

ADITYA BIRLA



HINDALCO

Hindalco Industries Limited

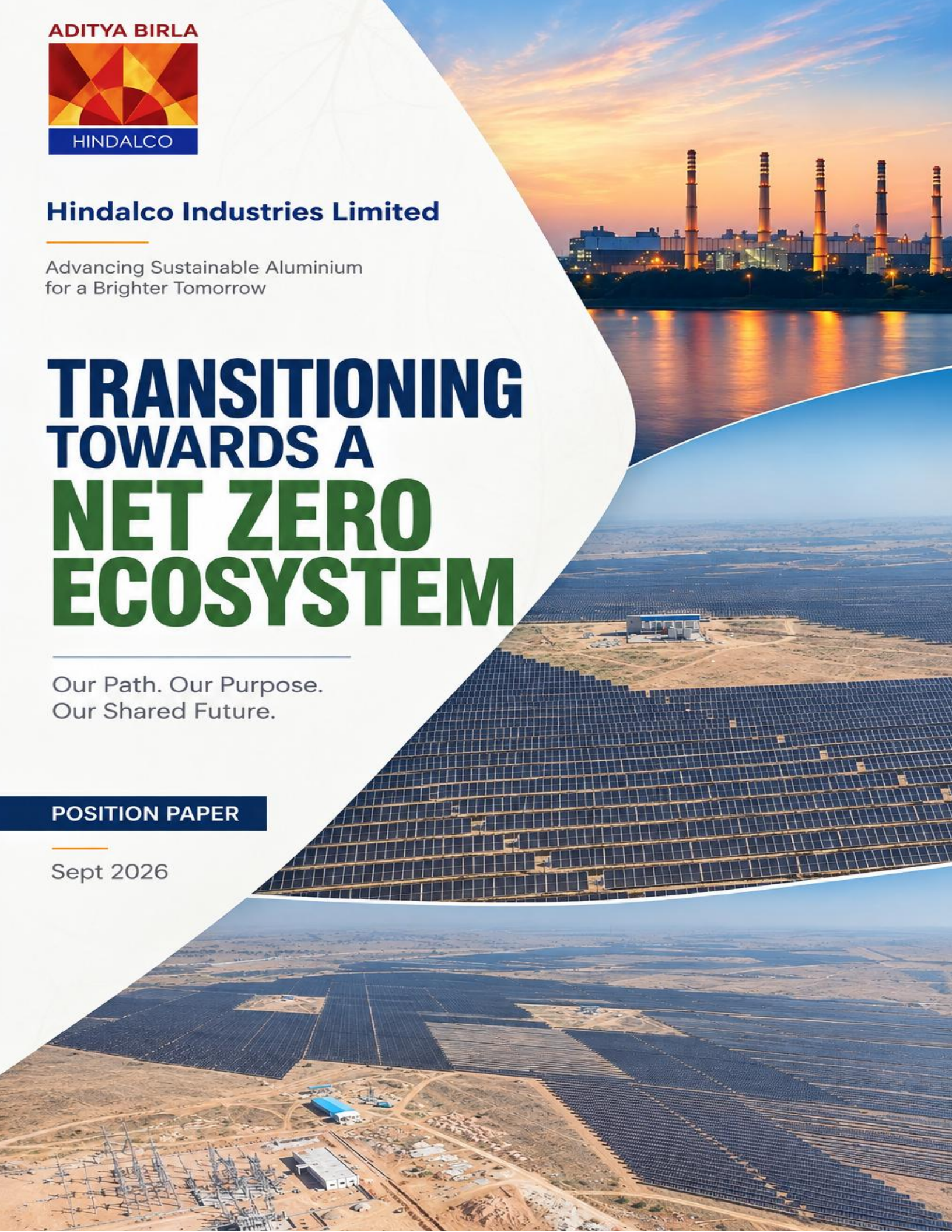
Advancing Sustainable Aluminium
for a Brighter Tomorrow

TRANSITIONING TOWARDS A NET ZERO ECOSYSTEM

Our Path. Our Purpose.
Our Shared Future.

POSITION PAPER

Sept 2026



1. Context

Hindalco Industries Limited is India's largest fully integrated aluminium producer, with operations spanning the entire value chain from bauxite and coal mining to alumina refining, aluminium smelting, and the production of downstream value-added aluminium products. The Company operates alumina refining facilities with an annual capacity of approximately 4.6 million tonnes, aluminium smelters with an annual capacity of 1.4 million tonnes, and captive power generation assets of approximately 3.4 GW, supporting the reliability and efficiency of its integrated operations.

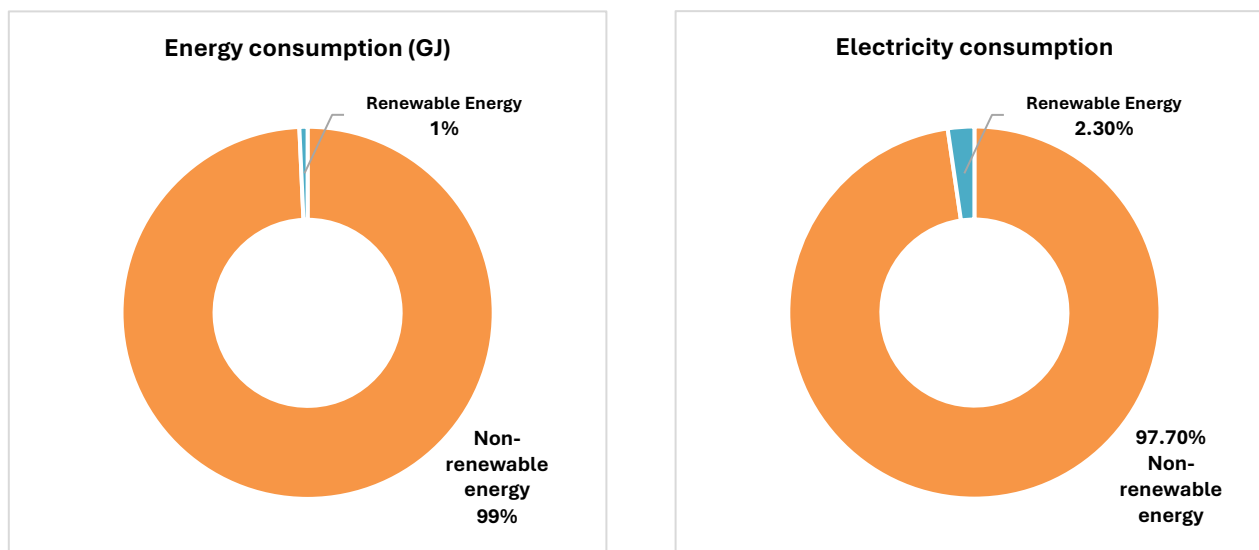
The Company also operates one of India's largest copper smelting complexes at Dahej, Gujarat, with an annual copper cathode production capacity of approximately 0.5 million tonnes. Through its diversified portfolio of aluminium, copper, specialty alumina, and recycling operations, Hindalco plays a critical role in enabling India's industrial growth while meeting the increasing demand for sustainable and low-carbon materials.

As part of its long-term growth strategy, Hindalco is undertaking one of the largest investment programmes in its history, focused on expanding its aluminium, specialty alumina, copper, recycling business and operating with renewable energy. The Company plans to increase its aluminium smelting capacity to 1.71 million tonnes and copper smelting capacity to 721 KT, while strengthening its presence in advanced materials and circular economy solutions. These investments are designed to support growing demand from renewable energy, electric mobility, infrastructure, packaging, and other future-oriented sectors while reinforcing Hindalco's position as a leading supplier of low-carbon materials.

Energy profile

As an energy-intensive metals producer, ensuring reliable, affordable, and increasingly low-carbon energy is fundamental to Hindalco's operational strategy and long-term competitiveness. In FY 2025-26, the Company consumed approximately 280 million GJ of energy, of which approximately 278 million GJ was derived from non-renewable sources and 2 million GJ from renewable sources. Electricity constituted the majority of the Company's energy consumption, accounting for approximately 240 million GJ, while process energy contributed approximately 40 million GJ.

Recognising the importance of decarbonising its energy mix, Hindalco has accelerated investments in renewable energy infrastructure. As of FY 2025-26, the Company had commissioned approximately 470 MW of renewable energy capacity and aims to expand this to 884 MW by FY 2026-27 and 1,514 MW by FY 2027-28.



Hindalco has also emerged as a pioneer in deploying Renewable Energy Round-the-Clock (RE-RTC) solutions by integrating solar and wind generation with pumped-storage hydro systems. The Company is among the first industrial enterprises in India to operate a portion of its aluminium smelting capacity using RE-RTC power. Furthermore,

Hindalco continues to monitor developments in emerging clean energy technologies, including nuclear power, and continues to assess their potential role as part of its long-term energy transition strategy.

GHG emissions Profile

The production of aluminium is inherently energy intensive and contributes significantly to greenhouse gas emissions. In FY 2025-26, Hindalco's combined Scope 1 and Scope 2 greenhouse gas emissions amounted to approximately 27.52 million tCO₂e. Of this, aluminium operations accounted for approximately 26.51 million tCO₂e, copper operations for 0.95 million tCO₂e, and mining activities for 0.06 million tCO₂e. The Company also measures Scope 3 emissions across relevant value chain categories, which amounted to approximately 13.42 million tCO₂e during the reporting year.

Hindalco closely monitors greenhouse gas emission intensity as a key performance indicator of progress towards its climate objectives. Through sustained investments in operational excellence, process optimisation, technology enhancements, and energy efficiency measures, the Company has achieved a 20.3% reduction in aluminium-specific greenhouse gas emission intensity compared to its FY 2011-12 baseline. The current emission intensity for aluminium smelters stands at 17.06 tCO₂e per tonne of primary aluminium and 0.94 tCO₂e per tonne of alumina produced.

While Hindalco continues to benchmark its performance against leading global aluminium producers, the Company operates within structural constraints associated with India's energy ecosystem, including the carbon intensity of electricity generation, limited access to low-carbon dispatchable power sources, and infrastructure-related challenges associated with renewable energy integration. Notwithstanding these constraints, Hindalco remains in the forefront to reduce emissions while maintaining energy security, operational resilience, and long-term competitiveness.

Benchmarking with leading international peers (Region specific) *

	Unit	HIL	China	Russia	Middle East	North America	South America
Specific GHG Intensity	tCO ₂ e/t	17.06	14.10	6.7	7.4	5.07	4.78
Renewable Energy/Non-Renewable Energy	%	2.3%	40%	58%	0.1%	81%	52.3%
Specific AC	kWh/t	14,403	12,950	13,746	13,840	14,521	15,060

**The above table represents one of the leading players of the region for benchmarking purpose and not the country average.*

Towards a Climate Ready Future

As part of its climate risk management framework, Hindalco conducts site-level assessments of both physical and transition climate-related risks across its operations. To further strengthen its approach and align with the requirements of IFRS S2, the Company is enhancing its climate risk assessment processes through the use of the GeoSust tool, which evaluates climate-related risks for future projects under multiple climate scenarios.

Physical risks are assessed using historical climate data and future climate projections under scenarios including SSP1/RCP2.6, SSP2/RCP4.5, and SSP5/RCP8.5. Transition risks are evaluated considering evolving climate policies, market dynamics, technological developments and stakeholder expectations, using internationally

recognised decarbonisation pathways such as the International Energy Agency's Net Zero Emissions by 2050 (NZE 2050), Beyond 2°C Scenario (B2DS), 2°C Scenario (2DS), and the International Aluminium Institute's 1.5°C Scenario. These assessments help strengthen the resilience of Hindalco's strategy and operations under a range of climate and transition futures.

The assessment covers own operations and upstream and downstream value chain. In parallel, ESG considerations are embedded throughout the supplier lifecycle, with supplier onboarding, sourcing and monitoring processes incorporating ESG and supply chain risk assessments. Environmental factors such as carbon intensity, recycled content and traceability are considered during supplier evaluations, while operational and ESG performance is monitored through periodic reviews, self-assessments and audits to enhance supply chain resilience and promote responsible sourcing practices.

2. Net Zero Transition Plan

Hindalco's Climate Transition Roadmap is aligned with its long-term ambition of achieving net-zero greenhouse gas emissions by 2050 and supporting the objectives of the Paris Agreement, including efforts to limit the increase in global average temperature to 1.5°C above pre-industrial levels. Recognising the unique challenges associated with decarbonising energy-intensive industrial processes, the Company has adopted a pragmatic and phased transition strategy that balances climate ambition with operational reliability, economic viability, and sustainable business growth.

The roadmap encompasses the reduction of Scope 1 and Scope 2 emissions across Hindalco's value chain. The transition strategy is guided by the following key decarbonisation levers:

Key Levers	Strategic Objective
Till FY 2030	
Renewable Energy & RE-RTC 	Evaluate opportunities to support the deployment of approximately 450-500 MW of round-the-clock renewable power capacity by FY30, enabling greater integration of clean energy into operations.
Recycling Expansion 	Expand recycling capabilities with an additional ~48 KTPA of recycling capacity by FY30, strengthening circularity and resource efficiency across the value chain.
Energy Efficiency 	Reduce specific energy consumption through process improvements, operational excellence and deployment of energy-efficient technologies.
Fuel Switching 	Advance the transition towards lower-carbon fuels through the progressive adoption of natural gas, compressed biogas and other viable alternatives across suitable operations.
From FY 2030-FY 2040	
Scaled RE-RTC Deployment 	Scale round-the-clock renewable energy deployment to a cumulative capacity of approximately 800-900 MW by FY40, subject to business requirements and technological advancements.
Nuclear Energy 	Explore participation in up to ~770 MW of nuclear power capacity by FY40, subject to regulatory evolution, commercial feasibility and technological readiness.
Expanded Circularity 	Increase cumulative recycling capacity to approximately 100 KTPA, further embedding circular economy principles across operations.

Advanced Process Optimisation 	Drive deeper emissions reductions through next-generation process innovations, digitalisation and efficiency improvements.
Afforestation & Carbon Sinks 	Enhance carbon sequestration initiatives and contribute to national climate goals through afforestation and development of natural carbon sinks.
2040 and beyond	
Inert Anode Technology 	Pursue breakthrough smelting technologies with the potential to significantly reduce or eliminate process emissions from aluminium production.
Carbon Capture, Utilisation and Storage (CCUS) 	Address residual hard-to-abate emissions through the deployment of carbon capture, utilisation and storage solutions.
Electrification of Process Heat 	Transition towards low-carbon industrial heating solutions, including electric calciners, electric boilers and other advanced technologies.
Green Hydrogen and Emerging Technologies 	Leverage green hydrogen and other emerging low-carbon technologies enable deep decarbonisation as commercial viability improves.

Accelerating Value-Chain and Technology-Led Decarbonisation

Hindalco is actively exploring technology-led solutions with the potential to accelerate its long-term decarbonisation journey. These initiatives are currently at varying stages of assessment, feasibility evaluation and pilot development.

Scope 3 and Low-Carbon Logistics

Alongside its focus on reducing operational emissions, Hindalco is strengthening its approach to value-chain emissions through supplier engagement, circularity and lower-carbon logistics. The Company has developed an approach to assess emissions across its logistics chain, covering inward and outward movement through road, rail and sea, and is progressively identifying opportunities to reduce logistics-related emissions.

The company is adopting and evaluating electric and other lower-emission transportation solutions across suitable logistics routes. In Gujarat, the Company has introduced heavy-duty electric trucks on the corridor connecting its Copper Business locations at Dahej and Asoj. In Odisha, Hindalco has launched an inter-plant EV logistics corridor connecting Aditya FRP and Hirakud FRP in the Sambalpur cluster, with dedicated EV trailers supporting inter-plant movement.

Other initiatives include electric and lower-emission solutions for material and personnel movement within operating locations, measures to encourage and incentivise lower-emission employee mobility, and engagement with logistics service providers to progressively introduce cleaner transportation fleets.

Emerging Decarbonisation Technologies

Hindalco is exploring emerging technologies that could support the decarbonisation of hard-to-abate industrial processes over the longer term. Key opportunities include inert anode and carbon capture technologies to reduce smelter emissions, as well as electric calciner technology to lower emissions and fossil-fuel consumption in refinery operations. These initiatives are at different stages of assessment and pilot development. Their potential contribution to the Company's transition roadmap and future scale-up will depend on technical performance, lifecycle emissions benefits, safety, infrastructure readiness and commercial viability.

- **Carbon Capture, Utilisation and Mineralisation**

Hindalco is advancing the assessment of carbon capture and utilisation pathways that could support the decarbonisation of hard-to-abate industrial processes. These include the potential capture of carbon dioxide from selected industrial flue-gas streams and its utilisation in value-added applications.

The Company is also evaluating carbon mineralisation using bauxite residue. This pathway seeks to enable carbon dioxide to react with alkaline constituents in the residue and be retained in mineral form, while supporting the development of potential applications for the resulting material. Initial development work has demonstrated the potential to combine carbon management with the productive utilisation of bauxite residue, thereby supporting Hindalco's broader circularity objectives.

Another area under exploration is the use of algae-based systems that integrate carbon capture with sewage or wastewater treatment. Such systems could offer co-benefits relating to carbon utilisation, wastewater treatment and biomass generation.

- **Biomass and Alternative Carbon Sources**

Hindalco is assessing biomass-derived char as a potential alternative carbon source for anode manufacturing. Its application will be subject to its ability to meet the required technical and product-quality specifications, including carbon content, reactivity, ash content, impurities and performance in the anode-manufacturing process.

The Company is also evaluating the sourcing and use of responsibly produced biomass for co-firing in suitable captive power-generation systems, with the aim of progressively reducing fossil-fuel consumption. Any wider application will depend on the availability and traceability of sustainable biomass, equipment compatibility, air-emissions performance, competing uses of biomass and demonstrated lifecycle emissions benefits.

Cleaner fuel and process options, including gas-fired technology for anode-baking furnaces, are also being considered as part of fuel switching and thermal-efficiency improvement. As natural gas remains a fossil fuel, its role would be transitional and subject to demonstrating an emissions benefit compared with the existing fuel and process configuration.

- **Hydrogen Applications**

Hindalco is evaluating opportunities to recover or produce hydrogen through suitable effluent-related pathways and assess its use for co-firing in selected furnaces. Before wider application, the technical pathway, source of energy, hydrogen quality, process suitability, storage and handling requirements, safety considerations and net lifecycle emissions benefits will need to be evaluated.

The Company is also building operational familiarity with hydrogen through selected industrial and pilot applications, including hydrogen-based cooking systems in canteens. These initiatives can support the development of internal technical capabilities, operating procedures and safety protocols.

While conventional hydrogen may assist in developing initial operational experience, its decarbonisation benefit depends on the production pathway and associated emissions. Over time, Hindalco will assess opportunities to adopt green or other low-carbon hydrogen for suitable applications as the required technology, infrastructure and supply ecosystem become more reliable and commercially viable.

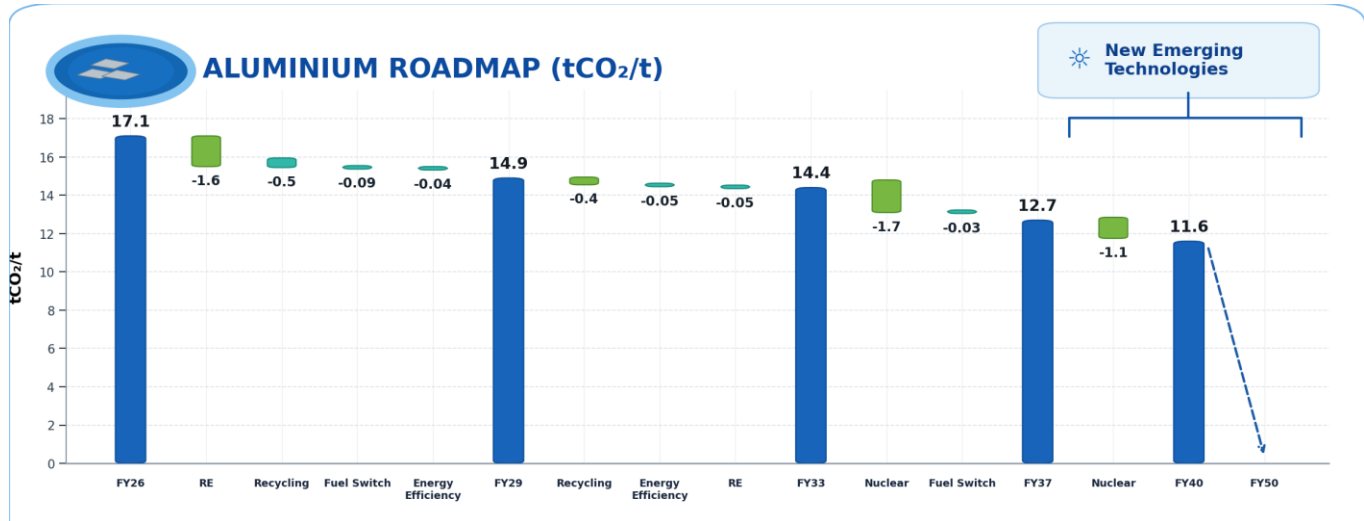
Role in Hindalco's Transition Roadmap

These initiatives complement Hindalco's established decarbonisation levers, including renewable-energy integration, energy efficiency, process improvement, fuel switching and circularity.

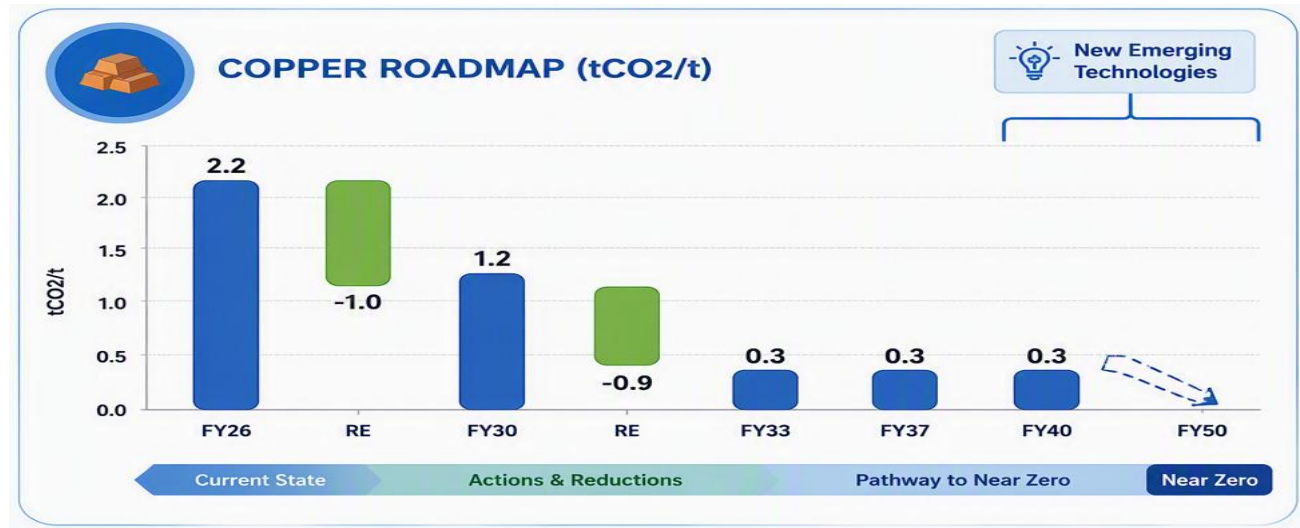
Emerging technologies are being assessed to complement Hindalco's existing decarbonisation strategy and support the reduction of residual emissions over the long term.

The Company's decarbonisation pathway aims to progressively reduce the emission intensity of primary aluminium smelting from approximately 17.1 tCO₂e per tonne in FY 2025-26 to 11.6 tCO₂e per tonne by FY 2040. The pathway

envisages an initial reduction to 14.9 tCO₂e/t by FY 2028-29, supported primarily by the increased use of renewable energy, recycling, fuel switching and energy-efficiency measures. Further reductions are expected to lower the emission intensity to 14.4 tCO₂e/t by FY 2032-33, driven by additional recycling, renewable energy and energy-efficiency initiatives. Thereafter, the adoption of nuclear energy and further fuel switching is expected to reduce the emission intensity to 12.7 tCO₂e/t by FY 2036-37, further reducing to 11.6 tCO₂e/t by FY 2040 through the expanded use of nuclear energy. Beyond FY 2040, the Company intends to leverage new and emerging technologies to advance towards its long-term ambition of achieving near-zero emissions by FY 2050.



Like aluminium, the Company's copper decarbonisation pathway is designed to progressively reduce the emission intensity of copper cathode production from approximately 2.2 tCO₂e/t in FY 2025-26 to 0.3 tCO₂e/t by FY 2032-33, maintain this level through FY 2040, and advance towards near-zero emissions by FY 2050.



Hindalco's environmental investments continue to deliver tangible financial and sustainability benefits, demonstrating that environmental stewardship can be a strong driver of value creation. The savings disclosed in the Integrated Report amounted to ₹71.28 crore, comprising ₹18.27 crore from Hindalco (₹13.44 crore from energy efficiency measures and ₹4.83 crore from other environmental initiatives) and ₹53.02 crore from Novelis (US\$6 million). A subsequent review of the environmental investment portfolio identified additional projects with an incremental annual savings potential of ₹854.11 crore, significantly enhancing the overall return profile. With the inclusion of these projects, the total estimated annual savings increased to ₹925.39 crore.

The Company plans to invest more than ₹10,000 crore by FY2050 to scale up and implement medium- and long-term decarbonisation projects to achieve its net-zero target.

Additionally, the Company has integrated biodiversity conservation and nature-based solutions into its climate transition strategy. As part of its Biodiversity Roadmap 2025-2050, Hindalco has committed to achieving No Net Loss of biodiversity by 2050 through a combination of habitat conservation, ecological restoration, afforestation, and responsible land management practices.

Hindalco has 41 sites, comprising 38 operational and three non-operational sites, with Biodiversity Management Plans developed for 40 sites. Of the 28 operational sites located within 10 km of critical biodiversity areas, 11 are classified as high priority due to their proximity to Key Biodiversity Areas (KBAs), including five sites covering 2,326.7 hectares within 0–2 km of a KBA. The remaining 17 sites are classified as medium priority based on the presence of Schedule I species.

To further support biodiversity conservation, ecological restoration and carbon sequestration, the Company aims to establish and maintain approximately 15 million native trees by 2040 under its long-term afforestation and ecological restoration programme. Based on a weighted-average sequestration rate of 10 kg CO₂ per tree per year, the programme's annual carbon sequestration potential is expected to increase from approximately 0.06 million tCO₂e for the current plantation base to approximately 0.15 million tCO₂e by 2040.

The Company will also engage with industry associations, financial institutions, policymakers, and value chain stakeholders, such as customers, suppliers, and local communities, to drive collective climate action.

The Company also acknowledges the social dimension of the transition and remains committed to workforce development, reskilling and upskilling initiatives, community engagement, and inclusive economic development, ensuring that the transition to a low-carbon economy is both responsible and equitable.

3. Looking Ahead

The transition to a low-carbon economy presents industries with the dual imperative of addressing climate-related challenges while pursuing opportunities for innovation and sustainable growth. As a leading producer of aluminium, copper and specialty alumina, Hindalco recognises its responsibility to contribute meaningfully to global decarbonisation efforts while supporting economic development and industrial progress.

Through execution of its Climate Transition Roadmap, continued investment in renewable energy, resource efficiency, circular economy solutions, innovation, and stakeholder collaboration, Hindalco aims to build a resilient, competitive, and future-ready business. The Company remains committed to creating long-term value while advancing climate action, supporting biodiversity conservation, and enabling the transition to a low-carbon economy.