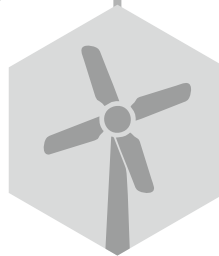


Growth in Harmony





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



To sustainably grow multi-fold in Mining, Alumina and Aluminum 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.



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.

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Sustainable Development Highlights

Lowest cost
producer of
Bauxite and
Alumina in the world

EBIDTA
₹ 3218 Crores

Profit after Tax
₹ 1732 Crores

5-star rating of
Mines by
Indian Bureau of Mines
for year 2017-18

130709 Saplings
planted during
the year

State-of-the-Art
Nano Technology based
plant for Smelter
effluent treatment

A total amount
of ₹ 30.35 Crores
spent on CSR

Mobile Health Units
treating
1,54,270 patients.

Unique scheme
'Nalco ki Ladli' providing
for adoption of poor
girl students to enable
them to study

Report Profile

102-46, 102-48, 102-49, 102-50, 102-51, 102-52, 102-53, 102-54, 102-55, 102-56

Reporting period & Date of most recent report

(102-50, 102-51, 102-52, 102-54)

The present Report is the 8th Sustainability Report for the reporting period of the financial year 2018-19, i.e. April 1, 2018 to March 31, 2019. This report has been prepared in accordance with the GRI Standards: Core option. The report is published annually. The 7th Sustainability Report was published for the year 2017-18. The report showcases our performance in the Social, Environmental & Economic area.

Reporting framework

The report outlines the sustainability performance as per the GRI Standards for sustainability reporting. All the relevant aspects of the Standard have been referred to while defining and developing the report content. The report adheres to the reporting principles of GRI Standards addressing principles of Accountability i.e., materiality, stakeholder inclusiveness, sustainability context and completeness. Efforts have been made to present balanced, clear, reliable, accurate and reasonable presentation of our contributions in the area of sustainable development. Description of material issues and their prioritization has been detailed in the report. The development of this report was guided by the GRI Standards Reporting Principles, Technical Protocols and Indicator Protocols. The GRI Content Index is available on page number 83 to 85 which provides an index of GRI disclosures and their locations within this report.

Scope and Boundary

(102-46)

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. 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.

Reporting Standards

Financial performance of the organization is reported based on guidelines provided in the Company's Law. Quality, Environment, Health and Safety audits are conducted regularly against International Standards which ensures data integrity. Further, various management system performances are verified and reviewed by the concerned government authorities for its appropriateness. Monitoring, measurement and calibration are carried out as per relevant Indian Standards.

Audience

The audience for this report is all our stakeholders and the report aims to apprise 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.

Data

(102-56)

Data is reviewed for completeness and accuracy at various levels. Data is mostly based on documents reviewed by the Board i.e. Annual Report, Financial Statements etc. Hence no third-party assurance is felt to be required. 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.

Restatement and Changes in Reporting

There is no change in the material topic and its boundaries and there is no restatement also. (102-48, 102-49)

Contact point

(102-53)

We value feedback and encourage contributions and suggestions from all our stakeholders. The contact person details are Mr Biswamaya Kar, AGM (TQM), NALCO Bhubaneswar, P/1, Nayapalli Bhubaneswar-751 013, Odisha. email - sustainability@nalcoindia.co.in, website - www.nalcoindia.co.in



Nalco Corporate Office



CMD's Message

102-14

Dear Stakeholders,

I am pleased to present our 8th Annual Sustainability Report for the FY 2018-19. This report has been prepared in accordance with the GRI Standards: Core option. This report illustrates our achievements in the areas of triple bottom line excellence encompassing Economic, Environment and Social facets of our operation.

Looking at a World reeling under Global warming & Climate change we at Nalco have ordained our industrial operation for a clean, green and pristine earth. We are committed to function in an environmentally conscious and socially responsible manner. In embodiment of a leading Indian Company in the area of Sustainable Development, we are continuously augmenting our organizational strategy and refurbishing our technical acumen in this domain. Our Sustainability Policy provides the overarching direction for the organizational activities to ensure that we are on track of Sustainable Development. The dashboard of our Sustainable Development Key Performance Parameters (KPI's) underscores improving trends compared to previous year which vindicates our commitment to Sustainable Development.

The UN Sustainable Development Goals (SDGs), known as Global Goals have set a direction for the committee of nations to move forward for achieving a world free from poverty, gender inequality, economic inequality, environmental degradation and thereby ensuring a healthy planet for future generations. The multi-dimensional goals integrate various social, economic and environmental dimensions. India continues to perpetuate its economic growth by introducing and implementing various policies and measures relating to sustainable development, climate change, resource efficiency and air pollution and moving expeditiously towards achieving the SDGs. It is a matter of great satisfaction that NALCO is making significant contributions towards the SDGs and a brief description on the same is a part of the report. We are determined to

take our achievements on Sustainable Development Goals to greater heights.

Global Aluminium industry witnessed price volatility throughout the year and the prices exhibited a downward trend in Q4 of 2018-19. The demand for Aluminium is likely to remain strong in the domestic market on account of expected growth in high consuming sectors like automobiles, construction and power. Major thrust on infrastructure development over the last few years and the recent announcement of mega investments in infrastructure projects by Government; the economic growth is likely to gain momentum. The threat of increasing aluminium import is quite high which accounted for 58.9% of total aluminium consumption in 2018-19 in the country. Support from the Government in countering excessive imports or dumping will augur well for the domestic producers to safeguard their market share and profitability.

Tiding over the challenges of business environment, we exhibited an excellent performance, as rated by the Ministry on the Memorandum of Understanding (MOU) parameters. We achieved an all-time high performance on many parameters i.e. Bauxite excavation, and production of Alumina Hydrate, wire rod & billet and T-ingot production. Value added products registered an impressive growth of 10.9% over 2017-18. Our Net sales stood at Rs 11,386 crores which included the revenue from exports amounting to Rs 4792.7 crores. We recorded an impressive EBITDA of Rs 3218 crores and profit after tax stood at Rs 1732 crores.

Due diligence has been carried out while formulating our Corporate Plan by considering various aspects like Risks, opportunities, threats, market trend, business scenario and environmental considerations. Our Corporate Plan envisages significant expansion of our operations. The future capacities are Bauxite Production 13.48 MT from 6.83 MT, Alumina Production 3.275 MT from 2.275 MT, Aluminium Production 1.10 MT from 0.46 MT, Wire Rods

Production 0.16 MT from 0.1 MT and Captive Power Generation 2600MW from 1200MW.

We have taken significant strides in the area of Raw Material Security. We secured extension of existing mining leases. Pottangi Bauxite Mines having a reserve of 75 million tonnes has been earmarked for NALCO by Government. Coal is a major element of our production cost and NALCO has been allotted Utkal-D & Utkal-E coal blocks which together account for extractable reserve of 175 Million Tons of coal. All efforts are underway to obtain the necessary clearance to commence operation of the Mines at the earliest.

With an aim to build organizational capabilities by diversifying in new areas, we have undertaken steps for Business Development. We have entered a joint venture with Gujarat Alkalies and Chemicals Ltd to set up 2.7 lakh TPA Caustic Soda Plant along with 130 MW Captive Power Plant (CPP) at Dahej in Gujarat. To meet the strategic demand of High-End Aluminium for Defence, Aerospace & Automobile Sectors we have signed a Memorandum of Understanding with Mishra Dhatu Nigam Ltd. (MIDHANI) for establishment of High-End Aluminium Alloy Plant in JV mode. It is a matter of great pride that ISRO has shortlisted NALCO for transfer of Li-Ion cell technology and a Memorandum of Understanding has been signed with ISRO in this regard. NALCO, HCL and MECL have signed a MoU to set up a JV Company named 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.

We are aware and responsible towards the impact that our operations have on the environment and communities around us. We are committed to clean manufacturing, responsible mining, optimum resource consumption and reducing the environmental footprint of our operations.

Our Environment policy explicitly exhorts adoption of environment friendly technologies and emphasizes reduction of environmental footprint of our operations. Alternative use, recycling of wastes and rejects through innovative methods are given high importance. In our endeavour towards environment stewardship, the Environment Management System ISO 14001:2015 and Energy Management Systems ISO 50001 are great enablers. During the year NALCO has generated 363 MU from wind power & 0.346 MU from Solar power Plants thus making a significant contribution to clean energy. Total energy consumption and surface water withdrawal has significantly reduced from previous year. A total of 130245 trees have been planted towards afforestation and plantation efforts apart from distribution of saplings and seedlings in peripheral communities to enthuse the spirit of plantation.

We are committed to actively contribute to the social and economic development of communities and the weaker sections of society. Our CSR efforts have made a positive impact on a large population in the surroundings. During the financial year 2018-19, a sum of Rs. 30.35 crores have been spent on CSR activities. The areas of CSR include financial support to poor and meritorious girl students under "Nalco Ki Ladli" scheme, residential education to poor children, free Health care services to people through Mobile Health Units (MHUs), skill development programs and drinking water supply to the society.

We value employees as the most important resource and give utmost importance to Safety, Occupational Health and employee development. We strive far beyond compliance towards all the applicable statutes under Safety, Occupational Health and Safety regulations. Driven by the goal of zero accidents we ensure adherence to safety norms and achieve continual improvement in the areas of personnel safety, health, working environment, illness and incidents. In order to enhance the competency of the employees various training programs are organized through in-house resources and premier institutes in the country. A total of 17,121.5 training man days was achieved for the year 2018-19.

It is a matter of great satisfaction that we are firmly marching ahead in our journey of Sustainable Development. The ongoing expansion and modernization drive of the company will usher in a new chapter for NALCO where the company will generate higher volumes and at the same time the value-added component will increase significantly. Our steady focus on deploying environment friendly and energy efficient technologies will lead to favourable impact on the environment.

I would like to express my sincere gratitude towards all the stakeholders who are our partners in our journey of transformation and seek their feedback and suggestions to create a truly sustainable company.

Shri Sridhar Patra

**Chairman cum Managing Director
NALCO**

Key impacts, risks, and opportunities

102- 15

Enterprise Risk Management

Sustainable operation and financial health of an organisation in a complex, dynamic and interdependent global business scenario is possible through timely identification and mitigation of inherent business risks. Keeping this in mind, NALCO has developed a Risk Management Framework with the Risk Policy addressing risk anticipation, identification, mitigation, remediation, elimination which also include implementing Govt. guidelines.

Risk Management is undertaken as a part of overall business strategies. The Company has a Risk Management Committee at Board level. The Committee reviews the exception Risk Reports and advises remedial measures from time to time. The risk mitigation measures are periodically reviewed to ensure that risks are managed through properly defined framework and established systems and procedures. 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 senior management. Deviations, if any, are reported to the Risk Management Committee.

Risk statement of NALCO

"NALCO as a leading Indian Public Sector Aluminium Company recognises that managing risk is critical for Sustainable Development and is a Choice in the pursuit of business objectives.

And thus, we are committed to the effective and efficient management of all risks to ensure continuity, profitability and business development as delineated in the Company's Vision and Mission."

Major Risks & Opportunities

Risk/Opportunities	NALCO's Initiatives
Business Growth and Diversification The demand for Aluminium is likely to move upwards based on projected growth in sectors where Aluminium consumption is high like automobiles, construction, power etc. in the domestic market. Government of India's thrust on infrastructure projects in last few years and the recent announcement of mega investments in infrastructure projects, will see a significant rise in the demand of the metal.	NALCO has chartered an ambitious growth plan where the volume of key items will see a significant growth to tap the opportunities of rising demand of the metal. NALCO has planned to produce high end Aluminium wire rods to serve sophisticated markets of defence, aerospace and automobile sectors. NALCO is diversifying its business portfolio and moving into areas like sourcing strategic minerals in foreign locations, production of caustic soda, Lithium-ion cell/battery
Raw Material Security The availability of Raw Material on a sustainable basis for present use and future use, where the capacity is being enhanced significantly, is a major risk.	The company has secured the extension of leases for the central, north and south blocks of Panchpatmali Mines. Over and above Pattangi Bauxite Mines with a reserve of 75 Million Tons has been reserved for NALCO by Government of India. All this has led to long term security of sourcing bauxite as a raw material.

Risk/Opportunities	NALCO's Initiatives
Fuel Security <p>Coal is sourced through various instruments like linkages, e-auction and imports. The energy component in the cost structure is highest at around 32%. Furthermore, depending of the instrument of obtaining coal, its prices have a wide fluctuation proving to be a major risk in the supply chain</p>	<p>NALCO has been accorded the mining lease of Utkal D and Utkal E coal mines which have a combined extractable reserve of 175 million tonnes. Mining activities for Utkal D are expected to start in near future followed by Utkal E. This will have favourable impact on the cost of fuels and the associated risks are mitigated.</p>
Water Availability <p>Water availability is becoming very critical and it is a major risk for sustainable development in view of significant stress on available water bodies. Reducing availability, increasing cost and stricter statutory controls are proving to be a major risk to availability of water in a sustainable manner which is a key input to operations.</p>	<p>We have achieved zero discharge with respect to wastewater and sewerage water in all our units. Treated wastewater is used in the production process and treated sewerage water is used for horticulture and gardening purpose. We have installed Rainwater harvesting in all the major areas to conserve rainwater</p>
Emission Control <p>The norms of emissions are becoming more and more stringent which are proving to be major risks as stricter norms will result in significant amount of investments</p>	<p>Elaborate measures have been taken to control emissions within norms and some of key measures include installation of Electrostatic Precipitators (ESPs) in Boiler, ESP in Calciners for collection of alumina dust generated in calcinations process. Bag filters and de-dusting system are provided in Alumina loading and unloading area to prevent dust emission.</p>

Sustainability Policy and Strategy

Sustainability strategy is an integral part of Nalco's business strategy. We leverage business opportunities, minimize risk and seek to address social and environmental challenges such as community development, scarcity of resources and climate change at an early stage. Our sustainability strategy is based on the premise that value is delivered for the business and the stakeholders with inclusive growth and harmonious socio economic development of community.



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.

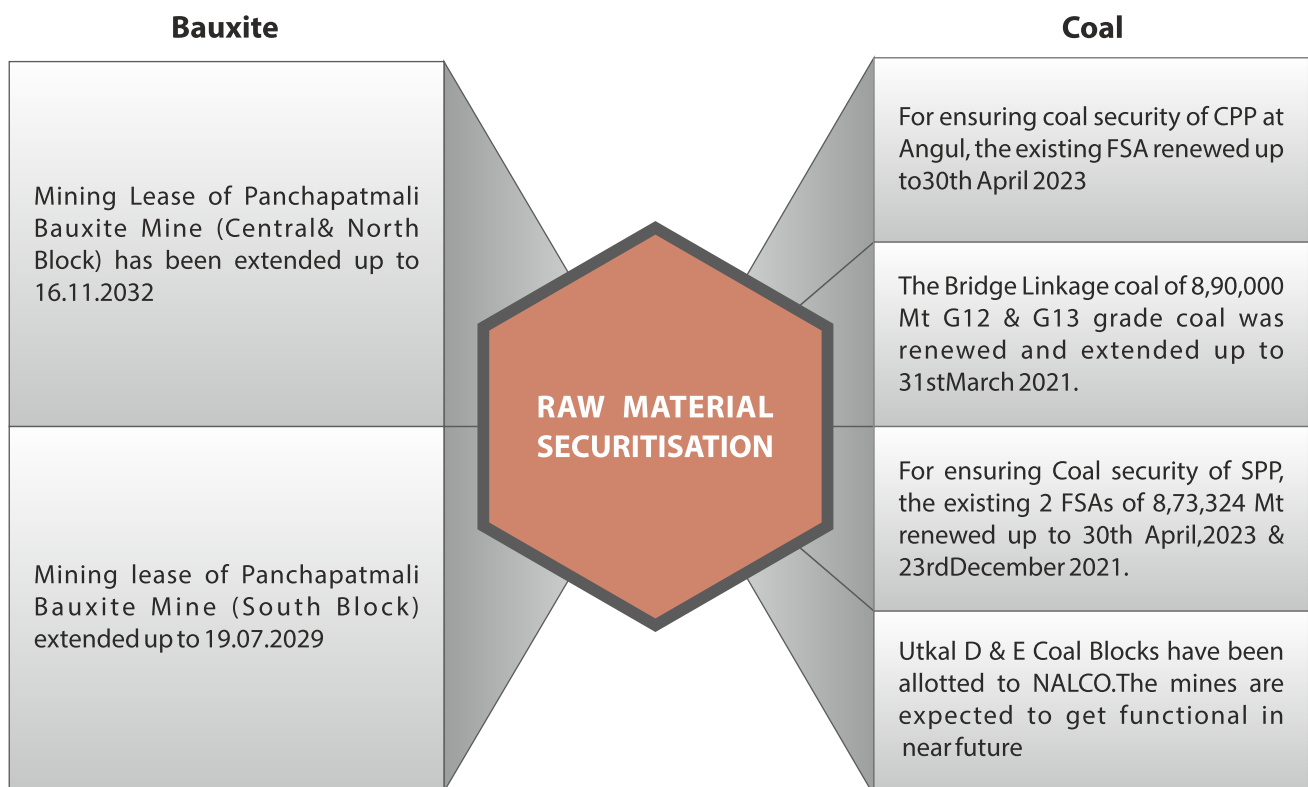
The organizational direction set by Vision, Mission and Value statement shapes our Sustainability Strategy which is a prioritised set of actions. It provides an agreed framework to focus investment and drive performance, as well as engage internal and external stakeholders.

Our well-articulated Sustainability policy has deeply ingrained principles that guide our actions and supports our purpose to create value and improve lives through sustainable and responsible corporate citizenship. We continuously strive to improve our sustainability performance on a triple bottom line excellence. The organizational goals are broken into departmental and functional goals & targets which are monitored through KPIs. We review our sustainability practices annually and improve them as required. In doing so, we also take the changing requirements of our stakeholders into account. 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 to achieve continual improvement. We have established a company-wide strategy cascaded to our economic, environment and social strategy

Raw Material Securitization

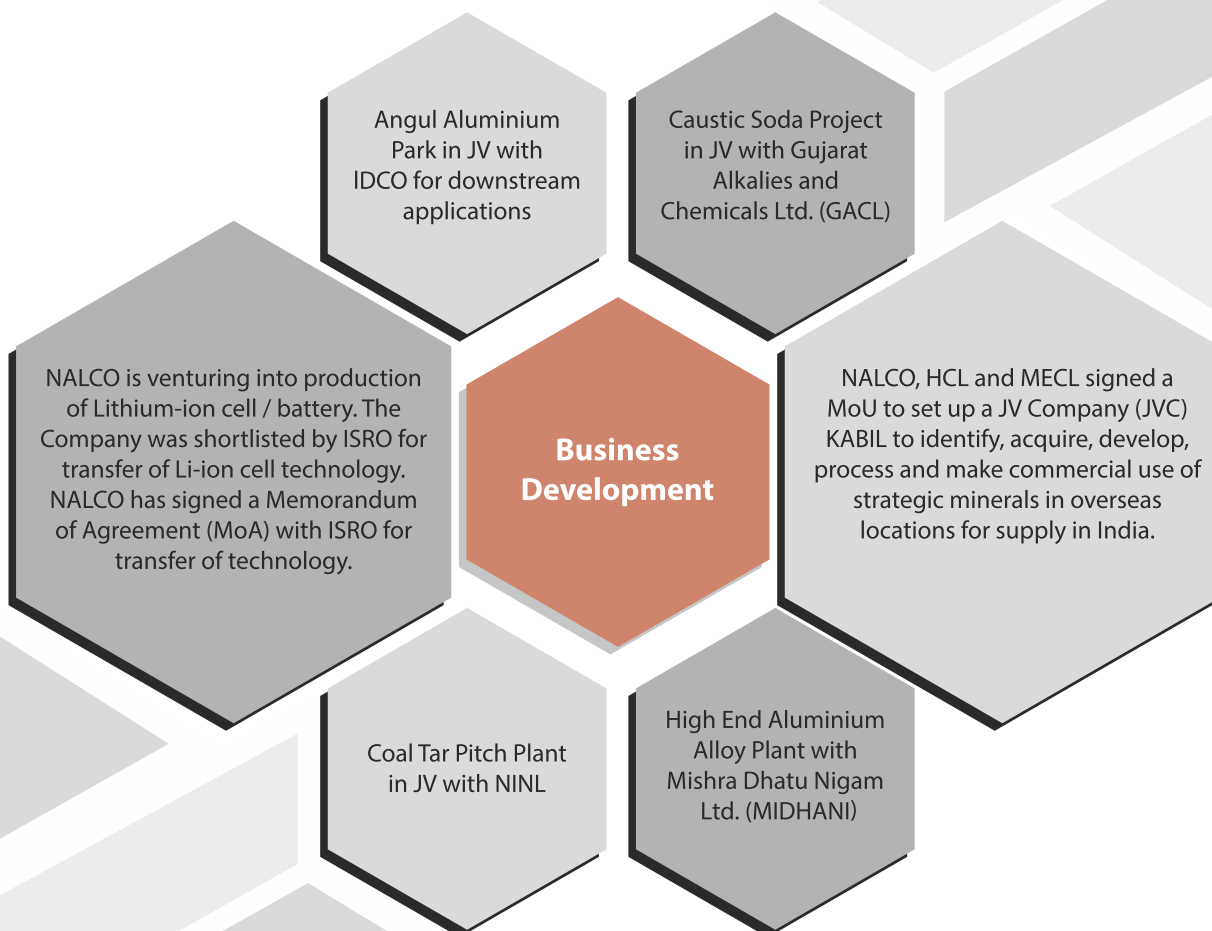
To address the risk of availability of raw materials on a sustainable basis, strategic intervention has been undertaken and a long-term raw material security for the company has been ensured. The company has secured the extension of leases for the Central & North block and South block of Panchapatmali Mines. Over and above Pattangi Bauxite Mines with a reserve of 75 Million Tons has been reserved for NALCO by Government of India. All this has led to long term security of sourcing bauxite as a raw material. As regards coal, another major raw material for its Captive Power Plant, NALCO has been accorded the mining lease of Utkal D and Utkal E coal mines. It is expected that the mining activities for Utkal D are expected to start soon followed by Utkal E. This will mitigate the risk of unavailability of raw materials on a sustainable basis.



Business Development

NALCO has been diversifying its business portfolio through Joint Ventures and Memorandum of Understanding (MoU) instruments. In a strategic move of national importance, a tripartite MoU has been signed among NALCO, HCL and MECL to identify, acquire, develop, process and

commercialize strategic minerals in overseas locations for supply in India. This is aimed at contributing to the ongoing Make in India movement. The business development activities undertaken by NALCO are shown below.



New product launch

Environmental Strategy

We are committed to adopt the highest standards of environmental performance in our operations. In planning and implementing various activities, we focus on minimizing and remediating any adverse impact on the environment. Our strategic focus on environment are reducing environmental footprint, enhanced production of renewable energy, use of cleaner fuels, technological up gradation and installation of energy efficient technologies,

greening activities by tree plantation, responsible consumption of natural resources and sound waste management practices. Our strategic intent towards environment is addressed through system building and all our operating units are certified to ISO 14001: 2015 Environment Management System Standards. We strive to go beyond 100% compliance with all environmental statutory and regulatory requirements.

Responsible Mining

Open cast mining of bauxite gives rise to breaking up of large areas which results in destruction of forest, change in natural topography and danger to wildlife, together with associated risks of noise, vibration, air & water pollution. At NALCO sustainable mining 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.

NALCO's mining practice involves minimum blasting with

measures in place for controlling air pollution, noise and vibration. In order to prevent excess noise & vibration and degradation of top soil fertility, secondary blasting of hard strata is completely avoided. Ensuring proper maintenance of mining equipment and machines go a long way in preventing excess noise and vibration. Haul roads in the mines are water sprinkled properly to minimise plume dust arising out of operation of heavy earthmoving equipment.

Mining Operations



Social Strategy

CSR Policy of NALCO affirms our commitment for Inclusive growth and equitable development. We believe that sustainable and equitable growth is the only acceptable business model. The CSR Policy of NALCO, in conformity with the provisions of Companies Act, 2013, provides for formulation, implementation, monitoring, evaluation, documentation and reporting of CSR initiatives of NALCO towards building a sustainable community around the area of its operations. NALCO aspires to grow its business by reducing adverse environmental footprint and creating positive social impact among the vulnerable and marginalized section of the society in the sphere of education, healthcare, women empowerment, promotion of

livelihood, enduring rural infrastructure, promoting and restoring cultural heritage, promoting sports etc.

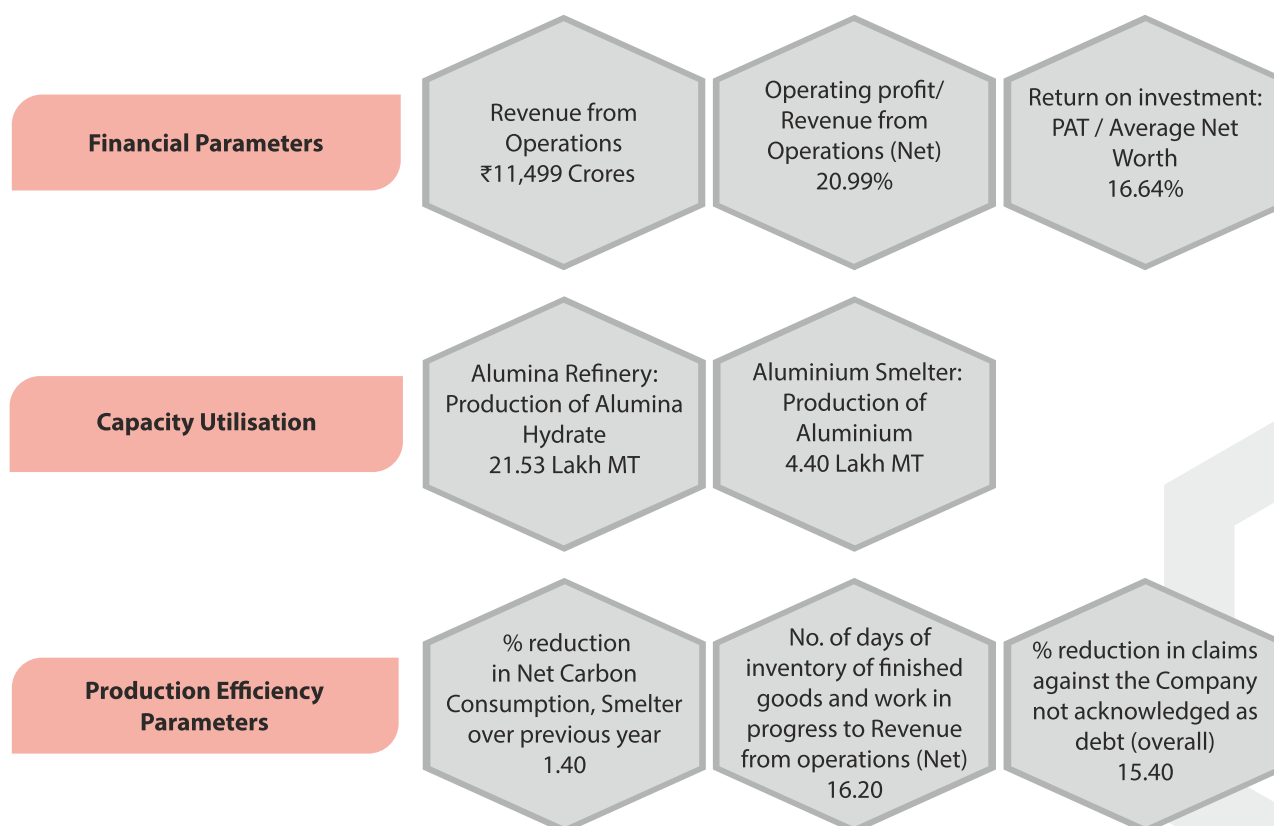
NALCO Foundation has been created for implementing our social strategies in a unified and structured manner. Our social development activity is focused on socio-economic development of the immediate villages located in the periphery of NALCO's operational areas. NALCO Foundation has adopted a project-based accountability through need-based approach and by ensuring participation of the primary stakeholders at the grassroots level in the project management process. The Foundation further intervenes in capacity building of youths, women, PRI members & other stakeholders.

Performance on Business Parameters

Major MoU Parameters

A Memorandum of Understanding (MoU) has been signed between the Ministry of Mines and NALCO in which targets are set for different financial, operational and developmental parameters to ensure accountability and boost

performance. The overall performance of NALCO has been rated "Excellent" in the reporting year, based on factors as enumerated in the MoU. The business performance against major parameters is shown below:



Sustainable Development Key Performance Indicators (KPIs)

S. No	Parameters	Unit	2017-18	2018-19	% Change
Economic					
1	Revenue from Operations	Crores	9,618	11,499	19.56 ↑
2	Profit Before Tax	Crores	2,039	2,740	34.38 ↑
3	Profit After Tax	Crores	1,342	1,732	29.06 ↑
4	Bauxite Production	Million tonnes	7.03	7.23	2.84 ↑
5	Aluminium Production	Million tonnes	0.426	0.440	3.29 ↑
6	Alumina Hydrate Production	Million tonnes	2.11	2.15	1.90 ↑
7	Power Generation (CPP)	Million Unit	6,547	6,256	4.44 ↓
8	Earnings Per Share		6.94	9.06	30.55 ↑
9	R&D Expenditure	Crores	27.95	31.00	10.91 ↑
Environment					
1	IBM sustainability rating status for Bauxite mine		5 stars	5 stars (Under Process)	
2	Total water consumption	m ³	4,95,39,890	4,88,51,713	1.39 ↑
3	Specific electricity consumption in Refinery	kwh/t alumina	316.00	315.51	0.16 ↑
4	Specific electricity consumption in Smelter	kwh/t Al	13464	13370	0.70 ↑
6	Specific Net carbon consumption in smelter	Kg/t Al	430	424	1.40 ↑
Social					
1	Training man days	Man-days/emp/year	2.40	2.64	10.00 ↑
2	Injury frequency rate	#	0.058	0.057	1.72 ↑
3	Total CSR Spent	Crores	29.01	30.35	4.6 ↑
4	Spending on local suppliers	Crores	296.11	361.17	21.97 ↑

Organisation Profile

102-1 to 102-13

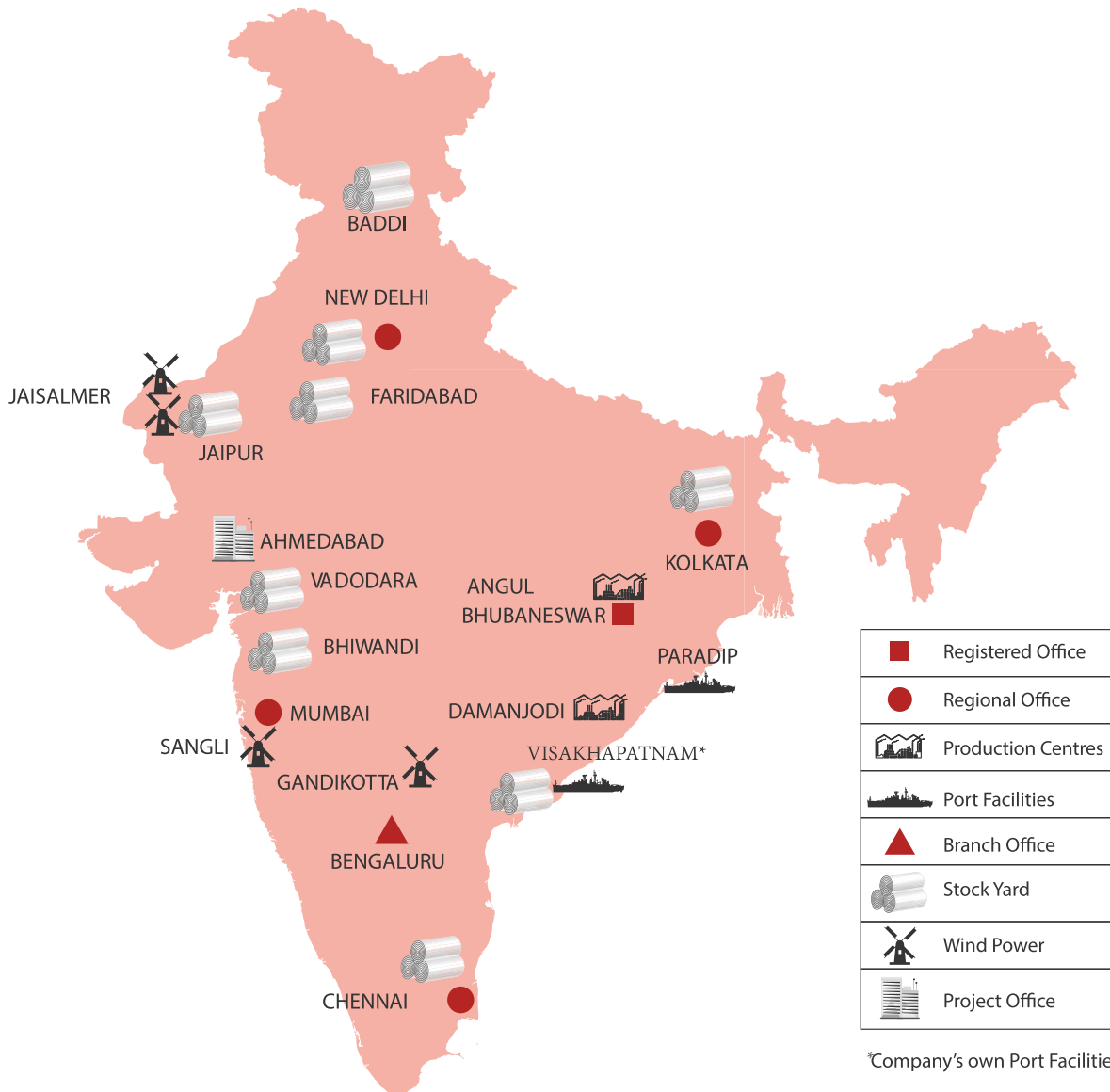
Location of the Company

National Aluminium Company Limited (102-1) has its headquarter at NALCO Limited, Nalco Bhawan, Nayapalli, Bhubaneswar-751013, Odisha, India, Website: [http://www.nalcoindia.com\(102-3\)](http://www.nalcoindia.com(102-3)).

With a 68.25 lakh TPA Bauxite Mine & a 22.75 lakh TPA Alumina Refinery located at Damanjodi in Koraput district of Odisha together with a 4.60 lakh TPA Aluminium Smelter and 1200MW Captive Power Plant located at Angul, Odisha, NALCO is one of the largest integrated Bauxite-Alumina-Aluminium- Power Complex in the Country. Overseas

transactions of Company are supported by bulk shipment facilities at Vizag port, Visakhapatnam of Andhra Pradesh. Port facilities at Kolkata (W.B.) and Paradip (Odisha) are also being utilised depending on the requirement. Domestic marketing are being facilitated by NALCO's registered marketing offices in Delhi, Kolkata, Mumbai, Chennai and Bangalore with nine operating stockyards at various locations in the country.

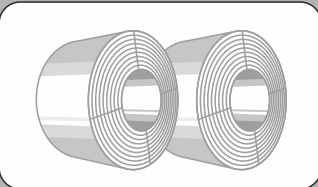
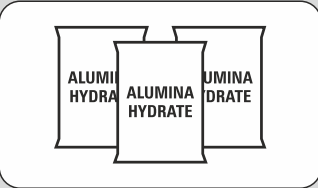
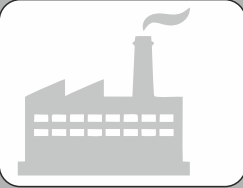
Location Map is shown below (102-4)



Activities, brands, products, and services

102-2

Established on 7th January 1981 in the Public Sector, National Aluminium Company Limited (NALCO) is a Navratna CPSE under Ministry of Mines. NALCO has its registered office at Bhubaneswar. The Company is a group 'A' CPSE, having integrated operations in mining, metal and power with Revenue from operation of ₹ 11,499 crores in financial year 2018-19.

Products	Application and Use
<p>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, High speed Alloy billets</p> 	<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.
<p>Alumina products- Calcined Alumina, Alumina Hydrate, speciality alumina & hydrate</p> 	<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
<p>Power (Thermal, Cogeneration, Wind and Solar)</p> 	<p>Own plant use and excess power exported to grid.</p>



Standard Ingot



T - Ingot



Ingot tee



Billets



Wire rod



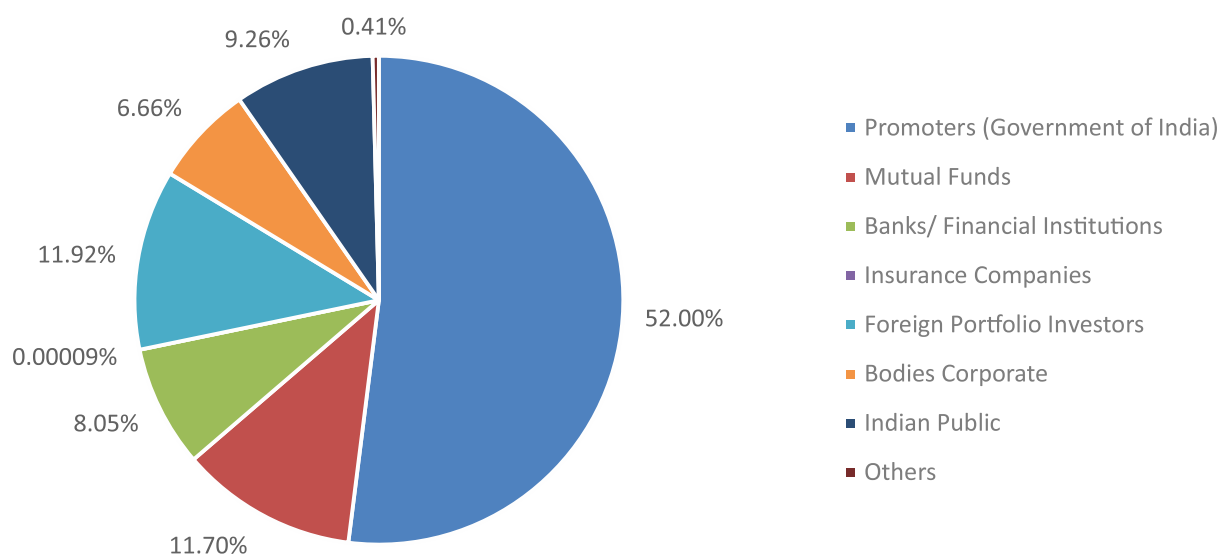
Chequered Sheet

Ownership and legal form

102-5

The shareholding pattern of NALCO as on March 31, 2019 is given below. The Govt. of India holds 97,00,81,517 equity shares (52.00%).

Shareholding Profile as on 31.03.2019



Markets served

102-6

The Aluminium markets catered to by the company apart from domestic market during the FY 2018-19 are Bangladesh, Malaysia, Korea & Singapore.

Calcined Alumina produced in excess of the Company's own requirement is exported. During FY 2018-19, the following Alumina markets were catered to by the company (in addition to India): Egypt, Iran, UAE, Qatar, Indonesia, Malaysia, Netherland, Iceland & USA.



Alumina transport

Scale of the organization

102-7

Sl	Particulars	Units	2016-17	2017-18	2018-19
1	Production				
	Bauxite	Mt	68,25,000	70,25,109	72,30,546
	Alumina Hydrate	Mt	21,00,100	21,05,500	21,52,500
	Aluminium	Mt	3,87,422	4,25,515	4,40,242
	Power (net)	MU	6,066	6,547	6,256
	Wind Power	MU	198	252	363
2	Export Sales				
	Alumina	Mt	12,43,103	12,76,775	12,44,256
	Aluminium	Mt	1,00,591	75,847	38,463
3	Domestic Sales				
	Alumina, Hydrate and Other Chemicals	Mt	51,797	60,641	73,377
	Aluminium	Mt	2,84,926	3,50,469	4,02,134
	Power (net)	MU	30	24	11
	Wind Power	MU	198	252	363

Employees and other workers

102-8

The breakup of Permanent Employees (As on 31.03.2019) by gender and by age group is given below:

Type of Employees	Male			Female			Total		
	<30	30-45	>45	<30	30-45	>45	<30	30-45	>45
Executives	214	497	1008	19	31	36	233	528	1044
Non-executives	138	1334	2946	18	94	161	156	1428	3107
Total	352	1831	3954	37	125	197	389	1956	4151

Supply chain

102-9, 102-10

Micro, Small & Medium Enterprises (MSMEs) and local suppliers in and around manufacturing units are part of



NALCO'S supply chain which are supported in various ways. They are vital elements in our sustainable development. We are committed to reduce resource usage (energy, water, raw material) during sourcing/production/ distribution through the entire supply value chain through inclusiveness of suppliers. Selection of appropriate mode of transportation & verification of social responsibility of supplier adds credibility to our supply chain. For further details please refer Procurement Practices & proportion of spending on local suppliers at pg. no 39

There has been no significant change in the organization and its supply chain.

Precautionary Principle or approach

102-11

We follow the precautionary principle, especially in areas involving environmental risks. Our existing risk management principles supplement the requirements of the precautionary principles and address the mitigation measures related to environmental, social and economic



risks. The international standards of ISO 9001, ISO 14001, ISO 50001, OHSAS 18001 and the SA 8000 standard reinforce the precautionary approach in the organization.

Various policies and manuals tacitly add to the strength of precautionary approach. Any proposed project or process is evaluated based on likely financial, environmental & social impacts before implementation. Any foreseen impact is properly redressed as per precautionary principle.

External initiatives

102-12



UN Global Compact, GRI Standards, UN Sustainable Development Goals, The Universal Declaration of Human Rights, International Labor Organization (ILO) Declaration on Fundamental Principles and Rights at Work, UN Guiding Principles for Business and Human Rights, OHSAS 18001, ISO 14001, etc are adopted in different policies, manuals and procedures of company.

NALCO's Business Responsibility Report (BRR), is prepared In line with Listing Obligation and Disclosure Requirements (LODR) 2015 and is based on the 9 Principles describing the initiatives taken by the company from the Environment, Social and Governance standpoint. Business Responsibility (BR) Report, is published annually as part of the Annual Report.

Ministry of Mines (MoM), Government of India (GoI) has set up the Indian Bureau of Mines (IBM) as a multi-disciplinary government organisation for the promotion of systematic and sustainable development of mineral resources of the country. This is achieved through regulatory inspections of the mines, approval of mining plans and environment management plans to ensure minimal adverse impact on environment. IBM's sustainability framework complemented by regular audits/inspections facilitate the sustainability practices of NALCO's Bauxite mine. Our mines have been given 5-star rating, the highest rating by IBM, on Sustainable Development Parameters.



Secretary (Mines) at All India partners summit







Alignment to Sustainable Development Goals of United Nations

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The Sustainable Development Goals (SDGs), lay out a roadmap to end poverty, reduce

inequality, and tackle climate change, among other ambitions.

Our economic & business, environmental and social performances, processes, practices and initiatives contribute to the various Sustainable Development Goals in the following ways:

SDG Goal	Elements of SDGs Mapped to GRI Standard Disclosures	NALCO Contribution
1 NO POVERTY 	<ul style="list-style-type: none"> Earnings, wages and benefits (GRI 202-1) Economic development in areas of high poverty (GRI 203-2) Community Development (GRI 413-2) 	<ul style="list-style-type: none"> NALCO is an excellent paymaster The Company has transformed the local economy We undertake local community development programs based on local communities' needs
2 ZERO HUNGER 	<ul style="list-style-type: none"> Significant indirect economic impacts (GRI 203-2) Infrastructure investments (GRI 201-1 & 203-1) 	<ul style="list-style-type: none"> Apart from creating jobs, directly or indirectly, NALCO has nurtured the local suppliers. NALCO has created various infrastructural facilities including, buildings, roads, parks, schools and hospitals.
3 GOOD HEALTH AND WELL-BEING 	<ul style="list-style-type: none"> Access to medicines (GRI 203-2) Air Quality (GRI 305-1, 305-2, 305-3, 305-6) Occupational health and safety (GRI 403-2 & 403-3) Spills and Water Quality (GRI-306-1, 306-2, 306-3, 306-4) 	<ul style="list-style-type: none"> Medicines at free of costs in health centres/camps Well-equipped Occupational Health Centres. To prevent spread of occupational disease Continual monitoring of emission and effluent parameters
4 QUALITY EDUCATION 	<ul style="list-style-type: none"> Education for sustainable development (GRI 102-27) Employee training and education (GRI 404-1) 	<ul style="list-style-type: none"> Educational facilities, residential education to tribal students, financial assistance to meritorious BPL girls During the year 17,121.5 training man days for regular employee/ 890 apprentice trainees engaged/ In house skill development programmes (5,133 man-days)/ 540 outside candidates trained under Skill India Campaign of Gol.
5 GENDER EQUALITY 	<ul style="list-style-type: none"> Equal remuneration for women and men (GRI 202-1) Diversity and Equal Opportunity (GRI 405-1, 405-2) Gender Equality (GRI 401-1, 404-1, 404-3, 405-1) Non-discrimination (GRI 406-1) 	<ul style="list-style-type: none"> Policy of equal remuneration to both women and men The recruitment and selection processes enable representation from across gender, regions, ethnicities, religions and different social strata There is no discrimination on any basis.
6 CLEAN WATER AND SANITATION 	<ul style="list-style-type: none"> Water (GRI 303-1, 303-3) Waste (GRI 306-2) Wastewater quality (GRI 306-1) 	<ul style="list-style-type: none"> Water conservation, STP, Rainwater Harvesting Proper storage, transportation & disposal of waste Parameters of effluent like Suspended Solids, COD, BOD and Oil & Grease are well within norm. Minimizing the adverse impact on water bodies following zero discharge to outside
7 AFFORDABLE AND CLEAN ENERGY 	<ul style="list-style-type: none"> Energy efficiency (GRI 302-1, 302-2, 302-3, 302-4) 	<ul style="list-style-type: none"> Procurement of Energy Efficient Product, services and design Ensuring conservation of energy 198.4 MW of wind power energy 310 kwp solar power plants
8 DECENT WORK AND ECONOMIC GROWTH 	<ul style="list-style-type: none"> Infrastructure investments (GRI 203-1) Earnings, wages and benefits (GRI 202-1) Employment (GRI 401-2) 	<ul style="list-style-type: none"> Investments towards roads, utilities, community social facilities, health and welfare centres, and sports centres Wages are above the applicable minimum wages All forms of forced or compulsory labour prevented Benefits to workforce to foster economic growth. Earnings per share
9 INDUSTRY INNOVATION AND INFRASTRUCTURE 	<ul style="list-style-type: none"> Infrastructure investments (GRI 201-1, 203-1) 	<ul style="list-style-type: none"> Significant amount of economic value is generated and distributed Infrastructure development initiatives for communities
10 REDUCED INEQUALITIES 	<ul style="list-style-type: none"> Equal remuneration for women and men (GRI 405-2) No discrimination based on caste, creed, religion etc 	<ul style="list-style-type: none"> Reducing inequalities by helping the social reform, training programs for unemployed youth, support to underprivileged, Needy and differently abled persons Equal remuneration for men and women ensured Equal treatment for all employees irrespective of their caste, religion, domicile status etc

SDG Goal	Elements of SDGs Mapped to GRI Standard Disclosures	NALCO Contribution
11 SUSTAINABLE CITIES AND COMMUNITIES 	<ul style="list-style-type: none"> Infrastructure investments (GRI 203-1) 	<ul style="list-style-type: none"> Wind & solar power, energy reduction technologies and equipments, LED lighting Appropriate effluent control by new technology, GTC, revamping of FTC Emission control through better combustion, proper fuel handling, automated burner management
12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	<ul style="list-style-type: none"> Energy efficiency (GRI 302-1, 302-2, 302-3, 302-4) Materials efficiency/recycling (GRI 301-1, 301-2) Procurement practices (GRI 204-1) Sustainable mining Spills (GRI 306-3) Transport (GRI 302-1 & 302-2) Water efficiency (GRI 303-3) Water quality (GRI 306-1) 	<ul style="list-style-type: none"> Energy reduction, adoption of green technologies, pollution control and environmental protection, Ambient air quality monitoring, emission monitoring & control, Increased use of green energy, resource optimization recycling and reuse of wastes, prevention of ground water and surface water contamination Sustainable mining Recycling of waste and sewerage water with zero discharge to outside Reduce, recycle & reuse is our basic ideology of waste management.
13 CLIMATE ACTION 	<ul style="list-style-type: none"> Energy efficiency (GRI 302) Environmental investments (GRI 305, 306) GHG emissions (GRI 305-1, 305-2, 305-3, 305-4, 305-5, 305-6) Risks and opportunities due to climate change (GRI 201-2) 	<ul style="list-style-type: none"> Renewable energy and energy reduction measures Investments have been made for the control of emission and effluents GHG emissions are monitored and controlled Achievement of PAT Target
14 LIFE BELOW WATER 	<ul style="list-style-type: none"> Marine Biodiversity (GRI 304-1, 304-2, 304-3, 304-4) 	<ul style="list-style-type: none"> The operations and supply chain activities do not have any impact on marine life as we maintain zero water discharge.
15 LIFE ON LAND 	<ul style="list-style-type: none"> Environmental investments (GRI 305, 306) Forest degradation (GRI 305-1, 305-2, 305-4, 305-5) Mountain ecosystems and Natural habitat degradation (GRI 304-1, 304-2, 304-3, 304-4) 	<ul style="list-style-type: none"> Investments have been made for the control of emission and effluents 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 Wildlife Management Plan approved by PCCF (Wildlife), Odisha. Significant amount has been paid to the State Forest Department towards implementation of the Plan
16 PEACE, JUSTICE AND STRONG INSTITUTIONS 	<ul style="list-style-type: none"> Anti-corruption (GRI 205-1) Compliance with laws and regulations (GRI 307-1, 419-1, 416-2) Grievance mechanisms (GRI 103-2) Non-discrimination (GRI 406-1) Human Rights 	<ul style="list-style-type: none"> Committed to ethics and transparency and have contract Manual, Purchase Manual, Code of Business Conduct & Ethics for Board Members and Senior Management, Core Values, Fraud Prevention Policy, Whistle Blower Policy, CDA rules Standing Order, Integrity Pact Strong policy of non-discrimination

Membership of associations

102-13

NALCO is a member of various trade and 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
- National Institute of Personnel Management, Kolkata
- Odisha State Productivity Council
- All India Management Association

Awards & Accolades

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

- CII, Eastern Region awarded ENCON -4-star award in the LARGE-SCALE CATEGORY for the year 2018
- Alumina Refinery received the "Good Green Governance Award - 2018", instituted by Srishti Foundation for excellent performance on Environmental Management on 22nd April 2018 at New Delhi.
- Alumina Refinery has bagged the prestigious "Greentech Environment Award-2018".
- NALCO bagged the "Kalinga CSR Award - 2017" in recognition of its Best CSR Activities for Sustainable Development, during the 3rd National Seminar on "Corporate Social Responsibility Initiatives – 2018



Director (HR), Shri B.K.Thakur receiving award from CM Odisha



Director (Production)- Shri V. Balasubramanyam receiving award from CM Odisha



Swachh Bharat award



CSR award event

- Steam & Power Plant (SPP) of Alumina Refinery was awarded as "Power Plant Performer 2018 –CPP (Coal)" by Mission Energy Foundation at the "Thermal Power O&M Conference-Expo-Awards" function
- Smelter Plant of NALCO won prestigious "Golden Peacock Environment Management Award 2018" for excellent practices and significant achievements in the field of Environment Management.
- NALCO has received the prestigious "Dun & Bradstreet Award" for Excellence in Export performance.
- Panchpatmali Bauxite Mines bagged the 2nd Best Award in "Emergency Preparedness in Mines" during the "Half yearly Safety Week Celebrations, 2018-19" held under the banner of "Odisha Metalliferous Mines Safety Week Celebrations Committee (OMMSWCC)".
- The Panchpatmali Bauxite Mines of NALCO bagged five prestigious awards at the concluding ceremony of 20th Mines Environment and Mineral Conservation (MEMC) week, held under the aegis of IBM.
- Alumina Refinery of NALCO has bagged the prestigious "CII-Exim Bank Business Excellence Award" for the year 2018 in the Gold Plus category.
- NALCO has bagged the "EEPC Gold Award" during the 34th EEPC Export Excellence Award ceremony at Kolkata.
- NALCO's S&P Complex was awarded "HR Excellence" Award by Dream Foundation
- NALCO was recognised and awarded in multiple categories including General working, Mechanical maintenance, Safety & Compliance, Safety Stall renovation and on Swachatta, during the "36th Annual Metalliferous Mines Safety Week celebration held at Sukinda, Odisha".
- NALCO received the "Brands of Odisha Pride of India CSR (Gold) Award", instituted by the Sambad.
- NALCO has bagged the "Swachh Bharat Award" for Sanitation-Infrastructure Building & School Sanitation Initiatives during the National Swachhata Summit-2019



Captive Power Plant



Smelter Plant



Refinery



Port Facilities

Ethics and Integrity

102-16 to 102-17



Values, principles, standards, and norms of behaviour

102-16

Company's philosophy

Transparency, accountability, commitment to values, financial prudence and responsibility to stakeholders are our driving force for growth and sustainability. The stated attributes combined with guidelines issued by the Government of India constitute the framework of NALCO's Good Governance Practices. Our motto is creating value for the stakeholders i.e. employees, shareholders, customers, suppliers, creditors, Government of India, State Governments, Governmental agencies/ departments and the society at large. Our core values with the apt acronym BEST also underline NALCO's philosophy of providing value to the stakeholders while ensuring the highest levels of quality in our business processes. We strive to adhere to sustainability principles for both the environment and the community through our responsible operations.

Policies and Manuals

An extensive set of documentation and Manuals have been developed after due diligence to cover a wide gamut of organizational activities which include Code of Business Conduct and Ethics for senior management, Vigilance Manual, Marketing Guideline, Purchase Manual, Delegation of Power etc. These documents clearly delineate the dos and don'ts of the activities to be carried out and they promote ethics, transparency and integrity in the organisation. List of important policies with their web addresses are given below:



Policies and Manuals

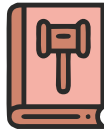
1	Code of Business Conduct and Ethics for Board Members and Senior Management: https://nalcoindia.com/wp-content/uploads/2018/12/CodeofConduct.pdf
2	Fraud Prevention Policy https://nalcoindia.com/wp-content/uploads/2018/12/Nalcofraudpreventionpolicy.pdf
3	Whistle Blower Policy https://nalcoindia.com/wp-content/uploads/2018/12/Whistleblowerpolicy_nalco.pdf
4	Delegation of Power
5	Vigilance Manual https://nalcoindia.com/vigilance/manuals-policies/
6	Marketing Guidelines
7	Purchase Manual https://nalcoindia.com/wp-content/uploads/2019/03/PurchaseManualUpdated-upto-2017.pdf
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
11	Code of Practices and Procedures for fair disclosure of unpublished price sensitive information https://nalcoindia.com/wp-content/uploads/2019/06/NALCO_Code-of-Conduct_new-25-06-2019-1.pdf
12	Risk Management Policy
13	HR Policy & Procedure https://nalcoindia.com/wp-content/uploads/2019/01/1.01-rp_exec-DSC.pdf
14	Dividend distribution Policy https://nalcoindia.com/wp-content/uploads/2019/01/Dividend-Policy-1.pdf
15	Social Accountability Policy https://nalcoindia.com/wp-content/uploads/2018/12/SA_POLICY_Approved.pdf
16	Policy on related party transaction https://nalcoindia.com/wp-content/uploads/2018/12/NEW-RPT-NALCO.pdf

Ethical behaviour at all levels is ensured through appropriate policy formulation & implementation followed up by close monitoring and corrective action. NALCO's commitment towards integrity, ethical practices and transparency is documented in the Sustainable Development Policy and CoreValues.

Code of Practices and Procedures for Fair Disclosure of Unpublished Price Sensitive Information, Code of Conduct, Fraud Prevention Policy, Whistle Blower Policy, Policy on Related Party Transactions etc also reinforce the ethical behaviour in their dwelling area.

Code of Conduct

NALCO has adopted a Model Code of Business Conduct and Ethics in order to instil sense of ethics, integrity and transparency in the top brass of management. It is applicable to every Board Member including Government Nominees & Independent Directors and Senior officials placed one level below the Board. The Code ratifies integrity, transparency, ethics and non-discriminatory approach for Board Members and Senior Management. It professes the value system, competency and discipline expected from them while transacting the business of the Company. The Code of Conduct is hosted at NALCO web site for reference.



Guidelines for various organizational activities like 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 etc. are promulgated in the Code of Conduct. Any violation of the NALCO Code of Conduct attracts disciplinary action. We at NALCO believe that every employee has a responsibility towards stakeholders and must strictly adhere to the Code of Conduct and conduct himself/ herself at all times in a professional and ethical manner. Integrity is the key to our organizational values and forms the basis of the Company's organisation culture.

Investors Complaint

During the financial year 2018-19, 429 complaints consisting of 424 Investor complaints & 5 SEBI complaints were received by the Company. All the received complaints stand resolved within the stipulated time.

Compliance

NALCO is submitting quarterly self-appraisal reports on compliance of the guidelines on Corporate Governance to Dept. of Public Enterprises (DPE). The Company is rated 'Excellent' as per the self-appraisal report for the financial year 2018-19. The self-appraisal report for 2018-19 can be accessed in the website at <https://nalcoindia.com/wpcontent/uploads/2019/04/Selfevaluation-report-1.pdf>.



It is ensured that all the provisions of the SEBI listing regulations, under our control, are complied with and non-compliances beyond our control are highlighted in quarterly reports on corporate governance to SEBI. Statutory auditors annually examine the adoption of procedures and implementation of the conditions of Corporate Governance. The Certificate of statutory auditors is published in the Annual Report.

Mechanisms for advice and concerns about ethics

102-17

NALCO has signed the Integrity Pact (IP) with Transparency International India (TII). As per the pact any breach of contract condition invites the attention of Independent External Monitor. Advice regarding ethics related issues pertaining to affected area are received during CAG Audit, Corporate Governance Audit and Secretarial Audit. The Vigilance department of NALCO give suggestions and advices for rectification of observed irregularities during the routine check and complaint investigation in addition to regular preventive study and CTE type intensive examination.

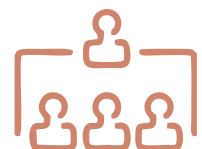
Appropriate actions are taken based on the severity of irregularity and misdemeanour based on NALCO's Vigilance Manual, CVC Guideline, Code of Conduct and related circulars or guidelines etc. Detailed investigations of the complaints are carried out as per rules of the company based on prescribed procedures with functional guidance sought from CVC and appropriate DAR actions and remedial measures are taken. Required measures are carried out regularly for ensuring equity, fairness & transparency in all spheres of activities including maintaining ethical standards. In fit cases 1st stage and 2nd stage advice of CVC is sought and appropriate DAR actions and remedial measures are taken. Required measures are carried out regularly for ensuring equity, fairness & transparency in all spheres of activities including maintaining ethical standards.

Corporate Governance

Governance structure

102-18

Corporate governance is the combination of policies, processes and guidelines effected by establishing systems, structures, and practices by which businesses are operated, regulated or controlled. We understand that the Governance structure should be appropriate to accommodate representation from different field of expertise to guide the company against changing external environment, balancing the expectation of stakeholders and managing the risks and opportunities.



It involves creating and enhancing value for stakeholders by balancing their interests with those of the company. The governance practices in NALCO have been strengthened over the years through a robust system of internal control, systems & procedures, structures, timely & continuous flow of material information to stakeholders and statutory compliance.

It involves creating and enhancing value for stakeholders by balancing their interests with those of the company. The governance practices in NALCO have been strengthened over the years through a robust system of internal control, systems & procedures, structures, timely & continuous flow of material information to stakeholders and statutory compliance.

In NALCO the company's governance structure is helmed by an independent, well informed and professional Board of Directors which at the apex level is responsible for the overall functioning and performance of the company. In addition, the Board provides a strategic direction while exercising appropriate control to ensure that stakeholders' aspirations and societal expectations are met. Being a central PSU, the Directors are appointed by Government of India considering their talent, experience and expertise in different business and industry related fields. 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's Board is accountable to all shareholders and the first duty of its members is to protect and further the interest of the Company. As on 31st March 2019, the Board of NALCO is headed by the Chairman-Cum-Managing Director and assisted by five full time (Executive) Directors, two Part-time official Directors and Eight Part-time Non-official (Independent) Directors. The full time Executive and non-Executive (Independent) Directors are selected through Public Sector Enterprises Board which has a well-laid out selection procedure.

Corporate governance is carried out as per the provisions of the Securities and Exchange Board of India, Listing Obligations and Disclosure Requirements Regulations 2015.

The details of Board of Directors as on 31.03.2019 are given below:

Sl. No.	Category of Directors	Name of Director	Date of Appointment
	Chairman-cum-Managing Director		
1		Dr. Tapan Kumar Chand	27.07.2015
	Functional Directors		
2		Shri V. Balasubramanyam	01.01.2015
		Director (Production)	
3		Shri Basant Kumar Thakur	04.07.2016
		Director (HR)	
4		Shri Sanjib Kumar Roy	03.02.2017
		Director (P&T)	
5		Shri Pradip Kumar Mishra	23.04.2018
		Director (Commercial)	
6		Shri Sridhar Patra	01.09.2018
		Director (Finance)	
	Part-time Official Directors		
7		Dr. K. Rajeswara Rao	19.02.2018
8		Shri Anil Kumar Nayak	27.03.2018
	Part-time Non-official (Independent) Directors		
9		Shri Dipankar Mahanta	21.11.2018
10		Shri S. Sankararaman	21.11.2018
11		Shri Pravat Keshari Nayak	21.11.2018
12		Prof. Damodar Acharya	21.11.2018
13		Shri Maheswar Sahu	21.11.2018
14		Smt. Kiran Ghai Sinha	03.02.2017
15		Shri Nagendra Nath Sharma	06.09.2017
16		Smt. Achla Sinha	08.09.2017

Board Level Committees

Constitution of Board sub-committees, both statutory and non-statutory is a process to strengthen Corporate Governance. Statutory and voluntarily constituted non-statutory committees comprise of a judicious mix of Executive and Non-Executive Directors to assist the Board in smooth conduct of important activities of the company. The

same Secretarial Standards applicable to Board meetings are applicable to Committee meetings also. 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.



Apart from the above Committees, 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.

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

CSR & Sustainability Development Committee

The Committee reviews CSR activities and sustainable development program of the Company. The Committee comprises of the following members as on 31st March 2019. Amongst the members, Director (HR) drives the CSR initiatives and Director (Production) looks after sustainability aspect 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	Non-executive Independent	Member
Director (Finance)	Executive Non-Independent	Member
Director (Production)	Executive Non-Independent	Member
Director (HR)	Executive Non-Independent	Member

* AS ON 31.03.2019

Stakeholder Engagement

102-40 to 102-44

We consider stakeholders as partners of our progress and respect their opinion, concerns and feedback to safeguard their interests. The privileges of the stakeholders are respected, and the emphasis is given for creating a condition where both the organisation and the stakeholder's contribution are mutually beneficial for growth. The insight gained by the stakeholders in the area of their concern opens a new horizon of possibilities and prompts us about the forthcoming challenges to be addressed. In order to capture

the expectation and requirements of our stakeholders we adopt both formal and informal modes of engagement and consultations. The formal modes include vendor meet, suppliers meet, customer meet, MSME conventions, RPDAC meeting, Customer survey etc. The informal modes are trade fairs, seminars, press and media release etc. For details, please refer section on approach to Stakeholder engagement at 102-43.



Mineral & energy conservation week celebrated at NALCO

List of stakeholder groups

102-40

The list of NALCO's major stakeholder groups is given below:



Collective bargaining agreements

102-41

NALCO creates a favourable environment for maintaining good Industrial relations by ensuring respect for the rights and privileges of the registered trade unions. A 4-level participative management system is in place at NALCO consisting of the Unit level, Complex level, Corporate level (Directors level) and Apex level (CMD level) consultation with Recognised Unions, creating opportunity for deliberation on issues at various levels depending on their importance.

Employees are free 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 Recognised Union in every unit is the registered trade union having highest number of members under its fold, decided by secret ballot. Consultation or negotiation with the Recognized Unions is arranged for all matters affecting workers. All welfare measures for employees are implemented in consultation with the Recognised Unions of all the units.

Collective bargaining is the method adopted for finalising all important policy matters connected to issues like wages, incentives, benefits, etc. The implementation of mutually arrived decisions regarding employees' demands and

expectations is carried out by involving recognised unions. Seeking constructive suggestions from employees and unions on administrative & production related issues is a firmly established practice and has paid rich dividends with quick liquidation of many problems.

Additionally, Shop-floor Councils are also very effective in ensuring workers' participation in day to day operation. Shop level discussions settle issues like job distribution, breach of safety, wrong work procedure, unsafe conditions, material shortages or equipment malfunctioning etc. A host of structured participatory forums like Canteen Committee, Safety Committee, Grievance Committee and Welfare Committee are available to guide and support employee related activities & issues. As per section 9 of the Industrial Dispute Act of 1947, a notice period of 21 days is allowed, prior to implementation of any significant operational change. Thus, a constructive atmosphere for growth and profitability is maintained by good industrial relations with the trade unions.

Hundred percent of the non-executive employees are unionised and the representation of employees in different recognized unions are given below.

Smelter – 44.83%, CPP – 52.68%, Refinery – 47.99%, Mines – 57.85% & Corporate – 76.22%.

The recognised unions as on 31.03.2019 are

Unit	Name of Recognised Unions
Smelter	Aluminium Mazdoor Sangha
Captive Power Plant	National Aluminium Company Shramik Congress Union
Mines	NALCO Mines Employees Union
Alumina Refinery	NALCO Employees Union
Corporate Office including Regional Offices	NALCO Employees Forum

Identifying and selecting stakeholders

102-42

Identification of stakeholders is based on the degree to which they are affected by our activities and relationships, as well as by their ability to influence the achievement of our business objectives.

Approach to stakeholder engagement

102-43

Nalco is engaged with all its stakeholders and the level of engagement is commensurate with the impact of the stakeholder' on the organization and vice-versa. Nalco has mapped its internal and external stakeholder for the purpose of stakeholder engagements. Refer 102-40.

Assessment of the organization with reference to its internal and external context pertaining to three pillars of sustainability viz. economic, environmental and social aspects is taken into consideration during stakeholder

engagement. The inputs received give us an opportunity to carry out self-analysis, identification of deviation from responsible business strategy and to find out ways to address them. This information is periodically updated through formal or informal channels of communication on an ongoing basis.

Engagement with stakeholders is through formal & informal channels depicted below.

Stakeholder Engagement










Formal Channels

- Vendors meet
- Suppliers meet
- Customers meet
- Training
- Knowledge sharing
- CSR projects identification
- Communication with shareholders
- Communication with investors
- Grievance handling
- Satisfaction survey

Informal Channels

- Active involvement in industry associations
- Active involvement in membership-based organizations
- Trade fairs
- Seminars
- Discussions on different issues

Continuous updating of the formal and informal ways of capturing concerns of our stakeholders is carried out and new stakeholders are identified as per the changing requirement of the organisation. Our viewpoints are propagated, and goodwill is earned by the feedback given to stakeholders. Our involvement in stakeholder engagement process is a catalyst for a strong and satisfying relationship with our valued stakeholders. The modes of our stakeholder engagement and their concerns are given below.

Categories	Modes of Engagement	Concerns
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. 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 Tax & Dividend Labour relation & Labour welfare Corporate Social Responsibilities. Compliance of various rules, acts, regulation and laws
Shareholders & Investors 	<ul style="list-style-type: none"> Annual General Meetings, Periodic financial & performance reports to shareholders and investors Reports, Memorandum & Press release of SEBI, CAG, Banks and Financial institutions Shareholders' surveys and meets 	<ul style="list-style-type: none"> Profit & return on Investment Financial restructuring and disinvestment of Govt. Shares. Share price & Dividend Grievance resolution Foreign exchange & exchange rate
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
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. 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
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.
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
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
Contractors/ Other service providers 	<ul style="list-style-type: none"> Tender enquiries and RFQ 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) No Forced labour, child labour, or discrimination
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.

Response to topics and concerns raised

Stakeholders	Response by NALCO to Stakeholder concerns
Government & Regulators 	<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
Shareholders & Investors 	<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
Employees 	<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.
Customers & Consumers 	<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
Suppliers & Vendors 	<ul style="list-style-type: none"> Vendor development and import substitution, E-Procurement & E- Payment Support including financial privilege to MSE units Plant level sub-committee meet at Angul & Damanjodi. Plant level advisory committee meeting at Bhubaneswar
Community/ civil society organisations 	<ul style="list-style-type: none"> Operating mobile health units & organizing health camps in periphery villages Sponsoring children from periphery villages for formal education. Other CSR initiatives
Industry Associations 	<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.
Contractors/ Other service providers 	<ul style="list-style-type: none"> On the job counselling and feedback, Timely payment, Trainings during induction, Toolbox talk, Periodic meetings with production facility in-charge
Business partners / New ventures 	<ul style="list-style-type: none"> Meetings. Official communication between the parent and joint venture entities

Key topics and concerns raised

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Key concerns emerging out of stakeholder engagement are listed below considering all aspects of the topics. These topics form the basis of evaluating and analysis of the materiality aspect.

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

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/2019/08/Annual-Report_38th-AGM.pdf

Materiality Analysis & Material topics

102-47

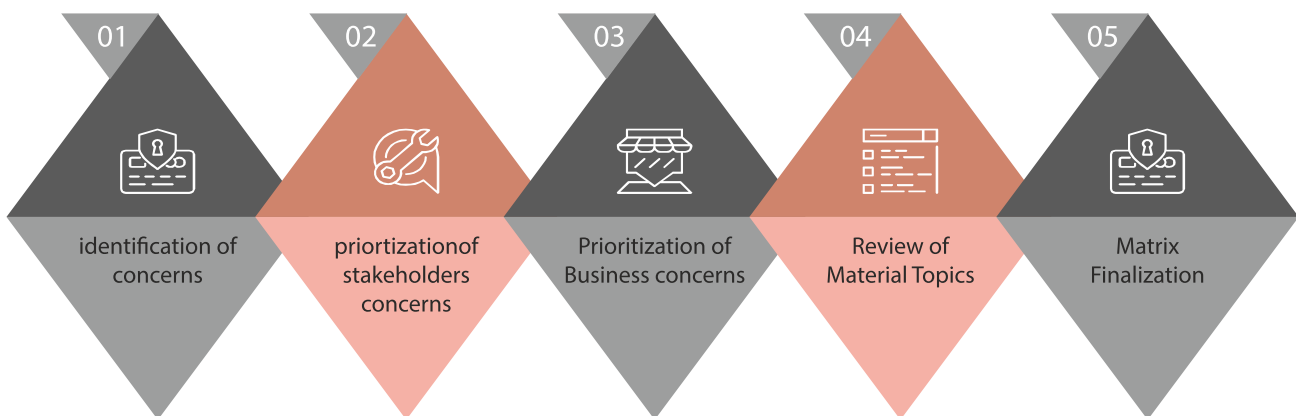
Materiality Assessment is defined as identifying, prioritizing and defining the aspects that are of highest importance to the stakeholders as well as the management of a company. Material issues are those that represent the most significant challenges and opportunities faced by the company in context of sustainability which in turn are the foundation for the sustainability strategy. Materiality, in this context, is the threshold at which an issue or interest should be reported.

GRI Sustainability Reporting Standards are used to formulate and guide the materiality analysis process by applying the Report Content Principles and Materiality Test. A structured materiality assessment exercise was carried out during 2017-18 across all the operational locations to capture perspectives of different stake holders. A formal workshop was organized at Corporate Office where we interacted with internal as well as some external stakeholders. In addition to informal verbal discussions, the stakeholders were included in a survey, based on a carefully designed questionnaire, the inputs for which were based on our experience and current challenges. Feedbacks of stakeholders from different locations were also collected by circulating the above

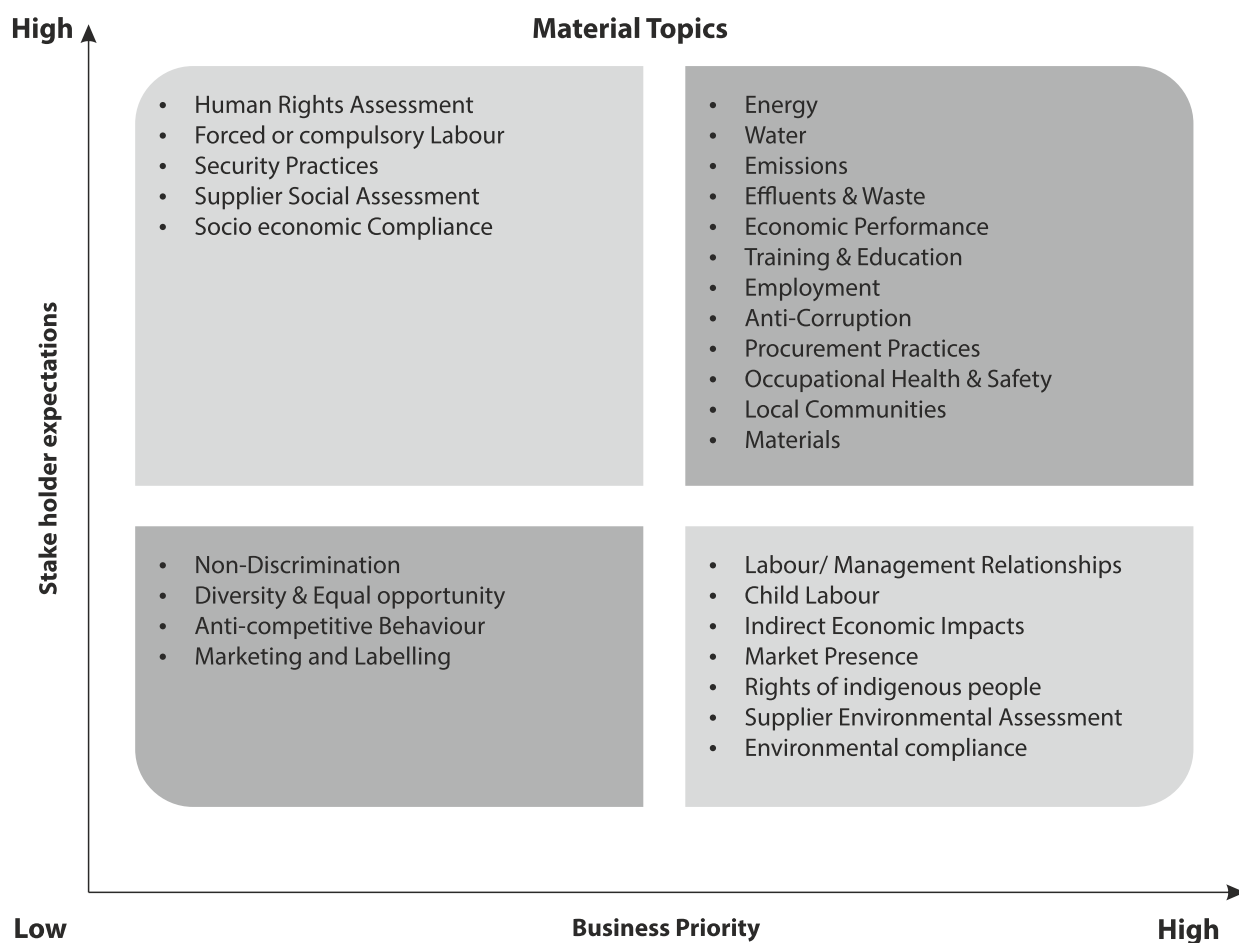
questionnaire to selected stakeholders.

For the current year the output received from the exercise has been reviewed based on various aspects of the business operations and insight gained from stakeholder engagement process. The different inputs and various engagements we had during the year with different stakeholders are the basis of our refinement of the material aspects. The MOU signed between Management and Ministry for the fiscal is the basis of capturing the importance assigned by the Government to different issues. The materiality was plotted on a 2X2 matrix and the aspects were plotted based on their relevance to the management on one axis and their significant impact on the stakeholder on the other. Identified material issues which are important from the business perspective of NALCO and those which are of concern to our stakeholders, form the focus of this sustainability report. There are no significant changes in scope or topic boundary compared to previous year. Due care and diligence are exercised to ensure reporting on the identified material issues as per GRI Standards in Accordance "Core" option.

Materiality Process



Materiality Matrix



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

Economic

Economic Performance

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103-1, 103-2 and 103-3

Economic Scenario

During the year 2018 world production of Aluminium has increased 6.3% to 63.71 Million tonnes out of which 36.15 Million tonnes i.e. 57% was produced by China. The world consumption of Aluminium during 2018 has increased 3.1 % to 65.39 Million tonnes out of which China's share was 35.71 Million tonnes i.e. 55%. As far as Aluminium consumption is concerned China registered a growth of 3.9 % vis-à-vis world consumption growth of 2.2%. In India Aluminium production has increased by 9.2% to 3.7 Million tonnes and consumption also increased by 9.7 % during the same period.

In the Domestic Market, the demand for Aluminium is strong, driven by prospective growth in high consuming sectors like automobiles, construction, power etc. Major thrust on infrastructure development over the last few years has led to rapid growth in the economy, and the trend is likely to gain momentum. The domestic primary aluminium producers have achieved nearly full capacity utilization.

However, the falling global prices of Alumina and Aluminium are likely to put pressure on their profitability, since the domestic prices are linked to LME price. The threat of increasing aluminium import – which accounted for 58.9% of total aluminium consumption in 2018-19 – persists. Support from the Government in countering the same shall help the domestic producers to safeguard their market share and profitability.

Opportunity and threats

NALCO is aware of the opportunities and threats faced by the Aluminium industry. It considers various factors of business environments to get an insight into the opportunity and threat being faced. This includes the growth in high consuming segments, price variations, geo-political factors, Government of India budget and its thrust areas. Accordingly, Opportunity and threats for the organization based on research and study is given below:

Opportunity

- Third most abundant element after oxygen and silicon
- Its applications span from everyday items like fuel-efficient vehicles and cans to cutting edge technologies.
- It combines strength and versatility
- Certain aluminium alloys are as strong as steel.
- Its excellent formability enables manufacturing of deep-drawn and/or complex shapes like cans or car body parts.
- As a reflector of heat and light, aluminium is well-suited for applications such as solar technology
- Ideal for food and pharmaceutical packaging.
- 100% and infinitely recyclable with no deterioration in quality.
- Demand of aluminium in India is expected to grow at 7-8 per cent per annum driven by growth in sectors like electricity, transport, building, construction and packaging.
- Based on weight, aluminium is 2 times better conductor of heat and electricity than copper

Threats

- The apparent slowdown in Chinese aluminium demand, leading to increased exports of their produce.
- Due to trade tensions China is likely to be on the lookout for alternate markets for its aluminium surplus, which in turn will push the aluminium prices lower.
- Steady increase in petroleum prices, along with volatility in raw material costs also lead to increased cost of production for the producers
- Crackdown by Governments against environmental hazards associated with discharge of red mud or air pollution due to coal-based power plants
- The threat of substitutes like improvised steel, PVC, engineered wood, glass, carbon fibre, composites etc. are also perennial in nature.
- Domestic primary aluminium manufacturers also face competition from scrap imports by secondary aluminium producers

To address the threats and opportunities as detailed above, 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 and 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 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. The new Vision and Mission adopted by the Company is available in the link <http://www.nalcoindia.com>

New Projects

Capacity Expansion	Brownfield Expansion of Smelter, CPP & Alumina Refinery	Greenfield Aluminium Smelter in Odisha:
The manufacturing capacity of wire-rod under expansion at an estimated cost of ₹131.22 crores with M/s. MECON being the EPCM Consultant. The project is expected to be commissioned by 4th Quarter of 2020-21.	<ul style="list-style-type: none"> Expansion of Smelter at Angul by adding a 5th Potline (5 lakh MTPY) and upgradation of pot amperage of existing 4 Potlines from 180 KA to 220 KA (1 lakh MTPY) Expansion of CPP by addition of 2 units of 660 MW each Expansion of Alumina Refinery by addition of 1 Million MtPY 5th stream is under progress. 	The Company has prepared a Pre-feasibility Report (PFR) for a proposed 0.6 MTPA Greenfield Aluminium smelter in Odisha.

R&D projects completed

Following R & D Projects were completed during 2018-19

- R&D Project on '1st stage trial production of Strontium modified 6XXX series Aluminium Billet & first billing' successfully completed.
- R&D Project on 'Fabrication and trial commercial use of a highly porous pervious concrete material from fly ash & first billing' successfully completed.
- Collaborative project with NIT Rourkela "Embedded system for compressed air consumption monitoring in smelter plant" implemented.
- In house project of Alumina Refinery Plant, "Replacement of synthetic flocculants by wheat bran flocculant" implemented in all three streams of plant.
- In house project of Smelter Plant, "Improvement of oxidation behavior of anodes" implemented in both GAPs of smelter plant.

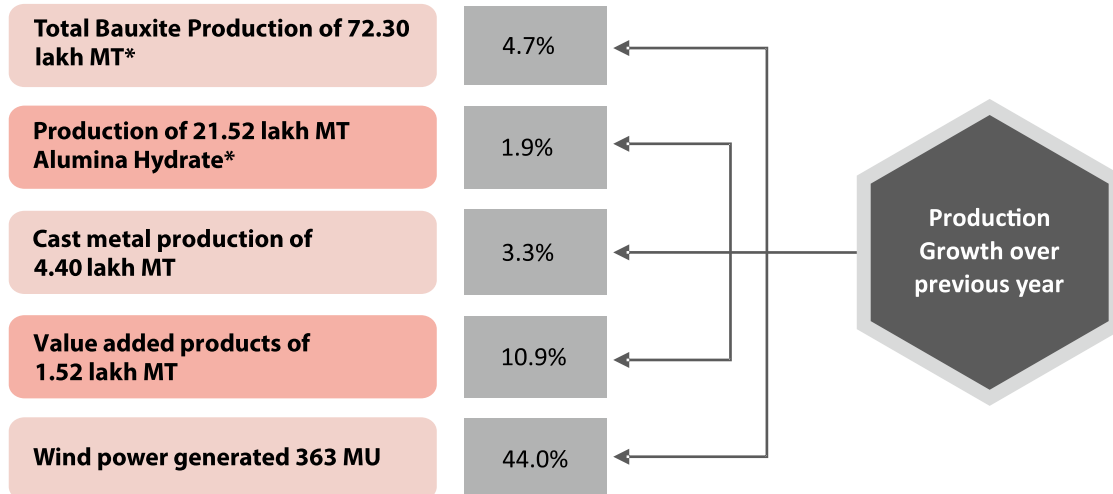


NRTC- R&D centre

Performance

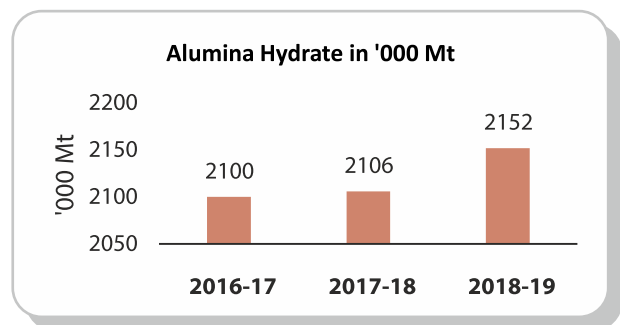
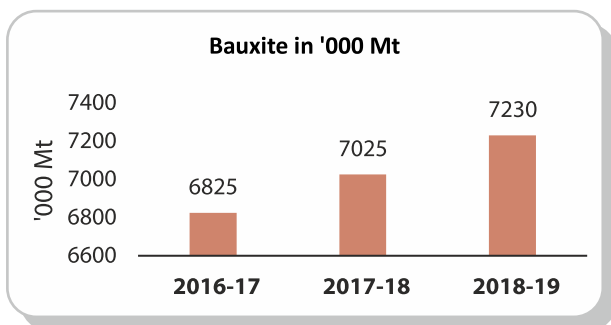
Production Growth over previous year

The company achieved impressive growth in production of bauxite, alumina hydrate, cast metal, value added products, wind power generation etc.

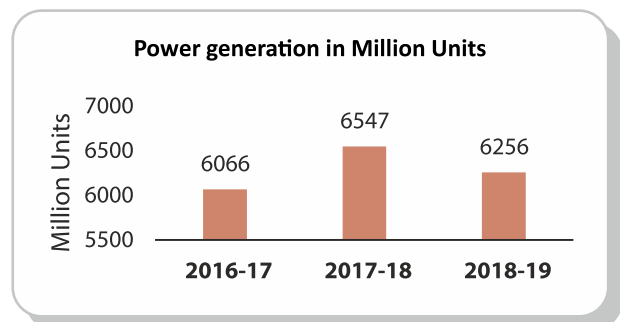
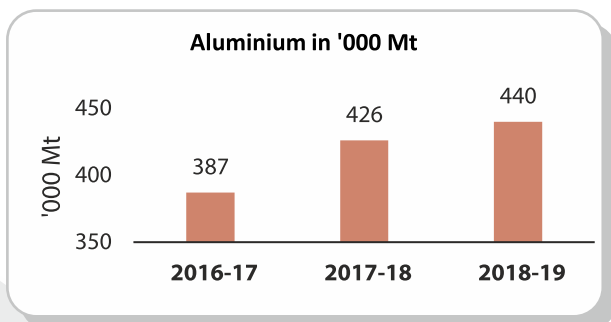


*ever best performance since inception

Production Performance

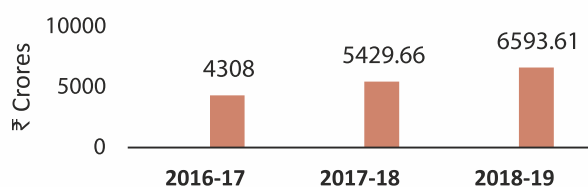


Financial Performance

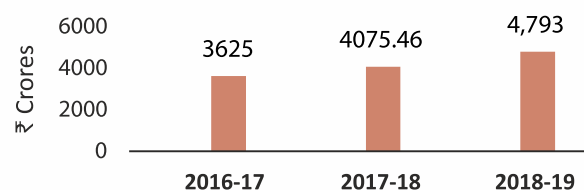


Item	Unit	2016-17	2017-18	2018-19
Sales Performance				
Total Alumina Sale	in '000 Mt	1295	1337	1317
Total Aluminium Sale	in '000 Mt	386	426	440
Financial Performance				
Gross Sales	in ₹ Crores	7933	9505	11,386
Domestic Sales	in ₹ Crores	4308	5429.66	6593.61
Export Turnover	in ₹ Crores	3625	4075	4,793
Net Worth	in ₹ Crores	10206	10505	10485
Profit Before Tax	in ₹ Crores	965	2039	2,740
Profit After Tax	in ₹ Crores	669	1342	1,732
Return on Net Worth	%	6.55	12.78	16.52
Book value per share (face value ₹ 5/-)	₹	52.8	54.35	56.2
Earnings Per Share	₹	2.98	6.94	9.06
R&D Expenditure	% of turnover	0.6	0.3	0.27

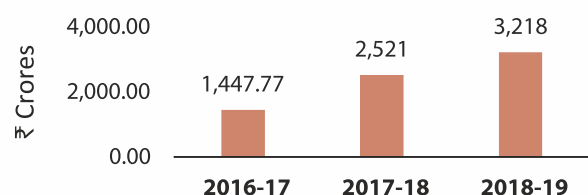
Domestic Sales in ₹ Crores



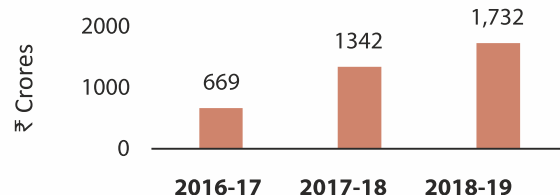
Export Turnover in ₹ Crores



EBIDTA in ₹ Crores



Profit After tax ₹ Crores



Direct economic value generated and distributed

201-1

Particulars (in ₹ Crore)	2016-17	2017-18	2018-19
1. Direct Economic Value Generated			
a) revenue from operation (includes other operating incomes)	8,050.02	9,618.31	11,499.33
b) revenue from other sources	408.27	299.65	325.87
Total	8,458.29	9,917.96	11,825.19
2. Economic Value Distributed			
a) Operating expenses (excluding employee wages and benefits)	6,880.70	6442	7,012.99
b) Employee wages & benefits	1,537.44	2261	2,072.28
c) Payments to providers of capital	686.19	908.48	978.82
d) Payments to government (Tax on PBT)			
I) Corporate Tax	296.19	696.42	1,024.65
ii) Dividend distribution tax	139.69	184.94	212.3
Total Economic Value			
Distributed (a+b+c+d)	9,540.21	10,510.67	11,301.04
3. Economic Value Retained (1-2)	-1,081.92	-592.71	524.15
4. Additional information on Expenditures included in operating expenses (2a above)			
Community Investment (included in 2(a) above)			
I) CSR expenses	30.01	29.01	30.35
ii) Horticulture (green belts within and vicinity of the plants)	7.31	9.3	10.22
Total community investment	37.32	38.31	40.57

Financial implications and other risks and opportunities due to climate change

201-2

We at NALCO are aware of the challenges posed by Climate Change and the urgent measures required for mitigating the risks caused by it. Accordingly thrust is given on shouldering the environmental responsibility in the areas of mining and manufacturing for sustainable development. We are striving towards low carbon growth and have installed renewable energy facilities i.e. wind and solar energy. We calculate and report the GHG emissions on an annual basis which is showing a declining trend. Our contributions towards mitigation measures include conservation of resources, reduction in energy consumption and increasing the share of renewable energy. India as a nation is fully committed towards addressing Climate Change and has embarked on 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. Our S&P complex and Alumina Refinery 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 through active energy conservation and efficiency enhancement measures it has achieved the stiff cycle-2 targets set by BEE i.e. 6.39% for S&P complex and 5.83% for M&R complex. All the three production units CPP, Smelter and Alumina Refinery, included in the Perform, Achieve & Trade (PAT) scheme, are operating with ISO 50001 certification.



Defined benefit plan obligations and other retirement plans

201-3

Net liability arising from defined benefit obligation (₹ Crores)

Provisions	As on 31st March 2019		
	Non- Current	Current	Total
Post-retirement medical benefits scheme (PRMBS)	117.22	6.22	123.44
Settling in benefit on retirement	19.52	2.9	22.42
NALCO benevolent fund scheme (NBFS)	2.45	0.59	3.04
NALCO retirement welfare scheme (NRWS)	11.56	0.34	11.9
Retirement gift	6.79	0.14	6.93
Compensated absences	315.57	31.69	347.26
Long service rewards	9.31	1.05	10.36
NALCO employee's family financial assistance rehabilitation scheme (NEFFARS)	17.01	5.57	22.58
Gratuity	0.00	57.4	57.4
Total	499.43	105.9	605.33

Defined benefit plans

The liability under various schemes is recognized based on actuarial valuation. Gratuity payable to employees as per The Payment of Gratuity Act is subject to a maximum of Rs.20,00,000. The gratuity scheme is funded by the Company and is managed by a separate trust. Post-retirement medical benefit is available to retired employees and their spouses who have opted for the benefit. In the Settling-in-benefit on separation from service, the transfer TA is admissible to the employees from the last headquarters to the hometown or any other place of settlement limited to distance of hometown. The objective of NALCO Benevolent Fund Scheme is to provide financial assistance to families of the members of the scheme who die while in employment of the Company. The objective of NALCO Retirement Welfare Scheme is to provide financial assistance as a gesture of goodwill for post-retirement support

to employees retiring from the services of the company. The objective of the Superannuation gift scheme is to recognize the employees superannuating or retiring on medical ground from the services of the Company.

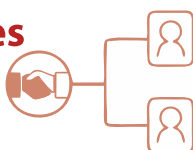
Defined contribution plans

The Company pays fixed contribution to Provident Fund at predetermined rates, to a separate trust, which invests the funds in permitted securities. On contributions, the trust is required to pay a minimum rate of interest, to the members, as specified by Government. of India. For the pension fund the Company pays fixed contribution to the trustee bank of PFRDA, which in turn invests the money with the insurers as specified by the employee concerned. The company's liability is limited only to the extent of fixed contribution.

Procurement Practices

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103-1, 103-2 and 103-3



Suppliers at NALCO are a part of extended organization and they are our strategic partners in the journey of Sustainable Development. The mutually beneficial relationship has been strengthened through active stakeholder engagement.

We have an extensive network of suppliers and vendors which includes raw material suppliers, plant and machinery suppliers, transporters and service providers. We are committed to develop a lasting business relationship with the suppliers who not only meet the specific requirements but also are aligned to our organizational principles and practices. We have a robust supplier management system which facilitates supplier value management. NALCO engages with the suppliers to ensure practice of highest ethical standards and best practices as per the guidelines of Government of India. Reviews are carried out on regular basis to mitigate the supply chain risks and expedite the procurement process.

NALCO supports Micro & Small enterprises (MSEs) and local

suppliers in and around its operations units. Regular vendor meets, Buyer-Seller meets and supplier development programs are being organized for MSMEs (including local suppliers), which serves as a platform for identification of needs and formulation of action plan for mutual benefits.

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 bauxite mine and coal blocks have strengthened our raw material security. For other raw materials like Caustic, lime Aluminium, Fluoride CP Coke and CT pitch etc., 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. Close watch on consignments of procured raw materials facilitate timely receipt.

Proportion of spending on local suppliers

204-1



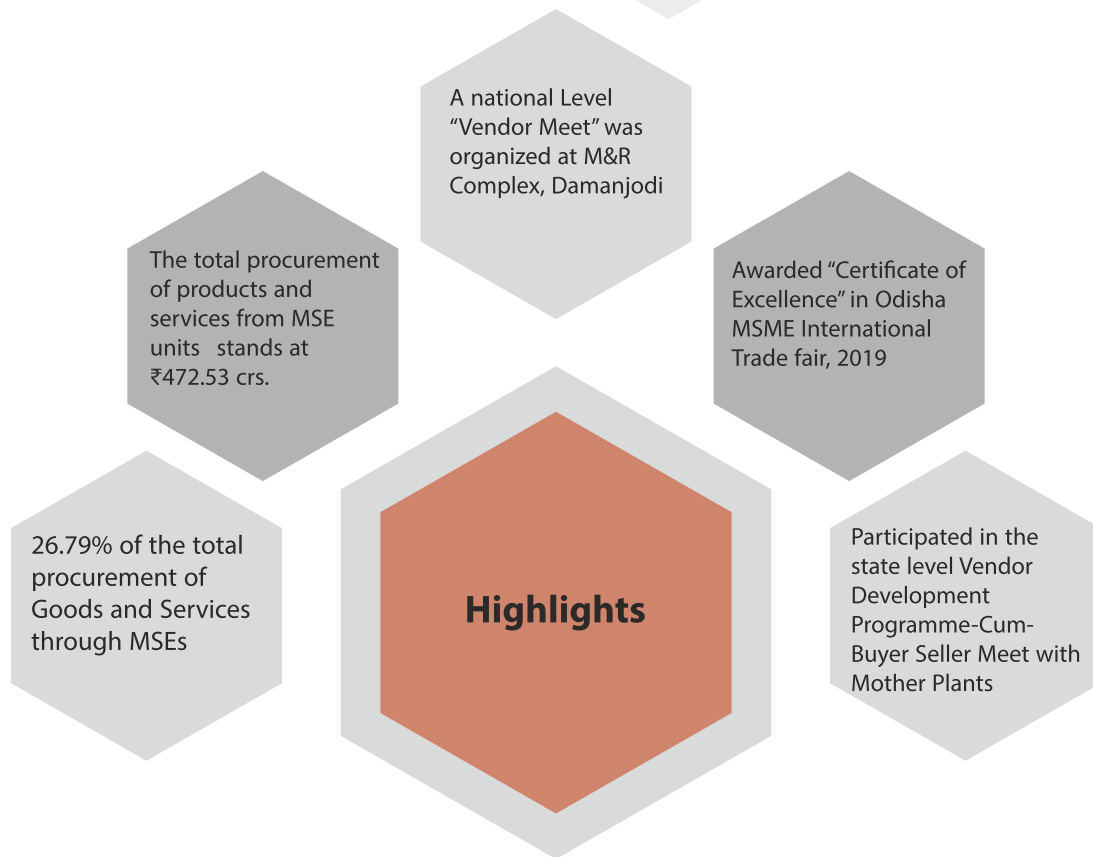
NALCO has a strong focus on the development of local vendors. The ancillary development policy of the organization promotes development of local vendors. The

MSE facilitation cell at the units implement the policy by providing guidance in technical, commercial areas to these vendors to improve their competitiveness. The goods and services which can be offered by MSE Units are listed and displayed prominently and web hosted in our web site and MSE App NAMASYA for wider circulation and awareness. NAMASYA (NALCO Micro and Small Enterprise Yogayog Application) App have been launched by NALCO on 13.07.2018 to facilitate the existing MSEs registered with NALCO as well as MSEs not registered. The App empower MSEs with information about vendor registration process, items which can be supplied by them with technical specifications, Vendor development programs and training program of NALCO etc. Display halls at M&R Complex and S&P Complex display the product along with

technical know how for developing the product and information regarding annual requirement and last procurement price. 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 band of 15% of lowest quoted price for the products and service earmarked for them. The company is also meeting the mandatory requirement set by Govt. of India of procuring minimum 25% of the total procurement of goods and services from MSEs.

The company has registered with GeM and all MSE vendors (including ancillary) are being requested to be on-board in GeM platform. This will help the company increase its procurement through GeM portal. Also as NALCO is registered with RXIL (TReDS Portal) all MSE vendors (including ancillary) are being requested to register in TReDS portal to avail the benefits extended to MSEs.

Highlights of our activities towards development of Ancillary Units & MSE's



Details of our activities towards development of Ancillary Units & MSEs (₹ in crores)

Sl. No.	Particulars (₹ Crores)	2017-18	2018-19
1.	Total annual procurement (In value) (*)	1,527.70	1,764.03
2.	Total value of goods & services procured from MSEs (Including MSEs owned by SC/ST entrepreneurs)	400.13	472.53
3.	Total value of goods & services procured from only MSEs owned by SC/ST entrepreneurs	NA	12.88
4.	Total value of goods & services procured from only MSEs owned by women entrepreneurs	NA	5.45
5.	%age of procurement from MSEs (Including MSEs owned by SC/ST & women entrepreneurs) out of total procurement	26.19	26.79
6.	%age of procurement from only MSEs owned by SC/ST entrepreneurs out of total procurement	0.00	0.73
7.	%age of procurement from only MSEs owned by women entrepreneurs out of total procurement	0.00	0.31
8.	Total number of Vendor Development programmes for MSEs	9	11

* 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.

Anti-Corruption

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103-1, 103-2 and 103-3

Corruption Risk Management Policy

Corruption is one of the major risks in commercial activities of business organizations. 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 laws of India. The policy reflects commitment of the Company and its management to high ethical standards. It further reinforces carrying out the business in an open, transparent and honest ways aimed at improving corporate culture, alignment with the best practices in corporate governance and maintaining the business reputation of the Company

Integrity Pact

NALCO has signed Integrity Pact with Transparency International and the same has been adopted in the company in the areas of tender, contract and procurement. The aim is to address the issue of corrupt practices in commercial transactions. The Integrity Pact is applicable to all purchase and contracts of value INR 50 Lakhs and above. The Pact mandates an agreement between NALCO and bidder, to mutually avoid all forms of corruption by following a system that is fair, transparent and free from any influence or prejudiced dealings in the entire period of the particular transaction. Meetings are held with the Independent External Monitors (IEMs) wherein procurement related issues grievances and complaints are taken up.

Integrity Index Development

Integrity is the attribute which denotes accountability, fosters competency & transparency and boost the ethical values of the personnel resulting in a corruption free environment. Performance, integrity perception, enabling systems, process management, and compliance are the broad parameters, detailed questionnaire on which bring out the level of probity, integrity, efficiency, transparency and compliance in the organizations. The integrity index is computed based on these parameters including perceptions of the internal and external stakeholders.

Whistle Blower Policy

We recommend probity for our constituents by adopting highest standards of professionalism, honesty, integrity and ethical behaviour. The purpose of Whistle Blower Policy is to provide a framework to promote responsible and secure whistle blowing to prohibit unethical practices by suppressing the identity of whistle blower. Furthermore, it provides a safety net around genuine complainant acting as the first reporter of corruption, fraud and misappropriation, against undue harassment, vindication and retribution. It shields and encourages employees, 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 financial irregularity, abuse of authority, breach of contract and criminal offence. It is stated that during the reporting period the company has not prevented any personnel from access to the Audit Committee. Details of the policy are available at the Company's website.

Fraud Prevention policy

NALCO has implemented the Fraud Prevention Policy approved by Board. The objective of the fraud prevention policy is reporting of any fraud that is detected or suspected vis a vis fair dealing of matters pertaining to reported fraud. The policy applies to any fraud, or suspected fraud involving all categories of employees of NALCO 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.

Vigilance

Vigilance function at NALCO guides and facilitates impartial, fair and transparent decision making and gives priority to preventive vigilance, with proactive measures. Vigilance is the nodal function to address the issue of corruption and enable an organizational environment for conducting various activities in an ethical and transparent manner. Vigilance Department at NALCO is an extended arm of Central Vigilance Commission under the leadership of CVO appointed by Government of India. Vigilance reports to the top management and carries out various activities like

Highlight of Vigilance Functions

- Study of contract/purchase/sales files and Internal Audit Reports
- Suggesting system improvements
- Investigating complaints.
- Advising CMD on vigilance matters and matters relating to disciplinary procedures.
- Implementation of Integrity Pact
- Liaison with CBI
- Surprise checks in sensitive areas.
- Scrutiny of Property Returns.
- Advising on rotation of officials in sensitive posts.
- Conducting training programs for awareness among employees and general public as a part of preventive vigilance mechanism.

identification & prevention of corruption, irregularities, and violations of company rules by employees, contractors, suppliers. The vigilance function facilitates impartial, fair and transparent decision making. Thrust is given on establishing adequate checks and balances in the form of well-defined systems and procedures.

e-Governance

e-governance at NALCO aims to significantly enhance transparency, speed, accuracy and most importantly fact-based decision making. SAP Enterprise Resource Planning (ERP) has been implemented in all the major functions i.e. Sales and Distribution, Finance & Controlling, Materials, Human Resource and Production Planning to optimize the resources through process management, improved information availability, enhanced transparency and faster decision making.

e-procurement of goods and services are carried out through Central Public Procurement Portal (GePNIC), GeM portal and SAP SRM. Centralized Employee Self-service Applications such as Attendance & Leave, Advances & Loans and reimbursements has been implemented. Hospital Management Systems have been implemented for the

Company hospitals at Angul and Damanjodi. Online web-based application such as Capital Expenditure, Fund Monitoring, Compliance Management Systems have been implemented. To take the e-governance to different stakeholders, NALCO has launched various Mobile Apps for Customer, MSE Vendors, CSR and Retired Employees.

All plants and offices are connected on hi-speed dual MPLS based circuits. The in-house state-of-the-art Data Centre at Bhubaneswar hosts the Business-Critical Applications and the Disaster Recovery Centre is at Damanjodi. Server Virtualization has been adopted for the Data Centre resulting in optimum utilization of computing resources in line with green practices. We are in the process of adopting Industry 4.0 practices using Industrial Internet of Things (IIoT), big data & analytics, for increased visibility into operations, improving efficiency and raising asset utilization.

Right to Information

All the provisions of the RTI Act, 2005 are being complied by the Company. 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) and the RTI requests are received and replied through this online portal also. A close monitoring of the RTI applications received is done to ensure that the replies are sent in time. Following are the details of the RTI applications and appeals during 2018-19:

	Under Process as on 01.04.2018	Received during the year	No. of cases transferred to other Public Authorities	Decisions where requests/ appeals rejected	Decisions where requests/ appeals accepted and settled	Under Process as on 31.03. 2019
Requests	18	337	Nil	107	232	16
First Appeals	Nil	61	Nil	4	56	1

Operations assessed for risks related to corruption

205-1

Major commercial transactions including purchase and contracts are assessed for risks related to corruption. Based on the system check inputs, recommendations are made to further refine the processes. This is an ongoing process which has resulted in modification or change in manuals, guidelines and procedures. Vigilance department undertakes system studies, regular inspections, intensive examination (CTE Type) and sample check as per

requirements to assess the operations for risks related to corruption. 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 or purchase deals are also analysed during routine and surprise checks. All these help in assessing operations to further strengthen them to minimize corruption.

Communication and training about anti-corruption policies and procedures

205-2

Regular training on vigilance and anti-corruption 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 anti-corruption are also included in training modules like tender and contract, finance, taxation etc. Talks, seminars and discussions on vigilance related issues are organized on appropriate occasions like Vigilance Awareness week etc. Various circulars of CVC, Ministry and CTE etc. are given wide circulation in the company. The details of training on Anti-Corruption are given below:

Employee Category	No. of persons trained			Training Man days		
	Male	Female	Total	Male	Female	Total
Executives	43	04	47	77.5	03	80.5
Non-Executive	72	03	75	62.5	03	65.5
Total	115	07	122	140	06	146

Confirmed incidents of corruption and actions taken

205-3



Environmental

300

103-1,103-2 and 103-3



Over the years, NALCO has strongly demonstrated its commitment towards environmental stewardship through activities like sustainable bauxite mining and rehabilitation, efficient use of resources, effective control of emissions, control of water pollution including ground water contamination, water conservation, reduction of waste and optimisation of land use. Environmental protection and conservation have been an integral part of overall management system at NALCO. Proactive environmental conservation measures are undertaken in mines, refinery and smelter operations to mitigate the potential adverse impacts. Our environmental policy lays emphasis on adoption of pollution prevention technologies and accords high importance to promotion and maintenance of clean environment in all our activities. Environment Management Systems Standard based on ISO 14001:2015 has been implemented and maintained at all our production sites which is duly supported by robust environmental compliance system. Our energy intensive units i.e. CPP, Smelter & Alumina Refinery have implemented Energy Management Systems based on ISO 50001 standards. A full-fledged Safety, Health and Environment Department is in place to measure, monitor, assess and implement environmental protection measures for controlling various environmental aspects. Some of the key areas of environmental management deployed at NALCO include state of art pollution control facilities, afforestation of mined out areas and utilisation of fly ash & red mud.

Adequate provisions are made in the annual Capital and Revenue budgets to adopt new technology, implement emission control technologies to meet the stricter environmental norms for future. Some of the efforts in this direction include retrofitting of ESP, installation of GTC, revamping of FTC and adoption of high concentration slurry disposal. Emission control and efficiency improvement has been achieved by adoption of better combustion technology, proper fuel handling, automated burner management and fume treatment.

We have strong focus on reduction of greenhouse gas emissions from our manufacturing processes. We continued our focus towards processes that improve energy efficiency, reduce greenhouse gas emissions, and enhance our natural environment through process improvements, applying best practices, and decarbonising energy sources.

There has been constant thrust from management to explore alternative use of waste, enhance recycling and reuse of wastes & rejects through in house and collaborative R&D efforts. For mitigating water pollution, we continue to apply innovative technologies by implementing recycling measured for waste and sewerage water achieving zero discharge to the water bodies. All the hazardous chemicals are stored and used as per laid-down procedures. Special care is taken to prevent Fluoride contamination in Smelter

Environmental Excellence & Protection

- Operating with valid Consents, Authorizations Licenses
- Environment policy explicitly declares adoption of non-polluting & environment friendly technology.
- All production units certified to Environment Management System ISO 14001:2015
- Well-furnished Laboratories for monitoring of effluents and emissions quality.
- Focused on alternative use, recycling and reuse of wastes and rejects through in house and collaborative R&D efforts.
- Provision of ESP, FTP, GTC, Bag Filters, Dust Suppression System, Dust Extraction System in areas susceptible to Air pollution and dust pollution.
- Adoption of better combustion technology, proper fuel handling and automated burner management for emission control and efficiency improvement.
- Hazardous chemicals are stored, used as per laid-down procedures of OSPCB/CPCB.
- Hazardous Waste, e-waste and non-biodegradable solid waste are disposed to Authorized Recyclers as per statutes.

plant and caustic contamination in Refinery unit. We have improved significantly in the area of bauxite residue storage efficiency and rehabilitation rate. We continuously review and update our targets. We actively endorse biodiversity conservation by operating in a manner that minimizes adverse effects on natural habitats and biological resources.



Bio-gas plant inaugurated at Mines

Pollution Control and Environmental Protection Measures

Mines

- Use of Rippers to avoid drilling & blasting wherever possible
- Wet drilling practiced in the blast-hole drills in dry seasons
- Suitable blast design to avoid excess dust during blasting
- Blasting is preferably done in mid-day and break hours
- During the year 1,00,260 nos. of trees were planted
- A biogas plant of 5 m³/day capacity commissioned to treat the entire food waste from canteen for biogas
- Pressurized water sprinkling /dry fog system at vulnerable points of crushing & conveying system
- Water sprinkling by auto sprinklers on haulage road

Alumina Refinery

- Total ash utilization is 69.59% during the financial year
- 19,788 nos. (Saplings) planted
- Hazardous waste and plastic waste of used filter clothes is channelized through the authorized agencies
- Bio additive microbial dosing is continuing for STP-IV, for achieving the norm for discharge effluent water

Smelter

- Pneumatic conveying & recycling of coke dust system commissioned for dust suppression and resource conservation
- A concrete containment pool and pump house were commissioned to collect surface water runoff of Rolling plant area and treated through defluoridation plant
- STP water Recycling project at S&P Township completed

CPP

- Up-gradation of Industrial Drain Water Recycling System to recycle Industrial effluent and ensure zero discharge
- Total ash utilization is 75.47% during the financial year
- Wheel washing system installed to dislodge ash from the wheels of ash carrying vehicles
- 7.3-ton E-waste disposed through authorized recyclers
- Mechanical waste converter for treatment of the solid canteen waste installed
- Ammonia dosing to reduce the particulate emission from flue gas.
- 7,51,087 m³ of water from rainwater harvesting and 1,57,254 m³ of water from exit point recycled and re-used.
- STP-I upgraded to meet the norms and around 6,5000 m³ of treated STP water used in horticulture purpose.

Environmental Risk and Concern Management

Biannual Environmental Audits are carried out in each operational unit under the ISO 14001 Environmental Management System. The environmental risks emerging during Environmental Aspect & Impact studies are mostly dealt with and controlled in line with our policy of minimal harm to environment. Observed risks are dealt on a priority basis through appropriate mitigation plans. Our R&D effort has yielded good dividend in the areas of Waste Management and Hazardous waste disposal. The environment risk matrix of our plants is presented below.

Unit	Environmental Concerns/Risks	Mitigation Measures
Alumina Refinery	<p>A. Air Pollution:</p> <ol style="list-style-type: none"> 1. Stack Emission 2. Dust in Calcined Alumina, Bauxite, Coal and Ash handling areas <p>B. Water Pollution</p> <ol style="list-style-type: none"> 1. Waste effluent 2. Sewage & Wastewater. 3. Surface Runoff water <p>C. Land Contamination</p> <ol style="list-style-type: none"> 1. Lime grit 2. Red mud 3. Ash. 	<p>A. Air Pollution:</p> <ol style="list-style-type: none"> 1. ESPs provided in Boiler for collecting particulate matters from Flue Gas. 2. ESP is provided in Calciners for collection of Alumina dust. <ul style="list-style-type: none"> • Bag filters and de-dusting system provided in Alumina loading and unloading area. • Sprinkler & de-dusting system in Lime Grit, Redmud, Ash, Coal and Bauxite handling areas. <p>B. Water Pollution:</p> <ol style="list-style-type: none"> 1. Effluents are treated in treatment facilities. 2. The wastewater treatment, recycling and reuse is carried out for Ash pond and Redmud pond overflow water. <ul style="list-style-type: none"> • 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 Wastewater is treated in STP and recycled water used for Horticulture purposes. 3. Surface runoff water stored and disposed after necessary treatment if required. <p>C. Land Contamination:</p> <ol style="list-style-type: none"> 1. Lime Grit is disposed to recyclers for Brick or other allied product manufacturing 2. Extraction of Iron concentrate and Gallium from Redmud is being explored. 3. Motivating entrepreneurs for utilization of fly ash for fly ash bricks, cement, road construction, etc.
Smelter	<p>A. Air Pollution:</p> <ol style="list-style-type: none"> 1. Fluoride & particulate emission from FTP stacks 2. Generation of PFC <p>B. Water Pollution:</p> <ol style="list-style-type: none"> 1. Fluoride contaminated surface runoffs. <p>C. Land Contamination:</p> <p>Hazardous waste like</p> <ol style="list-style-type: none"> 1. SPL, 2. Dross 3. Shot blasting waste 	<p>A. Air Pollution:</p> <ol style="list-style-type: none"> 1. Online Continuous monitoring of emission at FTP stacks is carried out. 2. The ALPSYS pot regulation system minimizes anode effect by timely dosing Alumina. <p>B. Water Pollution:</p> <ol style="list-style-type: none"> 1. Surface runoffs are treated through Emrion nano technology and used various ways. <p>C. Land Contamination</p> <ol style="list-style-type: none"> 1. SPL is stored in impervious lined secured engineered landfill and concrete floor sheds to prevent land contamination. Small quantities of Carbon & refractory portion of SPL are stored separately. 2. Action is underway to dispose of available dross to authorized recyclers 3. Shot blasting waste being disposed in common Hazardous waste landfill

Unit	Environmental Concerns/Risks	Mitigation Measures
CPP	<p>A. Air Pollution</p> <ol style="list-style-type: none"> 1. Emission from Boiler 2. Fugitive Dust from Coal and Ash Handling Area. 3. Heat emission in flue gas. <p>B. Water Pollution</p> <ol style="list-style-type: none"> 1. Effluent Wastewater 2. Sewage & Wastewater 3. Surface runoff water <p>C. Land Contamination:</p> <ol style="list-style-type: none"> 1. Mill Rejects 2. Ash 3. Scrap-Metallic/non-metallic) 	<p>A. Air Pollution:</p> <ol style="list-style-type: none"> 1. ESP is provided in Boiler flue gas emission path. 2. Dust Extraction and Sprinklers system are provided in Coal and Ash Handling areas. 3. Heat recovery from Flue gas for better Boiler efficiency & reducing coal consumption <p>B. Water Pollution:</p> <ol style="list-style-type: none"> 1. Effluent treatment plant for industrial wastewater & used for ash slurry making. 2. Decanted water from ash pond is reused for ash slurry making. 3. The sewage wastewater after treatment in STP is reused for Horticulture etc. 4. Surface runoff water is used in fire hydrant system for firefighting. <p>C. Land Contamination:</p> <ol style="list-style-type: none"> 1. Mill Rejects is stored in demarcated low-lying areas for disposal to authorized parties for reuse. 2. The project for lean slurry disposal to Mines Void for reclamation of mined out area is in progress 3. The Scrap is sold to recyclers.
Mines	<p>A. Air pollution</p> <ol style="list-style-type: none"> 1. Emission from heavy vehicles 2. Fugitive Dust emission during Bauxite mining, Handling including crushing in crusher and conveying in conveyor. <p>B. Water Pollution</p> <ol style="list-style-type: none"> 1. Excess rainwater overflow from mines 2. Wastewater from Canteen, Vehicle Washing and sewage from toilets <p>C. Noise pollution</p> <ol style="list-style-type: none"> 1. Noise during blasting and operation of heavy vehicles <p>D. Solid waste pollution</p> <ol style="list-style-type: none"> 1. Overburden material from excavation of minerals <p>E. Land Degradation</p> <ol style="list-style-type: none"> 1. Excavation of overburden and ore material 	<p>A. Air pollution:</p> <ol style="list-style-type: none"> 1. Proper selection and maintenance of vehicles. 2. Water spraying on haul roads and stockpile area 3. Suitable blast design and delayed blasting using NONEL detonators to minimise dust generation. 4. Installation of dry fog system at Crusher and Conveyor to suppress dust & prevent dust generation 5. Adoption of vacuum suction/wet drilling in all drill machines 6. Peripheral barrier of 7.5 m width with plantation to retain dust particles <p>B. Water Pollution:</p> <ol style="list-style-type: none"> 1. Peripheral barrier around active mining area to prevent silt laden rainwater outflow. <ul style="list-style-type: none"> • Check dams at strategic points to filter muddy water if any from mining areas • Collection of rainwater in mining area in sumps for ground water recharging 2. Treated water from canteen and vehicle wash area fully reused for dust suppression and plantation <p>C. Noise pollution:</p> <ol style="list-style-type: none"> 1. Suitable blast design and delayed blasting using NONEL detonators to minimise noise <ul style="list-style-type: none"> • Peripheral plantation to prevent propagation of noise • Suitable less noisy equipment, noise proof cabins in HEMMs and provision of PPEs to workers <p>D. Solid Waste Pollution:</p> <ol style="list-style-type: none"> 1. 100% reuse of topsoil and reuse of overburden for back filling of mined out areas <p>E. Land Degradation:</p> <ol style="list-style-type: none"> 1. Concurrent mining and backfilling of mined out areas. <ul style="list-style-type: none"> • Rehabilitation of mined out area with extensive plantation.

Responsible Consumption of Materials

301-1

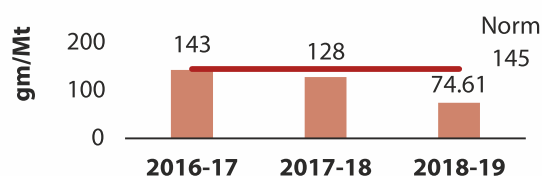
103-1, 103-2 & 103-3

Ensuring consistent availability of our input raw materials and resource conservation through monitoring and controlling its consumption are our basic raw material strategy. Conservation of bauxite and coal is our prime agenda as both have limited availability. We also care for optimum consumption of other raw materials.

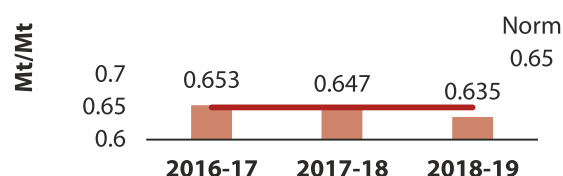
Consumption of raw materials is kept under scrutiny to achieve the norms of consumption fixed by our Technology Committee. NALCO is committed to progressively achieve optimization of raw material usage through adoption of better technology, process redesign and elimination of wastage. Use of high Silica bauxite & low calorific value coal is the basic challenge faced by us now.

The Specific Consumption trend of important raw materials are given below

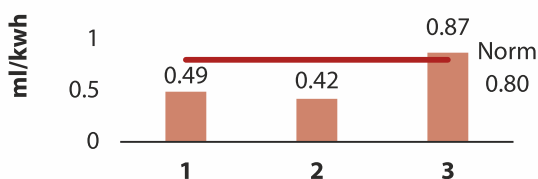
Sp. Explosive consumption, Mines (gm/Mt)



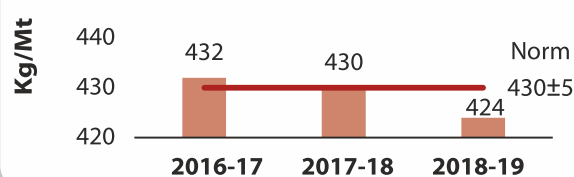
Sp. Consumption Coal for steam generation in SPP of refinery for hydrate production (Mt/Mt)



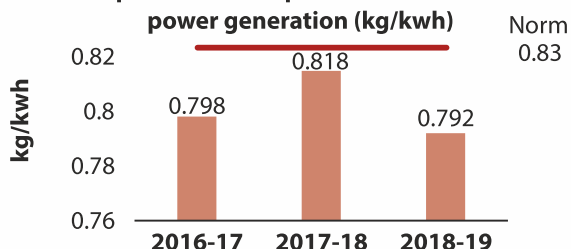
Sp. Consumption Fuel Oil, CPP (ml/kwh)



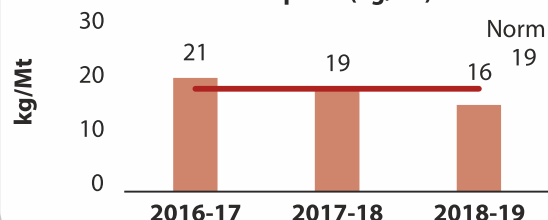
Sp. Net Carbon Consumption, Smelter (Kg/Mt)



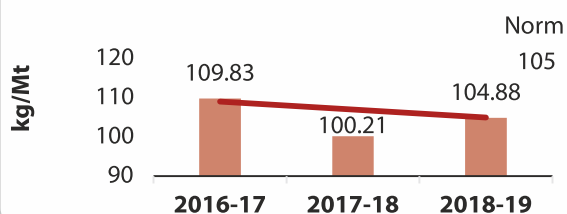
Sp. Coal consumption in CPP on net power generation (kg/kwh)



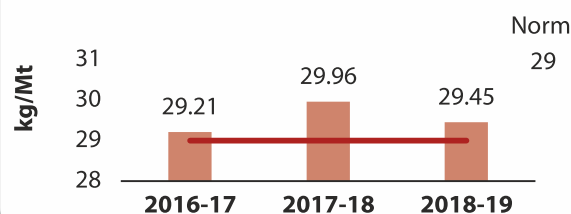
Sp. Aluminium Fluoride Consumption (kg/Mt)



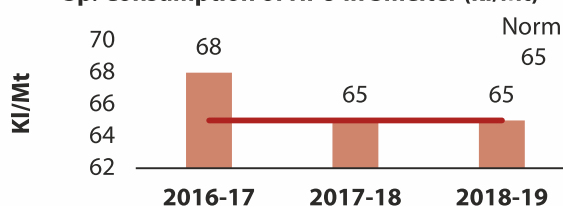
Sp. consumption of caustic soda Refinery (kg/Mt)



Sp. Consumption of Lime at Refinery (kg/Mt)



Sp. Consumption of HFO in Smelter (kl/Mt)



Materials used by weight or volume

301-1

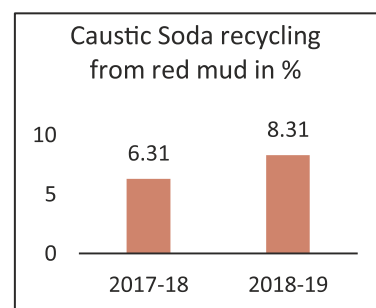
Materials consumed		Source	2016-17	2017-18	2018-19
Raw Material	Alumina (Mt)	Internal Production	7,53,401	8,26,295	8,51,208
	Coke (Mt)	External Suppliers	1,51,032	1,63,634	1,85,593
	Pitch (Mt)	External Suppliers	35,137	38,127	42,168
	Bauxite (Mt)	Internal Production	69,29,194	69,18,511	72,30,546
	Caustic Soda (Mt)	External Suppliers	2,30,647	2,10,999	2,25,754
Associated	Aluminium Fluoride (Mt)	External Suppliers	8,149	8,014	7,145
Process Material	Wheat Bran (Mt)	External Suppliers	1,703	1,480	--
	Lime (Mt)	External Suppliers	61,353	63,071	63,388
	Explosives (Mt)	External Suppliers	1,172.00	967.25	570.38
Packaging Material	VSI HDPE fabric (m2)	External Suppliers	2,52,700	2,40,462	6,79,500
	Wood in wooden pallets (m3)	External Suppliers	32,355	12,916	1,244
	Steel straps (Mt)	External Suppliers	271.3	249.0	237.0
	Polyester Strap (Mt)	External Suppliers	85.9	74.0	75.0

*Increase in Raw material consumption is due to increase in production of Alumina & Aluminum, mentioned on 102-7

Recycled input materials

301-2

In alumina refining process, indigestible contents of the ore are disposed of as red mud. This red mud is washed and thickened to the extent possible to minimize the caustic liquor that goes with the mud. This is pumped & stored in a specially lined red mud pond. In the pond, the solids settle down & water clarifies to the surface. This water from the surface (around 2-3 gpl of caustic soda) is again pumped to the plant and utilised for washing of outgoing mud and other miscellaneous purposes. Thus, through reclamation of red-mud pond reclaimed water, some minor quantity of caustic soda lost through mud is brought back to the circuit.



Energy

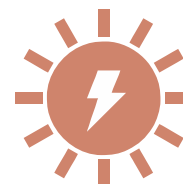
302

103-1, 103-2, 103-3

NALCO is 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 due to the energy intensive nature of Aluminium production. The implementation of National Mission on Enhanced Energy Efficiency by Bureau of Energy Efficiency, Ministry of Power has given a major responsibility on industries to enhance overall energy efficiency which has given a new impetus to

our efforts in this area. The major steps to mitigate climate change risks are improvement in energy efficiency, energy conservation and use of green energy.

NALCO's energy policy emphasises optimising energy use, consumption and efficiency and is committed to improve its Energy Performance.



Policy Commitment

We affirm our commitment to continually improve our Energy Performance and strive for achieving the objectives and targets.

Energy consumption within the organization

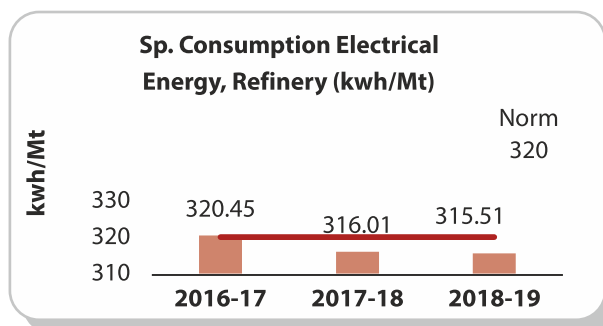
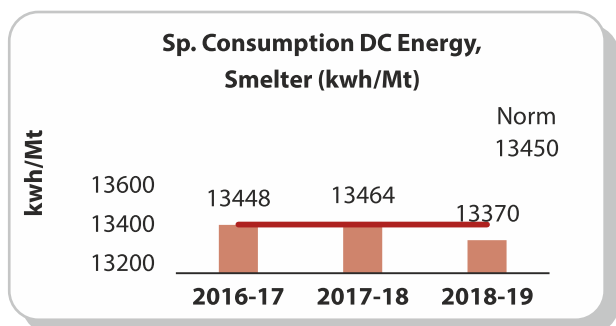
302-1

In addition to wasting fuels unnecessarily the hazard of GHG emission amplify the evils caused by irresponsible use of energy. GHG emissions are caused due to consumption of fossil fuel whereas consumption of electrical energy leads to associated indirect GHG emission. Total energy consumption in our operations during 2018-19 was 109327.66 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)	2018-19
HFO	7,895,650
LPG	989
LDO	117,280
Diesel	300,665
Coal	99,226,640
Indirect Energy consumption (GJ)	1,606,104
Total Energy Consumption (GJ)	109,147,328

*Value of 2018-19 is calculated using 2014 emission factor published by IPCC



Reduction of energy consumption

302-4

The energy intensive nature of Aluminium extraction makes conservation of energy a market driven need for our sustainability. The selection of technology and purchase of equipment is primarily based on this 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 this ideology.

Some of the interventions adopted by us for energy efficiency are

- 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.

Responsible use of light, fan, ventilation system, air conditioning and other electrical appliances is achieved by building behavioral awareness of our workforce. In addition, our energy and consequent GHG reductions came from reducing equipment wear, proper cleaning and lubrication or increasing throughput without overloading equipment

Energy conservation initiatives

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

	Cathode lining of 75 Smelting pots graphitized with reduction in D.C. energy consumption @55 KWH /Mt		Chemical cleaning of condensers done in CPP Units 2,3,5,6 & 7, to improve condenser vacuum thereby resulting in saving of 85,624 Mt coal per annum	
33995 nos conventional light fittings replaced with energy-saving LED lamps & fixtures in all units of NALCO		Replacement 15700 nos conventional light fittings with energy-saving LED lamps is in progress in Alumina Refinery		At CPP, the low-performing High/Intermediate Pressure (HIP) module turbine of Unit #7 was replaced with new one, resulting in saving in coal consumption by 30,660 Mt per annum
	Energy-saving Variable Frequency Drives installed in 250 KW Stream 1 Crushers motors at Mines		At CPP, R&M of existing Air-preheater with advanced profile heating element and double sealing arrangement taken up to improve boiler efficiency by about 1.14%	
Advanced Winch trolley communication control system at Smelter Anode Baking Furnaces 2 & 3 commissioned to reduce power and HFO consumption		At Smelter, Installation of Anode Slot Cutting Machine at Rodding Shop-II under implementation to reduce specific D.C. energy consumption in Pots		At CPP, replacement of old reciprocating air Compressors with Energy efficient Screw Compressors taken up in phases to help in reduction in power consumption.
	Air Pre-heaters replaced for Refinery Steam Generation Plant boilers 1 & 3 with improvement in Boiler efficiency		Thermol (Fuel oil additive) used to reduce fuel requirement in Refinery Calciner and dewatering aid used for reduction in moisture of feed hydrate to Calciners for reducing in Fuel oil consumption	

Innovation: Graphitization of Pots

- Helped in reducing Specific DC Energy consumption to tune of 55 kwh/Mt and increase the amperage of operation by another 5 KA.
- Converted 622 pots out of 960 pots into graphitized cathode and plan is in place to convert all pots into graphitized cathode.
- 65 % of the entire pot line has been graphitized
- Annual energy savings of 151.18 Lakh kwh



Graphitization of pots

Condenser chemical cleaning

To remove scales from condenser tubes SULPHAMIC acid was used at Max 4% concentration.

Step 1: Hydrojet cleaning and rinsing by DM water

Step 2: Sulphamic acid recirculation at 55-60 degree up to max 12 hrs

Step 3: Rinsing by DM water

- Inlet and outlet acid concentration (pH) and hardness were being measured at 1hr interval
- Dozing continued till acid concentration became equal at inlet and outlet.
- Venting provision was there for hydrogen and carbon dioxide

Condenser vacuum increased by 0.04-0.05 kscA
Energy Saving – 24328 ToE

Renewable energy

During the year NALCO has generated 363 MU from wind power & 0.346 MU from Solar power Plants.

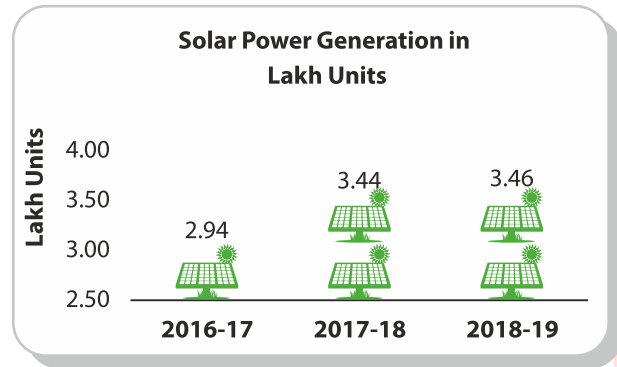
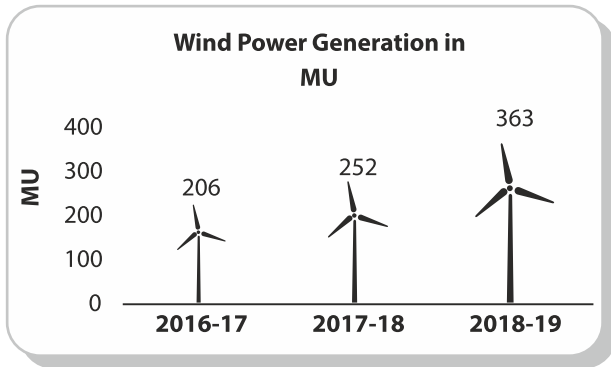
The Renewable Energy Plants



- 50.4 MW Wind Power Plant at Gandikota, Kadap, Andhra Pradesh
- 47.6 MW Wind Power Plant at Ludarva, Jaisalmer, Rajasthan.
- 50 MW Wind Power Plant at Devikot, Jaisalmer, Rajasthan
- 50.4 MW Wind Power Plant at Jath, Sangli, Maharashtra.



310 KWp Rooftop Solar Power Plant at NALCO Bhawan, NALCO Nagar and NRTC Building.
Another 320 KWp Roof top Solar Power Plant is installed at NRTC.



Water Stewardship

303

103-1, 103-2 and 103-3

NALCO is aware that global concerns regarding water availability and quality continue to increase. Water is considered to be a unique resource that underpins all drivers of growth as per World Economic Forum. In India, erratic rainfall and depleting ground-water reserves have made water conservation and management critically important for the metals and mining sectors. In 2017, the International Council on Mining and Metals (ICMM) released a new position statement on water stewardship focused on strong and transparent corporate water governance, managing water at operations effectively, and collaborating to achieve responsible and sustainable water use. Taking a cue, we demonstrate leadership in water stewardship by using water efficiently, maintaining water quality, and engaging with communities to collaboratively



manage a shared water resource.

Responsible use of water resources throughout the life cycle of industry is a part of our management strategy. 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. We are resorting to high concentration slurry disposal followed by dry disposal of fly ash to further conserve water as a next step after setting up recycling systems for Ash Pond and Red Mud Pond water.

All our plants have wastewater and sewerage water treatment for use in production process and horticulture respectively. Subsequent to successful implementation of zero discharge policy for wastewater, our focus is on rainwater harvesting and ground water recharge. A first of its kind in the world water treatment plant based on "Emiron Nano Technology" for de-fluoridation of water has been commissioned recently.

Highlights of Water management

Managing Water Footprint

Water conservation & recycling is an issue of utmost importance at NALCO

- Achieved zero discharge with respect to wastewater and sewerage water.
- Treated wastewater is used in the process and sewerage water is used for horticulture and gardening purpose resulting in reduced freshwater withdrawal from BRAHMANI River

Rainwater Harvesting system is being adopted in a significant way in NALCO

- Commissioned harvest pond capacity of 50000 m³ in CPP.
- Harvested water is used as a make up to
 - Fire hydrant Fore bay of RCPH 1
 - Raw water reservoir
 - ensuring water security in CPP
- Water Harvested : 75,1087 m³ (2018-19)
- Rooftop harvesting has been initiated in S & P Township

Reuse of surface runoffs & wastewater

- A first of its kind in the world, Defluoridation plant based on Emrion Nano technology to remove fluoride content in effluent water of Smelter Plant commissioned in 2016-17.
- At smelter plant, there are three holding pools of capacity 100,000 m³, 51000 m³ & 38000 m³ respectively store surface runoffs of pot line & carbon area during rain along with wastewater from the shop floor
- Treated water from the de fluoridation plant used for cooling tower make up, fire hydrant and plantation

Recycling of Subsoil water

- The sub soil water of pot line 3 & 4 are reused as makeup water of RP & compressor cooling.
- Around 150 to 200 KLD water is conserved in the above way

Water withdrawal by source

303-1

Surface Water	Source	Unit	2016-17	2017-18	2018-19
Smelter & CPP	Brahmani River	m ³	3,86,21,471	4,00,89,366	3,93,20,461
Alumina Refinery	Kerandi River	m ³	92,91,450	87,57,692	89,10,917
Bauxite Mines	Jholaguda Stream	m ³	7,86,986	6,92,832	6,20,355
Total Withdrawal		m ³	4,86,99,907	4,95,39,890	4,88,51,713

Water Conservation in 2018-19

Mine	<p>Effluent water handling</p> <ul style="list-style-type: none"> • Effluents from the Mechanical Workshop channelized, and the clear water is discharged to zero discharge sump • Effluent from canteen is treated in a biological treatment unit and treated wastewater is discharged to the zero-discharge sump and pumped to an overhead tank for use in dust suppression and horticulture <p>Rainwater harvesting</p> <ul style="list-style-type: none"> • NALCO's sedimentation basins located inside the mining area act as significant ground water recharging facilities • Five ponds excavated in the unexplored area which act as significant rainwater storage facilities • Two roof-top rainwater harvesting structures constructed in various buildings <p>Management of storm water</p> <ul style="list-style-type: none"> • Peripheral barrier around the mining area prevents rainwater from going down the valley and recharges the ground water.
Refinery	<p>Red Mud Pond</p> <p>3132854 m³ water is recycled and used for leaching out caustic from process mud</p> <p>Ash Pond</p> <ul style="list-style-type: none"> • Total water recycled is 8140664 m³ and used for making ash slurry of the Fly ash. <p>Sewerage Treatment Plant</p> <ul style="list-style-type: none"> • 2 No. of Township STPs of capacity 20 m³/hr & 125 m³/hr recycle water for horticulture & gardening. <p>Rainwater and plant outlet surface drain off holding ponds</p> <ul style="list-style-type: none"> • Sabari Lake (50000 m³), Shiva Lake (16000 m³) and SVM Lake (28825 m³) Recharges to River Kerandi <p>Rainwater Harvesting inside Refinery Plant</p> <ul style="list-style-type: none"> • 3 nos. of roof top rainwater harvesting facilities (total 6000 m³ capacity) are existing inside Refinery for ground water recharge. WO is issued for installing 03 No of RWH facilities at Township areas.
Smelter	<p>Recycling of treated water of Sewage Treatment Plant:</p> <ul style="list-style-type: none"> • STP of capacity 0.65 MLD uses wastewater from canteen, kiosk, toilets and urinals. After secondary purification by de-fluoridation plant around 17 m³/hr, STP water was recycled back for reutilization <p>Reuse of surface runoffs & wastewater:</p> <ul style="list-style-type: none"> • 3 holding pools of capacity 100,000, 51000 & 38000 m³ store surface runoffs of pot-line & carbon area along with wastewater from the shop floor which is then treated in the de-fluoridation plant & Emrion Nano Technology plant. • Treated water from de-fluoridation plant is used in plantation, anode cooling, vehicle washing etc. • Treated water from Emrion Nano Technology plant is used as cooling water make-up after de-fluoridation.

Surface runoff management:

- Re-routing of drain of RP area channelize a portion of surface runoff previously flowing outside, to Holding pool for plant use after treatment.
- Construction of garlanding drain with containment facility completed and the accumulated water pumped to holding pool through dedicated pipelines.
- A dam has been constructed near Watch Tower 23 for conservation & reuse of non – plant water flowing through culvert. Consultancy Proposal to utilize this water after treatment is underway.

Recycling of Subsoil water:

- Around 150 to 200 KLD water is conserved through recycle of subsoil water collected below the pot-line 3 & 4 used in cooling & fire water makeup of rolling plant and as makeup water for compressor cooling.

Recycling of effluent water of Hazardous Waste incinerator:

- Project completed for recycling of effluent water of Hazardous Waste incinerator into the scrubbing system after filtration.

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.

Rainwater harvesting in S&P township:

- The rainwater from the roof tops of new quarters is channelized to 3 charging wells to charge the ground water

CPP

Ash pond Recycle System

- Around 50,000 m³ 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 2018-19 around 17017960 m³ 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 wastewater. All industrial drain wastewater 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 2018-19 around 3313210 m³ of water (9077 m³/day) was recycled back from IDWRS. This is further reducing water intake from river Brahmani.

Sewage Treatment Plant of CPP

- STP of capacity 175 m³/day are kept under operation on continuous basis. Wastewater 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 m³/Year STP water was recycled back for reutilization in horticultures thereby reducing water intake from river Brahmani

Sludge Pond Recovering system of CPP

- In the sludge pond recovering system, sludge, grit consisting of sand, gravel, or heavy solids are allowed to settle and around 300-350 m³ per day (depending on season) of water is recovered and sent to the raw water reservoir of CPP.

Dust Suppression System at CPP

- Clear water of around 13 m³ per hour is recovered from the dust suppression system in CPP and is guided for use as ash slurry.

Rainwater Harvesting and Recycling system of CPP

- Rainwater Harvesting and Recycling system has been commissioned having harvest pond of capacity of 50000 m³ equipped with 2x250 m³ of pumping capacity on Sept'2016. The recycled water is used as a make up to fire hydrant Fore bay of RCPH-1& also extended to raw water reservoir. In the year 2018-19, around 751087 m³ of water from rainwater harvesting system and around 157254 m³ of water from storm water exit point was recycled and re-used.

Roof Top Rainwater Harvesting at CPP

- Roof top rainwater 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 3500m³/year rainwater shall be harvested. This will reduce the water make up quantity to CW fore-bay & RCPH fore-bay.

Water recycled and reused

303-3

We have achieved zero discharge with respect to wastewater and sewerage water in all our units. All our units have roof top rainwater harvesting, surface runoff rainwater harvesting and ground water recharging systems. Another major 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.

Conservation and Recycling of water

Water Recycled/Reused	Unit	2016-17	2017-18	2018-19
CPP				
STP	m ³	1,00,000	65,000	65,000
ETP	m ³	26,63,000	30,33,336	33,13,210
Ash Pond	m ³	1,61,63,255	1,52,46,625	1,70,17,960
% Water Recycled/Reused	%	64	100	100
Refinery				
RMP	m ³	34,73,918	29,53,808	31,32,854
Ash Pond	m ³	92,93,695	86,01,715	81,40,664
STP	m ³	5,43,000	5,44,500	5,56,400
% Water Recycled/Reused	%	143	138	135
Mines				
ETP & STP	m ³	76,650	76,650	76,650
% Water Recycled/Reused	%	9.74	11.06	12.36
Smelter				
STP	m ³	2,37,250	Included in ETP	Included in ETP
ETP, Subsoil Water & Others	m ³	8,76,000	3,57,432	5,32,212
% Water Recycled/Reused	%	52.10	17.00	28.50



Mines surface water reservoir

Biodiversity

304

103-1,103-2,103-3

Protecting and enhancing biodiversity, i.e., the abundance and variety of living organisms and ecosystems in nature, is an integral part of global sustainability. Alteration of many of the world's ecosystems, and loss of biodiversity is a major concern. Governments and businesses have been set on the path of addressing biodiversity on a global scale by the United Nations. The SDG 15 is focused on sustainably managing forests, combating desertification, halting and reversing land degradation, and loss of biodiversity.

Impact on biodiversity and alteration of ecosystems in a significant and highly visible way is a possible outcome of mining activities. Direct impacts can be land disturbance or discharges to waterbodies or the air. Indirect impacts are the result of social or environmental changes that arise when mining opens an area for other economic activities with increased habitation.

Conscious efforts have been made at all our operating units to manage our land and development of green belts. None of our units are in proximity to any world heritage site. The bauxite mine is beyond 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 Species.

NALCO has carried out a study on biodiversity in and around Panchpatmali Bauxite Mine Central & North Block through the Botany Department, Utkal University at a cost of ₹ 16,28,000/-. They have drawn up a Wildlife Management Plan which has been approved by the State Forest Department. NALCO has implemented the measures suggested for conservation of biodiversity. Although our bauxite mines are in hilly areas, the possibility of damage from mining is minimum as bauxite bearing hill tops are barren with only sparse bushes. Extensive plantation activities have improved the greenery on the hilltops. Annually, 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

Preservation of Natural Resources, Ecosystems & Biodiversity

- Extensive Plantation in and around the production units.
- Prevention of ground water & surface water contamination, air pollution and proper utilisation of waste.
- Opening of mining faces is carried out as per approved Mining Plan.
- After exploitation of minerals, the site is restored as per Mines closure plan with indigenous species.
- Wildlife Conservation Plan and Biodiversity Management Plan are in place.
- Adoption of Rainwater Harvesting Ponds and roof top rainwater harvesting system in all production units.
- Implementation of Renewable Energy projects.
- Adoption of green technologies.
- Eradication of use of Ozone Depleting substances.
- Zero Discharge with respect to industrial and sewerage wastewater by recycling and reuse.

operate in bio-diversity sensitive areas. We have already initiated a vegetation survey for crops and vegetables in the nearby area of our Alumina Refinery.

Afforestation activities & wildlife conservation

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



bauxite conveyor

Reclaim the mined-out areas by planting indigenous trees

Restore the ecology of the area

Prevent soil erosion

Provide a green belt around the periphery of the mining area to contain the dispersal of dust in the adjoining areas

Conserve moisture for increasing ground water recharging

Restore aesthetic beauty of the locality

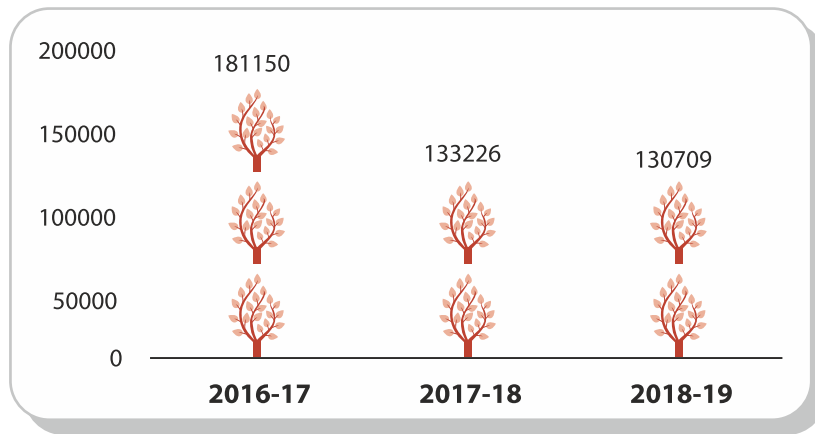
Prevent noise propagation

Meet the requirement of fodder, fuel and timber of the local community

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 are shown.

Plantation, Afforestation, Horticulture & Ornamental Developed



Unit	Mines	Refinery	Smelter	CPP	Corporate Office	Port Facility Vizag	Total
Plantation done during 2018-19	100260	19788	5047	5150	144	320	130709

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

304-4

The wildlife management plan prepared by M/s CEMC; Bhubaneswar anticipates the following impacts due to 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

Their survey indicates that, the mines lease area (core area) is devoid of tree growth, the vegetation consists of scrub only, which supports only a few small animals. The result of the survey and the position of Schedule-I species, as per the Wildlife Conservation Act -1972, are shown below

Core Zone (Species)	Buffer Zone (Species)	Insect (Species)
<ul style="list-style-type: none"> • 5 mammals • 4 reptiles • 9 birds • No Schedule I species 	<ul style="list-style-type: none"> • 16 mammals • 9 reptiles • 29 birds • 2 mammalian species (Elephant and Sloth bear) belong to Schedule – I category 	<ul style="list-style-type: none"> • 3 butterflies • 2 crickets • 1 grass hopper

In the report by the M/s CEMC, the following major suggestions have been given, regarding implementation of the wildlife management plan which has been implemented.

- 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 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.

Emissions

305

103-1, 103-2, 103-3

NALCO is 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.

Combustion of fossil fuels is the primary source of our energy. As such a strict watch is kept on stack emissions like NO_x, SO_x and particulate matter and their concentration in ambient air by installing real time monitoring stations. The

data of monitoring stations is uploaded to the OSPCB server for monitoring and record. The emissions are within the permissible limits during the reporting period. Every year the Environmental Statement containing information on emission, hazardous waste, solid waste etc. is submitted to regulatory authorities. We could limit our consumption of R-22, R-124 & R-134a refrigerant gases in all our production units by restricting use of ozone depleting substances. Smelter used 732 kg R-22, 703 kg R-124 & 62 kg R-134a gas. CPP used 610 kg R-22 gas during the year.

Units	Source	Pollutants	Unit	Norm	2016-17	2017-18	2018-19
CPP	Emission from ESP	PM	Mg/Nm ³	100	64.08	63.53	54.36
Smelter	Emission from Pot line FTP stack	PM	Mg/Nm ³	100	14.7	23.25	18.87
		Fluoride	Kg/T	0.3	0.151	0.171	0.213
	Emission from FTC of Bake Oven	PM	Mg/Nm ³	100	24.74	24.34	18.54
		Fluoride	Kg/T	0.1	0.0201	0.0096	0.0076
Alumina	Emission from Boiler stack	PM	Mg/Nm ³	150	135.1	132.94	116.8
Refinery	Emission from Calciner Stack	PM	Mg/Nm ³	50	30.1	33.41	29.37
Bauxite Mines	Ambient Air Quality	PM ₁₀	µgm/m ³	60	40.37	37.68	45.12
		PM _{2.5}	µgm/m ³	40	26.51	36.73	34.4

Total Green House Gas emissions

305-1, 305-2

Fuels	Unit	2018-19
HFO (Scope 1)	t CO ₂ e	611,123
LPG (Scope 1)	t CO ₂ e	62
LDO (Scope 1)	t CO ₂ e	8,690
Diesel (Scope 1)	t CO ₂ e	22,279
Coal (Scope 1)	t CO ₂ e	9,535,680
Electricity Consumed (Scope 2)	t CO ₂ e	365,835
Emission (Scope 1 & 2)	t CO ₂ e	10,543,670
Emissions through Anode Process (Pot line & Furnace)	t CO ₂ e	737,278
Emissions from PFC	t CO ₂ e	82,314
Scope 3 emissions*	t CO ₂ e	27,395
Total GHG Emissions	t CO ₂ e	11,390,657

Relevant direct and indirect greenhouse gas emissions are evaluated based on GHG protocol. <http://ghgprotocol.org/>.

*Only transportation of raw material & movement of finished product up to port of lading are taken in to consideration for calculating scope-3 emission."

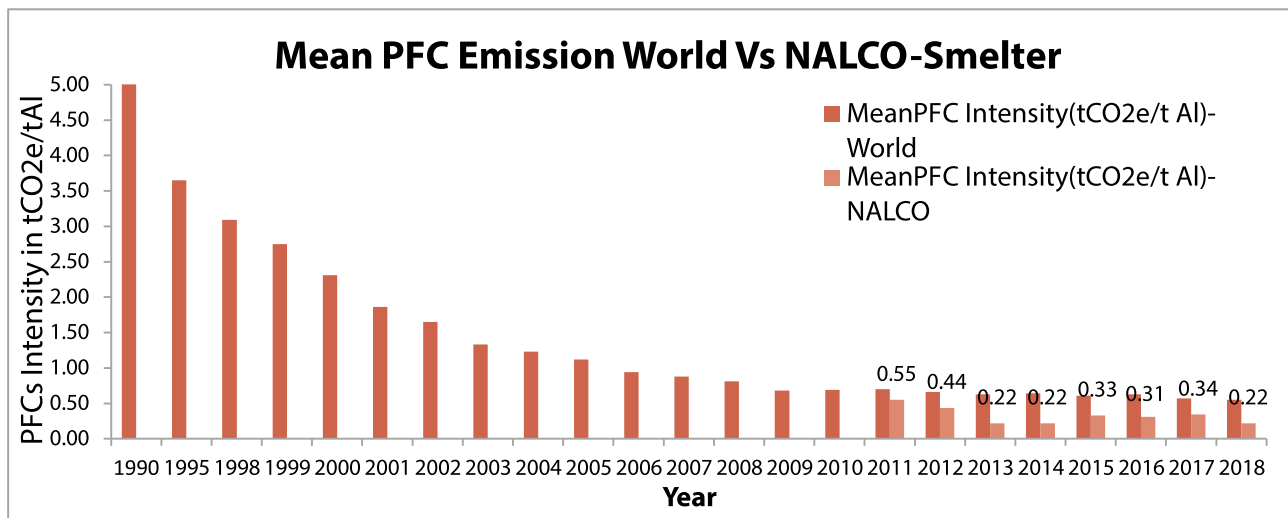
Emissions of ozone-depleting substances (ODS)

305-6

We monitor very closely the emissions of per-fluorinated compounds (PFCs) i.e. tetrafluoromethane (CF₄) and hexafluoroethane (C₂F₆) produced in the primary aluminium reduction process at Smelter, during anode effects. 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 2018-19, the PFC emission from Smelter Pot line has been estimated using AP (Aluminium Pechiney) overvoltage method and their values are given below:

	kg/t of Al	t CO ₂ e
CF ₄	0.0233	68527
C ₂ F ₆	0.0028	13787



Effluent & Waste

306

103-1, 103-2, 103-3



Waste Management plan is integral to project planning in NALCO. Technology selection is based on identification of process wastes and their management strategy. 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. Environment Impact Assessment and preparation of Environment Management Plan also presents an opportunity for planning of waste management in advance. 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&CC. Proper waste handling is also assigned due weightage during Aspect Impact Study, Hazard Identification & Risk Assessment and Disaster Management Plans.

Our waste management practices imbibe the 3R concept i.e. Reduce, Recycle and Reuse. NALCO's approach towards waste management involves finding alternate use of wastes

created during the process.

NALCO's captive thermal power plant generates fly ash as waste in bulk quantity which are used for -

- Brick making,
- Road & embankment construction,
- Use in cement industry and concrete making,
- Mine void filling etc.

Similarly, beneficiation of bauxite produces huge amount of red mud. Our prioritized approach is to explore alternate use for this iron and other mineral rich reject through R&D efforts. NALCO adopts the policy of safe disposal and segregation in case of hazardous wastes for which safe reuse is not possible in order to minimize environmental pollution and risk to biodiversity.

Employees are continuously educated, and their skills are upgraded to reduce wastes generated due to process instability and human negligence. Technology upgradation and renovation of facilities are carried out for recycling of wastes. We continuously try to find alternate use of wastes through R&D efforts.



Water Treatment & Treated Water Quality

306-1

Parameter	2016-17		2017-18		2018-19	
	Norm (mg/l)	Range After Treatment (mg/l)	Norm (mg/l)	Range After Treatment (mg/L)	Norm (mg/L)	Range After Treatment
Suspended Solids	100	14.75 - 32.04	100	14.92 - 28.46	100	2.00-55.00
COD	250	13.25 - 148.21	250	12.67 - 126.25	250	8.00-126.00
BOD	30	3.67 - 22.25	30	2.8 - 14.63	30	3.36-14.50
Oil & Grease	10	0.90 - 1.41	10	0.8 - 2.40	10	1.10-2.43



Nano-tech DF plant

Waste by type and disposal method

306-2

Hazardous and Non-hazardous Wastes are identified and segregated right at the generation point. Hazardous wastes are safely disposed as per the laid-down procedure developed for their handling complying with all the applicable statutory guidelines as given below.

- 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, thereby recovering valuable caustic for process use.

- Apart from alternate use of fly ash, excess ash from CPP is hydro sluiced to ash pond.
- Over burden & topsoil excavated during mining are stored separately and used for reclamation of mines as per progressive mine closure plan.

R & D project on fabrication and trial commercial use of a highly porous pervious concrete material from fly ash successfully completed on 12 November 2018.

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

Unit	Hazardous waste generation	Unit	2018-19	Waste Management Method
Alumina Refinery	Spent Resin	Mt	14	Disposed in secured land fill
	Used oil	kl	81.99	Sold to authorized recycler
	Discarded Asbestos	m ²	76.4	Dumped in specified pits
	Red mud	Mt	3057509	Disposed to red mud pond
Smelter	Aluminium Dross	Mt	6577	Mostly Recycled in the process
	Cathode Residue	Mt	5445	Stored in covered sheds on concrete floor. Refractory portion & Carbon portion of SPL are segregated and stored separately under shed. 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	64638	100% recycled in anode making
	Rejected Filter Bags	Mt	29	Incinerated in pot
	Rejected ALF3 bags	Nos.	81225	Incinerated in pot
	Used oils	kl	62	Sold to authorized recycler
CPP	Spent Resins	kl	8	Disposed in secured land fill
	Used oils	kl	33.49	Sold to authorized recycler
Mines	Used oil	kl	84.80	Sold to authorized recycler

Unit	Non-Hazardous Waste generation	Unit	2018-19	Waste Management Method
Alumina Refinery	Lime grit	Mt	23105	Used as land fill
	Fly ash	Mt	627876	Used for cement & brick making etc. Excess ash dumped in ash pond.
	Empty containers	Mt	1934	Sold to authorized recycler
Smelter	Ferrous Scrap	Mt	3408	Disposed to recycler
	Non-ferrous Scrap	Mt	90	Disposed to recycler
	Mixed Debris	Mt	1913	Disposed in the low-lying areas
	Refractories Bricks	Mt	3490	Reused in construction of temp. resistant floor
CPP	Fly ash	Mt	2477476	Used for cement & brick making etc. Excess ash dumped in ash pond.
Mines	Overburden	Mt	720000	Reused in backfilling of mined out area

Recycling & Reuse

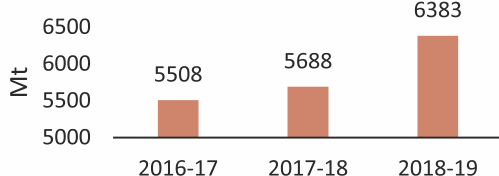
Dross Recycling

Aluminium Dross is a process waste arising from oxidation of hot aluminium metal during transportation as well as in melting & holding furnaces. NALCO has installed Bath Crushing System for Dross Recycling

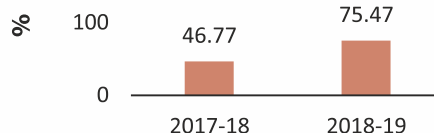
- Alumina and bath product from additional bath system are used as anode cover material in pot line along with crushed bath.
- Metallics material is again charged in pots to get the metal and increase productivity
- 6383 Mt of Dross is recycled.

Recycling of the inevitable process wastes to the maximum possible extent is a thrust area for us as a primary aluminium producer. 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 pot line scrap melting furnace. Spilled metal is also recycled by collection and re-melting.

Recycled Material - Al. Dross (Mt)



CPP Ash Utilisation in %



Recycling/ Reuse of waste 2018-19

Unit	Percentage	Utilisation
Bauxite Mines	100	Overburden is utilized for reclamation for mined out areas
Alumina Refinery	8.31	Caustic Soda is recycled from red mud
	69.59	Ash utilization
	93.61	Recycling of Ash pond water
Smelter	100	Recycling of Aluminium scrap
	86	Aluminium dross recycled as input to process
	100	Recycling of spent anode
CPP	75.47	Ash utilization

Overburden Management

Overburden & topsoil stripped due to advancement of bauxite mining faces, are dumped in the backfilled/ mined out area or stacked properly for subsequent use in reclamation. Levelling of dumped lateritic overburden is followed by laying of topsoil which is properly dressed to make the reclaimed land suitable for plantation, with adequate provision for benches and terraces. The restoration of mined out area is through concurrent reclamation as per Progressive Mine Closure Plan of the approved Mining Plan/Scheme. Backfilling, plantation and creation of water

basins at strategic points for ensuring proper drainage is the strategy adopted for total reclamation of the mined-out areas. Selected indigenous foliage and fruit bearing species are used to reforest the backfilled areas. Preservation of the natural topography of the virgin area and prevention of soil erosion are the key areas where due care is taken. Subsequent to plantation these areas 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 (Ha)	Cumulative area rehabilitated since inception (Ha)
2018-19	16.23	330.60

Social

400

NALCO acknowledges the social obligations of business and tune its operation for a symbiotic cohabitation in society by creating value for society and stakeholders. Driven by Sustainability principles, we create significant impact through well planned community development programs supported by provision of adequate resources to improve the living standards of the surrounding population. We are also totally committed to foster health, safety and well-being of employees through various measures.

We provide an excellent work environment which is conducive, harmonious and supports the development of

employees to give their best performance and contribute to their growth. In return the strong commitment of employees enables the Company to overcome challenging business and economic situations and emerge stronger. The Company ensures that there is no discrimination against any employee on grounds of race, color, religion, caste, gender, age, marital status, disability, nationality or any other factors prohibited under applicable laws and contemporary practices at the workplace. Our commitment to employee care is shown through financial compensation, amenities, capability building, engagement, social security and career growth.

Employment

401

103-1, 103-2, 103-3

We have deployed a host of employee-oriented measures like excellent remuneration, career growth, harmonious industrial relations, non-discrimination and human rights protection. We are committed to foster health, safety and empowerment 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. 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 facilitates a rewarding career with ample growth and development. Grievances or conflicts, if any, between employee and management is resolved through defined processes. HR department acts as an enabler to employee management relationship, projecting their views, arranging for negotiation and resolving their genuine grievances.

Approach to Employment

One of the best employers

Conducive & harmonious work environment

Holistic approach to learning & development

Committed to foster health, safety and career development

An equal opportunity employer and no discrimination

Benefits to employees

- Provident Fund
- Cafeteria Allowance
- Leave travel concession
- Benevolent Fund
- Contributory Pension Scheme
- Leave Encashment
- Medical benefits
- Post-Retirement Medical benefits
- House Building Advance
- Scholarship for Children of Permanent employees
- Performance Related Pay
- Multipurpose Allowance
- Best performance 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
- Settling-in-benefit
- Retirement welfare scheme
- Superannuation gift scheme
- Long Service reward
- NEFFARS- Nalco Employee Family Financial Assistance Rehabilitation Scheme

Employee Benefits

The company provides employees with attractive pay package which is one of the best in the industry along with plethora of other perquisite and benefits. The benefits extended to the 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, community bus service, subsidised canteen, Guest House and Transit House at different locations. 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.

As on 31.03.2019, ₹ 2,072.28 Crore was spent towards employee benefits expenses including salary as compared to ₹ 2261.20 Crore spent during 2017-18.



Employee Diversity

NALCO values diversity and is aware that unique talents from each diverse group combine to produce a synergetic organizational effectiveness resulting in immense value for all. This creates a positive vibe in the work environment which brings the best from people. We promote diversity and 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 a political, religious or union organization or majority/minority group. 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. There is no difference between basic salaries for

Male and Female at any position within the organization. The principle of 'Equal Remuneration for men and women workers for Work of Equal Value' is strictly followed in our Company. The Company provides equal opportunity to both men and women employees in all the matters, such as, salaries and payments, career growth, social security measures etc.

Total - 6496

1064 SCs (16.38%)

1199 STs (18.46%)

824 OBCs (12.68%)

95 PWDs (1.46%)

14ESMs (0.22%)

359 ladies

Gender Diversity

	Total Employees	2016-17			2017-18			2018-19		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Executives		1730	77	1807	1729	83	1812	1696	86	1782
•Non-Executives	Supervisory	706	48	754	632	48	680	550	44	594
	Highly skilled /skilled	3604	132	3736	3548	143	3691	3428	140	3568
	Semi-skilled /Unskilled	544	97	641	501	92	593	463	69	552
	Total Non- Executives	4854	277	5131	4681	283	4964	4441	253	4714
Total		6584	354	6938	6410	366	6776	6137	359	6496

Employee Engagement

Our employees play a vital role in the organizational growth and development. A host of benefits and facilities are provided to employees and their families to nurture the relationship between employee and the organization. We believe that an engaged employee has a positive attitude towards the organization and its values. Several initiatives have been taken to ensure that the development of employees and the organization is realised in a mutually inclusive manner. There are structured programs for career development of the employees. The capability building of employees is done through various training programs, both in house and through the reputed institutions.



We know that the two-way communication between the organization and the employee plays a vital role in enhancing the employee engagement. Accordingly, communication 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. The IT tools are being used extensively to enhance communication through website and emails. Feedback from employees are collected by meeting with unions, during grievance handling and DPC interview etc.

Forced Labour

ILO defines forced labour as "all work or service which is extracted from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily." We are committed not to resort to any form of forced or compulsory labour. The service condition is provided to all the employees along with the appointment letters where conditions of appointment are comprehensively stated.



The service rule and regulations manuals are available in all the units for reference and use. The workmen are given a copy of the certified Standing Orders precisely containing their general terms and conditions governing service conditions. The HR Manual is available in the Intranet site for reference. During the year 2018-19 there was no case in any form of forced or compulsory labour.

Human Rights

Units of NALCO are certified to SA8000:2014 Social Accountability Standard which testifies its credentials on human rights. Social Accountability International (SAI) is a non-governmental, multi-stakeholder organization whose mission is to advance the human rights of workers around



the world. It partners to advance the human rights of workers and to eliminate sweatshops by promoting ethical working conditions, labour rights, corporate social responsibility and social dialogue

We subscribe to the principles of the United Nations Global Compact on Human Rights as we are committed to protect human rights in our operations and supply chain. Our employee related policies are in line with the principles of Human Rights, The Constitution of India and various Labour Laws of the country. The policies ensure that the principles of human rights are adhered to across all our operations and including our stakeholders like suppliers, vendors and contractors. All the suppliers, contractors and vendors who are engaged for providing goods and services enter into a well-documented formal agreement which contain stipulations and conditions requiring them to abide by various applicable labour statutes. Various acts covered in the agreements are 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. There was no recorded case during the reporting year on any violation of human rights.

Equal Opportunity Employer

NALCO is an equal opportunity employer and measures are taken through policies, manuals and practices to ensure that there is no discrimination against any employee on any ground.



Uniform set of rules are provided in the HR manual which apply equally to all employees, irrespective of factors such as sex, caste, religion, race etc. All recruitments are conducted in a transparent and impartial manner, thereby, giving equal opportunity to all eligible candidates, without any discrimination whatsoever. Various activities affecting employees are carried out in the spirit of equal opportunity employer and that include recruitment, placement, promotion, transfer, compensation, training and other benefits which are based on the merit and competence of the individual and the business needs of the organization.

During recruitment we comply with all applicable Government Guidelines 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).

Grievance Redressal Mechanism

At NALCO the grievances are addressed through well designed procedures for different stakeholders. For key

stakeholders i.e. Employee, Shareholders, Vendors, and Customers there are formal grievance redressal system where any grievance can be registered.



Depending upon their service conditions there are separate formal grievance procedure for executives and non-executives for impartial and unbiased handling of genuine grievances. Under the scheme a grievance committee is formed for non-executives 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 2018-19 are given below:

Sl. No.	Category	No. of complaints filed during the F.Y. 2018-19	No. of complaints pending as on 31.03.2019
1	Child labour/ forced labour / involuntary labour	Nil	Nil
2	Sexual harassment	Nil	Nil
3	Discriminatory employment	Nil	Nil
4	Any other grievances	60	15

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 (years)		
			Below 30	30-50	50-60
2018-19	89	5	79	15	Nil

Separation

Year	Males	Females	Age Groups (years)		
			Below 30	30-50	50-60
2018-19	362	11	45	23	305

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

401-2

Employee well-being is a continuous process at NALCO, and we provide different kinds of benefits to our employees based on various factors i.e. laws of land, industry standards and the value of treating employees well. The benefits provided to contractual and temporary employees are guided by government rules and living wage factor. Retirement plans in NALCO are based on both defined

benefit plans and defined contribution plans. 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. Contractual employees enjoy different benefits like PF, ESI, Paid Holidays, Overtime, Canteen Allowance, Bonus etc.

Occupational Health & Safety

403

103-1,103-2,103-3

We are deeply committed to Occupational Health and Safety (OHS) of our employees. We have a zero-tolerance policy for unsafe work and non-conformance to safety norms in all our operations. All the units have been certified by OHSAS 18001, safety management system. The procedures facilitate systematic approach to safety management. Periodic audits by the certifying agency ensure the effectiveness of systems.

Our Occupational Health & Safety policy is approved by the Board. The systems, procedures, work instructions and accountability derived from Occupational Health & Safety Policy are the guiding mechanism for achievement of health and safety objectives.

The objective of Safety Management is to provide a structured approach to control safety risks in operations and maintenance activities to comply with the statutory norms.

The safety management system accords a very high importance to life and the same is applicable to employees, contractual workers, security personnel, visitors and people living in the vicinity. Adequate resources have been provided for safety management including staff, well equipped Health & Safety departments and Occupational Health Centres in all the Units to address safety and occupational health issues.

Assessment of safety hazards and risks forms the basis of development of safety management plans and procedures.



OCCUPATIONAL HEALTH & SAFETY POLICY

NALCO is committed to maintaining a Safe, Healthy and Sustainable work environment in all its operations. This shall be achieved by:

- Focusing on prevention of Accidents and Occupational Health issues.
- Complying with all legal requirements & other requirements related to Safety and Occupational Health of persons and establishing clearly defined goals & procedures to achieve the same.
- Ensuring Safety & Health of all employees and contract workers in its premises, including those involved in transportation, cleaning and other such activities.
- Conducting Periodic Safety Audits, Environment Audits, Health Check-ups and Risk Assessment by both internal and external qualified persons.
- Considering aspects related to Safety and Health of personnel as well as environmental issues at the time of procurement of equipment and selection of technologies.
- Ensuring health of persons in the peripheral locations, likely to be affected by our operations.
- Periodically monitoring and reviewing safety & occupational health issues at relevant levels, including the highest levels.
- Communicating Safety Hazards and health related issues to all concerned through suitable means, including training.
- Involving the workmen in Policy implementation as well as identification of potential issues.
- Considering Health & Safety performance of individuals at different levels during their career advancement, as per NALCO's policy.
- Establishing and maintaining suitable set-up with competent persons to monitor and bring to the notice of the management any issues related to unsafe conditions & practices.
- Striving for continual improvements, exceeding statutory compliance levels, wherever feasible.

Regular internal Safety inspections and Audits by external agencies are organised whose findings are analysed, and appropriate actions are taken to enhance the effectiveness. Systematic root-cause analysis of the incidents leads to underlying causes which are eliminated through corrective actions. Preventive actions are taken to pre-empt potential

incidents. There is major thrust on the 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.



Administration of Safety Pledge

All the applicable regulatory and statutory laws of Safety and Occupational Health are complied with in a proactive manner. We strive for continual improvement of personnel safety with the goal of zero accidents, illness and incidents. Worker participation in Health and Safety management

further enhances the effectiveness of safety management at NALCO. A Safety Committee in all units formed with representatives from management and workers helps in identification of unsafe areas and practices and suggests corrective action

Safety training for year 2018-19

Category	No. of employees trained			Training Man-days		
	Male	Female	Total	Male	Female	Total
Executives	226	4	230	298	4	302
Non-Executives	299	12	311	407	17	424
Contract Workers	5521	0	5521	5030.5	0	5030.5
Total	6046	16	6062	5735.5	21	5756.5

To facilitate safe practices, several different types of safety signage are displayed at appropriate locations. For a speedy response during fire accidents, the fire extinguisher usage instructions are provided at proper locations. Safety campaigns are carried out through various activities like distribution of handouts and safety badges, playing of skits and audio-visual communications. Use of PPE (personal protective equipment) i.e. helmets, safety shoes, gloves, safety goggles and safety belt are complied with as per the established norms. Safety permit and use of safety gadgets

are made mandatory for executing work at a height and other hazardous activities. Observance of required workplace safety regulations is a contract condition in every contract and in case of any violation necessary actions are taken like imposition of penalty, issue of warning and termination of contract, is resorted to depending on gravity of violation. Documentation of accidents and near miss cases are duly maintained and analysed to take suitable corrective actions on priority basis.

Health & Safety Highlights

Mines

- Annual Mines Safety Week Celebration 2018 from 20.11.2018 to 26.11.2018 at Panchpatmali Bauxite Mines with participation of 32 mines.
- PME of all eligible employees was carried out during the F.Y. 2018-19.
- Slope Stability study of Mine access road (ghat section) has been carried out in March 2019.

Alumina Refinery

- 3 nos. Radar Speed gun were procured for Road Safety measures,
- 490 employees imparted training on Safety and Environment by National Safety Council
- 2,334 nos. of contractor workers were covered through CLMS system in formal classroom training
- 94.47% employees covered in periodical medical check-up of our regular employees
- Retro-reflective signage in local languages displayed to build awareness on Safety & Health

Smelter

- Cast house –B was developed as a Safety model "AAINA"
- Smelter Plant observed National Safety Week
- Smelter Plant adopted small scale industries namely M/s. INDFAB, M/s. SAKUNTALA ALUMINIUM Industries and M/s. OMFED, ANGUL for improving their safety performance

Captive Power Plant

- 2,399 contractor workers have been covered under Audio & Video safety awareness programme
- 1,130 nos. of employees & 2,447 nos. of contractor workmen have been covered under PME health check-up programme
- Mock drills are being conducted involving NDRF team, District Crisis Group & Safety department for assessing response of the emergency service team members

Training is provided to employees on various aspects of safety i.e. Factories Act, Accident Prevention, Safe use of equipment's & accessories, Workplace Safety, Safe Crane Operation and Material Handling. Behaviour based safety,

handling of hazardous material, firefighting, electrical safety is some of the other selected subjects on which training is imparted. Safety training is routinely imparted in all our units and we try to build a culture of safety through training.

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

403-1

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

near miss cases, unsafe conditions are reviewed every month. The committee is headed by unit heads where as CSO is the convenor. Other senior executives and workers are the members. Members of the safety committee are periodically sent to other industries to learn new ways of safety practices.



Disaster response mock drill

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

403-2

We monitor key aspects of safety performance i.e. the incidence of injuries under pre-defined categories, man days lost, severity rate and work-related fatalities. The incidents are analysed under the OHSAS 18001 System to undertake corrective actions to prevent recurrence. The details of the accidents, severity rate and fatalities are given below for the year 2018-19.

Unit	Category	Reportable Accidents	Man-days worked	Man-days lost	Man-hours Worked	Severity Rate	Lost Time Injury Frequency Rate	Fatality
Smelter	Employees	0	782371.5	0	6258972	0	0	0
Plant	Contract Labour	0	1304552	0	10436416	0	0	0
CPP	Employees	0	317243	0	2537944	0	0	0
	Contract Labour	02	567254.5	527	4538036	74.477	0.282	0
Mines	Employees	0	128241	0	1025928	0	0	0
	Contract Labour	0	204943	0	1639544	0	0	0
Alumina	Employees	0	520292	0	4162366	0	0	0
Refinery	Contract Labour	0	560713.5	0	4485708	0	0	0

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

403-3

Occupational Health Centres with adequate facility are operating both at S&P Complex and M&R Complex to manage and prevent incidence of any occupational disease amongst workforce. The centres are well equipped and 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. Well-equipped hospital complexes at S&P complex and M&R complex treat any ailment including occupational disease of our employees and their family members. If required, employees and their family members are referred to different Govt. and corporate hospitals depending on criticality.

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

- Training programmes on stress management, Yoga and lifestyle 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.

We conduct PME of employees and contractual workers regularly. The PME statistics for reporting year are given below:

PME Statics

Unit	2016-17		2017-18		2018-19	
	Employee	Contractors	Employee	Contractors	Employee	Contractors
Alumina Refinery, Damanjodi	1715	1215	1703	1474	1573	582
Aluminium Smelter, Angul	2897	3123	2873	3317	2455	3437
Bauxite Mines, Panchpatmali (Canteen workers)	286	7	245	21	206	33
Captive Power Plant, Angul	1158	1856	1203	2355	1130	2447

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 in the area of Health & Safety:

- 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.
- Analysis of near -miss incident, report of inquiry into accident, unsafe conditions & practices, health & hygiene of workmen etc.

Training and Education

404

103-1,103-2,103-3



We are conscious of the fact that it is the knowledge and skill of the employees which is the differentiator. Accordingly, we have built a culture where learning, competency and talent are rewarded so that the organization builds its own capabilities to face the future challenges. We have developed a strong culture of learning which helps the workforce to realize their potential and in turn contribute to the organizational capability building. Classroom learning along with on-the job training, coaching and mentoring enhances Competencies and Skills of Executives and Workmen which in turn result in improved performance. The culture of learning is the great enabler to make the organization relevant, agile and keep it ahead in the competition. The training programs are custom designed to meet the training needs of the employees and the workers.

Centralised training facility at Corporate Office oversees the unit level training and organizes specific training programmes inviting participation from the entire organization. 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, along with individual training needs are combined with needs arising out of Government directives are compiled to form the training programs. 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.



CSR - Skill development Training

Training Performance Highlights 2018-19



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	3070	165	3235	8826.5	617.5	9444.0
Non-Executives	4226	238	4464	6975.0	702.5	7677.5
Total	7296	403	7699	15801.5	1320.0	17121.5

The average training man-days per employee for 2018-19 works out to 2.64.

Local Communities

413

103-1,103-2,103-3

Facilitating Local Employment

Employment generation in the areas of our operation is one of the key aspects of community 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. As on 31.3.2019, the total strength of employees in regular employment is 6496. Job Contractors working in areas like hospitality, maintenance, sanitation, conservancy and project activities etc. have engaged 10767 contract labour to discharge their contractual obligations. Most of these persons are from Odisha, which leads to creation of livelihood opportunity for a sizable local population.

Corporate Social Responsibility

The community development activities are carried under the aegis of Corporate Social Responsibility (CSR). The CSR Policy and Guiding Principles therein are the beacons for community related initiatives. The preamble and Guiding principle incorporated in CSR Policy of NALCO affirm our

conviction for Inclusive growth and equitable development. Company believes that sustainable, equitable growth is the only acceptable business model. The Company aspires to grow its business by reducing adverse environmental footprint and creating positive social impact among the vulnerable and marginalized section of the society in the sphere of education, healthcare, women empowerment, promotion of livelihood, enduring rural infrastructure, promoting and restoring cultural heritage, promoting sports etc. The dedicated Board level subcommittee on CSR & Sustainability, headed by an Independent Director, meets regularly to review progress of the major CSR activities vis. a vis. the plans. CSR proposals are examined by the CSR and Sustainability Committee of Directors, and their recommendations are put up for approval of the Board. A separate Monitoring & Evaluation framework has also been put in place to ensure timely completion of the planned interventions

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 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.



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

413-1

Stakeholder & Community Engagement mechanism

NALCO has institutionalized a multipronged stakeholder engagement mechanism when it comes to community engagement. The engagement with the community starts at the grassroots level followed by engagement with the representatives of the community i.e. MLA, MP, district administration and state administration. Based on this knowledge, NALCO develops the thrust and focus area to achieve desired outcomes. The CSR activities of the Company are undertaken through: Rehabilitation and Periphery Development Advisory Committees (RPDACs), NALCO Foundation and directly by NALCO.

Govt. of Odisha has constituted Rehabilitation & Periphery Development Advisory Committee (RPDAC) for Angul Sector and Damanjodi Sector under the Chairmanship of respective Revenue Divisional Commissioner. Other Members of the Committee includes District Collector, Local MLAs, MPs, People's representatives and representatives from Nalco. Upon receipt of the approved list of projects, the same are placed before CSR & SD committee and Board of Directors for detail deliberation and consideration.

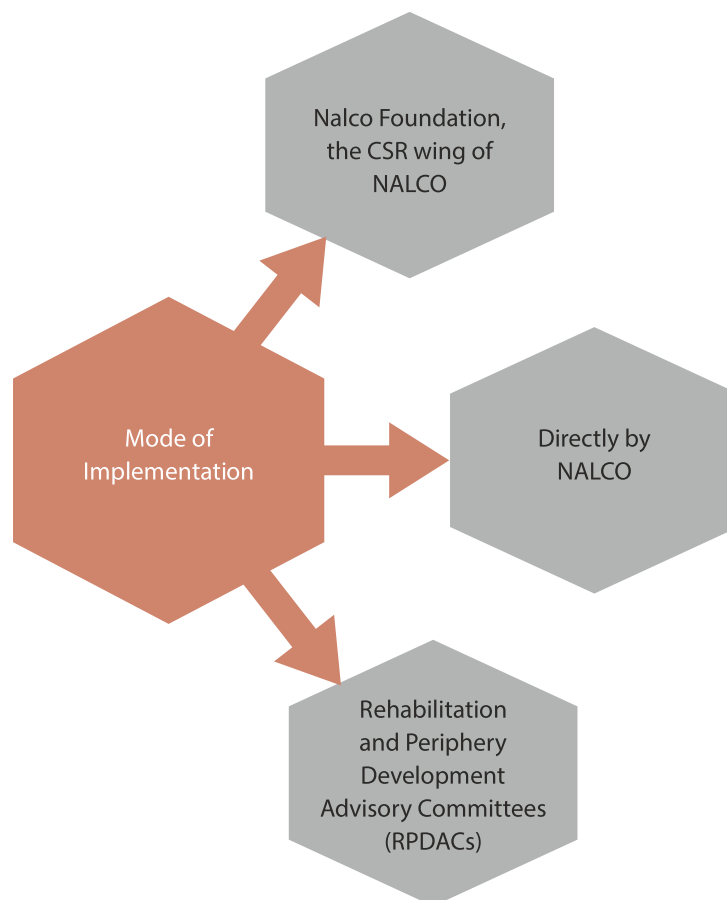
NALCO Foundation is focused on socio-economic development of the immediate villages located in the

periphery of NALCO's operational areas and other aspirational areas of the state and country. NALCO Foundation has adopted a project-based accountability approach through need-based approach and by ensuring participation of the primary stakeholders at the grassroots level in the project management process. The Foundation further intervened in capacity building of youths, women, PRI members & other stakeholders. Some of the projects are also being executed by NALCO directly.

Monitoring and Impact Assessment

NALCO has been regularly conducting impact assessment of some of its major CSR initiatives undertaken by the Company

- Social Impact Assessment (SIA) of the CSR projects implemented by Nalco were carried out by Utakal University, Bhubaneswar in 2017.
- An Impact Assessment Study was carried out with the support of Madras School of Social Work (MSSW), Chennai in 2019



CSR Expenditure

For the financial year 2018-19, a total amount ₹30.35 Crore has been spent for CSR activities.

Indradhanush - Residential education to Tribal Students, since 2012:

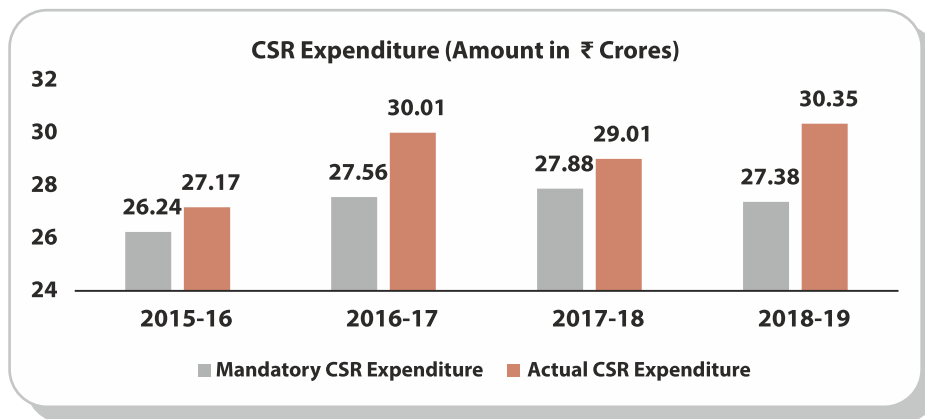
- In 3 Reputed Residential Schools at Bhubaneswar & Koraput
- Total Student sponsored: 920

Skill Development in collaboration with NSDC:

- 944 rural unemployed youths were imparted training through skilling partners
- Recognition of prior learning (RPL) training to 420 contract workers

Nalco Ki Laadli, since 2015:

- Total beneficiaries: 416
- Scale up to PAN India level



NALCO has consistently exceeded the mandatory expenditure on CSR



Handing over ultra modern eye care hospital by Hon'ble Union Minister Shri Dharmendra Pradhan



CSR- Free Mobile Health Care



CSR-Construction of Toilets

CSR Project wise Expenditure

The CSR expenditure under different heads against the plan is given below.

(₹ Lakhs)

Sl. No	CSR Project or activity	Sector	Plan	Actual	Cumulative
01	Health outreach Program- Mobile Medical Units, Diagnostic & awareness building through Information, Education, Communication (IEC) activities.	Preventive health care	361.00	143.85	867.68
02	(a) Construction of Toilets under SVA, Construction of Household Toilets under ODF initiative, School Toilets, Provision of water supply to toilets constructed under Swachh Vidyalaya Abhiyan.	Health care and sanitation	100.00	53.21	983.29
02	(b) Swachh Iconic City Project-Puri	Health care and sanitation	476.67	91.60	733.06
03	Providing safe drinking water to periphery villages of plants and during Ratha yatra at Puri	Safe drinking water.	366.47	301.64	517.75
04	Promoting education, sponsoring formal education of tribal children in reputed residential schools Supporting Nalco ki Laadli Quality education to students of periphery area at Angul & Damanjodi	Education including special education	539.12	1910.60	7922.02
05	Providing employment enhancing training to unemployed youth	Employment enhancing vocational skill	707.93	172.41	347.22
06	Empowering women through distribution of Charkha to women weaver & spinner in villages	Empowering women	0.00	0.00	13.50
07	Ensuring environmental sustainability, ecological balance through plantation, roof top solar power system.	Environment	251.76	110.22	509.88
08	Contribution towards protection of national heritage and culture and development of traditional arts and handicrafts.	National heritage, art & culture	70.00	50.85	203.72
09	Promotion of Rural Sports	Sports	9.25	9.25	9.25
10	Rural development activities in periphery villages and other areas.	Rural development projects.	340.83	62.71	760.00
11	Miscellaneous	—	195.00	128.58	241.10
	Total			3,034.92	13,508.47

NALCO will continue to expand the spread and the impact of its CSR programs. NALCO ki Ladli is being expanded beyond the local surroundings to benefit a larger cross section of the society. The impact assessment of the CSR programs is a valuable input for further refining the policy and strategies of CSR. 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.

Case Studies

NALCO ki Laadli

National Aluminium Company Limited (NALCO), the Navratna CPSE under Ministry of Mines, Govt. of India, has been selected for the prestigious President's Award for Excellent CSR. Corporate Affairs Department, Govt of India, has selected NALCO for this award at the national level for introducing and implementing schemes like Nalco ki Ladli.

The Scheme provides adoption of poor girl students to enable them to study and settle in life. At present, NALCO has adopted 416 poor girl students from 66 villages Angul and Damanjodi sectors in 45 schools. The scheme promotes Hon'ble Prime Minister's call for Beti Bachao, Beti Padhao. Under this scheme, which was launched in the year 2015, NALCO took great care to handpick meritorious girl children belonging to Below Poverty Line families located in periphery area of NALCO's plants in Damanjodi, Angul and Pottangi in Odisha. Apart from financially supporting the children from 8th standard to 10th standard, the Aluminium giant has gone beyond the script to empower the child.

To ensure a holistic approach to education, beneficiaries are exposed to various programmes and co-curricular activities organized by NALCO from time to time, including sports activities, workshops, seminars and celebration of various



Nalco ki Ladli Scheme to encourage education

events. NALCO has plans to scale up the scheme at Pan India level covering poor girl children of Odisha, aspirational districts of the country and NALCO's peripheral villages. CSR experts say the scheme will immensely contribute for girl child education & women empowerment.

With a view to augment the scheme, NALCO has launched an innovative Employee Social Responsibility (ESR) programme recently, which offers employees a satisfying way to meaningfully contribute towards social causes. Under this scheme, the employees of the company get a chance to adopt the Ladlis and support their education. This programme will enable the Company to augment the existing Corporate Social Responsibility (CSR) program with ESR through direct participation of employees

Lightening up remote villages through Solar Power

Background

Many villages in Koraput district are in remote areas with difficult terrain. These areas are underdeveloped, basic amenities like electricity are lacking. Kerosene lamps are used for lighting purposes and thus there is a great deal of difficulties in carrying out household activities such as cooking, washing utensils, stitching & other chores after sunset. Most importantly it affects studies of school going children.

NALCO Foundation has been aware of this condition and making efforts to brighten the lives of these villagers. In the year 2014-15, NALCO Foundation in partnership with OREDA (Odisha Renewable Energy Development Authority) implemented the solar streetlight project in 02 villages on pilot basis and again in 2016-17, in partnership with Vincent covered another 08 villages under solar streetlight project. But due to lack of post-installation maintenance services by the project partners success could not be sustained.

Implementation Methodology

Through the community engagement mechanism NALCO Foundation obtained the dire need of electricity for basic household appliances as well as street lighting. A baseline survey was conducted for need assessment with the support of people representatives and villagers. During this process the team realized that there is a need of solar lighting in these villages to improve their lives and enhance their effective working hours. NALCO Foundation organized

Project Challenges

- Lack of transportation facilities of equipment and accessories to the villages from nearest road link.
- Language barriers between villagers & staffs of implementing agency and NALCO Foundation.
- Lack of education & technical skills.
- Areas being Maoist affected zones.

several rounds of meeting with all the stakeholders like villagers, sarpanch, GP officials. The villagers offered their support for various activities of the project like transportation and installation.

For all important job of implementing the project, a partnership was formed with KARMA (Start-up under IIT Bhubaneswar) which promised post commissioning maintenance services also. Extensive interactions were carried out with KARMA to develop a holistic approach of the implementation of the project to deliver the intended results on a sustainable basis. A work order was issued to them in November 2018 for installation of solar home solution & streetlight as well. To overcome the language barrier, a local leader was appointed in each of the villages.

In the first phase it was planned to cover 9 villages of Pottangi and Damanjodi. The villages Ratamati, Jamukoli,

Majhiamba, Baraganda are situated in the remotest part of the district without having electricity and road connectivity and these villages were selected to be taken up in the first part. To reach the above four villages one needs to cross 3 mountains and walk for 2 to 3 Kms. It was very challenging to implement the project and ensure post installation maintenance. The day of commissioning was a memorable day for villagers as they got the first experience of electricity in their village.

In the other five villages, NALCO Foundation has a plan to install solar streetlights at the roadside of habitation area of the village. All the five villages have provided with electricity facilities by the Government but without having streetlights in functional condition. With the consent of the villagers, PRI members & OREDA, the Foundation has installed solar

streetlights in all the villages except Ambagaon during FY 2018-19.

Timely maintenance support of KARMA has created a favourable condition for NALCO Foundation to win the trust of the communities which will help in implementing the project in other villages,

Based on success in first phase, NALCO Foundation decided to install solar streetlights in 11 periphery villages of Pottangi areas. The 2nd work order was issued to KARMA on 06.02.2019. The team has successfully installed 149 streetlights in 9 villages. The Foundation has installed 41 solar streetlights in another 2 villages which has strengthened the credibility of the Foundation among the local population.

Benefits of the project

Basic lighting achieved to all houses in every village taken up in the project. This also developed entrepreneurial spirit among women. Activities such as grinding and stitching to supplement family incomes have now become part of their daily life during evening hours helped by solar lighting. Children got benefitted as they have more hours to study. Youths of villages are engaged in socializing and some productive works under the streetlights. Social functions and celebrations are being held in the evenings and nights because of the availability of lights.



Outcomes

- NALCO Foundation has successfully installed the solar streetlight & home solutions in 18 periphery villages with partner organization M/s KARMA
- The complaints regarding non-functioning of lights got addressed within 15 days.
- NALCO Foundation organized 1-day training for 40 local youths on basic repairing & maintenance of solar installations for trouble free operations of the installations with technical support of M/s KARMA.
- Overall, it is a great team effort by all stakeholder i.e. NALCO Foundation, KARMA, Villagers, PRI members, local leaders and village youth for successful intervention of the project.

Future Plan

NALCO Foundation Damnjodi has plan to cover 7 more villages under solar electrification project from Pottangi and Damanjodi periphery villages subject to clearance from OREDA Koraput.



40 numbers of youth trained on operation and maintenance of solar streetlight and solar home



Swachh Bharat Abhiyan in villages

Abbreviations

1	% - Percentage	51	kg – Kilogram
2	APH- Air Preheater	52	kl – Kilolitre
3	APS- Advanced Photo System	53	kwh - kilowatt hour
4	ASCII - American Standard Code for Information Interchange	54	kwp - kilowatt 'peak'
5	BEE- Bureau of Energy Efficiency	55	Lakh MT – Lakh Metric Tonnes
6	BPTG – Back Pressure Turbo Generator	56	LDO- Light diesel oil
7	BRR – Business Responsibility Report	57	LPG- Liquefied petroleum gas
8	CAAQMS - Continuous Ambient Air Quality Monitoring Stations	58	m ² - square meter
9	CAMPA- Compensatory Afforestation Fund Management and Planning Authority	59	m ³ - cubic meter
10	CC - Climate Change	60	MECL- Mineral Exploration Corporation Limited
11	CDA - Conduct Discipline and Appeal	61	MoEF - Ministry of Environment and Forests
12	CEMC - Centre for Envotech and Management Consultancy Private Limited	62	MoU- Memorandum of Understanding
13	CMD - Chairman cum Managing Director	63	MSEs- Micro and Small Enterprises
14	CMRI- Central Mining Research Institute	64	MSME- Micro Small & Medium Enterprises
15	CO ₂ e - Carbon dioxide equivalent	65	Mt - Metric Tonnes
16	CPCB- Central Pollution Control Board	66	Mtpa – Million tonnes per annum
17	CPP - Captive Power Plant	67	MU - Million Unit
18	CPSEs- Central Public Sector Enterprises	68	Mw- Megawatt
19	CSR- Corporate Social Responsibility	69	NALCO- National Aluminium Company Limited
20	CTE- Chief technical examiner	70	NAPCC - National Action Plan on Climate Change
21	CVC- Central Vigilance Commission	71	NIT- National Institute of Technology
22	DF Plant- De-fluoridation Plant	72	NMEEE - National Mission on Enhanced Energy Efficiency
23	DPC- Departmental promotion committee	73	No's – Numbers
24	EBIDTA- Earnings before interest, tax, depreciation and amortization	74	NOx- Nitrogen Oxides
25	EnPIs – Energy Performance Indicators	75	NRTC – NALCO Research & Training Centre
26	ERP- Enterprise Resource Planning	76	OHSAS- Occupational Health and Safety Assessment Series
27	ESP - Electro Static Precipitator	77	OSPCB - Odisha State Pollution Control Board
28	ESPs- employee stock purchase scheme	78	PAT- Perform, Achieve& Trade scheme
29	ETPL - Eligible Training Provider List	79	PAT- Profit After Tax
30	EVs- Electric Vehicles	80	PBT- Profit Before Tax
31	GHG- Green House Gas	81	PCCF- Principal Chief Conservator of Forests
32	GJ- Gigajoule	82	PFCs- Perfluorocarbons
33	gm- Grams	83	PG - Performance Guarantee
34	GOI - Government of India	84	PLK - Partially Lateritized Khondalite
35	GRI- Global Reporting Initiative	85	PWD- Persons with Disabilities
36	HCL- Hindustan Copper Limited	86	R&D- Research & Development
37	HDPE- High-density polyethylene	84	RPDAC- Rehabilitation & Peripheral Development Advisory Committee
38	HEMM- Heavy Earth Moving Machinery	87	RTDAS- Real Time Data acquisition system
39	HFO - Heavy fuel oil	88	SEBI- Securities and Exchange Board of India
40	ICAI- The Institute of Chartered Accountants of India	89	SGP- Steam Generation Plant
41	IDA- Industrial Dearness Allowance	90	SOx- Sulphur Oxides
42	IIM- Indian Institute of Management	91	SPCB- State Pollution Control Board
43	IIT- Indian Institute of Technology	92	STP- Sewerage Treatment Plant
43	ILO- International Labour organization	93	t CO ₂ e - tonnes of carbon dioxide equivalent
44	IP- Integrity Pact	94	t- Tonnes
45	IPCC - The Intergovernmental Panel on Climate Change	95	TII - Transparency International India
46	ISO - International Organization for Standardization	96	TISS- Tata Institute of Social Sciences
47	IUCN- International Union for Conservation of Nature	97	TOE - Tonne of Oil Equivalent
48	JV - joint venture	98	UAE- United Arab Emirates
50	KABIL- Khanij Bidesh India Limited	99	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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Thinkstep Sustainability Solutions Private Limited (TSSSPL), a SPHERA company, has facilitated in preparation of the Eighth Corporate Sustainability Report for 2018-19 in accordance with the GRI Standards: Core option, obtaining the GRI Content Index Service.



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