feed back given to stakeholders also help in propagating our view points and earn goodwill. Our strategic approach towards stakeholder engagement demonstrates our strong belief in creating strong & enduring relationship with all our relevant stakeholders.



NALCO Signs MOU with Ministry of Mines for 2017-18

Stakeholder Engagement Matrix

Categories	Modes of Engagement	Concerns	Action by NALCO	Accrued Benefits
Government & Regulators	<ul style="list-style-type: none"> Meetings with different Central and State Government Bodies, Ministry of Mines, Ministry of Corporate Affairs, Ministry of Environment, Forests and Climate Change on economic, environmental and social issues. Different circulars, office orders, letters and information Submissions of various returns & compliances to statutory authorities. 	<ul style="list-style-type: none"> Infrastructure development Capital expenditure Labour relation & Labour welfare Corporate Social Responsibilities. Compliance of various rules, acts, regulation and laws 	<ul style="list-style-type: none"> Compliance of Govt directives and alignment with Govt. Policies Performance MoU with Ministry of Mines. Apprising different Parliamentary Committees, Constitutional & Statutory Commissions and subordinate bodies Filing of Returns, Compliances, ATRs and status reports 	Collaboration with Government on industrial and social development
Shareholders & Investors	<ul style="list-style-type: none"> Annual General Meetings, Periodic financial & performance reports to shareholders and investors Reports & Press release of SEBI, CAG, Banks and Financial institutions Shareholders' surveys and meets 	<ul style="list-style-type: none"> Company's Profitability and Return on Investment Financial restructure and disinvestment of Govt. Shares. Share price & Dividend Grievance resolution 	<ul style="list-style-type: none"> Quarterly results Audited Financial performance Annual general meeting Annual report Analyst meet & Analyst briefings Press releases Website updates Shareholder's grievance committee 	Wealth creation for shareholders, raising equity from the financial institutions, infusion of capital in business
Employees	<ul style="list-style-type: none"> Official communications like notice, circular and hand outs. E-newsletters, Intranet & web hosting Bipartite & tripartite meetings with labour unions Collective bargaining Interaction with officers associations Employee satisfaction surveys Grievance redressal forums 	<ul style="list-style-type: none"> Employee benefits and remunerations. Performance rating and recognition. Career growth and succession planning Training and skill development Safe and healthy working condition Quality of life 	<ul style="list-style-type: none"> Regular sharing of information. Intimation to Unions, Officers Associations & similar forums. Employees participation in decision making Transparency of decisions. Address by members of top management during different official and social functions. 	Satisfied, motivated & self actuated employees, timely detection and resolution of grievances, free-flowing communication

Categories	Modes of Engagement	Concerns	Action by NALCO	Accrued Benefits
Customers & Consumers	<ul style="list-style-type: none"> Regional and national customer meets Customers' plant visits and management interactions Advertisements in print and audio visual media. Customer satisfaction surveys Customer feedback and grievance redressal forums 	<ul style="list-style-type: none"> Product quality, cost, and delivery Product life cycle including environmental aspects Customer complaint resolution 	<ul style="list-style-type: none"> Strict quality control and timely delivery Product information through website. Biennial customer satisfaction surveys Customer complaint resolution system. Product support and down stream development 	Satisfied customers and improvement in business, stronger bonds with consumers resulting in long-term patronage
Suppliers, & Vendors	<ul style="list-style-type: none"> Press advertisement and web hosting of requirement Periodic vendor and supplier meets Regional, National and International trade fairs Supplier relationship management 	<ul style="list-style-type: none"> Special privilege to MSE units Transparency & anti-corruption practices Simplified procedure & timely payment. Adoption of integrity pact programme Speedy liquidation of disputes & redressal of grievances. 	<ul style="list-style-type: none"> Vendor development and import substitution E- Procurement & E- Payment Support including financial privilege to MSE units Participation in exhibitions organised by industry associations, State & Central Government. Plant level sub-committee meet at Angul & Damanjodi. Plant level advisory committee meeting at Bhubaneswar 	Good rapport with suppliers and timely delivery of goods and materials.
Community/ civil society organisations	<ul style="list-style-type: none"> Gram-sabha and public hearing RPDAC meetings Cultural, religious and social functions Need assessment interactions for CSR projects Local community events 	<ul style="list-style-type: none"> Community needs on infrastructure, education, health, sanitation 	<ul style="list-style-type: none"> Operating mobile health units & organising health camps in periphery villages Sponsoring children from periphery villages for formal education. Water and energy study in periphery villages of Damanjodi Other CSR initiatives 	Partnership with communities for development of the region, improvement in the socioeconomic conditions

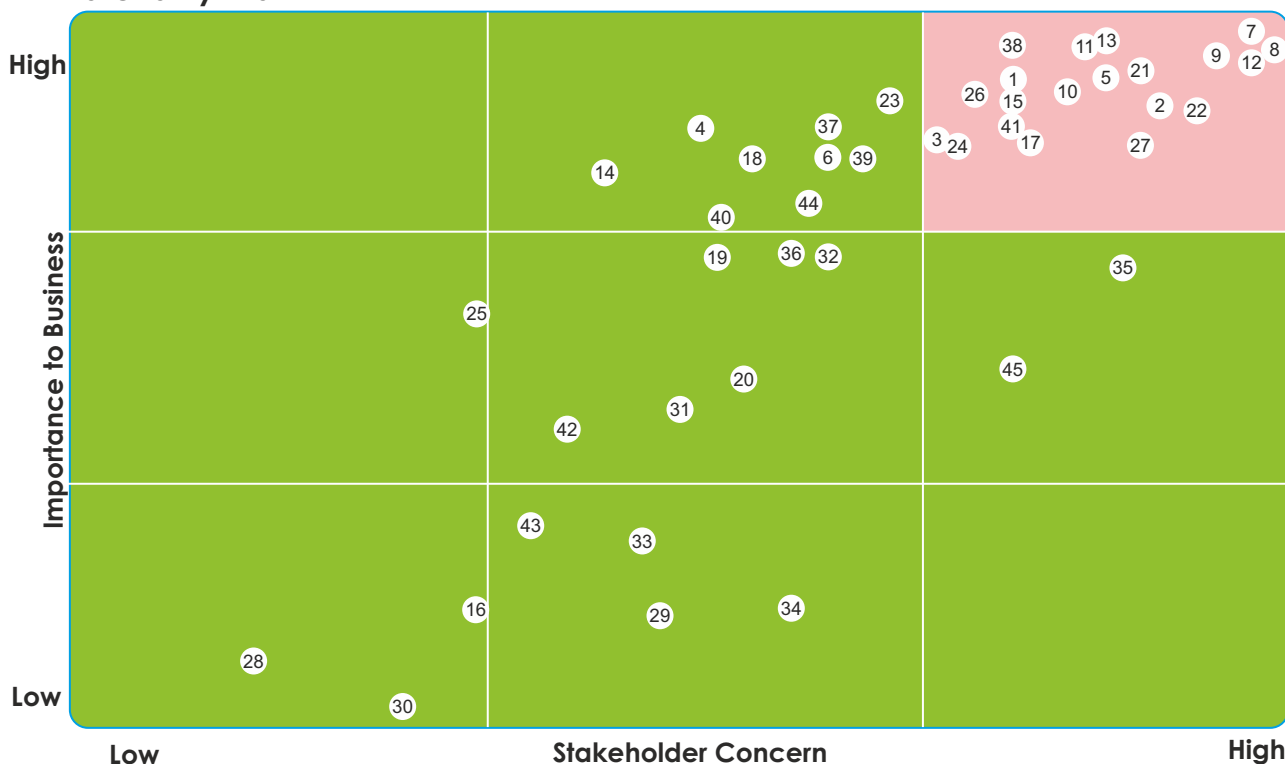
Categories	Modes of Engagement	Concerns	Action by NALCO	Accrued Benefits
Industry Associations	<ul style="list-style-type: none"> Conference, workshops & seminars. Membership in different industrial & professional association, confederation, etc. 	<ul style="list-style-type: none"> Policy issues Statutory regulations International & internal market condition. Technological developments 	<ul style="list-style-type: none"> Active participation and sharing of common issues in different industrial and professional platform Mentoring and sponsoring programs of different industry associations & professional bodies. 	Knowledge sharing and capacity building
Contractors/Other service providers	<ul style="list-style-type: none"> Meetings and discussions On the job supervision Techno commercial discussion for award of work 	<ul style="list-style-type: none"> Work culture and quality of supervision Statutory regulations & compliance Health and safety at workplace Welfare measures Working hours and overtime (wages) 	<ul style="list-style-type: none"> On the job counselling and feedback Timely payment. Trainings during induction. Tool box talk. Periodic meetings with production facility in-charge 	Creation of Win –Win situation for both
Business partners / New ventures	<ul style="list-style-type: none"> Review of business Technology & feasibility 	<ul style="list-style-type: none"> Guidance and hand holding. Support. Sharing of good practices. 	<ul style="list-style-type: none"> Meetings. Official communication between the parent and joint venture entities 	Technological advancements and knowledge sharing

Materiality Analysis

The output received from stakeholder engagement process forms the basis of our materiality identification. Perspectives of high impact stakeholders i.e. customers, employees, government, regulatory authorities, investors and shareholders, industry associations, civil society organizations and suppliers & vendors are taken into consideration while mapping the identified sustainability issues across important domains i.e. Economic, Environment, Labour Practices, Human Rights, Social, Corporate Governance etc. Blending the evaluated concern of stakeholders with Management vision & perception the issues material to our organisation are segregated.

To capture perspectives of different stake holders a structured materiality assessment exercise was carried out across all the operation location during 2014-15. A formal workshop was organised at each of our operational locations where we interacted with internal as well as some external stakeholders. Apart from informal verbal discussion the stakeholders were included in a survey, inputs for which were carefully selected as a questionnaire based on our past experience and current challenges. The output received from the exercise is subjected to Management Review at Unit and Corporate level for updation. The importance assigned by Govt. to different issues are captured from MOU signed between Management and Ministry for the fiscal. Through these interactions, we were able to determine the issues which are important from the business perspective of NALCO and issues which are of concern to our esteemed stakeholders. Identified material issues, form the focus of this sustainability report. There are no significant changes in scope or aspect boundary compared to previous year. All care and concern are taken to report on the identified material issues as per GRI G4 "in Accordance Core" option following guide line on Report Quality and Report Content. The issues found material are highlighted in the list of aspects given in the next page.

Materiality Matrix



List of Aspects and their Materiality

S.No.	Aspect	S.No.	Aspect
1	Market share and competition	24	Recycling and reuse of waste water
2	Raw material availability, price & quality	25	Impact on ground water table and quality
3	Land acquisition for mines and new projects	26	Hazardous and Non-hazardous Waste
4	Suppliers & dealers network	27	Improvement in air quality
5	Customer satisfaction, customer care & trust	28	Release of ozone depleting substances
6	Economic impact of NALCO's business	29	Greening of supply chain
7	Maintaining and improving product quality	30	Emissions form transportation of raw materials, products and employee commuting.
8	Efficient production process & technology	31	Product development strategy and innovation
9	Brand image of NALCO	32	Restriction of hazardous substances in process
10	Logistics and distribution cost	33	Product labelling (e.g. ecolabelling, energy labelling)
11	Transparency, corporate governance and ethics	34	Eco-friendly product packaging
12	Compliance to regulatory/statutory requirements	35	Labour issues
13	Profitability of the company	36	Retention of talents by the company
14	R&D and innovation management	37	Employee training and skill up-gradation
15	Good corporate governance	38	Occupational health and safety
16	Development of local suppliers	39	Gender equity & non-discrimination
17	Globalisation of NALCO's business	40	Addressal of employee grievances
18	GHG emissions & climate change	41	CSR activities being undertaken by NALCO
19	Usage of renewable/alternative energy sources	42	Sports and cultural activities for employees
20	Enhancing scrap recycling in aluminium making	43	Employee volunteering
21	Sustainable mining practices	44	Average age of the workforce
22	Energy efficiency improvement	45	Relocation and rehabilitation of displaced community
23	Sourcing of water		

Mapping of Aspects

S.No	Serial No. of Aspects	Linkage with GRI Aspects	Aspect Boundary
1	1, 13, 17	Economic Performance	Within Organisation
2	2	Materials	Within Organisation
3	3	Investment	Within Organisation
4	5, 7, 9	Product and Service Labeling	Within Organisation
5	8, 22	Energy	Within Organisation
6	10	Procurement Practices	Within Organisation
7	11, 12, 15	GRI Standard Disclosures	Within Organisation
8	24	Water	Within Organisation
9	21, 26	Effluents & Waste	Within Organisation
10	27	Emissions	Within Organisation
11	36	Employment	Within Organisation
12	37	Training & Education	Within Organisation
13	38	Occupational Health and Safety	Within Organisation
14	41	Local Communities	Outside Organisation

Key Sustainability Targets & Performance

Priority Aspect	Identified Risk	Key Stakeholders	Excellent Target for 2016-17	Achievement
Economic	Market Condition	<ul style="list-style-type: none"> Employees Share holders Financers 	<ul style="list-style-type: none"> Revenue from operation (net of Ex. Duty)-Rs.7100 Crore Profit Before Tax (excluding other income, extraordinary and exceptional items) as percentage of Revenue from Operations-2.90% PAT/Net Worth-3.82% 	Rs.7556 Crore 7.90% 6.55%
	Expansion & Diversification	<ul style="list-style-type: none"> Employees Competitors Share Holders 	<ul style="list-style-type: none"> Trial run of de-flouridisation plant based on nano-technology-01.12.2016 	30.11.2016
	Return on Investment & fund availability	<ul style="list-style-type: none"> Employees Share holders Financers Government 	<ul style="list-style-type: none"> Capital Expenditure (CAPEX)- Rs.1021 Crore 	Rs.876.1 Crore
Production	Availability of raw material, fuel & power	<ul style="list-style-type: none"> Employees Share holders Competitors 	<ul style="list-style-type: none"> Aluminium production-3.85 Lakh MT Alumina hydrate production-21.30 Lakh MT 	3.874 Lakh MT 21.001 Lakh MT
Environment	Material conservation	<ul style="list-style-type: none"> Society Government Customers Regulators NGO 	<ul style="list-style-type: none"> Improvements in coal consumption of Al. Ref. over previous year-0.75% 	0.76%
	Energy efficiency improvement	<ul style="list-style-type: none"> Regulators Community NGO Government 	<ul style="list-style-type: none"> Percentage reduction in DC power consumption of Smelter over previous year -0.03% Improvement in electrical energy consumption of Alumina Refinery over previous year-0.77% 	0.0372% 0.80%
Research & Development	Technology up gradation and innovation	<ul style="list-style-type: none"> Employee Academia Industry Associates 	<ul style="list-style-type: none"> Commercialisation of high speed extrusion alloy billets-15.02.2017 	25.01.2017
Marketing	Acceptability of product and receipt of payment	<ul style="list-style-type: none"> Customer Competitors Employees 	<ul style="list-style-type: none"> Number of days of inventory of finished goods and work-in-progress to sale of products-24.5 days 	27.12 Days

Corporate Governance

The corporate governance philosophy is based on sound business ethics & value creation for all its stakeholders with care for society and the environment. Adherence to the regulatory norms and transparency in our activities is the focus of our Corporate governance.

Compliance of rules, regulations and guidelines issued by Government or its subordinate bodies are ranked high on our corporate agenda. Documented strategies, policies and directives ensures ethics and transparency in all our dealings. On the implementation front we respect quick decision making and speedy disposal. Timely and accurate disclosure of information regarding the financial position, performance, ownership and governance of the Company has identified us as a good corporate citizen. At the apex level of governance structure we have Board of Director formulating policies, streamlining procedure and directing business for Performance and profitability.

The broad framework of our governance is based on the following principles:

1. Optimum combination of Executive and Non-Executive Directors on the Board.
2. Formation of various committees, statutory as well as non-statutory, for proper and judicious delegation of power.
3. Timely availability of information to each and every member of the Board and Board Committees for proper discharge of their fiduciary duties.
4. Robust system and processes in place for internal financial control.
5. Timely disclosure and dissemination of operational, commercial and financial information to the stakeholders.

Structure

In the governance hierarchy, the Board of Director is at the apex level, comprising of full time directors heading different functions of company, part time independent directors having distinction in different related areas and ex-officio part time directors from Ministry. Being a central PSU the directors are appointed by Government of India considering their talent, experience and expertise in different business and industry related fields like administration, science and technology, finance, etc. The Board is having the support of a management team to ensure that day to day activities are performed in an efficient manner. As on year ending 31.03.17, the Board has 13 directors comprising of five full time directors including the Chairman-cum-Managing Director, two part time official directors and six part time non-official (independent) directors. The five full time directors including CMD manage the day to day activities of the Company under the overall supervision of the Board. A committee of the Board called "Ethics and Corporate Governance Committee" oversees the Corporate Governance implementation in the Company.

NALCO also furnishes different reports to statutory authorities regarding corporate governance like quarterly report on Corporate Governance to SEBI & self appraisal report on Corporate Governance to DPE quarterly. NALCO also published a detailed report on Corporate Governance practices followed in the Company & Secretarial Audit Report, in the Annual Report every year. Statutory auditors conduct audit on the implementation of Corporate Governance practices and furnish a certificate on the Corporate Governance which is placed before the shareholders as a part of the Annual Report.

Corporate Governance Policies

Corporate Governance is effected in NALCO following documented policies and practices casted in a procedural framework. The company sincerely follows the Secretarial Standards issued by the Institute of Company Secretaries of India (ICSI) for convening Board Meetings and General Meetings. Nalco is also following the guidelines on Corporate Governance for CPSEs prescribed by the Department of Public Enterprise (DPE). Some of the important policies and significant codes for ethical business practices are given below.

- (i) Code of Conduct for Directors and Senior Management
- (ii) Insider Trading Code
 - a) Code of practices and procedures for fair disclosure of unpublished price sensitive information
 - b) Code of Conduct to regulate, monitor and report trading by its employees and other connected persons
- (iii) Fraud Prevention Policy
- (iv) Policy on Related Party Transactions
- (v) Whistle Blower Policy
- (vi) Dividend Policy
- (vii) Corporate Social Responsibility Policy



Promoting Digital India: Mobile APP "NAGINAA" (NALCO Grahak Information and Networking App for All)

The Top Management



Dr. T.K. Chand
Chairman-cum-Managing Director



Dr. K Rajeswara Rao
Govt. Nominee Director



Shri Niranjana Kumar Singh
Govt. Nominee Director



Shri K.C. Samal
DIRECTOR (FINANCE)



Shri V Balasubramanyam
DIRECTOR (PRODUCTION)



Shri B.K. Thakur
DIRECTOR(HR)



Shri Sanjib Kumar Roy
DIRECTOR(P & T)



Prof. Damodar Acharya
Independent Director



Shri Dipankar Mahanta
Independent Director



Shri Maheswar Sahu
Independent Director



Shri S Sankararaman
Independent Director



Shri Pravat Keshari Nayak
Independent Director



Smt. Kiran Ghai Sinha
Independent Director



Shri Nagendra Nath Sharma
Independent Director



Smt. Achla Sinha
Independent Director



Shri Biswaranjan Samal, IAS
CVO

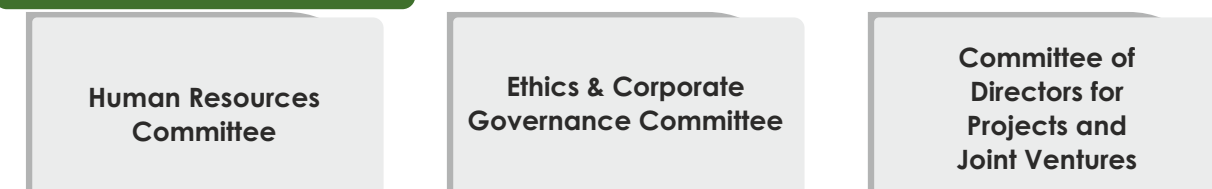
Board Level Committees

Various committees of the Board have been constituted keeping in view the statutory requirements and some other committees are constituted voluntarily with judicious mix of Executive and Non Executive Directors to assist Board in smooth conduct of activities of the company. Secretarial Standards relating to Board meetings are equally applicable to Committee meetings. Various committees constituted at the level of the Board of Directors of the company, for various aspects of governance of the company are listed below.

Statutory Committees



Non-statutory Committee



Besides there are 4 more committees constituted by functional Directors of the company. Details of these committees are given below.

- i) Investment Committee
- ii) Committee of Directors for Sale
- iii) Committee of Directors for Procurement
- iv) Share transfer Committee

The Company had constituted CSR & Sustainability Development Committee to look into matters related to CSR activities and sustainability development program of the Company. The Committee comprises of the following members as on 31st March, 2016. Amongst the members Director (HR) drives the CSR initiatives and Director (Production) looks after sustainability front while committee monitors the overall progress.

Members

Name	Category	Position
Shri D. Mahanta	Non-executive Independent	Chairman
Shri S. Sankararaman	Non-executive Independent	Member
Shri Maheswar Sahu	Non-executive Independent	Member
Ms. Kiran Ghai sinha	Non-executive Independent	Member
Director (Finance)	Executive Non-Independent	Member
Director (Production)	Executive Non-Independent	Member
Director (HR)	Executive Non-Independent	Member

Enterprise Risk Management

Risk anticipation and management is a critical function integral to business operation, by effective handling of which adversities can be turned to advantage in a multivariable dynamic business scenario. We are committed to suitably address the risks with appropriate mitigation measures striking a balance between the opportunities envisaged and the encountered operational, financial, social & environmental risks. For the purpose NALCO has formulated a risk management policy incorporating the latest government guidelines. Risk Management Committee at Board level reviews the exceptional Risk Reports and advises on remedial measures to be taken. The risk mitigation measures are also periodically reviewed to ensure that executive management controls risks through a properly defined framework. New risk areas are identified through periodical reviews and appropriate mitigation plans are developed. For the identified risks, the nominated risk officers maintain risk registers, over viewed by internal auditors of the company as well as senior management. Deviations, if any, are reported to the Risk Management Committee and Board. During the reporting year no risk capable of threatening the operation of the company has been identified.

Internal Control Mechanisms

Availability, utilisation and control of financial resource is single most important factor affecting the sustainability of any organisation. NALCO has a well established and adequate system of internal control commensurate with the size and nature of its business. This include delegation of power, revenue and capital budget, various manuals, rules, procedures and guidelines formulated by the company from time to time. The Company has developed & implemented an Internal Financial Control Framework duly approved by the Audit Committee which includes internally entity level policies/processes and operating level standard operating procedures primarily aiming at bringing awareness amongst the officials dealing with affairs of the Company so as to ensure adherence to the policies, procedures, guidelines designed and put in place for effective control. The overall responsibility for adequacy & efficacy of control system rest with Directors of the company. The Company's internal control system has been designed to provide for:

- Compliance with applicable statutes, policies & procedures, rules & regulations and delegated authority.
- Adherence to applicable accounting standards and policies.
- Proper recording of transactions & timely reporting.
- Effective use of resources and efficient operations.
- Safeguarding of assets.

Financial Statements are prepared in compliance with applicable accounting standards & on the basis of the Significant Accounting Policies as adopted by the Company after being duly approved by the Audit Committee and the Board. These Policies apply uniformly across the Company. The accounting policies supported by standard operating procedures are reviewed and updated from time to time. The Company uses ERP Systems as a business enabler and also to maintain its Books of Account. The Standard Operating Procedures and transactional controls built into the ERP Systems ensure proper recording, approval mechanisms and maintenance of records. The systems, standard operating procedures and controls are reviewed by management from time to time.

The Company carry out audits at all locations and functional areas by internal auditors. The observations of internal auditors arising out of audits are periodically reviewed at appropriate level and compliances ensured. Material observations of internal auditors are submitted to Audit Committee for review, analysis and advice, to further strengthen internal control system. Over and

above the internal audit statutory audit is done by auditors appointed by Comptroller and Auditor General of India and audit report is published as a part of annual report. Also cost audit as per Companies Act is done every year and audit report is submitted to Ministry of Corporate Affairs.

Corporate Ethics

The systems institutionalised for maintenance of ethics are described below.

● Vigilance

To eradicate corruption and to create an enabling atmosphere of mutual trust and cooperation we have our own vigilance set up working as the extended hand of Central Vigilance Commission under the leadership and guidance of a CVO appointed on deputation from Govt. of India. To assist CVO other vigilance officers are appointed from rank and file of the company in consultation with CVO. Vigilance helps top management in identification & prevention of corruption, irregularities, violations & deceptions committed by employees, contractors, suppliers etc and neutralise their effect so that healthy working condition is not vitiated and assets of the company are protected. For smooth functioning and direct monitoring vigilance administration is made multilocal having setup at S&P complex, Angul; M&R complex, Damanjodi and Corporate office, Bhubaneswar.

Vigilance department conducts Regular Inspections, Surprise checks, Intensive examination (CTE Type), sample check etc as per requirement along with complaint investigation. All high value contracts and purchases are analysed by the vigilance department. Some of them are selected for intensive examination. Selected contract/ purchase deals are also analysed during routine/ surprise checks. When any irregularity is established, suitable disciplinary action is initiated through concerned disciplinary authority. Where necessary, findings along with system improvement suggestions, are given to the management by the vigilance department.

During the year 100 stakeholder complaints related to ethics, bribery and corruption were received by the Vigilance dept. In addition to this, 19 complaints were pending from previous years. As on 31.03.2017, out of the total 119 complaints, 116 have been resolved and 3 are pending at different stages of investigation. Detailed investigations of the complaints, were carried out based on prescribed procedures with functional guidance sought from CVC, as per rules of the company. Appropriate actions i.e. issuance of advisory letters and imposition of minor/major penalties etc. were taken, based on the gravity of findings. As a preventive vigilance measure, suggestions for a few important systemic improvements were also made during the year. During the year, 48 executives and 51 non executive employees attended vigilance awareness training programs, organized for sensitizing employees about various rules, procedure & CVC guidelines etc. to bring about transparency in the system.

● Integrity Pact

In order to weedout corruption in contract & procurement company has introduced Integrity Pact since year 2012. Integrity pact is applicable in respect of all procurement transactions and contracts of value INR 5 Crore & above. According to this pact, NALCO would enter into an agreement with the bidder, in order to mutually avoid all forms of corruption by following a system that is fair, transparent and free from any influence/ prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into. Independent External Monitors are appointed to overlook the efficacy of Integrity Pact between the signed parties. Further details of Integrity pact is available on NALCO website.

● Whistle Blower Policy

Whistle Blower Policy is formulated by the organisation in compliance of clause 49 of listing agreement between NALCO & SEBI. The purpose of Whistle Blower Policy is to provide a framework to promote responsible and secure whistle blowers and to protect them from vindictive retribution. It protects employees wishing to raise a concern about serious irregularities within the company. The Policy covers malpractices and events which have taken place or suspected to take place involving: Financially irregularity, abuse of authority, breach of contract, criminal offence etc. Details of the Policy are available in NALCO website. The Company affirms that during the reporting period it has not prevented any personnel from access to the Compliance Officer, Designated Committee or Audit Committee.

● Fraud Prevention policy

The Company has a Board approved Fraud Prevention Policy in force to provide a system for detection and prevention of fraud. Reporting of any fraud that is detected or suspected and fair dealing of matters pertaining to reported fraud is the moto of fraud prevention policy. The policy applies to any fraud, or suspected fraud involving employees of NALCO (all employees full time, part time including the management of NALCO or employees appointed on adhoc/temporary/contract basis) as well as vendors, suppliers, contractors, consultants, service providers or any outside agency (ies) doing any type of business with NALCO directly or indirectly. The policy is placed in the website www.nalcoindia.com. No fraud has been reported by the auditors under Section 143(12) of Companies Act, 2013 during the year under report.

● Code of Conduct

In order to maintain ethics, integrity and transparency the company has adopted a Model Code of Business Conduct and Ethics which is applicable to every Board Member including Government Nominee & Independent Directors and Senior Management placed one level below the Board level. The Code mandates integrity, transparency, ethics and non discriminatory approach for Board Members and Senior Management and profess value system, competency and discipline expected from them while transacting the business of the Company. The Code of Conduct is hosted in NALCO web site for reference.

● SA 8000

Our Social Accountability Policy emphasizes upholding ethical business practices by adopting a company wise culture, for compliance with National laws, applicable laws & requirements to which the organisation subscribes & respect the international Instruments as described in the SA8000:2014 standard. All the production unit of NALCO including Corporate office have been certified to SA 8000 standard which ensure compliance with labor provisions contained within the Universal Declaration of Human Rights.

Right to Information

RTI act is implemented in NALCO with appointment of one Public Information Officer and nine Assistant Public Information Officer for providing information under the provisions of act. NALCO has also adopted online RTI portal of Department of Personnel and Training with effect from Jan' 2017 for speedy disposal of requests made under the act through portal. During the reporting period total 197 applications were received in addition to 17 pending ones from the previous year. As on 31.03.2017 out of the above 176 queries have been complied including 01 query transferred to other public authorities, 12 applications are rejected and balance 26 requests are under processing. Likewise out of total 48 First Appeal cases 44 were settled, 01 was rejected and 03 are under processing.

Investors Complaint

During the year 301 number of investors complaint were received and all the complaints were resolved satisfactorily.

Compliance

NALCO has complied with all provisions under its control, of the SEBI listing regulations and has furnished quarterly reports on corporate governance to SEBI highlighting non compliances beyond our control. Besides company has submitted self appraisal report on Corporate Governance to DPE quarterly. Examination of compliance of the conditions of Corporate Governance on procedures and implementation there of adopted by the company, is conducted every year by statutory auditors and Auditors Certificate is published in Annual Report. An elaborate report on Corporate Governance is published as part of annual report for awareness of all stake holders and public at large.

MoU Performance

To build accountability the controlling ministry execute a MoU with NALCO setting targets for different financial, operational, and developmental parameters. Variable pay of NALCO employees in the form of Performance Related Pay (PRP) is linked to MoU performance. In the reporting year NALCO is rated "Very Good" for its performance evaluated based on factors of signed MoU with ministry.

Precautionary Approach

All proposed project or process is evaluated based on financial, environmental & social impacts before implementation. Environmental Impact assessments are carried out for all projects and appropriate actions are taken to mitigate the impacts, if any.

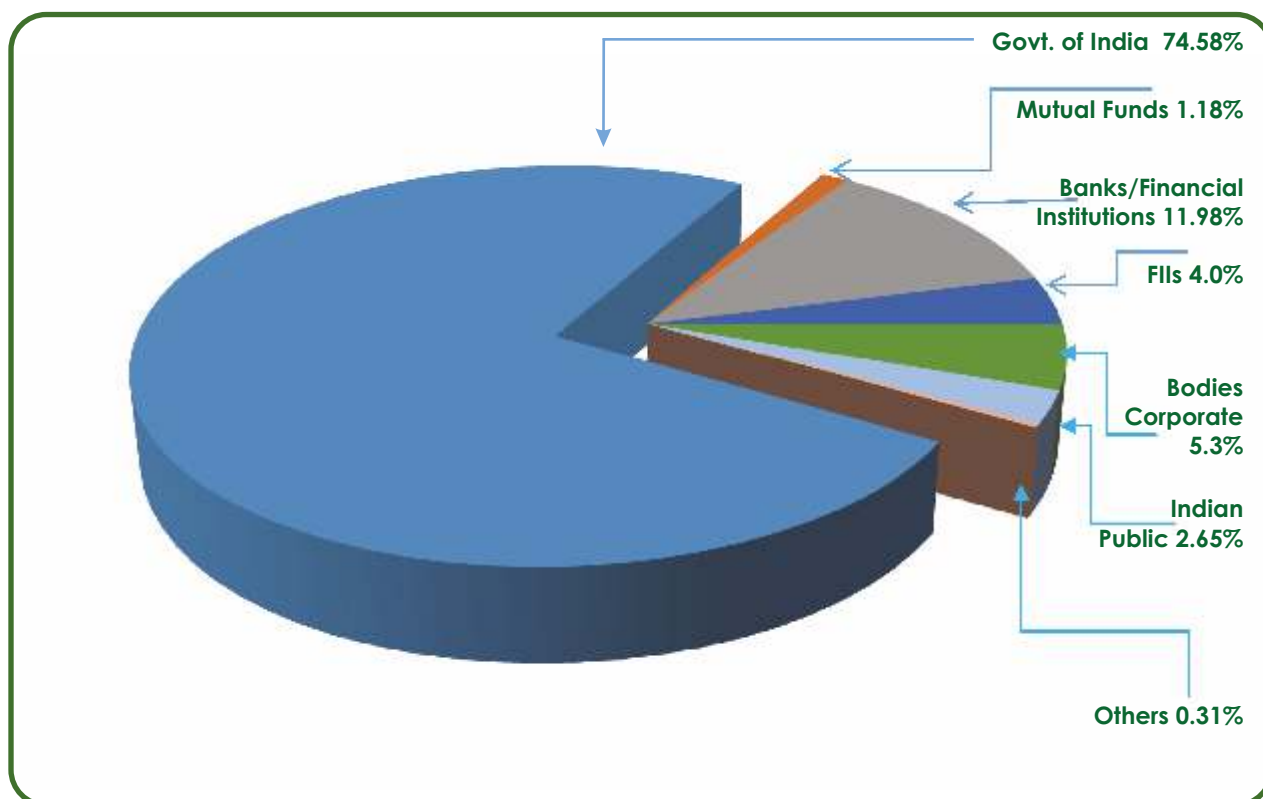
E-governance

In our path of implementing E-Governance we have already covered in-house services to employees and services like online application systems for recruitments to the general public. Further Implementation of latest exploit of Information technology is now in advanced stage. The network has been revamped with 10 Gbps backbone and 1 Gbps access technology and advanced routing, sequestering and queuing technologies, for better speed and performance. The Wide Area Network connecting plants and offices has been completely migrated to MPLS technology. Critical locations have been provided with dual circuits for fault tolerance. With augmentation of networking technology, following E-Governance interventions are introduced for better efficiency and transparency.

- SAP ERP has been implemented for Procurement, Inventory Management, Finance & Controlling, Sales & Distribution, Production and Human Resource Management. Payroll, Attendance, Perquisites and Leave System on legacy platform has been centralized. A centralised Hospital Management System is being implemented for the Company hospitals at Angul and Damanjodi.
- For close monitoring of various initiatives, online Capital Expenditure Monitoring System, Departmental Action Plan & Dashboard Monitoring System, Fund Monitoring System, Audit ATR Monitoring System have been implemented. Implementation of Revenue Expenditure Monitoring System is in progress.

● Shareholding Pattern

The shareholding pattern of NALCO as on March 31 2017 is given below. The Govt. of India holds 1441482490 equity shares (74.58%).



● Shareholding as on 31.03.2017

Sl. No.	Category	No of Shares	Percentage of Share Holding.
1.	Promoters (Government of India)	1441482490	74.58
2.	Mutual Funds	22758070	1.18
3.	Banks/ Financial Institutions	231609087	11.98
4.	Insurance Companies	1600	0.00
5.	FIs	77277058	4.00
6.	Bodies Corporate	102380262	5.30
7.	Indian Public	51352960	2.65
8.	Others	6067357	0.31
TOTAL		1932928884	100

Memberships & Association

We are members of some of the reputed associations. The major ones are:

1. Aluminium Association of India
2. Standing Conference of Public Enterprise (SCOPE), New Delhi
3. Federation of Indian Mineral Industries (FIMI), New Delhi.
4. National Safety Council, Mumbai
5. TQM Division of CII
6. Quality Circle Forum of India, Secunderabad
7. Indian Ceramic Society, Kolkata
8. Confederation of Indian Industry (CII), New Delhi
9. Utkal Chamber of Commerce & Industries, Bhubaneswar
10. Engineering Export Promotion Council, Kolkata
11. Federation of Indian Export Organisation, New Delhi
12. International Chamber of Commerce, Delhi
13. Chemical and Allied Products Export Promotion Council, Kolkata

We advocate policy issues through our involvement in discussions & meetings with above mentioned bodies for the benefit of the industry as well as the society at large. Some of the major issues are:

- > Avenues for enhancement of utilization of fly ash
- > Climate Change Action Plans
- > Environmental Stewardship
- > Inclusive Development & Equitable Growth
- > Skill Development & Employment Generation
- > Enhancing use of Aluminium as sustainable and strategic material for the future.
- > Sustainable mining practices including mineral conservation
- > Energy, Water, Mineral conservation
- > Safety & Health at workplace
- > Economic Leadership by betterment of industries.
- > Employee involvement and Work life balance



Business Development

Planned growth aids sustainability. New ventures open up new horizons of opportunity with enhanced product base, area of operation, market share and cash flow. Nalco management constantly endeavours to drive the organisation on the path of growth. In the process of redefining the business strategy the existing Corporate Plan and Vision 2020 is being rewritten and a new Corporate Plan spanning a time domain of 15 years being prepared to rejuvenate the company. The new Corporate Plan will be tough but at the same time resilient enough to absorb the uncertainties of future. Some of the major achievements in the direction of Business Development and growth are given below.

Angul Aluminium Park Pvt. Ltd.

To promote downstream and ancillary industrialization a JV Company named 'Angul Aluminium Park Pvt. Ltd. (AAPPL)' was formed in association with Odisha Industrial Infrastructure Development Corporation (IDCO) in year 2010. The project has been approved by Government of India under Modified Industrial Infrastructure Upgradation Scheme (MIUS). NALCO and IDCO hold 49% and 51% equity in the JV Company respectively. NALCO has contributed equity capital of Rs 14.70 Crore to AAPPL till end of March 2017.

Caustic Soda Project

Integrating backward for raw material securities NALCO has formed a JV Company "GNAL" with GACL in Dec, 2015 to set up 2.7 lakh TPA caustic soda plant along with 130 MW captive power plant at Dahej in Gujarat. Pre-project activities like land acquisition, water supply arrangement & environment clearance is in progress. Bidding for Boiler Turbine Generator (BTG) package, Balance of Plant (BOP) package and technology selection for the caustic soda plant is also underway.

Solar Power Plant

(i) NALCO plans to setup a 20 MW Solar Power Plant in Madhya Pradesh. The project is registered with MPNRED (Madhya Pradesh New & Renewable Energy Dept.). Acquisition of 55.62 Ha land in the name of MPNRED for this project was completed and permission for Grid Connectivity was submitted to MPPKVCL (Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Ltd.) in November, 2016. Investment decision will be taken up subject to availability of long term PPA.

(ii) Company has issued NIT for selection of developer for EPC for 50 MW Solar Power Project at any suitable location in India.

Wind Power Plant

Company plans to set up another Wind Power Plant of 50 MW capacity at any suitable location in India. Techno-commercial bids for selection of wind power developer were opened in Dec-2016 and approval process for price bid opening is in progress.

Power Project:

Company has signed a non binding MoU with NTPC to form a JV Company for establishment of 3X800 MW coal based Power Plant at Gajamara, Dhenkanal, Odisha for supplying power to Smelter expansion projects subject to feasibility.

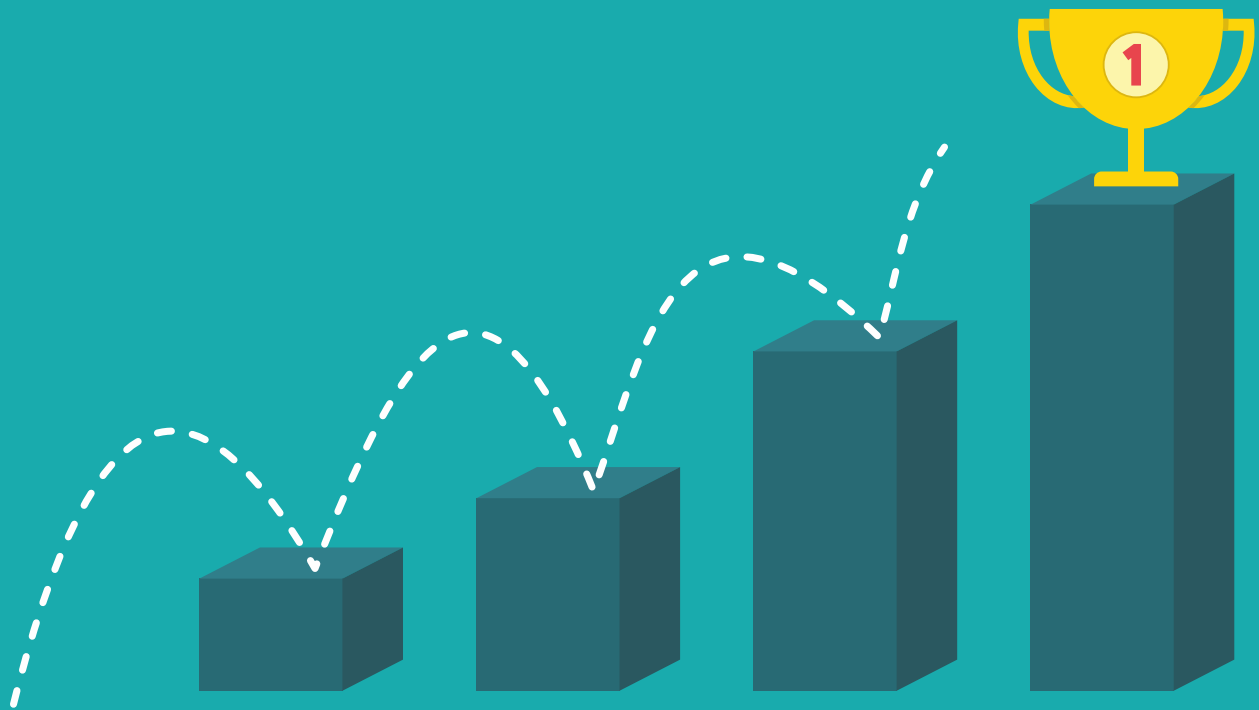
Aluminium Alloy manufacturing plant:

NALCO has signed a MoU with Mishra Dhatu Nigam Ltd. (MIDHANI) for establishment of aluminium alloy manufacturing plant for meeting the requirement of defence, aerospace, automotive and transport sector under the "Make in India" initiative of Government of India.

Coal Tar distillation plant:

Your Company has signed an MoU with Neelachal Ispat Nigam Ltd. (NINL) for setting up a coal tar distillation plant in JV mode for production of coal tar pitch, a raw material for production of aluminium metal.

Economic Performance



Robust performance

Disclosure on Management Approach- Economic Performance

We are committed to ensure proper financial management in the organisation, thereby fuelling our growth. As a business organisation we aim for profit generation through a balanced triple bottom line approach. Effective financial practices, efficient decision making process and robust control mechanism define our fiscal strategy. All the investment decisions are taken after examination of financial viability and technical analysis. Employment generation, wealth creation, ancillary development, foreign exchange generation, export promotion, skill development, environmental protection are some of the objectives pursued in our financial strategy. The efficacy of our financial management is reflected in realising handsome profit during last thirty years.

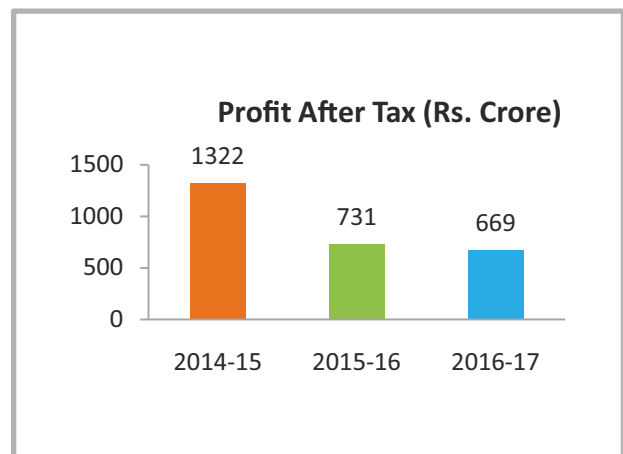
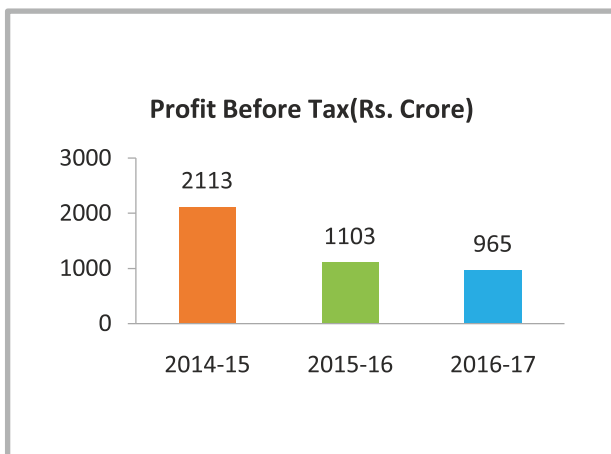
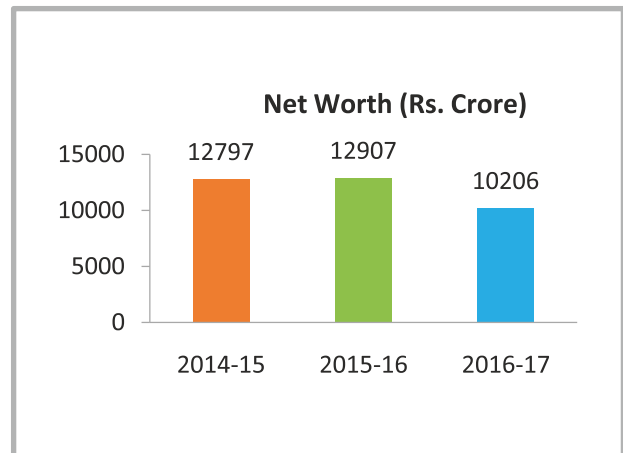
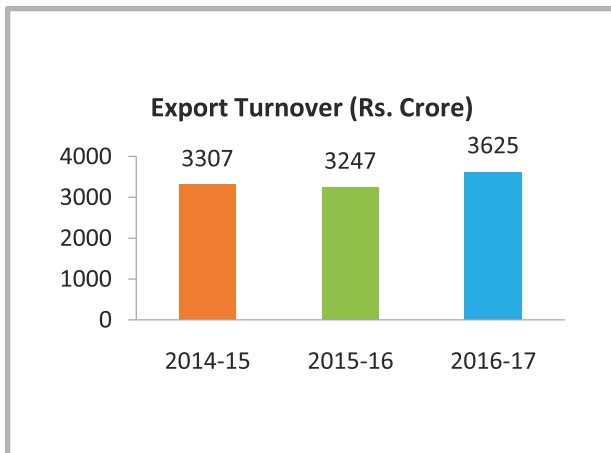
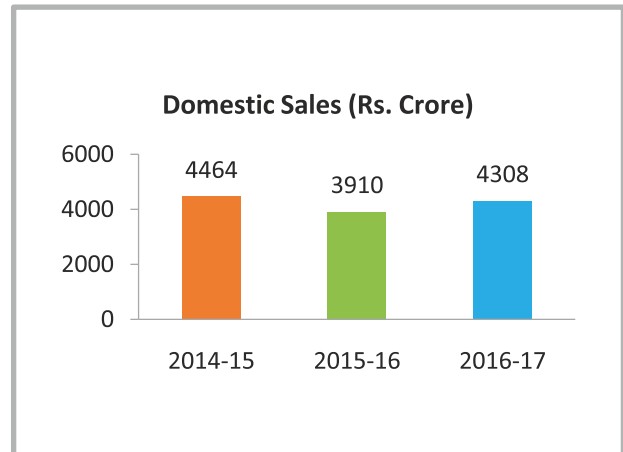
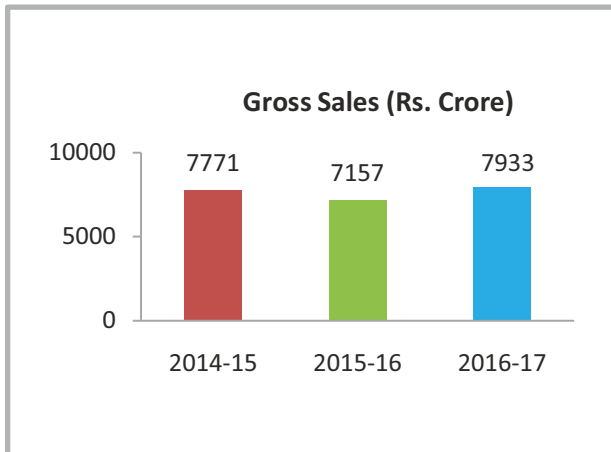
During the fiscal, the Bauxite Mine has achieved highest ever production and transportation of bauxite amounting to 68.25 Lakh MT which is 100% capacity utilisation of Mines. Operating in tandem Alumina Refinery has produced 21.00 Lakh MT alumina hydrate which is 100% normative capacity utilisation of Refinery. Maintaining the inertia Captive Power Plant generated 6066 MU net power which is 3.85% increment over last year generation. Smelter produced 4.03% cast metal more than the last year registering a total production of 3.87 Lakh MT. Generation of 206 MU of wind power, 32.05% more than last year generation is a major achievement towards green energy generation.

The total metal sales during 2016-17 were 3,85,518 MT compared to 3,72,424 MT during 2015-16. Total metal sale consists of domestic sale of 2,84,926 MT and export of 1,00,591 MT. Chemical sale during 2016-17 was 12,94,900 MT compared to 12,19,926 MT achieved during 2015-16. This includes calcined alumina export of 12,43,103 MT during 2016-17 as compared to 11,74,224 MT exports made during 2015-16. Company generated revenue of Rs 8050 Crore from its operation during the fiscal.

NALCO has been exporting aluminium metal and calcined alumina to various overseas destinations like Singapore, Malaysia, Korea, Taiwan, Oman, Vietnam, Bangladesh, Brazil, China, Egypt, Iran, UAE, Indonesia, & Nepal etc. Export orders are booked through e-tendering system to the registered customers.

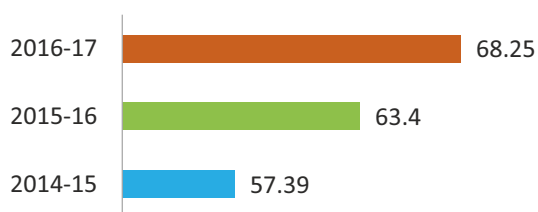


Financial Performance at a glance

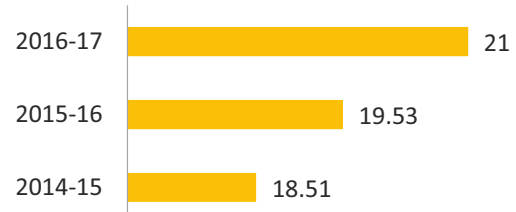


Highlights of Achievements

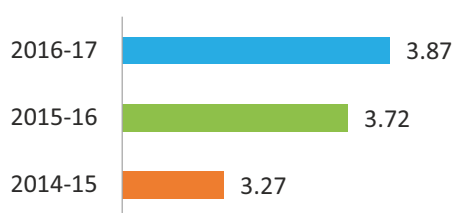
Bauxite Production (Lakh Ton)



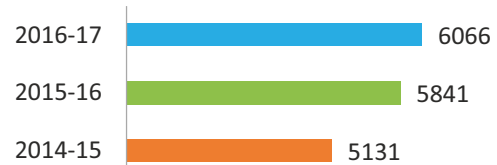
Hydrate Production (Lakh Ton)



Aluminium Production (Lakh Ton)



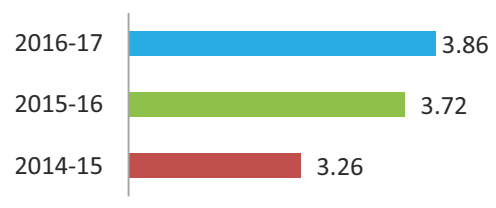
Power Generation (MU)



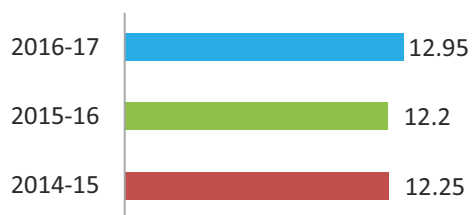
Wind Power Generation (MU)



Aluminium Sales (Lakh Ton)



Alumina Sales (Lakh Ton)



During reporting year Nalco has achieved a Profit after Tax of Rs. 669 Crores. The total dividend pay out for the financial year is Rs 541.22 Crore compared to Rs 467.13 Crore paid previous year. The net worth of the company is Rs 10,206 Crore during 2016-17 as compared to 12,907 Crore during 2015-16. The details of financial performance are given below:

Financial Results

Particulars (in Rs Crore)	2014-15	2015-16	2016-17
1. Direct Economic Value Generated			
a) revenue from operation (includes other operating incomes)	7,382.81	6,816.00	8,050.2
b) revenue from other sources	672.64	536.57	408.27
Total	8,055.45	7,352.57	8,458.29
2. Economic Value Distributed			
a) Operating expenses (excluding employee wages and benefits)	4,564.12	4,888.45	6,880.70
b) Employee wages & benefits	1,377.91	1,361.36	1,537.44
c) Payments to providers of capital	451.02	515.45	686.19
d) Payments to government (Tax on PBT)			
i) Corporate Tax	791.57	371.75	296.19
ii) dividend distribution tax	90.18	104.93	139.69
Total Economic Value Distributed (a+b+c+d)	7,274.8	7,241.94	9,540.21
3. Economic Value Retained (1-2)	780.65	110.63	-1,081.92
4. Additional information on Expenditures included in operating expenses (2a above)			
Community Investment (included in 2(a) above)			
i) CSR expenses	19.09	27.17	30.01
ii) Horticulture (green belts within and vicinity of the plants)	5.52	5.84	7.31
Total community investment	24.61	33.01	37.32

Important Financial Indicators			
Particulars	2014-15	2015-16	2016-17
Profit Before Tax (Rs Crore)	2,113	1,103	965
Profit After tax (Rs Crore)	1,322	731	669
Net worth (Rs Crore)	12,797	12,907	10,206
Return on Net worth (%)	10.33	5.66	6.55
Book value per share (Face value of Rs 5/- each)	49.65	50.08	52.80
Earning per share (Rs)	5.13	2.84	2.98

Local Employment Opportunity

Disclosure on Management Approach – Employment

Employment generation in the areas of our operation is one of the key aspects of economic development. We promote direct and indirect employment generation in our peripheral areas through capacity expansion, subsidiaries, joint ventures & downstream industries. As an equal opportunity employer, we do not discriminate based on religion, cast, sex, area of domicile etc. at the time of recruitment. For filling up non executive vacancies we advertise in news papers including employment news. Also candidates registered with local employment agencies are considered based on their skill level and employability. Like wise vacancies at executive level are given wide publicity in print and electronic media. All such opportunities are also notified in our web site. We have also provided employment to local persons who have lost substantial amount of land during land acquisition for NALCO project. Selected candidates from land losers and oustees are sponsored for skill development training in ITIs and for other similar trainings, improving their prospect of employment. Further avenues of employment for locals open up when different contractors i.e. transportation, security, maintenance, projects etc recruit personnel for discharge of their contractual obligation. Presently NALCO provide direct recruitment to 6938 and contractual employment to 9612 persons amongst which majority proportion is from Odisha, besides creation of livelihood opportunity for a sizable local population.

The different benefit extended to regular and contractual employees has made NALCO a recruiter of choice. The contractual work force are provided with different benefits like weekly off, overtime, medical facility, termination allowance, EPF, ESI etc in addition to substantial higher wage than statutory minimum wage. The wage structure of our contractual workers in comparison with statutory wage is presented below.

Contractual worker	Prescribed minimum wage	Wage offered by NALCO	% higher than minimum wage
Unskilled	350	394	12.57
Semiskilled	437	481	10.06
Skilled	523	567	8.41
Highly Skilled	610	654	7.21



Ancillary Development

Disclosure on Management Approach – Procurement Practices

Aligned with the current Govt. policy of Make in India, NALCO makes dedicated effort to promote local entrepreneurs to bring a culture of industrialisation in the vicinity of our operation. Due to our diverse operation covering mining, chemical, metallurgy and power we require a large no of different material in varied quantities. Local availability of required material will reduce logistic cost and lead time of their procurement. Also confidence of their door step availability will reduce inventory carrying cost. We have first hand experience that by hand holding support these units can even produce for import substitution. Increase of industrial activity will groom industrial culture in the vicinity of our operation and augment local economy. Taking a comprehensive view of above the Ancillary Development Policy of NALCO is drafted carefully to nurture MSE units. Plant Level Advisory Committee (PLAC) & Sub Committees are formed to deliberate and advise on different MSE related issues and the PLAC and sub-PLAC level meeting were held at complex and Corporate regularly to address their difficulties.

NALCO has implemented Ancillary Development policy in the year 1992 and till date identified 55 eligible industries as ancillary units of NALCO. List of goods and services with their annual requirement, which a MSE unit can develop and supply is available in our web site. In the permanent display hall at M&R complex and S&P complex the material earmarked to be purchased from MSE units are displayed with associated information like technical specification, amount of requirement and last purchase price etc for benefit of local small timers. Purchase preference is extended to MSE units quoting within the price band of 15% of lowest quoted price, if they agree to match the lowest quoted price and are allowed to supply upto 20% of total tendered quantity. Similarly purchase preference is extended to Ancillary Units irrespective of their bid position and order is placed on them up to 40% of tender quantity subject to matching of lowest quoted price. Care is taken to educate MSE vendors in e-tendering by imparting training and hand holding guidance both at M&R complex and S&P complex. MSE units and ancillary units are exempted from earnest money deposit and tender fee for their registered products.

During 2016-17 out of total MSE (Micro and Small Enterprises) procurement of Rs.414.95 Crores, (as against Rs 322.33 Crore of previous year), Rs 285.88 Crores (as against Rs 236.64 Crore of previous year) worth of products and services were procured from MSE units of Odisha including ancillary units. Procurement from MSEs during the year was 21% of total procurement made by NALCO. The total procurement from SC/ST MSEs stood at Rs 9.36 Crore which is 0.47% of the total procurement made by NALCO in 2016-17. The targeted procurement from MSE units in 2017-18, is Rs. 415.80 crores. Continuous efforts to engage the local MSEs and encourage them to enhance their contribution, resulted in having two successful Sub PLAC meetings at M&R Complex during July 2016 and November 2016. The 20th PLAC meeting in this regard was conducted by Nalco on 27.1.2017 at Bhubaneswar. State Level Vendor Development cum Buyer- Seller Meet was organized at S&P Complex on 28.9.2016 in association with Orissa Assembly of Small and Medium Enterprises (OASME) and MSME, DI, Cuttack and in M&R Complex on 04.10.2016 in association with MSME, DI, Rayagada and DIC, Koraput. A grievance redressal camp of suppliers and service providers of S&P Complex

was organized during observance of Vigilance Awareness Week on 05.11.2016. M&R Complex participated in Udyog Samashya Samadhan Sibir organized by MSME, DI, Govt. of Odisha at Jeypore, Odisha on 05.11.2017. An "On-line UAM (Udyog Adhar Memorandum) Registration Program" was conducted for On-line filling of Udyog Adhar Memorandum of MSE vendors at S&P Complex on 01.06.2016 in association with DIC, Angul.

Our participation in various MSME exhibitions and conventions also provides the much needed exposure and encouragement to many vendors. During the year, we participated in the "30th Annual State Level Convention - 2016" organised by Odisha Assembly of Small & Medium Enterprises (OASME)", Cuttack on 12th August 2016 and was honored with the "Best Mother Plant" award in recognition of our contribution towards the cause. Also NALCO bagged the "Best Display Award" in the Mother Plant category in the three day long National Vendor Development Programme-cum-Industrial Exhibition and Buyer- Seller Meet programme "MSME Expo Odisha - 2016" organised by MSME Development Institute, Ministry of MSME, Govt. of India from 5th to 7th Dec, 2016 at Kila Maidan, Cuttack

Climate Change Imperatives

Sharing the global concern on climate change, Govt. of India introduced the National Action Plan on Climate Change (NAPCC). National Mission on Enhanced Energy Efficiency (NMEEE) launched by Bureau of Energy Efficiency (BEE) under NAPCC has taken up the task of improving the energy efficiency and implemented Perform, Achieve & Trade scheme (PAT), a market driven scheme to enhance energy efficiency. Both S&P complex and Al. Refinery of NALCO as Designated Consumers have contributed significantly in the scheme and achieved beyond the target, earning 36119 Energy Saving Certificates during Cycle-1. PAT cycle 2 has started from year 2016 and Nalco is actively taking energy conservation and efficiency enhancement measures to achieve the stiff cycle-2 targets set by BEE i.e. 6.39% for S&P complex and 5.83% for M&R complex.



Environmental Excellence



Environmental Care

Assigning due importance to polluting potential of mining and metal extraction industries we have taken utmost care from planning & design stage to be environment friendly. Our Environment policy unequivocally proclaims adoption of non polluting & environment friendly technology and affirm to assign high importance to promotion and maintenance of pollution free environment in all our activities. Along with monitoring of effluents and emissions, management thrust is concentrated on alternative use, recycle and reuse of wastes and rejects. Help of R&D Dept. other research institutions of repute and academia is frequently taken in this regard. All our production units are certified to Environment Management System standard ISO 14001. Our energy intensive units i.e. CPP, Smelter & Refinery have established and maintained Energy Management System certified to ISO 50001 standard. Any non conformity to ISO guidelines observed during surveillance or recertification audits are taken seriously by management and complied at the earliest. A dedicated Safety, Health and Environment Dept. in each production unit looks after the environmental footprint of our operations. Use of fluoride, caustic soda, explosive and fuels are always taken up with utmost care. Prevention of ground water and surface water contamination, air pollution, rehabilitation of mined out areas and utilisation of fly ash & red mud are some of the highpoints of our proactive environmental care. In each year in Capital and Revenue budget suitable provision is kept to carry forward pollution control and environmental protection activities.

To neuter the increasing stringency of environmental regulations, proactive actions are taken to adopt new technology, revamp old equipments and recondition used equipments. Retrofitting of ESP, installation of GTC, revamping of FTC, adoption of high concentration slurry disposal etc are some of our efforts in this direction. Recycling of waste and sewerage water with zero discharge to outside has greatly reduced the apprehension of water pollution. Rain water harvesting is also taken up in all the production units to relive pressure on perennial water sources. Adoption of better combustion technology, proper fuel preparation and computerised burner management has helped in emission control and efficiency improvement. All the hazardous chemicals are stored and used as per specified procedures. Special care is taken to prevent fluoride contamination in Smelter plant and caustic contamination in Refinery unit. Reduce, recycle & reuse is our basic ideology of waste management. Waste disposal where inevitable is resorted to as per the guideline issued by State Pollution Control Board. For sustainable mining opening of mining face is done as per approved Mining Plan & after exploitation of minerals the site is restored as per Mines closure plan supplemented with indigenous plantation. Wildlife Conservation Plan and Biodiversity Management Plan are also in place for launching appropriate initiatives.

We mainly depend on combustion of fossil fuels as primary source of our energy. Hence strict watch is kept on emissions like NO_x, SO_x and particulate matter to atmosphere at the out let of stack and their concentration in ambient air by installing real time monitoring stations. The readings of monitoring stations are also uploaded to OSPCB server for monitoring and record. During the reporting period the emission readings are within the permissible limits. The environmental statement containing information on emission, hazardous waste, solid waste etc are submitted to regulatory authority every year. By restricting use of ozone depleting substances we could limit our consumption of R-22, R-124 & R-134a refrigerant gases in all our production units. Smelter used 866 kg R-22, 1159 kg R-124 & 61 kg R-134a gas. Mines & CPP used 51 Kg & 1342 kg R-22 gas during the year.

Pollution Control Measures

- Stack emission has been maintained well within the permissible limit after completion of retrofitting of an additional pass and revamping of ESPs (electrostatic precipitator) of old Units (Unit-1,2,3,4,5,& 6) of CPP.
- Online continuous monitoring of ambient air quality in CPP is being done after Installation of 4 Nos. of CAAQMS with digital display & transmission of data to OSPCB server..
- Steps have been taken to reduce fugitive dust at CHP area of CPP like repair of damaged ventilation ducts, optimization of new Dust Extraction System installed at Crusher House –II and revamping of settling pit of Crusher House-II.

- In CPP Several steps have been taken up for ash management :
 - i) Ash mound over Ash pond –II has been completed.
 - ii) Ash pond-I Dyke raising work is in progress from 110 Mrl to 113 Mrl.
 - iii) The project of mine void filling with lean ash slurry.
 - iv) CPP has adopted high concentration slurry discharge system in Unit - 7 to 10 for disposal of fly ash to Ash pond-IV for water conservation
- In Smelter 240 MT of SPL (Carbon portion) sent to M/s Green Energy Resources for detoxification and manufacturing of carbon fuel.
- 2500 MT hazardous Waste from Carbon Area of Smelter sent to CHWTSD (Common Hazards Waste Treatment Storage and Disposal Facility), Sukinda, Jajpur
- Hazardous waste audit of Smelter Plant completed by M/s GLOBAL TECH ENVIRO EXPERTS PVT. LTD.
- In Alumina Refinery adequate planation covering around 61% of total acquired land has been done.
- Provision of air pollution control equipment like ESPs, Dry Fog System, Bag filters, Scrubbers etc are adopted in Refinery for control of particulate emission.
- Provision of Captive Fly Ash Brick Plant and utilisation of fly ash in brick making, cement making, road development, low lying area filling etc. at alumina refinery. (% of fly ash utilised in Refinery during 2016-17 is 102.72 %)
- In-house & collaborative R&D projects have been undertaken for commercial utilisation of red mud and recovery of valuables from red mud.
- Inspection of Ash pond & Red Mud Pond dykes and assessment of dam stability by high level technical committee and experts of Indian Institute of Science, Bangalore.
- In Mines use of Rippers is being done to the extent possible to avoid drilling & blasting.
- Wet drilling is practiced for all the blast hole drills in Mines during the dry seasons.
- Use of suitable blast design to avoid excess generation of dust during blasting operations.
- Blasting is preferably done in mid-day during 1.15 PM to 2.00 PM depending on seasonal variation and break hours at Mines. Blasting will never be done in the morning, evening, cloudy day or at the time of strong wind flow.
- Use of mining equipment designed to latest environment standards so as to decrease the exhaust emissions.
- Proper maintenance of diesel equipment & transportation vehicles to decrease the emission level of NOx and SOx.
- Pressurized water sprinkling/dry fog system is used at un-loading point & transfer points of crushing & conveying system to suppress air borne dust.
- Slow unloading of OB in backfilling area to reduce dust emissions.
- Completely covered conveyor belt of 14.66 km is provided for transportation of crushed bauxite to the stockpile at refinery plant.
- 5 water tankers of 28 KL capacity each are deployed for regular water sprinkling on haulage roads, back filling areas and other possible dust generation areas of Mines. On permanent haul road, PLC controlled auto sprinkling system is installed to control dust generation.
- Staggered layout of mine faces to avoid concentration of dust, noise, vibration and exhaust emission due to HEMM operation.
- At the edge of the plateau, peripheral barriers of 7.5 m wide are left in-situ to act as a safety barrier to prevent men & machines falling down the stiff escarpment to the valley at 300m below. A green belt of fast growing plantation is maintained ahead of working faces to provide a biological fencing over these peripheral barriers to prevent dust & noise spreading outside the mine area.
- Dust masks are provided to protect the workmen exposed to high dust generating area of Mine and workers exposed to dusty operations for longer duration.
- Periodical monitoring of ambient air quality is being carried out. The air quality monitoring in the mine lease area and in surrounding villages will be carried out till the life of the Mine.

Per Fluorocarbon (PFC) gases from Smelter

The primary aluminium production process i.e. Smelter operations lead to emission of two Per fluorocarbon (PFC) gases i) tetrafluoromethane (CF₄) : 80-90% and ii) hexafluoroethane (C₂F₆) : 10-20% , having high global warming potential. Emission of these gases are due to Anode Effects from Electrolytic cells. Perfluorocarbons (PFCs) i.e. tetrafluoromethane (CF₄) and hexafluoroethane (C₂F₆) emissions , produced in the primary aluminium reduction process at Smelter during anode effects is monitored very closely. The Smelter Plant is equipped with the most advanced ALPSYS pot regulation system, which helps in reducing the frequency and duration of anode effect by timely dosing alumina into the pot. For the year 2016-17 ,the PFC emission from Smelter Potline has been estimated using AP (Aluminium Pechiney) overvoltage method and the values are given below:

CF₄(kg/T Al)- 0.0330

C₂F₆(kg/T Al)- 0.0040

Plantation

As an antidote to environment degradation & reverse global warming we do massive plantation at all our units thorough our horticulture departments. The details of plantation done during there porting period is enclosed.

Unit	Mines	Refinery	Smelter	CPP	Corporate (Township,NRTC & surrounding)	Total
Plantation done during 2016-17	102400	30400	10850	7500	30000	181150



Environmental Risk Management

Environmental Audits are done biannually in each operational unit under internationally acclaimed ISO 14001 Environmental Management System. Also during Hazard Identification & Risk Analysis (HIRA) some environmental risks emerge out. The perceived risks are mostly neutralised or otherwise controlled as we adopt zero tolerance to environmental risks. If opportunity exists observed risks are exploited to our advantage. Waste Management and Hazardous waste disposal is one such area in which our R&D effort has yielded good dividend. The environment risk matrix of our plants is presented below.

Environmental Risk Matrix

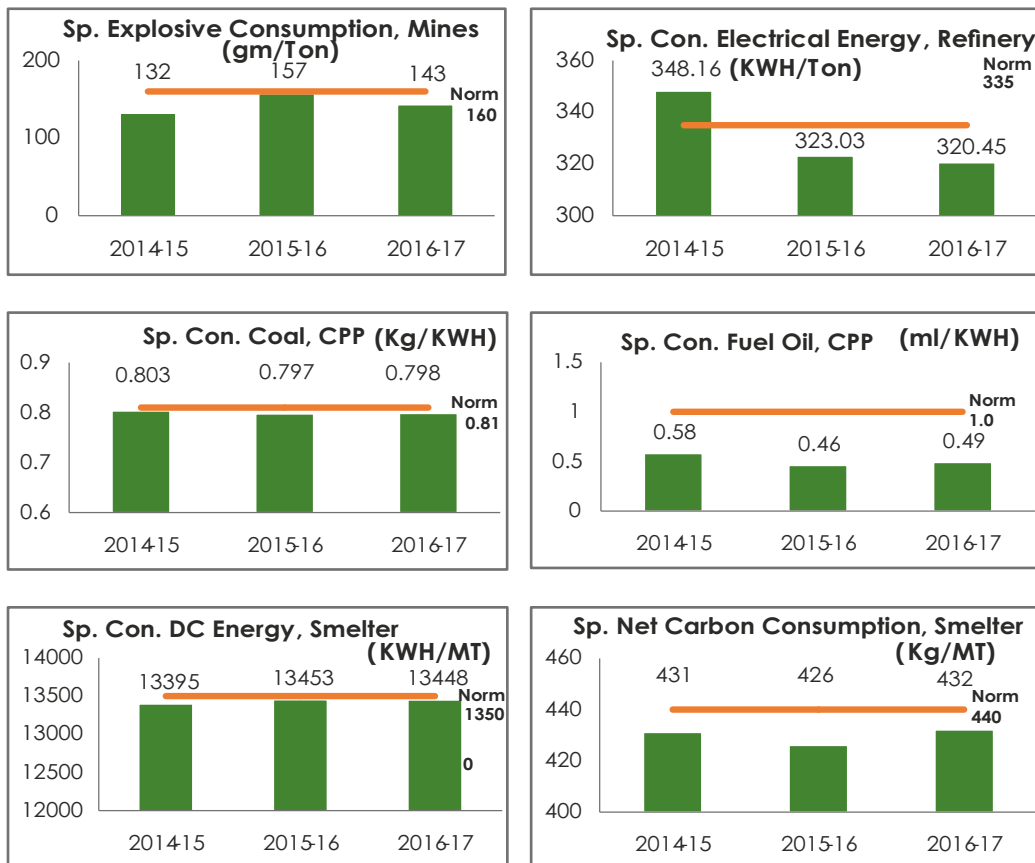
Unit	Environmental Risk areas	Environmental concerns	Opportunities
Alumina Refinery	Environmental pollution comprising of <ul style="list-style-type: none"> • Air pollution • Water pollution • Land contamination With risk associated with Health, Safety, Environment & Ecology	<ul style="list-style-type: none"> • Fly Ash • Lime grit • Redmud • Waste water 	<ul style="list-style-type: none"> • Higher utilization of fly ash in areas such as : Manufacturing of fly ash bricks, cement, road construction, dyke making, filling up low lying areas in organization premises. • Use of lime grit in fly ash brick manufacturing. • Redmud utilisation for extraction of iron concentrate and gallium from redmud. • Recycling of return water from ash pond for reuse in ash slurry pumping and from red mud pond for red mud slurry making and mud washing thus recycling caustic.
Smelter	Environmental pollution comprising of <ul style="list-style-type: none"> • Air pollution • Water pollution • Land contamination With risk associated with Health, Safety, Environment & Ecology	Generation of <ul style="list-style-type: none"> • Spent potlining • Dross • Shot blasting waste • Flouride & Particulate emission due to pot operation • Spillage of bath material during different operating processes. • Generation of fluoride contaminated surface run offs 	<ul style="list-style-type: none"> • Spent potlining utilization in Cement industry and power plant is being explored. • Recycling of Aluminium Dross in pots. • Non recyclable hazardous waste like shot blasting waste, furnace slags are sent to common HW landfill at Sukinda, Jajpur • Prevention of HF gas leakage from potline by using leak proof pot hoods. Absorption of Flouride gases in alumina by dry scrubbing method in FTPs thus recycling fluorine to process. • Provision of automatic shutoff valve and recycling of spillage bath. • Recycling of water by collecting surface runoffs in 3 holding pools and defloriding by Emiron Nano based Deflouridation technology.
CPP	<ul style="list-style-type: none"> • Air pollution • Water pollution 	<ul style="list-style-type: none"> • Fly Ash • Waste water • Emissions 	<ul style="list-style-type: none"> • Fly ash utilization in brick making, cement plant, road construction, reclamation of low lying area, abandoned stone queries & abandoned coal mines void etc. • (i) Recycling of ash pond decanted water for ash slurry making. • (ii) Utilisation of STP water for horticulture & plantation purpose. • Heat recovery from flue gas.
Mines	<ul style="list-style-type: none"> • Air Pollution, • Noise pollution • Land Contamination 	<ul style="list-style-type: none"> • Waste water & Dust • Overburden • Explosive 	<ul style="list-style-type: none"> • Recycling of treated waste water for dust suppression and horticulture activities • (i) Reuse of overburden material for backfilling of mined out area. • (ii) Rehabilitation of backfilled area with plantation thereby converting the barren mined out area into forest. • Use of NONEL to delay blasting sequence to reduce noise level and use of ripper dozer where ever possible.

Raw Material Sourcing & Conservation

Disclosure on Management Approach - Raw materials

High importance is accorded to availability of raw materials and monitoring of specific consumption of the inputs. Our main raw materials, bauxite & coal, being scarce minerals, their conservation is integral to our operation. Bauxite is sourced from our captive mine. Coal availability depends mainly on linkage coal allotment. Any shortfall in coal supply is met through procurement of E-Auction coal, bridge linkage coal or imported coal. Allotment of Patangi Bauxite Mine and Utkal D & E coal block has strengthened our raw material security. For other raw materials like Caustic, lime and Aluminium Fluoride etc. multiple procurement sources are identified to tackle any uncertainties in supply. Raw materials are procured as per an annual procurement plan chalked out at the beginning of year. The consumption of raw material is kept under close surveillance to achieve the norms of consumption fixed by Technology Committee. Close watch on consignment of procured raw materials facilitate timely receipt. Our constant endeavour is to economise the raw material use through adoption of better technology, process redesign and elimination of wastage.

The sp. Consumption trend of important raw materials are given below.



Consumption of Important Materials

Materials consumed		Source	2014-15	2015-16	2016-17
Raw Material	Alumina (MT)	Internal Production	6,31,453	7,20,880	7,53,401
	Coke (MT)	External Suppliers	1,24,310	1,45,387	1,51,032
	Pitch (MT)	External Suppliers	29,075	34,395	35,137
	Bauxite (MT)	Internal Production	57,39,000	63,40,142	69,29,194
	Caustic Soda (MT)	External Suppliers	1,90,491	2,07,114	2,30,647
Associated	Aluminium Fluoride (MT)	External Suppliers	5,597	6,760	8,149
Process Material	Wheat Bran (MT)	External Suppliers	1,881	1,977	1,703
	Lime (MT)	External Suppliers	50,231	54,120	61,353
	Explosives (MT)	External Suppliers	1,068	1,924	1,172
Packaging Material	VSI HDPE fabric (sq mtrs)	External Suppliers	6,53,517	2,44,600	6,31,750
	Wood in wooden pallets (Cubic feet)	External Suppliers	33,634	30,981	32,355
	Steel straps (MT)	External Suppliers	170	194.5	271.3
	Polyster Strap (MT)	External Suppliers	55	60.7	85.9
	HDPE Laminated bags for hydrate & Alumina (Nos)	External Suppliers	6,79,056	7,55,307	13,30,000

Recycled Input Materials (MT)	2013-14	2014-15	2015-16
Al. Dross	3390	2745	5523

Sustainable Sourcing

Availability and transportation of bauxite & coal the two primary raw materials required for Aluminium production are ensured by strategic location of our Alumina Refinery & Captive Power Plant close to Mines. The Alumina Refinery is located close to our captive Mines ie. the Panchpatmali Bauxite Mines & energy-efficient transportation of bauxite to the Refinery is made possible by a single flight long distance cable belt conveyor. As mining operation continued location of mining face gradually moved away from crushing and conveying facility requiring long haulage. Gradual receding away of mining face from crushing and conveying facility is tackled by erection of Semi Mobile Crusher Plant (SMCP) and Fixed Long Distance Conveyor (FLDC) near the present mining face. Likewise our Smelter is situated in the vicinity of the Captive Power Plant which in turn is located close to the coal mines of M/s MCL, our source for coal supply as per the prevailing Fuel Supply Agreement (FSA). Coal is transported to Our Captive Power Plant by a dedicated merry go round rail system and power is evacuated to Smelter located 5KM away, through EHT transmission lines, thereby, reducing transmission loss and minimizing transmission disruption. Any gap in coal requirement & availability through FSA is made up through procurement through E-Auction or bridge linkage or both, as applicable. The option of using

imported coal is also available & is exercised, depending on the exigency of requirements & outcome of detailed cost-benefit analysis. Allocation of new deposit of about 79 Million Tonnes of bauxite at Pottangi Mines & Utkal D & E coal blocks with coal reserve of 200 Million Tonnes, has the potential to strengthen sustainable sourcing of the major inputs i.e. bauxite and coal. For receiving caustic soda one of the vital raw material required for refining bauxite and other required inputs and exporting alumina we have developed dedicated port facility with fully mechanized loading and unloading facility at Vizag port. Our own railway siding at Budhapank, Angul and Damanjodi facilitate rail transportation of material.

All other critical inputs are procured through competitive bidding from multiple suppliers and vendors, enhancing our vendor base and thus, addressing the risk of over dependence on a few suppliers. Orders for supply of all bulk raw materials i.e. caustic soda, lime, CT pitch, CP coke, aluminium fluoride etc. are also distributed amongst multiple vendors meeting the qualifying criteria in order to enhance reliability of supply. In line with prevailing Govt. guidelines, preference is also given to local vendors in some sectors. Nurturing of local vendors, is expected to develop sustainable source of supplies while contributing to local economic development.



Energy Efficiency

Disclosure on Management Approach – Energy & Emission

Responsible use of energy and adoption of energy conservation measures are given utmost importance in NALCO in line with National Mission on Enhanced Energy Efficiency being implemented by Bureau of Energy Efficiency, Ministry of Power, GoI. Being the producer of a energy intensive product i.e. aluminium, adoption of energy saving measures also result in better economics of operation for us. We are in continuous search for adoption of improvised technology, process redesign and energy efficient equipments to achieve energy efficiency, addressing the global concern on climate change. Pursuing the objectives of limiting emission to the lower end of the IPCC emission scenarios in line with current international agreements, we are committed towards reduction of GHG emissions by reducing consumption of fossil fuels and adopting better combustion engineering. For providing access to clean and affordable energy to support economic development we have ventured in to wind power and solar power generation in a big way. For monitoring our energy consumption and effectuate energy saving we conduct energy audit of all our production units and offices regularly.

Extraction of aluminium being a energy intensive process, conservation of energy is a market driven prerogative for us for our sustenance. From the time of selection of technology and purchase of machineries this is the single most important consideration aptly reflected in our Energy Policy "To espouse Energy Efficient Technology encompassing procurement of Energy Efficient Product & Services and design for Energy Performance improvement". Our sustainable development policy also subscribe to above ideology. Our energy intensive plants such as CPP, Smelter & Alumina Refinery are compliant to Energy Management System conforming to ISO 50001 standard. We also ensure conservation of energy by avoiding idle running & overloading of machines. Maintenance of proper process parameters, better fuel preparation, proper air to fuel ratio, heat recovery from exhaust, prevention of heat loss, leak proof compressed air and water system etc. are some of the interventions adopted by us for energy efficiency. Switching off light, ventilation and air conditioning when not required etc are achieved by building awareness of our workforce. Our performance of generating 36119 Energy Saving Certificate in PAT cycle -1 has further strengthened our resolve to improve energy efficiency in our plants and townships. Till date our progress in achieving stiff PAT Cycle-2 target of energy consumption reduction by 6.39% for S&P complex and 5.83% for M&R complex, is satisfactory.

Consumption of fossil fuel leads to direct GHG emissions and consumption of electrical energy leads to associated, indirect GHG emission. Total energy consumption in our operations during 2016-17 was 119,373 TJ. Site specific calorific values were used for determining energy consumption from fuels. In absence of site specific values, calorific values by IPCC were used. Emissions from consumption of electricity have been calculated using the emissions factors published by the Central Electricity Authority of India. Total greenhouse gas emissions for the reporting period of 2016-17 was 11.56 million tonnes of CO₂e. The other relevant indirect greenhouse gas emissions are insignificant considering the scale of operation. The increase in energy consumption and greenhouse gas generation are due to increase in production of alumina hydrate, aluminium and power. For details of production of last three year pl. refer Highlights of Achievements in this report. Compared to year 2014-15 energy consumption has increased 15.9% where as hydrate, aluminium and power production has increased by 13.5%, 18.3% and 18.2% respectively.

Energy Consumption:

Direct Energy consumption (GJ)	2014-15	2015-16	2016-17
HFO	6,827,126	7,146,371	7,859,449
LPG	7,701	8,480	8,557
LDO	114,748	155,545	145,380
Diesel	228,620	242,926	265,359
Coal	95,793,431	106,470,041	111,094,623
Indirect Energy consumption (GJ)	0	0	0
Total Energy Consumption (TJ)	102,971,626	114,023,363	119,373,368

GHG Emissions (In Tonnes CO₂e) – Scope 1 & 2

Fuels	2014-15	2015-16	2016-17
HFO	528,420	553,129	608,321
LPG	486	535	540
LDO	8,503	11,526	10,773
Diesel	16,941	18,001	19,663
Coal	9,416,494	10,466,005	10,920,601
Electricity Consumed	0	0	0
Total GHG Emission	9,970,844	11,049,196	11,559,898

Energy conservation initiatives

During the year NALCO has attributed maximum thrust on energy conservation and major initiatives in this area are presented below.

Unit	Energy Conservation Measures 2016-17	Energy Saved in TOE
	1. Replacement of Dump Steam Control Valve in Boiler	
	2. Optimization of agitator speed in chemical process tanks by suitably downsizing the motor.	
	3. Energy saving by re-routing of pipe lines to achieve desired flow and pressure.	
	4. Use of indirect steam heating in Precipitator Tanks instead of direct steam heating.	
	5. Use of additive with coal firing is being done to achieve better combustion efficiency of coal. Successful trials have been carried out in all 05 boilers resulting with better boiler efficiency.	

Unit	Energy Conservation Measures 2016-17	Energy Saved in TOE
Alumina Refinery	6. Installation of Magnetic resonator in HFO line of Boiler no 4; it gives a saving of 6.1% of HFO. Qty saved in this year= 88 KL	45636
	7. Installation of energy efficient pumps in ash slurry pump house, in place of existing SL Cyclone feed pumps.	
	8. Use of separate hydro-test pump of 75 KW for hydro testing of boilers instead of using BFP of 1130 KW during that time.	
	9. 10 numbers of flood lights replaced with LED lights. 9320 numbers of tube lights of 57 Watts replaced with 18 Watts LED tubes.	
Aluminium Smelter	1. During the year the specific DC energy consumption in Smelter Plant has reduced to 13448 KWhr/MT of hot metal, lower by 5KWhr/MT as compared to last year's figure of 13453 KWhr/MT . This could be achieved by use ALPSYS Pot regulation system in all Pot lines, reducing anodic problems, reducing wedge drop & stem beam drops, use of graphitized cathode blocks, slotted anodes and use of increased anode stub hole and pin length in running pots. All these activities resulted in higher current efficiency, thereby reducing specific DC energy consumption.	33.57
	2. Installation of two energy efficient compressors in place of standard compressor	129.4
	3. Replacement of 20 nos. standard LT motors with high energy efficient IE-2 class motor.	6.0
	4. Replacement of 24 nos. HPSV high bay lights with LED lamps.	0.81
Captive Power Plant	1. All the six nos. of conventional fan motors of cooling Tower of Unit #6 were successfully replaced with energy efficient VFD controlled motors.	340
	2. All the conventional Glass Reinforced Plastics Blades of Cooling Tower fans of Unit #9 & #10 (Total of 12 nos. of fans) were replaced with Fibre Reinforced Plastics. This will result annual saving in energy consumption by 170 TOE.	170
	3. Installation of energy efficient lighting system like LED street light fitting and LED tube lights, electronic tube light ballast ,LED high bay fitting, LED well glass fitting etc.	983.02
Bauxite Mining	1. Replacement of 320 nos. of 70 W well glass HPSV fittings, 80 nos. of 250 W flood light HPSV lamps, 20 nos. of 250 W HPSV street light fixtures, 89 nos. of CFL lamps, 2300 nos. of T8 tube light fitting (40 W) with corresponding LED equivalent has been done.	25
	2. Replacement of 06 nos. of old (installed since 2000-2002) and inefficient air conditioners of 1.5 TR capacity with latest BEE 5-Star rated air conditioners (with R410 A environmental friendly refrigerant).	0.2

The steps taken for utilising alternate sources of energy :

A. NALCO is operating following Wind & Solar Power Units:

- 50.4 MW Wind Power Plant at Gandikota, Andhra Pradesh
- 47.6 MW Wind Power Plant at Ludarva, Rajasthan
- 50.0 MW Wind Power Plant at Devikot, Rajasthan
- 160 KWp Rooftop Solar Power Plant at Corporate Office, Bhubaneswar
- 100 KWp Rooftop Solar Power Plant at NALCO Township, Bhubaneswar

During the year NALCO has generated 205.722 MU from wind power & 0.294 MU from Solar.

B. In addition to above during the year NALCO has taken following steps for further augmentation of its green energy generation capacity.

- 50 KWp Rooftop Solar Power plant at Nalco Research and Technology Centre (NRTC), Gothapatna, Bhubaneswar is commissioned.
- 50.4 MW Wind power plant at Jath, Sangli, Maharashtra is commissioned.
- Company has identified developer for execution of the 20 MW Solar Power project in Madhya Pradesh and plans to award work soon.
- Company plans to issue NIT for selection of developer for EPC of the 50 MW Solar Power project at any suitable location in India.
- Company also plans to set up Solar Power Plant of up to 150 MW capacity in Odisha.
- Company has plans to set up Rooftop Solar Power Project in its various establishments for which feasibility survey has been carried out.
- Wind Power Project: Company plans to set up another Wind Power Plant of 50 MW capacity at any suitable location in India.



Water Stewardship

Disclosure on Management Approach – Water & Effluents

Water, one of the basic inputs for industry is getting scarce day by day and apportioning available water between industry and agriculture is a major contention in India. We acknowledge the fact that responsible use of water and maintaining water bodies in its pristine state will yield rich dividend for future availability of water for survival of industry. This critical resource is utilized in a responsible manner, taking into account the inherent seasonal fluctuations in availability of water from natural sources like rivers and streams, our main source of water. Responsible stewardship towards water resource throughout the life cycle of industry is our management strategy. Conservation of water was ingrained in our project planning and now we are infusing further refinement based on recent breakthroughs by reviewing all our operations. After establishing recycling system for Ash Pond and Red Mud Pond water, we resort to high concentration slurry disposal and now encouraging dry disposal of fly ash to aid conservation of water. We treat waste water and sewerage water in all our plants for use in process and horticulture respectively. Successfully implementing zero discharge concept for waste water, now we are graduating to rain water harvesting and ground water recharging. Recently we have commissioned water treatment plant based on Emiron Nano Technology for defluoridation of water, first of its kind in world.

Water drawal by different Units of Nalco (m3)

	Source	2014-15	2015-16	2016-17
Smelter & CPP	Brahmani River	3,11,57,944	3,61,41,063	3,86,21,471
Alumina Refinery	Kerandi River	99,23,139	99,23,370	92,91,450
Bauxite Mines	Jholaguda Stream	6,92,567	8,25,425	7,86,986
Total Withdrawal of surface water		4,17,71,550	4,68,89,858	4,86,99,907

Water Recycling and Reuse

Water conservation & recycling is given utmost importance in all our units. We have achieved zero discharge with respect to waste water and sewerage water in all our units. Treated waste water is used in the process and sewerage water is used for horticulture and gardening purpose. Roof top rain water harvesting and surface runoff rain water harvesting along with ground water charging is done in all our units. Another area where we have achieved exemplary success is recycling of ash pond and redmud pond water. After adoption of ion exchange and reverse osmosis method of water purification we have recently graduated to Emiron Nano Technology method of defluoridation in our Smelter Plant. A case study on Emiron Nano Technology is presented below

Case Study: Nano technology based De-fluoridisation Plant

Background:

Aluminium smelter electrolysis process uses fluoride rich substances which upon contact with water has certain risk of contamination. To eliminate any such risk, NALCO used to store surface run off

water in holding pools present inside the smelter plant premises for defluoridation. In order to implement a more robust process we have implemented a first of its kind indigenous technology developed by M/s Eesavyasa Technologies Pvt Ltd and successfully commissioned a scaled up de-fluoridation plant to de-contaminate the effluent water of Smelter. The process is based on nano-technology.



The breakthrough based on EMRION Nano technology, which is now adopted by NALCO has a major advantage over the conventional process such as;

- ❖ Zero use of chemicals and
- ❖ Zero liquid discharge (ZLD) plant.

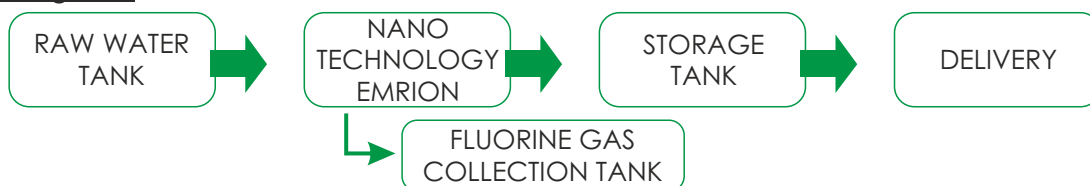
Fluoride contaminated water contains fluoride in mixed form as Sodium Fluoride & Potassium Fluoride which are removed through following process.

The Process in Brief :

- DC Voltage creates Electro Magnetic Resonance (EMR) to treat the water. In the presence of electromagnetic resonance, under the influence of nano material doped electrodes the molecular property of water (H₂O) changes with minimum electricity and the fluoride anions from sodium fluoride, potassium fluoride etc are converted to fluorine gas and is released from water.
- Fluorine gas is passed through a scrubber and neutralized with lime solution to give solid waste of calcium fluoride, which is water insoluble salt and is disposed safely from lime solution. The same is non-hazardous and can be separated periodically.
- Cations (Sodium/ potassium etc) will form their complex compounds and settle down as solid sludge, finally collected as non-hazardous inorganic solid waste.
- Upper layer of product water after settling is sent to utility tank



Schematic Diagram :



Impact/ benefits resulting from the initiative

The process Provide decontaminated and harmful chemical free water for the use of people, cattle, flora, and vegetation of the surroundings. This innovation creates a futuristic opportunity for our country towards a breakthrough water purification technology.

The various advantages of the process over the conventional methods are as under:

- Zero use of chemicals in the treatment process
- Zero liquid discharge (ZLD) plant.
- Less Capital cost as compared to conventional technology (ion-exchange through resin bed or reverse osmosis process)
- Less operational cost as compared to conventional technology



Details of recycled water and our effort towards conservation and recycling is presented below.

Sludge Pond Recovering system of CPP	<ul style="list-style-type: none"> In the sludge pond recovering system, sludge, grit consisting of sand, gravel, or heavy solids are allowed to settle and around 270-290 m³ per day (depending on seasons) of water is recovered and sent to the raw water reservoir of CPP.
Dust Suppression System at CPP	<ul style="list-style-type: none"> Clear water of around 13 m³ per hour is recovered from the dust suppression system in CPP and is guided for use as ash slurry.
Sewage Treatment Plants of CPP	<ul style="list-style-type: none"> 2nos. of STP's of capacity 175 m³/day & 204 M³/day are kept under operation on continuous basis. Waste water from canteen, kiosk, toilets and urinals is channelized to STP and after treatment the water is stored in a sump and utilized for gardening and horticulture purposes only. Around 100000 m³/Year STP water was recycled back for reutilization in horticultures thereby reducing water intake from river Brahmani
Ash pond Recycle System of CPP	<ul style="list-style-type: none"> Around 50,000 m³ per day water is recycled back from CPP ash pond after treatment to the ash water pump house for reuse in the system
Industrial Drain Water Recycling System (IDWRS)	<ul style="list-style-type: none"> CPP, NALCO have adopted zero discharge with respect to industrial waste water. All industrial drain waste water is channelized to a treatment facility and after treatment the treated water is used for ash disposal system. Around 26,00,000 m³ (7000 m³/day) water was recycled back from IDWRS. This is further reducing water intake from river Brahmani.
Rain water Harvesting and Recycling system of CPP	<ul style="list-style-type: none"> Rain water Harvesting and Recycling system has been commissioned having harvest pond of capacity of 50000 m³ equipped with 2x250 m³ of pumping capacity on Sept'2016. The recycled water is used as a make up to fire hydrant Fore bay of RCPH-1. In the year 2016-17, around 2,73,387 m³ of water from rain water harvesting system and around 93017 m³ of water from storm water exit point was recycled and re-used.
Roof Top Rain Water Harvesting at CPP	<ul style="list-style-type: none"> Roof top rain water harvesting system has been installed in CW pump house having an area of around 2500m². Roof top water collected during monsoon is fed to CW fore-bay; thereby reducing water makeup to CW fore-bay. Normal annual rain fall in this region is around 1400mm. Thus during normal rainy season around 3500m³/year rain water shall be harvested. This will reduce the water make up quantity to CW fore-bay. Also similar system is installed in the RCPH buildings of CPP.
Effluent water handling in Mines	<ul style="list-style-type: none"> Effluents from the Mechanical Workshop area is being channelized through well-designed oil-water separation tank where oil is collected and the clear water is discharged to zero discharge sump. Effluent from canteen is treated in a biological treatment unit and treated waste water is discharged to the zero discharge sump. Water from the zero discharge sump is pumped to an overhead tank from where water is used for dust suppression and horticulture purpose.
Rain Water harvesting at Mines	<ul style="list-style-type: none"> NALCO's sedimentation basins located inside the mining area act as significant ground water recharging facilities, when rain water percolates down and enriches the ground water table located below the surface. Besides five nos of ponds have been excavated in the unexplored area which are also acting as significant rain water storage and reuse facilities. Two nos of roof top rain water harvesting structures have been constructed in the Administrative Building and Mine Manager's Building of the Mine.

Management of storm water in Mines	<ul style="list-style-type: none"> ● Siltation of surface water is avoided by adoption of control measures like check dams and gully plugs, garland drains and settling ponds etc. The check dams also helps in enhancing the time period of water flow through nallahs and streams of the valley, thereby enhancing the ground water recharge.
Recycling of treated water of Sewage Treatment Plant of Smelter	<ul style="list-style-type: none"> ● Smelter is having a STP of capacity 0.65 MLD. Waste water from canteen, kiosk, toilets and urinals is channelized to STP and after treatment the water is stored in a sump & is pumped into holding pool for further treatment at Defluoridation plant and utilized for plant use. Around 17 m³/hr, STP water was recycled back for reutilization thereby reducing water intake from river Brahmani
Reuse of surface runoffs & waste water of Smelter	<ul style="list-style-type: none"> ● At smelter plant, there are three holding pools of capacity 100,000 m³, 51000 m³ & 38000 m³ respectively which store surface runoffs of potline & carbonarea during rain along with waste water from the shopfloor which is then treated in the Defluoridation plant and used in plantation, anode cooling water makeup, vehicle washing, roof cooling during summer and as the fire water supply in scrap yard, ● A Project, defluoridation of Surface Water by Emrion nano Technology is commissioned on 28.02.17. The treated water from this plant is directly used in cooling water makeup reducing water intake from river.
Recycling of Subsoil water at Smelter :	<ul style="list-style-type: none"> ● The subsoil water collected below the potline 3 & 4 are recycled in the process. The subsoil water of potline 3 is used in cooling and fire water makeup of rolling plant whereas the subsoil water of Potline 4 is recycled as makeup water for compressor cooling. Around 700 to 900 KLD water is conserved in the above way.
Surface runoff management at Smelter	<ul style="list-style-type: none"> ● Re routing of drain of RP area (phase -I) completed on 02.07.2016 as a result a portion of surface runoff which was flowing outside the plant boundary through natural gradient was diverted to Holding pool by reversing the slope of the drain and utilised in the plant after treatment.

Recycling of S&P township STP water	<ul style="list-style-type: none"> A project has been undertaken to use treated water from the STP of S&P township for horticulture, gardening, etc.
Rain water harvesting in S&P township	<ul style="list-style-type: none"> The rain water from the roof top of new B type buildings is channelized to a dedicated drain and is charged to the ground water through three No.s of charging wells.
Red Mud Pond of Refinery	<ul style="list-style-type: none"> From Red mud pond total 3473918 m³ water is recycled as per zero discharge principle, and used for leaching out caustic from fresh generated mud from the process.
Ash Pond of Refinery	<ul style="list-style-type: none"> Total water recycled from Ash pond is 9293695 MT as per zero discharge principle, and used for making ash slurry of the Fly ash from the boiler ESP.
Sewerage Treatment Plant of Refinery	<ul style="list-style-type: none"> Two No. of Township STPs of capacity 20 m³/hr & other 125 m³/hr, recycled 94000 m³ & 449000 m³ of water during the Yr.2016-17, for horticulture & gardening
Rain water and plant outlet surface drain off holding ponds (4no.) of Refinery	<ul style="list-style-type: none"> Sabari Lake, volume : 50000 m³ Recharges to River Kerandi Shiva Lake, volume : 16000 m³ Recharges to River Kerandi SVM Lake, volume : 28825 m³ Recharges to River Kerandi CISF station Fire barrack, volume : 3720 m³
Rain Water Harvesting inside Refinery Plant(3 no.)	<ul style="list-style-type: none"> Three number of rain water harvesting facilities had been installed inside Refinery. <ul style="list-style-type: none"> I) At Administrative Building roof top : Harvested volume 2000 m³; Caters to the need of green belt, dust suppression, toilets. II) At HRD Training centre 2 no. Total harvested volume 4000 m³; Caters to the need of green belt, dust suppression, toilets and ground water recharge

CPP	Water Recycled / Reused (m3)			% Water Recycled / Reused
	STP	ETP	Ash Pond	
2015-16	100,000	2,154,200	14,930,800	63.5
2016-17	100,000	2,663,000	16,163,255	64.1

Mines	Water Recycled / Reused (m3) ETP & STP	% Water Recycled / Reused
2015-16	76,650	9.29
2016-17	76,650	9.74

Refinery	Water Recycled / Reused (m3)			% Water Recycled / Reused
	RMP	Ash Pond	STP	
2015-16	3,813,309	9,095,911	543,120	136
2016-17	3,473,918	9,293,695	543,000	143

Smelter	Water Recycled / Reused (m3) (Estimated)		% Water Recycled / Reused
	STP	ETP, Subsoil Water & Others	
2015-16	219000	474,500	23.82
2016-17	237250	876,000	52.1

Waste Management

Disclosure on Management Approach – Effluent & Waste

Waste generation is not only an environmental concern but also a drain of useful resource not exploited due to limitation of technology, process instability or human negligence. The effect is more pronounced in case of industrial metal extraction, recognised world over as a major source of pollution due to inherent rejection of other major components of ore as waste. Our approach in this regard always has been to find alternate use for rejected portion. Also requirement of huge amount of electrical energy for extraction of aluminium has compelled us to go for captive thermal power generation with its associated risk of bulk fly ash generation. We have accepted the challenge of finding alternate use of fly ash and encourage use of fly ash for brick making, road & embankment construction, use in cement industry and concrete making etc. For the hazardous wastes where safe reuse is not possible we adopt the policy of safe disposal and segregation so that it will not pollute the environment and pose health and safety risks for biodiversity. Through our R&D effort also we are continuously trying to find alternate use of wastes.

Waste Management in NALCO starts from project planning and evaluation stage. During selection of technology process wastes are identified and strategy is developed for their management. Environment Impact Assessment and preparation of Environment Management Plan also presents opportunity for advance planning for waste management. The waste management plan is continuously reviewed by us to accommodate new breakthrough and changing regulatory guidelines. The total process is monitored by regulatory agencies such as State Pollution Control Board, IBM and MOEF. Proper waste handling is also conferred due weightage during Aspect Impact Study, Hazard Identification & Risk Assessment and Disaster Management Plans.

We adopt 3R concept of Reduce, Recycle and Reuse for waste management. We continuously educate employees and upgrade their skill to reduce wastes generated due to process instability and human negligence. To the extent possible wastes are recycled. We upgrade our technology and renovate our facilities for recycling of wastes. Through our R&D effort we continuously try to find alternate use of wastes.

All the wastes generated by us are identified and segregated as Hazardous Waste and Non hazardous waste right at the generation point. Hazardous wastes are segregated and safely disposed as per the specific procedure developed for their handling complying all the statutory guidelines issued in this regard. Special care is taken to prevent caustic and fluoride contamination. Spent Pot lining and cathode residues are segregated in secured landfills and concrete storage sheds. Left over portions of anode are reused for anode making. Red mud generated during refining process are washed to reduce caustic content and disposed in Redmud Pond in slurry form. Decanted water from redmud pond is used for mud washing thereby recovering valuable caustic for process use. Over burden & top soil excavated during mining are stored separately and use for reclamation of mines as per progressive mine closure plan. Ash generated in boilers are stored in ash ponds by hydro sluicing. We are continuously trying to find alternate use for fly ash and pond ash.

In our pursuit to reuse wastes we have involved R&D effort to a great extent. Recently we have completed a lab scale study on extraction of iron concentrate from red mud by conventional High

Gradient Pluse Magnetic Separation & a new technology i.e. Disperse Magnetic Calcination & Magnetic Separation in association with CHALIECO & Guiyang Aluminium Design & Research Institute Co. Ltd of China. A lab scale study for iron recovery and 100% utilization of red mud was done with the help of M/s Shenwu Group, China and the test report has been received. MOU has been signed with Bhabha Atomic Research Centre (BARC), Mumbai on 10th May, 2016 for development of chemical methods and technologies for value added processes and product in aluminium industry. Under the agreement two studies have been under taken by BARC i.e. (i) development of Gallium extraction technology from Bayer's Liquor of Alumina Refinery process and (ii) Use of red mud in nuclear reactors. Also expertise of TERI is solicited for sustainable rehabilitation of redmud areas. Steps taken for Recycling & utilisation of different wastes are summarised below:

Hazardous waste generation		2016-17	Waste Management Method
Alumina Refinery	Spent Resin (MT)	0	Disposed in secured land fill
	Used oil (KL)	38.83	Sold to authorized recycler
	Discarded Asbestos (m3)	58.8	Dumped in specified pits
	Discarded Containers (nos)	1,998	Disposed to vendors
Smelter	Aluminium Dross (MT)	6,093	Recycled in the process
	Cathode Residue (MT)	7,925	Stored in secured land fills
	Spent Anode (MT)	60,685	100% recycled in anode making
	Rejected Filter Bags (MT)	32.11	Incinerated in pot
	Rejected ALF3 bags (Nos)	1,62,718	Incinerated in pot
CPP	Used oils (KL)	24.49	Sold to authorized recycler
	Spent Resins (KL)	2.9	Disposed in secured land fill
Mines	Used oil (KL)	56.56	Sold to authorized recycler

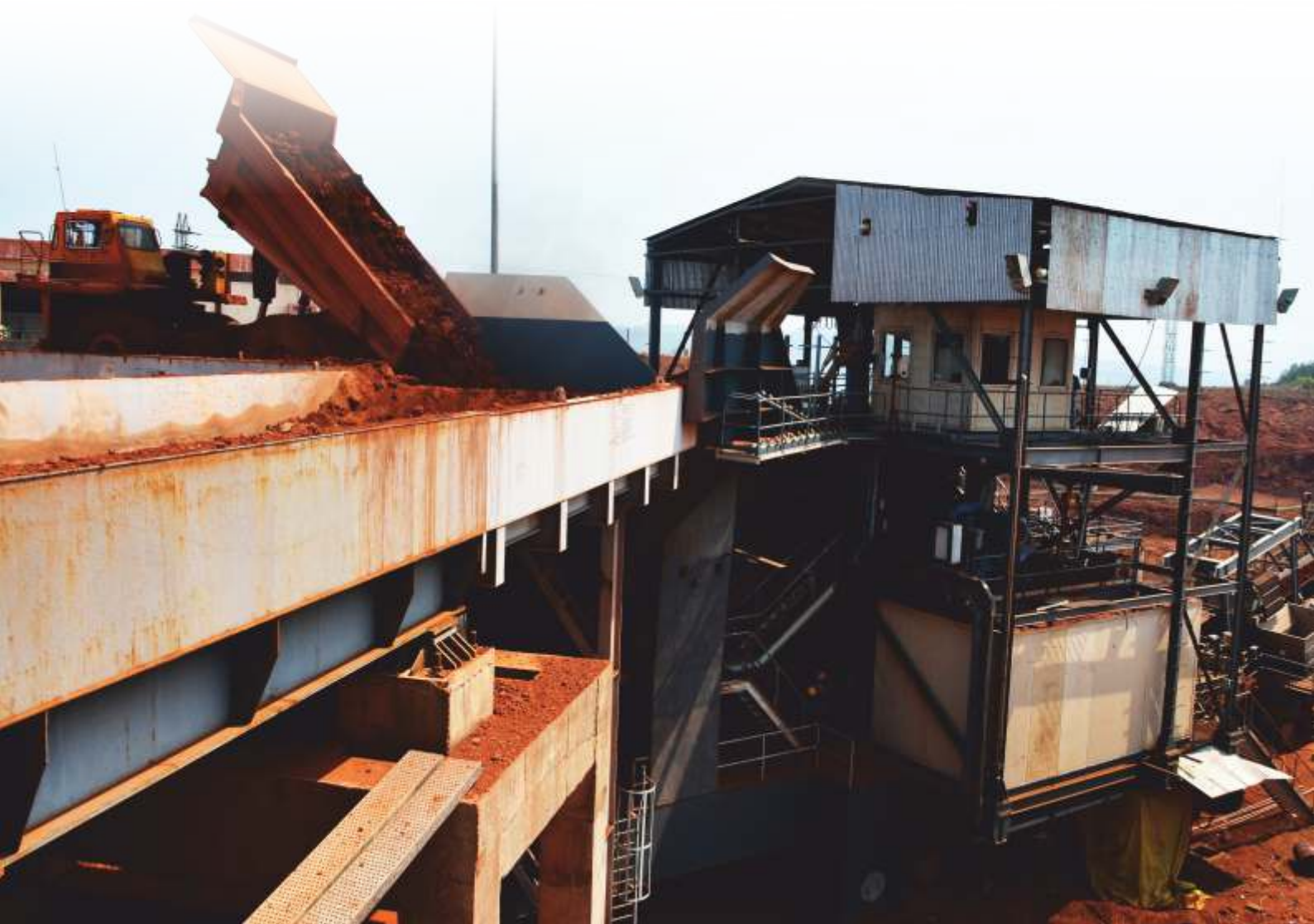
Non Hazardous waste generation		2016-17	Waste Management Method
Alumina Refinery	Red mud (MT)	31,90,383	Disposed to redmud pond
	Lime grit (MT)	24,038	Used as land fill
	Fly ash (MT)	6,80,177	Used for cement & brick making etc. Excess ash dumped in ash pond.
Smelter	Ferrous Scrap (MT)	3,967.58	Disposed to recycler
	Mixed Debris (MT)	2,350	Disposed in the low lying areas
	Refractories Bricks (MT)	2,815	Reused in construction of temp. resistant floor
CPP	Fly ash (MT)	23,20,563	Used for cement & brick making etc. Excess ash dumped in ash pond.
Mines	Overburden (MT)	13,54,000	Reused in backfilling of mined out area

Recycling & Reuse

Being a primary aluminium producer, the thrust is given to recycle the inevitable process wastes to the maximum possible extent. The aluminium dross generated in melting furnaces at Smelter are processed in autogenous mills where metal is separated from bath material and the recovered metal is recycled. The aluminium wedges used for bypassing pots, pot hoods, pot cowl, residual metal pad etc are melted and recycled through potline scrap melting furnace.

Recycling/ Reuse of waste

Unit	Utilisation	Percentage
Bauxite Mines	Overburden is utilized for reclamation for mined out areas	100%
Alumina Refinery	Caustic Soda is recycled from redmud	5.76%
	Ash utilization	102.72%
Smelter	Recycling of Aluminium scrap,	100%
	Aluminium dross recycled as input to process	87.87%
	Recycling of spent anode	100%
CPP	Ash utilisation	37.88%



Responsible Mining

We take every care and caution for sustainable bauxite mining for aluminium production as open cast mining involves inevitable excavation of large area with destruction of forest and associated risk of noise, vibration, air & water pollution, change in natural topography and danger to wildlife. The sustainable mining practice includes selection of appropriate mining technology, use of improvised mining equipment, adherence to scientific mining and mine closer plan, reclamation of mined out area and restoration of forest cover. We carry out mining with minimum blasting taking adequate measures for control of air pollution, noise & vibration. The removed overburden is preserved for reclamation and mined out ore is transported through water sprinkled haulage road to crusher house for primary crushing. As far as restoration of mined out area is concerned, the mine is reclaimed concurrently as per progressive Mine Closure Plan of the approved plans for mining. Overburden & top soil stripped ahead of bauxite mining faces, are dumped in the backfilled/ mined out area. Dumped lateritic overburden gets levelled before topsoil is put on it and subsequently, the top soil is properly dressed making the reclaimed land suitable for plantation, with adequate provision for benches and terraces. Secondary blasting of hard strata is totally avoided to prevent excess noise & vibration and degradation of topsoil fertility. Well maintained mining equipments and machines also prevent excess noise and vibration. The mined out area is totally reclaimed with backfilling, plantation and water basins at strategic points for ensuring proper drainage. Afforestation is carried out with selected forest and fruit bearing species in this back filled areas. Care is taken to preserve the natural topography of the virgin area and prevention of soil erosion. These areas, after plantation, are now covered with good vegetation, which is evident from the present scenic greenery of our bauxite mine.

Year	Mined out area rehabilitated during the year	Cumulative area rehabilitated since inception
2016-17	16.26 Ha	295.64 Ha



Bio-diversity Management

NALCO has attached highest importance to the maintenance of bio-diversity around all its operating units. Balance between biodiversity and industry/mines is essential for the very sustenance of the ecology of the area. NALCO has made conscious effort to manage its land and adjacent forest cover and development of green belt at all its operating unit. None of our units are located near any world heritage site. The bauxite mine is not located within 10 km of International Union for Conservation of Nature (IUCN) protected areas or areas of high biodiversity value having risk of direct impact on ecosystem leading to any threat to IUCN Red List Threatened Species. But bio-diversity study has been conducted in the core zone and buffer zone of the bauxite mine by professional agency and also wildlife management plan has been prepared and approved by State Forest Department, details of which are given in next section. The suggested measures for conservation of bio-diversity are implemented. Our bauxite mine is located in a hilly area. By its basic nature bauxite bearing hill top are barren land with only sparse bushes. Due to lack of any forest cover on bauxite hilltops possibility of damage from mining is minimum. However, after taking up mining activities in the bauxite mines, lot of plantation activities have taken place and greenery on hill top has improved. Every year, about 1,00,000 trees consisting of fruit bearing, forest species and economic species, are planted in the Mines and peripheral areas. Our other units i.e. Alumina Refinery, Smelter, CPP and the Port Facilities do not operate in bio-diversity sensitive areas. We have already initiated a vegetation survey for crops and vegetables in the nearby area of our Alumina Refinery.

Afforestation activities & wildlife conservation

The mining lease area has Dry Deciduous Forest (5/DS1) and Dry Deciduous Savannah (5/DS2). However with afforestation the area is full of trees belonging to local species. The afforestation plan has been prepared keeping in view the land use changes that will occur due to mining operation in the core area. The objectives of the restoration plan are to:

- -Reclaim the mined out areas by planting trees which are indigenous in nature;
- -Provide a green belt around the periphery of the mining area to combat the dispersal of dust in the adjoining areas;
- -Prevent propagation of noise
- -Protect the erosion of the soil;
- -Conserve moisture for increasing ground water recharging;
- -Restore the ecology of the area;
- -Restore aesthetic beauty of the locality; and
- -Meet the requirement of fodder, fuel and timber of the local community.

Year	Area covered under plantation during the year in Ha	Total no of trees planted during the year	Cumulative area covered under plantation in Ha	Total no of trees planted Cumulative since inception
2016-17	22.26	1,02,314	1088.94	33,05,454

The wild life management plan is prepared in anticipation of following impacts due to operation of Mine by M/s CEMC, Bhubaneswar.

- Fragmentation of habitat due to conveyor belt, service road and HT power line
- Dust in atmosphere, contributed by mining and associated activities, noise and vibrations due to blasting and operation of the machines may scare wild animals and birds from the nearby forests.
- Lights from mining area during night disturbs the wild animals

As per their survey, the mines lease area (core area) is devoid of tree growth, the vegetation consists of scrub only, which supports only a few small animals. In the core area, there are 5 mammals, 4 reptiles and 9 bird species present. No schedule I species, as per the Wildlife Conservation Act -1972, are present within the core zone. In the buffer zone, there are 16 mammals, 9 reptiles and 29 bird species present out of which, two mammalian species belongs to Schedule-I category. Apart from the above species, there are 6 insects found during our field survey, belonging to different species: three to butterflies, two to crickets and one to grass hopper. Only two Schedule-I mammals (Elephant and Sloth bear) are present in this area.

The following major suggestions have been given in the report by the M/s CEMC, regarding implementation of the wild life management plan.

- Undertake appropriate alternative measures in mine working so as to avoid / minimise or mitigate the adverse impacts on wildlife in and around the mine.
- Maintain / enhance food and cover values in buffer habitats while counterbalancing decimating factors.
- Initiate studies on habitat utilization pattern of the wildlife with a view to strengthen and secure the critical habitat.
- Control depredation by wild animals to generate public support in conservation management and build up synergy in conjunction with regular protection set up.

For Central and North Block, the prepared Wildlife Management Plan has been approved by PCCF(Wildlife), Odisha, Bhubaneswar during 2014. NALCO has made a payment of Rs. 2011.50 lakhs to the State Forest Department in Orissa CAMPA, MoEF&CC towards implementation of the Plan. Besides the above Rs 2,63,07,260/- have been deposited with Orissa CAMPA by NALCO towards Regional Wildlife Management Fund. For South Block, the prepared Wildlife Management Plan has been approved by PCCF(Wildlife), Odisha, Bhubaneswar during 2010. A deposit of Rs 10.43 Crores has been made with CAMPA, MoEF&CC for its implementation. Besides the above Rs 1,37,34,812/- have been deposited with Orissa CAMPA by NALCO towards Regional Wildlife Management Fund. The prepared plans are being implemented by State Forest Department.

NALCO has carried out a study on bio-diversity in and around Panchpatmali Bauxite Mine Central & North Block with Botany Department, Utkal University at a cost of Rs 16,28,000/- . The study has been completed and various suggestions for conservation of bio-diversity are under implementation.

Runoff management and drainage Control

Control measures are being taken to prevent soil erosion and sedimentation of water courses. Garland drains are cut ahead of overburden fronts to curtail the entry of rain water into the mining area. Surface run off water inside the active mining area mostly percolate down through the partially lateritised khondalite substratum and backfilled area and thus help in recharging the perennial streams and ground water. An in-situ peripheral barrier of about 7.5 m width is left around the mine boundary which will not allow silt or soil to egress or overflow to the neighbouring water courses. Nevertheless, check dams and gabion structures have been constructed at strategic locations at foot hill of the Mine to arrest washed outs, if any. The check dams also helps in enhancing the time period of water flow through nallahs and streams of the valley, thereby enhancing the ground water recharge.

Noise and vibration control measures

We adopt all necessary precaution as detailed below to control noise and vibration so that work environment is not vitiated and there is no adverse effect on workers, peripheral villagers and wildlife.

The following control measures are being practiced for reducing the noise levels from mining operations.

- Green belt has been made around the mine lease boundary to screen the noise and also for arresting fugitive dust.
- Plantation has been carried out on backfilled area, and infrastructure facilities, etc to attenuate the noise levels and fugitive dust from mining operations.
- Blasting is done only during noon time. Blasting is avoided during high winds and unfavourable conditions.
- Sharp drill bits are used for drilling of holes to reduce noise generation and dust emission.
- Noise generated due to blasting is impulse type which may be controlled by putting adequate stemming column. Use of noiseless trunk line for bottom initiation is done as such noise from primary blasting are completely eliminated.
- The Noise generated due to blasting operations is being reduced by using NONEL.
- Use of Rock breakers is done for size reduction of oversize boulders thereby avoiding secondary drilling and blasting, which generates irritating noise.
- Cabins of HEMM and other mining equipments like crusher, etc are made sound proof to protect the operators from high noise levels.
- Maintenance and fine tuning of machinery is regularly ensured to reduce undesirable noise.
- Earplugs and earmuffs are provided to the workmen working near high noise generating area like Drills, HEMM, etc.
- Crusher is enclosed to minimise noise generation.
- Limiting the speed of haulage vehicles / tippers used for transportation of mineral and waste.

- Plantation is carried out along the conveyor corridor to attenuate noise generated from conveyor operations.

Control measures for blasting

Following control measures are adopted to control ground vibrations due to blasting:

- To reduce noise /air overpressure as well as ground vibration, deck charging has been recommended for 8m to 10m deep holes.
- Number of holes to be blasted at a time is restricted to 8– 10.
- Proper blast design and optimum use of explosives to reduce fly rocks, over fragmentation, ground vibration and noise.

Vibrations due to blasting is also kept to a minimum by adopting a well designed blasting pattern with sequential blasting by use of delay detonators or by use of NONEL. As per the study conducted by M/s ISM, Dhanbad & M/S CMRI , the blast vibration falls to an unperceivable limit within a distance of 50-60 metres on hill slope. Employees are provided with personal ear protective equipments like earplug, earmuff wherever necessary. Besides NIMH, Nagpur carry out six monthly study of noise and vibration of various equipment and structures inside the Mine for rectification of any abnormal conditions.





**Human Resource
Excellence**

Participative Management

We believe in participative management and interpret it as a shift in the management paradigm from a top-down approach to a more self-facilitated and self-sustained approach accommodative of views and expectation of workers. Employees are given complete freedom to form trade unions and give constructive views on employee related policies, encountered problems and general administration. About, 99% non executive employees are members of the registered Trade Unions. The registered trade union having highest number of members under its fold, decided by secret ballot is declared Recognised union in every unit. We negotiate all matters affecting workers with our recognized unions. All welfare measures for employees are implemented in consultation with recognised unions of all the units. The collective bargaining method of settling employees demand and expectation involving recognised unions result in seamless implementation of mutually arrived decisions. Soliciting constructive suggestion from employees and unions on production related and administrative problems have yielded excellent result culminating in their quick liquidation.

NALCO respects the rights and privileges of the registered trade unions, providing a conducive environment for maintaining good Industrial relations. In NALCO a truly participative management system is formalised by the four layered i.e. Unit level, Complex level, Corporate level (Directors level) and Apex level (CEO level) system of consultation with Recognised Union, creating opportunity for deliberation on issues at various levels depending on their importance. Apart from this shop level joint committees are also very effective in ensuring workers' participation in day to day operation of plant. Trivial issues like job distribution, a breach of safety due to wrong work procedure or problem of a broken machinery is itself get settled by shop level discussion. Different purpose driven consultative bodies are also available to chalk out guideline and extend support to different employee related activities. Canteen committee, Safety Committee, Shop Council, Grievance Committee, Welfare Committee etc are examples of some of the structured forum in this regard. A notice period of 21 days is allowed, as per section 9 of the Industrial Dispute Act of 1947, prior to implementation of any significant operational change. Important policy matters connected to issues like wages, incentives, benefits, etc. are finalised through collective bargaining method. A constructive atmosphere for growth and profitability is maintained by good industrial relation with trade unions. The recognised unions as on 31.03.2017 are

Unit	Name of Recognised Unions
Smelter	Election due for recognition
Captive Power Plant	Election due for recognition
Mines	Nalco Mines Employees Union
Alumina Refinery	Election due for recognition
Corporate Office including Regional Offices	Nalco Employees Forum

Management & Employee Relationship

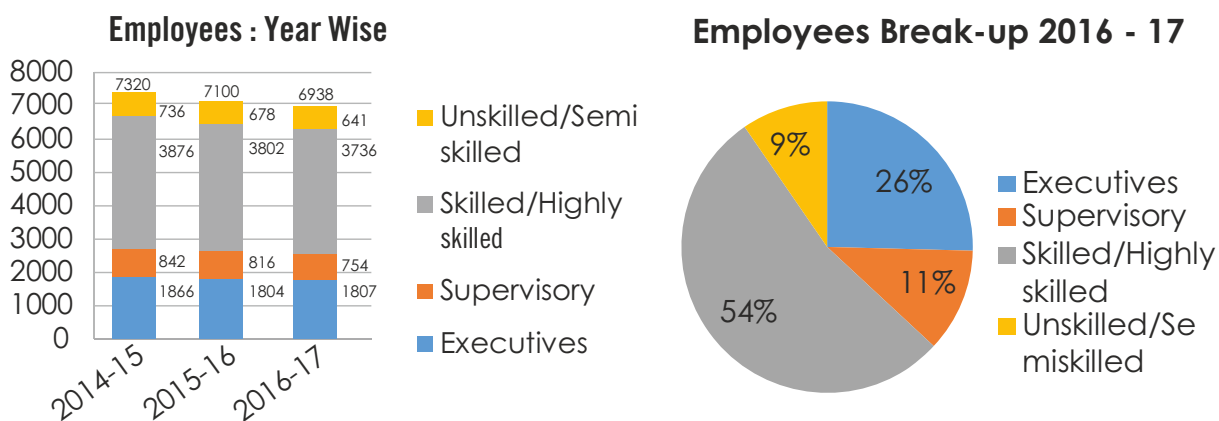
Management employee relationship based on mutual trust and cooperation has created a atmosphere of growth for both. Along with lucrative remuneration, Management extends all possible support to employee to update their skill and knowledge, take welfare measures, plan their

career growth, and extends social security. Company does not discriminate on the basis of cast, creed, gender, religion or area of domicile, extending equal opportunity to all employees. The HR practices championed in the organisation are aimed at attracting, developing and retaining right talent at all levels. A holistic approach to learning & development through external and in house training ensures a rewarding career with ample progress and high level of satisfaction. Catering to higher order needs of employees like recognition, self esteem and self actualisation, motivation level of employees are kept high. Employees in turn reciprocate with dedication and belongingness to organisation, shouldering responsibility and achieving production and profit. Conflicts if any in employee management relationship is resolved across the table by negotiation at different levels depending upon gravity of the issue. HR department of the company act as a bridge between Management and Trade Unions, projecting their views, arranging for negotiation and resolving their genuine grievances. All this has fructified in exemplary employee management relation best illustrated by non occurrence of any strike, lockout or stand off during the reporting period.

Equal Opportunity Employer

At the time of recruitment we do not discriminate amongst applicants on the basis of caste, religion, language, state of domicile or gender. During recruitment we comply all applicable Presidential Directives related to reservation for SC, ST & OBC candidates. Differently able persons are also considered for recruitment under the provision of Persons with the Disabilities Act, 1995. In order to have a control over the implementation of Presidential Directives as well as Government instructions, Liaison Officers for SC/ST/OBC have been appointed to look after the reservation matters for SCs/STs/OBCs as well as Persons with Disabilities (PWD).

As on 31.03.2017, out of 6938 employees on the company's roll, there were 1,129 (16.27%) SCs, 1,278 (18.42%) STs, (11.57%) OBCs and 86 (1.24%) persons with disabilities. The total number of female employees in organization stands at 354.



Total no. of Employees (as on 31/03/2017)

Type of Employees	Male			Female			Total		
	<30	30-45	>45	<30	30-45	>45	<30	30-45	>45
Executives	185	518	1027	18	25	34	203	543	1061
Non-executives	184	1453	3217	20	108	149	204	1561	3366
Total	369	1971	4244	38	133	183	407	2104	4427

Employee's Skill Matrix & Gender Diversity

Total Employees	2014-15			2015-16			2016-17		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Executives	1789	77	1866	1730	74	1804	1730	77	1807
Non Executives	5176	278	5454	5015	281	5296	4854	277	5131
• Supervisory	796	46	842	765	51	816	706	48	754
• Highly skilled /skilled	3747	129	3876	3672	130	3802	3604	132	3736
• Semi-skilled /Unskilled	633	103	736	578	100	678	544	97	641
Total	6965	355	7320	6745	355	7100	6584	354	6938

New hires during the reporting period

New Hires (2016-17)	Male			Female		
	<30	30-45	>45	<30	30-45	>45
Executives	51	7	8	3	1	0
Non Executives	30	19	0	2	2	0
Total	81	26	8	5	3	0

Employee Benefits

Remuneration provided to employees in Nalco is one of the best among similar industries. Different benefits extended to regular employees include medical facilities, leave travel concession, subsidised accommodation, subsidised electricity & water facilities, different allowances, parental leave, pension schemes, cash incentive for acquiring higher qualification, different loans & advances, scholarship for dependant children, social security scheme like NEFAR etc. Company has provision of dedicated fund for different defined benefit schemes like gratuity, pension, provident fund etc. Apart from these direct benefits company also extend many indirect benefits like well developed township, Multipurpose co-operative society, 24 hour security in township, amenity bus service, subsidised canteen etc to its employees. Contract employees are also covered under some benefit schemes such as Provident Fund, Medical benefits, etc. During the year 2016-17, Rs 1537.44 Crore was spent towards employee benefit expenses including salary as opposed to Rs 1,361 Crore spent during 2015-16. Employees at NALCO are a satisfied lot due to proper handling of work and welfare related issues concerning them which is demonstrated by low employee separation from the organization demonstrated below

Defined Benefit Scheme
Provident Fund
Pension Fund
Gratuity
Post Retirement Medical Benefit
Setting in Benefit
Long Service Reward
NEFFARS
Leave Encashment
NALCO Benevolent Fund Scheme
NALCO Retirement Welfare Scheme
Superannuation Gift Scheme

Employee Separation

Reason	Executives		Non Executives		Total
	Male	Female	Male	Female	
Demise	3	0	20	0	23
Resignation	10	1	1	0	12
Superannuation	72	1	166	7	246
Termination/Struck Off	3	0	0	0	3
Total	88	2	187	7	284

Enhancing Competency

Disclosure on Management Approach – Training & Education

Adoption of new technology and use of efficient machineries is key to sustainability in present day industrial scenario which calls for updation of knowledge and enhancement of skills of workers. NALCO gives due weightage to education and training to make our work force conversant with new developments in industry and academics. Dedicated training Dept. operate at both the complexes and centralised training facility exists at our Corporate office catering to needs of employees. Training is imparted for various functional and developmental needs of employees. Training needs of individual employees are evaluated along with the performance evaluation to identify the gap in competency level. Training needs of different departments are collected at the beginning of the year. Organisational needs, Govt. prerogatives etc are also given due consideration. Based on the inputs a training calendar is prepared and people are trained by internal faculty or visiting experts at our training institutes. We also sponsor employees to different professional bodies in India and abroad for trainings depending on requirement. Training on Yoga, meditation, health care, stress relief and relaxation technique, lifestyle management etc are also given to employees for their well being. Training statistics for the reporting year is presented below in a tabular form.

Training statistics 2016-17

Employee Category	No. Of persons trained			Training Man-Days		
	Male	Female	Total	Male	Female	Total
Executives	3041	117	3158	10620	376	10996
Non-Executives	4911	239	5150	8331.5	299	8630.5
Total	7952	356	8308	18951.5	675	19626.5

Employees trained on Human Rights

Employee Category	No. of employees trained		Training Man-Days	
	Male	Female	Male	Female
Executives	17	7	40	19
Non-Executives	7	2	21	6
Total	24	9	61	25

Regular training on vigilance and anticorruption is imparted to employees to build awareness and maintain integrity of the employees. Knowledge of company rules and regulation, CVC guidelines, disciplinary procedure, tendering and procurement procedures and discussion on commonly observed irregularities etc prepares our employees to work transparently without fear or favour. Officers on deputation to vigilance are given specialised training by CBI Institute to function effectively. Specific aspects of vigilance and anticorruption are also included in training modules like tender and contract, finance, taxation etc. Besides talks, seminars and discussions on vigilance related issues are arranged during suitable occasions like Vigilance Awareness week etc. Various circulars of CVC, Ministry and CTE etc. are given wide circulation in the company.

Employees trained on Anti Corruption

Employee Category	No. Of employees trained	Training Man-Days
Executives	48	65
Non-Executives	51	51
Total	99	116

Grievance Redressal Mechanism

To maintain good industrial relation grievances of employees are handled expeditiously in NALCO based on procedural framework. There are separate schemes of formal grievance procedure for executives and non-executives for impartial and unbiased handling of genuine grievances. Under the scheme a grievance committee is formed for non executives taking representatives of the Recognised Union, Management and representative from HRD Dept. An aggrieved employee is supposed to intimate verbally to superior officer about the problem and if not satisfied with decision may submit written request to HOD. If the grievance still persists grievance committee may be approached. Any grievance application received from any employee is scrutinized by the committee and action is being taken to resolve the grievance within the framework of the company policy. In case any grievance could not be solved due to any ambiguity, the concerned employee is counselled with reason of non-action. Likewise an executive can take advantage of three tier arrangement of HOD, Unit Head & Functional Director for redressal of his grievances.



Occupational Health & Safety



Occupational Health & Safety

Disclosure on Management Approach-Occupational Health & Safety

Our Occupational Health and Safety policy available on our website nalcoindia.com is an explicit memorandum of our views regarding two very important aspect of industrial accountability health & safety. Our policy encompass employees, contractual workers, security personnel and peripheral dwellers in its fold ensuring a safe and healthy work environment for all. Dedicated E&S Dept. and occupational Health Centers in all our Units look after safety and occupational health issues. Workers are first casualty of any laxity in safety. Hence their participation in safety is effected through constitution of unit level safety committees who look after day today safety practices and recommend modifications for unsafe work conditions. Adoption of management systems like OSHAS18001 in all our production units further augment our conviction to protect and promote the safety and health of workers through structured and documented interventions. Safety training is a on going affair in all our units and we try to build a culture of safety through training and retraining of our employees. Apart from surveillance and recertification audit of OHSAS18001 we conduct dedicated safety audit and fire audit in all our units periodically. Free medical benefits is a service condition for all our employees. Added to it we conduct periodic medical checkup of all our employees and contractual workers. We have included Behavior Based Safety, an emerging approach towards total safety at work place realized through conditioning of human behavior, in our safety itinerary for preventing human failure leading to accidents at work place.

Occupational Health

Well equipped Occupational Health Centres both at S&P Complex and M&R Complex take care of occupational health of employees and contractual workers. Manned by qualified doctors, paramedics and technicians they continuously track for outbreak of any occupational disease and take remedial measures for prevention of probable occupational diseases. Ergonomics of work place is given due importance to prevent occupational disease in workers. Well equipped hospitals at S&P complex and M&R complex look after any ailment including occupational disease of our employees and their dependant family members. If required employees and their dependants are referred to different Govt. and corporate hospitals depending on situation. Even we extend health care facility to our retired employees and reimburse their medicine and hospitalisation expenses.

Initiatives to improve the overall health of employees and their family members are

- Training programmes on stress management, Yoga & lifestyle etc. are arranged regularly in our training centres at Units and Corporate office.
- Talks on lifestyle diseases like diabetes, hypertension and cardiac diseases are arranged from time to time.
- Signage boards are put up at conspicuous locations cautioning employees about smoking, tobacco and alcohol abuse and drug addiction.

We conduct PME of employees and contractual workers regularly the PME statistics for reporting year is given below :

PME statistics

Unit	Permanent Employees	Contractual Employees
CPP	1158	1856
Smelter	2898	3123
Refinery	1715	1380
Mines	286	07
Total	6057	6366

Safety

In NALCO we comply with all safety regulations in letter and spirit. Safety, Health and Environment Department in every unit looks after the safety requirements of the respective unit under the leadership of a DGM and SH&E Dept. of Corporate office coordinate the activities of Units. In our Mines, Training and Safety Dept. looks after mines safety and implement safety requirements as per the guideline of DGMS. A safety committee formed with representatives from management and workers helps in identification of unsafe areas and practices and suggest corrective action. To increase awareness sufficient number of safety signage are provided at advantageous locations. Safety campaigns are carried out by distribution of handouts and safety badges, playing of skits and use of audio visual medium. Use of safety equipments like helmets, safety shoes, gloves, safety goggles, safety belt etc are enforced depending on nature of work. For executing work at a height and other risky areas requirement of safety clearance is made mandatory. Observance of safety regulations is a contract condition in every major contract and in case of any violation necessary actions like imposition of fine, issue of warning, termination of contract etc are enforced depending on gravity of violation. Record of accidents & near miss cases are maintained and analysed regularly and suitable corrective actions are implemented on priority basis. We take no chance with safety and conduct safety audit as per statutory stipulation and any gap in safety observed during audit is acted upon immediately.

Our safety performance for the reporting period is provided in the attached table :

Unit	Category	Reportable Accidents	Man-days worked	Man-days lost	Man-hours Worked	Lost days Rate	Rate of Injury	Absentee Rate
Smelter Plant	Employees	0	826298	0	6610384	0	0	0
	Contract Labour	0	1303872.5	0	10430980	0	0	0
CPP, Nalco	Employees	0	342394	0	2739152	0	0	0
	Contract Labour	0	566424	0	4531392	0	0	0
Mines	Employees	0	128400	0	1027200	0	0	0
	Contract Labour	0	190779	0	1526232	0	0	0
Alumina Refinery	Employees	0	544159	0	4353272	0	0	0
	Contract Labour	0	480480	0	3843840	0	0	0
Port Facility	Employees	0	12864	0	102912	0	0	0
	Contract Labour	0	27392	0	219136	0	0	0

Safety Awareness and Training

To maintain our culture of safety we provide regular training to regular employees and contractual workers related to their area of work. Behaviour based safety, Safety during handling of hazardous material, Fire fighting, Electrical safety, Safety practices for height work etc. are some of the selected subjects on which training is imparted. Details of safety training imparted to employees is given below.

Category	No. Of employees trained			Training Man-days		
	Male	Female	Total	Male	Female	Total
Executives	79	08	87	156	16	172
Non Executives	193	12	205	298	21	319
Casual Workers			2755			2019
Total			3047			2510

Human Rights

Disclosure of Management Approach – Investment Decision & Human Rights

Respect for Human Right is a key enabler to gain customer confidence for global operation. Starting from our vision and mission all our policies and practices are framed guided by above value. The spirit of human rights, as enshrined in various international conventions and declarations such as; United Nations Universal Declaration of Human Rights and its Protocols, the International Labour Organization's Declaration on Fundamental Principles and Rights at Work and principles of the UN Global Compact, etc are reflected in our Social Accountability Policy, Sustainable Development Policy, and Code of Conduct for top management. We rescind child labour & forced labour in all our operating units and promote non discrimination on the basis of caste, creed, religion, gender and area of domicile. We acknowledge the rights of indigenous people and respect their socio cultural customs and tradition. Our security personnel are trained to respect human right in their day to day work. Implementation of social management standard SA 8000 in all our production units and corporate office has further augmented our stand against violation of human right. Inclusion of human rights related parameters like child labour, forced/ compulsory labour etc. is a contract condition in all major work, procurement & service contracts. This has repealed the chances of human rights violation by our contractors and other service providers.

Policy and Practice

Our commitment towards observance of Human Rights is absolute and our Human Rights practice covers all our employees, contract labours, contractors, suppliers and other service providers. Our pioneer work on social and CSR front also address many human rights issues like right to education, right to health care, right to standard of living etc. The Code of Business Conduct and Ethics for board members and Senior Management, affirms an obligation to protect fundamental human rights and to respect the diversity of cultures. Human Rights practices mandated as per the various applicable statutes i.e. Factories Act 1948, Industrial Disputes Act 1947, Mines Act 1972 etc. are implemented in the company and necessary screening & evaluation is done for suppliers and contractors also. In the job contract conditions, important human rights concerns i.e. child labour, forced and compulsory labour are suitably addressed to restrain any human rights violation. Our units including Corporate Office are certified to SA 8000.

Screenings during projects and procurements

We consider human rights record of beneficiaries before major financial investment decision are taken. Elements of human rights and human dignity are subject of enquiry during finalisation of a new contract. Special care is taken for rehabilitation of displaced persons and indigenous people and restoration of their livelihood. For ensuring protection of human rights and social accountability we have formulated a SA 8000 based questionnaire which helps us in screening all our vendors on various human rights and social accountability aspects such as forced labour, compulsory labour and child labour in all our major contracts. All our agreements and MoUs with foreign bodies are in compliance with UN Declaration on Human Rights. We also do regular monitoring of our existing supplier to verify their adherence to our policies.

Facilitating human rights through trainings

We conduct regular training programs to train our employees on human rights and socially accountable policies. We provide half a day training on SA 8000, covering various aspects of human rights, to our executive and non-executive staff. As on date almost all the executives and most of the non-executives were given awareness about SA 8000.

Community Engagement



Community Care

Disclosure on Management Approach – Local Communities

Social dimension of sustainable development advocates taking genuine care of our major stakeholder ie. the communities in the neighbourhood of operations & to create an enduring positive social impact on the target group. The Corporate Social Responsibility (CSR) Policy and objectives are the guiding beacons for CSR initiatives and specific activities are carried out based on the need assessment carried out directly by the CSR coordination cell, or based on the recommendations of Rehabilitation & Peripheral Development Advisory Committee (RPDAC), or feedbacks received from the CSR arm ie. NALCO Foundation as well as, in accordance with the need projections made by the local people and their representatives regarding their developmental issues pertaining to health, education, infrastructure development and employment generation. Close follow up and monitoring of these projects are done to ensure execution as per plan catering to the genuine needs of the communities.

A Board level, SD and CSR Committee consisting of 4 Independent Directors and 3 Functional Director, directs and oversees the implementation of policy and execution of work. As per the requirements of Companies Act 2013, it is ensured that minimum 2% of our average net profit during the three immediately preceding financial years, is spent on CSR activities in specified areas stipulated under Schedule VII of the Companies Act, 2013, around all our operational areas. The CSR works are carried out directly by NALCO or through NALCO Foundation, a trust created exclusively to look after CSR activities of the company.

CSR initiatives are aimed :

- To play a catalytic role for improving the living standards and quality of life of the community through upliftment of economic status & community care
- To develop the infrastructural facilities to cater to the social and economic need in vicinity of the community
- To provide better health care & health education
- To promote education & literacy
- To promote sanitation and cleanliness
- Plantation and environmental measures
- Promotion of sports & games, arts, crafts & culture

During year 2016-17, Rs 30.01 crore was spent on CSR activities, which is 2.18% of average Net Profit of the three previous financial year. Few major initiatives championed by us are outlined below:

Major CSR initiatives

- As a measure for protection of environment, massive avenue plantation, installation of 50 Kw Roof top Solar System at NALCO Research and Training Center (NRTC), Bhubaneswar and solar street light in eight remote periphery villages of M&R complex, Damanjodi are done
- As a multi stake partner, initiatives for development of Iconic Shrine, Puri and for transforming it to a Swachh Pilgrimage Place is taken up in the Government of India scheme for Swachh Iconic Shrine Development
- Action has been initiated to make eleven (11) villages Open Defecation Free (ODF). Construction of Indian House Hold Toilets (IHHT) have been started in two Villages of mines periphery at Damanjodi.

- Construction of toilets under Swachh Vidyalaya Abhiyan and other purpose in Koraput & Angul districts of Odisha and Vishakhapatnam district of Andhra Pradesh.
- Safe drinking water provision to periphery villages of plants in Koraput, Angul and during Rathayatra at Puri.
- Contribution towards protection of national heritage & culture and development of traditional arts & handicrafts in Koraput & Khurda districts of Odisha.
- Besides we also contribute to Prime Minister's Relief Fund/ Central Govt. Fund for socioeconomic development & welfare of SC, ST, minorities & women and undertake rural development activities and provide skill enhancing training for livelihood support.

Healthcare

Health care is one of the basic area identified for CSR activities, with due consideration of the socioeconomic condition and awareness level of peripheral villagers. In order to provide better health care services in the periphery villages, four Mobile Health Units (MHUs) are operated in M&R complex with support service of Wockhardt Foundation and three Mobile Health Units (MHUs) are operating in S&P Complex, Angul with service of Lions Club. Each MHU is equipped for primary health services to the villagers at their door step including free medicines, diagnostics and much needed awareness building Information, Education, Communication (IEC) activities. The IEC activities discharge yeomen service in terms of building confidence of local people in modern health care freeing them from the clutches of quacks. We have also organized one Specialist OPD center for providing out-patient treatment to people from periphery villages in Angul Sector. The center is functioning with one qualified doctor & supporting para-medical staff. During the year 2016-17, total 1,12,809 patients were provided health-care service through above facility.

Education

In order to bring the tribal students into the main stream of education, Rs 21.32 Crore were spent during the reporting period. Total 755 students from the peripheral villages of Damanjodi and Pottangi mines, are sponsored for formal education in three residential schools ie. Kalinga Institute of Social Science (KISS), Bhubaneswar; Koraput Development Foundation, Jeypore; Bikash Vidyalaya, Koraput. The entire cost pertaining to education, lodging and boarding of the 755 students is borne by the Company. In addition to this, 4129 students from peripheral villages are provided education in company-aided schools at Damanjodi and Angul.

A scheme 'Nalco ra Aliali Jhia' is developed for promoting education of meritorious girls students from weak financial background, in line with the Government initiative on "Beti Bachao & Beti Padhao". Financial assistance of Rs. 6000/- (Rupees Six thousand) per student per year is provided to these students in order to meet their expenses towards uniform and study materials. During the reporting period, 181 such girl students have been supported under this scheme. Under Swachh Bharat and Swachh Vidyalaya Abhiyan, the Company has constructed 473 toilets in different schools within stipulated time against MHRD target of 354 toilets.

Case Study-1

Case study on empowerment of girl child and promotion of education

Scripting a bright future for 'Ladlis of NALCO'

Taking due cognisance of the humane & the compassionate element inherent in the 'BETI BACHAO, BETI PADHAO' scheme of Govt. of India, a unique scheme 'NALCO KILADLI' was designed and implemented with the laudable goal of transforming the life of destitute girl children in the peripheral areas of NALCO by arranging for providing them education free of cost. This initiative to empower girl children through our CSR programme has turned out to become a powerful trigger for bringing in a positive change in the mindset of villagers of Odisha. The success story as continuing is presented below.

NALCO has started a CSR programme 'NALCO KI LADLI' under 'BETI BACHAO, BETI PADHAO' program of Govt. of India, to promote meritorious girl students having minimum 60% marks and belonging to Below Poverty Line (BPL) families, in the schools located in periphery area of NALCO's plants in Damanjodi, Angul and Pottangi in Odisha. The girl children belonging to marginalized section of the society are identified from class 8th, 9th and 10th standard of their higher secondary education.

It was far from an easy job to convince the villagers about the benefits of this initiative as many of the villagers have never been to a school in their childhood, leave alone comprehending the benefits of

continuing education of their daughters. The project managers and members of NALCO's CSR team carried out a baseline study to map the response and convinced the villagers before launching of the initiative. NALCO started the programme with an objective to extend a helping hand to the poor and meritorious students belonging to BPL category, to restrict the high drop-out rate owing to poor financial condition. Under the scheme NALCO is providing monthly stipend /scholarship for meeting the educational expenses of the girl child till they complete class 10th standard.

During 2016-17 total 181 students received assistance under the scheme from Angul & Damanjodi area. 81 students from 25 schools have been identified and provided with financial assistance under the programme at Angul, compared to 32 students identified from 18 schools in Angul, in the preceding year. In coming year, it is planned to extend coverage to more than 50 villages across Angul and Damanjodi enrolling about 250 students. The scheme ensures that the scholarship amount is directly credited to Savings Bank account of beneficiaries through e-transfer. The beneficiaries are exposed to various programmes and co-curricular activities organized by NALCO from time to time, including sports activities, workshops, seminars, celebration of various events, etc.



Hon'ble Ministers at the launch ceremony of NALCO Ki Ladli



Girl child belonging to BPL families receiving accolades for their performance

The 'NALCO KI LADLI' scheme envisages all-round development of girl child and ensures a holistic approach to education. There is a remarkable change in the villages reaping the benefits from this programme. Scepticism & resistance has given way to optimism and a sense of empowerment for these families who have seen their 'ladli's undergo transformational change for a better and brighter tomorrow. Slowly, but surely, the revolution has begun to take shape and NALCO is playing a key role in making their dreams come true.

Case Study-2

Case study on rural development Road of Hope for villagers

The road from Kaniabeda to Kurudol has for long been a major reason for despair and hardships for the villagers due to its dilapidated condition. The lifeline of the area, the 3.45 km linkage road, was an arduous, backbreaking daily chore for the people of 14 villages, heavily dependent on road for their livelihood. Even fire tenders and ambulances get stuck up in this stretch and such emergency services get delayed adding to the misery of the villagers. During rains, the misery of villagers get multiplied driving them to despair. The desperate need of villagers of Kaniabeda, Kurudol, and other nearby villages, was to have a road constructed in this area for the benefit of all. A ray of hope emerged, when local people and their representatives approached NALCO to take up this important project of constructing this road. The Aluminum major, which has been working



**Photograph of the road before work
was taken up by NALCO**



**Photograph
of the road
after
completion
of work by
NALCO**



incessantly for the development of its periphery villages, took the initiative to build the much-awaited road to the satisfaction of villagers. Acting on war-footing, a baseline study was conducted, consent of district administration was taken and NALCO decided to invest Rs. 1.38 crore from its CSR budget. The dream of peripheral villagers got realized and the project was completed providing relief to all. Not only NALCO has helped in improving rural connectivity, but it has shown the way to make a lasting impact in the lives of underprivileged people. Today, more than 30000 people residing in the 14 villages in and around Kaniabeda and Kurudol, use this road, enjoying the ride with a smile on their face, to look forward to a brighter life - a life which can empower them and their children for a better tomorrow.



**Customer
Focus**

Product Responsibility

Disclosure on Management

Approach-Product & Service Labeling

The product information provided on product label is sufficient to define our product in the market and considered to be adequate by the customer to make informed choice . For Aluminium metal, the product grade, stack no., bundle no., net weight is displayed on the product label. In case of Rolled Products, name of the Company & production unit and place, Coil No, Grade, Size (Thickness X Width) in mm, Net Weight (in kgs.), Signature of the inspecting authority, Date of Packaging, No. of sub-stacks and total no. of sheets per packet (for Rolled sheets only) is displayed on the product label. In this regard we comply with all the requirements mandated by the law. Any further information on products, required by customer is furnished to him without any delay.

Consistent manufacturing of products of international standard is our prime achievement on production front which drives market demand for our products both in global and domestic market. Our finished products are alumina and aluminium metal. Physical and chemical properties of both alumina and aluminium are well established to be non detrimental to human health and safety when used properly. Calcined Alumina, produced adhering to internationally acclaimed Metallurgical Grade Alumina Standard and Aluminium satisfying the P1020A specifications benchmarked for London Metal Exchange registration are our set standard for our major products. In the production process of extraction of alumina and smelting of aluminium we take every care for control of pollution, safe disposal and recycling of waste and protection of environment which are presented in detail in environment section of this report. Timely delivery of quality product has created a brand image for our products. Further value addition for our product at the customer end is a hassle free affair due to consistency in quality which demands same process condition and machine setting. Appropriate packaging ensures easy handling and rule out product deterioration during transportation.

We advertise and promote our products responsibly without any misleading information, clearly defining the quality, property and benefits accrued from our products. Our market communications are easily comprehended by customers for its clarity and non ambiguity. We exhibit our products in trade fairs and exhibition etc in a responsible manner without any misleading information on product specification, product use and requirements. We assign due importance to customer privacy and never disclose any sensitive information about production plan, technology or marketing strategy etc. of customer to any outside agency or competitors.

Sustainability aspect of our products are taken care of in the various stages of product life cycle, including sourcing of inputs, production process, transportation and delivery of products etc. Detailed Environment impact assessments, approved Environment Management Plans, Aspect Impact Study, Hazard Identification & Risk Assessment, On Site Emergency Management Plans etc. are implemented at units to address Environmental and Social concerns in respect of our products & processes. By judicious consideration of market dynamics, customer requirements and new developments in technology we plan our product mix. During the last year a new product CH-90 grade Billet (High Speed Extrusion Billet) has been developed and commercialised. Continuous R&D effort for new breakthrough in production process, end use and waste management, has further augmented our effort towards product responsibility. We also build awareness about benefits of use of aluminium in automobile, construction and electrical transmission sector. Use of aluminium in automobile sector reduces weight of vehicle with associated benefit of reduced fuel consumption and reduced emission.

Customer Satisfaction

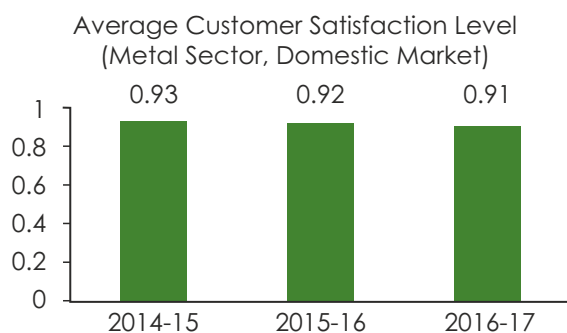
Disclosure on Management Approach – Customer Satisfaction

As a global player in free market economy, the importance of favorable customer perception and enhanced customer satisfaction in boosting up market share and profitability, is well appreciated in NALCO. Our Quality Policy emphasizes adopting internal customer focus as means to external customer satisfaction. Our approach in this regard is reflected in our mission statement "continuously improving on efficiency and business practices thus enhancing value for all stakeholders.". We work relentlessly to win the trust and goodwill of customers for realising our growth story.

It is our constant endeavour to identify the requirements of customer and discover ways to address them. We have established ware houses all over the country from where customer can be supplied with least delivery time and logistics support. To build confidence of customers about timely delivery of required quantity we have adopted the provision of signing MOU with customers for their requirement. Material are despatched to customer based on centralised planning with cost effective delivery made from convenient stockyard. Meeting the needs and expectations of the customer by consistently improving our performance through product innovation and value addition is our chosen path for achieving business excellence and fulfilling other social obligations. Better quality, timely delivery and competitive pricing along with timely redressal of grievances are our intrinsic investment to enhance customer satisfaction. We solicit customer feedback on product quality and our service. The inputs received are used for analysis and improvement of our performance. We have a structured procedure for addressing customer complaints expeditiously to the satisfaction of external customers.

- Customer Complaints pending as on 31.03.2016 : 02
- Customer Complaints received during FY 2016-17 : 16
- Customer Complaints disposed during FY 2016-17 : 14
- Customer Complaints pending as on 31.03.17 : 04
- % Customer Complaints pending as on 31.03.17 : 22.22%

There has not been any case filed by any stakeholder against the company regarding unfair trade practices, irresponsible advertising and anti-competitive behaviour during the last five years



To assess the customer perception about our service we conduct customer satisfaction survey twice a year. Feedbacks received during the survey are analysed for mapping satisfaction index and identifying the lacuna in our customer centric approach. We have been achieving above 90% customersatisfaction index consistently.

GRI sector supplement for Metals and Mining sector

MM1	Amount of land (owned or leased, and managed for production activities or extractive use) disturbed or rehabilitated.
Response	Page No: 60
MM2	The number and percentage of total sites identified as requiring biodiversity management plans according to stated criteria, and the number (percentage) of those sites with plans in place.
Response	Page No: 61,62
MM3	Total amounts of overburden, rock, tailings, and sludges and their associated risks.
Response	Page No : 58
MM4	Number of strikes and lock-outs exceeding one week's duration, by country.
Response	Page No : 67
MM5	Total number of operations taking place in or adjacent to Indigenous Peoples' territories, and number and percentage of operations or sites where there are formal agreements with Indigenous Peoples' communities.
Response	NALCO has only one mining operation at Damanjodi. While setting up its operations all local regulatory requirements have been adhered to.
MM6	Number and description of significant disputes relating to land use, customary rights of local communities and Indigenous Peoples.
Response	There have been no disputes relating to land use, customary rights of local communities and Indigenous Peoples.
MM7	The extent to which grievance mechanisms were used to resolve disputes relating to land use, customary rights of local communities and Indigenous Peoples, and the outcomes.
Response	There have been no disputes relating to land use, customary rights of local communities and Indigenous Peoples.
MM8	Number (and percentage) of Company operating sites where artisanal and small-scale mining (ASM) takes place on, or adjacent to, the site; the associated risks and the actions taken to manage and mitigate these risks.
Response	There are no Company operating sites where artisanal and small-scale mining (ASM) takes place on, or adjacent to, the site.
MM9	Sites where resettlements took place, the number of households resettled in each, and how their livelihoods were affected in the process.
Response	No resettlements took place at any location during the reporting period
MM10	Number and percentage of operations with closure plans.
Response	Page No : 60
MM11	Programs and progress relating to materials stewardship.
Response	Page No: 45,46

GRI G4 Content Index



General Standard Disclosures			
General Standard Disclosures	Page no.	External Assurance	Description
Strategy and Analysis			
G4-1	3,4	-	Statement from the most senior decision-maker of the organization.
Organizational profile			
G4-3	6	-	Name of the organization
G4-4	7,8	-	Primary brands, products, and/or services.
G4-5	6	-	Location of organization's headquarters.
G4-6	6	-	Number of countries where the organization operates, and names of countries with either major operations or that are specifically relevant to the sustainability issues covered in the report.
G4-7	28	-	Nature of ownership and legal form.
G4-8	7	-	Markets served (including geographic breakdown, sectors served, and types of customers/beneficiaries).
G4-9	6, 7, 33, 67	-	Scale of the reporting organization.
G4-10	68	-	The total number of employees by employment contract and gender
G4-11	66	-	The percentage of total employees covered by collective bargaining agreements
G4-12	45,46	-	The organization's supply chain
G4-13	5	-	Significant changes during the reporting period regarding size, structure, or ownership
G4-14	27	-	Whether and how the precautionary approach or principle is addressed by the organization
G4-15	6	-	Externally developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes or which it endorses
G4-16	29	-	Memberships of associations (such as industry associations) and national or international advocacy organizations

General Standard Disclosures	Page no.	External Assurance	Description
Identified Materials Aspects and Boundaries			
G4-17	6,7	-	All entities included in the organization's consolidated financial statements or equivalent documents
G4-18	17,18	-	The process for defining the report content and the Aspect Boundaries
G4-19	18	-	All the material Aspects identified in the process for defining report content
G4-20	18	-	For each material aspect, whether the Aspect is material within the organization
G4-21	18	-	For each material aspect, whether the Aspect is material outside the organization
G4-22	no restatement	-	The effect of any restatements of information provided in previous reports, and the reasons for such restatements
G4-23	17	-	Significant changes from previous reporting periods in the Scope and Aspect Boundaries
Stakeholder Engagement			
G4-24	14,15,16	-	List of stakeholder groups engaged by the organization
G4-25	13	-	Basis for identification and selection of stakeholders with whom to engage
G4-26	14,15,16	-	Organization's approach to stakeholder engagement, including frequency of engagement by type and by stakeholder group,
G4-27	14,15,16	-	Key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to those key topics and concerns, including through its reporting
Report Profile			
G4-28	5	-	Reporting period (such as fiscal or calendar year) for information provided
G4-29	5	-	Date of most recent previous report (if any)
G4-30	5	-	Reporting cycle (such as annual, biennial)
G4-31	5	-	The contact point for questions regarding the report or its contents
G4-32	5	-	The 'in accordance' option the organization has chosen, the GRI Content Index for the chosen option, the reference to the External Assurance Report, if the report has been externally assured
G4-33	5	-	Organization's policy and current practice with regard to seeking external assurance for the report
Governance			
G4-34	20,21,22,23	-	The governance structure of the organization, including committees of the highest governance body
Ethics & Integrity			
G4-56	21,25,26	-	The organization's values, principles, standards and norms of behaviour such as codes of conduct and codes of ethics

Specific Standard Disclosures				
DMA and Indicators	Page no.	omissions	External Assurance	Description
Category : Economic				
Material aspect: Economic Performance				
G4-DMA	32	-	-	Disclosure on Management Approach
G4-EC1	35	-	-	Direct economic value generated and distributed, including revenues, operating costs, employee compensation, donations and other community investments, retained earnings, and payments to capital providers and governments.
Material aspect: Procurement Practices				
G4-DMA	37	-	-	Disclosure on management approach
G4-EC9	37	-	-	Proportion of spending on local suppliers at significant locations of operation
Category: Environmental				
Material aspect: Materials				
G4-DMA	44	-	-	Disclosure on management approach
G4-EN1	45	-	-	Materials used by weight or volume
Material aspect: Energy				
G4-DMA	47	-	-	Disclosure on management approach
G4-EN3	48	-	-	Energy consumption within the Organization
Material aspect: Water				
G4-DMA	51	-	-	Disclosure on management approach
G4-EN8	51	-	-	Total water withdrawal by source
Material aspect: Emission				
G4-DMA	47	-	-	Disclosure on management approach
G4-EN15	48	-	-	Direct greenhouse gas emission
Material aspect: Effluents & Waste				
G4-DMA	57	-	-	Disclosure on management approach
G4-EN23	58	-	-	Total weight of waste by type and disposal method
Category: Social				
Labour practices and Decent Work				
Material aspect: Employment				
G4-DMA	36	-	-	Disclosure on management approach
G4-LA1	68,69	-	-	Total number and rates of new employee hires and employee turnover by age group, gender, and region

Specific Standard Disclosures				
DMA and Indicators	Page no.	omissions	External Assurance	Description
Material aspect: Occupational Health and Safety				
G4-DMA	72	-	-	Disclosure on management approach
G4-LA6	73	-	-	Rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities by region and gender.
Material aspect: Training and Education				
G4-DMA	69	-	-	Disclosure on management approach
G4-LA9	69	-	-	Average hours of training per year per employee by gender and by employee category.
Human Rights				
Material aspect: Investment				
G4-DMA	74	-	-	Disclosure on management approach
G4-HR1	74	-	-	Percentage and total number of significant investment agreements and contracts that include human rights clauses or that have undergone human rights screening.
Society				
Material aspect: Local Communities				
G4-DMA	76	-	-	Disclosure on management approach
G4-S01	76,77	-	-	Percentage of operations with implemented local community engagement, impact assessments, and development programs.
Product responsibility				
Material aspect: product and Service Labelling				
G4-DMA	81	-	-	Disclosure on management approach
G4-PR5	82	-	-	Results of surveys measuring customer satisfaction.

