

Engineering Better Futures with Sustainable Solutions

The RO unit of an effluent treatment plant at Mahan. In the reporting year, 25.80% of water from Hindalco's aluminium operations was recycled and reused



Natural Capital

KEY HIGHLIGHTS

Installed renewable capacity (without storage) as on March 31, 2025*	190 MW	Water recycled and reused in copper operations*	27.36%
Specific Greenhouse Gas Emissions reduced in aluminium from FY 2011-12 base*	19.50%	Water positivity certifications: Scope-1 (Aspiring category) Water neutral	5 plants Mouda
Specific water consumption reduced in aluminium from FY 2018-19 base*	9.8%	Plants with ZWTL certification	12
Specific water consumption reduced in copper from FY 2018-19 base*	25.36%	Recycling of non-hazardous and hazardous waste	85%
Out of 19 plants, ZLD in*	16	Average recycled content in Novelis products	63%
Water recycled and reused in aluminium operations*	25.80%	Cans recycled in Novelis operations	84 billion
		Trees planted in FY 2024-25*	5.33 lakh

LINKAGES

Capital Linkages

Financial Capital	Human Capital
Manufactured Capital	Social and Relationship Capital
Intellectual Capital	

Strategic Priorities

SP3 - Strong ESG Commitment

Material Topics

M1 Energy and GHG Emissions	M8 Air Emissions
M2 Circular Economy & End-of-life Recycling	M12 Solid Waste & Mineral Waste Management
M5 Biodiversity & Land Use & Land Use Change	M13 Tailings Management (Bauxite Residue)
M6 Water and Effluents	M14 Mine Closure & Land Rehabilitation

Key Risks and Opportunities Addressed

R1 Increased focus on decarbonisation	R10 Depletion of natural resources
R2 Climate change risk	O2 Development of low-carbon products
R7 Stakeholders' focus on ESG	O3 Recycling and circular economy
R8 Solid waste management	

Contribution to SDGs



*The details provided are for India operations



At Hindalco, sustainability lies at the core of our value creation model, serving as a catalyst for innovation, responsible growth, and resilience. Our steadfast commitment to ESG principles is embedded across every facet of our operations, ensuring that each decision supports a greener, more sustainable world.

Our approach is anchored in key focus areas: advancing towards nature positivity including Net Zero, improving air quality, practicing responsible water stewardship, promoting a circular economy, ensuring no net loss of biodiversity, and driving sustainable mining practices. These pillars guide our journey toward long-term environmental and social impact.

Another example of our commitment is exemplified by

the launch of ecoEDGE G and ecoEDGE C, our new brand of aluminium and copper products and solutions. ecoEDGE G offers low-carbon products that minimise environmental impact, while ecoEDGE C advances circular solutions that optimise resource efficiency and reduce waste.

With our Novelis' AL:sust™ brand, we're building a growing family of highly advanced, highly sustainable products. Our collection of innovative low-carbon aluminum solutions — each containing at least 80% recycled content. Together, these initiatives set new benchmarks for our industry and reflect our deep-seated belief that business can, and must be, a true force for sustainable solutions, Engineering Better Futures.

Focus Areas

- Net Zero
- Improving Ambient Air Quality
- Water Stewardship (Zero Liquid Discharge, Water Neutrality & Water Positivity)
- Circular Economy, Recycling and Zero Waste to Landfill
- No Net Loss of Biodiversity
- Sustainable Mining

Environmental Management

At Hindalco, our robust governance structure underscores our unwavering commitment to sustainability and the transition towards a greener future. Our sustainability commitments are under the oversight of the Risk Management and ESG (RM&ESG) Committee, comprising the Board of Directors and the Managing Director. They conduct reviews and offer guidance on a quarterly basis.

At the executive level, we have an Apex Sustainability Committee chaired by the Managing Director, which sets the strategic direction for sustainability. The Chief Sustainability Officer (CSO) oversees sustainability issues and provides monthly updates on environmental performance, compliances, sustainability projects and climate-related developments, ensuring the committee is equipped with insights to make informed decisions. Our Executive Management Team is supported by

sustainability leads from units to drive the initiatives forward. These sustainability leads, along with their teams, implement the plans, measure progress, and provide continuous updates to the CSO. We also have taskforces and people with technical expertise to manage waste, water, biodiversity, and air emissions. This governance structure ensures sustainability-related initiatives are driven by every function and vertical in the organisation.

Board Oversight	Board of Directors			
	Risk Management and ESG Committee Comprises of Board of Directors, Chaired by an Independent Director and Permanent Invitees are Group Chief Economist Officer, Chief Risk Officer, Head: Treasury, Head: Sustainability, and Head Risk Management			
Executive Management	Apex Sustainability Committee (Chaired by Managing Director, convened by Chief Sustainability Officer and includes CXOs and Business Heads of various functions)			
Project Implementation	Taskforces + Waste + Water + Biodiversity + Air emissions management	Cluster level	Site level	Department level
		Cluster Sustainability Heads	Energy Managers Sustainability SPOCs	Energy & Sustainability Task Forces
		Risk Ambassadors	Risk Champions	Risk Coordinators

Sustainability is the bedrock of Novelis' governance framework, steering our mission and progress. The Global Sustainability Steering Committee, chaired by the Vice President of Sustainability, sets the course by convening quarterly to evaluate the progress of initiatives and shape our overall sustainability strategy. The committee ensures rapid decision making for all the projects and initiatives and proper resource allocation.

Complementing this is the Global Sustainability Council, chaired by the

Director of Global Sustainability which meets monthly to track sustainability efforts. The committee comprises regional strategy and sustainability leaders and various subject matter experts.

At the regional level, the Regional Sustainability Council members set region-level strategies, define working groups to meet targets and ensures environmental compliances. Oversight of all sustainability related initiatives under the purview of this council.

Effective management of waste and water metrics is integral to our success, and the Global Waste and Water Council oversees this. Co-chaired by the Director of Global Sustainability and the Global EHS Senior Manager, this council consists of EHS managers and sustainability leaders. It also conducts monthly reviews with manufacturing plants to assess progress and identify avenues for enhancement.



A set up for screening spent pot lining at Hirakud. Hindalco utilised 24,000 tonnes of spent pot lining waste to authorised recyclers and cement companies in the reporting period.



At Hindalco, our [Sustainability Policy](#), [Environment Policy](#), [Biodiversity Policy](#), [Energy & Carbon Policy](#), and [Tailings Management Policy](#) serve as guiding principles that drive sustainable growth while ensuring regulatory compliance and operational excellence. These policies are approved by our Board of Directors and demonstrate our commitment to environmental stewardship at the highest level. At Novelis, our [Environment, Health, Safety and Quality Policy](#) reflects our values and dedication to delivering sustainable results and high performance.

Moreover, policies at Hindalco and Novelis are reviewed and updated regularly to ensure they remain aligned with the evolving regulatory landscape, emerging best practices, and our organisational objectives. By doing so, we strive to continuously improve our environmental performance and uphold our commitment to sustainability. Additionally, before starting any new operation, we conduct a comprehensive Environmental Impact Assessment (EIA) in accordance with applicable laws and regulations. We also maintain detailed impact registers across our plants to systematically identify and monitor the environmental footprint of our operations.

For us, sustainability is not merely a commitment but an integral part of our DNA. This is clearly reflected through our Annual Incentive Payout (AIP) which is designed to promote sustainable practices by linking incentives to environmental KPIs which is applicable to executives and management level employees. These parameters include 100% utilisation of fly ash for all power plants, including cogeneration units, a 5% reduction in specific water consumption, zero waste to landfill, 100% utilisation of bauxite residue (red mud) across three refineries, 10% utilisation of bauxite residue for Utkal, and management of energy consumption in line with the plan. Additionally, it also includes KPIs related to compliance to regulatory requirements and plantations. By incorporating these parameters, we demonstrate our dedication to environmental sustainability and drive concrete actions and accountability within our organisation.

Our commitment to sustainability also fosters our continuous investment in diverse initiatives. Leveraging digital tools such as Enablon and ESG Compass enables us to track and monitor environment-related projects and KPIs effectively. The ISO 14001:2015 certification for all our

India operations and 29 Novelis plants establishes a robust framework for compliance management and continual enhancement of environmental performance. All our Novelis plants undergo audits once over a four-year period internally or by third parties. Furthermore, our dedication to sustainable practices is underscored by the certification of 8 Hindalco plants, 21 Novelis plants, 15 scrap centres under the Aluminium Stewardship Initiative (ASI) Standards. Our copper concentrate procurement has achieved Joint Due Diligence Standard under Copper Mark Certification.

Additionally, two of our facilities in North America — Davenport, Iowa, and Uhrichsville, Ohio — produce flat-rolled aluminum sheet with up to 99% recycled content. Every year, these products undergo GreenCircle certification, which provides a detailed, science-based evaluation to verify the amount of pre- and post-consumer recycled content.

8
Hindalco plants have received certification from the Aluminium Stewardship Initiative Mining Charter

Environment Capex, Opex, Savings

₹384 crore Capex

- + Hindalco - ₹350 crore
- + Novelis - \$4 Million (₹33.82 crore)

₹899 crore Opex

- + Hindalco - ₹738.23 crore
- + Novelis - \$19 million (₹160.63 crore)

₹154 crore saving

- + Hindalco - ₹66.05 crore
- + Novelis - \$10.45 million (₹88.35 crore)

In FY 2024-25, we contributed approximately ₹98.64 crore towards Corporate Environment Responsibility initiatives.

In the reporting year, at Hindalco, we did not face any environmental non-compliances. At Novelis, we encountered three violations in FY 2023–24 at our Uhrichsville, Ohio, plant regarding non-compliance with hazardous waste regulations. The proceedings are ongoing, and we anticipate an accrued liability of \$11,600 (₹9,80,704.73). In response, we have undertaken immediate corrective actions.

Taskforce on Nature-related Financial Disclosures

At Hindalco, our commitment to protecting nature is integral to our operations. We acknowledge our reliance on natural resources and responsibility to minimise environmental impact. To strengthen this commitment, we have adopted the [Taskforce on Nature-related Financial Disclosures \(TNFD\)](#) framework to manage nature-related risks and opportunities effectively. Climate

change, freshwater use, resource replenishment, land-use change, pollution, and the threat of invasive alien species are key drivers of nature change that closely align with our material topics, guiding our strategies and commitments.

By comprehensively understanding the risks associated with our impacts and dependencies on the

surrounding ecosystem, we aim to proactively address challenges and foster a culture of responsible environmental stewardship. This ensures that we integrate nature-related risks into our business strategy, promoting sustainable practices that not only mitigate environmental impacts but also enhance our operational resilience.

Driver	Link to material topic	Relevance	Actions taken
Climate change	Energy and GHG Emission Management	Our production processes emit GHGs at various stages, including extraction of bauxite ore, refining of alumina from bauxite, and smelting of alumina, each of which contributes to climate change.	See the Climate Action section.
Freshwater use	Water and Effluents	Our manufacturing processes rely on freshwater resources, particularly in areas already experiencing water stress. The depletion of these vital resources poses risks to local communities and ecosystems and may affect our social licence to operate.	See the Water Stewardship in Action section.
Land-use change, removal, or introduction of invasive alien species	Biodiversity and Land-use Change	The extraction of raw materials can impact natural habitats of species and alter land use. Invasive species can further affect habitats and ecosystems.	See the Sustainable Mining and Biodiversity Management section.
Pollution	Air Emissions, Waste and Hazardous Materials Management	Burning fossil fuels, aluminium smelting, and various production processes can release pollutants. Furthermore, improper waste management may degrade the quality of land, air, and water.	See the Air Emissions section.



Net Zero

Climate Action

The world relies on non-ferrous metals, essential to growth and building for the future. Our products- aluminium, copper and specialty alumina, are integral to several industries, such as construction, transportation, infrastructure, electronics, telecommunications, and power transmission. However, manufacturing these products have an impact on the environment and natural ecosystem- releasing GHG emissions, consuming water, etc.

While aluminium consumption in India is expected to double and the demand for refined copper is expected to increase by ~ 2.5 times in the next 10 years, these metals have an indispensable role in accelerating the transition to a low-carbon economy. To address the impacts, we also take action to minimise and mitigate climate change. For us, responsible production and use are not just important but imperative for a sustainable future.

Climate Governance

Our Risk Management and ESG Committee reviews our climate-related initiatives and performance every quarter. At the management level, the Chief Sustainability Officer, along with Head – Energy & Decarbonisation, drive the climate agenda across the organisation. We have an Apex Sustainability Committee and Apex Decarbonisation Committee, chaired by the Managing Director. These committees have monthly reviews, attended by leaderships of all the businesses, functions, and plants. It serves as a platform to review performance, discuss recent developments, and monitor progress on decarbonisation projects.

Our Approach

We measure the impact on climate change by tracking and monitoring GHG emissions from our operations and the value chain and conduct periodic climate risk assessments.



A solar unit at our Mahan plant. In the reporting period, the installed renewable capacity (without storage) in Hindalco India rose to 190 MW.

In the latest assessment, we conducted site-specific baseline physical risk analysis and reviewed historical events taking into account the Intergovernmental Panel on Climate Change's (IPCC) global scenarios which are based on the Representative Concentration Pathways (RCPs), as per the Fifth Assessment Report (AR5). The scenarios include RCP 2.6, RCP 4.5, RCP 6.0, and RCP 8.5.

For transition risk, we have studied the potential impacts of the climate change landscape on our operations using the International Energy Agency (IEA) NZE 2050, IEA B2DS, IEA 2DS, and the

International Aluminium Institute (IAI) 1.5°C scenario. The assessment details are available in [Hindalco's Task Force on Climate-related Financial Disclosure report FY 2021-22](#).

Climate-related risk and opportunities

We have adopted a 'Predictive, Proactive, and Prepared' approach to managing the risks posed by climate change impacts. Climate risk management is integrated into the risk management framework, which helps manage the risks and build a climate-resilient business.

Climate-related risks		
Impact associated with the identified risk	Financial implications of the risk before actions are taken	Methods for managing risks
Disruption of mining operations due to extreme weather events		
Increased risks of mine closures or delays in production due to floods and landslides, resulting in damage to equipment and infrastructure.	+ Potential revenue losses from decreased production output and increased maintenance costs.	+ Implement early warning systems for extreme weather event tracking. + Develop contingency plans for temporary mine closures or reduced operations. + Invest in resilient infrastructure and equipment.
Regulatory changes related to carbon emissions and environmental standards		
Increased costs associated with complying with stricter environmental regulations which may result in potential fines for non-compliance.	+ Direct financial costs from carbon taxes, emissions permits, and compliance reporting. + Indirect costs from changes in market demand and investor perception.	+ Conduct regular assessments to ensure compliance with environmental regulations. + Invest in emissions reduction technologies and sustainable mining practices. + Engage with regulators and industry groups to influence policy decisions.
Climate change resulting in water scarcity for mining operations		
Reduced water availability for ore processing and dust suppression due to droughts at mining locations.	+ Potential production disruptions and increased costs for alternative water sources or water treatment. + Estimated financial implication of the risk is ~₹1.37 crore and estimated costs associated with the risks is ~₹243 crore.	+ Implement water management strategies such as recycling and reuse of process water, rainwater harvesting. + Invest in water-efficient technologies and conservation measures.
Increased focus on decarbonisation		
Failure to focus on decarbonisation leading to increase in compliance costs, regulatory penalties, reputational damage, and diminished market competitiveness.	+ Operation costs might be impacted by policies such as carbon pricing in the near future. + Estimated financial implications ~₹677 crore (Considering coal consumption of ~ 17 million MT and a carbon tax of ~₹400/MT) and estimated cost of the actions are ~₹228 crore.	+ We have increased our renewable energy capacity to 190 MW. + Additionally, 600 MW of renewable capacity together with pumped hybrid storage is under execution for the supply of 200 MW of RTC (round the clock) power.
Climate change leading to flooding of plants		
Changing climatic patterns pose a threat such as flooding in plants which might disrupt the process, damage equipment and goods.	+ Potential loss of life and property. + Financial loss up to 0.08 to 1% of revenue.	+ Insurance taken for losses due to natural hazards, covers revenue loss, cost of repairs and damage to goods or infrastructure. + A disaster management plan is in place at all plants. + Regular tracking of IMD reports.

Climate related opportunities		
Impact associated with the identified risk	Financial implications of the risk before actions are taken	Methods for managing risks
Increased demand for sustainable aluminium products		
Growing market demand and consumer preference for aluminium products with low carbon footprint and recycled content.	+ Potential revenue growth from sales of sustainable aluminium products. + Opportunities to enter new market segments with a special focus on enhancing exports of aluminium products. + ~ ₹27 crore of positive financial implication, considering 5% of our primary aluminium production will be low carbon. The estimated costs associated with developing this opportunity is ~ ₹223 crore.	+ Invest in research and development to innovate sustainable aluminium alloys and manufacturing processes. + Enhance marketing and brand campaigning to promote eco-friendly products.
Investment in sustainable mining and processing practices		
Sustainable mining practices address the environmental, economic, health and social impacts throughout the life cycle.	+ Potential cost savings from efficiency improvements and resource optimisation. + Reduction of regulatory and reputational risks associated with environmental and social impacts.	+ Implement sustainable mining and processing technologies such as water recycling systems, energy-efficient equipment, and waste management initiatives. + Engage with local communities and stakeholders to address social and environmental concerns.



Towards Net Zero through innovation

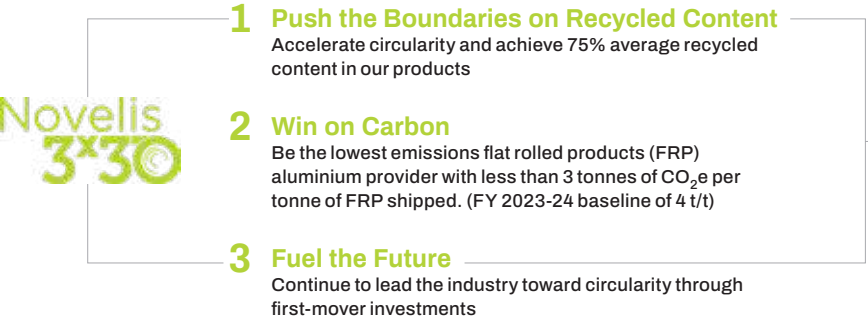
Recognising the significant role our industry plays in low-carbon economy, we are driven by a profound commitment to not only mitigate climate-related risks but also harness the vast opportunities that sustainable practices present. Our determination

to transition towards a low-carbon future is reflected by our commitment to achieving Net Zero by 2050.

To achieve this goal at Hindalco, we have set a target to reduce specific GHG emissions by 25% by FY 2026-27 against the base year FY 2011-12.

For our Novelis operations, we aspire to reduce the absolute carbon emissions by 30% by FY 2026 and become carbon neutral by 2050 against the base year of FY 2016.

At Novelis, we are guided by our 3X30 vision, which we aim to achieve by 2030. The decarbonisation levers align with this vision and are outlined below:



- Decarbonisation levers**
- + Decarbonising the melting processes and energy sources
 - + Maximising circularity
 - + Innovating new high recycled content alloys
 - + Increase recycling capacities and capabilities
 - + Supporting decarbonisation of primary aluminium

At Hindalco, our efforts are reinforced by a range of decarbonisation levers steering our climate action agenda. These are:

1

Energy efficiency

We are adopting innovative technologies in processes to achieve energy efficiency. The details of the initiatives are outlined in the energy consumption section.

2

Renewable energy adoption

To reduce the dependency of fossil fuel, we are advancing large-scale off-site renewable energy projects with storage solutions. We have achieved an installed capacity of 190 MW, including biomass-based power.

3

Transitioning to low-carbon fuels

We are actively exploring and adopting low-carbon technologies like substituting LNG with Bio-CNG in calcination processes and replacing furnace oil-based boilers with electric boilers to generate green steam in our refineries.

4

Implementing new technologies

We are collaborating with industrial organisations to drive the adoption of new technologies.

Aligned with our commitments, we have introduced two new brands dedicated to low-carbon solutions and circularity.



This brand offers products like low-carbon ingots, copper rods and solar strips manufactured using renewable energy and have zero or low carbon.



This brand offers circular products and services, such as recycled ingots, foil with recycled content, and green circle alloy.

Sustainable Products

Our portfolio of sustainable products — including aluminium circles, recycled ingots, flame retardants, roofing and façade solutions, and offerings from the Eternia brand — aligns with the EU taxonomy for the manufacture of aluminium. Our cookware-grade aluminium circles, produced at Renukoot, Belur, and Taloja, incorporate 80% recycled scrap and are certified by Intertek. At Aditya and Mahan, we manufacture low-carbon recycled ingots using renewable energy, with their reduced carbon footprint verified by Bureau Veritas. As per the Carbon Border Adjustment Mechanism (CBAM) declarations, our recycled ingots from the Aditya plant report direct process emissions of 1.529 tCO₂e/t and indirect process emissions of 13.929 tCO₂e/t.

The Belagavi refinery exemplifies clean production, using 85–90% of its energy from natural gas and wind sources, while manufacturing flame-retardant materials for the automotive, electrical, and railway sectors. In Taloja and Renukoot, our roofing, façade, and bus body solutions benefit from a 10 MW solar plant that now meets 60% of the facilities’ energy demand. We have also enhanced our solar capacity at Alupuram to support Eternia—our premium extrusion product line manufactured at Renukoot, Silvassa, Kuppam, and Alupuram—thereby advancing both energy efficiency and product sustainability. In the reporting year, our sustainable products accounted for 0.25% of total operational revenue.

	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25
Sustainable Products Sales (MT)	14,616.30	15,342.10	21,364.59	29,271.06
Revenue from Sustainable Products (₹ crore)	363.00	338.80	406.73	586.33

Decarbonising the melting processes and energy sources - Although our operations are less energy-intensive than primary aluminium production, melting scrap aluminium remains the most energy-intensive process. To reduce emissions, we are exploring alternative fuels, clean electricity sources, waste heat recovery, and innovative carbon capture technology while implementing new efficiency-enhancing technologies to reduce fuel and energy use across our plants. Our Latchford plant is participating in the regional hydrogen network project to evaluate the feasibility of using low-carbon hydrogen.

Maximising circularity - Increasing our use of recycled content is key to reducing carbon emissions in our products. We are expanding closed-loop programmes and are investing in new approaches and partnerships along the value chain.

Innovating new high recycled content alloys - We are collaborating with customers from key industries such as beverage packaging, automotive, aerospace, and specialities to develop high-recycled-content alloys that meet their technical specifications.

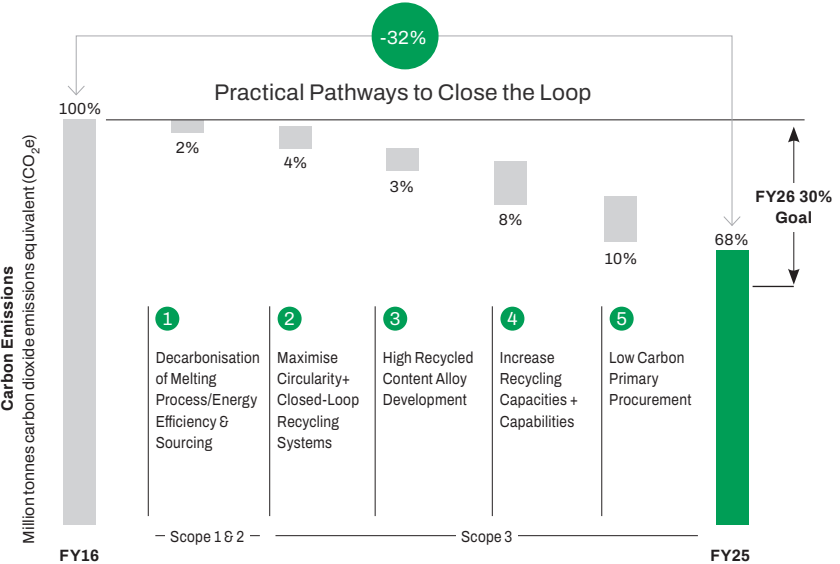
Increase recycling capacities and capabilities - Our recycling content has doubled in the past 15 years, and we invested more than \$ 1.1 billion since 2011. We are increasing the recycling capacities and capabilities with

around projects worth ~\$5 billion under execution. We commissioned recycling capacities at Guthrie, USA, and UAL, South Korea, in FY 2024-25; Bay Minette, USA and Latchford, UK, are expected to be commissioned in FY 2026-27.

Supporting decarbonisation of primary aluminium - We are focused on procuring low-carbon primary aluminium to supplement the use of recycled content. We are expanding our primary supplier network to secure the low-carbon aluminium and collaborating with the World Economic Forum’s First Movers Coalition (FMC)- a global initiative aimed at decarbonising “hard-to-abate” sectors.

We offer two products under our AL:sust™ line — HRC73A® and HRC57S®,

specifically built for architectural applications. Both products contain at least 80% recycled content. We designed AL:sust™ HRC73A® as a pre-anodised aluminium material that’s ready for direct use in both exterior and interior façade cladding, combining ease of processing with a sleek, durable finish. With AL:sust™ HRC57S®, we provide an anodising-quality aluminium that supports batch anodising, allowing architects and designers to create customised finishes while benefiting from its high recycled content and reduced environmental impact. We have achieved external certification for both the Performance Standard and the Chain of Custody Standard from the ASI across all our European manufacturing sites.





Internal Carbon Pricing (ICP)

At Hindalco, we have implemented internal carbon pricing (ICP) to accelerate our Net Zero journey. ICP integrates climate impact into strategic decisions and financial investments. It enables us to identify low-carbon opportunities, enhance energy efficiency, and prioritise projects based on sustainability value rather than financial returns. It also prepares

us for regulatory changes and guides low-carbon investment decisions. We effectively manage climate-related risks and opportunities by assigning a cost per tonne of CO₂e emitted. Our shadow price for carbon is informed by stakeholder engagement and technical analysis of existing and evolving technologies. It costs US\$31 (₹2,620.85) from 2021 to 2030,

US\$43 from 2031 to 2040, and US\$59 from 2041 to 2050- covering Scope 1 and 2 emissions.

The ICP framework outlines roles and responsibilities for project implementation, with an internal audit mechanism ensuring its effectiveness. We utilise ICP to estimate the internal rate of return for any project.

Energy Management

Hindalco

Targets

- + To achieve **300 MW** of renewable capacity – **200 MW** without storage and **100 MW** with storage by 2026

Progress

- + **190 MW** of installed renewable capacity (without storage) as on March 31, 2025

At Hindalco, we are boosting energy efficiency, scaling up renewable energy use, shifting to low-carbon fuels, and embrace cutting-edge technologies through strategic collaboration, which is improving our energy performance, cost efficiency and reducing greenhouse gas emissions. It is strengthening our competitive edge and accelerating our transition to a low-carbon future.

We have set ambitious internal energy savings targets and integrated them in our planning and budgeting framework, to capture operational enhancements, projected efficiency gains, and planned maintenance activities throughout the year. To ensure these targets translate into measurable impact, we have deployed a dedicated team that monitors performance, drives initiatives, and systematically eliminates energy inefficiencies across all operations.

Our Energy Managers and Energy Cell play a pivotal role at each plant, ensuring robust energy management and delivering monthly progress updates to the leadership team.

At Novelis, the energy managers of four regions conduct monthly meetings to discuss improving energy consumption, installing state-of-the-art technology, and the capital expenditure requirements for implementing the projects.

At Hindalco and Novelis, we conduct regular energy audits that help us monitor performance, ensure alignment with energy performance, and identify opportunities for ongoing improvements. At Novelis, energy audits are performed by technical departments, cross factory units and audits involving energy auditing firms. At Hindalco, we conducted external audits at Muri, Mahan, Belagavi, Aditya, and Hirakud plants in the reporting year. The external audits led to the identification of 80 energy-saving projects with a combined potential savings of 0.38 million GJ. To further strengthen our capabilities, we invested ₹13.26 crore in research and development focused on innovative solutions to reduce energy consumption.

Empowering our workforce is equally vital to us. We actively foster a culture of energy consciousness through a blend of on-site and virtual training sessions,

weekly knowledge-sharing forums, and webinars. In the reporting year, we conducted six webinars for our employees. Further, we organised targeted sessions for plant teams to build capacity in energy management and greenhouse gas accounting practices. These initiatives not only boosted awareness but also helped embed global best practices in our day-to-day operations.

Energy consumption

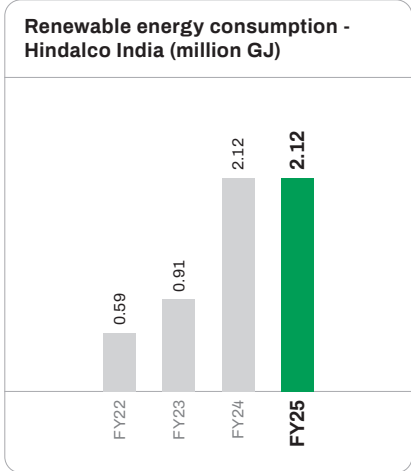
Our total energy consumption was 322.54 million GJ, of which Hindalco India contributed 87.70% and Novelis contributed 12.30%.

Within Hindalco India, the aluminium operations consumed 271.62 million GJ of energy, and copper operations consumed 10.64 million GJ. The total consumption at mines was 0.62 million GJ.

The increase in energy consumption compared to the previous year at Hindalco was due to a higher number of pot start-ups and frequent power outages at the Renukoot smelter. During the reporting year, we also purchased 5,370,000 Renewable Energy Certificates (RECs) to fulfil our obligation.



Total Energy Consumption (million GJ)									
Energy Type		Fossil Fuels	Electricity Purchased	Steam/ Heating/ Cooling and other Energy (Non-renewable) Purchased	Total Non-Renewable Energy (Electricity, Heating and Cooling) Sold	Total Non-renewable Energy	Renewable Energy Source	Total Renewable Energy	Total Energy Consumption
FY 2021-22	Hindalco	269.72	2.68	0.01	2.20	270.21	0.59	0.59	270.8
	Novelis	29.34	10.05	0.30	-	39.69	-	-	39.69
	Total	299.06	12.73	0.31	2.20	309.90	0.59	0.59	310.49
FY 2022-23	Hindalco India (Standalone)	249.03	3.49	0.01	1.71	250.82	0.87	0.87	251.69
	Hindalco India (Subsidiaries)	23.09	0.07	-	-	23.16	0.04	0.04	23.20
	Novelis	27.93	9.84	0.23	-	38.01	-	-	38.01
	Total	300.05	13.4	0.24	1.71	311.99	0.91	0.91	312.9
FY 2023-24	Hindalco India (Standalone)	255.67	2.23	0.02	1.81	256.10	1.83	1.83	257.93
	Hindalco India (Subsidiaries)	24.07	0.10	-	-	24.17	0.29	0.29	24.46
	Novelis	27.15	11.06	0.30	-	38.52	0.002	0.002	38.52
	Total	306.89	13.39	0.32	1.81	318.80	2.12	2.12	320.92
FY 2024-25	Hindalco India (Standalone)	255.16	2.07	0.01	1.43	255.81	2.00	2.00	257.81
	Hindalco India (Subsidiaries)	24.82	0.13	-	-	24.95	0.12	0.12	25.07
	Novelis	28.16	11.19	0.30	-	39.65	0.01	0.01	39.66
	Total	308.14	13.39	0.31	1.43	320.41	2.13	2.13	322.54



Accelerating Clean Energy at Hindalco

At Hindalco, we are committed to leading the transition to a low-carbon future. Our renewable energy portfolio has expanded, encompassing solar, wind, hydroelectric, and biomass sources, with a total capacity of 190 MW - a ~10% increase from the previous year.

Key Renewable Energy Projects in FY 2024-25

Taloja Solar Energy Project (10 MW): Commissioned a 10 MW solar energy project, enabling the plant to meet 60% of its energy needs through renewable sources.

Mahan Floating Solar Project (6.4 MW): Installed a first-of-its-kind 6.4 MW floating solar project at Mahan.

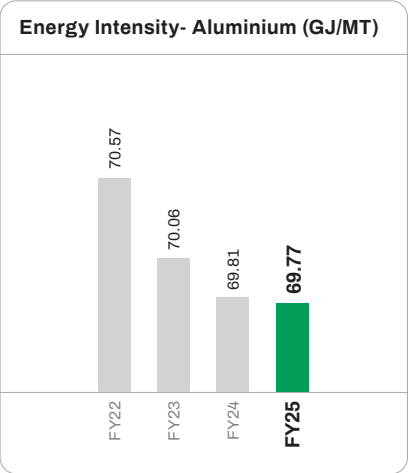
Biomass Co-Firing Initiatives: Initiated biomass co-firing at our power plants to reduce fossil fuel dependency.

Projects in the Pipeline
In second quarter of FY 2025-26, we will commission a 100 MW round-the-clock (RTC) renewable energy project with installed capacity of 300 MW at our Aditya Aluminium smelter in Odisha. We have an additional 49 MW of renewable energy projects scheduled for commissioning in FY 2025-26: Belagavi Solar Project (9 MW), Taloja Wind Power Project (10 MW),

Dahej Hybrid Solar-Wind Project (20.5 MW) and Mouda Solar-Wind Hybrid Project (10 MW).

Energy Intensity

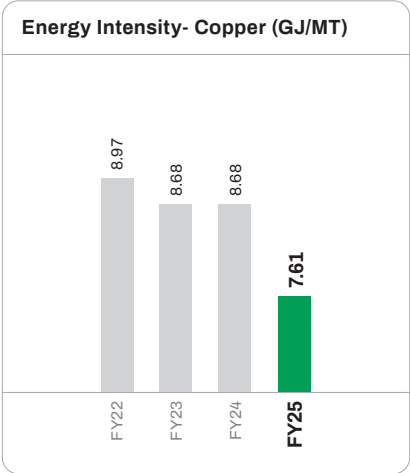
At Hindalco, we continuously track the energy intensity of our aluminium and copper operations. For aluminium, the specific energy consumption refers to the energy consumed per tonne of aluminium produced, which includes energy consumed in alumina refinery, aluminium smelter, carbon anode plant and downstream (FRP/Extrusion and Foils) operations. For copper, specific energy consumption refers to the energy consumed per tonne of copper cathode produced.



¹ International Monetary Fund. (8 June 2025). Implied PPP conversion rate – India.
PPP conversation rate 2025 (8 June 2025) – 20.66

We also monitor energy intensity with respect to turnover. Hindalco India's energy intensity was 2,778 GJ/₹ crore (turnover) and 5,738.8 GJ/\$ million (turnover adjusted for PPP)¹ in the reporting year. In the previous year, the energy intensity accounted for 3,107.30 GJ/₹ crore (turnover) and 6,960.4/GJ/\$ million (turnover adjusted for PPP).

For Novelis, the specific energy consumption refers to the energy consumed per tonne of FRP sold. In the reporting period, it accounted for 3.16 MWh/MT FRP as compared to 2.83 MWh/MT FRP in the previous year.



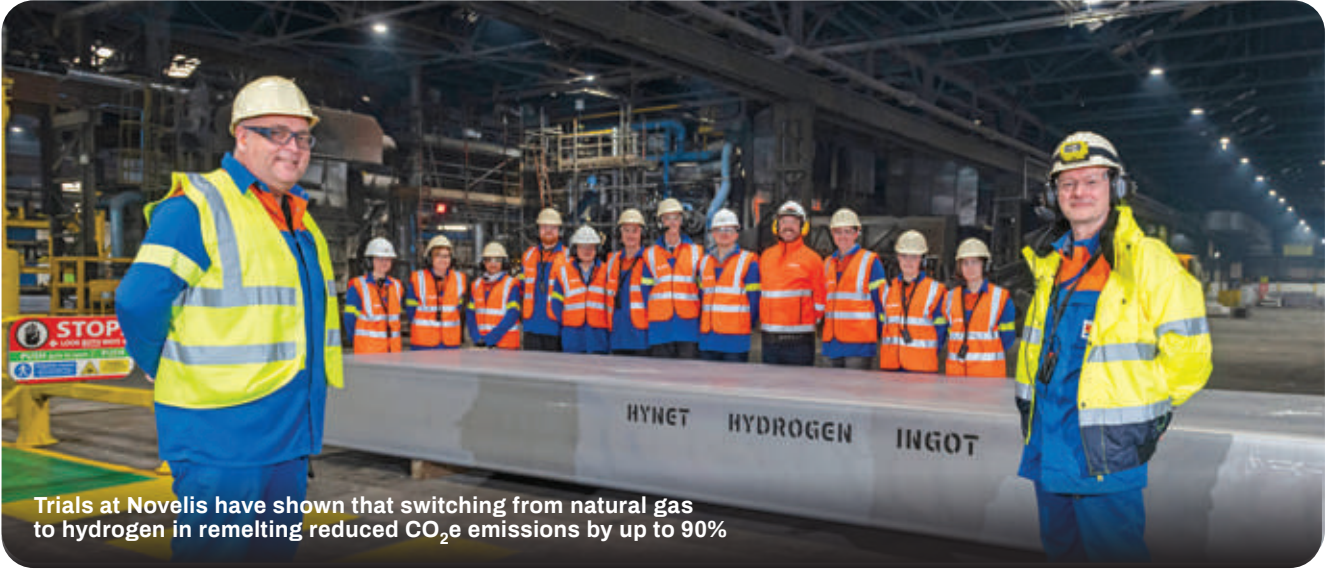
Novelis Drives Energy Efficiency in Melting Facilities

Committed to advancing operational efficiency, we designed the Ideal Furnaces Programme to reduce energy consumption at our melting facilities by upgrading our furnaces to state-of-the-art technology.

Our operations team benchmarked best practices across our plants, identifying key applications that yield the most substantial impact and developing compelling business cases for large-scale implementation. Through rigorous evaluation, we identified and executed capex

projects that integrate these best practices, ensuring maximum efficiency gains.

By upgrading the furnaces, at a cost of US\$9.7 million, we achieved a reduction of 473,490 GJ of energy consumption leading to annual savings of US\$7 million. This programme represents a transformative step toward achieving energy efficiency in our operation and strengthening our financial performance.



Trials at Novelis have shown that switching from natural gas to hydrogen in remelting reduced CO₂e emissions by up to 90%

Successful Trials of Hydrogen in Aluminium Remelting at Novelis

At Novelis, we completed testing of hydrogen fuel in powering a recycling furnace at our Latchford plant in UK, marking a significant step in decarbonisation. We upgraded our infrastructure with new burners, regenerators, and furnace lining to run comprehensive trials blending hydrogen with natural gas. These tests showed that switching from natural gas to hydrogen could reduce CO₂e emissions by up to 90%.

During these trials, we remelted and cast several hundred tonnes of 3000 series scrap aluminium into sheet ingots while closely monitoring product quality, process performance, and environmental impact. This project aligns with our broader support of the UK's £1 billion Net Zero Innovation Portfolio. With grant support of £4.6 million, we're helping lead the shift from natural gas to low-carbon hydrogen.

GHG Emissions Management

Through continuous innovation, strategic investments, and cutting-edge initiatives, we are making a measurable impact by reducing our carbon footprint and driving progress toward our goals.

In FY 2024-25, our total Scope 1 and Scope 2 emissions stood at 30.01 million tCO₂e, with Hindalco contributing 27.76 million tCO₂e and Novelis 2.25 million tCO₂e. Within Hindalco India, aluminium operations accounted for 26.82 million tCO₂e of Scope 1 and Scope 2 emissions, while copper operations added 0.89 million tCO₂e. Additionally, our mines generated 0.05 million tCO₂e.

At Hindalco, we track five categories of scope 3 emissions. In the reporting year, the Scope 3 emissions accounted for 14.12 million tCO₂e, of which 2.69 million tCO₂e was from Hindalco and 11.43 million tCO₂e was from Novelis. At Hindalco and Novelis the Scope 3 emissions are dominated by the purchased goods and services category.

We follow the GHG Protocol- A Corporate Accounting and Reporting Standard supplemented by IPCC guidelines.

Hindalco

Targets

- + To achieve **Net Zero** by 2050
- + To reduce specific GHG emissions by **25%** by FY 2026-27 against the base year FY 2011-12

Progress

- + **19.50%** reduction in specific greenhouse emissions from the base year FY 2011-12

Novelis

Targets

- + To reduce the absolute carbon emissions by **30%** by FY 2025-26 and become carbon neutral by 2050 against the base year FY 2015-16 (20 million tCO₂e)

Progress

- + **32%** reduction in absolute carbon emissions against the base year FY 2015-16

27.76 million tCO₂e is the Scope 1&2 emission for Hindalco in FY 2024-25



Scope 1 and 2 emissions (million tCO ₂ e)				
		Scope 1	Scope 2 (Location Based)	Total Scope 1+2 (Location Based)
FY 2021-22	Hindalco	26.49	0.59	27.08
	Novelis	1.42	0.91	2.33
	Total	27.91	1.50	29.41
FY 2022-23	Hindalco India (Standalone)	24.83	0.69	25.52
	Hindalco India (Subsidiaries)	1.96	0.01	1.97
	Novelis	1.38	0.86	2.24
	Total	28.17	1.56	29.73
FY 2023-24	Hindalco India (Standalone)	25.28	0.44	25.72
	Hindalco India (Subsidiaries)	2.04	0.02	2.06
	Novelis	1.35	0.83	2.18
	Total	28.67	1.29	29.96
FY 2024-25	Hindalco India (Standalone)	25.22	0.41	25.63
	Hindalco India (Subsidiaries)	2.10	0.03	2.13
	Novelis	1.39	0.86	2.25
	Total	28.71	1.30	30.01

Scope 3 emissions (million tCO ₂ e) *			
Category	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Novelis
Purchased goods and services	0.90	0.26	10.99
Upstream transportation and distribution	0.24	0.03	0.44
Downstream transportation and distribution	0.29	0.04	-
Fuel and energy related activities	0.76	0.11	-
Waste generated in the operations #	0.06	-	-
Total	2.25	0.44	11.43
* The computation for Scope 3 emissions for Hindalco India (Standalone) includes all mines, aluminium upstream & downstream units, and Hindalco India (Subsidiaries) includes Utkal. External validation audit has been completed, and the improvement opportunities identified are currently under implementation.			
# Emissions from waste generated in the operations are partially computed for fly ash and bauxite residue only.			

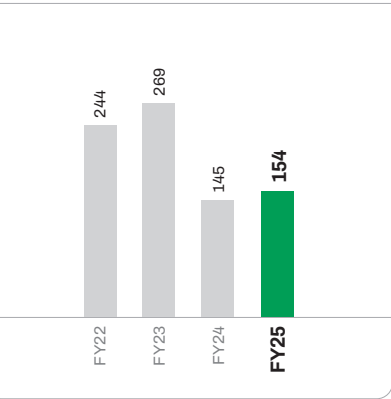
GHG Emissions (million tCO₂e)

Upstream	Production	Downstream
Scope 3 Emissions	Scope 1 Emissions	Scope 3 Emissions
Purchased Goods and Services	Hindalco – 27.32	Downstream transportation and distribution
Hindalco – 1.16	Novelis – 1.39	
Novelis – 10.99	Total – 28.71	
Total – 12.15	Scope 2 Emissions	Hindalco – 0.33
Upstream Transportation and Distribution	Hindalco – 0.44	
Hindalco – 0.27	Novelis – 0.86	
Novelis – 0.44	Total – 1.30	
Total – 0.71		
Fuel and energy related activities		
Hindalco – 0.87		
Waste generated in the operations		
Hindalco – 0.06		

Perfluorocarbon emissions (PFCs)

At Hindalco, we drive industry-leading initiatives to reduce PFC emissions comprising two gases CF₄ and C₂F₆, significantly tackling a key challenge in aluminium production. Some initiatives focus on optimising alumina feeding cycles and advanced process control systems. Our PFC emissions accounted for 154 kg CO₂e/MT, an increase of 6% from the previous year. The increase as compared to the previous year is due to higher number of pot start-ups and frequent power outages at Renukoot. Our calculation methodology is based on the HV anode effect, as per the IPCC 2019 guidelines.

Perfluorocarbon emissions (kg CO₂e/MT)

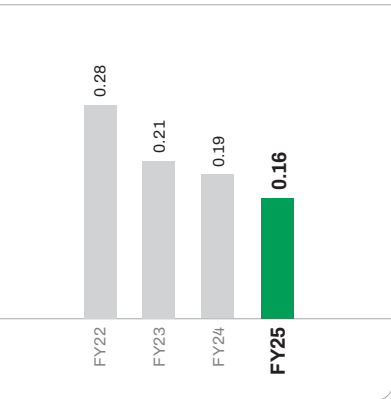


Year	Tonne PFC produced	PFC in million tCO ₂ e
FY 2021-22	45.15	0.32
FY 2022-23	50.81	0.36
FY 2023-24	27.60	0.19
FY 2024-25	29.13	0.20

Ozone Depleting Substances (ODS)

In the reporting year, our ODS contribution was 0.16 MT of CFC-11 eq., 16% lower than the previous year. At Hindalco, we aim to phase out ODS by FY 2025-26 and have prepared a comprehensive plan to achieve this. We are replacing older equipment with eco-friendly alternatives, and we have replaced around 1,500 equipments in the reporting year.

Ozone Depleting Substances (MT of CFC-11 eq.)



Emission Intensity

We closely track emission intensity (Scope 1+2) to measure our progress toward sustainability goals and targets. In aluminium operations, we have achieved a 19.50% reduction in emission intensity compared to the FY 2011-12 baseline of 24.1 tCO₂e per tonne. This increase in intensity is due to a higher number of pot start-ups and more frequent power outages at the Renukoot smelter.

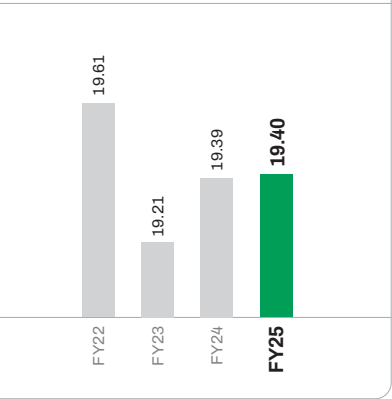
In India, we have an integrated aluminium value chain from bauxite mining to the manufacture of primary metal and beyond. Utkal Alumina is an integral part of our operations. The specific energy consumption (on physical output basis) is disclosed taking into account Hindalco India Limited and Utkal Alumina together.

During the reporting period, the emissions intensity per rupee of turnover for our Hindalco India operations accounted for 274.74 tCO₂e/₹ crore as compared to 309.85 tCO₂e/₹ crore in the previous year. The emissions intensity per rupee of turnover adjusted for PPP² accounted for 567.62 tCO₂e/\$ million as compared to 694.1 tCO₂e/\$ million in the previous year.

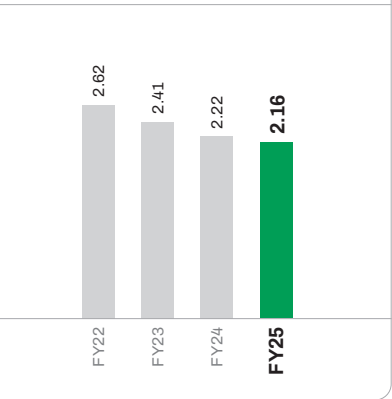
At Novelis, emission intensity is measured as the total Scope 1, 2, and 3 emissions per tonne of flat-rolled products (FRP) shipped. Through our continuous sustainability efforts, we have successfully reduced emission intensity to 3.64 tCO₂e per metric tonne of FRP shipped from the 2016 baseline of 5.5 tCO₂e per metric tonne of FRP shipped.

² International Monetary Fund. (8 June 2025). Implied PPP conversion rate – India.
PPP conversation rate 2025 (8 June 2025) – 20.66

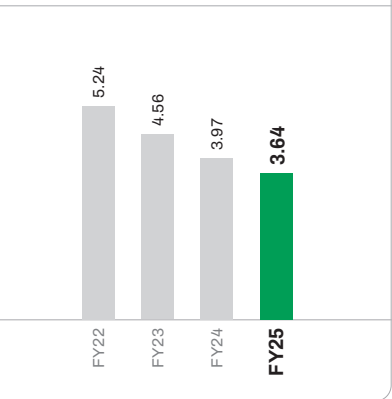
GHG Emission Intensity Aluminium (tCO₂e/MT)[#]



GHG Emission Intensity Copper (tCO₂e/MT)[#]



GHG Emission Intensity Novelis (tCO₂e/MT FRP shipped)^{##}



[#] GHG Emission Intensity- Scope 1+2
^{##} GHG Emission Intensity- Scope 1+2+3



Improving Ambient Air Quality

Air emissions

At Hindalco, we are dedicated to contributing to a cleaner future by innovating and collaborating with stakeholders to improve air quality. We identify our impact by consistently tracking and monitoring air emissions through an Online Continuous Emission Monitoring System (OCEMS). Our internal system, Enablon, allows us to capture real-time emission data, enabling data led decisions while ensuring full compliance with regulatory standards and reporting requirements.

We conduct regular audits to verify the reliability of the data which is supplemented by offline monitoring through NABL-accredited third-party laboratories. Since our upstream plants are a key source of emissions, we monitor the Air Quality Index (AQI) using Continuous Ambient Air Quality Monitoring System (CAAQMS) in all directions.

Our air emissions management is governed by a robust monitoring framework. Each plant has an Air Task Force (ATF), led by the operations head and supported by experts from

operations, environment, and the utilities departments. The ATF is responsible for tracking emissions and overseeing key projects aimed at emissions reduction. Progress is reviewed quarterly by the Chief Sustainability Officer, ensuring alignment with our sustainability targets and goals. Additionally, the Apex Sustainability Committee, chaired by our Managing Director, provides strategic oversight, further reinforcing our commitment to long-term environmental stewardship.

At Hindalco India, the increase in air emissions is attributed to the rise in primary metal production. However, our ‘Clean Air to Breathe for All’ initiatives have led to a reduction in particulate matter emissions. At Novelis, the decrease in air emissions is due to the closure of two plants. In the reporting year, we started a new recycling facility at Guthrie and accounted for the total air emissions. Additionally, our Novelis operations produced 1.69 KT of volatile organic compounds (VOCs).

We have implemented several initiatives to minimise emissions, such as:

Hindalco Rail Maintenance Yard

To address air pollution from painting and grit blasting BTAP wagons, we will

collect paint chips in an impervious pit, and a bag filter installation is planned within six months. Additionally, we maintain a rail and road coefficient of 47% and 53% to increase cost efficiency and reduce emissions.

YeongJu Plant

We installed Activated Carbon technology in the Residual Carbon Management Unit (RCMU) to significantly reduce dioxin emissions. We use advanced adsorption systems to prevent the release of pollutants achieving a 30% reduction from regulatory limits.

Zhenjiang Plant

We installed a Selective Catalytic Reduction (SCR) technology in the casting line, with a 450 m³/min capacity, effectively removing NOx emissions and enhancing air quality.

Nachterstedt Rolling Plant

We installed a Regenerative Thermal Oxidizer (RTO) with heat recovery to reduce CO emissions, which is scheduled for commissioning in FY 2025-26.

These efforts reinforce our commitment to environmental compliance, air quality management, and emission reduction across our operations.

Air Emissions ('000 MT)

Pollutants	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Novelis	Total	FY 2023-24				FY 2024-25			
					Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Novelis	Total	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Novelis	Total
Oxides of Sulphur (SOx)	84.68	5.52	0.12	90.32	87.04	3.58	0.08	90.70				
Oxides of Nitrogen (NOx)	37.42	2.63	1.98	42.03	42.05	1.85	1.91	45.81				
Total Particulate Matter (PM)	14.67	0.50	0.74	15.91	14.86	0.28	0.73	15.87				
Fluoride	0.07	-	-	0.07	0.13	-	-	0.13				

Retrofitting Emission Control Devices for Diesel Generator (DG) Sets

To ensure compliance with the revised emission norms by the Central Pollution Control Board (CPCB) for power-generating set engines, we undertook a comprehensive assessment of all plants with DGs. This initiative aligns with the broader environmental goals outlined by the Ministry of Environment, Forest and Climate Change (MoEFCC) under the National Clean Air Programme (NCAP), aimed at preventing, controlling, and abating air pollution in urban and regional areas.

After the assessment, we proactively installed 68 advanced emission control devices across identified locations. This significant compliance effort was supported by a capex allocation of ₹15.97 crore, underscoring our commitment to sustainable operations and air quality improvement.

Clean Air to Breathe for All

At Hindalco, we are dedicated to improving air quality and minimising environmental impact through our ‘Clean Air to Breathe for All’ project.

Reducing SOx Emissions with Flue Gas Desulphurisation (FGD) Units

To tackle sulphur oxide (SOx) emissions from fuel combustion, we commissioned FGD units at our Aditya and Mahan plants. These installations have led to an impressive 60% reduction in SOx emissions at both plants, reinforcing our commitment to cleaner air. The installation of FGD is actively underway at Renusagar.

Auto-Lime Dosing System for Effective Sulphur Removal

At Hirakud and Muri, we have deployed Auto-Lime Dosing Systems, a technology for reducing sulphur emissions from stacks. These systems inject hydrated lime or quicklime into the flue gas stream, enabling a chemical reaction that neutralises sulphur dioxide and forms calcium sulphate, which is later removed. This system has also helped us to adhere to regulatory norms while advancing sustainability.

Transition to Cleaner Fuels

To significantly reduce particulate matter (PM) and SOx emissions, we are shifting from heavy fuel oil to cleaner alternatives such

as piped natural gas (PNG) in our furnaces and smelters. This transition ensures lower emissions and greater efficiency, supporting a greener footprint.

Striving for ‘Good’ Ambient Air Quality Index (AQI)

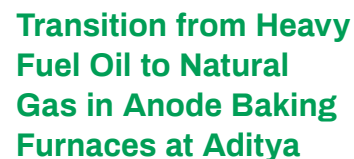
In alignment with national standards, we are committed to achieving ‘Good’ Ambient Air Quality Index (AQI: 0–50) in and around our operations. To make this vision a reality, we have introduced several measures to enhance air quality:

- + **Clean Transportation:** Adopted solar-powered and battery-operated vehicles for internal mobility.
- + **Eco-Friendly Bulk Material Movement:** Switched to gas-based and electric options for external transport of bulk materials.
- + **Fugitive Emissions Control:** Implemented closed conveyors, fog cannons, water sprinklers, wind barriers, dense green cover, and bag filters to curb airborne pollutants.

Through these comprehensive initiatives, we continue to lead the way in sustainable air quality management, ensuring a healthier environment for all.



Windscreens installed at the coalyard in Dahej to reduce air emissions, ensuring cleaner air for everyone.



At our Aditya smelter, we previously relied on Heavy Fuel Oil (HFO) for the process in anode baking which led to a higher emission footprint. To address this, we conducted a feasibility study to convert the HFO-based firing system to a natural gas-based one. Consequently, we identified gas pipeline projects to ensure an uninterrupted supply of natural gas. With a capex of ₹40 crore, we successfully commissioned this project in two units.

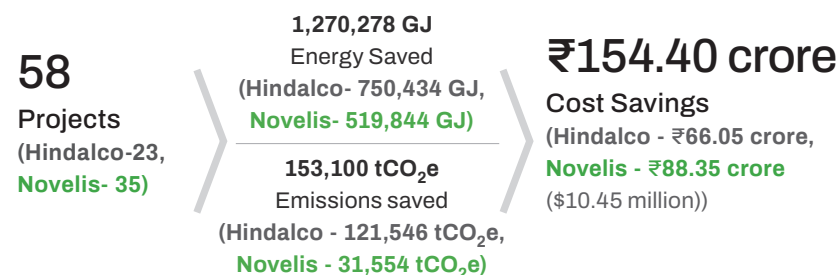
This initiative has resulted in a 60% reduction in SOx emissions, leading to cleaner operations and reduced production costs. It has also contributed to a 29% reduction in the cost of fuel per tonne of baking (from ₹2,600/tonne to ₹1,844/tonne) and a 29% reduction in the cost of fuel per tonne of hot metal (from ₹1,066/tonne to ₹756/tonne).

Novelis Installs Air Pollution Control System at Ulsan

As environmental regulations become increasingly stringent, we have implemented air pollution control systems to minimise emissions and ensure compliance. In the cold line at Ulsan, we installed a bag house to efficiently capture and remove dust, reducing particulate matter to less than 30% of the regulatory limit. For the hot line, we deployed a comprehensive system to tackle multiple pollutants, including Selective Catalytic Reduction (SCR), a Bag House, and a Scrubber. This system is expected to control emissions, keeping dust levels below 30% of the limit, NOx below 60%, and HCl below 50%, significantly reducing environmental impact. We have also installed an SCR in the pusher furnace, with a capacity of 1,148 m³/min, to effectively remove NOx emissions.

Initiatives to reduce energy consumption and emissions

Guided by our steadfast commitment to sustainability, we have implemented initiatives which have resulted in the conservation of 1,270,278 GJ of energy and the reduction of 153,100 tCO₂e emissions.



At Hindalco, under the Perform, Achieve and Trade (PAT) scheme, eight of our plants are identified as Designated Consumers (DC). Seven of these plants — Renukoot, Mahan, Hiralud, Utkal, Belagavi, Muri, and Talaja, were identified in previous cycles (I and II), while one plant, Aditya Aluminium, was identified in cycle III. We achieved 9% and 8.8% energy savings against the 4.7% and 6% targets, respectively, in cycles II and III. We have successfully secured a total of 248,706 Energy Saving Certificates (ESCerts) under the

PAT scheme, recognising our ongoing efforts to reduce specific energy consumption.

India's Carbon Credit Trading Scheme is developed in line with PAT. While PAT focuses on energy consumption norms, CCTS is built around greenhouse gas (GHG) emission intensity norms. In FY 2023-24, authorised agencies completed baseline audits across all our plants, capturing baseline production and GHG emissions (tCO₂/t) as outlined in the notification. All our facilities are on track to achieve the emission reduction targets specified in the notification. As we begin integrating large-scale RTC renewable energy for an aluminium smelter, we're navigating several technical, commercial, and operational challenges. Despite these challenges, our planned projects will enable us to meet the CCTS targets effectively.

At Novelis, to enhance energy efficiency and minimise Scope 1 and 2 emissions, we have implemented various advanced technological systems. Our furnace burners have been upgraded from cold air to regenerative systems, significantly improving fuel efficiency. We've also integrated a furnace automation control system and installed a magnetic stirrer in the furnace of our recycling plant to optimise operations. Additionally, annealing of the furnaces has been carried out to enhance performance, and a screw inverter-type air compressor has been installed to further streamline energy consumption.

To minimise Scope 3 emissions, we are enhancing recycling capacities and capabilities and collaborating with customers and partners to implement closed-loop recycling systems. Additionally, we are pioneering the development of new alloys that incorporate a higher percentage of recycled inputs and can be efficiently repurposed into high-value products at the end of their lifecycle. By engaging across the value chain, we are ensuring that materials are neither downcycled nor diverted to landfills.

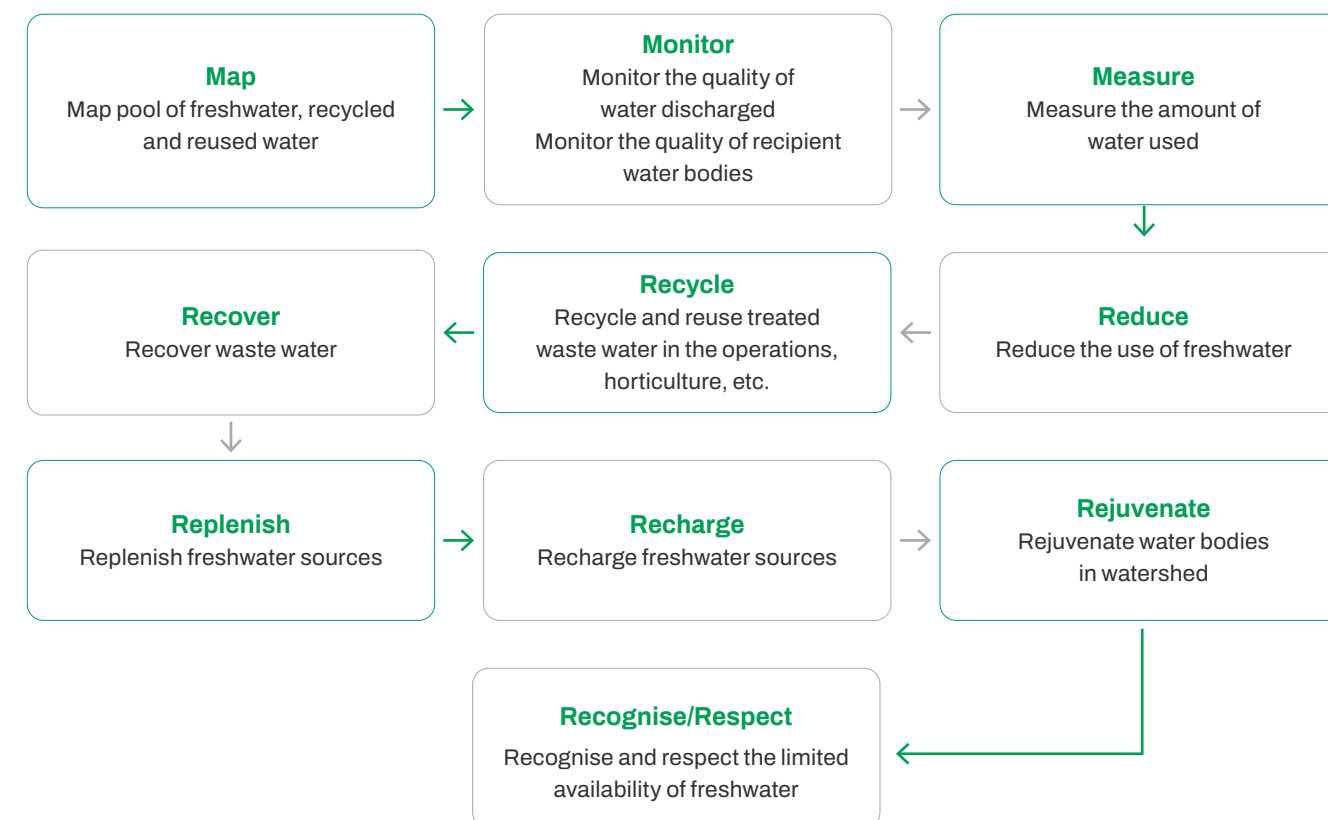
During the reporting period, we avoided approximately 8,290 tCO₂e emissions by recycling 84 billion used beverage cans. Our products contain 63% recycled content, with a total of 2,363 KT of scrap material processed and helping us avoid nearly 20 million tCO₂e emissions overall.

Water Stewardship in Action

We firmly acknowledge the significance of water management for the continuity of our operations. In our commitment to sustainability, we have embraced Niti Aayog's 3M+7R framework, not only to achieve water neutrality but also to significantly enhance our operational efficiency.



NITI Aayog's water neutrality framework





Anchored by the six strategic pillars, our dedication to water stewardship lays the foundation for achieving our ambitious goals in water conservation and promoting responsible water management. Guided by the Aditya Birla Group's Water Stewardship Policy and Hindalco's Environment Policy, we integrate water stewardship practices across all our operations.

Smart Water Management

- + We have developed water balance on actuals for 19 plants.
- + We continuously monitor and report the fluctuations using digital platforms.

Segregating process water and storm water

- + All the plants are adding drains for process water and stormwater.
- + This water is sent to the ETP, TWRU systems for treatment and reused in the operations.

Enhancing 3M+7R framework

- + We are maximising reduce, recycle and reuse within the operations.
- + We have constructed 54 rainwater harvesting structures with holding capacity 432,411 m³ and harvested 1,297,235 m³ in the reporting year.

ZLD implementation with tertiary water treatment

- + 16 plants have achieved ZLD
- + Technological upgrades being done to achieve ZLD at all our plants

Water security risk identification

- + We regularly conduct risk assessments and have developed action plans.
- + We focus on water stress areas to reduce freshwater consumption.

Ensure compliance

- + We adhere to all the applicable laws and regulations and monitor the effluent quality regularly before discharge.



A 6000 KL pond in Belagavi that stores ETP-treated water. This initiative has reduced dependency on freshwater

Hindalco

Targets

- + To achieve **20%** reduction in specific water consumption by 2025 against the baseline of FY 2018-19.
- + To achieve water positivity across our mining sites by 2025 and across all our operations by 2050.
- + To achieve **Zero Liquid Discharge (ZLD)** status by FY 2025-26 for Aluminium business and FY 2029-30 for Copper business.

Progress

- + **9.8%** specific water consumption reduction in aluminium operations and **25.36%** in copper operations from FY 2018-19
- + **Water positivity at Mines** - Bagru (0.86 times), Netarhat (2.25 times), Pakhar (1.87 times), Shredang (16.56 times), Samri (1.49 times)
- + **Water positivity at operations Scope-1 (Aspiring category)** certification for **5 plants** (Aditya, Hirakud, Utkal, Alupuram, Belagavi)
- + **Water neutral**- Mouda
- + **16 plants** out of **19** achieved ZLD

Novelis

Targets

- + To reduce water intensity by **10%** at all our operations by 2026 from the base year of 2020.

Progress

- + **7.63%** reduction in water intensity from 2020.

During the reporting year, five of our plants- Utkal, Aditya, Hirakud, Alupuram, and Belagavi- successfully obtained the Scope 1 (Aspiring category) certification which emphasises the maximisation of operational efficiency. Additionally,

these plants have water saving potential of approximately 5 million m³. Next year, we plan to obtain Scope 1 certification for five more plants. In the coming years, we plan to pursue Scope 2 certification which focuses on promoting operational sustainability and addressing critical water supply chains.

Recognising the need for sustainable water management, we have instituted a dedicated Water Task Force (WTF) in each unit to address water-related risks and opportunities. This team has a lead, a convenor and other members. The WTF conducts water-

Water Taskforce Lead

- + Provides guidance and support for project identification and implementation
- + Regularly reviews water related goals and targets

At Novelis, we have developed baseline water use surveys and water balances for our plants. We also have a Global Water Committee that reviews the performance and guides us in implementing best practices. We adhere to all the applicable laws and regulations; however, we encountered a minor violation at our Guthrie, Kentucky, facility regarding the pH level of the stormwater sample, which was 9.39 against a limit of 9.0.

We have partnered with Nalco Water Ecolab to identify water-saving projects and deployed the Nalco Water Quality Intelligence Data Management tool—a digital solution providing real-time insights into utility asset performance. This enables us to detect problems and take corrective action quickly. All our plants have been trained to use this tool, integrating data-led decision-making into our sustainability strategy.

use assessments and ensures water balance across the plant. In addition to these responsibilities, it carries out internal audits to identify inefficiencies, spearheads process improvements, and fosters a culture of continuous innovation through Kaizens.

To uphold transparency and drive progress, the WTF convenes monthly for performance evaluations and updates the CSO quarterly. Moreover, it actively empowers employees by conducting training sessions on effective water management strategies and facilitating knowledge-sharing across all plants.

Water Taskforce Convenor

- + Tracks and monitors projects under the water taskforce
- + Reviews progress of projects at monthly meetings
- + Updates Apex Sustainability Committee during monthly meeting and CSO during quarterly meeting

Water Risk Management for Safeguarding Operations
As water scarcity grows, the risks associated with water availability and quality also rise. To evaluate the potential effects on our operations, we conducted a water risk assessment utilising the WBCSD's India Water Tool (IWT) and the WRI Aqueduct Tool. Our analysis examined several key aspects, such as baseline water stress, annual and seasonal fluctuations, occurrences of flood, drought intensity, upstream storage capacity, and groundwater stress, while also considering dependency and impact-related risks. The results showed that four plants—Dahej, Belagavi, Asoj, and Kuppam—are situated in water-stress regions.

We have identified scenario-wise risks and their operational impact on each plant and the assessment revealed a high risk of seasonal variability across our plants. To measure the seasonal variability, we took into account scenarios such as flash floods, changes

The task forces conduct cross-functional audits to identify opportunities for improvement in water management; and in the reporting year, we conducted audits at 10 plants.

At Hindalco, we have 22 Effluent Treatment Plants (ETPs) and 31 Sewage Treatment Plants (STPs), and we review their performance periodically. Till date, we have reviewed 9 ETPs and 13 STPs of which 7 ETPs and 6 STPs were assessed in the reporting year.

Water Taskforce Members

- + Regularly conduct water use assessment
- + Identify and implement Kaizens
- + Conduct internal water audits

in rainfall patterns due to climate change, droughts, and a declining groundwater table.

To identify the impact on local community we conducted water needs assessment studies. Further, using the comprehensive reports on the hydrogeological characteristics of the watershed, water levels in the CGWB observation wells in the vicinity, and rainfall predictions for the next 30 years in Utkal, Aditya, Hirakud, and Renukoot, we have developed water positivity roadmaps covering specific interventions to be implemented.

We periodically forecast the cost and availability of water, to identify potential demand and supply changes, in view of future expansion and the impact of regulatory changes on the operations. We have estimated that water-related risks could cost us over ₹1,084 crore (₹10.84 billion) due to production disruptions, regulatory water costs, and compliance expenses.

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Financial Statements	



Risk	Impact	Mitigation Actions
Water Stress & Scarcity	+ Four of our plants — Dahej, Belagavi, Asoj, and Kuppam — are in water stress regions. Climate change is increasing seasonal variability, raising risks of droughts in summer and floods in monsoon.	+ We have adopted Niti Aayog (3M+7R) principle for water management across our plants. + We are enhancing water security measures including reuse and recycle of water through TWRU/ ZLD operation. + We have built rainwater harvesting ponds and installed digital water flow meters and dashboards across operations.
Regulatory & Reputational Risks	+ Stricter water withdrawal limits and discharge regulations impact our operations. + Not meeting water efficiency and conservation targets could harm our reputation and social license to operate.	+ We collaborate with regulators, local communities, and industry groups to ensure sustainable water use. + We actively monitor and manage water withdrawal permits and regulatory changes.
Water Pollution Risks	+ Effluents from manufacturing processes require treatment. The discharge of untreated effluents in water bodies may lead to water pollution. + Untreated water may lead to leachate and seepage risks affecting surrounding water bodies.	+ 16 plants have achieved ZLD status. + We have deployed advanced wastewater treatment technologies to ensure quality compliance and to prevent seepage and contamination. + We regularly monitor groundwater quality and collect samples using piezometers. + We conduct a biannual water survey through CGWA- authorised third-party auditors.

Water Withdrawal

Water is a scarce resource, and our approach to sourcing and utilising it is designed to balance efficiency and sustainability. About 85% of our water comes from surface sources, including harvested rainwater.

Additionally, 6% is sourced from third-party suppliers and 5% comes

from groundwater. The remaining 4% comes from seawater for which we integrate desalination. By diversifying our sources, we enhance resilience, reduce stress on a single water source, and ensure responsible extraction, conservation, and efficient use to safeguard the resource for future.

In the reporting year, our water withdrawal was at 92.42 million m³, of which 83.32 million m³ was on account of Hindalco and 9.10 million m³ on account of Novelis. At the mines, we withdrew 0.85 million m³, of which 54% was from groundwater, 31% was from surface water, and 15% was from rainwater.

Water Withdrawal (million m ³)								
	FY 2023-24				FY 2024-25			
	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Novelis	Total	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Novelis	Total
Surface Water	68.55	5.77	2.74	77.06	69.43	6.64	2.33	78.40
Groundwater	0.18	0.1	4.39	4.67	0.65	0.10	3.82	4.57
Seawater	3.49	-	-	3.49	3.65	-	-	3.65
Third-Party Water	2.49	0.01	2.80	5.30	2.63	0.01	2.95	5.59
Total	74.71	5.88	9.93	90.52	76.36	6.75	9.10	92.21
Rainwater	0.27	-	-	0.27	0.21	-	0.001	0.21
Total Water Withdrawal	74.98	5.88	9.93	90.79	76.57	6.75	9.10	92.42

Our water withdrawal from water-stressed areas at Hindalco was 7.03 million m³, which is 8.4% of the total water withdrawn. Freshwater withdrawn in water-stress areas accounted for

3.38 million m³, which is 4.3% of the total water withdrawn. In water stress areas, 52% of the water withdrawn is seawater, which is desalinated and used in the operations.

The increase in water withdrawal is due to increase in copper production as compared to previous year.

Water withdrawal from water stress areas (million m³)

	FY 2023-24			FY 2024-25		
	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Total	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Total
Surface Water	0.62	-	0.62	0.74	-	0.74
Groundwater	0.03	0.10	0.13	0.03	0.10	0.13
Seawater	3.49	-	3.49	3.65	-	3.65
Third-Party Water	2.38	-	2.38	2.51	-	2.51
Total	6.52	0.10	6.62	6.93	0.10	7.03

Water Consumption

Our water consumption is calculated as the difference between water withdrawal and water discharge. In the reporting year, we used 84.80 million m³, of which Hindalco India consumed 81.53 million

m³ and Novelis 3.27 million m³. Our freshwater use was 81.15 million m³, of which Hindalco India consumed 77.88 million m³ and Novelis 3.27 million m³. At Hindalco India, we consumed 7.00

million m³ of water in water stress areas, of which 3.35 million m³ was freshwater. The increase in water consumption is due to increase in copper production as compared to previous year.

Water consumption (million m³)

	FY 2023-24				FY 2024-25			
	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Novelis	Total	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Novelis	Total
Total Water Consumption	73.39	5.88	3.18	82.45	74.78	6.75	3.27	84.80
Fresh Water Consumption (excluding seawater)	69.90	5.88	3.18	78.96	71.13	6.75	3.27	81.15

Water consumption in water stress areas (million m³)

	FY 2023-24			FY 2024-25		
	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Total	Hindalco India (Standalone)	Hindalco India (Subsidiaries)	Total
Total Water Consumption	6.43	0.10	6.53	6.90	0.10	7.00
Fresh Water Consumption (excluding seawater)	2.94	0.10	3.04	3.25	0.10	3.35



Initiatives to reduce water consumption in water stress areas

Dahej

We took up a project to improve the health of cooling towers and enhance the Cycle of Concentration (COC) parameter. Through this project we were able to save 300 m³ of fresh water daily and the water savings amounted to 105,000 m³ annually.

Belagavi

We are set to reduce our freshwater use by approximately 80,000 m³ annually from FY 2026 as we invested in new rainwater harvesting pond in the reporting year. Given our current freshwater withdrawal of 621,344 m³ per annum, this initiative would bring down consumption by around 12.87%. Additionally, we are extending our efforts beyond the fence through CSR initiatives by developing lakes in low-lying areas. These projects are supported by hydrogeological studies and driven by active community engagement.

Asoj

We improved the efficiency of RO system, resulting in freshwater savings of 11 m³/hour. We also optimised our wastewater reuse circuit, which further reduced freshwater consumption by 6 m³/day.

Kuppam

We spent ₹41 lakh to set up the rainwater harvesting system with five structures and a capacity of ~7,200 KL per annum. Through this initiative we reduced the dependency on freshwater sources by ~25% of total annual consumption.

Not a drop lost: Mouda's water saving breakthrough

We launched the Water Neutrality Project at Mouda in 2019 to address the region's growing dependence on the Kanhan River, aiming to reduce surface water withdrawal and promote long-term environmental sustainability. What distinguishes our initiative is its holistic and tech-enabled approach.

We constructed two large rainwater harvesting ponds with a combined capacity of 130,000 KL and installed a state-of-the-art ETP incorporating RO, UF, flocculation, and lamella clarifiers—effectively establishing a closed-loop water management system.



We further enhanced our infrastructure with nano water converters, automatic taps, and sand-carbon filtration systems to meet the quality standards for processed water.

Through these efforts, we've achieved savings of ₹4 lakh per annum, marking a significant environmental milestone for our plant. Our commitment and innovation have been recognised with the CII National Award for Water Management, positioning Mouda as a torchbearer for other downstream plants.

Specific Water Consumption

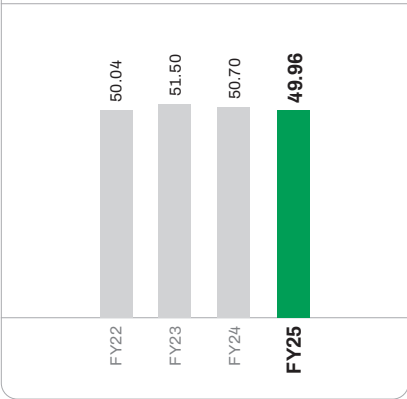
We continuously track progress towards our target of reducing specific water consumption by 20% by 2025, compared to the FY 2018–19 baseline. In the reporting year, the specific water consumption for our aluminium and copper operations stood at 49.96 m³/MT and 9.43 m³/MT, respectively. While calculating the specific water consumption, we take into account the water used in the process (measured through flow meters). This does not include the losses from evaporation and percolation.

For Novelis, the water intensity accounted for 2.42 m³/MT of flat-rolled products, a 10% decrease from the previous year.

At Hindalco India (Standalone), the water intensity with respect to turnover was 801.31 m³/₹ crore in the reporting period and 901.63 m³/₹ crore in the previous year. The water intensity per rupee of turnover adjusted for Purchasing Power Parity (PPP)³ for Hindalco India (Standalone) was 1,655.5 m³/\$ million compared to 2020.64 m³/\$ million the previous year. At Hindalco India (Standalone), the water intensity with respect to turnover in water stress areas accounted for 73.90 m³/ ₹ crore (turnover) as compared to 77.44 m³/ ₹ crore (turnover) in the previous year.

³ International Monetary Fund. (8 June 2025). Implied PPP conversion rate – India. PPP conversation rate 2025 (8 June 2025) – 20.66

Specific Water Consumption- Aluminium (m³/MT)



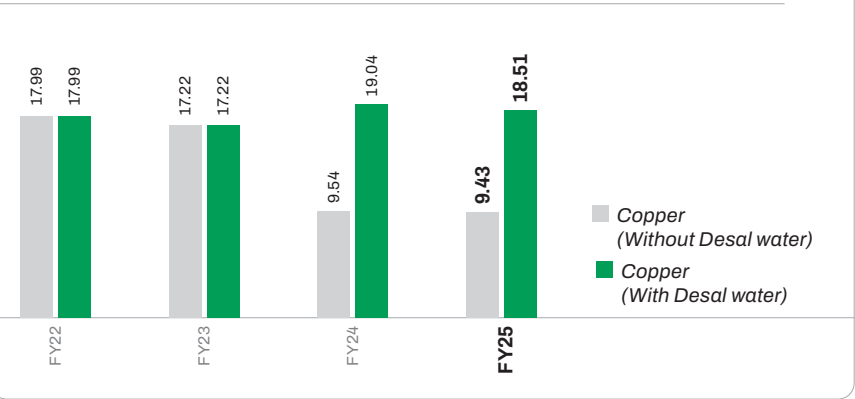
Our Dahej plant lies in a water stress area and used to earlier withdraw water from river Narmada. To reduce dependency on surface water, Gujarat Industrial Development Corporation (GIDC) launched a common desalination project for industries to use seawater in their operations. In 2021, Hindalco invested ₹114 crore in a desalination project to support our operations at Dahej. Today, the desalination project contributes 10 MLD water annually and has reduced our copper plant's dependency on freshwater by 50%.

At Hindalco, we are implementing certain initiatives to optimise water use. These include setting up low-flow fixtures (sensor-based) in restrooms. We are exploring other solutions to save water— such as digital dashboards at Renukoot, Hirakud, Muri, and ways to recycle water used in cooling processes.

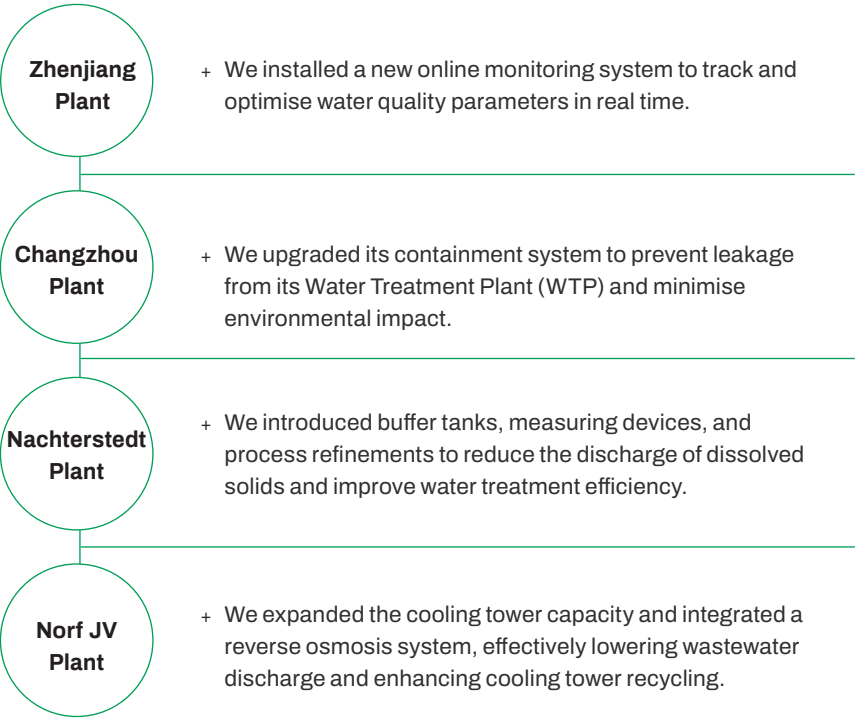
Enhancing Water Efficiency at Hirakud Power Plant

We have installed a digital monitoring system at the Hirakud Power plant to optimise water management. The system includes digital flow meters and sensors which helped create a centralised water dashboard. This dashboard, which consolidates

Specific Water Consumption- Copper (m³/MT)



At Novelis, we implemented multiple water quality enhancement projects across global operations, reinforcing our commitment to sustainable water management.





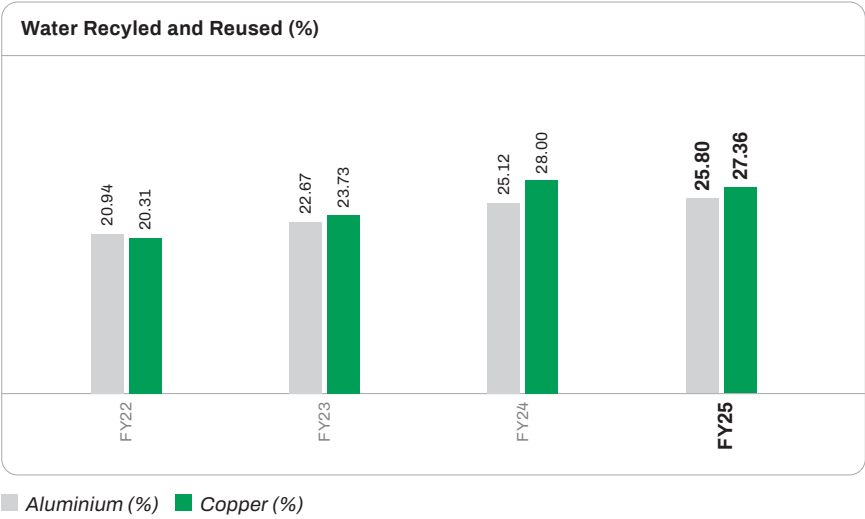
Reusing and Recycling Water, Preserving Resources

In a concerted effort to reduce our reliance on freshwater sources, we have enhanced water recycling and reuse initiatives across our operations, gardening, and sanitation systems. In the reporting period, our commitment to water stewardship resulted in recycling and reusing 19.09 million m³ of water. This included 17.05 million m³ recycled at our aluminium facilities, achieving a rate of 25.80%, and 2.04 million m³ recycled at our copper operations with a rate of 27.36%.

Our water management strategy involves utilising recycled water in processes such as dust suppression,

wheel cleaning, sanitation, and flushing systems. By treating and repurposing sewage water, we contribute to conserving freshwater resources by using it in cooling towers and sanitation facilities. Furthermore, our approach includes providing tertiary treatment to blowdown from cooling towers and boilers, effectively recycling it as make-up water within our operations.

Novelis' progressive water reuse practices is showcased at their Ulsan plant, where an advanced filtration system has enabled the recycling of wastewater from the cooling tower at a rate of 4 million m³ per hour.



Water conservation at Aditya

At Aditya, we launched a water recovery and conservation project to reclaim water from the smelter effluent stream. Previously, this water used to flow to the ash pond.

Installing a Tertiary Water Recycling Unit (TWRU), with a capacity of 200 KLD, proved to be a turning point in water conservation. Before the unit had been set up, treated water from the effluent ETP used to evaporate. With the implementation of a thermal evaporation

system, we now recover and reuse over 95% of water in our operations. Additionally, the Mechanical Vapour Recompression (MVR) system treats RO reject water and recovers more than 190 KL of water daily from the effluent stream, significantly enhancing our water efficiency. These efforts led to a daily reduction of 180-190m³ freshwater consumption and the complete elimination of effluent discharge into the ash pond.

Terre Haute Closed-Loop Water System: Conservation through innovation

Earlier, at Novelis' Terre Haute plant, we relied on a cooling water system and consumed groundwater from a subsurface aquifer. In alignment with our commitment to environmental stewardship, we decided to transform the once-through cooling water system into a closed-loop water system, with a water recycling rate of approximately 90%. The key enhancements involved the installation of a new cooling tower, upgrading the heat exchangers and integrating essential piping, infrastructure, and electrical systems to support the closed-loop operation. The project will be commissioned in FY 2025-26, and we anticipate saving approximately 575,000 m³ of water annually, showcasing our dedication towards resource conservation and sustainability.

Driving Efficiency: Enhanced Cooling Tower Cycles at Novelis Pinda

To optimise water consumption at the Pinda plant, we enhanced the cooling tower cycles in the water remelt system, a significant step towards sustainable operations. As part of the initiative, we introduced a new chemical component to the water treatment, which aimed to reduce the sulphate concentration and thereby increase the concentration cycles. Before applying the chemicals, we conducted lab testing to validate the efficacy of the new chemical additives. By successfully increasing the cycles in the cooling towers from 2.6 to 3.5, we achieved a substantial reduction in water consumption.

Striving for Zero Liquid Discharge

At Hindalco, efficient treatment of effluents and sewage is a major step in our journey towards Zero Liquid Discharge (ZLD). Hindalco India (Subsidiaries) have achieved ZLD, setting the pace for our ongoing efforts across other locations.

Water Discharge (million m ³)						
	FY 2023-24			FY 2024-25		
	Hindalco India (Standalone)	Novelis	Total	Hindalco India (Standalone)	Novelis	Total
(i) To Surface water	-	3.930	3.930	-	3.283	3.283
No treatment	-	3.590	3.590	-	2.835	2.835
With treatment	-	0.350	0.350	-	0.449	0.449
(ii) To Groundwater	-	0.170	0.170	-	0.119	0.119
No treatment	-	0.170	0.170	-	0.119	0.119
With treatment	-	-	-	-	-	-
(iii) To Seawater	0.090	-	0.090	0.030	-	0.030
No treatment	-	-	-	-	-	-
With treatment	0.090	-	0.090	0.030	-	0.030
(iv) Sent to third parties	0.010	-	0.010	0.001	-	0.001
No treatment	-	-	-	-	-	-
With treatment	0.010	-	0.010	0.001	-	0.001
(v) Others	-	-	-	0.002	2.431	2.433
No treatment	-	-	-	-	-	-
With treatment	-	2.650	2.650	0.002	2.431	2.433
Total water discharged	0.100	6.750	6.850	0.033	5.834	5.866

The change in last year's data is due to change in calculation methodology. We have reported the sewage generated in the colonies separately. Our treated sewage discharge from Renukoot and Belur colonies accounted for 1,761,370 m³ in the reporting year and 1,485,401.15 m³ in the previous year.

We have made progress in water-stressed regions reducing our overall discharge by 66% compared to previous year. These significant reductions underscore commitment to sustainable water management.

Water Discharge in water stress areas (million m ³)		
	FY 2023-24	FY 2024-25
	Hindalco India (Standalone)	Hindalco India (Standalone)
To Seawater (with Treatment)	0.090	0.030
Sent to third parties (with treatment)	0.002	0.001
Total water discharged	0.092	0.031

Adopting Zero Liquid Discharge: A Transformation at Hindalco Kuppam

Situated in a water-stress region in Andhra Pradesh, our Kuppam plant took a transformative step towards water sustainability by targeting ZLD. Earlier, effluent from the ETP was routed to the Common Effluent Treatment Plant (CETP) and pond without reuse.

After conducting a rigorous streamwise effluent evaluation, treatment, and optimisation, we implemented a ZLD system of 60 KLD with an investment of ₹20 crore. The treated effluent now passes through a Thermal Evaporation unit and in this process, only 8-10% of the water is lost as moisture, while the remaining is efficiently recycled back into the operations.

Since commissioning the ZLD system, freshwater consumption has reduced by approximately 55 KLD with estimated reduction of 19,000 m³ in annual groundwater withdrawal, marking a major step forward in our water circularity efforts.



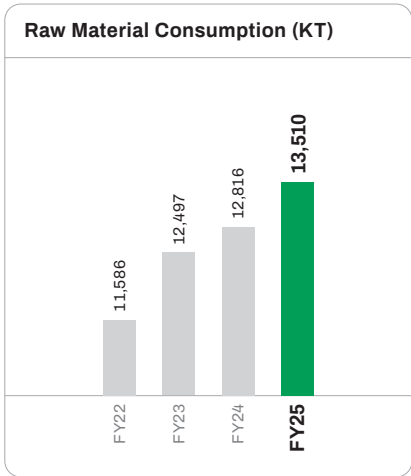
Circular Economy, Recycling and Zero Waste to Landfill

Raw Material Stewardship

At Hindalco, we optimise production efficiency and minimise our environmental footprint to ensure responsible utilisation of resources. We incorporate circularity in our operations, maximise resource efficiency and promote reuse and recycling of materials.

During the reporting period, we consumed 13,536 KT of total materials, of which 13,510 KT accounted for raw materials. The associated materials accounted for 12 KT. For packaging, we consumed 18.97 KT of wood, 1.75 KT of paper, and 5.49 KT of other materials. We have taken innovative steps to reduce consumption of packaging material. One such initiative was the use of collapsable and reusable metal boxes to replace 2000+ cubic feet of wood.

The 5% increase in our raw material consumption is due to business expansion and increased production. At all our smelters, we are reducing the consumption of aluminium fluoride through initiatives such as replacement of 100% ducts and FTP bags, installing new compressors and improving efficiency of pot hooding. This is helping us achieve the norms and go beyond.



Aluminium scrap ready for recycling at Hindalco

Material consumption- Hindalco (KT)				
Material type	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25
Bauxite	9,598.77	10,386.72	10,637.86	11,385.42
Aluminium fluoride	21.78	18.27	16.40	19.85
Calcined petroleum coke	465.67	497.59	513.46	511.20
Caustic soda	254.36	254.23	275.41	305.97
Pitch	137.77	112.30	113.10	115.17
Ammonia	0.02	-	0.03	0.03
Copper Concentrate	1,108.06	1,227.62	1,149.17	1,172.44

At Hindalco, we take steps to increase the consumption of recycled materials. At Hindalco India (Standalone), 5.97% of the total input material from end of life (aluminium, copper) scrap was recycled and reused, compared to 5.62% in the previous year. At Hindalco India (Standalone and Subsidiaries), 2.67% of the total input material from scrap was recycled and reused.

At Novelis, one of the objectives of the 3x30 Vision is to accelerate circularity and achieve 75% average recycled content in our operations. In the

reporting year, at Novelis, we recycled over 84 billion used beverage cans and consumed 2,372 KT of scrap, achieving 63% average recycled content in our products. Additionally, we also consumed 1,460 MT of primary ingots and alloys. We are increasing our recycling capacities and capabilities to reduce the consumption of primary aluminium and support our decarbonisation efforts.

Transforming Waste into Value

At Hindalco, we take a holistic approach to waste management, not just reducing waste but transforming it into valuable resources, reinforcing our dedication to sustainable practices. To ensure effective waste management and regulatory compliance, we have instituted Waste Management Taskforce (WaMTF) at plants. The WaMTF comprises a leader, a convenor, and other team members from different functions

and collaborates with stakeholders to develop and implement waste disposal strategies. The taskforce convenes monthly to review waste management practices, ensuring that we stay aligned with our commitments and continue to drive progress. The Corporate Sustainability team reviews the progress half yearly. The taskforce periodically conducts waste-management training at plants.

At Novelis, our Global Waste Management Committee, comprising experts from operations, R&D, and engineering, guides in advancing waste reduction strategies. Reporting to our Global Sustainability Steering Committee, this team develops targeted waste minimisation plans, shares best practices, prioritises key initiatives, and secures funding for impactful projects.

Taskforce Leader

- + Strategic planning and decision making to achieve goals
- + Review progress towards goals
- + Benchmark waste management practices with national and international peers

Taskforce Convenor

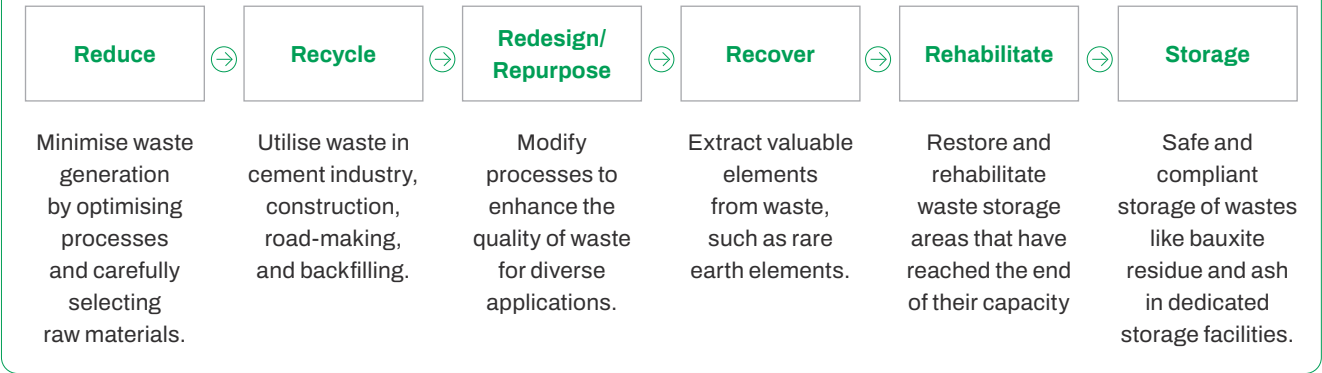
- + Organise and schedule internal meetings
- + Track and develop action plans to meet goals
- + Maintain operational efficiency

Team members

- + Implement industry best practices to achieve zero waste to landfill
- + Provide technical expertise on waste management
- + Collaborate with stakeholders such as startups, institutions, prospective users and regulatory authorities

At Hindalco, we have adopted a comprehensive waste management strategy emphasising minimisation, resource recovery, and circularity. Our 5R+1S framework—Reduce, Recycle, Redesign/Repurpose, Recover, Rehabilitate, and Store — serves as the cornerstone of our waste management strategy, ensuring an integrated and forward-thinking approach that aligns with our environmental policies and UN Sustainable Development Goal 12 (Responsible Consumption and Production).

5R+1S framework





We are committed to responsible management of waste in full compliance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules. Every waste stream is managed through authorised recyclers, co-processing units, or secured landfills, ensuring environmental safety and sustainability.

Beyond compliance, we actively work to reduce the use of hazardous and toxic chemicals in our processes.

Our approach includes substitution with safer alternatives, process innovation, strict monitoring & control, and adherence to national and international regulations.

Beyond our operations, we extend our commitment to waste reduction and responsible practices across the value chain, reinforced through our Supplier Code of Conduct, ensuring that sustainability is embedded at every level.

Additionally, we identify waste-related risks and implement mitigation measures to ensure environmental responsibility and compliance. The risks are also integrated into the enterprise risk management framework.

To further minimise risks, we audit waste disposal facilities annually. In the reporting year, five of our plants — Aditya, Belagavi, Mahan, Muri, and Renusagar — were certified Zero Waste to Landfill (ZWTL) by a third-party. With this achievement, 8 out of 19 of our plants now hold ZWTL certification, marking significant progress in our ongoing efforts to minimise environmental impact.

In addition, we actively invest in research and development to drive innovation in waste management. In the reporting year, we allocated ₹30.73 lakh towards waste-related R&D initiatives and committed ₹448.78 crore in operating expenses to facilitate the use of bauxite residue, ash, copper slag, etc.

At Novelis, we are guided by our Waste Management Performance Standard, which ensures proper classification, handling, storage, segregation, and disposal while maintaining auditing and compliance protocols. These standards extend to both our operations and contractors, reinforced through annual training and audits. We track waste data monthly in EtQ management databases, with quarterly validation by our corporate EHS team to ensure accuracy and accountability.

Additionally, our R&D teams are driving innovation in recycling technologies, particularly for dross, while our committee promotes best practices across operations. In the reporting year, we reinforced our sustainability efforts through global training across all plants, ensuring alignment with our long-term environmental goals.

To uphold industry best practices, we conduct third-party audits every three years, complemented by annual corporate audits and regulatory compliance reviews every four years. Our commitment to sustainability is further demonstrated by our Pindamonhangaba Plant receiving Zero Waste Certification from the Zero Waste International Alliance, validating our success in landfill diversion and sustainable waste practices.

At Hindalco, we are committed to Zero Waste to Landfill (ZWTL) by 2050 and at Novelis, we have set a target to reduce waste-to-landfill intensity by 20% by 2026 from 2020 baseline.

Risk	Impact	Actions taken
Regulatory and compliance risks	+ Failure to comply with waste and tailings management regulations could result in fines, harm to reputation, and lead to even operational shutdowns.	+ We adhere to all relevant regulatory laws, ensuring full compliance across operations. + All our tailings storage facilities (TSFs) for bauxite residue (red mud) comply with GISTM guidelines. + We periodically conduct internal audits and stability assessments through independent geotechnical experts to monitor the structural integrity of storage dams and enhance preparedness and mitigation against overtopping or subsidence risks.
Operational and Structural Risks	+ We operate 19 TSFs, with three classified as high-risk and two as significant-risk facilities. + Risks associated with these facilities include dyke instability, seepage, and failure due to extreme weather conditions.	+ We minimise waste by dispatching bauxite residue to cement plants and rehabilitate the legacy storages. + We conduct regular geotechnical evaluations with independent experts to ensure structural integrity. + We utilise drone surveys and geotechnical monitoring tools, including piezometers and inclinometers, to provide continuous oversight of our facilities.
Waste Disposal Risks	+ Insufficient recycling and refurbishing capacity, especially in remote areas, can lead to improper disposal of waste. + Operational delays and waste accumulation may result in regulatory non-compliance and hurt reputation. + Higher costs for alternative disposal methods can strain resources. + Challenges in waste management may hinder progress towards Zero Waste to Landfill (ZWTL) goals.	+ 85% of our waste is sent for recycling to authorised recyclers, pre-processors and co-processors. + We ensure 100% compliance with Extended Producer Responsibility (EPR) regulations for plastic packaging waste, earning the plastic EPR credits. + We continuously invest in R&D initiatives to develop waste-to-value solutions, including metal recovery, construction materials, and industrial applications.
Pollution risks	+ Improper storage, handling, or leakage of waste could result in land, air, and water contamination, posing environmental and health risks. + Pollution concerns may lead to scrutiny from surrounding communities, potentially affecting trust and social license to operate.	+ We follow standard operating procedures (SOPs) to ensure safe handling and storage of waste. + We conduct periodic audits to uphold compliance and best practices. + We continuously engage with communities to address concerns and promote awareness. + We develop green belts and structural safeguards near storage areas to mitigate ecological impact.

Hindalco

Targets

- + To achieve **Zero Waste to Landfill** by 2050

Progress

- + **8 out of 19 plants** with ZWTL certification
- + **21 single-use plastic-free sites** till date (18 plants, 3 mines); 5 sites in FY 2024-25
- + **85%** recycling of non-hazardous and hazardous waste

Novelis

Targets

- + To reduce waste-to-landfill intensity by **20%** by 2026 from 2020 baseline

Progress

- + **12%** reduction in waste to landfill intensity from the baseline
- + **4 sites** with ZWTL certification

Waste Generation and Utilisation

At Hindalco, waste generation is a part of our value chains, emerging at every stage from raw material extraction to finished product delivery. We process bauxite ore and copper concentrate along with chemicals and consumables, resulting in bulk, non-hazardous and hazardous waste. Our bulk process wastes — including bauxite residue, fly ash, spent pot lining (SPL), aluminium dross, vanadium sludge, and copper slag — require scientific storage, reuse, or co-processing to minimise environmental impact. Meanwhile, hazardous wastes like ETP sludge, used oils, fluoride-contaminated materials, and used anode butts require handling and disposal through

authorised channels. We also manage non-hazardous waste, such as scrap and packaging materials through recycling initiatives and third-party collaborations. Additionally, plastic waste, e-waste, used batteries, biomedical waste, municipal solid waste, and construction debris are processed responsibly within regulatory frameworks.

At Novelis, our primary waste streams — dross, salt cake, filter residues, baghouse dust, and refractory materials — are managed with a focus on recovery and reuse. We strive to produce aluminium alloys with high downstream recyclability, ensuring a sustainable lifecycle for our products.



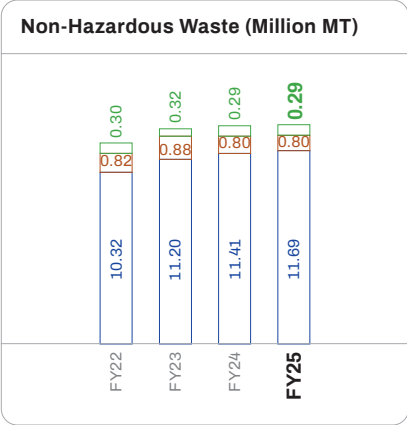
In FY 2024-25, we generated 13.37 million MT of waste, of which 13.01 million MT was generated by Hindalco and 0.36 million MT by Novelis. Of the total waste generated, we diverted 85% from disposal. The increase in waste generation is due to business expansion and increase in production.



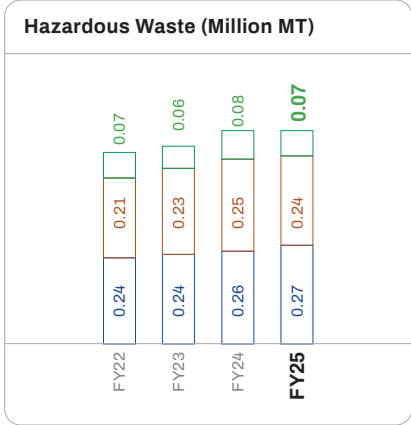
Non-Hazardous Waste (Million MT)						
		Waste Generation	Recycled and reused	Landfill/TSFD	Stored in approved structures	Incineration
FY 2021-22	Hindalco India (Standalone + Subsidiaries)	11.140	9.610	-	2.310	-
	Novelis	0.320	0.290	0.029	-	-
	Total	11.460	9.900	0.029	2.310	-
FY 2022-23	Hindalco India (Standalone)	8.858	10.321	0.002	-	-
	Hindalco India (Subsidiaries)	3.229	0.396	-	2.833	-
	Novelis	0.320	0.290	0.026	-	0.002
	Total	12.407	11.007	0.028	2.200	0.002
FY 2023-24	Hindalco India (Standalone)	8.945	9.995	-	-	-
	Hindalco India (Subsidiaries)	3.263	0.422	-	2.602	-
	Novelis	0.290	0.260	0.029	-	0.007
	Total	12.499	10.677	0.029	2.602	0.007
FY 2024-25	Hindalco India (Standalone)	9.014	10.131	0.000	0.003	0.000
	Hindalco India (Subsidiaries)	3.476	0.511	0.001	2.971	0.000
	Novelis	0.288	0.263	0.024	-	0.002
	Total	12.779	10.904	0.025	2.974	0.002

Hazardous Waste (Million MT)						
		Waste Generation	Recycled and reused	Landfill/TSFD	Stored in approved structures	Incineration
FY 2021-22	Hindalco India (Standalone + Subsidiaries)	0.450	0.370	0.100	0.010	-
	Novelis	0.070	0.050	0.005	-	-
	Total	0.520	0.420	0.105	0.010	-
FY 2022-23	Hindalco India (Standalone)	0.477	0.363	0.116	0.004	0.002
	Hindalco India (Subsidiaries)	0.0002	0.0002	-	-	-
	Novelis	0.060	0.050	0.006	-	0.002
	Total	0.537	0.413	0.122	0.004	0.004
FY 2023-24	Hindalco India (Standalone)	0.504	0.405	0.240	-	0.001
	Hindalco India (Subsidiaries)	0.0004	0.0001	-	0.0003	-
	Novelis	0.080	0.072	0.005	-	0.002
	Total	0.584	0.477	0.245	0.001	0.003
FY 2024-25	Hindalco India (Standalone)	0.515	0.448	0.159	0.000	0.001
	Hindalco India (Subsidiaries)	0.0006	0.0005	-	0.0001	-
	Novelis	0.070	0.064	0.005	-	0.002
	Total	0.586	0.512	0.164	0.000	0.003

Waste Generation- Hindalco Standalone (MT)		
	FY 2023-24	FY 2024-25
Plastic waste	2,138.89	2,288.81
E-waste	212.74	342.98
Bio-medical waste	15.54	16.27
Construction and demolition waste	305.28	1,247.88
Battery waste	128.28	99.99
Radioactive waste	-	-
Municipal Solid Waste	3,330.39	2,797.34
Other Hazardous waste	5,03,335.66	5,14,801.75
Other Non-hazardous waste generated	89,39,447.76	90,07,759.65
Total waste generated	94,48,914.53	95,29,354.67



Aluminium Copper Novelis



Aluminium Copper Novelis

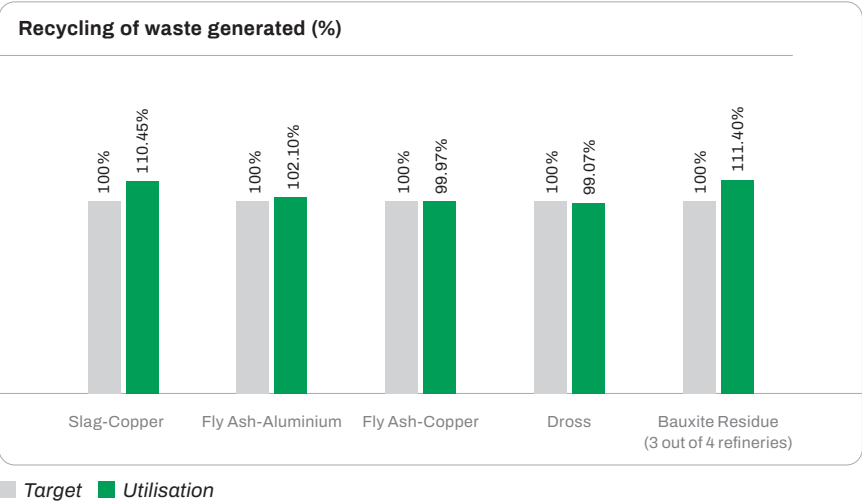
5,891 tonnes of reclaimed waste was recycled by Hindalco in FY 2024-25

In India, we are registered as a brand owner under the Plastic Waste Management Rules, 2016 and have integrated Extended Producer Responsibility (EPR) compliance across 13 applicable operation sites.

In the reporting period, we recycled around 5,891 MT of reclaimed waste. We ensure compliance and have partnered with the CPCB registered plastic waste processors and recyclers.



All our waste is processed by recyclers, pre-processors and co-processors authorised by Central & State Pollution Control Boards.



In FY 2024-25, waste intensity of Hindalco India (Standalone) was 102.13 MT/₹ crore (turnover) compared to 113.83 MT/₹ crore in the previous year. The waste intensity per rupee of turnover adjusted for Purchasing Power Parity (PPP) is 211 MT/\$ million¹⁴ compared to 255 MT/ \$ million in the previous year. The waste intensity for aluminium operations accounted for 6.42 MT/ MT of primary aluminium production in the reporting year and 6.31 MT/ MT of primary aluminium production in the previous year. The waste intensity for copper operations accounted for 2.59 MT/ MT of copper cathode production in the reporting year and 2.83 MT/ MT of copper cathode production in the previous year. For Novelis, the waste-to-landfill intensity accounted for 22.55 kg/ MT of FRP shipped.

We continuously implement initiatives to uphold our commitments to sustainability and operational efficiency. At Novelis, we enhanced

wastewater treatment by installing a sludge dehydrator at Yeongju, significantly reducing sludge moisture content and improving waste management practices. This advancement minimises waste volume and ensures regulatory compliance and seamless operational continuity. As a result, general waste generation has decreased by 5–10%, reinforcing our commitment to sustainable waste management.

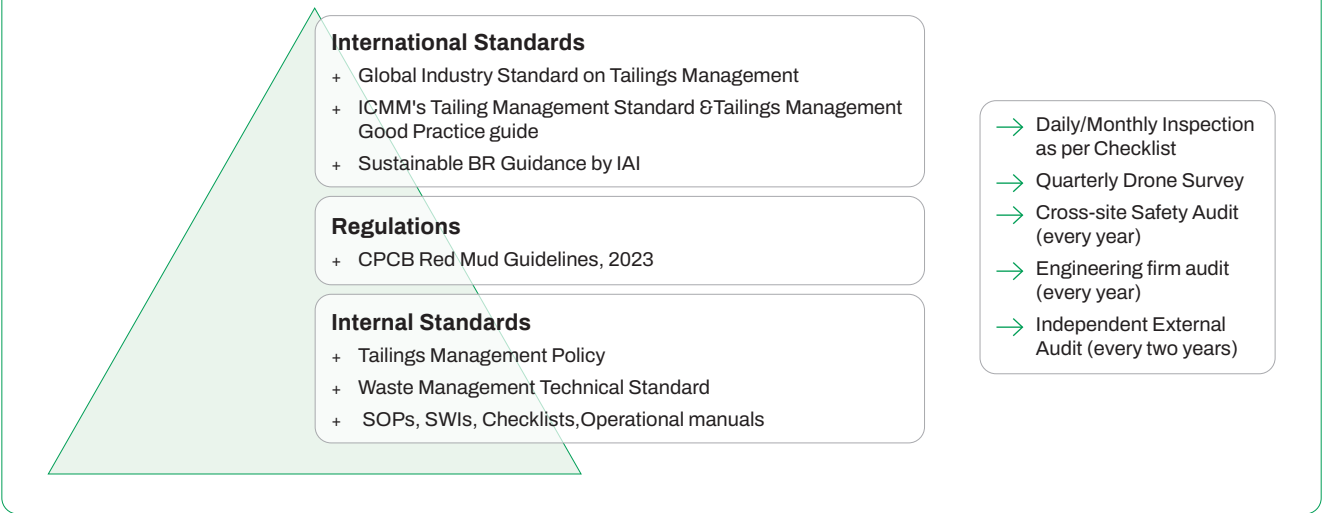
We are committed to reducing landfill waste through organic waste composting at Pinda plant. By developing and qualifying suppliers for composting, we ensure that all organic waste from our factory restaurant, as well as grass and tree pruning, is diverted from landfills and composted. As a result, we successfully prevented 188 tonnes of organic waste and vegetation from being deposited in landfills.

Strengthening Tailings Management

At Hindalco, our commitment to responsible tailings management is guided by our Tailings Management Policy, which aligns with the Global Industry Standard on Tailings Management (GISTM). Adhering to the ABG Technical Standard on Solid and Hazardous Waste Management and the Mining Waste Management Guidance, we ensure that both hazardous and non-hazardous waste is managed effectively. In line with our Sustainable Mining Charter, we have established a Life-of-Mine Tailings Management Plan to uphold environmental stewardship throughout the operational cycle. This strategic framework ensures that every aspect of tailings management is meticulously planned and executed, reflecting our commitment to operational excellence and environmental protection.

Central to our success in tailings management is a robust Tailings Governance Framework that emphasises the pivotal elements of effective management and governance of tailings. Each facility has a dedicated Tailings Management Team with clearly defined roles and responsibilities. Each TSF is managed by a Responsible Tailings Facility Engineer (RTFE) who is supported by an Engineer of Records (EoR), reporting to the Accountable Executive (Unit Head) to maintain operational integrity. An Independent Tailings Review Board, comprising geotechnical experts from reputed institutions is responsible for providing guidance and oversight on the stability of TSFs. We also have an Apex Tailings Management Committee, comprising members of Excom and independent geotechnical experts.

Tailings Governance Framework



Our refineries at Utkal, Renukoot, Muri, and Belagavi have well-structured TSFs. Belagavi and Utkal each have 2 active Red Mud Disposal Areas (RMDAs), Muri has 4 of which 1 is active, and Renukoot has 11 of which 1 is active.

A comprehensive risk assessment has been conducted across all 19 TSFs, classifying three as high risk, two as significant risk, and the remaining as low risk. Additionally, we have identified bauxite residue slippage beyond designated storage areas as a potential risk.

We have integrated these risks into Enterprise Risk Management (ERM) and Hazard Identification and Risk Assessment (HIRA) system at each refinery. Mitigation measures and controls have been established to address them.

3 out of 19 tailings storage facilities are classified as high-risk, 2 as significant risk and the remaining as low risk

Tailings risk potential	Total number of facilities	Number of facilities identified as 'high-risk potential'	Percentage of high-risk potential sites
Active facilities	6	3	50%
Inactive facilities (including facilities in care and maintenance or closed)	13	0	0
Planned facilities	1	0	0

Our climate risk assessment has identified Belagavi, Renukoot, and Muri as extreme risk zones and Utkal as high risk. Factors contributing to risk include heat index, flooding, drought, geophysical hazards, wildfires, wind, and precipitation. In response, we have implemented climate adaptation strategies across all refineries to safeguard operations against these risks.

We have established an Emergency Preparedness and Response Plan (EPRP) based on three key pillars — prevention, control, and recovery — across all TSFs, ensuring resilience in emergency scenarios. An SOP has been developed to guide responses to breaches in bauxite residue ponds. Our tailings storage facilities undergo regular monitoring, with measures in place to control seepage, dust suppression, and runoff management. As a result of our efforts, none of our facilities faced failure (leakages, overflows, breaches) in the past four years.

We engage actively with communities to build trust, understand risks, and develop post-closure land use objectives. An effective grievance mechanism has been established, with committees at village level to address community concerns. At Belagavi, Renukoot, and Muri, we have undertaken rehabilitation projects to restore inactive red mud disposal areas, ensuring long-term environmental restoration under “Red to Green” programme.

Our mineral waste comprises overburden and tailings, and we are dedicated to reducing it by implementing innovative recycling and reuse strategies. The values of waste rock generated and waste rock reused or repurposed for previous years have been restated due to the standardisation of processes.

¹⁴ International Monetary Fund. (8 June 2025). Implied PPP conversion rate – India. PPP conversation rate 2025 (8 June 2025) – 20.66



Mineral Waste (million MT)				
	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25
Waste rock generated	19.37	25.32	25.68	16.91
Tailings generated	4.68	5.08	5.25	5.56
Waste reused/repurposed	21.75	28.20	28.33	19.78
Waste disposed	2.30	2.20	2.60	2.69

Sustainable Utilisation of Bauxite Residue in Road Construction

The alumina manufacturing process generates significant quantity of bauxite residue as a byproduct. For every tonne of alumina produced, approximately 1.5 to 2 tonnes of this residue is generated. At Utkal, this amounts to ~30 lakh MT annually, leading to vast accumulations of bauxite residue in designated storage areas. This waste remained unused as there were no cement plants in the remote areas where Utkal is located.

Recognising the need to develop alternative application and the surging demand in road construction, we collaborated with premier research institutes, such as CSIR-Central Road Research Institute (CRRI), CSIR-Institute of Minerals & Materials Technology (IMMT), and government authorities like the National Highway Authority of India (NHAI) and Indian Road Congress, to explore the feasibility of using bauxite residue in road construction. This collaboration led to the development of a pilot road near Utkal at Koraput, Odisha.

Through environmental and health impact assessments and laboratory testing, we confirmed that bauxite residue is meeting the MoRTH & IRC specifications and can be safely used in subgrade and embankment construction.

In the reporting year, we successfully utilised 2.3 lakh MT of bauxite residue in road construction, transforming waste into resource, saving the natural soil, and meeting our circularity objectives.

Preventing and Managing Spills

Spills and leaks are a significant challenge in industrial operations, something that requires us to be vigilant and prepared to take swift action. Our Environmental Aspect-Impact Register is a dedicated system to track and assess these risks in our plants. Each risk is documented, and precautionary, preventive, and control measures are mentioned in our risk registers. This is complemented by SOPs, ensuring that safety is embedded in daily operations. Additionally, we also have installed CCTVs at all our various waste storage and material handling areas.

For spills and leaks during material transportation outside our premises, we use fishbone analysis to trace the root cause — whether packaging flaws, transportation mishaps, or procedural gaps — enabling precise corrective actions.

Once root cause has been identified, we collaborate with in-house and external SMEs to take remedial measures in line with industry best practices. In the reporting year, there were no spills and leaks at our plants, mines and facilities, and during material transportation.

At Novelis, we have a Spill Prevention Performance Standard for the proper storage and handling of materials.

Circularity through recycling focus

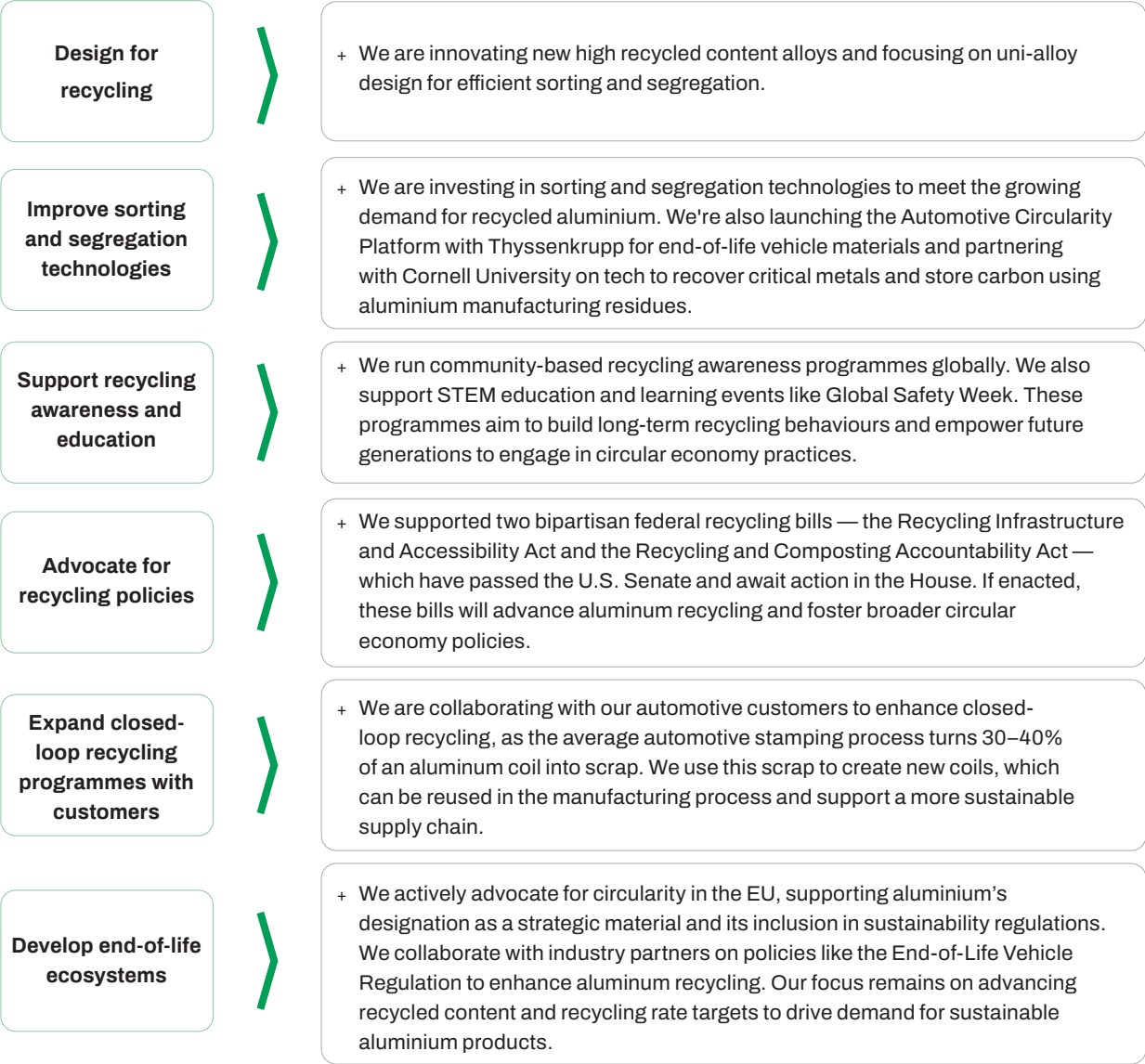
At Hindalco, we are pioneering technological innovation in waste recycling and reuse, driving a transformative shift towards sustainability and circular economy leadership. Our ambitious expansion of

aluminium recycling facilities — targeting a growth of 30 KTPA by FY 2026 and scaling to 200 KTPA by FY 2029 — will be powered by strategic third-party tolling arrangements. Simultaneously, we are harnessing the potential of domestic and global scrap markets, establishing a robust, organised network for sourcing high-quality scrap. As part of our commitment to sustainability, we have introduced two new eco-friendly brands, namely ecoEDGE.G and ecoEDGE.C. The ecoEDGE.C brand features products with inputs from recycled scrap.

In copper operations, we are setting new benchmarks in recycling efficiency, aiming to boost our capacity to 50 KTPA by FY 2025-26 through investments of US\$290 million, and scaling up to 200 KTPA in phases. We are pioneering a first-of-its-kind copper and e-waste recycling, unlocking the potential for recovering high-value metals such as gold, silver, platinum, and palladium. Our cutting-edge process will be capable of recycling Printed Circuit Boards (PCBs) equivalent to 3 million cell phones annually, marking a significant step towards sustainable resource recovery and demonstrating our commitment towards urban mining. By championing innovation and bold initiatives, we continue to redefine industry standards and accelerate the global transition to a more sustainable and circular economy.

Aligned with Novelis’ 3×30 Vision, we are accelerating efforts to enhance circularity in our operations. This vision drives us to push boundaries on recycled content, aiming for 75% average recycled aluminium in our products. Our AL:sust™ brand is a growing family of innovative low-carbon aluminum solutions – containing at least 80% recycled content. Through strategic investments and industry-leading innovations, we are reinforcing our commitment to sustainability by expanding recycling capabilities, optimising resource efficiency, and fostering circular economy.

Strategies to scale circularity



Waste to Resource: Utilisation of ETP Gypsum in Cement Co-Processing

At Hindalco’s Copper Business, Dahej, we generate approximately 320-350 MT/day of ETP Gypsum, which constitutes 99% of the total hazardous waste generated at the plant. In our pursuit of achieving ZWTL, we partnered with cement companies, institutions and pollution control boards to create a sustainable solution.

Our journey began with obtaining the necessary permissions and conducting trial runs, which have

now been completed. Earlier, ETP gypsum used to be sent to landfills, but now, we’ve transformed it into an opportunity, redirecting around 400 MT/day of ETP gypsum, including legacy stock, to cement industries, where it is utilised in co-processing.

This initiative delivers dual benefits. For us, it significantly reduces waste to landfill, aligning with our commitments to zero waste to landfill. For cement manufacturers, it provides a valuable substitute for

natural gypsum, conserving natural resources and enhancing their production processes.

Since the start of operations approximately 1.96 million MT waste had been directed to eight landfills. The initiative ends the need for new landfills which is a huge benefit. By embracing this approach, we are fostering a circular economy, turning waste into a resource and driving a greener future.



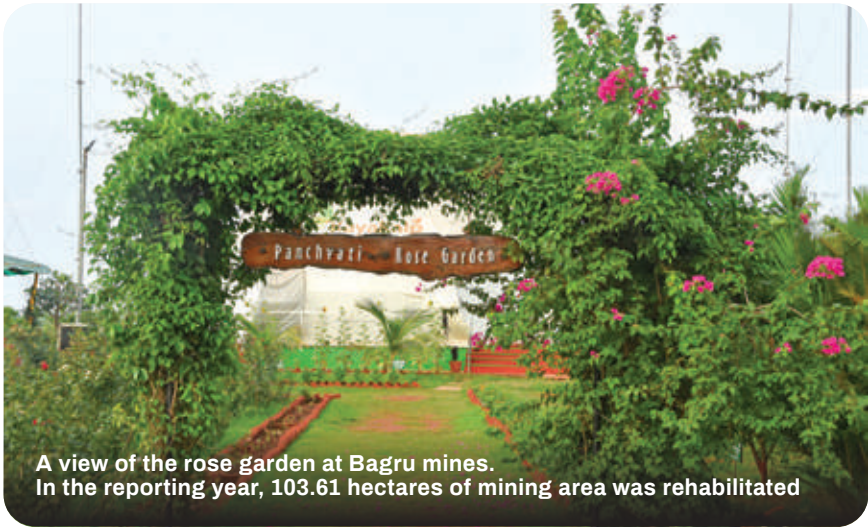
Sustainable Mining

Our approach to mining is grounded in our commitment that goes beyond regulatory compliance. We strive to strike a harmonious balance between economic growth, environmental stewardship, and social responsibility through continuous community engagement.

As part of our commitment, we introduced our first Sustainable Mining Charter in 2021 — a structured, actionable framework that aligns with our three guiding principles and spans seven thematic areas. This charter integrates a mine lifecycle approach and robust risk management strategies to drive sustainable outcomes at every stage of operation.

We have a robust governance structure comprising cross-functional teams that implement sustainable mining strategies across various focus areas, including managing goals, setting targets, and monitoring progress. Our Board-level committee regularly reviews the overall performance. Our corporate-level sustainable mining committee oversees planning, resource allocation, performance review of mining operations and mine closure KPIs, training and capacity building, new technology adoption, and cross-sector partnerships. This committee meets monthly and is also responsible for reviewing closure liabilities including budget versus cashflows, assessment of constraints or delays and oversight of both long-term and concurrent reclamation. Moreover, our site-level committee tracks progress, implements initiatives, engages stakeholders, and manages the site.

2021 is the year Hindalco introduced the Sustainable Mining Charter



A view of the rose garden at Bagru mines. In the reporting year, 103.61 hectares of mining area was rehabilitated

Board level Committee (Board Members)

Corporate level Sustainable Mining Committee

(MD, Head of Mine Planning and Operations, Chief Sustainability Officer, CSR Head, Health and Safety Head, Chief Technology Officer, Finance Head, HR Head, Head - Legal and Compliance)

Site level Sustainable Mining Committee

(Mines Head, Head of Mine Operations, Sustainability Head, CSR Head, Head-Environment, Health and Safety Head, Land and R&R Head, HR Head, Materials and Store Head)

A key focus of our sustainable mining is responsible land use. Recognising land as a critical mining resource, we implemented a dedicated Sustainable Land Use Framework to manage land transformation across the mine life cycle. This framework emphasises conservation, restoration, rehabilitation,

resettlement, and responsible mine closure. Our aim is to enhance local environmental and social infrastructure while minimising adverse impacts on natural resources, biodiversity, livelihood, and cultural heritage.

The framework is built on three strategic approaches, supported by clearly defined metrics to track and monitor our progress.

Framework and pathway for action

- + Sustainable land use across lifecycle
- + Land enrichment approach
- + Mine closure approach

Key metrics

- + Total land degraded
- + Percent land reclaimed
- + Plantation density
- + Area having three-tier plantation

In the pre-mining phase, we collect data to create baseline of socio-economic and environmental parameters including flora, fauna, water bodies and habitats, and conduct social baseline studies. From this phase to the mine closure, we engage with stakeholders, including local communities and administrative bodies, on an ongoing basis.

Our mine closure planning starts at the pre-mining stage, where we plan progressive closure activities that are implemented during the operating phase. At every stage of the lifecycle, we continuously collaborate with relevant stakeholders and conduct reviews in case of any changes in permits. We also develop social and economic transition plans which include closure strategies for social transition⁵, creating opportunities for local communities and handover of infrastructure.

One of our thematic areas is local economic development, aimed at building an integrated, equitable, and sustainable growth model that creates synergistic and symbiotic socio-economic value for the community. We promote this through our 3C strategy of Communication, Collaboration, and Consultation. This helps us identify community needs, conduct socio-economic and environmental baseline studies and prioritise short- and long-term goals. In addition, we communicate transparently about the mine's development plan and potential positive and negative impacts. We also consult with the communities to develop programmes and mine closure management plans, ensuring they are inclusive and responsive to regional needs. These plans address a broad range of focus areas, including mine design and engineering, employee relations, socio-economic development, rehabilitation and remediation, post-mined landscapes, future land use, and biodiversity conservation.

Through our integrated development strategy, we create sustainable livelihoods, improve employability, ensure access to education, healthcare and other basic amenities, enable inclusive social change, develop resilient infrastructure, and promote regional progress.

⁵ The International Council on Mining and Metals (ICMM) recommends using the term 'social transition' in place of the more commonly used 'social closure' due to the latter's negative connotations.

To ensure that our local development programmes are inclusive and sustainable, we adopt an end-to-end design approach that starts with stakeholder consultation and extends through impact assessment of interventions and reporting.

Framework and pathway for action

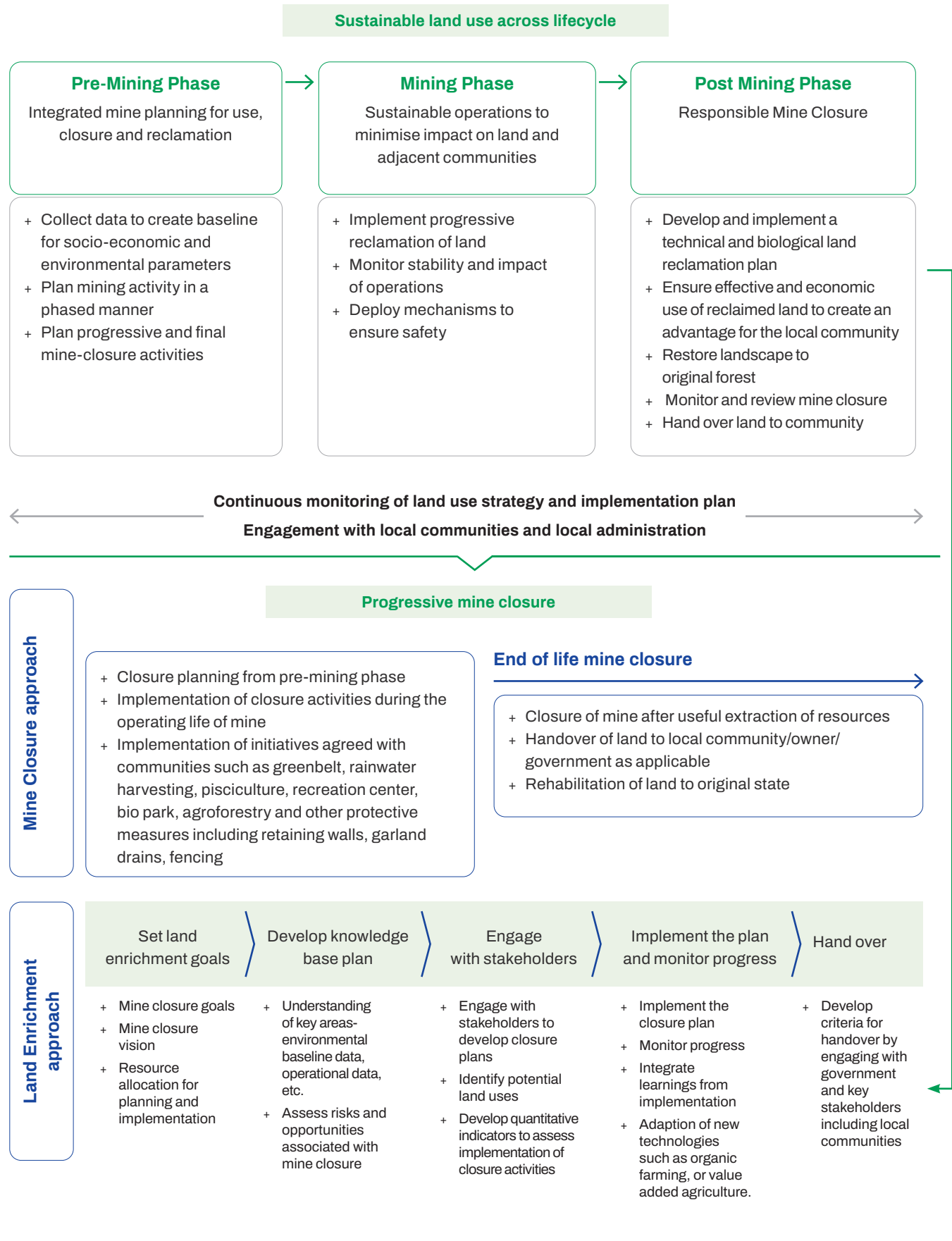
- + Trust development through community engagement
- + Integrated development strategy
- + End-to-end programme design approach

Key metrics

- + Number of off-site jobs created/ supported
- + Expenditure in infrastructure development projects
- + Percent improvement in indicators such as education, health, and livelihoods

We have also identified risks that may arise during the closure and adopted mitigation actions to minimise them.

Risk	Impact	Mitigation Strategies
Physical risk	+ Inadequately planned progressive and final closure	+ We improve closure success by evaluating baseline soil, environmental, and socio-economic data and incorporating these into progressive and final closure and rehabilitation planning.
	+ Improper implementation of a progressive closure plan increasing the likelihood of environmental and social challenges during final closure	
	+ Failure to anticipate the environmental issues and challenges that may arise during mine closure	
Regulatory risk	+ Failure to prevent acid mine drainage	+ We have instituted regular reviews of the processes that guide progressive closures, rehabilitated areas that are no longer required for operational purposes, and integrated knowledge gained from on-site experience to update closure management plans and practices.
	+ Non-compliance with regulations during mine closure and rehabilitation	
	+ Unsuccessful land rehabilitation, leading to greater regulatory scrutiny of current and future projects	
Stakeholder risk	+ Impact on community well-being and safety due to unsafe mine closure	+ We ensure proper understanding of, and adherence to, national and local regulations.
	+ Poor land rehabilitation practices, leading to an adverse impact on traditional livelihoods such as agriculture	
	+ Long-term environmental problems due to inadequate rehabilitation, including an adverse impact on water sources, changes in microclimatic conditions, and soil contamination	
Financial risk	+ High remediation costs of land rehabilitation during closure due to poor closure planning that does not incorporate site-specific conditions	+ We involve local communities in closure planning and identification of the best post-mining land use.
		+ We contribute to environmental and community resilience by developing social investment plans that are aimed at developing sustainable livelihood opportunities.
		+ We ensure a better estimation of closure costs by gaining a detailed understanding of site conditions and benchmarking different mine operations.
		+ We manage and optimise closure costs by integrating feedback obtained from a progressive closure.





No Net Loss of Biodiversity

Biodiversity Management

At Hindalco, we recognise that business and nature are intrinsically linked. Our operations rely on thriving ecosystems, and, in return, we have a responsibility to minimise our impact on them. As we grow, nature remains at the heart of our approach, guiding us to reduce our footprint while promoting the responsible use of natural resources.

Through innovation, collaboration, and proactive biodiversity management, we strive to balance resource development with ecosystem preservation, working closely with stakeholders to safeguard biodiversity in and around our areas of operation.

Our approach

We are committed to conserving, preserving, and restoring biodiversity, recognising its crucial role in maintaining ecological balance and enabling sustainable development. In alignment with the Kunming-Montreal Global Biodiversity Framework (KMGBF), we have set an ambitious long-term goal: to achieve No Net Loss (NNL) of biodiversity by 2050.



In 2024-25, Hindalco has prepared Biodiversity Management Plans for 39 out of 41 sites, contributing to habitat restoration

To support this vision, we have outlined short-, medium-, and long-term targets that offer a structured roadmap to integrate biodiversity conservation into every facet of our operations. Our approach is rooted in proactive action, ensuring we minimise environmental impact while enhancing the resilience of ecosystems.

To guide and institutionalise these efforts, we have developed a [Biodiversity Policy](#), which positions conservation as a fundamental pillar of our business practices. This policy applies across our plants, mines, and supply chain partners. Furthermore, it aligns with Aditya Birla Group's Technical Standards, reinforcing our commitment to sustainability and accountability.

No Net Loss by 2050

The integrity, connectivity, and resilience of all degraded ecosystems/habitats near our areas of operation are to be restored by at least 10% by 2030, 40% by 2040, and 100% by 2050, considering baselines set by the Biodiversity Management Plans in each of our operating sites.



Our Impacts and Dependencies

As a metals and mining company, we depend heavily on ecosystem services and acknowledge that our operations have an impact on nature. In our inaugural report aligned with the [TNFD](#) disclosures, we identified our nature-related impacts and dependencies using TNFD's Locate-Evaluate-Assess-Prepare (LEAP) nature risk assessment approach. For this, we employed tools such as ENCORE, WRI Aqueduct 3.0, STAR-R, and IBAT. Using ENCORE, we identified impacts and dependencies at the sector level and further analysed their relevance to our operations.

Nature-related impacts

Our industry inherently interacts with the environment in multiple ways. The extraction of minerals, metals, and fossil fuels demands large-scale operations that directly affect land, water, soil, and air quality. One impact is the disruption of terrestrial ecosystems caused by mining and infrastructure development, often resulting in habitat destruction and fragmentation.

Water is another essential resource critical to our operations. Our processes place significant demand on local water

sources, especially in regions already experiencing scarcity. If effluent discharge quality is not maintained, it may pollute nearby water bodies and affect the aquatic ecosystems and communities that rely on the resource.

Our operations also contribute to greenhouse gas (GHG) emissions and other pollutants, which can degrade air quality and accelerate climate change. Additionally, if not appropriately treated, the disposal of mining residues and other waste in landfills can negatively impact the soil quality.

Drivers of Nature Change (IPBES)	Resources Use Replenishment		Land, Freshwater and Ocean Use Change			Climate Change		Pollution/Pollution Removal			
	Water	Use	Terrestrial Ecosystem Use	Freshwater Ecosystem	Marine Ecosystem Use	GHG Emissions	Non-GHG Pollutants	Water Pollutants	Soil Pollutants	Solid Waste	Disturbances
Business Sector											
Metals and Mining	Very High		Very High	High	NA	High	High	High	High	High	High

Source: ENCORE

Nature-related dependencies

We depend on a wide range of ecosystem services, particularly those related to water and land. While water is essential for processing, cooling, mineral extraction, and other services crucial for business continuity, land is a critical resource for extraction activities and infrastructure development.

Furthermore, we rely on regulating ecosystem services to maintain healthy environments. These include services that purify air and water, regulate climate, and mitigate natural hazards. As ecosystems degrade, these services diminish, posing risks to the environment, operational efficiency, and long-term sustainability.

	Direct Physical Input		Enables Production Process	Protection from Disruption	
	Ground Water	Surface Water	Water Flow Maintenance	Climate Regulation	Mass Stabilisation and Erosion Control
Business Sector					
Metals and Mining	High	High	Medium	Medium	Medium

Source: ENCORE

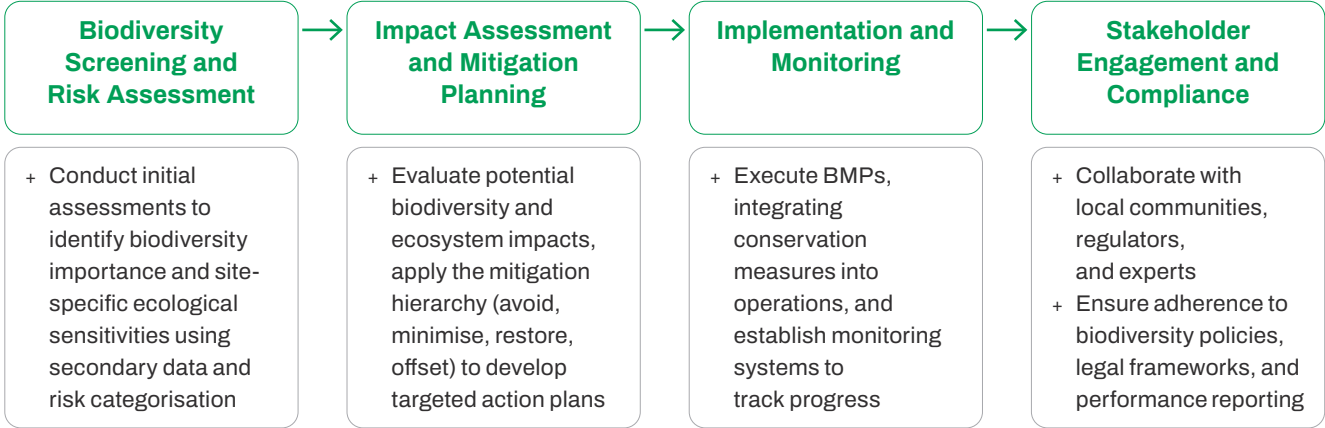
We have also identified impacts and dependencies at the site level. The details are available in our [Taskforce on Nature-related Financial Disclosures Report 2024](#).

Biodiversity risk management process

Biodiversity risk assessment is integrated into our ERM framework, ensuring that environmental stewardship is embedded into our decision-making processes. By integrating biodiversity considerations into our ERM framework, we adopt a proactive and forward-thinking approach, identifying, mitigating, and addressing risks before they escalate.

Our risk management process follows four key steps and accounts for risks related to impacts and dependencies. We conduct biodiversity risk assessments not only for our own operations but also

for our downstream activities—including outsourced operations—and the areas surrounding our operating sites. In the initial stage, we conduct biodiversity screenings at our operational sites to assess potential impacts on surrounding habitats. This includes identifying key biodiversity areas (KBAs) and protected areas (PAs) using the IBAT tool. We then categorise each site as high, medium or low based on the presence of KBAs and PAs—particularly those that include Rare, Endangered, and Threatened (RET) species. Our focus remains on high-priority sites with crucial biodiversity within a 10 km buffer zone and on medium-priority sites with RET species in the same radius.



In the next stage, once sites are prioritised, we conduct an ecosystem services review, including identification of impacts and dependencies. This review includes provisioning, regulating, and cultural services.

It guides the identification and mitigation of environmental risks and helps prioritise actions to reduce dependency and impact on critical ecosystem services. It also supports responsible resource management

across our operations. We follow the mitigation hierarchy framework — Avoid, Minimise, Restore, and Offset — to manage biodiversity risks, minimise the environmental impact, and develop targeted action plans such as BMPs.

Mitigation Hierarchy Framework

Avoid

+ **Avoiding sensitive habitats:** We ensure operations are outside critical zones such as World Heritage Sites, IUCN Category I–IV protected areas, and Ramsar wetlands. We make operational guidelines and conduct impact assessments for these areas.
+ **Avoid tree felling:** For upcoming project sites (Aditya FRP and Taloja expansion, Aditya refinery), we avoided tree felling during the project planning phase and wherever necessary a scientific approach of tree transplantation is adopted.
+ **Avoiding virgin materials by using recycled metals:** ~2.3 million tonnes of recycled aluminium, including 84 billion aluminium cans, are used as input materials in Novelis' production process. Aluminium process scrap and customer scrap recycling is done at Hindalco.

Restore/Rehabilitate

+ **Habitat restoration targets:** We plan to restore at least 10% of degraded operational areas by 2030, with progressive increases over the decades.
+ **Riparian habitat and wetland restoration:** We are rejuvenating water bodies and surrounding ecosystems.
+ **Community engagement:** We are integrating local communities in restoration projects to ensure sustainability and shared benefits.

Minimise/Reduce

+ **Reducing invasive species:** We are replacing invasive species with native vegetation in operational zones.
+ **Transplanting trees:** We have transplanted 1,181 trees in the reporting year at Aditya refinery.
+ **Green belt development:** We are implementing vegetation buffers around operations to reduce habitat fragmentation and enhance biodiversity.
+ **Process optimisation:** We are using technologies to lower emissions, manage waste, and reduce water consumption.

Offset/Transform

+ **No Net Loss (NNL):** We are committed to NNL of biodiversity by 2050, aligned with global frameworks like the Kunming-Montreal Global Biodiversity Framework.
+ **Tree planting initiatives:** We have set a target to plant 1 million trees annually to enhance carbon sequestration and biodiversity.
+ **Collaborations for biodiversity offsets:** We are working with conservation organisations to create or enhance habitats equivalent to the impacted areas.

As a next step, site-specific actions are implemented by dedicated taskforces in accordance with the BMPs. These teams continuously monitor and report progress in line with our No Net Loss commitment.

During the assessment, we also integrate stakeholder consultations to include local socio-economic, geographic, and climate perspectives. We further communicate the key findings of our studies to all stakeholders regularly through our Integrated Annual Report and other online platforms.

We conduct third-party risk assessments of our suppliers in upstream operations, focusing on biodiversity-related risks including water stress regions, emissions, and waste management, along with other key environmental and social parameters.

Biodiversity-related risks

We recognise that biodiversity loss presents profound challenges. However, these risks are irreversible and demand urgent action, emphasising the critical need for proactive biodiversity management.

This reinforces our commitment to sustainable operations and compliance with stringent conservation regulations. Moreover, our mitigation measures are rooted in responsibility and resilience, ensuring that biodiversity protection becomes an integral part of our corporate governance.

Type of Risk	Impact	Mitigation Strategies
Physical risk	+ Heatwaves, wildfires, and extreme precipitation could threaten local biodiversity.	Ecosystem Restoration and No Net Deforestation + Committed to No Net Deforestation by 2030 + Rehabilitation of 10% of operational land (1,500 hectares) by 2030 Invasive Species Management + Replacement of invasive species with native plants + Pilot projects at Renukoot, Utkal, and Lohardaga mines
	+ Soil erosion and degradation may impact land stability.	
	+ Operations near KBAs require additional mitigation measures.	
Regulatory risk	+ Protected area designation and stricter land-use regulations may pose risks.	Sustainable Project Design and Habitat Protection + Mining projects avoiding areas with RET species + Infrastructure projects incorporating buffer zones around forests and wetlands
	+ Changes in environmental laws could affect operations near eco-sensitive zones. + There may be difficulties in obtaining operational permits due to biodiversity risks.	
Reputational risk	+ Failure to achieve No Net Loss of Biodiversity (NNL) targets may lead to stakeholder concerns.	Water Conservation and Aquatic Biodiversity Protection + ZLD at 16 out of 19 plants + Rainwater harvesting, and wetland conservation efforts of 10% of operational land (1,500 ha) by 2030
	+ There may be increased scrutiny from investors and environmental groups.	
Liability risk	+ Non-compliance with biodiversity laws could result in fines or legal action.	Stakeholder Engagement and Policy Compliance + Collaboration with NGOs, regulators, local communities, and indigenous groups + Adherence to GISTM, TNFD, and biodiversity-related ESG frameworks
	+ There could be potential disruptions in operations if biodiversity restoration commitments are unmet.	



Hindalco's approach to fauna management focuses on conservation and habitat restoration



Biodiversity Management Plans (BMPs)

At Hindalco, we have total 41 operating sites of which we have prepared BMPs for 39 sites. Out of the 39 BMPs we completed the third season study for 23 sites in May 2025. The change in the operating areas is due to addition of one plant, and closure of one plant. Additionally, we have also prepared a BMP for Chakla mine, which will be operational in FY 2025-26. For the Novelis sites, we have conducted biodiversity assessment for 19 ASI-certified plants.

Additionally, we have identified IUCN Red List species [Critically Endangered (CR), Endangered (EN), and Vulnerable

(VU)] by leveraging biodiversity assessment reports and environmental impact assessment reports.

	Number	Operational Areas (Ha)
Total own operational sites	41	14,428.94
Own operational sites where biodiversity impact assessments are conducted	41	14,428.94
Own operational sites in close proximity to critical biodiversity	28	8,721.00
Own operational sites in close proximity to critical biodiversity and for which biodiversity management plans are prepared	28	8,721.00
Other low-priority sites for which biodiversity management plans are prepared	11	4,449.87

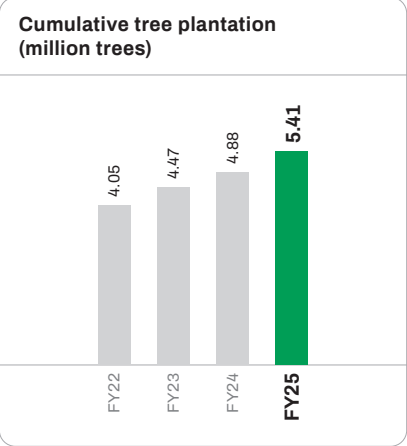
Conservation and restoration of biodiversity

As part of our commitment to ecosystem restoration and invasive species management, we consistently undertake afforestation and reforestation activities in and around operating sites. Using the Miyawaki plantation technique, we have planted around 5.33 lakh trees in the reporting year.

We are about to start a community-led mangrove plantation project in Bharuch, Gujarat. This initiative will cover a 50-hectare area with native mangrove species — Avicennia Marina — with a density of 2500 per hectare. The proposed land is around 26 km from our Dahej plant and is a government-owned unserved revenue land with mudflats and no vegetation. The project will begin with forming a committee, conducting training and capacity building for the locals, planting trees, and maintaining the site.

At our Belagavi plant, we conducted a three-season study during FY 2023–24. A key recommendation from the BMP is to develop off-site habitats covering

106.3 hectares at the site and around the buffer zone. To initiate this habitat development project, we engaged a third-party expert to analyse the recommendations and assess the buffer zones for suitable habitat restoration. The assessment involved a preliminary survey (including desktop and site assessments), a feasibility analysis, and a multi-criteria decision analysis to evaluate potential implementation strategies. The study was completed in the reporting year, and we plan to implement the project in FY 2025–26.



A golf course has been built on an area for bauxite residue, in Renukoot



A view of green belt at Aditya Aluminium. In the reporting period, 5.33 lakh trees were planted across our plants and mines

Restoration of Native Flora at Renukoot

We conducted a pilot ecological restoration project on a two-acre land parcel at Renukoot, focusing on removing invasive species and revitalising native biodiversity. Through this initiative, Leucaena leucocephala (Subabul), an aggressive invasive species, was systematically removed to create space for indigenous vegetation. In its place, we planted 2,000 saplings of native species — Pongamia pinnata,

Neem, and Tecoma stans — to help restore the ecological balance.

To support long-term health of the newly introduced vegetation, we developed an in-house vermicompost system to supply organic nutrients that enhance soil fertility and plant growth. We also installed a water pipeline for irrigation and established a dedicated watch ward system to ensure continuous oversight and protection of the plantation.

These proactive measures have resulted in a 98% survival rate of the planted saplings, reinforcing the project's success. This integrated approach — combining ecological intervention, sustainability practices, and continuous monitoring — has significantly improved biodiversity and ecosystem health.

Live and Let Live: Biodiversity initiatives at Aditya Aluminium, Odisha

Groundbreaking ecological initiatives are bringing about a green transformation at Aditya. We've planted over 8 lakh saplings, developed 33% of our land into green belts, created a 20-acre Biodiversity Park at the plant.

At the heart of this journey is our own seasoned horticulture and biodiversity expert, fondly recognised as the "Green Architect of Aditya." Under his leadership, we've elevated our focus from regulatory compliance to true conservation excellence.

Many of our efforts align with IUCN–BMP recommendations, including:

- + Developing an 8,000 sq.m Butterfly Garden with carefully curated nectar and host plants
- + Creating dedicated habitats for reptiles and ecological niches for mammals within our premises
- + Launching a restoration drive for IUCN Red List plant species native to the Sambalpur region
- + Introducing the Miyawaki plantation technique, a first not just for Hindalco, but across the Aditya Birla Group

- + Implementing bird conservation measures that have seen the return of migratory species
- + Advancing our journey towards water positivity
- + Establishing a 20-acre Biodiversity Park within Aditya Township, which now thrives as a habitat for diverse flora and fauna

In our pursuit of No Net Loss of Biodiversity, we've gone beyond our boundaries — carrying out afforestation across 144 acres of degraded forest land allocated by the Government of Odisha.