



Natural Capital

Conserving, Preserving and Restoring

In alignment with our strategic priority for strong ESG Commitment, we were able to position ourselves as an industry leader in aluminium in the S&P Global Dow Jones Sustainability Index Corporate Sustainability Assessment 2021, for the second consecutive year. We believe we can accelerate value creation by catering to society's increasing demand for sustainable solutions, which will benefit our Company, stakeholders and communities.

We see the need and urgency to go beyond our limits and drive a positive change through our environmental endeavours. We bolster our natural capital in alignment with our commitment to the UN Decade on 'Ecosystem Restoration'. Our key focus areas have been defined to contribute to prevent, halt and restore, the impacts that we have on the ecosystem and bring about a positive change.

Key Highlights

100%

Increase of renewable energy installed capacity from FY2020-21

18.5%

Reduction in specific GHG emissions for aluminium from base year FY2011-12

18%

Reduction in specific energy consumption for aluminium from base year FY2011-12

86%

Waste utilisation with 6 basis points increase from FY2020-21

Contributions to SDGs



Value enhancing growth

SP-3

Strong ESG Commitment

Interlinkages with Material Topics and Other Capitals

Material Topics

Water Management

Compliance Management

Air Emissions

Waste and Hazardous Materials Management

Energy and GHG Emissions Management

Capitals Connected

Financial Capital

Manufactured Capital

Intellectual capital

Human Capital

Social & Relationship Capital



Our Focus Areas

Net Carbon Neutrality	Zero Waste to Landfill	Emphasis on recycled content and Circular Economy
Water positivity and Zero Liquid Discharge (ZLD)	Sustainable Mining of coal and bauxite	Biodiversity Conservation with No Net Loss

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Key Highlights:

114%

Ash utilisation with 24 basis points increase from FY 2020-21

10%

YoY increase in greenbelt

10.7 MN m³

Within and beyond fence rainwater collection storage capacity

9%

Reduction in specific freshwater consumption for aluminium from base year FY2018-19

Environment Management

Environment Governance at Hindalco starts with the Board of Directors, with the Risk Management & ESG committee providing strategic inputs. Our Apex sustainability committee, having representation from two Executive Directors, tracks implementation of sustainability initiatives in the organisation through monthly performance reviews. We have instated task forces for each material work area to implement initiatives as per the direction of the governing bodies.

We also conduct Environmental Impact Assessment (EIA) for our new operations as a regulatory requirement, as per applicable law. We continually strive to improve our environmental performance by integrating sound environmental systems and practices. We have formulated an Environment Policy and Sustainability Policy to ensure our compliance. During the reporting period, we faced two incidents of environmental non-compliance. However, no penalty was paid, and as a mitigation strategy, corrective actions have been taken. Further, all our operations are running with necessary permits and clearances.

We have undertaken TCFD based assessment to identify the climate related risks and opportunities to align our business strategy to the global climate transition, and the details of the same can be found on our website with our detailed TCFD report. We have ISO 14001:2015 certification for all sites of Hindalco. In FY2021-22, we spent ₹413.9 Crore in Capex and ₹601.1 Crore in revenue expenditure on Environment management. At Novelis, we spent \$16 Million (₹121.5 Crore) in Capex and \$2 Million (₹15.2 Crore) in operational expenditure on environment management.

Towards Decarbonisation

With global temperatures rising and climate impacts becoming more evident, there is an urgency to act. Acknowledging the energy-intensive nature of our business, we at Hindalco believe that our decarbonisation strategy will enable us to contribute towards the global commitment of limiting global warming to 1.5 degrees Celsius. We have started our journey towards Net Carbon Neutrality and aim to achieve it by 2050. In line with this target, we aim to reduce the specific energy consumption and specific GHG emissions by 25% by 2025

from the base year of FY2011-12. For our Novelis operations, we plan to reduce the carbon footprint by 30% by 2026 and reduce energy intensity by 10% by 2026.

The path towards decarbonisation has opened a diverse pool of opportunities for us. The levers on which we are relying for decarbonisation are energy mix and energy efficiency, increasing focus on value-added products and product stewardship. We are tapping opportunities for increasing renewable energy generation, improving energy efficiency through innovative projects and exploring modern technologies like green hydrogen, low carbon fuels, and Carbon Capture Utilisation and Storage (CCUS). We are expanding downstream manufacturing capacity to develop value-added products that utilise less energy and have much less impact over their lifecycle. We are also accelerating the development of low-carbon products to cater to upcoming markets.

Energy Mix and Energy Efficiency

Focus on Downstream Expansion

Product Stewardship

Internal Carbon Pricing

Internal Carbon Pricing (ICP) is an effective tool for managing carbon risk and opportunities, and to enable more carbon efficient projects to get approved through the investment decision process. We have adopted the ICP mechanism to monitor the cost of carbon. This initiative will help us to prepare for upcoming regulations, Emission Trading Schemes (ETS), Carbon Tax and taking investment decisions related to low carbon growth initiatives.

We initiated a solar project at Bagru with a capacity of 500 kWp with 390 kWh of battery storage. Before the initiation of the project, we used the ICP tool to calculate the Internal Rate of Return (IRR) and Net Present Value (NPV). With the ICP tool, our IRR and NPV increased, and the project got a boost in return metrics which made approvals easier. The ICP tool considers the direct returns from the project, hidden savings/cost from fuel, electricity, and hidden savings/costs of carbon.

Energy Consumption

It has been a fruitful year for us with the production and sales figures soaring at an all-time high. The total energy consumption for Hindalco and Novelis amounted to 310.49 Million GJ in FY2021-22.

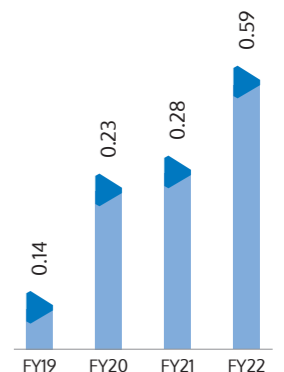
Our Hindalco operations consumed 270.8 Million GJ of energy in FY2021-22. Out of the total energy consumption, 96% was by our aluminium and mines operations and 4% by our copper operations. We purchased 0.13 Million GJ of renewable energy and around 8.03 Lakh Non-solar REC & 0.25 Lakh Solar REC in FY2021-22. Six of our sites are certified with ISO 50001 i.e. Energy and Carbon Technical standard.

We took several initiatives to increase the share of renewable energy at Hindalco. In FY2021-22, we added 51 MW of renewable energy capacity, taking the total installed capacity to 100 MW. We are also in the process of executing 24 MW clean energy projects and finalising another 55 MW of projects. Our target is to expand the renewable energy capacity to 300 MW by 2025, including 100 MW with storage. We are also planning to take up projects on a large scale through third-party round-the-clock renewable power sourcing, to the tune of 100-300 MW in the near future.

Our Novelis operations consumed 39.69 Million GJ of energy. The increased energy consumption was due to the expansion of our global operations. To reduce the energy consumption from conventional fuels, we are in the process of preparing a roadmap for renewable energy consumption. We have also carried out site assessment for Photovoltaic (PV) panel installation. We plan to implement two new renewable projects in the upcoming future.

Renewable Energy Consumption

(Million GJ)



Year	(Million GJ)			
	Renewable Energy	Non – Renewable Energy	Total	
FY2018-19	Hindalco	0.14	276.64	276.78
	Novelis	-	30.27	30.27
	Total	0.14	306.91	307.05
FY2019-20	Hindalco	0.23	272.73	272.96
	Novelis	-	30.51	30.51
	Total	0.23	303.23	303.47
FY2020-21	Hindalco	0.28	254.90	255.18
	Novelis	-	37.28	37.28
	Total	0.28	292.18	292.46
FY2021-22	Hindalco	0.59	270.21	270.80
	Novelis	-	39.69	39.69
	Total	0.59	309.90	310.49



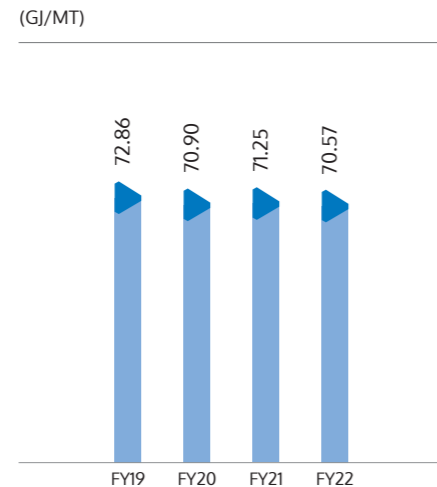
Solar plant at Aditya

Energy Type (Million GJ)		Fossil Fuels	Electricity Purchased	Renewable Energy source	Steam/Heating/Cooling and Other Energy (Non-Renewable) Purchased	Total Non-Renewable Energy (Electricity and Heating & Cooling) Sold
Year						
FY2019-20	Hindalco	273.79	3.03	0.23	0.002	4.1
	Novelis	21.55	8.69	0	0.27	-
	Total	295.34	11.72	0.23	0.27	4.1
FY2020-21	Hindalco	255.65	1.9	0.28	-	2.7
	Novelis	25.64	11.42	-	0.21	-
	Total	281.29	13.32	0.28	0.21	2.7
FY2021-22	Hindalco	269.72	2.68	0.59	0.01	2.2
	Novelis	29.34	10.05	-	0.3	-
	Total	299.06	12.73	0.59	0.31	2.2

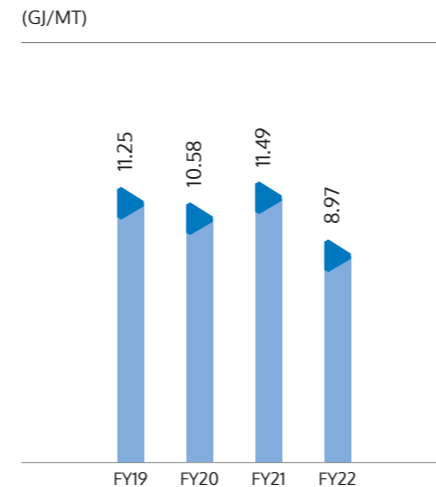
Energy Intensity

We measure specific energy consumption for our aluminium and copper operations. For aluminium, our specific energy consumption is the energy consumed per tonne of primary aluminium across our smelter, alumina refinery and anode plant operations. For copper, our specific energy consumption is the energy consumed in copper operations per tonne of copper cathode produced. Our efforts to increase the operational efficiency in aluminium and copper verticals have resulted in reduced specific intensity for aluminium and copper.

Energy Intensity Aluminium (GJ/MT)



Energy Intensity Copper (GJ/MT)



Emission Management

Reducing energy consumption is important for reducing GHG emissions, but we aim to go beyond. We have initiated projects for transition to low emission fuels and are working with the public sector to ensure availability of such fuels at the sites. We are planning to operate a portion of our smelter operations at Aditya using LNG in place of coal at the power plant.

To strengthen the monitoring of our emissions, we have started monitoring emissions for mines along with the aluminium and copper manufacturing processes. Along with Scope 1 and Scope 2, we also have started monitoring Scope 3 emissions for our aluminium operations. Scope 3 emissions are more material to our downstream operations. In FY2021-22, total GHG emissions at Hindalco were at 27.14 Million tCO₂e for Scope 1 and Scope 2. The rise in our GHG emissions is due to the expansion of the Utkal alumina refinery. We monitored Scope 3 emissions for three downstream plants in five categories which were found to be material. These include purchased goods and services, fuel and energy-related activity, upstream transportation and distribution, waste generation and transportation and downstream transportation and distribution.

In FY2021-22, the GHG emissions for our Novelis operations were at 2.3 Million tCO₂e for Scope 1 and 2 and 17.92 Million tCO₂e for Scope 3. The rise in emissions is due to the expansion of activities at Novelis. Though, with the use of recycled aluminium, we avoided 16.7 Million tCO₂e emissions in FY2021-22.

Together at Hindalco and Novelis, our GHG emissions amounted to 29.47 Million tCO₂e for Scope 1 and Scope 2 and 17.92 Million tCO₂e for Scope 3.



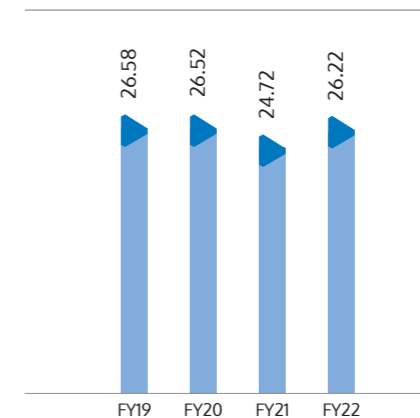
Pear plantation at Samri mines

Emissions - Hindalco (Million tCO ₂ e)					
Year	Scope 1		Scope 2		Total (Scope 1 + 2)
	Aluminium + Mines	Copper	Aluminium + Mines	Copper	
FY2018-19	26.07	1.15	0.51	0.04	27.77
FY2019-20	25.94	1	0.58	0.11	27.63
FY2020-21	24.33	0.83	0.39	0.04	25.59
FY2021-22	25.76	0.79	0.45	0.14	27.14

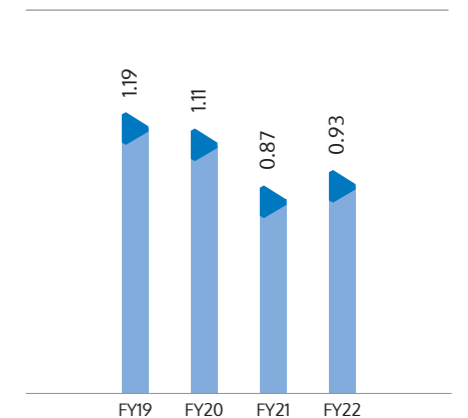
Emissions - Novelis (Million tCO ₂ e)				
Year	Scope 1	Scope 2	Total (Scope 1 + 2)	Scope 3
FY2019-20	1.38	1.12	2.5	1.85
FY2020-21	1.48	1.12	2.60	11.82
FY2021-22	1.39	0.91	2.3	17.92*

*Novelis has started tracking Scope 3 emissions of several new categories resulting in the increase

GHG Emissions - Aluminum + Mines (Million tCO₂e)



GHG Emissions - Copper (Million tCO₂e)



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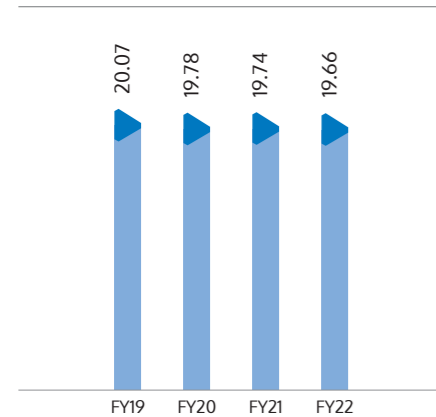


GHG Emission Intensity

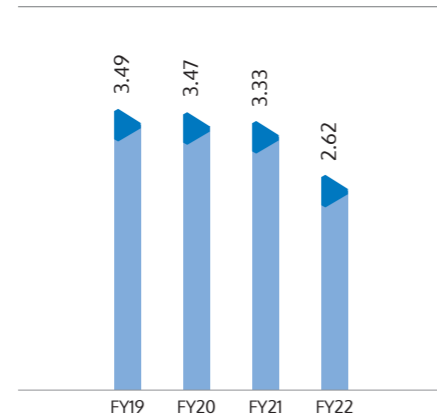
We report GHG emission intensity for our aluminium and copper operations including downstream. Our GHG emission intensity can be seen decreasing due to various efficiency measures taken at our plants.

The GHG emission intensity at Novelis amounted to 5.34 tCO₂/MT, which is higher compared to FY2020-21. We are taking measures to reduce the emission intensity as we expand.

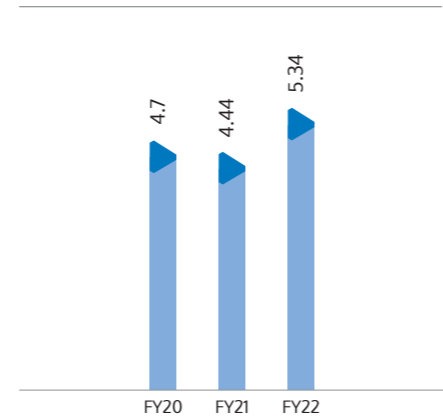
GHG emission intensity - Aluminium (tCO₂/MT)



GHG emission intensity - Copper (tCO₂/MT)



GHG emission intensity - Novelis (tCO₂/MT)



Stack Emissions

Our non-GHG air emissions occur because of burning of fuel and in the production process itself. Our aluminium smelting process contributes to fluoride emissions while the burning of fossil fuels contributes to Oxides of Sulphur (Sox), Oxides of Nitrogen (NOx) and Particulate Matter (PM). Hence, we monitor these pollutants regularly for processes and fuel consumption as part of our operations. We track emissions through the Continuous Emission Monitoring System (CEMS) and by NABL accredited third parties on a regular basis.

Pollutants	Air Emissions ('000 MT)							
	Hindalco- Aluminium			Hindalco- Copper			Novelis	Hindalco + Novelis
	Process	Fuel	Total	Process	Fuel	Total	Total	Total
Oxides of Sulphur (Sox)	6.43	70.23	76.66	0.48	0.38	0.85	0.17	77.68
Oxides of Nitrogen (Nox)	4.25	28.65	32.90	0.00	0.12	0.12	2.23	35.25
Total Particulate Matter (PM)	2.21	7.10	9.31	0.09	0.12	0.22	0.73	10.26
Fluoride	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.05



Novelis' Ulsan plant in South Korea

We carry out ambient air quality assessments as fugitive emissions are material in the upstream plants. We calculate Air Quality Index (AQI) and ensure that the index stays within healthy limits so there is minimum impact on the workforce and the communities at large.

We are taking up several projects to minimise emissions from our operations. We are installing pilot Flue Gas Desulphurisation (FGD) units at Mahan, Aditya, and Renusagar. For the first time in India, Mahan and Aditya, will use semi-dry technology from Black and Veatch which consumes less water.

At Renusagar we will use catalyst-based technology from WL Gore, US, which will be the first large-scale implementation in the world. We are also finalising the pilot unit for Utkal. We are deploying automatic lime feeding system for lime dosing at Hirakud and Muri power plants. These projects have a committed cashflow of over ₹400 Crore, and we are conceptualising other projects worth ₹2,500 Crore for the cause.

At Ulsan Aluminium plant of Novelis, we have Regenerative Thermal Oxidizers (RTOs) to reduce Total Hydrocarbon (THC) emissions. Since the installation, the THC emissions have reduced to

non-detectable levels. We also have Selective Catalytic Reduction (SCR) at Ulsan Aluminum plant to reduce NOx (nitrogen oxide) emissions. Our NOx emissions have reduced from an average of 157 ppm prior to the installation of SCR, to an average of 39 ppm since the installation of SCR.

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MEASURES TO REDUCE EMISSIONS AT BIRLA COPPER

At Birla copper, we have a captive thermal power plant (CPP). To store the different types of coal for the power plant, we have a coal yard with 1 Lakh MT of capacity. We consume 30,000 MT of imported coal every month at a gross calorific value of 5,500 kcal/kg. The day-to-day handling of coal leads to fugitive dust emissions. To tackle fugitive emissions and improve the air quality, we have taken various initiatives at the coal yard.

We have installed windscreen of approximately 1,000 metres in the

periphery of the coal yard to contain the dust emissions from spreading. We have installed a water tank to store cooling tower blowdown water, having high turbidity. We reuse this water in the sprinkler system, where we have installed sprinklers with 34 nozzles in the periphery of coal yard and conveyor. To reduce the emissions generated while unloading the coal we have also installed a central sprinkler system with 78 nozzles. Two anti-smog guns are in place to spray water and help the dust particles to settle.

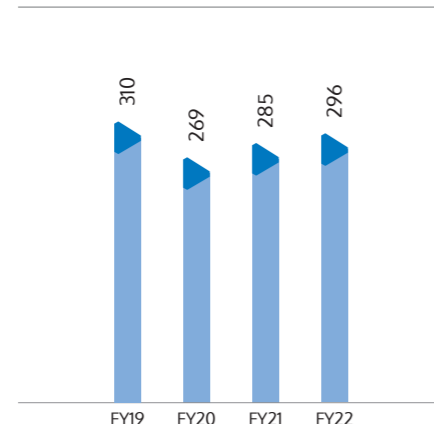
At the thermal power plant, a crusher house is the place where the coal is crushed into a particular size. The crusher house is one of the sources of high fugitive dust emissions, which is why we have installed screens around the house to reduce the emissions. We have also installed an automated lime feeding system to control SOx coming out of the CPP stack.



Perfluorocarbon (PFC) Emissions

PFC emissions represent PFC kg CO₂ eq per tonne of aluminium produced. Due to the technological challenges in smelter potlines, we observed higher PFC generation. To reduce the PFC emissions, we have taken several initiatives on better process control. We are also collaborating with Aditya Birla Science and Technology Company (ABSTC) for the reduction of Anode Effect Frequency (AEF) by changing the process control logic and implementing a programmable logic controller.

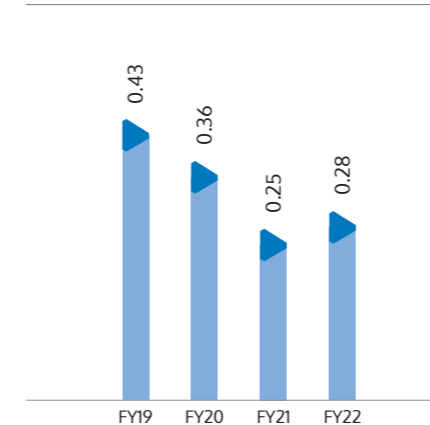
Direct PFC emissions (kg PFC / MT)



Ozone Depleting Substances (ODS)

We contributed 0.28 kg of CFC-11 eq ODS during FY2021-22 which is slightly higher than FY2020-21. The major contributor to this was the replenishment of fire retardants and refilling of gases in Air Conditioning systems.

Ozone Depleting Substances (kg of CFC-11 eq)



Initiatives for Energy and Emission Reduction

In FY2021-22, we at Hindalco took 144 initiatives across our sites which resulted in saving a total of 28,89,926.45 GJ of energy and 5,43,327.38 tCO₂e of emissions.

Our capital expenditure for these projects account for ₹259.5 Crore which resulted in a cost-saving of ₹146.75 Crore. At our Novelis operations, we took 26 new projects with a capital expenditure of \$5.9 Million USD (₹44.78 Crore) which resulted in energy saving of 211.75 GJ and emission saving of 12.36 tCO₂e. It also resulted in saving \$3.1 Million (₹23.53 Crore)

Total Projects taken at Hindalco and Novelis- 170

28,90,138.20 GJ Energy Saved	5,43,339.74 tCO ₂ e Emissions Saved	₹170.28 Crore Cost Saving
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Perform, Achieve and Trade (PAT)

During FY2021-22, Hindalco received 1,91,171 ESCerts (Energy Saving Certificates) for surpassing target reduction of PAT Cycle-2 (Assessment year - FY2018-19) in which seven units including Utkal Alumina were involved. In this cycle, a net Energy Saving of 0.39 Million TOE (MT of oil equivalent) and an overall reduction of 8.9% was achieved against a target of 4.7%. Hirkud unit had fallen short of the target in Cycle-1 primarily due to plant disruption caused by the flood, while surpassed target in Cycle-2. While Belagavi unit fell short of the target in Cycle-2, actions have been

initiated to meet the target in next cycle (assessment year FY25).

Aditya Aluminium unit was included in PAT Cycle-3 (based on its year of commissioning) and for which M&V (monitoring and verification) audit was under taken in FY21. This unit has also surpassed its target and the audit report is currently with BEE for final approval. The next applicable cycle is Cycle-7, for which targets have been announced and assessment year is FY25.

Designated Consumers	Cycle I	Cycle II	Cycle III	Cycle VII
Renukoot	■			
Hirkud	■			
Muri				■
Belagavi	■			■
Taloja				
Mahan		■		■
Utkal				■
Aditya			■	

■ Included in PAT cycle



Novelis' recycling plant in Nachterstedt, Germany

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ELECTRIC FORKLIFTS AT MAHAN

At our Mahan plant, we produce more than 360+ kt of metal every year which is then converted into various products in the cast house. At the cast house, we produce more than 1,000 MT of molten metal every day. To process the material at various stages, we use

58 different vehicles. These vehicles are a major source of consumption of non-renewable fossil fuels like diesel. Every year, these vehicles consume diesel worth ₹5 Crore and contribute to 1,955 MT of CO₂ emissions. To solve this problem, we introduced electric

forklifts which are easy-to-use, have high capacity and stability, and are low-maintenance vehicles. With the introduction of these electric forklifts, we had an annual cost saving of ₹3 Lakh and 19.5 MT less CO₂ emission.



ENERGY EFFICIENCY MEASURES AT CAPTIVE POWER PLANT (CPP) CRITICAL AREA, MAHAN

Due to the settling of coal ash and temperature change in the CPP control area at Mahan, the conventional lighting system gets damaged frequently. The frequent damage affected the lux (Luminous intensity) level at the plant. We decided to replace the conventional lighting with LED to maintain the lux level and reduce the emission footprint. With the replacement, we obtained a desired level of lux. In FY2021-22, CPP area had the lowest auxiliary power consumption which resulted in saving 9,89,124 kWh of power and a cost saving of ₹29.5 Lakh.

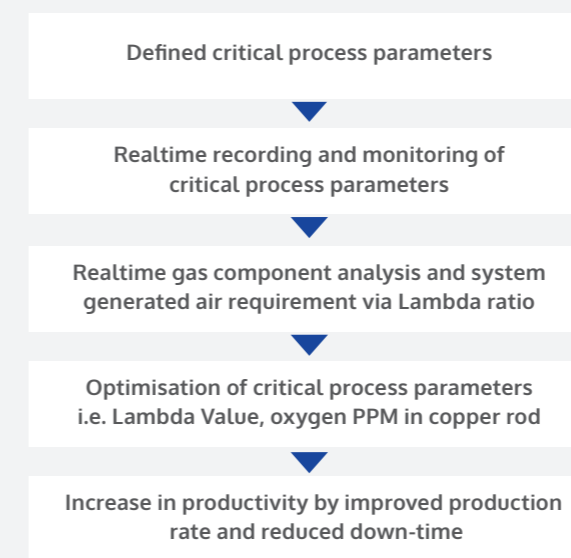


ENERGY EFFICIENT PROCESS FOR COPPER ROD PRODUCTION

At the Continuous Cast Copper Rod (CCR) Plant at Birla Dahej, there is a shaft furnace where the solid copper cathode is converted into molten copper. We use Liquefied Natural Gas (LNG) as a source of energy for

the copper cathode melting. The shaft furnace has 19 gas-fired burners divided in Row-A, Row-B and Row-C to melt the copper cathode. The molten copper metal is then converted into a continuous solidified cast bar,

which undergoes rolling process and converts the cast bar into final finished rod of different sizes. To reduce the LNG consumption in furnaces and increase productivity, we adopted a methodology as follows.



With this initiative, we reduced the LNG consumption by 6.4% from Planning and Budgeting (P&B) target of 39 SCM/MT to 36.52 SCM/MT in FY2021-22. This resulted in a total cost saving of ₹1.46 Crore from P&B cost.

ENERGY SAVING USING COPPER INSERT COLLECTOR BARS IN POTLINE

With the aim to reduce carbon footprint and to improve pot cell performance, Aditya Aluminum collaborated with ABSTC and initiated a project of low energy lining in the copper insert collector bar.

As copper is more conductive than mild steel, we changed the collector bar design and material of construction. With the use of copper in the collector bar, the horizontal current is reduced which helped us in running at a lower specific energy consumption. The

use of copper also helped reduce the cathode voltage.

At Aditya, we seal the copper collector bar's cathodes in the plant. The process goes through various steps of cleaning (shot blasting), pre-heating and sealing. Both the copper collector bars and the cathodes are pre-heated separately. After the pre-heating process, the collector bar is sealed with the cathode using cast iron. The process is carried out at temperatures of 1320°C-1380°C. The modified

lining composed of insulating bricks, refractory bricks and cathodes is done diligently in the lining shop.

We started the pilot project at three pots and with the consistent results we replicated the same in 228 pots in FY2021-22. With this initiative, we reduced the DC power consumption to 13,266 kWh/t which is 260 kWh/t lower than the standard design. The efficiency of copper insert collector bar pots is 94.8% which is 1% higher than the standard design.

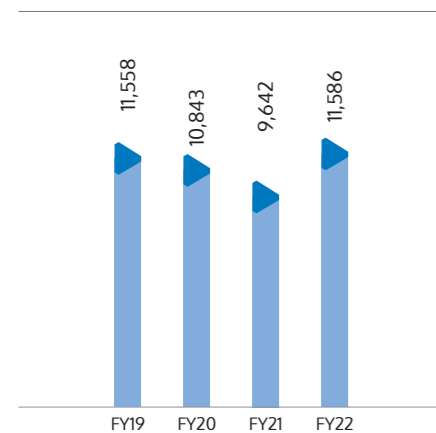
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Responsible Consumption

Natural raw materials are elementary to our business. While consuming these resources, it becomes important for us to optimise their utilisation to bring about efficiencies that synergistically reduce costs. In FY2021-22, we consumed 11,586 kt of raw material. Expansion in our business and production has led to an increase in consumption compared to the previous year, with major contribution from the increased bauxite consumption to support the expanded alumina production.

We consumed 6.7 kt of packaging materials of which wood accounted for 4.3 MT. We recycled 7,372 MT of aluminium scrap procured from the external market and reused it in our operations. We are continuously exploring new markets for the recycling of aluminium and copper scrap.

Raw Material Consumption (000MT)



At our Novelis operations, we consumed 3,968 kt of raw materials out of which 2,214 kt was recycled material and 1,754 kt were other materials like alloys and sheet ingot. In FY2021-22, we used 57% of the recycled material in our operations, primarily using used in beverage cans.

Material type ('000 MT)	FY2018-19	FY2019-20	FY2020-21	FY2021-22
Bauxite	8,987.99	8,511.77	8,097.12	9,598.77
Aluminium Fluoride	21.20	19.44	17.82	21.78
Calcined Petroleum Coke	473.73	518.99	447.70	465.67
Caustic Soda	276.88	222.49	206.24	254.36
Pitch	105.74	113.05	100.69	137.77
Ammonia	77.11	56.10	1.02	0.02
Rock Phosphate	480.57	363.77	-	-
Copper Concentrate	1,134.83	1,037.30	770.90	1,108.06

EFFORTS TO OPTIMISE NATURAL RESOURCE CONSUMPTION

We consume around 33,818 wooden pallets every year at Renukoot. With the aim to preserve our natural resources and to minimise our carbon footprint, we introduced an innovative design for the pallets which was successfully implemented in FY2021-22. We started by analysing the design of pallets used by other plants and used Computer-aided Design (CAD) to develop new and efficient structural models. We successfully developed a design with the same loading strength as the older one, and implemented the modified pallet in WRM coil packing. This project helped us achieve a saving of 5 kg or 0.23 cu.ft. of wood per pallet. The total saving of wood, thus accounted to 7,778 cu.ft. and cost savings of ₹34.8 Lakhs.

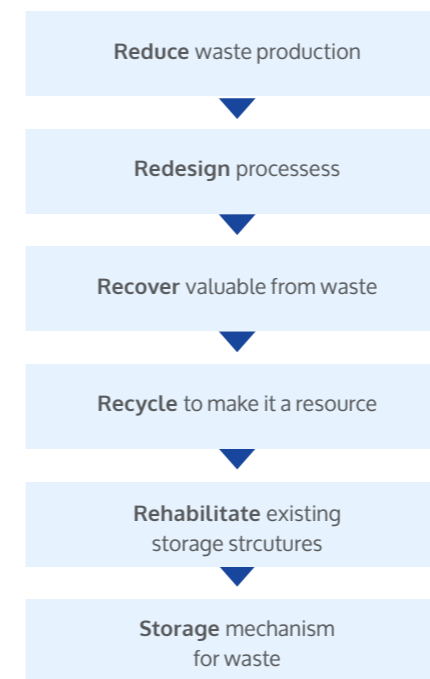
We also carried out a study on the production data and size of the billets used throughout the year. Feasibility was assessed to recollect the used wood runner between Renukoot and Mahan in every two months. After carrying out the studies, we started reusing the wood runner for billets and we were able to save ₹18 Lakh in FY2021-22.

Altogether with above mentioned initiatives for reduction of wood consumption, we were able to save 641 trees in FY2021-22, which resulted in cost saving of ₹52.8 Lakh.



Waste as a Resource

We make conscious efforts to manage our waste in an environment-friendly manner. We follow 5R+1S approach (Reduce, Redesign, Recover, Rehabilitate, Recycle, and Store) to achieve our aim of becoming Zero Waste to Landfill by 2050. At Novelis, our target is to reduce waste to landfill intensity by 20% by 2026.



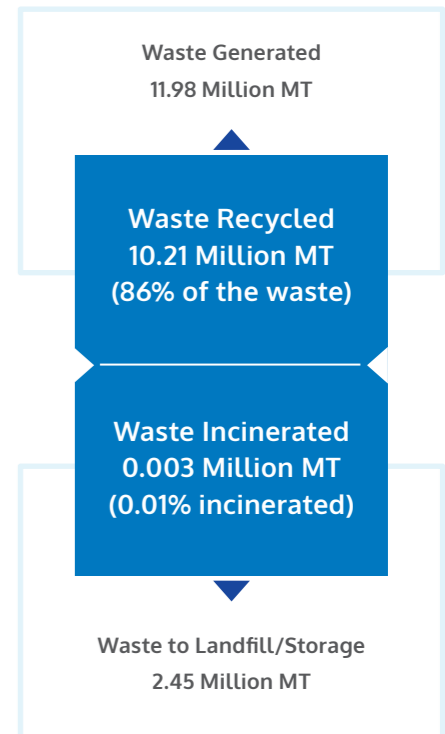
We have instated a task force for waste management at every unit. Our Waste Management Task Forces (WaMTF) have team members from different line functions who streamline the waste management process and prepare emergency preparedness and response plan. The WaMTF also identifies alternative technologies for waste management with support from the corporate leads. Our corporate sustainability team, including the Chief Sustainability Officer (CSO) conducts half-yearly reviews of the waste-related practices and projects.



Flyash is transported to cement plants via covered rakes

At Novelis, we have established a global committee for waste reduction. The waste data is entered into digital database and validated on quarterly basis by the EHS team. We conduct annual onsite audits to ensure ground implementation of waste related projects identified and implemented by the team.

In FY2021-22, our total waste generation for Hindalco and Novelis accounted for 11.98 Million MT out of which 11.6 Million MT was generated at Hindalco and 0.38 MT was generated at Novelis. Major wastes generated by our aluminium business are bauxite residue, fly ash, bottom ash, Spent Pot Lining (SPL), aluminium dross and vanadium sludge. Our copper business generates copper slag and fly ash as major waste. A total of 86% of our total waste was recycled. To reduce waste generation, we are improving efficiency across the value chain, some of these initiatives are mentioned in this report.



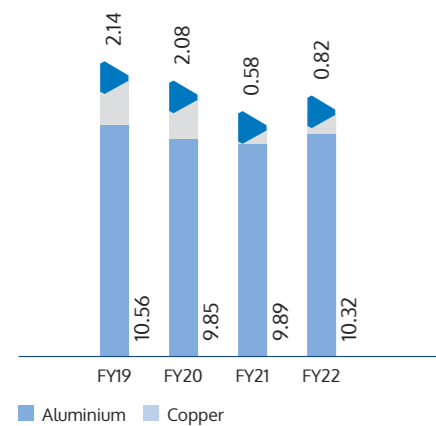
Natural Capital

Non-Hazardous Waste

In FY2021-22, we generated 11.44 Million MT of non-hazardous waste at Hindalco and Novelis. Over 93% of the non-hazardous waste generated comprises ash and bauxite residue categorised as HVLE (High Volume Low Effect) waste. The increase in waste generation is attributed to the expansion at our Utkal Alumina refinery. We are running multiple research projects to further increase the bauxite residue utilisation, especially at Utkal alumina, including road development, mine backfilling, polymerised bricks, soil amelioration and carbon capture projects.

In FY2021-22, eight of our sites have become Single-Use Plastic Free, certified by the Confederation of Indian Industry (CII). We are planning for another six sites to get certified in FY2022-23. As per Plastic Waste Management Rules on Extended Producer Responsibility, we are registered as brand owners and are complying with relevant EPR regulations and plastic recycling, with 100% of plastics being brought into the market, getting recycled through authorised recyclers. Our e-waste constitutes electrical and IT waste, which we sell to the authorised vendors. We also dispose-off the e-waste that we generate to authorised vendors for recycling and reuse.

Non-hazardous Waste (Million MT)



Our Municipal Solid waste (MSW) is generated by domestic households and canteens. We faced non-compliance for the burning of MSW and inadequate measures taken to control the fugitive emission from the raw material handling and fly ash transportation areas at Renusagar under the Air (Prevention and Control of Pollution) Act, 1981. We were levied ₹0.28 Crore; no fines were paid, and we took corrective actions. We initiated a proper mechanism for waste

segregation and disposal. The waste is segregated into compostable and non-compostable waste and we convert compostable waste to manure for use in our greenbelts, and send the non-compostable waste for further processing with a focus on recycling. To control the fugitive emissions, we installed water sprinklers and rain guns in the Coal Handling Plant (CHP) and initiated fly ash transportation by closed vehicles.

Type of Utilisation (Million MT)	Hindalco			Novelis		Total
	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2021-22	FY 2021-22
Recycled & reused	7.73	7.78	9.31	9.61	0.29	9.9
Landfill/TSFD	0.01	0.01	0.01	0	0.03	0.03
Stored in approved structures	5.69	4.28	2.14	2.31	0	2.31
Incineration	0	0	0	0	0	0
Total	13.43	12.07	11.46	11.92	0.32	12.24



Hindalco has industry leading waste utilisation practices

Eight Sites Certified as Single Use Plastic-free by CII



Hazardous Waste

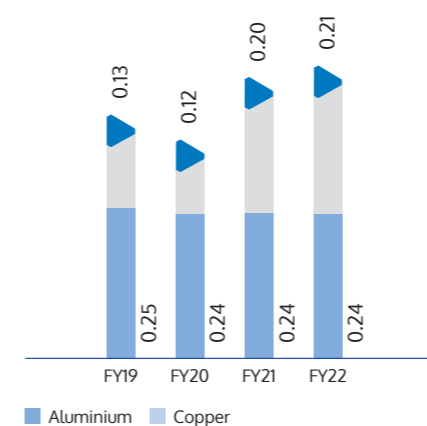
In FY2021-22, we generated 0.52 Million MT of hazardous waste at Hindalco and Novelis. All the hazardous waste is handled with proper care, following applicable regulations, and ensuring the safety of our people. We have been able to make breakthroughs in the recycling of hazardous waste, especially in dross and spent potline, which has resulted waste to in high utilisation.

Novelis have a Spill Prevention Performance Standard for the handling of hazardous materials. This standard also applies to the contractors. We also have the Contractor Management Performance standard and all the contractors are given training at our sites annually. We conduct third-party audits for regulatory and performance standard compliance. Each of our sites undergoes a third-party audit once every four years.



Hindalco has taken a stand to move away from landfilling

Hazardous Waste (Million MT)



Type of Utilisation (Million MT)	Hindalco			Novelis		Total
	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2021-22	FY 2021-22
Recycled and reused	0.13	0.24	0.28	0.37	0.05	0.42
Landfill/TSDF	0.09	0.09	0.08	0.09	0.007	0.097
Stored in approved structures	0.09	0.03	0.08	0.01	0	0.01
Incineration	0	0	0	0	0	0
Total	0.31	0.36	0.44	0.47	0.06	0.53

Natural Capital

Maximising Circularity

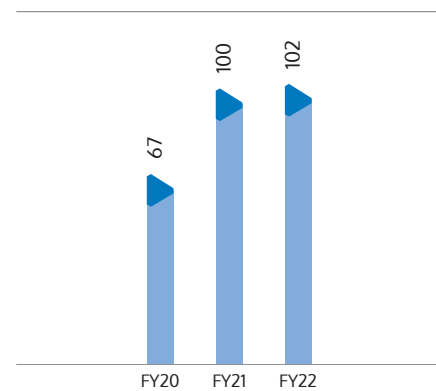
We consider waste as a resource and make efforts to maximise its use and to scale down the use of new materials, in our industry as well as the others that we collaborate with. We have partnered with several cement companies to use our ash and bauxite residue as raw materials. In FY2021-22, we reused 102% of the bauxite residue from three alumina refineries. We utilised 114% fly ash in cement making, brick making, ready-mix concretes, and filling in low lying areas inside the plant boundaries. We have also installed in-house dross processing units to increase the utilisation of aluminium dross.

Novelis is the global leader in aluminium can recycling. At Novelis, we have established a close looped recycling system, where we produce aluminium from aluminium scrap that is procured from our customers. We have carried out several initiatives to recycle and reuse waste.

To increase the recycling of the used refractory, we initiated a project at Pinda, wherein we started the proper separation of waste during the furnace rebuild. The waste refractory was sent to a new off-site facility for recycling. The recycled refractory served as a raw material for new brick products. This initiative led to the reduction of 459 MT of refractory previously landfilled and saving ₹8.58 Lakh.

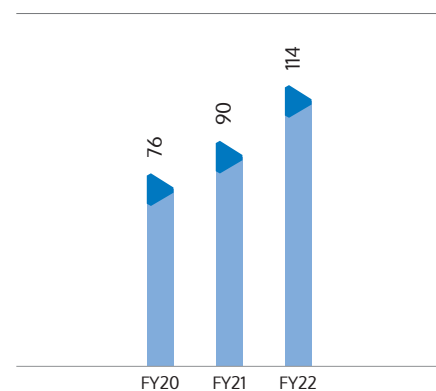


Bauxite residue utilisation* (%)



* Bauxite Residue utilisation from 3 out of 4 refineries

Ash utilisation (%)



Red mud composite bricks

REDUCTION OF HAZARDOUS SOLID WASTE AT BIRLA COPPER

The hazardous effluent generated during the copper production is transported to the Effluent treatment plant (ETP) and around 250 TPD of hazardous sludge is generated at the ETP. The hazardous waste sludge, containing Arsenic, Lead, Cadmium and Selenium, is disposed at the secured landfill sites. To reduce the volume of the effluent waste sludge at the ETP, we have developed an innovative process with the capability to reduce the waste sludge generation by 80%.

Our process involves three-stage neutralisation with selective pH control. It will generate around 60,000 MT of byproduct gypsum per annum which will be utilised as an additive in the cement plants and for the preparation of gypsum boards, plasters and blocks. We have completed the plant scale trials with the basic engineering activities.



REPLACEMENT OF SAND BY COPPER SLAG IN READY-MIX CONCRETE (RMC)

To preserve precious river sand and increase the utilisation of the Cu-slag, we initiated a project to replace the 30-50% sand in RMC with Cu-slag. Copper slag (Cu-slag) is the byproduct of the smelting process of copper and is successfully used in many other applications. In the trials, we found that 50% of the sand can be replaced in the RMC while maintaining the required strength and performance.

After the successful trial, we started the commercialisation process. We sent Cu-slag to Ultratech Cement Limited (UTCL). We follow a three-stage procedure to utilise Cu-slag in RMC applications. In the first stage, we reduce the size of the Cu-slag at the source by process modification, as finer particles are required to mix in the RMC. After the size is reduced, in the second stage we start the screening process on the rack at the copper slag yard. We have deployed a third party for taking samples from the respective sites and transporting them to UTCL. In the third stage, finer materials are mixed in RMC to match the particle size requirements

at UTCL. At present UTCL replaces 30-40% of the sand with approximately 5000 TPM Cu-slag.

We are further modifying the processes for Cu-slag application. We also carried out feasibility for copper slag size reduction through slag granulation process modification.



Natural Capital

RICE HUSK- AGRICULTURAL WASTE BECOMES SOURCE OF POWER AT HIRAKUD

Biomass co-firing, the process of supplementing a portion of coal with biomass in high-efficiency coalboilers, is one of the most effective and easily implemented biomass energy technologies. Over the past few years, it has emerged as an efficient, clean, and cost-effective method for power generation.

In December 2019, we adopted the practice of biomass co-firing using rice husk at Hirakud power plant. Rice covers about 65% of the cultivated area in Odisha, thereby making rice husk a good source of biomass. Additionally, the plant's Circulating Fluidised Bed Combustion (CFBC) Boilers, which offer multi-fuel firing capabilities, high efficiency, and low emissions of Sox & NOx, can effectively utilise a variety of coal and alternate sources of fuel. The current monthly utilisation of rice husk is 3,000- 3,500 MT – increased from 0.3% to 1.4- 1.5% in two years.

A joint team has been formed between Hirakud Power and Thyssen Krupp for detailed analysis of:

- Field Survey & Assessment of alternate fuels
- Infrastructure requirements for Incoming Storage; Testing; Final preparation and Onward Feeding
- Boilers assessment
- Risk assessment and mitigation

The initiative has resulted in 1.4% of metal production being produced with biomass. The project has brought savings in tune of ₹22 Lakh/month. This projects helps us ensure compliance, reduce GHG emissions, and provides us with a sustainable alternative to coal.



Securing Water

Water is one of the most critical shared resources of the planet and equally important for us to run our operations. At Hindalco, we understand the importance of effective and efficient use of water. We have defined a structured approach to ensure water security in areas where we operate. This is guided by our well-defined targets across all our operations.

At Hindalco, we aim to

- Achieve water positivity across our mining sites by 2025 and across all our operations by 2050
- Reduce 20% specific freshwater consumption by 2025 against the baseline of FY2018-19
- Achieve Zero Liquid Discharge status by 2025 across all our plants

At Novelis, we aim to

- Reduce water use by 10% at all our operations by 2026 from the base year of 2020

We monitor our water consumption daily through flow metres and logs. The MIS

departments at the plants regularly update the water consumption data in the business-level management system. The collated data from all the plants is then used to prepare management reports for monthly review by our senior management. We also envision creating a central dashboard and monitoring system with digital dashboards for all the units.

We have set up Water Management Task Force (WMTF) at all units with members of relevant expertise in operational, utilities, and environmental functions. WMTF identifies risks pertaining to water use and plans for mitigation by taking up projects to achieve the Company targets. The task force members hold regular meetings at unit level and present the progress of initiatives to the Chief Sustainability Officer twice every year. The targets for each site are reviewed and projections are made for the Company level targets and their progress. These include targets related to water use efficiency, as well as targets for recycling, rainwater harvesting etc.

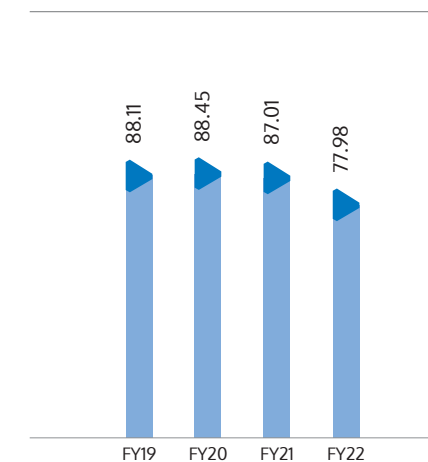
To foresee future usage and identify water stress, we use World Business Council for Sustainable Development's (WBCSD) India Water Tool (IWT) and World Resource Institute's (WRI) Aqueduct tool. These tools helped us evaluate the risk for baseline water stress, seasonal variability, flood occurrence, groundwater stress, and drought severity. We also identify critical sites to focus on with the necessary water conservation measures. We have a total of 5,885 KLD worth water efficiency projects completed, with 9,873 KLD worth of projects under implementation and 12,923 KLD worth projects being conceptualised. These new projects will enable us to achieve our water-related targets within the stipulated timelines.

Novelis has a Global Water Committee that focuses on water reduction for our processes. The Committee has regional representatives who meet monthly to implement strategic plans and discuss priorities. We track and monitor the water usage on a quarterly basis for all our plants at Novelis.

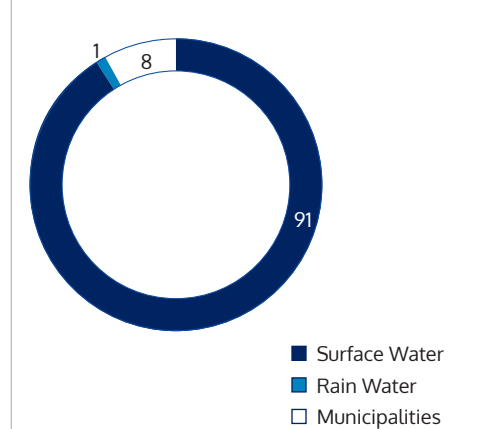
Water Withdrawal

At Hindalco, our water withdrawal accounted for 77.98 Million m³ in FY2021-22. Out of the total water withdrawal, 91% is sourced from surface water, followed by 8% from municipalities. Only 0.1% of the total water withdrawn is from the groundwater.

Water Withdrawal (Million m³)



Water Withdrawal by Source (%)



Source	Water Withdrawal (Million m ³)*		
	Aluminium +Mines	Copper	Total
Surface Water	70.92	0	70.92
Groundwater	0.09	0	0.09
Rainwater	0.57	0	0.57
Municipalities	0.13	6.27	6.40
Total Freshwater Withdrawn	71.71	6.27	77.98

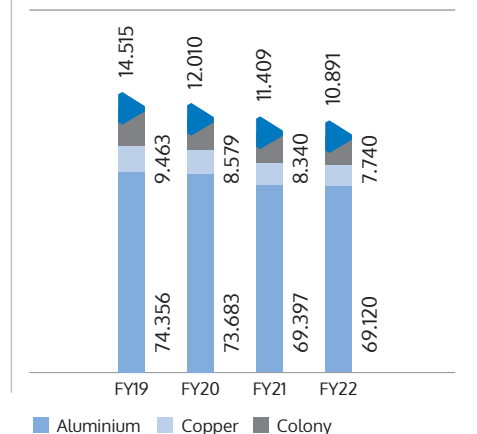
*Water Withdrawal for Novelis is the same as water consumption.

Water Consumption

We require a significant amount of water in the production process of aluminium. By design, cooling towers use a large quantity of water.

As an effort to reduce water loss due to evaporation, drift, leaks, and blowdown at cooling towers, we are exploring projects to capture the losses to reduce water use significantly.

Water Consumption - Freshwater and Recycled water (Million m³)



Natural Capital

Freshwater Consumption Aluminium, Copper and Mines (In Million m ³)				
Parameter	FY2018-19	FY2019-20	FY2020-21	FY2021-22
Total municipal water supplies (or from other water utilities)	6.2	5.60	7.96	4.99
Fresh surface water (lakes, rivers, etc.)	55.6	61.11	49.29	55.32
Fresh groundwater	0.08	0.07	0.05	0.07
Rainwater consumption	2.18	0.09	3.55	0.44
Total Net freshwater consumption	64.05	66.86	60.85	60.82

At Novelis, water is mainly used for cooling purposes, we monitor water usage at our plants quarterly. Our water consumption has increased due to water usage by eleven new plants. The increase in water consumption is also due to an increase in production by 7%.

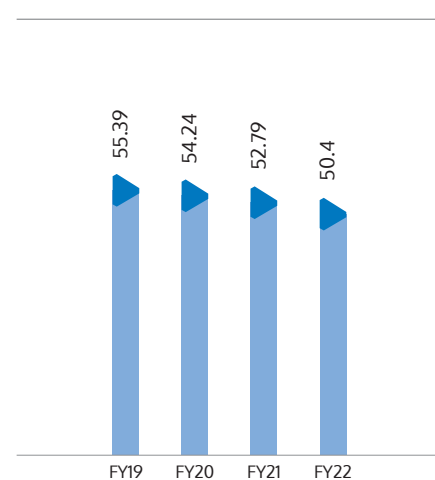
Freshwater Consumption- Novelis (In Million m ³)				
Parameter	FY2018-19	FY2019-20	FY2020-21	FY2021-22
Total municipal water supplies (or from other water utilities)	2.03	2.28	3.17	3.44
Fresh surface water (lakes, rivers, etc.)	3.13	3.26	4.35	4.22
Fresh groundwater	3.69	3.92	4.69	4.61
Total Net freshwater consumption	8.85	9.46	12.21	12.27

Water Intensity

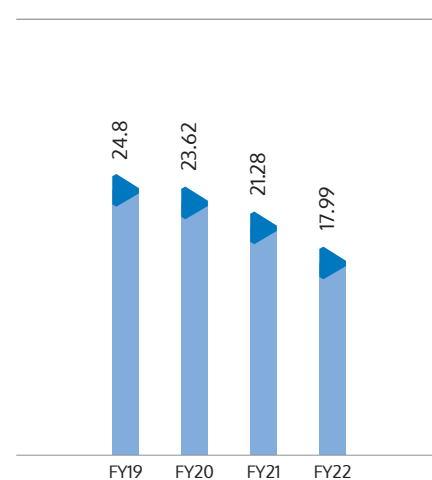
We have achieved a 9% reduction of specific freshwater consumption in our aluminium operations and a 24% reduction of specific freshwater consumption in our copper operations base FY2018-19 largely due to closure of fertiliser operation and recycling efforts. We have recalculated and restated the information provided for specific freshwater consumption for our copper plant for FY2020-21.

At Novelis, with continuous efforts, we have reduced the water intensity by 26% from FY2009-10 to FY2019-20. To further reduce the water intensity, our focus is on the optimisation of water usage at cooling towers.

Specific freshwater consumption - Aluminium (m³/MT)



Specific freshwater consumption - Copper (m³/MT)



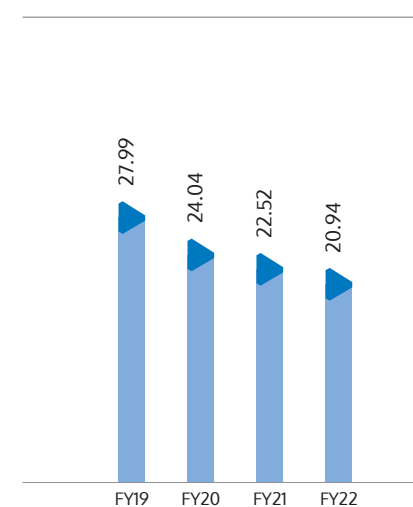
Water Recycling

We at Hindalco have adopted processes to recirculate, reuse and recycle the outlet process water to achieve Zero Liquid Discharge (ZLD) and freshwater reduction. We are constantly finding ways to make our processes more water efficient. We have identified and implemented several water recirculation projects through which we can use the outlet water of one process as input water of the other with minimal treatment. This will enable us to use less water, decreasing the loads on the water recycling systems and saving the associated treatment costs. Our refinery operations are sustainable by design, which recirculate caustic soda repeatedly through closed loop systems, reducing the freshwater top-up requirement.

In FY2021-22, we recycled 16.1 Million m³ of wastewater in aluminium and copper plants. A total of 20.94% of wastewater was recycled in aluminium operations and 20.31% in copper operations.

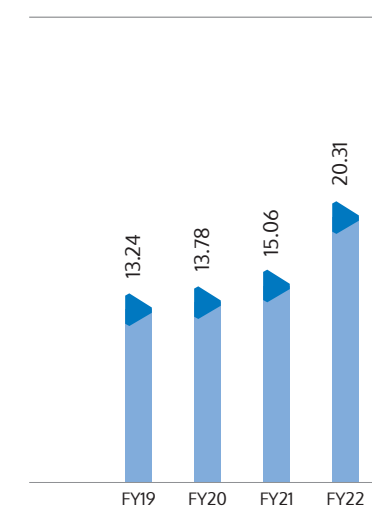
Our Dahej and Belagavi plants fall under the water stress area. We have commissioned a 700 KLD tertiary water treatment plant at Dahej, complete

Water recycled -Aluminium (%)



with Reverse Osmosis (RO) filtration and Mechanical Vapor Recompression (MVR) based thermal solution for complete reuse of treated water. We have been able to achieve over 27% reduction in specific freshwater consumption over the last year at Dahej, partly due to the decommissioning of our fertiliser operations. We plan to

Water recycled -Copper (%)



start using desalinated sea water at Dahej from FY2022-23, sourced from a local common desalination plant of GIDC. Through close looping at the Belagavi site, we have been able to achieve a 40% reduction in specific freshwater consumption from a baseline of FY2018-19. We have been well ahead of our targets at both the sites.

Natural Capital

Effluent Management

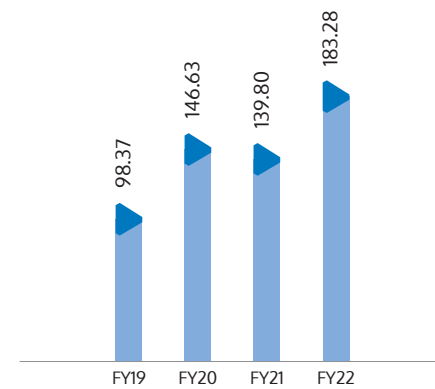
To achieve the ZLD status, we at Hindalco plan to cover one site every year till 2025. In FY2021-22, our total effluent discharge was at 340,370 m³. The increase in discharge is due to the increased production at sites and we have plans in place for these sites to become ZLD by 2025.

We follow the relevant CPCB and SPCB guidelines for effluent discharge, and ensure conformity to all the required quality parameters. Before the effluent discharge, we constantly monitor the chemical properties of wastewater such as Fecal coliform, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Soluble Solids (TSS), Total Dissolved Solids (TDS) and heavy metals as per regulatory guidelines.

At Renukoot, we faced non-compliance under Water (Prevention and Control of Pollution) Act, 1974, for not achieving ZLD conditions and discharging wastewater into the environment. We were levied ₹1.37 Crore, no fines were paid and we took corrective actions. We installed a 4,000 KLD PWRP system to resolve the issue. The treated water from the STP is used in horticulture and the rest is discharged into Murdhawa Nala.

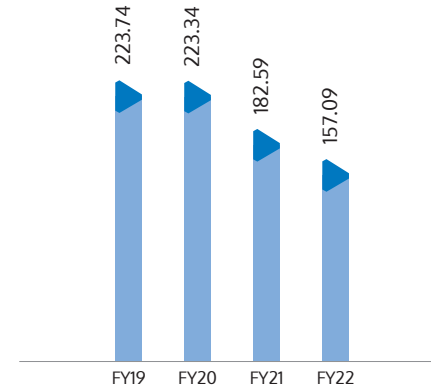
Effluents Discharge -Aluminium

(000' m³)



Effluents Discharge -Copper

(000' m³)



At Novelis' Changzhou plant in China, we have implemented ZLD, which is applied to automotive processing lines. We faced one incident where the oil and grease at Richmond Water exceeded the standards, which was resolved with immediate effect.



Local community engages in pisciculture and duck rearing in rainwater harvesting structures at Bagru mines

Discharge outlet	Effluent Discharged (m ³)	
	Aluminium	Copper
River	1,20,162	0
Industrial Drainage system	15,611	0
Deep Sea	0	1,57,093
Sanitary Sewer	3,712.74	0
Municipal WWTP	43,791	0
Total Discharged Effluent	1,83,276.74	1,57,093

Initiatives taken for Managing Water

We believe that integrated watershed management is a key aspect of water conservation. We have undertaken various initiatives as a part of our watershed management programme which include the construction of bunds, gully plugs, rainwater harvesting ponds, contours and terraces. We use harvested rainwater for our mining operations to minimise the consumption of groundwater. Our focus is on developing solutions for sustainable water management and we are collaborating with industry leaders to achieve it.

To increase the awareness of responsible water consumption and regeneration of water resources, we are working with the local communities, Gram Panchayat and several NGO's. Our CSR vertical developed infrastructure for rainwater storage outside the boundary with capacity over 3.1 Million m³. Our units have also developed structures for rainwater and raw water storage with a total capacity of 10.69 Million m³.

Structures Type	Structures at Plants (Nos)	Structures through CSR(Nos)
Check dams	26	133
Injection wells	2	-
Ponds	33	169
RC Tank	2	-
Recharge Pit	9	-
Rooftop systems	12	-
Cannel	-	2
Reservoir	-	4
WHT	-	13
Trench	-	16
Total	84	337

Natural Capital

WATER MANAGEMENT INITIATIVES AT MOUDA

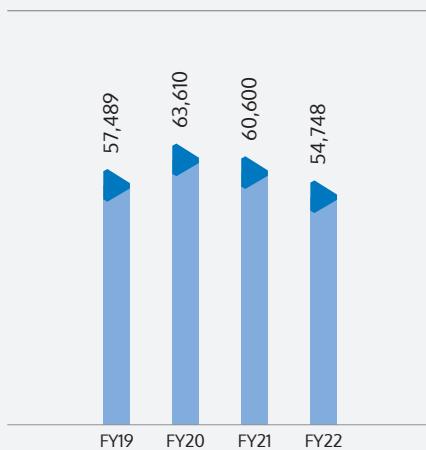


With the aim of reducing freshwater consumption, we took the following initiatives:

- Installed rainwater harvesting pond equivalent of 14 KLD; started to use treated effluent water at cooling tower
- Used recycled domestic water for construction work at the sewage treatment plant
- Started collecting and reusing RO reject water from centralised drinking water at admin, washrooms, and foil plant

With these initiatives, we were able to reduce freshwater consumption and freshwater intensity. We have reduced the freshwater intensity by 32% as compared to FY2018-19.

Water Consumption (MT)

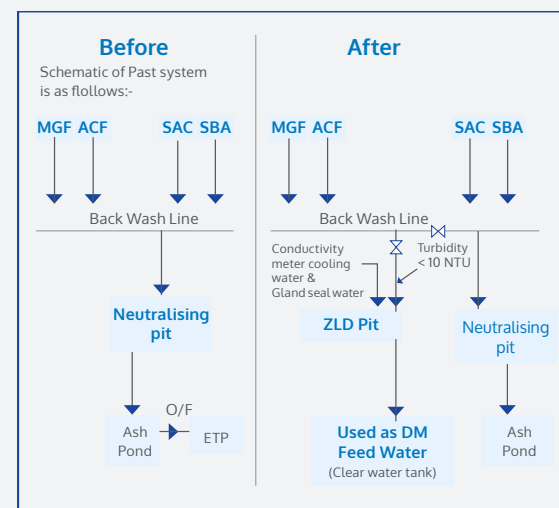


RECIRCULATION OF ACF/ MGF BACKWASH WATER AT RENUKOOT

At Renukoot, we have eight Demineralised (DM) water units with a total capacity of 390m³/hr., to meet the requirement of boiler plants. At DM units, salts from raw water are removed by using an ion-exchange chemical process. The DM water is then used as feed for boiler plants.

After 20 hours of use, the active ion concentration in the DM units reduce. So, regeneration of our DM units is done to enhance the active ion concentration. Approximately 910 m³ of water is used for regeneration and filter backwash. The backwash water from the Multi Grade filter (MGF) and Activated Carbon Filter (ACF) is turbid and acidic. So, the backwash water is neutralised at the neutralising pit, from where it used to be diverted to the ash pond, while the excess water was sent to the ETP.

We conducted a study to check the feasibility of reusing the backwash water as DM feed water. As a solution, we developed a ZLD pit to collect the MGF/ACF backwater from all the DM units. Backwash water is treated at the ZLD pit and then pumped into the clear water tank. With this initiative, our water consumption has gone down by 587 KLD and cost savings of about ₹13.39 Lakh per year have been realised.



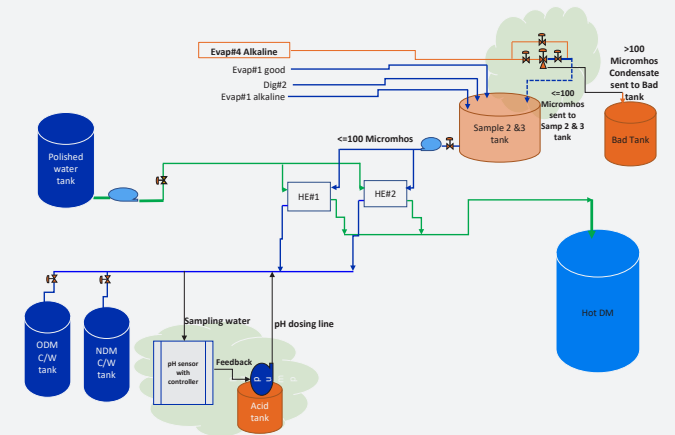
UTILISATION OF EVAPORATION # 4 ALKALINE CONDENSATE OF ALUMINA PLANT HAVING CONDUCTIVITY (< 100 MICRO MHO) AS DM FEED WATER TO BOILER

To reduce freshwater consumption and reduce the effluent load on ETP at the Renukoot plant, we developed infrastructure for pH correction system with auto controller. Initially, Evaporation # 4 Alkaline condensate of Alumina plant was sent to the 'Bad condensate tank' and then to the Effluent treatment plant. We conducted a study and found out that Evaporation # 4 Alkaline condensate having conductivity of <120 Micromhos and pH 9.8 can be used as DM water after pH correction.

To execute the process, we laid a pipeline in the boiler area and other modifications in-house. This procedure was executed in-house. We had faced few challenges during the implementation as the condensate required continuous monitoring for pH and TDS. We then diverted the Evaporation # 4 Alkaline condensate to sampling tanks 2 and 3. We conducted CRC overhauling, calibration, and modification to divert the condensate.

The initiative has led us to save 400 KLD. We are reviewing and modifying the process even further to save upto

600 KLD. Initially, the water consumption was 4,769 KLD and after implementing the project, our water consumption has gone down to 4,369 KLD. This has resulted in 8.4% freshwater reduction and cost-saving of ₹9.13 Lakh per year.



REDUCTION IN FRESHWATER CONSUMPTION IN MAHAN



With the aim to reduce freshwater consumption and contribute toward water positivity, we installed a next-generation 3D TRASAR™ Technology automatic dosing system which provides real-time monitoring for cooling water and helps to avoid fluctuations in parameters in the cooling tower. Upon commissioning this technology, we observed improved water quality and reduced blowdown in cooling towers, soft water plant cycle changed from 20 hours to 30 hours and the side stream filter back washing practice changed from a daily basis to on demand. We replaced the rusty water pipelines and closed the monitoring of cooling drift loss and water-cooling circuits.

We also conducted a water leakage audit from supply to end-user point. With the installation of this technology, we observed increased Cycle of concentration (COC), optimised chemical concentration and a 15% reduction in freshwater consumption. We saved 9,221 m³ of freshwater in FY2021-22 which resulted in a cost saving of ₹18.44 Lakh.

Natural Capital

WATER IMPROVEMENT PROJECT AT PINDA

Our approach towards enhancing water efficiency at our Pinda plant has been 3 pronged- increase the availability of water, improve the quality of water, and recycle the water.

For increasing the availability of water, we installed a new water intake

pipe in the adjacent river. With this, we assured availability of a reliable water source for our operations and processes.

To treat the water sourced from the river, we installed a new water treatment plant. The WTP removes

sediments and solids from the water which provides high-quality water and increases the water use efficiency in the plants. The WTP captures rainwater and recycles it using reverse osmosis. With these projects installed, we saved 71,893 m³/year and resulted in saving ₹1.27 Crore

Sustainable Mining

Hindalco owns and operates 17 manufacturing units and 21 operational mines across India. We operate across large areas of land, within varied habitats. We believe in harmonious co-existence with nature and all its beings and it is crucial for us to nullify any impacts that our operations may have on the health and richness of surrounding ecosystems. We work in 8,569 ha of the operational mining area in the coal and bauxite sectors.

Mining Area Details				
Parameter	FY2018-19	FY2019-20	FY2020-21	FY2021-22
Total mining area leased (Operational) (Ha)	9,977	9,278	9,133	8,569
Total area mined out (Ha)	155	132	80	106
Total area reclaimed (Ha)	156	112	86	92
Total area rehabilitated (Ha)	94	102	57	85

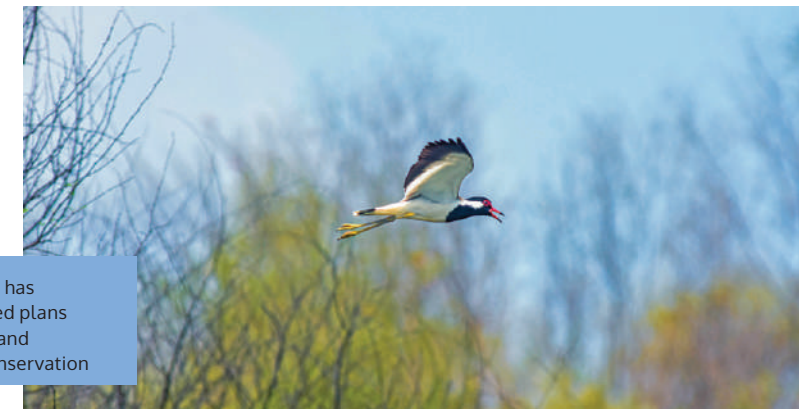
THE SUSTAINABLE MINING CHARTER

As biodiversity and natural resource preservation becomes material areas for sustainability in mining locations, so does the pre-existing poverty and poor access to health, education, infrastructure and information. The crucial role of sustainability in extractive mining needs specific, structured approach and guidelines in order to arrive at practical and long-term solutions. The Sustainable Mining Charter (SMC) embodies Hindalco's effort towards building a theme-based practical and actionable guideline for sustainability.

SMC is a guideline document to provide a structured framework for achieving sustainable mining goals in a holistic way by focusing on the ESG Framework. It also guides us how to develop Sustainability Goals for Focus/Thematic Areas and an implementation Road map to achieve these goals. Further, it has cited several case studies to provide insights into the practical aspects of implementation.

After unveiling SMC in June 2021, Hindalco has commenced its implementation. We believe that with the adoption of SMC, the management can channelise its resources and

focus on a structured way to achieve definite goals in each focus area of the mine. Besides, fulfilling the needs of the Local People, Maintaining the Environmental Conditions and Improving Productivity, the focus will help in market value creation, meeting international stakeholder expectations, and may also assist in securing funding from agencies in certain cases. We have taken various initiatives like duck farming, aquaculture, mushroom cultivation, and vermicomposting under the Corporate Social Responsibility (CSR) in line with the thematic areas as per the sustainable mining charter.



Hindalco has developed plans for flora and fauna conservation

efforts to avoid deforestation, but we do acknowledge the nature of our business being extractive which requires a lot of cleared land area. We also take up transplantation projects whenever scientifically possible. We comply with applicable laws and regulations pertaining to forest conservation. We are committed to No Net Deforestation* at our sites of operation.

Green belt development is one of our short-term targets for biodiversity management. Green belts act as living walls and offsets emissions. We use them for green belt development as native species survive well and keep the natural ecosystem of the region intact. In FY2021-22, we developed 12 green belt development plans at the non-IUCN sites to serve as BMPs. We conducted greenbelt assessment for carbon sequestration potential for Dahej unit in the reporting year as well. We have developed a company-wide SOP as well on developing dense and healthy greenbelts and are driving quality improvements in plantations

Safeguarding Biodiversity

We have committed to achieving No Net Loss (NNL) by 2050 and this goal is supported by our Biodiversity Policy and Technical standards. We conducted a biodiversity assessment for 48 sites using the Integrated Biodiversity Assessment Tool (IBAT) tool which resulted in identifying high-priority sites for biodiversity management. To achieve NNL, we have set out short-term and long-term objectives for identified high-priority sites through the development of

detailed Biodiversity management plans (BMP) with the International Union for Conservation of Nature (IUCN). We have developed four BMPs for five sites last year in India. Now we have another five BMPs spanning 10 sites near completion, that will take the total to fifteen sites with detailed 4-season BMPs. The total sites having BMPs stands at 26 out of the 32 sites having exposure to biodiversity impacts.

Whenever we are expanding or upgrading operations, we make

* No Net Deforestation means and includes commitment to reforestation to compensate against forest loss caused due to operational activity as well any permissible pre-emptive clearing, in accordance with the applicable local laws.



A unique concept of bio park has been adopted at Hindalco's Bagru mines

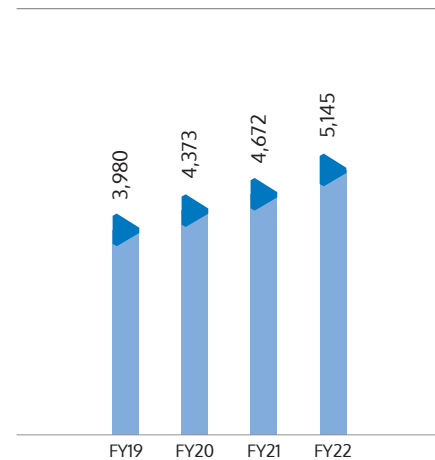
Natural Capital

by training people and through constant monitoring at sites. Our current greenbelt stands at over 5,144 acres with over 4.5 Lakh trees planted in the reporting year.

We are planning to conduct a rehabilitation activity at the Ash Mound of Hirakud S&P, where we plan to create an entire forest ecosystem on the closed ash dyke.

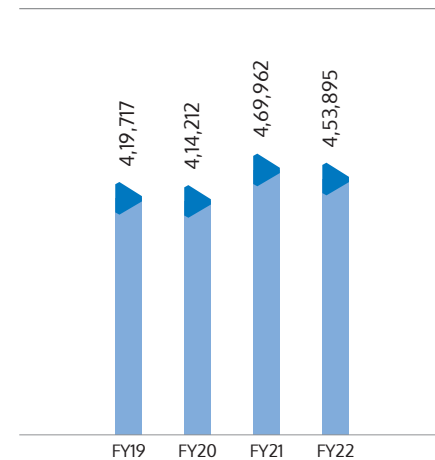
To make a conscious effort towards identifying and minimising the impact, we at Novelis carried out an assessment using IUCN guidelines for Planning and Monitoring Corporate Biodiversity Performance. The guidelines help in identifying the pressure on biodiversity, plan to reduce the impact and set measurable targets. The assessment produced that no anthropogenic pressures require goals or targets to reduce the impact but as a

Green Area Plantation (Acres)



responsibility toward the environment. We have identified six anthropogenic activities that need to be controlled to minimise the impact. We also conducted

Tree Plantation Trends (Number)



a biodiversity assessment for all our sites and none of our sites are near critical biodiversity.

MIYAWAKI PLANTATION IN ADITYA

Miyawaki technique is a unique plantation methodology proven worldwide, irrespective of soil and climate conditions. Various native types of plants are planted close together in the Miyawaki system so that the greens only receive sunlight from the top and grow upwards rather than laterally. The plants become self-sustainable and are 30 times denser. The Miyawaki plantation method helps in noise and dust reduction. We applied the Miyawaki plantation technique at the CHP area as it is a high dust location.

As the site selected was waterlogged barren and we had to clear the area before the plantation. Our plants are yielding a 99.5% survival rate with a high growth rate. Due to the presence of a diverse range of plant species, it is currently serving as a hotspot for butterflies. We invested ₹50,000 for the plantation initiative, which also aligns to the requirements of the IUCN mitigation plan.

With the positive outcomes from the plantation at Aditya CHP, we are planning to replicate the technique of plantation at the smelter plant location where we are expecting this to be a nature-based solution for fugitive dust mitigation. Renukoot, Renusagar and Mahan have already started their own Miyawaki plantation patches.



INITIATIVES UNDER BIODIVERSITY MANAGEMENT PLANS AT VARIOUS SITES



We developed four BMPs at Utkal Alumina, Aditya Aluminium, Gare Palma and Baphlimali and implemented initiatives as proposed in the BMPs.

Conservation initiatives at Utkal Alumina

At Utkal Alumina we undertook an afforestation programme. In FY2021-22, under this programme, we added 20% new species. To increase bird diversity, we identified sites with primary or secondary hole-nesting bird species. To attract such species, we installed 52 nest boxes on the trees with a low density of mature tree cover. We also monitored the species after installing nest boxes. With the aim to plant native species during the afforestation programme, we collected seeds to prepare saplings of the indigenous species. For this, we collected seeds from the local forests and dried them to make them ready for further stages. After the seeds

were ready, we prepared a poly pot to develop saplings. The poly pots were planted in our in-house nursery under the afforestation programme.

Conservation initiatives at Gare Palma

We extract coal from our Gare Palma mine in Chhattisgarh. In FY2021-22 we planted 10,025 saplings in an area of around 4 ha near the coal mines. Due to the continuous afforestation programmes undertaken at Gare Palma, the green cover there has increased by 5.7%. We also undertook plantations under the Wadi Project for a sustainable tribal livelihood project. A total of 20 ha of land was covered under this project.

Conservation Initiatives at Baphlimali

At our Baphlimali bauxite mine at Utkal Alumina, we continuously carry out afforestation programmes to

reduce the impact of mining. Through continuous afforestation efforts, we planted 50% more new species in FY2021-22 compared to FY2019-20. In addition, we also carried out rehabilitation of 15 ha of area and slope plantation of 20 ha.

Conservation Initiatives at Aditya Aluminium

At Aditya Aluminium, we identified sites with the presence of native butterfly species and prepared a butterfly conservation and habitat enhancement action plan. As per the plan, we developed 2,000 sq.m of butterfly conservation area at Aditya Aluminium. To attract butterflies and pollinator insects we planted native trees, herbs and shrubs in the conservation area. We have also installed 25 nest boxes to attract bird species. In addition, we added 20 new plant species in FY2021-22 as compared to FY2020-21.