

Driving the wheel of progress



7th Sustainable
Development Report
2017-18

In Accordance GRI Standards - 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.



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About the Report

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As a responsible Corporate Citizen, National Aluminium Company Limited (NALCO) is committed to remain economically robust while protecting the environment and transforming the society around its locations. NALCO intends to play a pivotal role in overcoming the challenges faced by society and to establish a positive, long lasting relationship with the communities. Sustainable Development is integral to our ethos and we are committed to excel on our Triple Bottom Line performance. Annual reporting on sustainability has commenced in NALCO since 2011-12 and the first report was prepared based on the National Voluntary Guidelines of Government of India. From subsequent years, reports on annual basis as a standalone document, are being prepared based on applicable reporting framework of the Global Reporting Initiative (GRI). Since 2014-15, we are reporting our Sustainable Development performance, based on the GRI- G4 Guidelines. The present Report is the 7th Annual Sustainability Report for the reporting period of the financial year 2017-18, i.e. April 1, 2017 to March 31, 2018 and is based on Global Reporting Initiative (GRI) Standards 'in accordance' Core option to highlight our performance on various aspects of Sustainable Development in a structured manner.

This report aims to appraise our stakeholders clearly about the applicable materiality issues, sustainability strategies, performance indices, major organizational achievements, difficulties and challenges and the steps taken to address the stakeholder concerns. NALCO continues to strive for a deeper and wider understanding of its stakeholders, innovating new modes of engagement and defining a clear way forward in line with its sustainability strategy.

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 topics found material in a structured materiality analysis exercise. Considering the impact, some topics which are not material are also covered to the required extent. The material topics boundary is appropriately mentioned in the report. Due care is taken to collect & present required data keeping in view the requirements of GRI-Standards so that a transparent & balance picture of our performance can be presented in the report. No third-party assurance is felt to be 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 in the area of sustainable development.

Care is also taken to present data based on credible measurements. Wherever actual measurement is not feasible, 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. To ensure comparison, the content presents a historical series of three fiscal years, wherever applicable.

Quantitative data has been represented in the metric system and the currency has been reported as Indian National Rupees (₹). The report adheres to the reporting principles of GRI Reporting Guidelines addressing 3 principles of Accountability as per AA1000 APS-2008 namely, materiality, stakeholder inclusiveness, sustainability context and completeness.



A panoramic view of CPP

CMD Message

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Dear Stakeholders,

It is with great pleasure and satisfaction that I present the 7th edition of SD Report of NALCO encompassing our initiatives in the sustainability front during 2017-18.

We understand the human civilization is passing through the most critical juncture in view of the threat posed by global warming and climate change which requires urgent and effective steps by all, especially the business organizations. Global warming is having significant and costly impacts which will only intensify as the planet's temperature continues to rise.

NALCO is aware of the enormity of the phenomena and its measured response as a corporate citizen. Against this backdrop, it gives me immense pleasure to present the Sustainability Report for 2017-18, prepared based on Global Reporting Initiative (GRI) Standards, showcasing various facets of our Sustainable Development efforts which include significant efforts in economic, environment and social areas. The report details our efforts towards mitigating the climate change risk through focused actions like strong push for increasing the share of renewable energy, fly-ash utilization, water recycling and conservation, sustainable mining, energy, water and mineral conservation. We are in the process of augmenting our wind power generation capacity from 198.40 Mw to 223.90 Mw by adding another wind farm of capacity 25.5 Mw at Kayathar, Tamil Nadu at a capital expenditure of ₹ 163 crores. Three Roof-top Solar Photo - Voltaic Plants of a total capacity of 310 Kwp, are operating at different locations, with 320 Kwp Rooftop Solar Power Project at NRTC being in pipeline.

On economic front, the estimated growth of the global economy in the year and 2018 has been 3.7% and the growth forecasts for 2019 & 2020 are above 3.5% which opens huge opportunities for sustainable development of business organizations. There is near unanimity among the institutions and experts that Indian economy is bound to expand with resilience and the IMF forecast of growth is at 7.8% in FY19. Over the medium term, growth is expected to steadily rise with continued implementation of structural reforms that raise productivity and incentivize private investment. Increased urbanization & expanding middle-class with disposable income along with Govt. efforts for Make in India, construction, transportation, rural electrification, Housing for all, Smart Cities, introduction of electric vehicles (EVs) and the drive to move towards a low carbon economy is expected to increase domestic demand of aluminum to 7 million tons by 2022-23.

I am happy to share with you the fact that for the last three years, NALCO has been registering continuous growth in all parameters of performance like production, productivity, profit and profitability. From year 2015-16 to year 2017-18 the Bauxite production increased from 63 lakhs Mt to 70 lakhs Mt, Alumina Hydrate from 19.5 lakhs Mt to 21.05 lakhs Mt, Aluminium from 3.7 lakhs Mt to 4.26 lakhs Mt, Net sales from ₹.6703 crore to ₹.9376 Crore, PAT from ₹.731 Cr to ₹.1342 Cr and dividend payment from 40 % to 114%. To keep abreast of National agenda for increased economic activity and for capacity expansion and entry into new ventures special drive is taken to enhance the Capex spending over last three years which reached more than a double figure of ₹.1080 Cr in 2017-18 from ₹.452 Cr in 2015-16.

Climate Change is the biggest risk to humanity- World Economic Forum

Our renewable energy being 224 Mw of wind power with 310 Kwp of Solar Power and growing

Domestic demand of Aluminium is expected to increase to 7 million tonnes by 2022-23

We are the lowest cost producer of Alumina in the world for last two successive years

Due to its inherent properties, Aluminium possesses bright growth prospects in a variety of areas like transportation sector, auto industry, high-speed rail systems, aerospace, defense applications and housing and construction sectors. To harness the new opportunities and meet the challenges of future, a new set of Vision, Mission and Values of the Company have been crafted to move forward in a direction which will ensure steady growth and minimize the adverse impact of commodity cycle on the profitability. The new business initiative includes growth through expansion in core business, forward integration through value addition, downstream facilities, selective diversification and backward integration for raw material securitization, based on an in-depth study of industries and economic outlook, opportunities arising out of emerging business scenario and Company's core capabilities. Our new long-term corporate plan envisages 3 years action plan, 7 years strategy and 15 years vision for progressive growth of the Company.

Our new Corporate Plan envisages action plans, strategies and vision for sustainable growth

NALCO, HCL and MECL, the three CPSEs under the Ministry of Mines, Government of India have signed an MoU in Sept 2017 to set up a JV Company named Khanij Bidesh India Limited (KABIL) to identify, acquire, develop, process and make commercial use of strategic minerals in overseas locations for supply in India and thus boost "Make in India" initiative of Government of India.

KABIL JV to boost Make in India

NALCO has shouldered its responsibilities to communities through its CSR programs which are overseen by Board Sub-committee on CSR & Sustainability. During the financial year 2017-18, a total amount ₹ 29.01 crores has been spent for CSR activities. Some of the major activities are sponsoring 812 students from periphery residential schools, sponsoring education of 277 nos. of girl students, financial assistance for infrastructure development of Sunabeda Deaf School and "Desire Society" at Vizag, 3,191 Mobile Health Camps treating 1.38 lakh patients.

₹ 29.01 Crores spent on Corporate Social Responsibility schemes

NALCO gives utmost importance to Safety and Occupational Health and is committed to maintain sustainable work environment across all its production units through well-crafted policies, systems and procedures. We strive for beyond compliance towards all the applicable statutes under Safety and Occupational Health and Environmental regulations. Driven by the goal of zero accidents we ensure adherence to safety norms and achieve continual improvement in the areas of safety, health, ergonomics, stress control, working environment.

We aim at Zero accidents

In order to enhance the functional and behavioral competency of its employees and to align the individual need with the holistic objective of the organization towards increasing production and productivity as well as to improve business culture in the organization, there has been an all-out effort by the Company to impart skill and behavioral training to its employees. In its commitment for social accountability and good corporate governance, the company also imparts skill development training to contract workers, apprentices, students from managerial and technical institutes as well as local populations. As regards regular employees, the Company has 16,244.5 training man-days for the year 2017-18. Our people are our greatest asset which is amply reflected by our superlative achievement of profit figures of 2017-18 which doubled to ₹ 1342.19 crores vis-a-vis that of ₹ 667.72 crores in 2016-17. We care and nurture this key asset in a compassionate manner.

We doubled our profits in 2017-18 enabled by competency and capability building efforts

The NALCO collective is geared up to take up the challenges of the sustainable development and achieving triple bottom line excellence. The rewarding and fulfilling journey of adding superior value to all the stakeholders continues with a sense of purpose and vigour.

The Sustainable Development Journey continues



Dr. Tapan Kumar Chand

CMD

Sustainability Strategy

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Driven by our Vision, Mission and Core Values, our sustainability strategy is based on the premise that value is delivered for the business and the stakeholders throughout the life cycle of aluminium. We are driven by the seminal definition of Sustainability "Meeting the needs of the present without compromising the needs of the future" is our sustainability ethos, which requires that we understand and effectively manage our broad profile

of social and environmental risks. Sustainability – serving as a catalyst for local economic development through transparent and effective stakeholder engagement and as responsible stewards of the environment – is a deeply ingrained principle that guides our actions and supports our purpose to create value and improve lives through sustainable and responsible corporate citizenship.



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



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

Benefitting Stakeholders

We provide our customers, suppliers and other stakeholders with utmost level of value, service and satisfaction.

Excellence and quality

We ensure that our products, manufacturing & business processes adhere to the highest quality levels and standards.

Sustainability

We relentlessly pursue sustainable practices and create a positive impact on the communities we engage with.

Trust & Integrity

We conduct ourselves with dignity, integrity, equity, transparency and accountability to build trust.

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 stakeholders.
- 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 utilization; 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.

Sustainability management is an integral part of NALCO business strategy. We leverage business opportunities, minimize risks and seek to overcome social, environmental and business challenges such as scarcity of resources, operational efficiency, competition, market fluctuations, energy intensity, water consumption, safety, social issues and climate change at an early stage. We continuously strive to improve our sustainability performance by further refining our strategy & defining it more precisely. To this end, we have established a company-wide strategy cascaded to our economic, environment and social strategy. We review our sustainability targets annually and adjust them as required. In doing so, we also take the changing requirements of our stakeholders into account.

Responsible Mining

At NALCO sustainable bauxite mining for aluminium production is a priority as open cast mining involves breaking up of a large area for excavation with consequent 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 proper mining equipment, adherence to scientific mining and mine closure 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. Secondary blasting of hard strata is totally avoided to prevent excess noise & vibration and degradation of topsoil fertility. Well maintained mining equipment and machines also prevent excess noise and

vibration. The ore haulage to the primary crusher is through properly wetted haul roads.

Respective functions at Corporate, mines and plants have been earmarked responsibility to improve the performance in their sustainability related areas. .

Achievements

- Highest since inception Bauxite excavation of 70.84 lakh Mt during the year registering a growth of 3.8% over last year.
- Alumina Refinery achieved 100% normative capacity with production of 21.06 lakh Mt Alumina Hydrate.
- Calcined Alumina of 21.11 lakh Mt during the year is highest ever since inception registering a growth of 3.9% over last year.
- Steam Generation Plant (SGP) of Alumina Refinery achieved highest ever net power generation of 484 MU registering a growth of 6.9 % over last year.
- The plant also achieved record ash utilization of 103.5% against 100% achieved last year.
- Aluminium Smelter achieved highest cast metal production of 4.26 lakh Mt in last 7 years, registering a growth of 9.8 % over last year.
- CPP achieved 'Net Power Generation' of 6,547 MU, registering a growth of 7.9 % over previous year.
- 4 wind power units at different locations of the Country have generated 252 MU against 206 MU generated last year, registering a growth of 22%.



Mining activities at Panchpatmali

MoU Performance

Controlling Ministry i.e. Ministry of Mines signs MoU with NALCO, setting targets for different financial, operational and developmental parameters to build accountability and boost

performance. In the reporting year NALCO is rated "Very Good" for its performance evaluated based on factors of signed MoU with Ministry.

Performance evaluation for FY 2017-18								
w.r.t. The MoU Signed with Ministry of Mines								
	Performance Indicators	Unit	Annual Target 2017-18					
			Excellent	V. Good	Good	Fair	Poor	Actual Achievement
Compulsory Parameters: Financial Performance Criteria								
i.	Operating Profit		2.25	2.00	1.75	1.50	1.00	9.64
	Operating profit/ Revenue from Operations	%						
ii.	Return on investment:		2.90	2.50	2.25	2.00	1.75	13.04
	PAT / Average Net Worth	%						
Optional Parameters								
1	Capacity Utilisation							
	Alumina Refinery: Production of Alumina Hydrate	Lakh Mt	21.0	20.4	20.0	19.5	19.0	21.06
	Aluminium Smelter: Production of Aluminium	Lakh Mt	4.40	4.20	4.00	3.80	3.60	4.26
2	Production Efficiency Parameter							
	Reduction in Specific Electrical energy consumption in Hydrate production, Refinery over previous year	%	0.90	0.80	0.60	0.40	0.20	1.39
3	Reduction in C P Coke Consumption, Smelter over previous year	%	0.90	0.80	0.60	0.40	0.20	0.91
	Inventory of finished goods and work in progress to Revenue from operations (Net)	No of Days	24	26	28	30	32	19.44
4	HRM Related Parameters							
	Talent Management and career progression by imparting at least one-week training in Centre of Excellence e.g. IITs, IIMs, NITs, ICAI etc.	% of executives	7.50	7.00	6.50	6.00	5.50	8.63



Indian delegation at PDAC-2018

Organisation Profile

102-1 to 102-13

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Activities, brands, products, and services

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National Aluminium Company Limited (NALCO) is a Navratna CPSE under Ministry of Mines. It was established on 7th January 1981 in the Public Sector, with its registered office at Bhubaneswar. The Company is a group 'A' CPSE, having integrated and diversified operations in mining, metal and power with Revenue from Operations of ₹ 9,618.31 crores in financial year 2017-18.

Name of the organization

102-1

National Aluminium Company Limited

Products	Application and Use
Aluminium Products- Standard Ingots, Alloy Ingots, T-Ingots, Sow Ingots, Billets, Wire rods, Cold-rolled coils and sheet, Chequered sheet, foil stock, fan-blade stock	<ul style="list-style-type: none"> • Ingots used for re-melting and casting and processing to various end-products • 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.
Alumina products- Calcined Alumina, Alumina Hydrate, 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 alumina 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
Power	<ul style="list-style-type: none"> • Thermal, Cogeneration, wind and solar

Location of headquarters

102-3

NALCO Limited, Nalco Bhawan, Nayapalli, Bhubaneswar-751013, Odisha, India, Website: www.nalcoindia.co.in



Corporate Office, NALCO, Bhubaneswar

Location of operations

102-4

NALCO is one of the largest integrated Bauxite-Alumina-Aluminium- Power Complex at Panchpatmali, in the Country. The Company has a 68.25 lakh TPA Bauxite both in Mine & 21 Lakh TPA Normative capacity Alumina Refinery located at Damanjodi in Koraput district 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, Visakhapatnam of Andhra Pradesh for export of Alumina/Aluminium and import of caustic soda. It also utilizes the facilities at Kolkata Port, West Bengal and Paradeep Port, Odisha. The Company has registered sales offices in Delhi, Kolkata, Mumbai, Chennai and Bangalore and nine operating stockyards at various locations in the Country to facilitate domestic sales.



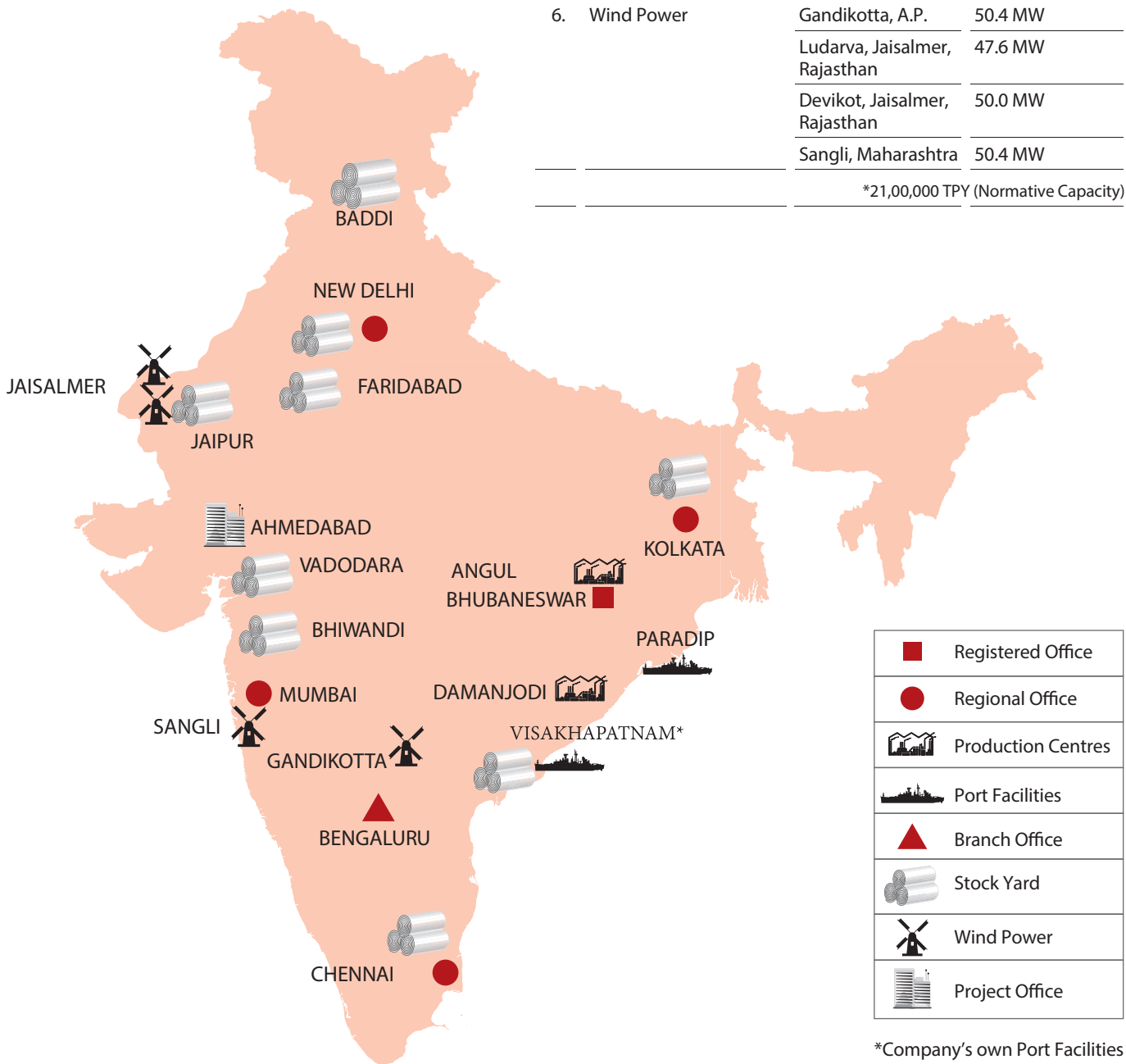
A birds eye-view of Alumina Refinery, Damanjodi



Overview of Smelter Plant

Location Map & Installed Capacities

1.	Bauxite Mines	Panchpatmali	68,25,000 TPY
2.	Alumina Refinery	Damanjodi	22,75,000 TPY*
3.	Smelter Plant	Angul	4,60,000 TPY
4.	Captive Power Plant	Angul	1,200 MW
5.	Port Facilities	Visakhapatnam	14,00,000 TPY (Alumina Export / Caustic Soda Lye Import)
6.	Wind Power	Gandikota, A.P.	50.4 MW
		Ludarva, Jaisalmer, Rajasthan	47.6 MW
		Devikot, Jaisalmer, Rajasthan	50.0 MW
		Sangli, Maharashtra	50.4 MW
			*21,00,000 TPY (Normative Capacity)



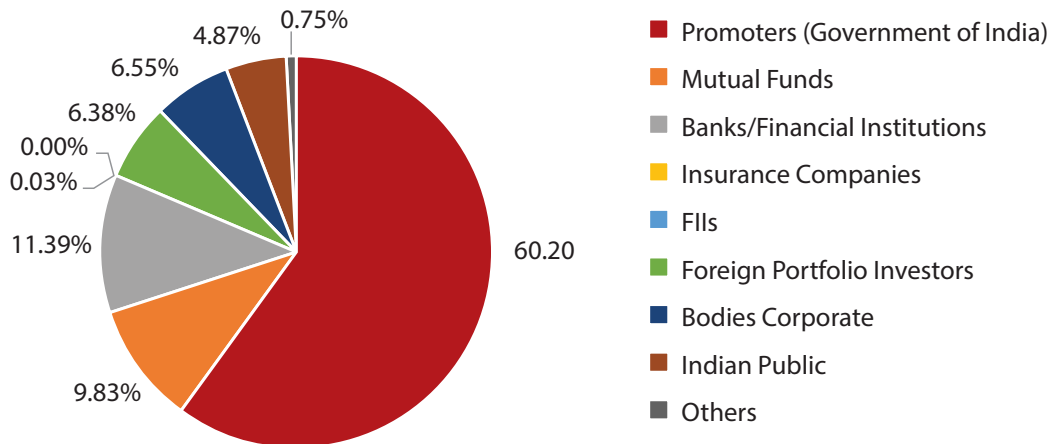
*Company's own Port Facilities

Ownership and legal form

102-5

The shareholding pattern of NALCO as on March 31, 2018 is given below. The Govt. of India holds 1163717107 equity shares (60.2%).

Shareholding Profile as on 31.03.2018



Sl. No.	Category	No of Shares	Percentage of Share Holding.
1	Promoters (Government of India)	1163717107	60.20%
2	Mutual Funds	189959452	9.83%
3	Banks/ Financial Institutions	22,00,71,816	11.39%
4	Insurance Companies	1,600	0.00%
5	FII's	612252	0.03%
6	Foreign Portfolio Investors	123261362	6.38%
7	Bodies Corporate	12,66,85,292	6.55%
8	Indian Public	94214280	4.87%
9	Others	14405723	0.75%
TOTAL		1932928884	100



NALCO hands over interim dividend to Union Minister of Mines for FY 2017-18

Markets served

102-6

During the FY 2017-18, the following Aluminium markets were catered to by the company (in addition to India): Bangladesh, Malaysia, Singapore.

Calcined Alumina produced in excess of the Company's own requirement is exported. During FY 2017-18, the following Alumina markets were catered to by the company (in addition to India): China, Egypt, Iran, UAE, Oman, Qatar and Malaysia.

Scale of the organization

102-7

SI	Particulars	Units	2015-16	2016-17	2017-18
1	Production				
	Bauxite	Mt	63,40,142	68,25,000	70,25,109
	Alumina Hydrate	Mt	19,53,000	21,00,100	21,05,500
	Aluminium	Mt	3,72,183	3,87,422	4,25,515
	Power (net)	MU	5,841	6,066	6,547
	Wind Power	MU	156	198	243
2	Export Sales				
	Alumina	Mt	11,74,224	12,43,103	12,76,715
	Aluminium	Mt	94,671	1,00,591	75,847
3	Domestic Sales				
	Alumina, Hydrate and Other Chemicals	Mt	45,702	51,797	60,641
	Aluminium	Mt	2,77,753	2,84,926	3,50,469
	Power (net)	MU	31	30	24
	Wind Power	MU	156	206	252

Information on employees and other workers

102-8

Permanent Employees (As on 31.03.2018)
By gender & By Age Group

Employees	Nos.	Percentage
Males	6410	94.60
Females	366	5.40
Total	6776	100.00

Age Group (Years)	No. of Employees	Percentage
< 30	412	6.08
30 - 45	2028	29.93
> 45	4336	63.99

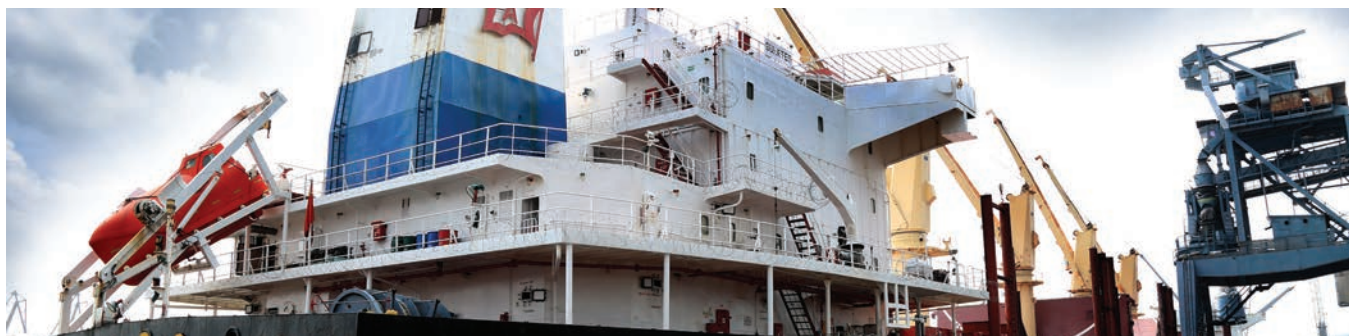
Supply chain

102-9

Supply chain is a vital integrated and extended sustainability enabler of NALCO operating in a structured manner leading to creation of livelihoods for small scale units. NALCO is committed for better value chain and inclusiveness of suppliers for resource usage (energy, water, raw material) to reduce during sourcing/ production/ distribution through entire supply chain.

Sustainable sourcing of bauxite, our most important raw material, is ensured through our captive mines and adopting sustainable mining practices. Electricity for smelting is sourced from Captive Power Plant located close to Smelter, ensuring continuous supply of power with minimum transmission loss. Bulk purchase of Coal for our Captive Power Plant (CPP) is sourced from Mines

of Mahanadi Coal Fields located a few kilometres away. Coal availability is ensured through long term Fuel Supply Agreement and Bridge Linkage. Any shortfall in coal supply is made up with procurement of coal through, e-auction route. Other major raw materials like Aluminium Fluoride, Caustic Soda, C.T Pitch, CP Coke & Lime etc. are procured through multiple vendors. Our own railway siding and port facility complete with fully mechanized loading and unloading system facilitate sourcing of above input materials. Engagement of multiple suppliers for important raw materials ensures availability of critical raw materials at the time of scarcity. Location of bauxite mine and coal mines near our production facility and dedicated transportation systems like cable belt for bauxite and merry go round railway system for coal addresses sustainability issues in transportation.



Port facility at Vishakhapatnam

Significant changes to the organization and its supply chain

102-10

NALCO has signed an MoU with Neelanchal Ispat Nigam Ltd. (NINL) to set up a Coal Tar Distillation plant of 20,000 TPA capacity based on the Coal Tar generated in NINL's Coke Oven Plant for production of liquid CT Pitch and supply to Smelter plant for own consumption.

NALCO, under the Ministry of Mines, Government of India has signed an MoU in Sept, 2017 to set up a JV Company Khanij Bidesh India Limited (KABIL) to identify, acquire, develop, process and make commercial use of strategic minerals in overseas locations for supply in India and thus boost "Make in India" initiative of Government of India. NALCO has formed a JV Company, GACL-NALCO Alkalies & Chemical Pvt. Ltd.(GNAL) with GACL(A Gujarat Govt. promoted company) for setting up a 2.67 Lakh TPA Caustic Soda Plant at Dahej-II in Baruch district, Gujarat. The commissioning of plant expected by April 2020. However presently there has been no significant change in the organisation and its supply chain.

Precautionary Principle or approach

102-11

The Sustainable Development (SD) Policy at NALCO addresses the essence of the 9 National Voluntary Guidelines (NVG) principles. **The SD Policy is approved by the Board & signed by CMD** and implementation of the same is done by operating Management Systems conforming to International Standards i.e. **ISO 9001, ISO 14001, ISO 50001, OHSAS 18001 & the SA 8000 standard.** **Vision, Mission and Core Values** touch upon the essential elements required to drive sustainability in the organisation. All the five Management Systems are subjected to periodic external audits by independent Certification Bodies besides regular internal audits. Internal audits, statutory audits are also regularly conducted covering financial aspects.

The Company has a Risk Management Policy, which inter-alia incorporates guidelines issued by Government of India from time to time. Risk Management is under taken as a part of normal business practice and that as separate tasks at set time. The Company has a Risk Management Committee at Board level. The Committee reviews the exceptional Risk Reports and

advise remedial measures from time to time. The risk mitigation measures are periodically reviewed to ensure that executive management controls risk through means of a properly defined frame work. Periodical review is made to identify new risk areas along with mitigation plans. For the identified risks, the nominated risk officers maintain risk registers in prescribed format which are also overviewed by Internal Auditors of the Company as well as at senior management level. Deviations, if any, are reported to the Risk Management Committee and Board. So far there is no risk prevailing in the Company during the year which is likely to threaten the functioning of business of the Company.

The policies, manuals, guidelines implemented at NALCO are "Code of Business Conduct and Ethics" for board members and senior management, Fraud Prevention Policy, Whistle Blower Policy, Delegation of Power, Vigilance Manual, Marketing Guidelines, Purchase Manual, Contracts manual, Stores Manual, Independent External Monitor Policy, CDA/IDA Rules applicable to all executives, Standing Order applicable to all non-executive employees., Environment Policy, OHSAS Policy, HR Manual, Social Accountability Policy, Core Values "BEST", CSR Policy and Quality Policy.

Any 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.

External initiatives

102-12

In line with Listing Obligation and Disclosure Requirements (LODR) 2015, NALCO prepares Business Responsibility Report (BRR) describing the initiatives taken by the company from Environment, Social and Governance perspective Vis-a-vis. 9 National Voluntary Guidelines. Business Responsibility (BR) Report, which is mandatory as per SEBI requirements, is prepared based on the National Voluntary Guidelines and is published on annual basis as part of Annual Report.

Indian Bureau of Mines (IBM), a Government of India (GoI) body, is engaged in promotion of systematic and sustainable development of mineral resources of the country through regulatory inspections of the mines, approval of mining plans and environment management plans to ensure minimal adverse impact on environment. IBM sustainability framework and their audit/inspection facilitate the sustainability practices of NALCO



Indo-Italian Metal Hub organised by Aluminium Association of India

Bauxite mine. Panchpatmali Bauxite Mines received 5-Star Rating under Star Rating System of IBM for implementation of Sustainable Development Framework for the year 2016-17 at the 3rd National Conclave on Mines and Minerals held at New Delhi by IBM on 20th March 2018.

Membership of associations

102-13

NALCO is a member of various trade chambers / associations. Few of the major ones are listed below:

- Aluminium Association of India
- Standing Conference of Public Enterprise (SCOPE), New Delhi
- Federation of Indian Mineral Industries (FIMI), New Delhi.
- National Safety Council, Mumbai
- Quality Circle Forum of India, Secunderabad
- Indian Ceramic Society, Kolkata
- Confederation of Indian Industry (CII), New Delhi
- Utkal Chamber of Commerce & Industries, Bhubaneswar
- Engineering Export Promotion Council, Kolkata
- Federation of Indian Export Organisation, New Delhi
- International Chamber of Commerce, Delhi
- Chemical and Allied Products Export Promotion Council, Kolkata

Awards & Accolades

The details of awards received by the Company are as follows: -

- a) Prestigious SCOPE Award for Excellence and Outstanding Contribution to Public Sector Management – Institutional Category I (Maharatna & Navratna PSEs). Also received another award for meritorious performance in CSR. Your Company is



Best CEO Award

one of the top two Navratna/Maharatna companies receiving double prestigious awards.

- b) Appreciation Award in large mines category at CII Eastern Region Safety Health & Environment Excellence Awards 2016-17 to Panchpatmali bauxite mine.
- c) EEPC Silver Trophy, in the Large Enterprise category, for its outstanding export performance during the year 2014-15.
- d) Smelter Plant of your Company has bagged the National Energy Conservation Award in Aluminium Sector for the year 2017.
- e) Four prizes to Panchpatmali bauxite mine in inter-mines competitions held during the Half-yearly Safety Week Celebration of "Odisha Metalliferous Mines Safety Week Celebration Committee 2017-18".
- f) Best Exporter Award for the year 2015-16, under metallurgical products category at the State Export Award Ceremony.
- g) Kalinga Safety Award (Silver) for the year 2016 to Alumina Refinery during Odisha State Safety Conclave-2017.
- h) Five Star Rated Mines to Panchpatmali Bauxite Mines for exemplary performance in implementation of Sustainable Development Framework during 2016-17.
- i) Best PSU Award in the 'Brands of Odisha: Pride of India', the Corporate Excellence Awards, instituted by leading Odia daily 'The Sambad'.
- j) State Safety Award for "Lowest Weighted Frequency Rate of Accidents for the performance Year 2016" to NALCO's Alumina Refinery.
- k) Award to Alumina Refinery for "Efficient Use of Fly Ash" by Mission Energy Foundation in the 7th edition of "Fly Ash Utilization Conference Expo Award - 2018".
- l) Kalinga CSR Award for the year 2016 during the 2nd National Seminar on 'CSR Initiatives'.
- m) National Business Leadership Award for CPSE in recognition of the outstanding achievements in Business and Social Service.
- n) Best CEO Award to Dr. Tapan Kumar Chand, CMD for promoting probity, integrity, transparency and inclusive growth during the two-day 17th Annual Geomintech Conference.
- o) Corporate Governance Award to Dr. Tapan Kumar Chand, CMD at 21st International Conference on Non-ferrous Minerals & Metals.

Ethics and Integrity

102-16 to 102-17

Values, principles, standards, and norms of behaviour

102-16

Company's philosophy

NALCO, a Navratna Company, believes in financial prudence, customer satisfaction, transparency, accountability and commitment to values. The Company's Good Governance practices, based on its stated belief and the guidelines of the Government of India issued from time to time, shall go a long way in enhancing value for all those who are associated with the Company: shareholders, customers, suppliers, creditors, Government of India, State Governments, Governmental agencies/ departments and the society at large.

Policies and Manuals

Due diligence has been carried out in developing extensive set of manuals in a wide area of the organizational activities which include Code of Business Conduct and Ethics for senior management, vigilance, marketing, purchase, delegation of power etc. These manuals clearly define the dos and don'ts of the activities to be carried out. This set of manuals helps in ensuring the ethics and integrity in the organization.

Policies, Manuals, Documents	
1	Code of Business Conduct and Ethics for Board Members and Senior Management: https://nalcoindia.com/wp-content/uploads/2018/12/CodeofConduct.pdf
2	Fraud prevention policy https://nalcoindia.com/wp-content/uploads/2018/12/Nalcofraudpreventionpolicy.pdf
3	Whistle blower policy https://nalcoindia.com/wp-content/uploads/2018/12/Whistleblowerpolicy_nalco.pdf
4	Delegation of Power
5	Vigilance Manual
6	Marketing Guidelines
7	Purchase Manual
8	Contracts Manual https://nalcoindia.com/wp-content/uploads/2019/01/CONTRACT-MANUAL-2013-updated-till-15-03-2019.pdf
9	Stores Manual
10	Independent External Monitor Policy

Efforts for inculcating ethical behaviour at all levels are made starting from policy formulation & implementation followed by strong monitoring and follow-up activities. The Sustainable Development Policy and Core Values reflect our commitment towards integrity, ethical practices and transparency. Ethical behaviour in business practices is also further reinforced by additional guidelines.

Code of Conduct

To promote ethics, integrity and transparency in the top echelon 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. The Code clearly spells out guidelines for employees on dealing with people in the organisation, ensuring a gender friendly workplace, relationships with suppliers and customers, legal compliance, health & safety, avoidance of conflict of interest, transparency and auditability in all their actions, protection of confidential information, leading by example etc. Any violation of the NALCO Code of Conduct by an employee renders him/her liable for disciplinary action. We at NALCO believe that every employee has a responsibility towards stakeholders and must strictly adhere to a Code of Conduct and conduct himself/ herself at all times in a professional and ethical manner. Integrity is a key to our organizational values and forms the basis of the Company's organisation culture.

Vigilance

Vigilance function takes both corrective and preventive actions in the area of unethical practices. The department conducts investigations into complaints lodged by stakeholders regarding unethical practices and based on the merit of the complaint it pursues conviction of employees indulging in unethical behaviour or deviations from code of conduct. This helps in creating an enabling atmosphere of fairness, integrity, ethical practices and overall healthy work practices. The Vigilance Department works as an extended arm of Central Vigilance Commission. Vigilance department advises top management in identification and prevention of malpractices committed by employees, contractors and suppliers.

Investors Complaint

During the year, 709 number of investors complaint were received and all the complaints were resolved satisfactorily.

Compliance

NALCO has regularly submitted quarterly self-appraisal report on compliance of guidelines on Corporate Governance to DPE. The Company is rated 'Excellent' as per the self-appraisal report for the financial year 2017-18. The self-appraisal report for 2017-18 can be accessed in the website at

<https://nalcoindia.com/investor-services/self-evaluation-report-on-corporate-governance/>

Besides company has also 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. 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.

Mechanisms for advice and concerns about ethics

102-17

NALCO is committed to working with stakeholders in government, business and civil society to promote good governance,

responsible use of mineral wealth and to prevent corruption. As discussed earlier, NALCO has also signed the Integrity Pact (IP) with Transparency International India (TII). The Vigilance department at NALCO guides and facilitates for impartial, fair and transparent decision making and gives priority to preventive vigilance, with proactive attitude.

Depending on the gravity of irregularity and misdemeanour in various aspects coming under the purview of ethics and transparency, appropriate actions as per NALCO Vigilance Manual, CVC Guideline, code of conduct and related circulars/guidelines, is taken. Detailed investigations of the complaints are 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. are taken, based on the gravity of findings.



NALCO observes Sankalp Divas

Corporate Governance

Governance structure

102-18

Corporate governance is a set of systems, structures, processes, rules and practices by which a firm is directed and controlled. Corporate governance essentially involves balancing the interests of a company's many stakeholders, such as shareholders, management, customers, suppliers, financiers, government and the community and creating & enhancing value for them. In NALCO, the aim of corporate governance practices is to align the interests of stakeholders with the interests of the company. A robust system of internal control, timely and continuous flow of material information to stakeholders, compliance of statutes has strengthened governance practices in NALCO over the years. Transparency, integrity, accountability and fairness are integral part of the functioning of the Company.

An enlightened, well informed and independent professional Board is the crux of governance practices. The Board being at the apex level is responsible for function, strategic direction and performance of the company. The Board also gives direction and exercise appropriate control to ensure that the Company meets stakeholders' aspiration and societal expectation. The Board

derives its power from the Companies Act, 2013, SEBI (LODR) Regulations, 2015, DPE guidelines on the functioning of Navratna Companies and other guidelines issued by the Government from time to time.

NALCO recognizes that the Board is accountable to all shareholders and that each member of the Board owes his/her first duty for protecting and furthering the interest of the Company. Corporate governance adheres to the provisions as specified in Securities and Exchange Board of India, Listing Obligations and Disclosure Requirements Regulations 2015. The Board of Directors is guided by the organization's Vision, Mission and values. The composition of the Board –of Directors comprises of full time Executive and non-Executive (Independent) Directors selected through Public Sector Enterprises Board which has well-laid out selection procedure. As on 31st March 2018, the Board of NALCO comprised of Chairman-Cum-Managing Director, five full time (Executive) Directors including Chairman-cum-Managing Director, two Part-time official Directors and Eight Part-time Non-official (Independent) Directors.



The Top Management



Dr. T. K. Chand
Chairman-cum-Managing Director
w.e.f-27.07.2015



Dr. K Rajeswara Rao
Govt. Nominee Director
w.e.f-19.02.2018



Shri Anil Kumar Nayak
Govt. Nominee Director
w.e.f-27.03.2018



Shir V Balasubramanyam
Director (Production)
w.e.f- 01.01.2015



Shir B. K. Thakur
Director (HR)
w.e.f- 04.07.2016



Shri Sanjib Kumar Roy
Director (P & T)
w.e.f-03.02.2017



Shir Pradip Kumar Mishra
Director (Commercial)
w.e.f-28.04.2018



Shri Sridhar Patra
Director (Finance)
w.e.f-01.09.2018



Prof. Damodar Acharya
Independent Director
w.e.f-21.11.2015



Shri Dipankar Mahanta
Independent Director
w.e.f-21.11.2015



Shri Maheshwar Sahu
Independent Director
w.e.f-21.11.2015



Shri Pravat Keshari Nayak
Independent Director
w.e.f-21.11.2015



Smt. Kiran Ghai Sinha
Independent Director
w.e.f-03.02.2017



Shri Nagendra Nath Sharma
Independent Director
w.e.f-06.09.2017



Smt. Achla Sinha
Independent Director
w.e.f-08.09.2017



Shri Sankararaman
Independent Director
w.e.f-21.11.2015

Board Level Committees

Corporate governance is further strengthened by the mechanism of constitution of Board sub-committees, both statutory and non-statutory. Non statutory committees are constituted voluntarily with judicious mix of Executive and Non-Executive Directors to

assist the Board in smooth conduct of important 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

Audit Committee

Stakeholder Relationship Committee

Risk Management Committee

CSR & Sustainability Development Committee

Nomination & Remuneration Committee

Technology Committee

Non-statutory Committee

Human Resources Committee

Ethics & Corporate Governance Committee

Committee of Directors for Projects and Joint Ventures

Besides, there are 4 more committees where only the Functional Directors are members and these committees take care of certain functional activities with the terms of reference approved by the Board.

- Investment Committee
- Committee of Directors for Sales
- Committee of Directors for Procurements
- Share Transfer Committee

CSR & Sustainability Development Committee reviews CSR activities and sustainability development program of the Company. The Committee comprises of the following members as on 31st March 2018. Amongst the members Director (HR) drives the CSR initiatives and Director (Production) looks after sustainability front while committee monitors the overall progress.

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
Shri NN Sharma (w.e.f. 22.03.2018)	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

Timely anticipation and management of inherent business risks is vital for sustainable operation and financial health of an organisation in a complex, dynamic and interactive global industrial & business scenario. Rising to the requirement NALCO has implemented a Risk Management Policy for risk anticipation, identification, mitigation, remediation and eradication to formalise Risk Management which also includes Government guidelines issued in this regard.

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 risk 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

NALCO has a well-established and adequate system of internal control, commensurate with the size and nature of its business. This includes 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 entity level policies/processes and operating level standard operating procedures primarily aiming at bringing awareness amongst the officials dealing with affairs of the Company to ensure adherence to the policies, procedures and guidelines, designed and put in

place for effective control. The overall responsibility for adequacy and 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.

Company prepares its financial statements responsibly, complying with applicable accounting standards in accordance with Accounting Policies approved by Audit Committee & 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 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 carries 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.



Visit of DGCA to NALCO

Stakeholder Engagement

102-40 to 102-44

A sustainable business operation requires engagement with stakeholders for capturing their needs and requirements, meeting their expectations and channelizing their opinion. They are the cornerstone of an organisations' achievements and ambassadors of our success. Quite often they have deep insight of our various operations and alert us about a developing situation which is missed due to oversight. We respect their privilege as our stakeholders and try to create win-win situation for both recognising their contribution for our growth. We use formal modes like vendor meet, suppliers meet, customer meet, MSME conventions, RPDAC meeting, Customer survey etc. and informal mode like trade fairs, seminars, press and media release etc., to capture the expectation and requirements of our stakeholders.

List of stakeholders' groups

102-40

The identified stakeholders include government & regulatory authorities, employees, investors & shareholders, industry associations, customers, consumers, civil society organisations, suppliers & vendors as well as general public around our operations.

The expectations and the concerns of stakeholders and the extent to which the relevant issues are addressed, play a vital role in influencing the sustainable growth of an organization. During engagement we conduct assessment of the internal and external context of organization with respect to three pillars of sustainability viz. economic, environment and social aspects. During the engagement and consultation process, the received inputs have given us an opportunity for self-analysis, identifying any gap in the business strategy and to find out ways to address them. During the reporting period, we engaged with our stakeholders on various platforms. The key concerns that emerged out of these interactions have been addressed. As an on-going process, the information pertaining to stakeholders is periodically updated through formal or informal channel of communication. The details of stakeholders, mode of engagement, key concerns and the subsequent actions have been detailed.

Collective bargaining agreements

102-41

A favourable environment for maintaining good Industrial relations is created by NALCO's sustained respect of the rights and privileges of the registered trade unions. In NALCO, a truly participative management system is structured with four layers i.e. Unit level, Complex level, Corporate level (Directors level) and Apex level (CMD level) system of consultation with Recognised Unions, creating opportunity for deliberation on issues at various levels depending on their importance. There are no barriers for employees to form trade unions and to participate constructively

in framing employee related policies and general administration. Nearly all 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 as the Recognised union in every Unit. Consultation or negotiation with the recognized Unions is practised for all matters affecting workers. All welfare measures for employees are implemented in consultation with the recognised unions of all the units. Important policy matters connected to issues like wages, incentives, benefits, etc. are finalised through collective bargaining method. This approach of resolving employee's demands and expectation by involving recognised unions clears the path for smooth implementation of mutually arrived decisions. The firmly established practice of seeking constructive suggestions from employees and unions on issues whether administrative or production related, has paid handsome dividends with quick liquidation of many such problems.

Apart from this, Shop-floor Councils are also very effective in ensuring workers' participation in day to day operation. Issues like job distribution, a breach of safety due to wrong work procedure, unsafe conditions, material shortages or equipment malfunctioning etc. get settled by shop level discussions. A host of structured participatory forums for different purposes are also available to guide and support employee related activities such as Canteen committee, Safety Committee, Grievance Committee, Welfare Committee. 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. Thus, a constructive atmosphere for growth and profitability is maintained by good industrial relation with trade unions.

The recognised unions as on 31.03.2018 are

Unit	Name of Recognised Unions
Smelter	Aluminium Mazdoor Sangha
Captive Power Plant	Recognition process continuing
Mines	Recognition process continuing
Alumina Refinery	Recognition process continuing
Corporate Office including Regional Offices	Recognition process continuing

Identifying and selecting stakeholders

102-42

Nalco is engaged with all its stakeholders and the level of engagement is commensurate with the impact of the stakeholders and vice-versa. Nalco has mapped its internal and external stakeholder for the purpose of stakeholder engagements. The key categories are as below:

- Government and Regulators
- Shareholders/Investors
- Customers & Consumers
- Suppliers & Vendors
- Employees
- Community/ civil society organisations
- Industry Associations
- Contractors/Other service providers
- Business partners/New ventures



Canadian delegation visits NALCO

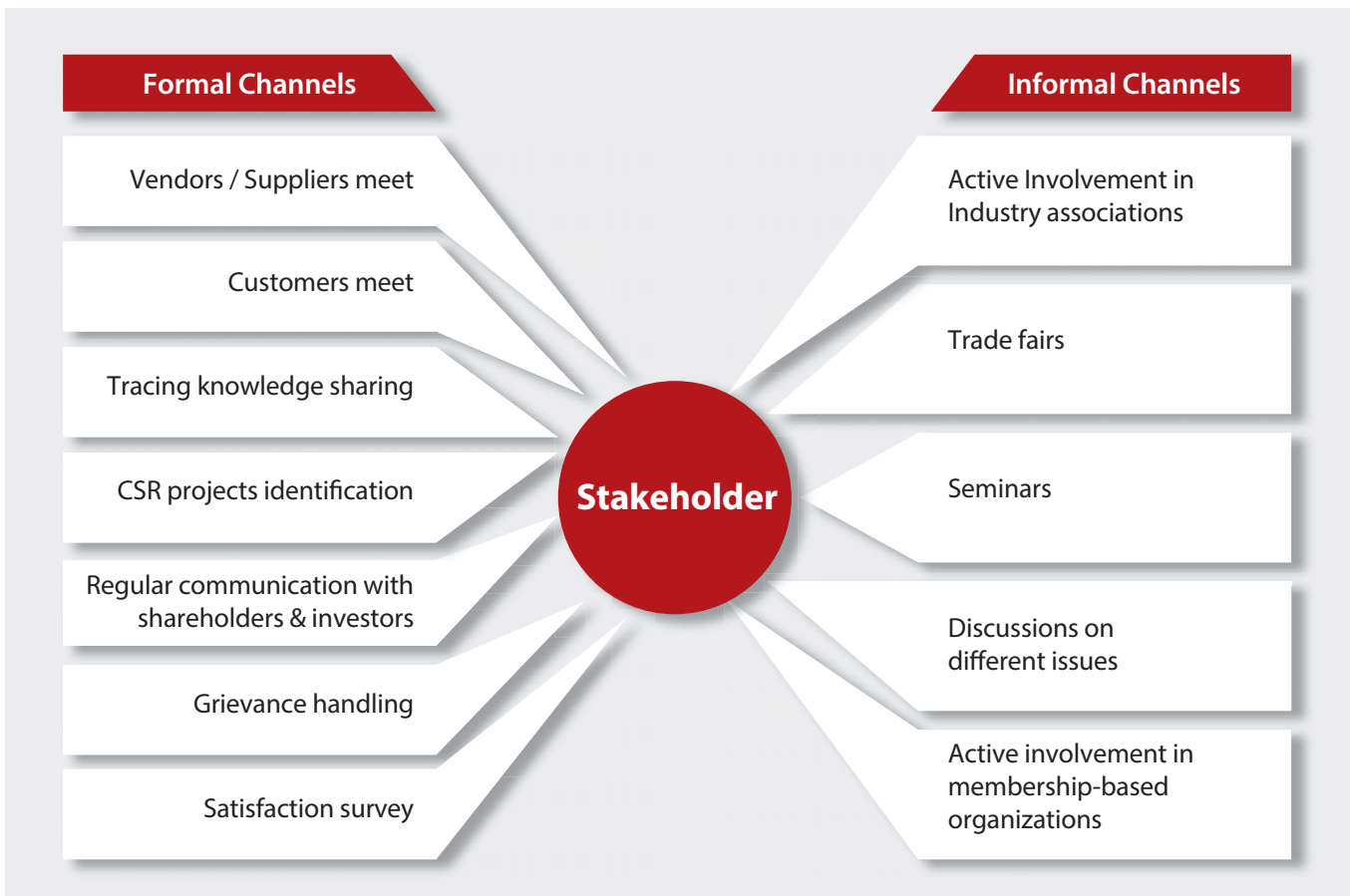
Approach to stakeholder engagement

102-43

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 feedback 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.

Channels of Engagement



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, such as: 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 Change in Tax structure 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 	Alignment with Government policies for healthy industrial and social growth.
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 restructuring 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 office order, 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. Interaction with Unions, Officers Associations & similar forums. Training & performance feedback Succession Planning. Address by members of top management during different official and social functions. 	Employee motivation, skill development and grievance resolution
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 feedback, satisfaction surveys and grievance resolution Product information and enquiries. 	<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 downstream development 	Satisfied customers and improvement in business, stronger bonds with consumers resulting in long-term patronage

Categories	Modes of Engagement	Concerns	Action by NALCO	Accrued Benefits
Suppliers, & Vendors	<ul style="list-style-type: none"> Tender & contract Periodic vendor and supplier meet Regional, National and International trade fairs Supplier relationship management 	<ul style="list-style-type: none"> Special privilege to MSE units Transparency & anticorruption practices Simplified procedure & timely payment. Terms & conditions of purchase 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 MSE facilitation cell in S&P and M&R Complex. Permanent display hall of the items required by plant in S&P and M&R Complex. Grievance redressal system for MSEs available in NALCO website. 	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, employment, 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
Industry Associations	<ul style="list-style-type: none"> Conference, workshops & seminars. Trade Fair, exhibitions and industrial expo 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 Training, skill development, work instruction 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

Key topics and concerns raised

102-44

Key topics and concerns have been listed considering all topics as per GRI Standards. These topics form the basis of evaluating the materiality.

Economic	Environment	Social
Economic Performance	Energy	Human Rights Assessment
Indirect economic Impacts	Water	Security practise
Procurement practices	Biodiversity	Supplier Social Assessment
Anti-Corruption	Emissions	Socio Economic Compliance
Market presence	Effluents and Wastes	Marketing & Labelling
Anti-competitive behaviour	Environmental Compliance	Forced Labour
	Materials	Labour/Management Relationships
	Supplier Environmental assessment	Child Labour
		Rights of Indigenous people
		Employment
		Occupational Health and Safety
		Training and Education
		Diversity and Equal Opportunity
		Non-Discrimination
		Freedom of Association and Collective Bargaining
		Local Communities
		Customer health and safety
		Customer privacy



Unveiling of New Vision & Mission of NALCO

Reporting Practices

102-45 to 102-56

Entities included in the consolidated financial statements

102-45

All the operations of NALCO have been included in consolidated financial statements. Please refer annual report <https://nalcoindia.com/wp-content/uploads/2018/12/37TH-NALCO-AR-2017-18-DELUXE.pdf>

Defining report content and topic Boundaries

102-46

Please Refer chapter "About the report"-page no-2

List of material topics

102-47

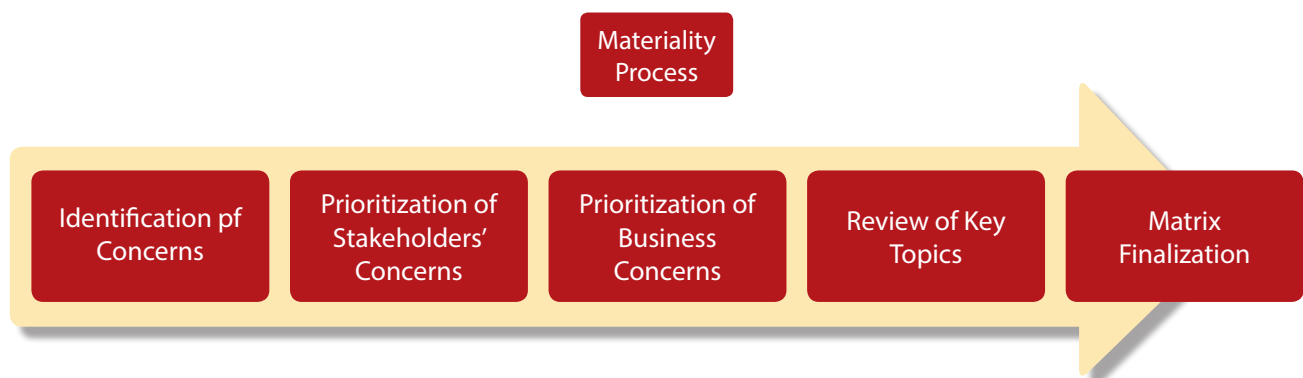
Materiality Assessment being the process of identifying, prioritizing and defining the aspects that are of highest importance to the stakeholders and the management of a company, the material issues have been identified those reflect most significant sustainability impacts and opportunities. Materiality, in this context, is the threshold at which an issue or interest should be reported. Focus areas have been identified representing the most significant challenges and opportunities facing the company in the area of sustainability which in turn are the foundation for the sustainability strategy.

Our materiality analysis process allows us to further define our

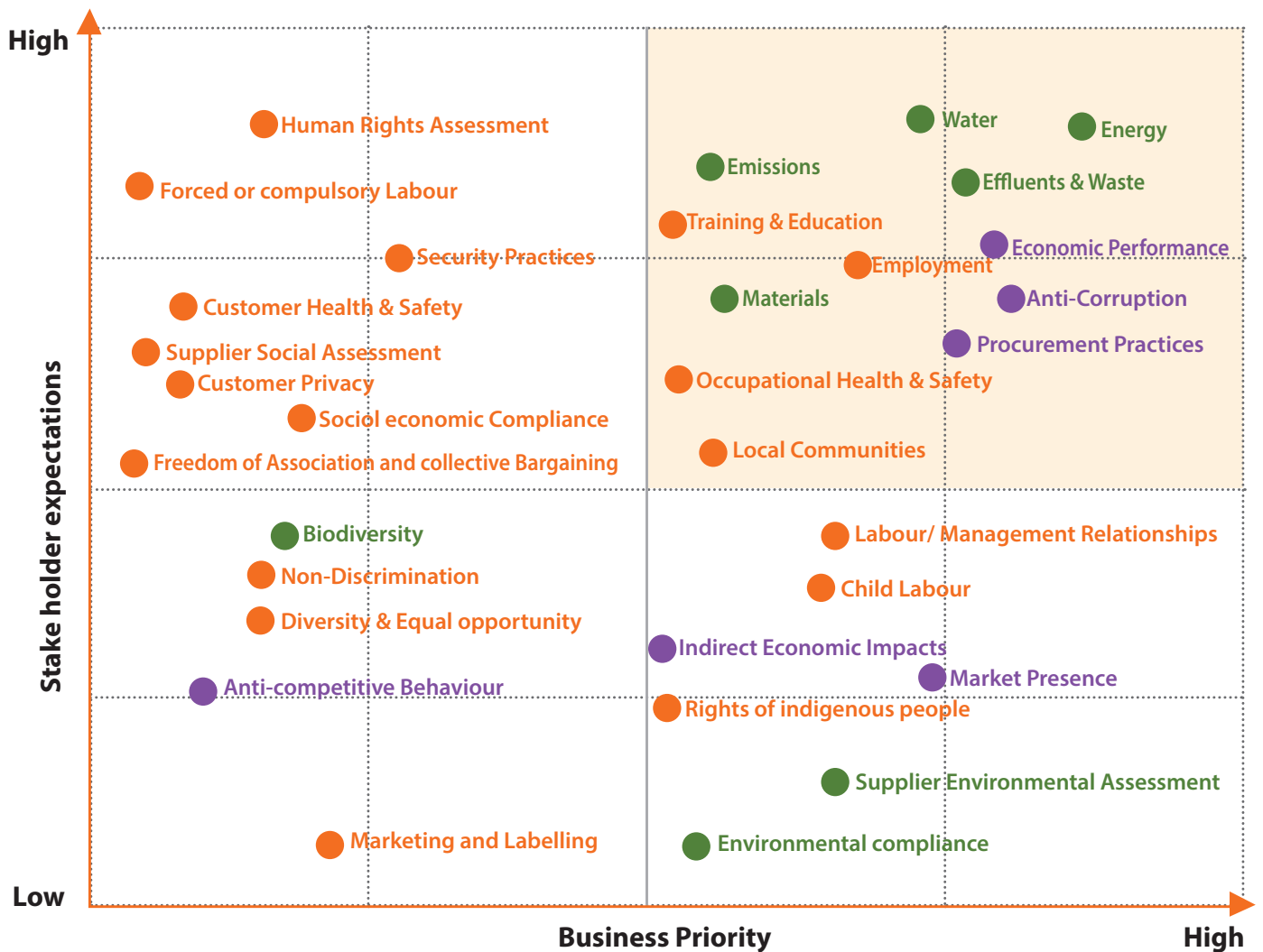
report content by identifying material topics within these focus areas, as well as to identify key risks and opportunities for whole spectrum of activities. Our process is shaped and guided by Global Reporting Initiative's standard, applying the Report Content Principles and from Accountability's Five-Part Materiality Test. Our assessment of the material aspects accounts for different inputs and various engagements we have had during the year with different stakeholders. To capture perspectives of different stakeholders, a structured materiality assessment exercise was carried out across all the operational locations. A formal workshop was organized at corporate office 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 experience and current challenges. Also feedback of stakeholders from site were collected by circulating the same questionnaire to selected stakeholders.

The output received from the exercise is subjected to Management Review at Unit and Corporate level for ratification. The importance assigned by Govt. to different issues are captured from MOU signed between Management and Ministry for the fiscal. Finally, we have come up with a materiality matrix that is an amalgamation of both the stakeholder perspective and management perspective. The materiality matrix determined was plotted on a 2X2 matrix and the aspects were plotted based on their relevance to the management and their significant impact on the stakeholder. 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 stakeholders. Identified material issues, form the focus of this sustainability report. There are no significant changes in scope or topic boundary compared to previous year. All care and concern are taken to report on the identified material issues as per GRI Standards in Accordance "Core" option.

The material topics are given below along with the applicable boundary.



Sl. No.	Materiality Topic	Topic Boundary (Inside or outside the boundary)
1.	Economic Performance	Inside
2.	Procurement practices	Inside
3.	Anti-Corruption	Inside
4.	Materials	Inside
5.	Energy	Inside
6.	Water	Inside
7.	Emissions	Inside
8.	Effluents and Wastes	Inside
9.	Employment	Inside
10.	Occupational Health and Safety	Inside
11.	Training and Education	Inside
12.	Local Community	Outside



Restatements of information

102-48

As such there is no restatement in this report from preceding report.

Changes in reporting

102-49

This is the 7th sustainability report of NALCO and it has been decided to switch over our reporting from GRI G4 'Core Option' to GRI Standards 'Core Option', which represents the current global best practice for reporting on a range of economic, environmental and social impacts. We selected topics that we identify as material, representing those that reflect impacts associated with our operations around the world. We continue to evaluate issues that are material to our company and address them accordingly.

Reporting period

102-50

Annually every Financial Year.

Date of most recent report

102-51

NALCO has published its sixth Sustainability Report for 2016-17, prepared as per Global Reporting Initiative (GRI) G4 Guidelines.

Reporting cycle

102-52

Financial Year – 1st April to 31st March

Contact point for questions regarding the report

102-53

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Designation: AGM (TQM)
Email: sustainability @ nalcoindia.co.in
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Claims of reporting in accordance with the GRI Standards

102-54

This report has been prepared in accordance with the GRI Standards: Core Option

GRI content index

102-55

Please refer page no 85 to 87 for GRI content Index

External assurance

102-56

No third-party assurance is required, considering that the disclosed information and data are mostly based on documents reviewed by the Board i.e. Annual Report, Financial Statements etc. Further data related to environmental and social performance are also captured through the robust monitoring system deployed within the externally certified management systems such as ISO 14001, OHSAS 18001 and SA 8000.



Inside view of electrolytic pot at Aluminium Smelter



Finished product storage area of Smelter

Economic

Economic Performance

201

103-1, 103-2 and 103-3

NALCO has embarked upon a new long-term corporate plan to retain its position as a major player in the field of Alumina and Aluminium. The plan envisages 3 years action plan, 7 years strategy and 15 years vision for progressive growth of the Company. Improving functional capabilities through identified road maps & enhancing different functions are some of the key elements of the plan to give the Company a competitive edge. Focused functional initiatives have been devised leveraging the strength of each function to utilize future opportunities. A new Vision, Mission and Core Values Charter of the Company have been crafted to move forward in a direction which will ensure steady growth and minimize the adverse impact of commodity cycle on the profitability. The new business initiative includes growth through expansion in core business, forward integration through value addition, downstream facilities, selective diversification and backward integration for raw material securitization, based on an in-depth study of industries and economic outlook, opportunities arising out of emerging business scenario and Company's core capabilities.

In India, total Alumina production during the Financial Year 2017-18 was 62 lakh Tonnes, to which NALCO's contribution was 34%. Alumina Refinery achieved 100% normative capacity (i.e. 21 lakh Mt) with production of 21.06 lakh Mt Alumina Hydrate. Calcined Alumina production of 21.11 lakh Mt during the year is also

highest ever since inception registering a growth of 3.9% over last year. During the financial year 2017-18, NALCO registered total Alumina sale of 13,37,356 Mt, including export of 12,76,715 Mt. This better the corresponding figures of 12,94,900 Mt and 12,43,103 Mt respectively achieved during 2016-17.

During the fiscal, the Bauxite Mine has achieved highest ever production and transportation of bauxite amounting to 70.25 Lakh Mt. Total Bauxite excavation of 70.84 lakh Mt during the year is also highest ever since inception registering a growth of 3.8% over last year.

NALCO achieved Aluminium metal sales of 4,26,316 Mt during 2017-18, which is significantly higher than the sales figures of 3,85,518 Mt achieved during 2016-17. This comprises of sales of 3,50,469 Mt (an all-time record) in the domestic market and 75,847 Mt in the overseas market. This resulted in an all-time low inventory of 1,502 Mt at the end of Financial Year 2017-18.

CPP achieved 'Net Power Generation' of 6,547 MU, registering a growth of 7.9 % over previous year. Wind Power: 4 wind power units at different locations of the country have generated 252 MU against 206 MU (generated last year.).



Lowest Cost Bauxite producer in the world



Lowest Cost Alumina producer in the world



Five Star Rating for Panchpatmali Bauxite Mines by Ministry of Mines



Largest Integrated Bauxite-Alumina-Aluminium Complex in Asia



SCOPE Award of Excellence in Institutional category & CSR Meritorious Award from President of India



Third highest Net Foreign Exchange Earning CPSE in the Country.



Pot Room, at Smelter Plant

Opportunities and Threats

Opportunities

- Aluminium metal is unique as it has some distinct physical properties like malleability, ductility, conductivity etc. and is a non-toxic, noncorrosive and non-magnetic metal.
- Aluminium makes very strong alloys with silicon, copper and magnesium. These are lightweight alloys and yet have great strength. Aluminium-zinc alloys are some of the strongest alloys available today and are commonly used by the automotive and aerospace industries.
- Lightweight, durable and infinitely recyclable, value-added aluminium products can lower energy costs and carbon emissions in dozens of applications.
- Coated aluminium roofs can reflect up to 95 percent of sunlight, dramatically increasing building energy efficiency.
- Highly recycled and lightweight aluminium packaging can reduce shipping costs and carbon emissions for beverage makers. Automakers are increasingly turning to aluminium as part of the multi-material mix to increase vehicle fuel efficiency while maintaining strength and safety.
- Aluminium is highly effective at absorbing crash energy, protecting passengers in the event of an accident. Lighter aluminium vehicles ensure better handling and shorter stopping distances help drivers avoid accidents to begin with.
- Indian Aluminium demand is growing at a CAGR of 10% and anticipated to grow more than 4 times by 2030 with the Government's visionary initiatives like Make in India, Smart Cities, 100% rural electrification, indigenous space programmes, domestic defence sector revival etc. which will boost domestic manufacturing and value addition. Aluminium is one of the main components of Electrical Transmission and Distribution (accounts for 38% of total Aluminium consumption in India).
- Aluminium demand is rising in domestic defence sector as special advanced Aluminium Alloys in aero structures for fighter aircraft and helicopters, warships, submarines and components for aero frames, engines, radars, missiles etc.

Threats

- Potential threats to Aluminium industry include volatility of global Aluminium prices exhibited in recent times. Due to rapid smelter capacity expansions across the world, especially in China, there is abundant availability of Aluminium metal in warehouses, putting pressure on the metal prices.
- Several major economies have introduced protectionist tariff regimes in order to safeguard their domestic industry, triggering trade wars and thereby increasing the risk of flooding of stocks in other open markets like India and loss of market for Indian exporters of Aluminium.
- The slowing economy of China, which is the major consumer of Aluminium, also is a cause of concern for the industry, as it may lead to piling up of Aluminium surplus stocks globally.
- Primary Aluminium manufacturers also face competition from scrap imports by secondary aluminium producers, which keep increasing every year and eat into the primary producers' market share.

has embarked upon a new long-term corporate plan to retain its position as a major player in the field of Alumina and Aluminium. In this regard the new Vision and Mission adopted by the Company is available in the link <http://www.nalcoindia.com>

Cost reduction measures and efforts to improve specific consumption of critical raw material.

Enhancement of efficiency and reduction in specific consumption is one of the priority areas and reduction of energy, raw materials etc. has resulted in reduction of cost. Benefits are realised from following projects during the FY 2017-18.

Smelter:

- Total 121 no. of pots graphitized in the FY 2017-18 and energy saving on account of graphitization is 1,26,70,240 Kwh (1089.64 TOE).

CPP:

- Improved version of Air Preheater having double sealing arrangement with 24 Sectors were retrofitted in place of original single sealing, 12 Sectors APH in Unit#1 with the assistance from M/s. BHEL in January 2018. This has resulted in increase in boiler efficiency by about 1.14% due to reduction in air leakage and increased heat transfer.
- Chemical cleaning of Condensers of Unit - 1, 8 & 10 has resulted in reduction of Unit Heat Rate by about 84 Kcal/Kwh and saving in coal consumption by 16,371 Mt/year per Unit due to improvement in condenser vacuum.

Alumina Refinery:

- Procurement, installation & commissioning of 50 nos. VFDs in Battery A, B, C & D completed on 30.12.2017 and electrical energy savings of 3,637,000 Kwh achieved in last four months.
- Plant scale trial "substitution of Wheat Bran by Synthetic flocculent in all the flat bottom washers" as a major R&D project was successful. Saving is about ₹ 20/- per Mt of hydrate production.
- Upgradation of Rake drives system in three washers from 96S2 to 109S2. A new system of supporting the arms of washer rake drive was also developed in-house.
- Development and standardization of control philosophy to reduce support fuel (HFO) during Coal Mill changeovers has been done and saving of 171 KL HFO achieve

Mines:

- Reconditioning of 2007 Poly Pulley Hubs for waste reduction and reuse of salvageable items completed.
- Rebuild of crushing segments of SMCP crusher as a measure for waste reduction and extension of life of Crushing segments completed.

Also some systemic cost reduction measures as detailed below are taken by our Commercial Departments.

- Open/Global tenders are done for major raw materials, capital equipment, high value spares & consumables to increase vendor base.
- Reverse auction, De-proprietisation, Import substitution,

To address the threats and opportunities as detailed above, NALCO

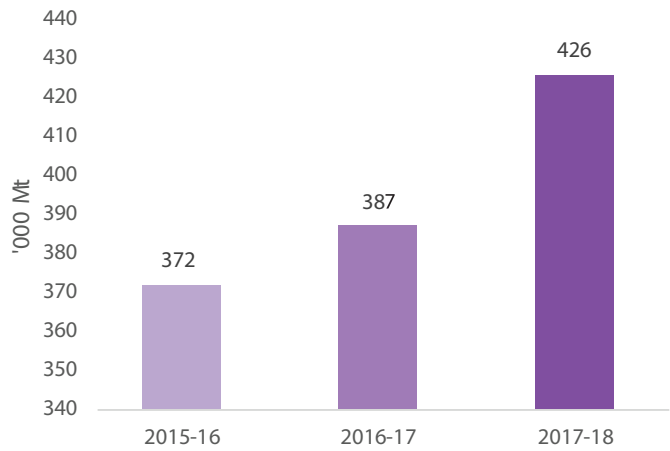
Clubbing of PRs & POs, are practised for cost & price advantage.

3. Procurement of general items are done through GeM portal
4. Recovery of salvage value through scrap disposal.
5. Inventory control measures.

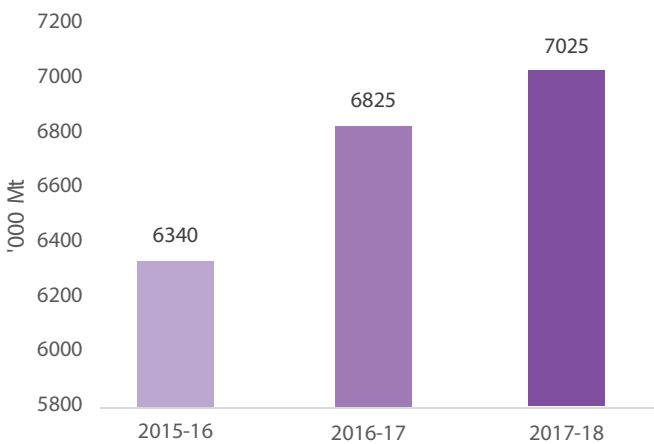
Performance

The year 2017-18 saw robust performance towards economic growth and achieved enhanced level of indices in the area of production, sales, EBIDTA, profit before tax and profit after tax. The growth over previous year under different heads, i.e. Turnover, PBT and PAT has been 19%, 111% and 100% respectively.

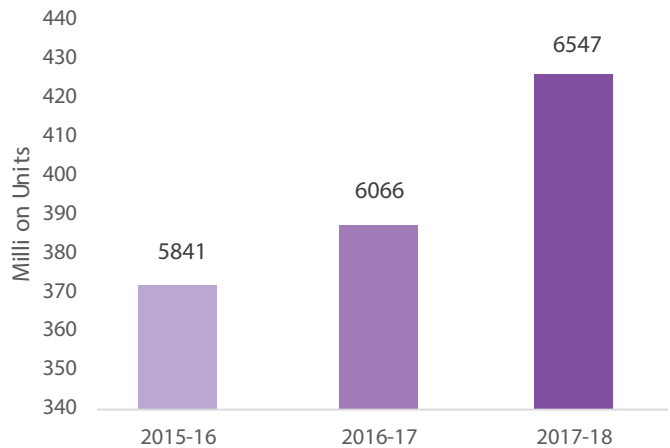
Aluminium in '000 Mt



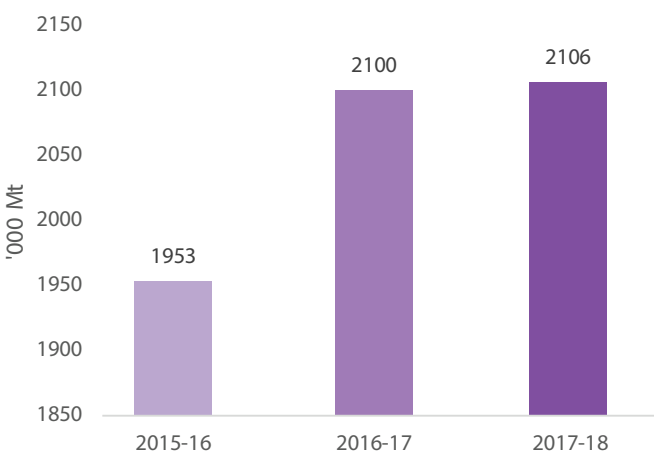
Bauxite in '000 Mt



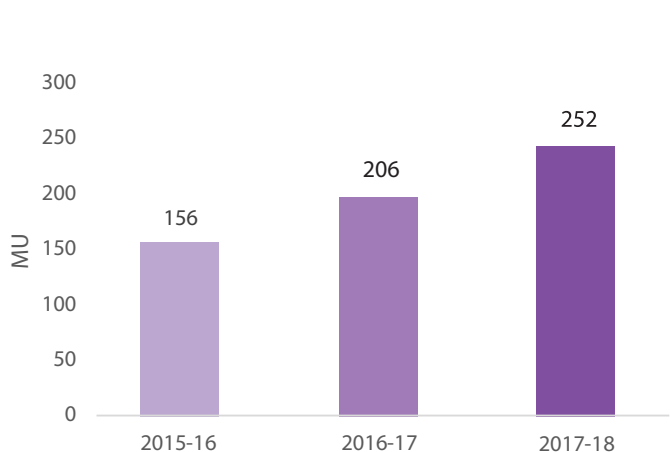
Power Generation in Million Unit



Alumina Hydrate in '000 Mt



Wind Power Generated in MU





New Projects

- NALCO is in the process of setting up of 5th Stream in its existing Alumina Refinery which shall add 1.0 Mtpa to its existing installed capacity of 2.275 Mtpa (total capacity 3.275 Mtpa), at a projected expenditure of ₹ 5,540 crores, based on improved Medium Pressure Digestion technology of M/s. Rio Tinto Alcan International Limited (RTAIL).
- Sourcing of Bauxite for 5th Stream Expansion of Alumina Refinery has been envisaged from Pottangi Mines Since bauxite from Pottangi would be available beyond 5th stream commissioning bauxite is proposed to be supplied from Panchpatmali South block through a new crushing and conveying system
- Utkal-D&E Coal Blocks (200 Million tonnes) have been allotted by Govt. of India in favour of your Company in the year 2016.
- NALCO is in process of augmenting its wind power generation capacity from 198.40 Mw to 223.90 Mw by adding another wind farm of capacity 25.5 Mw at Kayathar, Tamil Nadu at a capital expenditure of ₹163 crores.
- Retrofit Conversion of Flat Bottom Tank to HRD-DCW in Streams #1, 2 & 3 at Alumina Refinery
- To reduce dependency on power supply from the grid at Refinery, BPTG-5 project was envisaged. The project was commissioned in October 2017.
- NALCO is planning the brownfield expansion of Smelter at Angul by adding a 5th Potline (5 lakh Mtpa) and upgradation of pot amperage of existing 4 Potlines from 180 KA to 220 KA (1 lakh Mtpa) along with expansion of CPP by addition of 2 units of 660 Mw each.

R&D projects completed in 2017-18

- 150 m3 per batch Defluoridation Plant with Emrion Nano Technology of ETPL first of its kind in the world is running successfully, meeting the environments norm stipulated by OSPCB at Smelter Plant. Performance Guarantee (PG) test of the Emrion plant has been completed successfully on 19th March 2018.
- Filtration trials of Red mud carried out in pilot setups with M/s. Unitop Multitech India Pvt. Ltd. and M/s. FL Smith to establish the efficiency of pressure filtration for Red mud filtration. The data generated will be used for plant scale implementation.
- R&D has developed a process for improvement of oxidation behaviour of anode which has been successfully implemented in the Smelter plant.
- "Extraction of Alumina from Partially Lateritized Khondalite (PLK) at laboratory scale" has been completed and the basic flow sheet for the process has been developed by CSIRO, Australia.
- NALCO & IIT, Bhubaneswar have jointly developed a process for "Synthesis, Characterization and Development of Red Mud-Fly ash based Geopolymer concrete" which has a potential for application in civil activities.
- Two patent applications:
 - i) A process for beneficiation of bauxite ore to obtain an upgraded alumina.
 - ii) Partially Lateritized Khondalite based Ceramic Proppants and its preparation were filed.
- Six patent applications filed earlier have been granted during the year 2017-18.

Direct economic value generated and distributed

201-1

Particulars (in ₹ Crore)	2015-16	2016-17	2017-18
1. Direct Economic Value Generated			
a) revenue from operation (includes other operating incomes)	6,816.00	8,050.02	9618.31
b) revenue from other sources	536.57	408.27	299.65
Total	7,352.57	8,458.29	9917.96
2. Economic Value Distributed			
a) Operating expenses (excluding employee wages and benefits)	4,888.45	6,880.70	6442.01
b) Employee wages & benefits	1,361.36	1,537.44	2261.00
c) Payments to providers of capital	515.45	686.19	908.48
d) Payments to government (Tax on PBT)			
i) Corporate Tax	371.75	296.19	696.42
ii) Dividend distribution tax	104.93	139.69	184.94
Total Economic Value Distributed (a+b+c+d)	7,241.94	9,540.21	10510.67
3. Economic Value Retained (1-2)	110.63	-1,081.92	-592.71
4. Additional information on Expenditures included in operating expenses (2a above)			
Community Investment (included in 2(a) above)			
i) CSR expenses	27.17	30.01	29.01
ii) Horticulture (green belts within and vicinity of the plants)	5.84	7.31	9.30
Total community investment	33.01	37.32	38.31

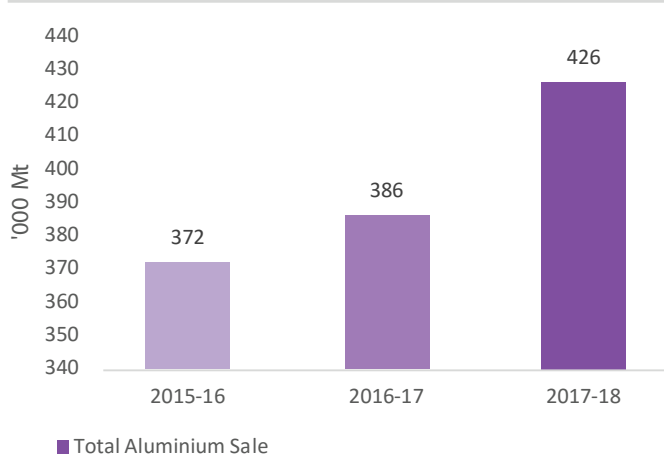
Important Financial Indicators	Unit	2015-16	2016-17	2017-18
Revenue from Operations	₹ Crores	7269	8050	9618
Return on Net Worth	%	5.66	6.55	0.426
Book value per share (face value ₹ 5/- each)	₹/each	50.08	52.80	54.35
Earnings Per Share	₹	2.84	2.98	6.94
R&D Expenditure	% of turnover	0.22	0.60	0.30



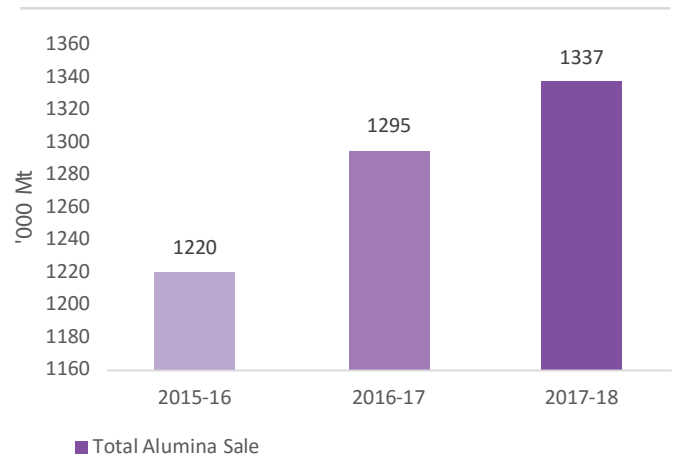
Alumina Transportation by BTAP Wagon

Financial Performance

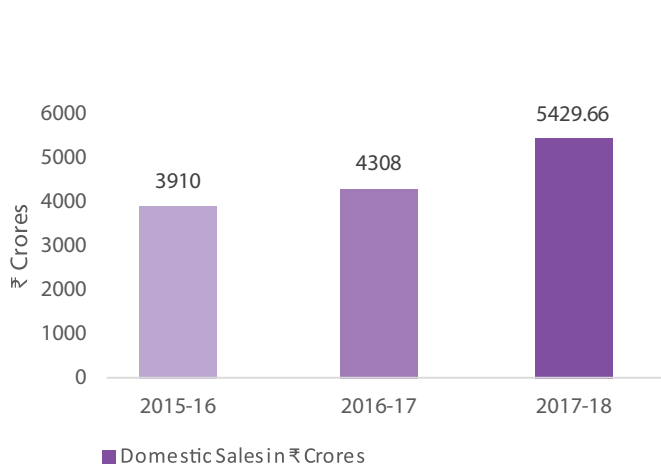
Total Aluminium Sale in '000 Mt



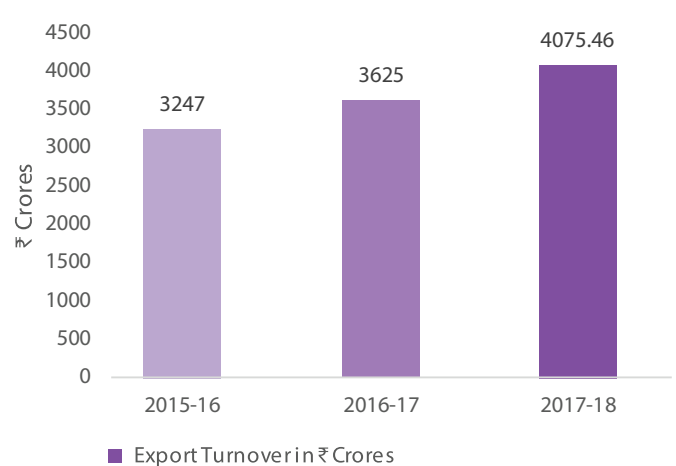
Total Alumina Sale in '000 Mt



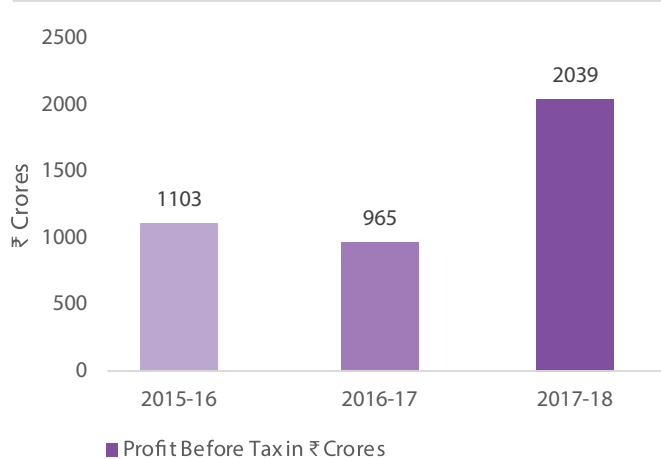
Domestic Sales in ₹ Crores



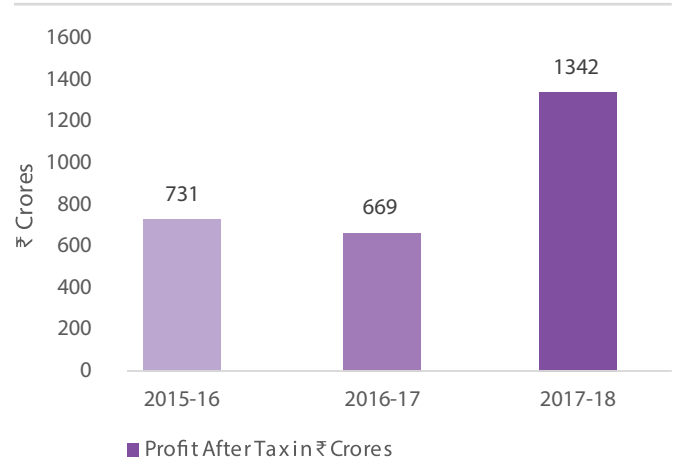
Export Turnover in ₹ Crores



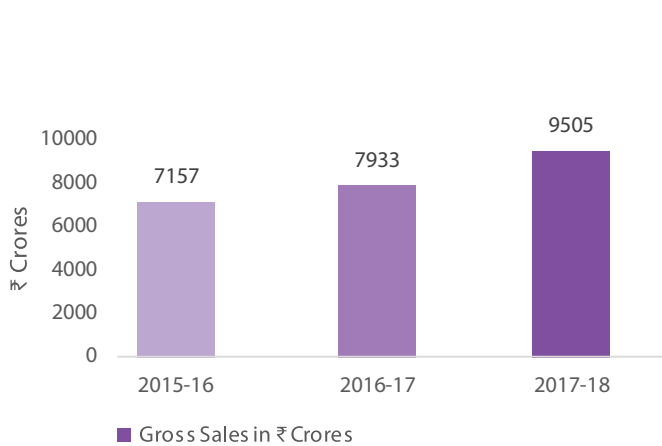
Profit Before Tax in ₹ Crores



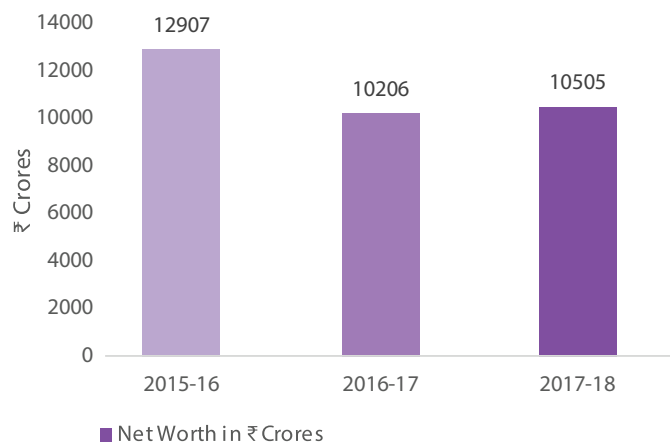
Profit After Tax in ₹ Crores



Gross Sales in ₹ Crores



Net Worth in ₹ Crores



Wire Rods

Financial implications and other risks and opportunities due to climate change

201-2

NALCO has strategies to address climate change and other global environmental challenges. It stands committed in promoting greater environmental responsibility in mining and processing of minerals for sustainable development. NALCO strives to embark on low carbon growth trajectory in its operations. NALCO calculates and reports its GHG's every financial year. The possible mitigation measures proposed for the thrust areas of conservation of resources, reduction in fuel and electricity consumption are being investigated for abatement. 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.

All the three production units CPP, Smelter and Alumina Refinery, included in the Perform, Achieve & Trade (PAT) scheme, are operating with valid ISO 50001 certificates, having accreditation from RvA, Netherlands.

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

Procurement Practices

204

103-1, 103-2 and 103-3

NALCO considers its suppliers as strategic partners for growth and competitiveness taking the relationship to win-win situation for both. NALCO is committed to develop a lasting business relationship with those suppliers that not only satisfy its requirements for quality, price and reliability, but that also share its principles and business approach. NALCO has strong supplier management system in place ensuring fair and transparent cooperation with suppliers. NALCO continuously communicates with the suppliers in order to uphold ethical standards and best practices introduced by Government of India. Regular feedback are taken from vendors to improve customer experience with NALCO. Reviews are carried out on regular basis to mitigate the supply chain risks and expedite the procurement process. The core business of our operations creates jobs, provides infrastructure and sources goods and services on a large scale through our supply chains.

Sustainable sourcing of bauxite, our most important raw material, is ensured by having captive mines and adopting sustainable

mining practices. Electricity for smelting is sourced from Captive Power Plant located close to Smelter, ensuring continuous supply of power with minimum transmission loss. Bulk purchase of Coal for our Captive Power Plant (CPP) is sourced from Mines of Mahanadi Coal Fields located a few kilometres away. Coal availability is ensured through long term Fuel Supply Agreement and Bridge Linkage. Any shortfall in coal supply is made up with procurement of coal through, e-auction route. Other major raw materials like Aluminium Fluoride, Caustic, Pitch & C P Coke & Lime etc. are procured through multiple vendors. Our own railway siding and port facility complete with fully mechanized loading and unloading system facilitate sourcing of above input materials. Engagement of multiple suppliers for important raw materials ensures availability of critical raw materials at the time of scarcity. Location of bauxite mine and coal mines near our production facility and dedicated transportation systems like cable belt for bauxite and merry go round railway system for coal addresses sustainability issues in transportation.



Aerial view of Port Facility, Visakhapatnam

Proportion of spending on local suppliers

204-1

Ancillary Development of the organization promotes development of local vendors. The MSE facilitation cells at units implement the policy by providing guidance in Technical, Commercial areas to these vendors to improve their competitiveness. The goods and service which can be offered by MSE units are listed and displayed prominently and hosted in our website for wider circulation and awareness. Display halls at M&R complex and S&P complex display the products along with technical knowhow for developing the product & information regarding annual requirement and last procurement price etc. are provided to MSE entrepreneurs. Relaxation in tendering process i.e. waiver of EMD and tender fees

etc. are extended to such units to encourage them to participate in bidding. Our purchase manual is suitably amended to extend purchase preference to MSE units quoting in the band of 15% of lowest quoted price for the products and service earmarked for them. List of Goods and Services which can be procured from MSEs are available in our website.

The procurement of products produced, and services rendered by MSEs (Micro and Small Enterprises) of Odisha including Ancillary Units for FY 2017-18 stands at ₹ 296.11 crores (as against ₹ 285.88 crores of last FY). The total procurement of products produced, and services rendered by MSE units (including those from outside Odisha) stands at ₹ 400.13 crores during FY 2017-18 (as against ₹ 414.95 crores during FY 2016-17) and it is 26.19 % of the total procurement of Goods and Services made by NALCO against

Govt. target of minimum 20%. For FY 2018-19, the target for procurement of products produced and services rendered by MSE has been set at ₹ 400.70 crores.

NALCO bagged the “Best Display Award” in the Mother Plant category in three day long National Vendor Development Programme cum- Industrial Exhibition and Buyer-Seller meet programme “MSE Expo Odisha - 2017”, organised by MSE Development Institute, Ministry of MSE, Govt. of India from 17th to 19th December, 2017 at Chauliaganj Club grounds, Cuttack. NALCO was awarded “Certificate of Excellence as best PSU” in Odisha MSME International Trade fair, 2018 organised by MSE Department, Government of Odisha from 5th to 10th March 2018 at Bhubaneswar.

A national level “Vendor Meet” was organized at M&R Complex,

Damanjodi in which MSE vendors both inside and outside Odisha participated. The agenda of the meet was GST, Business Excellence and E-procurement requirement of your Company.

A “Buyer-Seller Meet for SC-ST Entrepreneurs” was conducted at M&R Complex, Damanjodi.

An awareness programme on “Zero Defect and Zero Effect (ZED)” with an aim to enhance the quality of MSE products was organized by S&P complex, Angul.

Udyog Samasya Samadhan Shivir (USSS)-cum-Buyer-Seller meet for MSEs was organized by S&P Complex, Angul. Company’s procurement data from MSEs (Micro and Small Enterprises) are being uploaded on a monthly basis in “MSME SAMBANDH” Portal of MSE Department, Gol.

Sl. No.	Particulars	2016-17	2017-18	Target for 2018-19
1	Total annual procurement (in value) (*).	₹ 1,975.30 Cr.	₹ 1,527.70 Cr.	₹ 1,530 Cr.
2	Total value of goods & services procured from MSEs (Including MSEs owned by SC/ST entrepreneurs).	₹ 414.95 Cr.	₹ 400.13 Cr.	₹ 400.7 Cr.
3	Total value of goods & services procured from only MSEs owned by SC/ST entrepreneurs.	₹ 9.36 Cr.	NA**	₹ 61.2 Cr.
4	%age of procurement from MSEs (Including MSEs owned by SC/ST entrepreneurs) out of total procurement.	21 %	26.19 %	26.19 %
5	%age of procurement from only MSEs owned by SC/ST entrepreneurs out of total procurement.	0.47 %	0 %	4 %
6	Total number of Vendor Development programmes for MSEs.	9	9	10
7	Whether Annual Procurement Plan for purchases from MSEs are uploaded on the official website.	Yes	Yes	Uploaded
8	Whether targets reported in Annual Report.	Yes	Yes	To be Reported
* This value excluded procurement of Coal, Fuel Oil, Caustic Soda, ALF3, Synthetic flocculants, Steel, Cement, Bearings, Lubricants, Proprietary items, imported items and Contracts for professional services/consultancy services/major turnkey contracts/contracts linked to specific technology.				
** N.A. - Not available.				
The identification and registration of MSEs owned by SC/ST Entrepreneurs is being done with support from DIC, Angul, DIC, Koraput and MSME DI, Cuttack, Odisha.				



Release of NALCO's New Corporate Plan

Anti-Corruption

205

103-1, 103-2 and 103-3

Vigilance

Vigilance is the key function established to combat corruption at NALCO and to create an enabling environment for conducting the organizational activities marked by fairness and integrity in an atmosphere of mutual trust and cooperation. NALCO has its own vigilance set up working as the extended hand of Central Vigilance Commission under the leadership and guidance of a CVO appointed by Govt. of India. To assist CVO other vigilance officers are appointed from the work force 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 maintained, and company resources are protected. NALCO Vigilance Department guides and facilitates impartial, fair and transparent decision making and gives priority to preventive vigilance, with proactive

measures. Emphasis is laid on adequate checks and balances in the form of well-defined systems and procedures.

Integrity Pact

NALCO has adopted Integrity Pact since year 2012 in order to eradicate corruption in tender, contract & procurement. The threshold value for applicability of Integrity Pact has been reduced and the Pact is made applicable to all procurement transactions and contracts of value INR 50 lakhs and above. The Pact mandates an agreement between NALCO and bidder, in order to mutually avoid all forms of corruption by following a system that is fair, transparent and free from any influence or prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered. Independent External Monitors are appointed to overlook the transparency of contract and to mediate between the signed parties in case of observed irregularity.

The Vigilance Department functions

- Investigating complaints.
- Surprise checks in sensitive areas.
- Study of contract/purchase/sales files and Internal Audit Reports which are good source of information for vigilance cases.
- Suggesting system improvements.
- Circulation of CVC Circulars/ guidelines.
- Giving vigilance clearances to various employees for various purposes, viz. NOC for issue of Passport, Promotion, Resignation/ Superannuation/ Voluntary Retirement, Conferment of Award, Foreign Assignment, Deputation and appointment of officers to Board level etc.
- Scrutiny of Property Returns.
- Advising on rotation of officials in sensitive posts.
- Advising CMD on vigilance matters and matters relating to disciplinary procedures.
- Liaison with CBI etc.
- Implementation of Integrity Pact.
- Conducting training programmes for awareness among employees and general public as a part of preventive vigilance mechanism.
- Conducting outreach activity
- Quarterly updating the basic and vigilance data of executives(E6 and above) on DoPT portal
- Developing several modules/portal like learning portal, online vigilance clearance & Online Exit Process etc.



Vigilance Awareness Week-2017

Whistle Blower Policy

The genesis of Whistle Blower policy is clause 49 of listing agreement between NALCO & SEBI. The aim of the policy is to provide a safety net around genuine complainant acting as the first reporter of corruption, fraud and misappropriation, against undue harassment, vindication and retribution. It protects and encourages stakeholders and public in general 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 and criminal offence. Details of the Policy are available at 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

In order to deter and detect frauds the Company has a Board approved Fraud Prevention Policy in force. 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 ad-hoc/temporary/contract basis) as well as vendors, suppliers, contractors, consultants, service providers or any outside agencies doing any type of business with NALCO directly or indirectly. The policy is placed at the website www.nalcoindia.com. No fraud has been reported by the auditors under Section 143(12) of Companies Act, 2013 during the reporting year.

Corruption Risk Management Policy

Corruption is a special category of risk. Corruption Risk Management policy of the Company has been implemented to determine the key principles and requirement aimed at preventing corruption and compliance of anti-corruption law of India. The policy reflects commitment of the Company and its management to high ethical standards at carrying on business in an open, transparent and honest ways aimed at improving corporate culture, compliance with the best practices in corporate governance and maintaining the business reputation in the NALCO.

Integrity Index Development

Integrity is the attribute which denotes accountability, fosters competency and transparency, boosting the ethical values of the personnel resulting in a corruption free environment. In this regard, a framework was envisaged by CVC in 2017-18 to measure integrity index in Public Organizations for ensuring probity. An initiative was taken under the direction of CVC by IIM-Ahmedabad to quantify level of Integrity in different organisations as Integrity Index involving 25 PSUs, State organizations and Ministries including NALCO. Performance, integrity perception, enabling systems, process management, and compliance are the broad parameters with detail questionnaire to bring out the level of probity, integrity, efficiency, transparency and compliance in the Organizations. The integrity index is to be computed based on these parameters including perceptions of the internal and external stakeholders. NALCO responded actively by participating in the process in a time bound manner and bridging in the gaps

in the processes in many areas during submission in the IID portal, which was finally submitted in February' 2018.

e-Governance

Nalco is leveraging Information Technology for e-Governance for speed, convenience and transparent Governance system promoting quick business decisions making and implementation of decisions. For better speed and performance, the network has been upgraded with 10 GBPS back bone and 1 GBPS access technology. The Wide Area Network connecting plants and offices has been completely migrated to MPLS technology. With augmentation of network following e-Governance interventions are introduced for effective business management and transparency.

- Through Enterprise Resource Planning (ERP) application, vital functions like Marketing, Materials, Finance, Human Resource and Production planning are controlled and monitored for quick data availability, transparency and ease of decision making.
- Centralized Non-ERP Applications such as Payroll, Attendance, Perquisites, Advances and Leave systems have been implemented. A centralized Hospital Management System has been implemented for the Company hospitals at Angul and Damanjodi.
- For governance and monitoring, online web-based application such as Capital Expenditure, Fund Monitoring, Monitoring and Compliance Management systems and Monitoring of Internal Audit observations have been implemented.
- The following mobile and web-based Apps have been developed for the benefit of stakeholders and public at large.
 - a. "NISARG" - NALCO Initiatives for Social Awareness and Responsible Growth. A vibrant App for Citizens at large on Nalco CSR activities.
 - b. "NAGINAA" - NALCO Grahak Information and Networking App for All – A feature rich App for Domestic Customers providing information such as Account Status, Despatch Plan, history, MOU calculator and product pricing information.
 - c. A Portal for contract labour has been deployed to facilitate contractors to manage contract workers attendance, payments and statutory returns.

Right to Information

In order to address the provisions of Right to Information Act (RTI), one Appellate Authority, two Public Information Officer and nine Assistant Public Information Officers responsible for providing information sought by stakeholders have been appointed. NALCO has been aligned with the Online RTI portal of Department of Personnel and Training (www.rtionline.gov.in) with effect from 18.01.2017. The RTI requests are received and replied through this online portal also. During F.Y. 2017-18, a total of 219 applications were received in addition to the 26 pending ones from previous year. As on 31.03.2018, 153 requests for information were accepted and replies sent, while 74 such requests were rejected. 18 requests for information are pending as on 31.03.2018,

Operations assessed for risks related to corruption

205-1

Vigilance department conducts Regular Inspections, Surprise checks, Intensive examination (CTE Type), sample check as per requirements along with complaint investigation. The vigilance functions are generally in the nature of preventive, punitive, surveillance and detection. All high value contracts and purchases and internal audit reports 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 ever necessary, findings along with system improvement suggestions, are given to the management by the vigilance department. NALCO has its vigilance set up at

three locations, i.e. Corporate Office, Bhubaneswar, S&P Complex, Angul and M&R Complex, Damanjodi.

Communication and training about anti-corruption policies and procedures

205-2

Various programmes were conducted for awareness on vigilance matters for the employees of the Corporation. The vigilance functionaries at the units have conducted regular training classes for the employees on the vigilance matters.

During the FY 2017-18 24 nos of vigilance awareness training programs were organised for sensitising the employees about various rules, procedures & CVC Guideline etc. to bring about transparency in the system.

Confirmed incidents of corruption and actions taken

205-3

27 vigilance related stakeholder complaints were received during the year, while 3 complaints were carried forward from previous year. Out of the total 30 complaints, 20 complaints were closed after analysis, while 10 complaints are under different stages of investigation with necessary actions. Depending on the gravity of irregularity and misdemeanour, appropriate actions as per NALCO Vigilance Manual and CVC Guideline, is taken. As a preventive vigilance measure, suggestions for a few important systemic improvements on contract execution, raw material procurement, sampling and testing, free issue material etc. are given during the year.



Integrity Pledge at NALCO



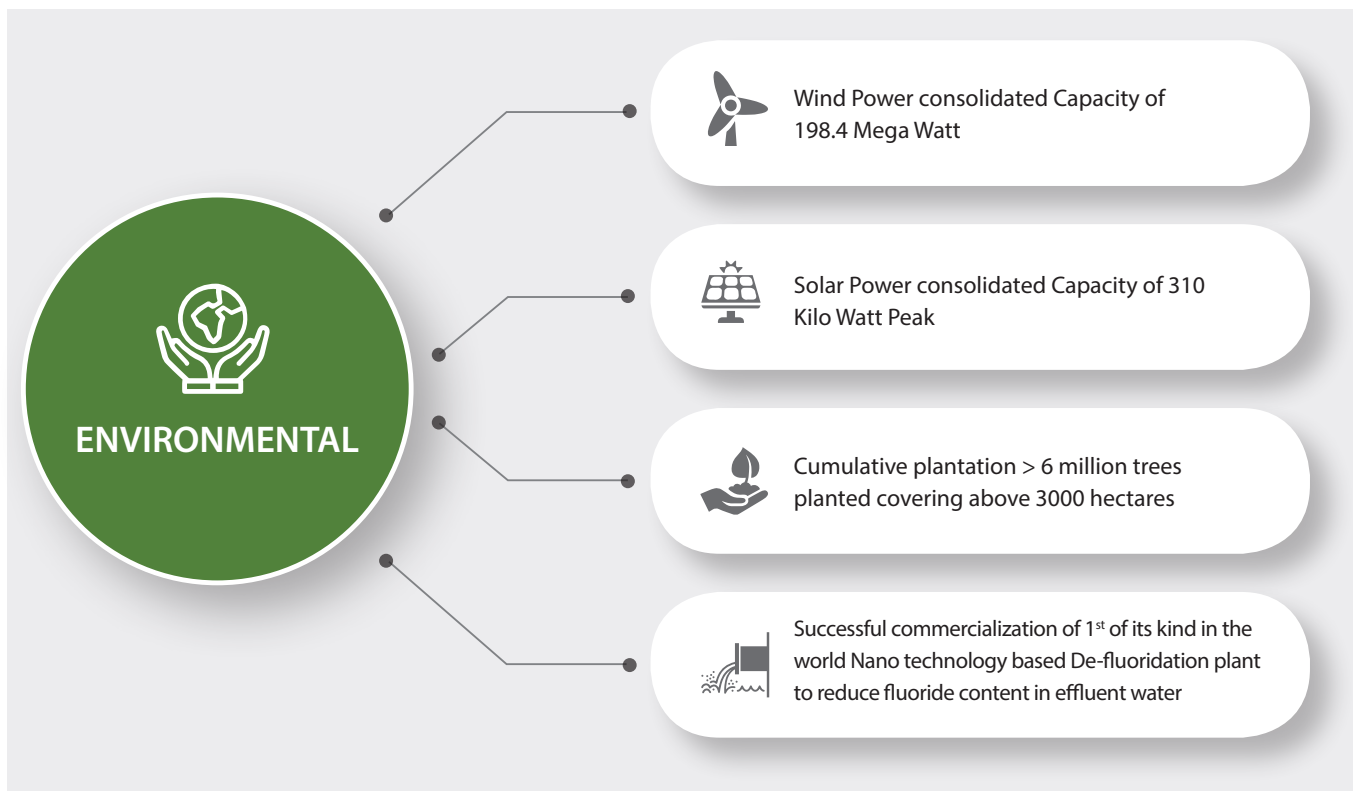


Environmental

300

Considering polluting potential of mining and metallurgical industries, NALCO has assigned top priority and taken every step to be environment friendly right from the planning and design stage to mitigate the known adverse impacts of its operations i.e. mining, refining and smelting on the environment. Adoption of green technologies, pollution control and environmental protection etc. are our defined area of environmental care. Emission Control, water pollution including ground water contamination, Hazardous material handling and proper waste disposal etc. rank high on our operational agenda. Our Environment policy explicitly declares adoption of non-polluting & environment friendly technology and affirms high importance to promotion and maintenance of pollution free environment in all our activities. Along with monitoring of effluents and emissions, management thrust is focused on alternative use, recycling and reuse of wastes and rejects through in house and collaborative

R&D efforts. All our production units are certified to Environment Management System Standard ISO 14001:2015. Our energy intensive units i.e. CPP, Smelter & Al. Refinery have established and maintained Energy Management Systems certified to ISO 50001 standard. A dedicated Safety, Health and Environment Dept. in each production unit coordinates handling of the environmental aspects of our operations. Use of Fluoride compounds, caustic soda, explosives, hazardous chemicals and fuels are always taken up with utmost care. Prevention of ground water and surface water contamination, air pollution, and rehabilitation of mined out areas and utilisation of y ash & red mud are some of the highpoints of our proactive environmental care. Each year in the Capital and Revenue budget suitable provision is made to augment and modernize pollution control and environmental protection activities.



To seamlessly comply with the increasingly tougher environmental regulations, proactive actions are taken to adopt new technology, revamp old equipment and restore used equipment. 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 contained the risk of water pollution. Adoption of better combustion technology, proper fuel handling and automated burner management have resulted in emission control and efficiency improvement. All the hazardous chemicals are stored and used as per laid-down procedures. Special care is taken in Smelter plant to prevent Fluoride contamination and in Refinery unit for caustic contamination.

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.

Pollution Control and Environmental Protection Measures

CPP

- In the year 2017-18, around 8,58,586 m³ of water from rainwater harvesting system & 2,64,912 m³ of water from exit point was recycled and re-used.
- Several steps have been taken up to enhance ash utilization at CPP:
 - 2nd phase work of Ash mound over Ash pond-II (from 111 MRL to 115 MRL) has been completed.

- Ash pond-I Dyke raising work has been completed (from 110 MRL to 113 MRL) and is in operation.
- The lean slurry project of mine void filling with ash is in progress.
- NALCO has been adopting high concentrated slurry discharge system in Unit-7 to 10 for disposal of fly ash to Ash pond-IV to prevent dust pollution and water conservation.

- A major modification has been carried out in the ash slurry trench by laying a 80 NB pipe line all along the trench so that the leakage ash from the header can be pumped back to the ash slurry sump thereby avoiding any slippage of ash to the nearby area.
- STP (Sewerage Treatment Plant) at CPP has been upgraded by installing phytoid filter & improved aeration system to meet the recent norms stipulated by CPCB and was put to operation throughout the year. Treated STP water was utilized for horticulture purposes only. In the year 2017-18, around 65,000 m³ of treated STP water was used for horticulture purpose.

Smelter:

- The project to recycle coke dust of Bake oven-I and dust of slot cutting machine to Gap-1 through mechanized conveying system.
- Fluoride is recovered by state-of-the-art Dry Scrubbing process using ABART technology. The fluoride recovered is recycled to the pots through alumina.
- Integrated automated alumina and bath mixing system commissioned to reduce generation of dust to a great extent.
- Three new dedusting systems have been installed at Rodding Shop-1 of capacities 82000 m³/hr, 62000 m³/hr & 15000 m³/hr.
- RTDAS (Real Time Data acquisition system) for Bake Oven, Pot Room stacks and four nos. online Continuous Ambient Air Quality Monitoring Stations (CAAQMS) have been installed



Cable Belt Conveyor from Bauxite Mines to Alumina Refinery

for continuous uploading of monitoring data to the server of OSPCB through GPRS service.

- As a part of waste to wealth initiative carbon portion of spent pot lining material was given to M/s Green Energy Resources, Sambalpur for trial detoxification, a technique developed jointly by JNARDC and R&D, NALCO and subsequently use of the energy value in cement industries.
- Three major dedicated drains serve sub-catchments of the different shop floor areas of Smelter Plant. Drains enter three HDPE lined concrete the settling ponds called Holding Pools for sedimentation. The capacities three Holding pools are approximately 1,00,000 m³, 51,000 m³ & 38,000 m³ respectively for management of contaminated surface water inside the plant. All the Holding pools are inter-connected. The contaminated water is treated in modern De-fluoridation Plant (DF Plant) of 900 m³/day capacity using ion-exchange technology. To augment the capacity recently, Smelter has commissioned latest patented Emrion Nano technology based De-fluoridation plant of 1000 m³ /day capacity. The state of art technology is having advantage of zero reject & sludge.

Alumina Refinery:

- 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 2017-18 is 103.5 %)
- In-house & collaborative R&D projects have been undertaken for commercial utilization 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.

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 NO_x and SO_x.
- Pressurized water sprinkling/dry fog system is used at unloading 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, backfilling 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.
- 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.
- Our Panchpatmali Bauxite Mines received the 5-Star Rating Award under Star Rating System of Indian Bureau of Mines for implementation of Sustainable Development Framework for the year 2016-17 at the 3rd National Conclave on Mines

and Minerals held at New Delhi by IBM on 20th March 2018. Our Mines was also awarded the second prize of CII Eastern Region SH&E Excellence Awards 2016-17 at a symposium held at Kolkata by CII Eastern Region Office on 8th August 2017.

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 the reporting period is enclosed.

Unit	Mines	Refinery	Smelter	CPP	Total
Plantation done during 2017-18	100536	19000	10040	3650	133226



Plantation at Damanjodi

Environmental Risk Management

Environmental Audits are done biannually in each operational unit under internationally acclaimed ISO 14001 Environmental Management System. Also, during Environmental Aspect & Impact study, some environmental risks emerge out. The perceived risks are mostly dealt with and 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 Concerns & Mitigation Measures

Unit	Products	Environmental Concerns	Risks	Opportunities / Mitigation Measures
Alumina Refinery	Calcined Alumina	a. Air Pollution b. Water Pollution c. Land contamination	1. Air Pollution: i) Stack Emission ii) Dust in Calcined Alumina, Bauxite, Coal and Ash handling areas 2. Water Pollution i). Waste effluent ii). Sewage & Waste water. iii) Surface Runoff water 3. Land Contamination i) Lime grit ii) Red mud iii) Ash.	1. Air Pollution: i) Electro Static Precipitators (ESPs) provided in Boiler for collecting particulate matters from Flue Gas. ii) ESP is provided in Calciners for collection of Alumina dust. • Bag filters and de-dusting system are provided in Alumina loading and unloading area. • Sprinkler and de-dusting system are provided in Lime Grit, Redmud, Ash, Coal and Bauxite handling areas. 2. Water Pollution: i) Effluents are treated in treatment facilities. ii) The waste water treatment, recycling and reuse is carried out for Ash pond and Redmud pond over flow water. • Recycling of return water from ash pond is reused for ash slurry making. • Red mud pond return water is reused for red mud slurry making and mud washing thus recycling caustic. • Sewage Waste water is treated in STP and the same is recycled and reused for Horticulture purposes. iii) Surface runoff water is stored in the Sabari Lake and disposed after necessary treatment if required. 3. Land Contamination: i) Lime Grit is disposed to recyclers for Brick or other allied product manufacturing. ii) Extraction of Iron concentrate and Gallium from Redmud is being explored. iii) Motivating entrepreneurs for utilization of fly ash in areas such as: in manufacturing of fly ash bricks, Development Report 2017-18 cement, road construction, dyke making, filling up low lying areas etc.

Unit	Products	Environmental Concerns	Risks	Opportunities / Mitigation Measures
Smelter	Aluminium	<ul style="list-style-type: none"> a. Air pollution b. Water pollution c. Land contamination 	<p>1. Air Pollution:</p> <ul style="list-style-type: none"> i) Fluoride & particulate emission from the FTP stacks due to pot operation. ii) Generation of PFC during anode effect. <p>2. Water Pollution</p> <ul style="list-style-type: none"> i) Generation of fluoride contaminated surface runoffs. <p>3. Land Contamination</p> <p>Generation of Hazardous waste like</p> <ul style="list-style-type: none"> (i) SPL, (ii) Dross, (iii) Shot blasting waste etc. 	<p>1. Air Pollution:</p> <ul style="list-style-type: none"> i) Adsorption of Fluoride gases in primary alumina by dry scrubbing method in FTPs. Online Continuous monitoring of emission at FTP stacks is carried out. ii) The Smelter plant is equipped with ALPSYS pot regulation system, which minimizes anode effect by timely dosing Alumina. <p>2. Water Pollution:</p> <ul style="list-style-type: none"> i) Surface runoffs are collected in three HDPE lined holding pools through dedicated drains. The fluorinated surface runoff is treated in Defluoridation plants. (Operated on Ion Exchange technology and latest Emrion nano technology). The treated water is then recycled for cooling, horticulture & other plant use. <p>3. Land Contamination:</p> <ul style="list-style-type: none"> (i) SPL is stored in impervious lined secured engineered landfill & also in concreted floor sheds to prevent land contamination. After separation, small quantities of semi-segregated Carbon & refractory portion of SPL are stored separately in concreted floor sheds. (ii) Aluminium Dross is recycled into pots. Action is underway to dispose of available dross to authorized recyclers, registered with OSPCB. (iii) Shot blasting waste etc. is being disposed off in common Hazardous waste landfill at Sukinda, Jajpur.
CPP	Electricity	<ul style="list-style-type: none"> • Air Pollution • Water Pollution • Land Contamination 	<p>1. Air Pollution:</p> <ul style="list-style-type: none"> i) Emission from Boiler ii) Fugitive Dust from Coal and Ash Handling Area. iii) Heat emission in flue gas. 	<p>1. Air Pollution:</p> <ul style="list-style-type: none"> i) ESP is provided in Boiler flue gas emission path. ii) Dust Extraction and Sprinklers system are provided in Coal and Ash Handling areas. iii) Heat recovery from Flue gas through Air Pre-heaters and Economiser is carried out for enhancing Boiler efficiency and reducing coal consumption.

Unit	Products	Environmental Concerns	Risks	Opportunities / Mitigation Measures
			2. Water Pollution i) Effluent Waste water ii) Sewage & Waste water iii) Surface runoff water 3. Land Contamination i) Mill Rejects ii) Ash iii) Scrap (Metallic and Non-metallic)	2. Water Pollution: i) Effluent treatment plant is provided for treatment of industrial waste water. The treated water is used for ash slurry making. ii) Decanted water from ash pond is reused for ash slurry making. STP is provided. The sewage waste water after treatment is reused for Horticulture & plantation purposes. iii) Surface runoff water is used in fire hydrant system for firefighting. 3. Land Contamination: (i) Mill Rejects is stored in demarcated low-lying areas for disposal to authorized parties for reuse. ii) The Ash in slurry form is disposed to Ash pond. The project for lean slurry disposal to Mines Void for reclamation of mined out area is in progress. Dry Ash is also used for low lying area filling, Stone quarries void filling. Therest is disposed to value added product manufacturer for ash brick making and use in Asbestos, cement etc., under a subsidy scheme. iii) The Scrap is sold to recyclers.
Mines	Bauxite	<ul style="list-style-type: none"> • Air Pollution, • Water Pollution • Noise pollution • Solid waste pollution 	1. Air Pollution: i) Emission from heavy vehicles ii) Fugitive Dust emission during Bauxite mining, handling including crushing in crusher and conveying in conveyor.	1. Air Pollution: i) Proper selection and maintenance of vehicles. ii) Water spraying on haul roads and stock pile area with 5 nos. of 28 KL mobile sprinkler and fixed sprinklers along haul road. <ul style="list-style-type: none"> • Suitable blast design and delayed blasting using NONEL detonators to minimise dust generation. • Installation of dry fog system at Crusher and Conveyor to suppress dust & fully covered conveyor to prevent dust generation. • Adoption of vacuum suction/wet drilling in all drill machines. • Peripheral barrier of 7.5 m width with plantation to retain dust particles.

Unit	Products	Environmental Concerns	Risks	Opportunities / Mitigation Measures
			2. Water Pollution i) Waste water from Canteen, Vehicle Washing and sewage from toilets 3) Noise pollution i) Noise during blasting and operation of heavy vehicles 4) Solid waste pollution: i) Overburden material from excavation of minerals 5) Land Degradation i) Excavation of overburden and ore material by blasting and use of machinery.	2. Water Pollution: i) In-situ peripheral barrier all around active mining area to prevent silt laden rain water outflow. • Check dams at strategic points to filter muddy water if any from mining areas • Collection of rain water in mining area in sumps and percolation of collected water into ground • Water from toilets treated in septic tanks and disposed in soak pits, canteen waste water treated in biological treatment unit, wash water from vehicle washing area treated in oil water separator. Treated water from canteen and vehicle wash area fully reused for dust suppression and plantation 3) Noise pollution: i) Suitable blast design including delayed blasting using NONEL detonators to minimise noise • Peripheral plantation to prevent propagation of noise • Selection of suitable less noisy equipment, provision of noise proof cabins in HEMMs and provision of PPEs to workers 4) Solid Waste Pollution: i) 100% reuse of top soil and reuse of overburden for back filling of mined out areas 5) Land Degradation: i) Concurrent mining and backfilling of mined out areas. ii) Rehabilitation of mined out area with extensive plantation.

Raw Material Sourcing & Conservation

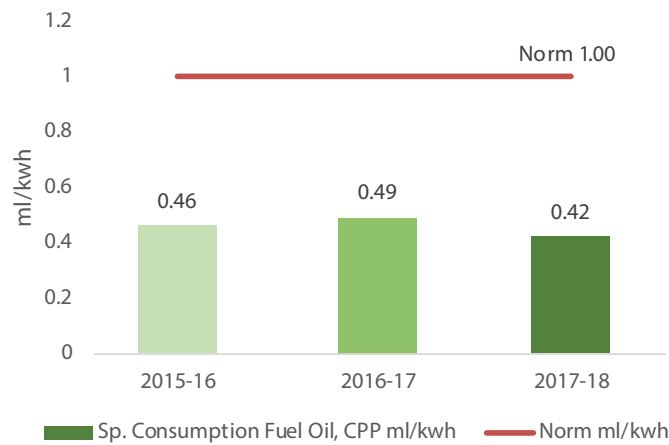
301

103-1, 103-2 and 103-3

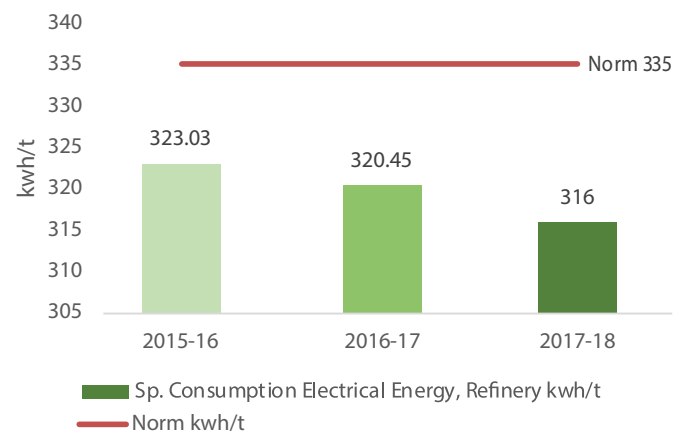
While being concerned with ensuring consistent availability of our input raw materials, we also attach prime importance to resource conservation through monitoring and controlling their consumption. Conservation of bauxite & coal, our main raw materials is integral to our operation. Bauxite is sourced 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 Flouride, CP Coke & CT Pitch. multiple procurement sources are identified to deal with any uncertainties in supply. Raw materials are procured as per the annual procurement plan chalked out at the beginning of year. Consumption of raw materials is kept under scrutiny to achieve the norms of consumption fixed by Technology Committee. Close watch on consignment of procured raw materials facilitate timely receipt. NALCO is committed to progressively achieve optimization of raw material usage through adoption of better technology, process redesign and elimination of wastage.

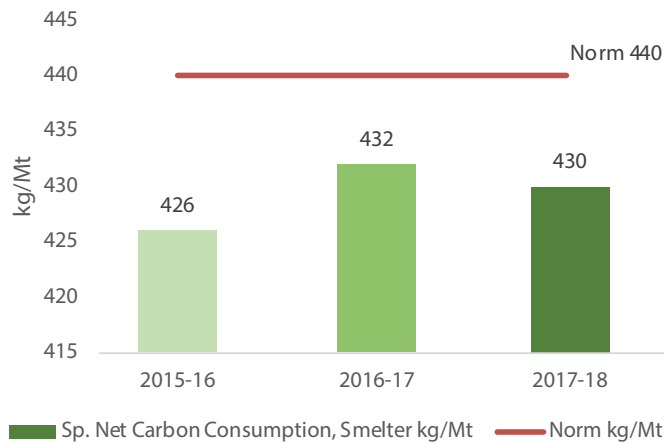
Sp. Consumption Fuel Oil, CPP (ml/kwh)



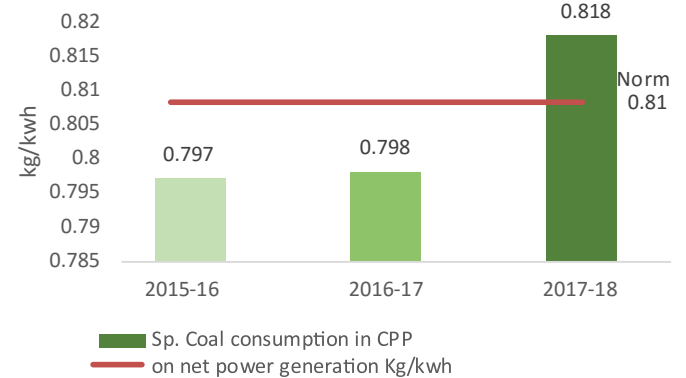
Sp. Consumption Electrical Energy, Refinery (kwh/t)



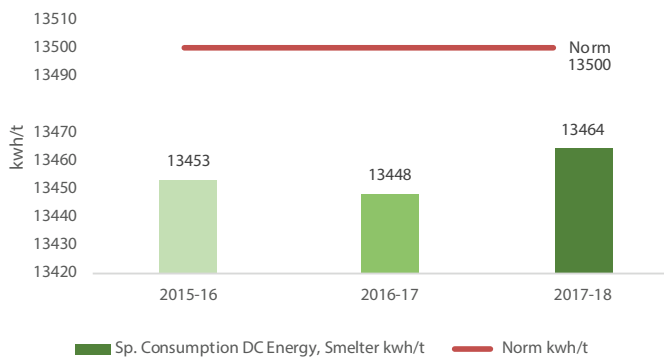
Sp. Net Carbon Consumption, Smelter (kg/Mt)



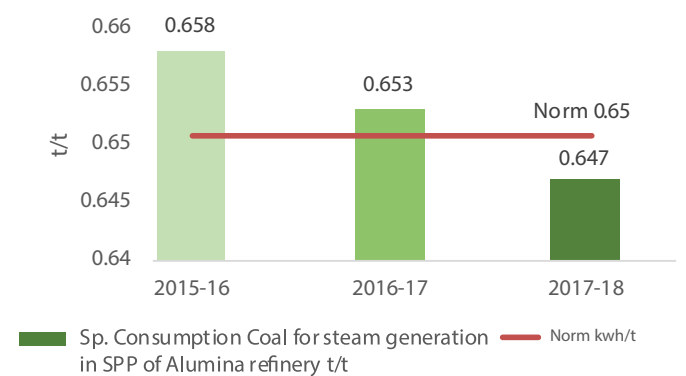
Sp. Coal consumption in CPP on net power generation (kg/kwh)



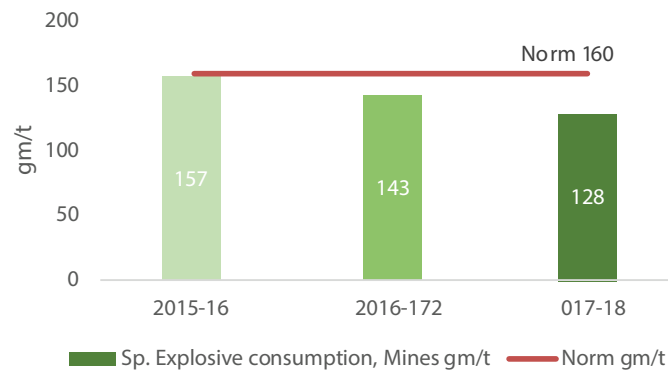
Sp. Consumption DC Energy, Smelter (kwh/t)



Sp. Coal consumption for steam generation (t/t)



Sp. Explosive consumption, Mines (gm/t)



Materials used by weight or volume

301-1

Materials consumed		Source	2015-16	2016-17	2017-18
Raw Material	Alumina (Mt)	Internal Production	7,20,880	7,53,401	8,26,295
	Coke (Mt)	External Suppliers	1,45,387	1,51,032	1,63,634
	Pitch (Mt)	External Suppliers	34,395	35,137	38,127
	Bauxite (Mt)	Internal Production	63,40,142	69,29,194	69,18,511
	Caustic Soda (Mt)	External Suppliers	2,07,114	2,30,647	2,10,999
Associated Process Material	Aluminium Fluoride (Mt)	External Suppliers	6,760	8,149	8,014
	Wheat Bran (Mt)	External Suppliers	1,977	1,703	1,480
	Lime (Mt)	External Suppliers	54,120	61,353	63,071
	Explosives (Mt)	External Suppliers	1,924.00	1,172.00	967.25
Packaging Material	VSI HDPE fabric (m2)	External Suppliers	2,44,600	2,52,700	240462
	Wood in wooden pallets (m3)	External Suppliers	30,981	32,355	12916
	Steel straps (Mt)	External Suppliers	194.5	271.3	249.0
	Polyster Strap (Mt)	External Suppliers	60.7	85.9	74

Recycled input materials

301-2

Recycled Input Materials (Mt)	2015-16	2016-17	2017-18
Al. Dross	5523	5508	5688

Energy

302

103-1, 103-2 and 103-3

Aluminum being an energy intensive product, we are concerned about Energy efficient technology and energy conserving operation right from the inception of the project to achieve reduction in production cost giving a competitive advantage in market. Our conviction is further consolidated after implementation of National Mission on Enhanced Energy Efficiency by Bureau of Energy Efficiency, Ministry of Power, Govt. of India for achieving energy efficiency improvement, energy conservation and use of green energy as the antidote to climate change.

Adoption of improved technology, process redesign and installation of energy efficient equipment to achieve energy efficiency and addressing the global concern on climate change is a continuous process at NALCO. We are committed towards reduction of GHG emissions by reducing consumption of fossil fuels and adopting better combustion controls thereby pursuing the objective of limiting emission to the lower end of the IPCC emission scenarios in line with current international agreements.

All the three production units CPP, Smelter and Alumina Refinery, included in the Perform, Achieve & Trade (PAT) scheme, are operating with valid ISO 50001 certificates, having accreditation from RvA, Netherlands. Total 36,119 Energy Saving Certificates issued to NALCO by Ministry of Power, Govt. of India for achieving energy reduction in excess of PAT Cycle1 targets are banked and included in financial accounting. Comprehensive Energy audits are conducted at all our production units and offices regularly for monitoring our energy consumption and validate energy saving.

We have also ventured into wind power and solar power generation in a big way for providing access to clean and affordable energy to support environmental protection.

Energy consumption within the organization

302-1

Consumption of fossil fuel leads directly to GHG emissions and consumption of electrical energy leads to associated, indirect GHG emission. Total energy consumption in our operations during 2017-18 was 128586.164 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.

Energy Consumption:

Energy (GJ)	2015-16	2016-17	2017-18
HFO	7,146,371	7,859,449	7,963,774
LPG	8,480	8,557	873
LDO	155,545	145,380	151,680
Diesel	242,926	265,359	258,176
Coal	106,470,041	111,094,623	119,962,779
Indirect Energy consumption (GJ)	0	0	248,882
Total Energy Consumption (GJ)	114,023,363	119,373,368	128,586,164

Reduction of energy consumption

302-4

Extraction of Aluminium being an energy intensive process, conservation of energy is a market driven need for our sustainability. This is the prime consideration in selection of technology and purchase of equipment and is 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 subscribes to the above ideology.

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. Responsible use of light, fan, ventilation system, air conditioning etc. is achieved by building behavioral awareness of our workforce. Our performance in PAT cycle -1 has further strengthened our resolve to improve energy efficiency in our plants and townships, which is reflected in 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.



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 2017-18
Alumina Refinery	<ol style="list-style-type: none"> 1. Procurement, installation & commissioning of 50 nos. VFDs in Battery A, B, C & D completed on 30.12.2017 which gives energy saving of 9,00,000 kwh per month approximately. 2. Use of dewatering aid for reduction in moisture of feed hydrate to Calciners for reduction in Fuel oil consumption. 3. Modification of Aluminate Liquor pipes to Streams 3 & 4 seed filter chutes to reduce discharge pressure of aluminate pumps for Electrical Energy Saving. 4. Indirect heating of Chemical Cleaning Liquor for Streams 1 & 2 precipitator for Steam Energy Saving. 5. Replacement of old aluminate liquor pumps with energy efficient pumps to save electrical energy. 6. By use of synthetic flocculent in place of wheat bran for mud washers; reduction of Steam Energy and Electrical energy is achieved. 7. Downsizing of blower capacity for three numbers of disc filters for saving electrical energy. 8. Modifications carried out in steam ejector lines of evaporators to maintain vacuum to achieve higher steam economy for steam saving. 9. Conversion of two numbers of seven stage boiler feed pumps of boilers 1, 2 & 3 to six stages as an electrical energy conservation measure. 10. Development and standardization of control philosophy to reduce support fuel (HFO) during Coal Mill changeovers has been done and saving of 171 kl HFO achieved. 11. Replacement of tube lights and incandescent bulbs with LED tubes and bulbs at all major roads and public buildings 12. Replacement of Air Preheater (APH) in Boiler no. 1 and 3. Procurement completed. Erection/Installation in Boiler 3 is in progress. Erection/Installation in Boiler 1 will be done in next Year.
Aluminium Smelter	<ol style="list-style-type: none"> 1. Total 121 no. of pots graphitized in the FY 2017-18 saving 12,670 Mwh energy. 2. Replacement of 102 nos. of standard LT motors with high energy efficient IE-2 class motor: saving 7,46, Mwh energy 3. Putting sun film over window & door glass of compressors house 2 and rodding shop control room: saving 50 Mwh energy. 4. Replacement of Aluminium blades by FRP blades in cooling tower 1 & 2: saving 75 Mwh 5. Reduction in Electrical Energy consumption in pot lines by installation of Anode Slot Cutting Machine at Rodding Shop-II. 6. Waste heat recovery by use of Recuperator in Melting furnace-1 of Rolling Plan 7. Replacement of 5,127 nos. TFL Tubes and 284 nos. HPSV/MH lamps with LED Lamps 8. Development of low energy cell technology for smelter plant (AP2XN) in collaboration with Rio Tinto Alcan (RTA) is in progress so as to reduce Electrical Energy consumption in pot lines
Captive Power Plant	<ol style="list-style-type: none"> 1. Improved version of Air Preheater having double sealing arrangement with 24 Sectors were retrofitted in place of original single sealing, 12 Sectors APH in Unit#1 with the assistance from M/s. BHEL in January 2018. This has resulted in increase in boiler efficiency by about 1.14% due to reduction in air leakage and increased heat transfer. Replacement of APH in other units of CPP is planned. 2. Chemical cleaning of Condensers of Unit - 1, 8 & 10 has resulted in reduction of Unit Heat Rate by about 84 kcal/kwh and saving in coal consumption by 16,371 Mt/year per Unit due to improvement in condenser vacuum. 3. A plant wide Energy Management System comprising of multifunction meters (600 nos.) connected through a large network of Fibre Optic cables was commissioned for accurate monitoring and measurement of energy in the plant. 4. A Centac compressor was replaced with a new energy efficient Screw Compressor of capacity 43 Nm³/min in Unit #7 & #8 Compressor House in September 2017. 5. Procurement and installation of energy efficient light fittings: <ol style="list-style-type: none"> a. Electronic Tube light ballast in place of copper ballast: 883 nos. b. Total nos. of LED light fitting installed in place of conventional ones: 1,871 nos.
Bauxite Mining	<ol style="list-style-type: none"> 1. 230 nos. old conventional 250-Watt HPSV Lamps, 110 nos. old 250-Watt HPSV fixtures, 300 nos. of 70 Watt well glass HPSV fixtures, 110 nos. of 70 Watt Well glass fixtures, 80 nos. of 250-Watt HPSV Flood light fixtures have been replaced by their corresponding equivalent LED Luminaries. 2. 10 nos. of Astronomical timers have been installed in lighting circuits in place of digital timers with a view to conserve energy.

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
- 50.4 Mw Wind Power Plant at Jath, Sangli, Maharashtra
- 160 kwp Rooftop Solar Power Plant at Corporate Office, Bhubaneswar
- 100 kwp Rooftop Solar Power Plant at NALCO Township, Bhubaneswar
- 50 kwp Rooftop Solar Power Plant at NRTC, Gothapatna, 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.

- Company has placed order for 25.5 Mw Wind Power Plant at Kayathar, Tuticorin, Tamil Nadu
- Around 1 Mw rooftop Solar Power Plant is planned at Alumina Refinery, Damanjodi.

The increase in energy consumption and greenhouse gas generation are due to increase in production of alumina hydrate, aluminium and power. Compared to year 2016-17 energy consumption has increased in 2017-18 by 7.52 % whereas hydrate, aluminium and power production has increased by 0.21 %, 10.08 % and 7.93 % respectively.

Water Stewardship

303

103-1, 103-2 and 103-3

Water Scarcity has emerged as one of the top-most concerns all over the world. NALCO is well conscious of the fact that water, one of the basic inputs for industry is getting scarce day by day. In India, erratic pattern of rains and depleting ground-water reserves have

Water withdrawal by source

303-1

Surface Water	Source	Unit	2015-16	2016-17	2017-18
Smelter & CPP	Brahmani River	m ³	3,61,41,063	3,86,21,471	4,00,89,366
Alumina Refinery	Kerandi River	m ³	99,23,370	92,91,450	87,57,692
Bauxite Mines	Jholaguda Stream	m ³	8,25,425	7,86,986	6,92,832
Total Withdrawal		m ³	4,68,89,858	4,86,99,907	4,95,39,890

Water recycled and reused

303-3

Water conservation & recycling is an issue of 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

made water conservation and management critically important for one and all. We know that responsible use of water will yield rich dividends towards future availability of water for survival of the industry.

NALCO utilizes water in a responsible manner, considering the inherent seasonal fluctuations of its availability from our main sources like rivers and streams. Our management strategy is responsible use of water resources throughout the life cycle of industry. Water Conservation is an integral part of our project planning which we are refining further by reviewing all our operations based on recent technological breakthroughs. After setting up recycling systems for Ash Pond and Red Mud Pond water, we are resorting to high concentration slurry disposal followed by dry disposal of fly ash to further conserve water.

Waste water and sewerage water is treated in all our plants for use in process and horticulture respectively. After having successfully implemented zero discharge policy for waste water, we are now focusing on rain water harvesting and ground water recharge. Recently we have commissioned water treatment plant based on "Emiron Nano Technology" for de-fluoridation of water, a first of its kind in the world.



recharging is done in all our units. Another area where we have achieved exemplary success is recycling of ash pond and red mud pond water. After adoption of ion exchange and reverse osmosis method of water purification we have recently graduated to Emiron Nano Technology method of de-fluoridation in our Smelter Plant.



Water Recycled/Reused	Unit	2015-16	2016-17	2017-18
CPP				
STP	m ³	1,00,000	1,00,000	65000
ETP	m ³	21,54,200	26,63,000	30,33,336
Ash Pond	m ³	1,49,30,800	1,61,63,255	1,52,46,625
% Water Recycled/Reused	%	64	64	100
Refinery				
RMP	m ³	38,13,309	34,73,918	29,53,808
Ash Pond	m ³	90,95,911	92,93,695	86,01,715
STP	m ³	5,43,120	5,43,000	5,44,500
% Water Recycled/Reused	%	136	143	138
Mines				
ETP & STP	m ³	76,650	76,650	76,650
% Water Recycled/Reused	%	9.29	9.74	11.06
Smelter				
STP	m ³	2,19,000	2,37,250	Included in ETP
ETP, Subsoil Water & Others	m ³	4,74,500*	8,76,000*	3,57,432
% Water Recycled/Reused	%	23.82	52.10	17.00

*Approx. estimation

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

MINES	Effluent water handling	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	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 ponds have been excavated in the unexplored area which are also acting as significant rain water storage and reuse facilities. Two 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	There is an in-situ peripheral barrier all around the mining area which prevents rain water from inside mines from going down the valley. All the runoff inside the mining area gravitate towards the low-lying areas inside mine and percolate into the ground thus recharging the ground water.	
REFINERY	Red Mud Pond	From Red mud pond total 2953808 m ³ water is recycled as per zero discharge principle and used for leaching out caustic from fresh generated mud from the process.	
	Ash Pond	Total water recycled from Ash pond is 8601715 Mt as per zero discharge principle, and used for making ash slurry of the Fly ash from the boiler ESP.	
	Sewerage Treatment Plant	Two No. of Township STPs of capacity 20 m ³ /hr & other 125 m ³ /hr, recycle water for horticulture & gardening.	
	Rain water and plant outlet surface drain off holding ponds	Sabari Lake, volume: 50000 m ³ Shiva Lake, volume: 16000 m ³ SVM Lake, volume: 28825 m ³	Recharges to River Kerandi Recharges to River Kerandi Recharges to River Kerandi
	Rain Water Harvesting inside Refinery Plant	Three number of rain water harvesting facilities had been installed inside Refinery. I) At Administrative Building roof top: Harvested volume 2000 m ³ ; Caters to the need of green belt. II) At HRD Training centre 2 no. Total harvested volume 4000 m ³ ; Caters to the need of green belt, and ground water recharge	
CPP	Ash pond Recycle System	Around 50,000 m ³ per day water is recycled back from Ash pond after treatment to the ash water pump house for reuse in the system. In the year 2017-18 around 15258445 m ³ of water recycled to plant for use in ash handling system.	
	Industrial Drain Water Recycling System (IDWRS)	CPP, NALCO have adopted zero discharge with respect to industrial waste water. All industrial drain waste water is channelized to a treatment facility called Industrial Drain Water Recycling System (IDWRS) and after treatment the treated water is used for ash disposal system. In the year 2017-18 around 3033336 m ³ of water (8300 m ³ /day) was recycled back from IDWRS. This is further reducing water intake from river Brahmani.	
	Sewage Treatment Plant	STP of capacity 175 m ³ /day is 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 65000 m ³ /Year STP water was recycled back for reutilization in horticultures thereby reducing water intake from river Brahmani	
	Sludge Pond Recovering system	In the sludge pond recovering system, sludge, grit consisting of sand, gravel, or heavy solids are allowed to settle and around 300-350 m ³ per day (depending on season) of water is recovered and sent to the raw water reservoir of CPP.	

SMELTER	Dust Suppression System	Clear water of around 13 m ³ per hour is recovered from the dust suppression system in CPP and is guided for use as ash slurry.
	Rain water Harvesting and Recycling system	Rain water Harvesting and Recycling system has been commissioned having harvest pond capacity of 50000 m ³ equipped with 2x250 m ³ of pumping capacity on Sept'2016. The recycled water is used as a make up to fire hydrant. Fore bay of RCPH-1& also extended to raw water reservoir. In the year 2017-18, around 858586 m ³ of water from rain water harvesting system and around 264912 m ³ of water from storm water exit point was recycled and re-used.
	Roof Top Rain Water Harvesting	Roof top rain water harvesting system has been installed in CW pump house & RCPH buildings of CPP. Roof top water collected during monsoon is fed to CW fore-bay & RCPH fore-bay. Normal annual rain fall in this region is around 1400mm. Thus during normal rainy season around 3500m ³ /year rain water shall be harvested. This will reduce the water make up quantity to CW fore-bay & RCPH fore-bay.
	Recycling of treated water of Sewage Treatment Plant	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 de-fluoridation plant and utilized for plant use. Around 17 m ³ /hr, STP water was recycled back for reutilization thereby reducing water intake from river Brahmani
	Reuse of surface runoffs & waste water	At smelter plant, there are three holding pools of capacity 100,000 m ³ , 51000 m ³ & 38000 m ³ respectively which store surface runoffs of pot-line & carbon area during rain along with waste water from the shop floor which is then treated in the de-fluoridation 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, de-fluoridation 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	The subsoil water collected below the pot-line 3 & 4 are recycled in the process. The sub-soil water of pot-line 3 is used in cooling and fire water makeup of rolling plant whereas the subsoil water of pot-line 4 is recycled as makeup water for compressor cooling. Around 700 to 900 KLD water is conserved in the above way.
	Surface runoff management	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	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	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 Nos. of charging wells.



Bio-diversity

304

103-1, 103-2 and 103-3

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. We have made conscious efforts to manage our land and adjacent forest cover and development of green belt at all our operating units. 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.

Bio-diversity studies have been conducted in the core and buffer zones of the bauxite mine by a professional agency and a Wildlife

Management Plan has been prepared and approved by the State Forest Department, details of which are given in next section. The suggested measures for conservation of bio-diversity are implemented. Our bauxite mines are in hilly areas. By its basic nature bauxite bearing hill tops are barren with only sparse bushes, as such 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 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.



Plantation at Bauxite Mine

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 contain the dispersal of dust in the adjoining areas;
- Prevent noise propagation
- Prevent soil erosion;
- 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.



IUCN Red List species and national conservation list species with habitats in areas affected by operations

304-4

The wild life management plan prepared by M/s CEMC, Bhubaneswar anticipates the following impacts due mine operation. 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. No Shedule1 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, out of which, two mammalian species (Elephant and Sloth bear) belong to Schedule – I category. Apart from the above species, there are 6 insects found during our field survey, belonging to different species: 3 butterflies, 2 crickets and 1 grass hopper.

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 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.

Above suggestions have been implemented.

For Central and North Block, the Wildlife Management Plan has been approved by PCCF (Wildlife), Odisha, Bhubaneswar during 2014. NALCO has made a payment of ₹ 2011.50 lakhs to the State Forest Department in Orissa CAMP, MoEF & CC towards implementation of the Plan. Besides the above ₹ 2,63,07,260/- have been deposited with Orissa CAMP 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 ₹ 10.43 Crores has been made with CAMP, MoEF & CC for its implementation. Besides the above ₹ 1,37,34,812/- have been deposited with Orissa CAMP 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 through the Botany Department, Utkal University at a cost of ₹ 16,28,000/-. The study has been completed and various suggestions for conservation of biodiversity 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 help in increasing the time period of water now 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 belts have been planted around the mine lease boundary to screen the noise and arrest 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 of impulse type which may be controlled by adequate stemming column. Use of noiseless trunk line for bottom initiation is done as such noise from primary blasting is 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 equipment like crusher, etc. are made sound proof to protect the operators from high noise levels.
- Maintenance and fine tuning of machinery are 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:

- Number of holes to be blasted at a time is restricted to 8 – 10.
- Proper blast design and optimum use of explosives to reduce by rocks, over fragmentation, ground vibration and noise.

- To reduce noise /air overpressure as well as ground vibration, deck charging has been recommended for 8m to 10m deep holes.
- 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 meters on hill slopes. Employees are provided with personal protective equipment like ear plugs, ear muffs wherever necessary. In addition, MINH, Nagpur carries out noise and vibration studies of various equipment and structures inside the Mine in order to rectify any abnormal conditions detected during the study.

Emissions

305

103-1, 103-2 and 103-3

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 authorities 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 671 kg R-22, 638 kg R-124 & 62 kg R-134a gas. CPP used 1769 kg R-22 gas during the year.



Direct Energy (Scope 1) & Indirect Energy (Scope 2) GHG emissions

305-1, 305-2

Fuels	Unit	2015-16	2016-17	2017-18
HFO (Scope 1)	t CO ₂ e	553,129	608,321	616,396
LPG (Scope 1)	t CO ₂ e	535	540	55
LDO (Scope 1)	t CO ₂ e	11,526	10,773	11,239
Diesel (Scope 1)	t CO ₂ e	18,001	19,663	19,131
Coal (Scope 1)	t CO ₂ e	10,466,005	10,920,601	11,792,341
Electricity Consumed (Scope 2)	t CO ₂ e	0	0	56690
Total GHG Emission (Scope 1 & 2)	t CO ₂ e	11,049,196	11,559,898	12,495,853

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 2017-18 were 12.495 million tonnes of CO₂e. The other relevant indirect greenhouse gas emissions are not significant considering the scale of operation.

Emissions of ozone-depleting substances (ODS)

305-6

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. 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 2017-18, the PFC emission from Smelter Potline has been estimated using AP (Aluminium Pechiney) overvoltage method and their values are given below:

CFC	Unit	Value
CF₄	(kg/t Al)	0.0367
C₂F₆	(kg/t Al)	0.0044



Effluent & Waste

306

103-1, 103-2 and 103-3

Any waste is a burden on environment and drain of scarce natural & financial resource. In recognition of above fact, we give prime importance to reduction of waste generation and any waste generated due to limitation of technology, process instability or human negligence are either given for alternate use or benignly contained scientifically. Finding alternate use for waste is the challenge and we accept the challenge to change the practice from waste disposal to waste management abiding by all applicable laws in this pursuit. Also, we take all preventive measures at waste generation area to shield its negative effect on work force and periphery.

Waste Management in NALCO starts from project planning and evaluation stage. Identification of process wastes, and their management strategy is kept in mind at the time of technology selection. 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 technological breakthroughs and changing regulatory guidelines. All our production units are certified to environment Management System ISO 14001 and during internal and periodic surveillance audit of EMS our waste management system is also reviewed, and any observed deficiencies are rectified. The total process is monitored by regulatory agencies such as State Pollution Control

Board, IBM and MoEF. Proper waste handling is also assigned due weightage during Aspect Impact Study, Hazard Identification & Risk Assessment and Disaster Management Plans.

The 3R concept i.e. Reduce, Recycle and Reuse is imbibed in our waste management practices. NALCO's approach towards waste management has been to find alternate use of wastes created during the process. Intensive use of electrical energy for aluminium extraction has compelled us to go for captive thermal power generation with its associated risk of bulk fly ash generation. Exploring alternate use of fly ash, we facilitate, and practice use of fly ash for brick making, road & embankment construction, use in cement industry and concrete making, mine void filling etc. Likewise, beneficiation of bauxite produces huge amount of red mud and finding alternate use for this iron and other mineral rich reject through R&D effort is our prioritized approach. We adopt the policy of safe disposal and segregation in case of hazardous wastes where safe reuse is not possible so that environmental pollution and risk to biodiversity are minimized.

We continuously educate employees and upgrade their skill to reduce wastes generated due to process instability and human negligence. 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.

Water discharge by quality and destination

306-1





Parameter	2015-16		2016-17		2017-18	
	Norm (mg/l)	Range After Treatment (mg/l)	Norm (mg/l)	Range After Treatment (mg/l)	Norm (mg/l)	Range After Treatment (mg/l)
Suspended Solids	100	16 - 33.29	100	14.75 - 32.04	100	14.92 - 28.46
COD	250	13.25 - 137.95	250	13.25 - 148.21	250	12.67 - 126.25
BOD	30	5.9 - 22.66	30	3.67 - 22.25	30	2.8 - 14.63
Oil & Grease	10	2.2 - 137.95	10	0.9 - 1.41	10	0.8 - 2.4

Waste by type and disposal method

306-2

All the wastes generated by us are identified and segregated as Hazardous Waste and Nonhazardous waste right at the generation point. Hazardous wastes are segregated and safely, disposed as per the laid-down procedure developed for their handling complying with all the applicable statutory guidelines. 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 Red-mud Pond in slurry form. Decanted water from red-mud pond is used for mud washing, there by recovering valuable caustic for process use. Apart from alternate use of excess fly ash from our CPP, it is hydro sluiced to ash pond and excess water from pond is recycled back. 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.

We have involved R&D effort to a great extent in our pursuit to reuse wastes. Filtration trials of Red mud carried out in pilot setups with M/s. Unitop Multitech India Pvt. Ltd. and M/s. FL Smith to establish the efficiency of pressure filtration for Red mud filtration. The data generated will be used for plant scale implementation. "Extraction of Alumina from Partially Lateritized Khondalite (PLK) at laboratory scale" has been completed and the basic flow sheet for the process has been developed by CSIRO, Australia. NALCO & IIT, Bhubaneswar have jointly developed a process for "Synthesis, Characterization and Development of Red Mud-Fly ash based Geopolymer concrete" which has a potential for application in civil activities.

Steps taken for Recycling & utilization of different wastes are summarized below:

Facility	Hazardous waste generation	Unit	2017-18	Waste Management Method
Alumina Refinery	Spent Resin	Mt	14	Disposed in secured land fill
	Used oil	kl	87.14	Sold to authorized recycler
	Discarded Asbestos	m2	100	Dumped in specified pits
	Red mud	Mt	3096637	Disposed to red mud pond
Smelter	Aluminium Dross	Mt	7288	Recycled in the process
	Cathode Residue	Mt	6050	Stored in covered sheds on concrete floor. Refractory portion & Carbon portion of SPL are segregated and stored separately under shed. Carbon portion sent to authorized recyclers. For disposal of refractory & mixed portion permission from OSPCB is awaited to dispose in CHWTSDF. Efforts underway for installation of De-Toxification plant for treatment of Carbon portion of SPL as per patented technology through R&D.
	Spent Anode	Mt	67768	100% recycled in anode making
	Rejected Filter Bags	Mt	14.39	Incinerated in pot
	Rejected ALF3 bags	Nos.	54259	Incinerated in pot
	Used oils	kl	31	Sold to authorized recycler
CPP	Spent Resins	kl	12	Disposed in secured land fill
	Used oils	kl	48.57	Sold to authorized recycler
Mines	Used oils	kl	62.58	Sold to authorized recycler

Non-Hazardous waste generation	Waste	Unit	2017-18	Waste Management Method
Alumina Refinery	Lime grit	Mt	26111	Used as land fill
	Fly ash	Mt	612172	Used for cement & brick making etc. Excess ash dumped in ash pond.
	Empty containers	Mt	748	Sold to authorized recycler
Smelter	Ferrous Scrap	Mt	6430	Disposed to recycler
	Non-ferrous Scrap	Mt	678	Disposed to recycler
	Mixed Debris	Mt	1700	Disposed in the low-lying areas
	Refractories Bricks	Mt	2815	Reused in construction of temp. resistant floor
CPP	Fly ash	Mt	2670.8	Used for cement & brick making etc. Excess ash dumped in ash pond.
Mines	Overburden	Mt	720000	Reused in backfilling of mined out area

Fly ash utilization of 104.8% was achieved during 2017-18. At Smelter, 873.49 Mt of carbon portion of SPL was disposed to OSPCB/CPCB authorized re-processors. Third party Hazardous Waste Audit was also carried out at Smelter.

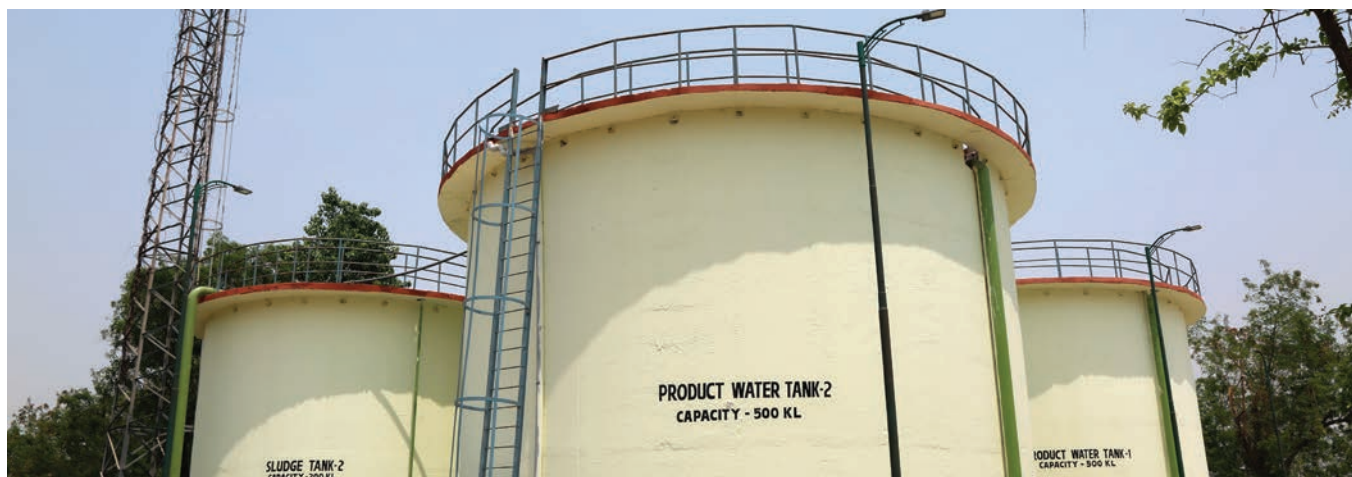
Recycling & Reuse

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 and 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. Spilled metal is also recycled by collection and re-melting.

Recycling/ Reuse of waste 2017-18

Unit	Percentage	Utilisation
Bauxite Mines	100%	Overburden is utilized for reclamation for mined out areas
Alumina Refinery	6.31%	Caustic Soda is recycled from red mud
	103.5%	Ash utilization
Smelter	100 %	Recycling of Aluminium scrap
	78 %	Aluminium dross recycled as input to process
	100 %	Recycling of spent anode
CPP	46.77%	Ash utilization



Overburden Management

The removed overburden is stacked properly for subsequent use in reclamation. As far as restoration of mined out area is concerned, the mine is reclaimed concurrently as per Progressive Mine Closure Plan in the approved Mining Plan/Scheme. Overburden & top soil stripped ahead of bauxite mining faces, are dumped in the backfilled/ mined out area. Dumped lateritic overburden is first levelled, followed by laying of topsoil which is properly dressed, thereby making the reclaimed land suitable for plantation, with adequate provision for benches and terraces. The mined-out area

is totally reclaimed with backfilling, plantation and water basins at strategic points for ensuring proper drainage. Afforestation of the backfilled areas is carried out with selected indigenous foliage and fruit bearing species. Care is taken to preserve the natural topography of the virgin area and prevent soil erosion. After plantation, these areas over time are covered with dense vegetation, which is evident from the present-day scenic greenery of our bauxite mine.

Year	Mined out area rehabilitated during the year	Cumulative area rehabilitated since inception
2017-18	18.73	314.37



Overburden handling at Bauxite Mine





NALCO Tableau on Republic Day-2018

Social

400

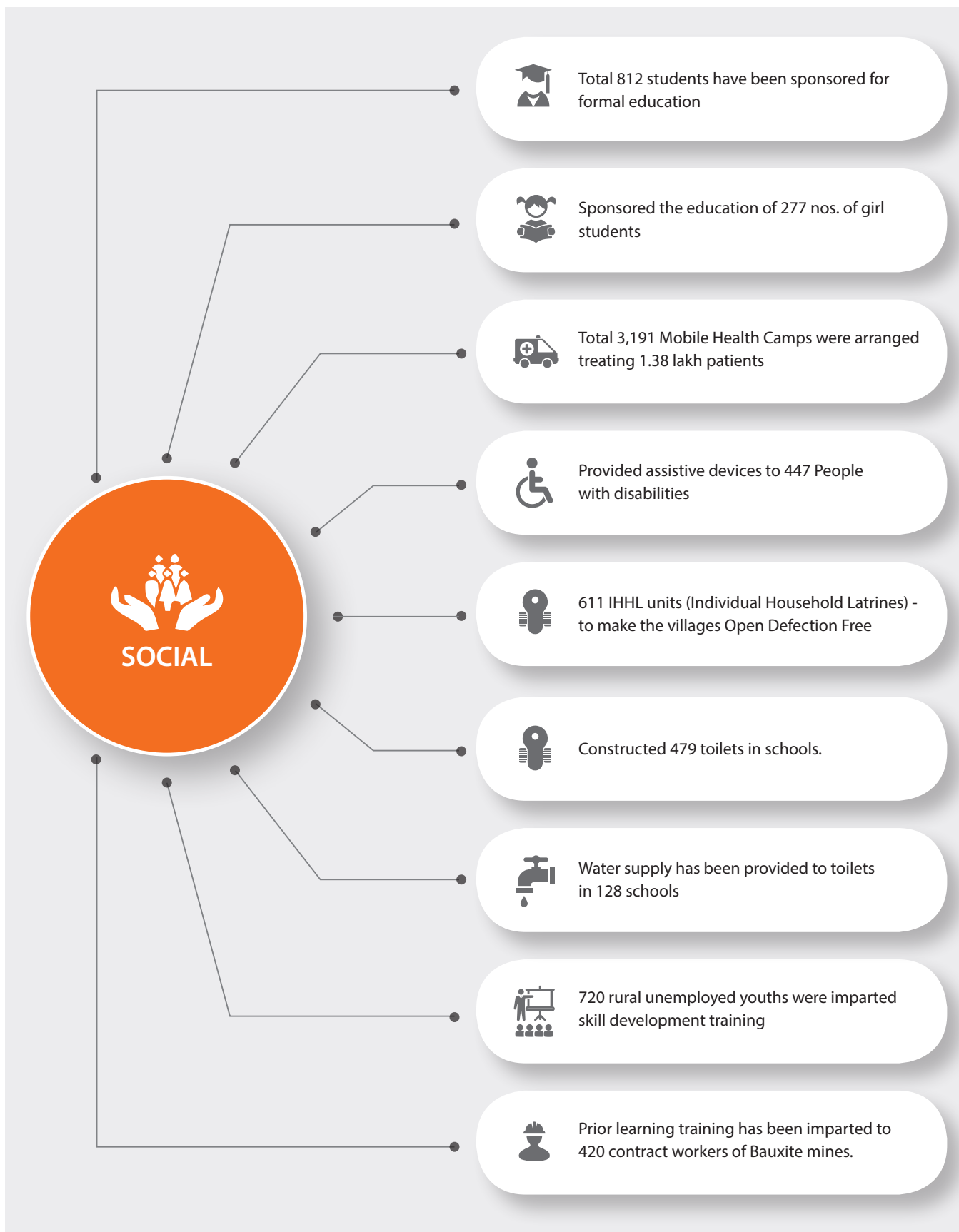
Employment

401

103-1, 103-2 and 103-3

We owe our success story to our diligent workforce who have built this company from scratch, managed the day to day affairs with dedication & dexterity and rendered exemplary support at the time of crisis. Acknowledging our employees as our most precious resource a host of progressive measures are implemented for their welfare and growth. We are committed to foster health, safety and career enhancement of employees by building a unique culture of collaborative working. NALCO provides a conducive and harmonious work environment for employees to actualise their potential and contribute to the growth of the organization. The strong commitment of employees enables us to meet business and economic challenges successfully. As an equal opportunity employer there is no discrimination on the basis of caste, creed, gender, religion or area of domicile etc. amongst the employees. The HR practices championed in the organisation are aimed at attracting, developing and retaining the right talent at the right

place. A holistic approach to learning & development through external and in-house training resources facilitates a rewarding career with ample growth and development. The employee needs like recognition, self-esteem and self-actualisation are addressed through well laid out HR processes and Leadership functions. Employees in turn reciprocate with dedication and belongingness to the organisation; shouldering responsibility, achieving the target and earning profit. Grievances or conflicts, if any, between employee and management is resolved through defined processes and direct interventions at different levels depending upon gravity of the issue. HR department acts as an enabler to employee management relationship, projecting their views, arranging for negotiation and resolving their genuine grievances. All this has resulted in exemplary employee management relation best illustrated by non-occurrence of any strike, lockout or stand off during the reporting period.



Total no. of Employees (as on 31/03/2018)

Type of Employees	Male			Female			Total		
	<30	30-45	>45	<30	30-45	>45	<30	30-45	>45
Executives	190	507	1032	19	30	34	209	537	1066
Non-executives	178	1387	3116	25	104	154	203	1491	3270
Total	368	1894	4148	44	134	188	412	2028	4336

Employee wellbeing

In recognition of contribution of employees in progress of NALCO, company remunerates employees with attractive pay package, one of the best amongst comparable industries along with plethora of other perquisite and benefits.

Different benefits extended to regular employees include medical facilities, leave travel concession, subsidised accommodation, subsidised electricity & water facilities, different allowances, parental leave, pension schemes, incentives for acquiring higher education, different loans & advances, scholarship for dependent children, social security scheme etc. Company has provision of dedicated fund for different defined benefit schemes like long-service award, gratuity, benevolent fund, settling-in allowance, provident fund, post-retirement medical benefit etc. Apart from these direct benefits, company also extend many tacit benefits like multipurpose co-operative society, 24-hour security in township, bus service, subsidised canteen, Guest House and Transit House at different locations etc. to its employees. Full-fledged townships have been developed over the years at the plant locations with the modern infrastructural facilities along with premier schools, hospitals, shopping complexes, clubs, parks, gymnasium, stadiums

etc. Contractors' employees are also covered under various benefit schemes such as Provident Fund, Medical benefits, etc.

During the year 2017-18, ₹ 2,261.20 was spent towards employee benefits expenses including salary as opposed to ₹ 1537.44 Crore spent during 2016-17.

Employee Diversity

NALCO subscribes to the notion that diversity in the organization leads to pay-offs as people from diverse backgrounds bring unique abilities and talents which adds value to organisation. This positively impacts work performance and work environment through innovative ideas and better employee engagement. The intent is to ensure that there is no discrimination in compensation, training and employee benefits; based on caste, religion, disability, gender, sexual orientation, race, colour, ancestry, marital status or affiliation with any political, religious or union organization or majority/minority group. Given the Socio-Cultural diversity of our country, the recruitment and selection processes are geared towards enabling representation from across regions, ethnicities, religions and different social strata and in line with Government of India guidelines.

Total Employees	2015-16			2016-17			2017-18		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Executives	1730	74	1804	1730	77	1807	1729	83	1812
Non-Executives	5015	281	5296	4854	277	5131	4681	283	4964
• Supervisory	765	51	816	706	48	754	632	48	680
• Highly skilled / skilled	3672	130	3802	3604	132	3736	3548	143	3691
• Semi-skilled / Unskilled	578	100	678	544	97	641	501	92	593
Total	6745	355	7100	6584	354	6938	6410	366	6776

Employee Engagement

Several initiatives have been taken to ensure that the development of employees and the organization is realised in a mutually inclusive manner. As a direct result of a vibrant work culture, duly supporting knowledge sharing and learning opportunities, employees have charted out challenging career paths.

Communication with to the employees at various levels on a

wide range of issues impacting the Company's performance as well as those related to employees' welfare is done in a structured manner across the Company. Mass communication campaigns are undertaken at Senior Officers' level involving structured discussion with large group of employees. These sessions help employees to align their working with the goals and objective of the Company leading to enhanced productivity and employee's belongingness to the company.

Forced Labour

NALCO stands committed not to resort to any form of forced or compulsory labour. We do not exert any type of pressure on anybody for joining and appointment orders issued by the Company comprehensively state all the conditions of appointment.

Printed manuals of service regulations and other rules are distributed to all Units for reference and use. The workmen are given a copy of the certified Standing Orders precisely containing general terms and conditions governing their service conditions. The HR Manual is available in the Intranet site for reference. Employees are given incentives for achieving higher levels of output. During the year 2017-18 there was no case in any form of forced or compulsory labour.

Human Rights

We are fully committed to abide by the principles on Human Rights across our operations and this reflects in our dealing with our different stakeholders. All suppliers and contractors who undertake to provide services enter into a comprehensive formal agreement with NALCO, which contains stipulations and conditions requiring them to abide by various applicable labour statutes in respect of their employees or workers. These include the Payment of Wage Act - 1936, the Minimum Wages Act -1948, Equal Remuneration Act - 1976, the Industrial Dispute Act - 1947, the Employees State Insurance Act - 1948, the Child Labour (Prohibition and Regulation) Act -1986 and the Contract Labour (Regulation & Abolition) Act -1970. NALCO ensures that the contractor's labour is treated fairly as per the law. The contractors are advised to pay the wages to its workers through bank and settle the issues in accordance with the law. We are also committed to the principles of the United Nations Global Compact on Human Rights. Units of NALCO are certified to SA8000:2014 Social Accountability Standard which testimonies its credentials on human rights.

NALCO strongly believes in protection of Fundamental Rights described in the Constitution of India. There was no recorded case during the reporting year on any violation of human rights. NALCO includes human rights related clauses in its new contracts. Periodic checks are being done with respect to various suppliers/contractors on compliance of human rights.

Equal Opportunity Employer

NALCO is an equal opportunity employer and ensures that there is no discrimination against any employee on any ground. Recruitment, placement, promotion, transfer, compensation, training and other benefits are based on the merit and competence of the individual and the business needs of the organization.

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 with 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 oversee 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 31.03.2018, out of 6,776 employees on the company's roll, there were 1,104(16.29%) SCs, 1,248 (18.42%) STs, 828(12.22%) OBCs and 89 (1.31 %) persons with disabilities (PWDs). The total number of female employees in organization stood at 366.

Local 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. Candidates registered with local employment agencies are considered based on their skill level and employability. 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 are generated when different contractors i.e. transportation, security, maintenance, projects etc recruit personnel for discharge of their contractual obligation. Presently NALCO provide direct employment to 6776 persons as on 31.3.2018 and contractual employment to 10421 persons amongst which majority proportion is from Odisha, besides creation of livelihood opportunity for a sizable local population.

Grievance Redressal Mechanism

To keep morale of employees high and to maintain good Industrial Relation between Management and employees the process of grievance handling is both procedure based and transparent.

Depending upon their service conditions there are separate formal grievance procedures for executives and non-executives for impartial and unbiased handling of genuine grievances. Under the scheme a grievance committee is formed for non-executives comprised of representatives of the Recognised Union, Management and representative from concerned departments. An aggrieved employee can intimate verbally to superior officer about the problem and if not satisfied with the decision, he/she may submit written request to HOD. If the grievance persists, grievance committee may be approached. Any grievance application received from any employee is scrutinized by the committee and action is taken to resolve the grievance within the framework of the company policy. In case any grievance could not be resolved to its logical end 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.

The details of complaints relating to child labour, forced labour, involuntary labour, sexual harassment in 2017-18 is given below:

Sl. No.	Category	No. of complaints filed during the F.Y. 2017-18	No. of complaints pending as on 31.03.2018
1	Child labour/ forced labour/ involuntary labour	Nil	Nil
2	Sexual harassment	Nil	Nil
3	Discriminatory employment	Nil	Nil
4	Any other grievances	Nil	Nil

New employee hires and employee turnover

401-1

The details of new employee hires and employee turnover under different categories are shown below:

New Hires

Year	Males	Females	Age Groups		
			Below 30	30-50	50-60
2017-18	155	26	128	53	Nil

Separation

Year	Males	Females	Age Groups		
			Below 30	30-50	50-60
2017-18	294	15	17	13	279

Benefits provided to full-time employees that are not provided to temporary or part-time employees

401-2

Full time employees are provided benefits as per different laws of land and temporary employees are governed by rules framed by different Government bodies for their welfare.

NALCO has always considered employees as part of one extended family and has supported them during service as well as post-superannuation. Retirement plans in NALCO are based on both defined benefit plans and defined contribution plans. All retirement plans currently followed are mandatory for all regular employees. Benefits and management are as per statutory Provident Funds & Miscellaneous Provisions Act, 1952, Payment of Gratuity Act, 1972 and Employee Pension Scheme, 1995. NALCO manages a large PF and Gratuity Fund.

NALCO provides comprehensive Medical and Health care facilities to its employees and their dependants. The main objective of the Company Health Policy is "To promote and maintain a healthy work-force right from Induction to Post Retirement". Contractual employees enjoy different benefits like PF, ESI, Paid Holidays, Overtime, Canteen Allowance, Bonus etc.

The benefits extended to permanent employees are listed.

Benefits to full time employees

- Provident Fund
- Cafeteria Allowance
- Leave travel concession
- Benevolent Fund
- Contributory Pension Scheme
- Leave Encashment
- Long Service Awards
- Medical benefits
- Post-Retirement Medical benefits
- Furniture Allowance
- House Building Allowance
- Scholarship for Children of Permanent employees
- Performance Related Pay
- Multipurpose Allowance
- Annual reward scheme
- Accidental Insurance Cover to all employees
- Subsidised canteens (subsidised rates for eatables)
- Gratuity (as per prevailing statutory law)
- Employee Family Benefit Scheme (EFBS)
- Parental Leave

Parental leave

401-3

The parental leave consists of maternity leave of 26 week for female employees and paternity leave of 15 days for male employees. In the year 2017-18, maternity leave was availed by 6 female employees and paternity leave was availed by 149 male employees.

Occupational Health & Safety

403

103-1, 103-2 and 103-3

Occupational Health and safety, the two most humane elements of industrial echelon are deeply infused in our value system from days of inception. We have set no limits in practice of occupational health and safety and always go beyond compliance level in their accountability. Our Board approved occupational Health & Safety policy is the reflection of our commitment and encompass peripheral dwellers along with plant personnel in its fold. The systems, procedures, instructions and accountability derived from Occupational Health & Safety Policy forms guiding mechanism for achievement of health and safety objectives.

The Policies and procedures are people centric and cover all the relevant stakeholders i.e. employees, contractual workers, security personnel and people living in the vicinity. We have adequately staffed and equipped Health & Safety departments along with occupational Health Centres in all the Units to address safety and occupational health issues.

All the NALCO units are functioning with management systems conforming to Environmental Management System – ISO 14001:2015; Occupational Health & Safety Management System – OHSAS 18001:2007 & Social Accountability – SA 8000:2014 Certification Standards. The safety management plans and procedures are developed based on the systematic assessment of the underlying safety hazards and risks. Regular internal Safety inspections and Audits by external agencies are organised whose findings are analysed, and appropriate actions are taken to mend the breach. Participative root-cause analysis of the incidents leads to greater insight into the safety issues and the subsequent corrective measures leads to the prevention of recurrence of similar type of incidents. Current focus is on Behaviour Based Safety, which has proved to be one of the most effective ways to improve safety performance. This approach has been quite effective with drastic reduction in the incidents caused by human errors.

In NALCO we comply with all health & safety regulations in letter and spirit. Safety, Health and Environment Department in every unit fulfils

the safety requirements of the respective unit. SH&E Dept. of Corporate office coordinates the activities of Units. In our Mines, Training and Safety Dept. looks after Mines safety and implements requirements as per the guideline of DGMS, Director General of Mines Safety.

Participation of workmen is the hallmark of Health and Safety management in NALCO Units. A Safety Committee formed with representatives from management and workers helps in identification of unsafe areas and practices and suggests corrective action. To increase awareness, adequate number of all types of safety signage and fire extinguisher usage instructions 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 personal protective equipment like helmets, safety shoes, gloves, safety goggles, safety belt etc. are insisted on depending on nature of work. For executing work at a height and other hazardous activities requirement of safety permit is made mandatory. For out-sourced work, observance of applicable workplace safety regulations is a contract condition in every contract and in case of any violation necessary actions like imposition of penalty, issue of warning, termination of contract etc. is resorted to depending on gravity of violation. Record of accidents & near miss cases are duly maintained and analysed, and suitable corrective actions are implemented on priority basis. We conduct safety audit as per statutory stipulation and any gap in safety observed during audit is acted upon immediately. Even, road safety within the premises is promoted with insistence on use of crash helmets, imposition of speed limits and checking by regular traffic squad etc.

Safety training is routinely imparted in all our units and we try to build a culture of safety through training and retraining of our workforce. To maintain our culture of safety, we provide regular training to regular employees and contractors' workers. Behaviour based safety, handling of hazardous material, firefighting, electrical safety etc. are some of the selected subjects on which training is imparted. Details of safety training imparted to employees are given below.



Kalinga Safety Award for Alumina Refinery during Odisha State Safety Conclave-2017

Category	No. of employees trained			Training Man-days		
	Male	Female	Total	Male	Female	Total
Executives	70	3	73	106.5	5.0	111.5
Non-Executives	350	16	366	521.0	28.5	549.5
Contract Workers			903			870.5
Total			1342			1531.5

Workers representation in formal joint management-worker health and safety committees

403-1

Unit level Safety Committee Meetings are conducted in each of the units involving senior officials and Workers Union Representatives in which Safety Performance is reviewed, suggestions are given, and action plans are made for continual improvements.

Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities

403-2

Lost Time Injury Frequency Rate- Number of accidents per million manhours worked

Severity Rate - Man-days Lost per 1000 man-days worked.

Unit	Category	Reportable Accidents	Man-days worked	Man-days lost	Man-hours Worked	Severity Rate	Lost Time Injury Frequency Rate	Fatality
Smelter Plant	Employees	0	795685	0	6365480	NIL	NIL	0
	Contract Labour	0	1049567	0	8396536	NIL	NIL	0
CPP	Employees	0	336169	0	2689352	0	0	0
	Contract Labour	1	682747	190	5461976	0.278	0.183	0
Mines	Employees	1	136936	6174	1095488	45.086	0.912	1
	Contract Labour	-	194639	0	1557112	0	0	0
Alumina Refinery	Employees	0	520292	0	4162366	0	0	0
	Contract Labour	0	560713.5	0	4485708	0	0	0
Port Facility	Employees	0	13779	0	110232	0	0	0
	Contract Labour	0	27086	0	216688	0	0	0
Total	All Units	2	4317614	6364	34540938	1.474	0.058	1

In the Year 2017-18 there were two reported accidents. One fatal accident of a regular employee in Mines and the other a minor accident involving a contract labour in the CPP. Whereas in the year 2016-17 there were no accidents reported.

Based on the data reported in the above table the Lost Time Injury Frequency Rate (LTIFR) is 0.058 and the Severity Rate (SR) is 1.47.



Workers with high incidence or high risk of diseases related to their occupation

403-3

To prevent spread of any occupational disease amongst workforce, both at S&P Complex and M&R Complex, well equipped Occupational Health Centres are operating with adequate facility. 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 illness in employees. Well-equipped hospital complexes at S&P complex and M&R complex treat 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 criticality. We even 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 by eminent experts 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.

NALCO strives to ensure that workers are not exposed to occupational hazards that negatively affect their health. We conduct PME of employees and contractual workers regularly. The PME statistics for reporting year is given below:

PME statistics

Unit	2016-17		2017-18	
	Employee	Contractors	Employee	Contractors
Alumina Refinery, Damanjodi	1715	1215	1703	1474
Aluminium Smelter, Angul	2897	3123	2873	3317
Bauxite Mines, Panchpatmali	286	7	245	21
Captive Power Plant, Angul	1158	1856	1203	2355

It has been determined that, there is no high risk of any specified occupational disease among the employees of NALCO, as per prevailing nature of work and work conditions.

Health and safety topics covered in formal agreements with trade unions

403-4

Following topics are covered in formal agreements with trade unions:

- Achieving zero accident rate
- Behavioural based safety trainings are to be conducted for all the employees (executives + workmen) every year.
- Senior workmen are to be included in the audit team for conducting the safety audits.
- International standards are to be followed in ergonomics for ensuring safe & healthy working conditions.
- Behavioural based safety trainings are to be conducted for all the employees (executives + workmen) every year.
- Senior workmen are to be included in the audit team for conducting the safety audits.
- International standards are to be followed in ergonomics for ensuring safe & healthy working conditions.



Nalco observes International Yoga Day

Training and Education

404

103-1, 103-2 and 103-3

NALCO has consistently fostered a culture that rewards continuous learning, collaboration and talent for the organization to be future-ready and to meet the challenges posed by ever-changing market realities. In order to continue to grow and thrive in the competitive marketplace, we have developed a strong culture of learning — where executives and workmen are supported and encouraged to constantly hone and build their skills and competencies. Combining formal learning with diligent on-the-job training, coaching and feedback, the Competencies and Skills of Executives and Workmen are enhanced to result in improved performance. This culture of learning keeps the organization relevant, agile and ahead of the competition. The training programs are custom designed to meet the desired objective in an effective manner. The vital strategic resource i.e. Human Resource is thus harnessed to meet the organizational challenges.

Training is imparted for various functional and developmental needs of employees at complex level Training Institutes functioning under Training Department. Centralised training facility at Corporate office supervise the complex level training and arrange specific training programmes inviting participation spanning entire NALCO when wide awareness is required. Training needs of individual employees are mapped 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. In order to enhance the functional and behavioural competency of its employees and to align the individual need with the business objective of the organization

towards increasing production and productivity as well as to improve business culture in the organization, there has been an unstinting effort by the Company to impart skill and behavioural training to its employees. 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 wellbeing. In its commitment for social accountability and good corporate governance, the company also imparts skill development training to contract workers, apprentices, students from managerial and technical institutes as well as local populations.

Training Performance Highlights 2017-18

- NALCO achieved 16,244.5 training man-days for the year 2017-18 for regular employees
- 5 days Talent management programme conducted by MOU partners, XLRI, Jamshedpur and TISS, Mumbai where 139 executives were covered against a target of 136
- 17 employees were also sent to IIM, ASCI, IIT & National Institutes of Advanced Studies, Bangalore for five days programme under talent management
- In-house skill development programmes for security personnel, contract labours, traffic volunteers and trainees were also organized with 4,425.5 man-days during 2017-18 across the company compared to 4,421.5 man-days during the year 2016-17
- Skill development training classes for enhancement of employability and income generation provided to 630 candidates

Average hours of training per year per employee

404-1

Employee Category	No. Of persons trained			Training Man-Days		
	Male	Female	Total	Male	Female	Total
Executives	3637	177	3814	8779.0	463.5	9242.5
Non-Executives	3423	241	3664	6528.5	473.5	7002.0
Total	7060	418	7478	15307.5	937.0	16244.5

The average training hours per employee for 2017-18 works out to 2.40.

Employees trained on Human Rights

Employee Category	No. Of persons trained			Training Man-Days		
	Male	Female	Total	Male	Female	Total
Executives	72	14	85	22	463.5	9242.5
Non-Executives	41	31	58	60	473.5	7002.0
Total	113	45	143	82	937.0	16244.5

Employees trained on Anti-Corruption

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.

Local Communities

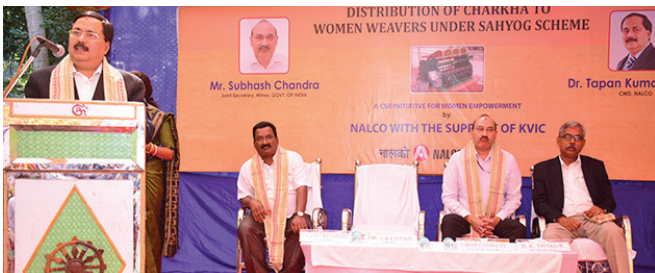
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103-1, 103-2 and 103-3

CSR has emerged as a vital tool for the Organisation for social value creation through sharing and caring. 'Sharing Happiness' is the spirit of CSR and community development at NALCO.

The community development activities are carried under the aegis of Corporate Social Responsibility (CSR). The CSR Policy and Guiding Principles therein are the guiding beacons for community related initiatives. Social interventions are designed, and specific activities are carried out based on the need assessment carried out directly by the CSR coordination cell, or based on the

The CSR Policy approved by the Board, addressing the National Priorities and Sustainable Development Goals of the organization provides direction for interventions. The Board subcommittee on CSR & Sustainable Development comprising of five Independent Directors & three Functional Directors, meets regularly to review progress of the major CSR activities vis. a vis. the chalked-out plans. CSR proposals are examined by the Committee and their recommendations are put up for approval of the Board. A monitoring framework is in place to ensure timely completion of



Distribution of Charkha to women weavers



recommendations of Rehabilitation & Peripheral Development Advisory Committee's (RPDAC), or feedbacks received from the CSR arm i.e. 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 is done to ensure execution as per plan to address the genuine needs of the communities.

the planned interventions. CSR initiatives at NALCO are carried out mainly in the following areas:

1. Education
2. Safe Drinking Water
3. Health Care Services
4. Skill development
5. Woman Empowerment
6. Sanitation & Cleanliness
7. Infrastructure Development
8. Promoting Sports & Games, Arts & Crafts
9. Community Care



Operations with local community engagement, impact assessments, and development programs

413-1

Stakeholder & Community Engagement mechanism



NALCO has extensively engaged with the local community's right from inception which has led to deep understanding and insight into the key requirements of the local society in the developmental journey. Based on this knowledge, NALCO develops the thrust and focus area to achieve desired outcomes. We have institutionalized a multi layered stakeholder engagement mechanism covering the entire range of stake holders. The involvement of stakeholders' starts at the grassroots community level and people representatives followed by District level interaction and culminating in coordination with State Governments ensuring conceptual clarity, effective implementation and proper monitoring of the CSR programs in NALCO.

Implementation, Monitoring and Impact Assessment

The CSR activities of the Company are undertaken through

- i) Nalco Foundation, the CSR wing of NALCO
- ii) directly by Nalco and
- iii) Rehabilitation and Periphery Development Advisory Committees (RPDACs).

NALCO has been regularly conducting impact assessment of some of its major CSR initiatives under taken by the Company. Social Impact Assessment (SIA) of the CSR projects implemented by Nalco was carried out in 2017 by Utkal University, Bhubaneswar.

CSR Programs

During year 2017-18, a total of ₹. 29 crores were spent on CSR activities, which is 2.08% of average Net Profit for the three previous Financial Years. Some of the major CSR activities during the year are:

1. Total 812 students from periphery villages of Damanjodi and Pottangi mines area have been sponsored for formal education in 3 residential schools viz. Kalinga Institute of Social Science (KISS), Bhubaneswar; Adarash Vidyalaya, Jeypore; & Bikash Vidyalaya, Koraput.
2. Complementing the "Beti Bachao Beti Padhao" scheme of Government of India Nalco has sponsored the education of 277 nos. of girl students under the programme "Nalco Ki Ladli" from the periphery villages.
3. Further, Nalco has extended financial assistance for infrastructure development of Sunabeda Deaf School, MANAS (School for the mentally challenged) and financial support to "Desire Society" at Vizag working for HIV affected children.
4. MHU Services: NALCO has successfully addressed the issues of the poorest people in the periphery of plant areas by running Mobile Health Units. Total 3,191 Mobile Health Camps were arranged in M&R complex and in S&P Complex treating 1.38 lakh patients.
5. NALCO in collaboration with ALIMCO provide assistive devices to 447 People with disabilities.
6. NALCO has contributed towards installation of 7-axis Robotics machine with in-built CAD/CAM software for manufacturing of sockets & modification of necessary infrastructure at SVNIRTAR (Swami Vivekanand National Institute of Rehabilitation Training and Research), Olatpur, Cuttack under the Ministry of Social Justice and Empowerment, Gol.
7. In 6 periphery villages of M&R Complex 611 IHHL units (Individual House Hold Latrines) are to make the villages Open Defection Free (ODF).

8. In the recent years under the Swachha Vidyalaya Abhijan (SVA) programme, NALCO has constructed 479 toilets. Water supply has been provided to toilets in 128 schools i.e. 54 in Angul and 74 in Damanjodi.
9. Under the Swachh Iconic Place Programme of Gol, various steps taken in iconic city Puri are: Beautification and maintenance of Gandhi Park, installation of water posts for clean drinking water, providing Battery Operated Vehicle at railway station and designated

vehicle parking area for senior citizens and differently abled persons.

10. 720 rural unemployed youths were imparted skill development training under "Skill India Initiatives" of Govt. of India through NSDC and Certified Skilling Partners. Recognition of prior learning training has been imparted to 420 contract workers of Bauxite mines.

Sl. No.	CSR Project or activity	Sector	Locations	Amount outlay (₹ Lakh)	Amount spent (₹ Lakh)	Cumulative expenditure up to the reporting period (₹ Lakh)	Direct or through implementing Agency
01	Health outreach Program- Mobile Medical Units, Diagnostic & awareness building through Information, Education, Communication (IEC) activities.	Promoting preventive health care	Koraput & Angul District of Odisha and Visakhapatnam in AP	873.99	485.61	723.83	Nalco Foundation & directly by the Company
02	(a) Construction of Toilets under SVA, Construction of House Hold Toilets under ODF initiative, School Toilets, Provision of water supply to toilets constructed under Swachh Vidyalaya Abhiyan.	Promoting preventive health care and sanitation	Koraput & Angul District of Odisha & Visakhapatnam and Kakinada in AP	1,058.90	628.07	930.08	Nalco Foundation & directly by the Company
02	(b) Swachh Iconic City Project-Puri	Promoting preventive health care and sanitation	Puri district of Odisha	1,343.33	641.46	641.46	Nalco Foundation & directly by the Company
03	Providing safe drinking water to periphery villages of plants and during Rathayatra at Puri	Making available safe drinking water.	Angul, Koraput & Puri district of Odisha	263.58	76.76	216.11	Nalco Foundation & directly by the Company
04	Promoting education, sponsoring formal education of tribal children in reputed residential schools	Promoting education including special education	Koraput, Angul, Khurda District of Odisha & Varanasi in UP	3,494.80	573.34	6,011.42	Nalco Foundation
05	Providing employment enhancing training to unemployed youth	Employment enhancing vocational skill	Angul, Koraput & Khurda district of Odisha	484.40	82.81	174.81	Directly by the Company

06	Empowering women through distribution of Charkha to women weaver & spinner in villages	Empowering women	Khurda, Koraput and Puri district of Odisha	23.50	13.50	13.50	Nalco Foundation
07	Ensuring environmental sustainability, ecological balance through plantation, roof top solar power system.	Ensuring environmental sustainability, ecological balance	Koraput & Khurda district of Odisha	796.75	79.22	399.66	Nalco Foundation & directly by the Company
08	Contribution towards protection of national heritage and culture and development of traditional arts and handicrafts.	Protection of national heritage, art & culture	Koraput & Sambalpur district of Odisha	186.28	61.84	152.87	Directly by the Company
09	Contribution to the Prime Minister's relief Fund/Central Govt. Fund for socio-economic development/ welfare of SC/ST/ OBC/ Minorities/ Women	Contribution to Prime Minister's Relief Fund or any other fund set up by Central Govt.	PAN India	400.00	—	400.00	Nalco Foundation
10	Rural development activities in periphery villages and other areas.	Rural development projects.	Angul and Koraput district of Odisha, Gwalior and Shivapuri district of MP & Vizianagaram and	1,665.55	183.63	697.29	Nalco Foundation & directly by the Company
11	Administrative Expenditure for carrying various CSR Projects/ Programme	—	—	206.01	75.16	112.52	Nalco Foundation

As regards future strategy in CSR, NALCO will continue to focus its projects in alignment with the flagship programs of Government of India like Iconic Shrines, ODF etc. under Swachh Bharat Abhiyan; enhancing employability under Skill India; promoting education of girl students under Beti Bachao Beti Padhao. The much-appreciated program “Nalco Ki Ladli” will be scaled up and will

be implemented in close collaboration with Kendriya Vidyalaya on PAN India basis. Going a step further to supplement and complement the Government of India's initiative for development of “Aspirational Districts”, the Company will augment the activities in two districts identified by Niti Ayog namely- Koraput and Dhenkanal in the State of Odisha.



Swachh Iconic City Program at Puri

Case Studies

Case Study 1

NALCO Ki Ladli – Empowering the girl child through Education



Luck favours the brave

The story of Ms Baisali Rani Turuk is a story of grit, determination and talent overcoming formidable challenges. She is a girl from Badanareka, Damanjodi and the daughter of Mr Sukanta Turuk, a contract labour working in NALCO. She was studying at Kakirguma High school and her father was unable to provide support for her further study after completion of 7th class due to inability to run a family with a meagre income. But Baisali was a bright student and good in extracurricular activities where she got prizes in every school program by participating in quiz, debate & essay competition. It was devastating moment for her to see her career coming to an end in a rather unfortunate fashion. The only recourse left was sitting idle in the home and supporting her mother in household works.

As the luck would have it, her teachers were very supportive, and they gave her assurance to help her. They told her about NALCO KI LADLI scholarship meant for Girl's education and persuaded her to apply for the same. After some days, school officials told her that she got the scholarship of ₹ 6000 annually from NALCO KI LADLI which will continue till 10th subject to her performance



in the annual examination. It was great relief for her family. As she was a meritorious student she did well and continued to get the scholarship till her Board of Secondary Education which she passed with good marks. Currently she is studying 12th Science at SVM School, Damanjodi. She wishes to take admission in MBBS after clearing NEET examination.

Here is what Baisali has to say:

"I lost my hope after 7th class when I was about to stop my study for family issues. But NALCO KI LADLI was a saviour for me, got this scholarship & excelled in academics and now hoping a better career in future. All the credits should go to NALCO Foundation and my teachers".

What Sukanta Turuk says about his Daughter's success?

I am feeling very thankful to God that my daughter is continuing her studies. I had given up as I couldn't manage her studies due to my

poor income. But because of the help from NALCO Foundation she is able to continue her studies. Today I am very happy for her and will support her to my best of abilities to achieve her dreams. I will always be grateful to NALCO Foundation which supported my daughter when there was no hope for her to continue her studies.

Case Study 2

Brightening the lives of people in darkness



Majhiamba, a village of Narayan Patna block, with a population of around 250, is situated on the top of the hill and is at 45km from Damanjodi. The location of the village is marked by difficult terrain as one must climb three hills to reach the place. Due to difficult accessibility, the villagers are deprived of many basic facilities. Even after 70 years of independence, there is no modern source of lighting in the village.

In view of the above, NALCO Foundation (NF) has identified this village for providing lighting source to brighten up the lives of the deprived population. The Foundation has partnered with KARMA solar solution to provide solar energy-based power to the village. Overcoming the challenges, 13 solar street lights and 57 solar home solution have been installed in the village.

Solar Street lights

Solar street lights in village has a huge impact as it provides reliable outdoor lighting which improves the living conditions by providing safety to women and children. Now it is also allowing communities to engage in activities after sunset thus enhancing livelihood and improving income potential. Before this intervention, the villagers were taking night nap after the sunset.

Solar Home Solution:

- It is a solar appliance which contains two bulbs, one fan and a solar panel to provide round the clock lighting powered by solar energy. This has improved the lives of people in many ways. Children can study in the evenings and others are able to engage in various activities during the evenings.
- Moreover, NALCO Foundation provided the solar solution in remote areas of Damanjodi thereby changing the lives of

Abbreviations

%	Percentage	ESPs	employee stock purchase scheme
APH	Air Preheater	ETPL	Eligible Training Provider List
APS	Advanced Photo System	EVs	Electric Vehicles
ASCII	American Standard Code for Information Interchange	GHG	Green House Gas
BE	Bureau of Energy Efficiency	GJ	Gigajoule
BPTG	Back Pressure Turbo Generator	gm	Grams
BRR	Business Responsibility Report	GOI	Government of India
CAAQMS	Continuous Ambient Air Quality Monitoring Stations	GRI	Global Reporting Initiative
CAMPA	Compensatory Afforestation Fund Management and Planning Authority bill	HCL	Hindustan Copper Limited
CC	Climate Change	HDPE	High-density polyethylene
CDA	Conduct Discipline and Appeal	HEMM	Heavy Earth Moving Machinery
CEMC	Centre for Envotech and Management Consultancy Private Limited	HFO	Heavy fuel oil
CMD	Chief Managing Director	ICAI	The Institute of Chartered Accountants of India
CMRI	Central Mining Research Institute	IDA	Industrial Dearness Allowance
CO ₂ e	Carbon dioxide equivalent	IIM	Indian Institute of Management
CPCB	Central Pollution Control Board	IIT	Indian Institute of Technology
CPP	Captive Power Plant	IP	Integrity Pact
CPSEs	Central Public Sector Enterprises	IPCC	Integrated Professional Competence Course
CSR	Corporate Social Responsibility	IPCC	The Intergovernmental Panel on Climate Change
CTE	Career and technical education	ISO	International Organization for Standardization
CVC	Central Vigilance Commission	IUCN	International Union for Conservation of Nature
DF Plant	De-fluoridation Plant	JV	joint venture
EBIDTA	Earnings before interest, tax, depreciation and amortization	KABIL	Khanij Bidesh India Limited
ERP	Enterprise Resource Planning	kg	Kilogram
ESP	Extra-Sensory Perception	kl	Kilolitre
		Kwh	Kilowatt hour

Kwp	Kilowatt 'peak'
Lakh MT	Lakh Metric Tonnes
LDO	Light diesel oil
LPG	Liquefied petroleum gas
m2	square meter
m3	cubic meter
MECL	Mineral Exploration Corporation Limited
MoEF	Ministry of Environment and Forests
MoU	Memorandum of Understanding
MSEs	Micro and Small Enterprises
MSME	Micro Small & Medium Enterprises
Mt	Metric Tonnes
Mtpa	Million tonnes per annum
MU	Million Unit
Mw	Megawatt
NALCO	National Aluminium Company Limited
NB	Nominal Bore
NAPCC	National Action Plan on Climate Change
NIT	National Institute of Technology
NMEEE	National Mission on Enhanced Energy Efficiency
No's	Numbers
NOx	Nitrogen Oxides
OHSAS	Occupational Health and Safety Assessment Series
OSPCB	Odisha State Pollution Control Board
PAT	Perform, Achieve & Trade scheme
PAT	Profit After Tax
PBT	Profit Before Tax

PCCF	Principal Chief Conservator of Forests
PFCs	Perfluorocarbons
PG	Performance Guarantee
PLK	Partially Lateritized Khondalite
PWD	Persons with Disabilities
R&D	Research & Development
RPDAC	Rehabilitation & Peripheral Development Advisory Committee
RTDAS	Real Time Data acquisition system
SEBI	Securities and Exchange Board of India
SGP	Steam Generation Plant
SOx	Sulphur Dioxide
SPCB	State Pollution Control Board
STP	Sewerage Treatment Plant
CO ₂	tonnes of carbon dioxide equivalent
t	Tonnes
TII	Transparency International India
TISS	Tata Institute of Social Sciences
TOE	Tonne of Oil Equivalent
UAE	United Arab Emirates
USSS	Udyog Samasya Samadhan Shivar



"For the GRI Content Index Service, GRI Services reviewed that the GRI content index is clearly presented and the references for all disclosures included align with the appropriate sections in the body of the report."

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National Aluminium Company Limited

CIN : L27203OR1981GOI000920

Environment Policy

In recognition of the interests of the society in securing sustainable industrial growth, compatible with a wholesome environment, NALCO affirms that it assigns high importance to promotion and maintenance of a pollution-free environment in all its activities.

Objectives

- To use non-polluting and environment-friendly technology.
- To monitor regularly air, water, land, noise and other environmental parameters.
- To constantly improve upon the standards of pollution control and provide a leadership in environment management.
- To develop employees' awareness on environmental responsibilities and encourage adherence to sound environmental practices.
- To work closely with Government and local authorities to prevent or minimise adverse consequences of the industrial activities on the environment.
- To comply with all applicable laws governing environment protection through appropriate mechanisms.
- To actively participate in social welfare and environmental development activities of the locality around its Units.

Commitment

We dedicate ourselves to ensure a green and wholesome environment in all areas of our operations for sustainable industrial growth and to set standards in environmental management.

(T. K. Chand)

Bhubaneswar

Chairman-cum-Managing Director



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