

SUSTAINABILITY IN ACTION

CLIMATE ACTION REPORT 2023

Aligned with Task Force on Climate
Related Financial Disclosures (TCFD)



vedanta
transforming for good

aluminium



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About Us

About this report

Vedanta Aluminium is committed to sustainable development and is taking steps to reduce its greenhouse gas emissions and mitigate the risks of climate change. This report provides an overview of our climate-related risks and opportunities, our strategies for managing these risks, and our progress in reducing our emissions.

We believe that climate change is a risk to our business and to the world. As a large consumer of energy, we are exposed to both physical damages from extreme weather events as well as the transition risks such as rising energy prices and disruptions to our supply chain.

To mitigate these risks, we are taking several steps, including:



Reducing our energy consumption and switching to renewable energy sources



Investing in energy efficiency measures.



Developing new technologies to reduce our emissions.



Devising plan to work with our suppliers to reduce their emissions.

We are also committed to reporting on our progress in reducing our emissions and managing climate-related risks. This is our second report in line with the Task Force on Climate-related Financial Disclosures (TCFD).

We believe that this report will help us to better understand our climate-related risks and opportunities, and to develop more effective strategies for managing these risks. We also hope that this report will help to build trust with our stakeholders and demonstrate our commitment to sustainable development.



From the Chairman's desk

Our Transforming for Good initiative represents our commitment to driving positive change across the pillars of the planet, workforce, and communities. As India's path to economic growth increasingly relies on low-carbon practices, Vedanta Aluminium is poised to be a pivotal partner in India's journey towards Net Zero by 2070. Leveraging our strong position as the largest primary Aluminium producer in the country, we are intensifying our focus on ESG leadership as a strategic driver for operational excellence.

We are diligently working on structural cost reduction and operational efficiency enhancements, which have already led to remarkable performance achievements. These learnings will be scaled across our businesses, enabling us to do more with less and reduce our carbon footprint.

A greener product portfolio is a top priority, and we are continuously innovating to meet diverse needs. Aluminium plays a crucial role in the world's transition to a low-carbon future and meeting the sustainable development goals. In pursuit of this, Vedanta Aluminium proudly introduced India's first low-carbon aluminium brands, 'Restora' and 'Restora Ultra,' catering to customers worldwide. The success of these greener products hinges on stakeholder support, adoption, and endorsement, making transformation truly sustainable.

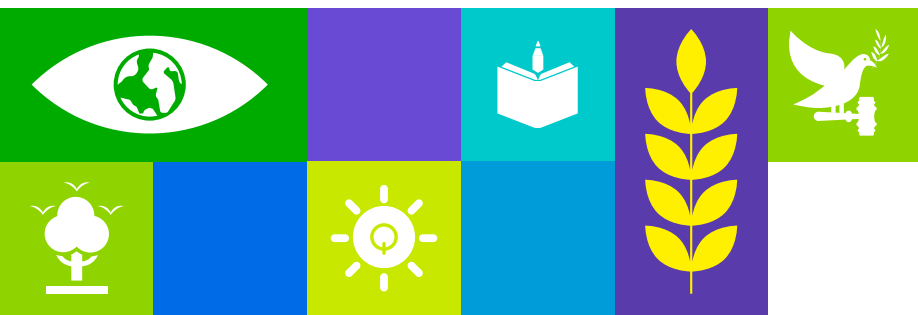
Recognizing the physical risks posed by climate change, we are fortifying our assets and supply chains to adapt to emerging challenges. Decarbonization efforts are underway, and we are actively identifying opportunities that will bolster our future competitiveness. We were able to achieve 8.13% GHG Intensity reduction over FY 2021 baseline. Concurrently, we are championing climate-resilient practices to empower local communities against climate risks.

Our 2023 Climate Action Report underscores our dedication to addressing the global climate challenge. This commitment aligns with our strong safety culture and leading sustainability practices, crucial foundations for Vedanta Aluminium's profitable and resilient future.



Anil Agarwal
Non-Executive Chairman

“At Vedanta, we are cognisant of the immense growth potential and the ESG risks and opportunities. We will continue to operate in a manner that generates maximum value for our stakeholders. As an industry leader, we stand in solidarity with India, in its ambition of being Aatmanirbhar.”



Group CEO's thoughts

I am pleased to present Vedanta Aluminium's journey of value creation as we release our FY 2021 climate change report, in alignment with the Taskforce on Climate-related Financial Disclosures (TCFD) recommendations. Our commitment to becoming a Net Zero carbon company by 2050 or earlier is unwavering, and we are eager to transparently communicate our strategy and roadmap to our stakeholders. This report outlines our comprehensive approach to achieving our decarbonization targets in the short, medium, and long term. By sharing our plans, we aim to foster collaboration and engagement, ensuring that all stakeholders are informed and involved in our journey towards a more sustainable and low-carbon future.

Both the Board and management share the objective of leading the organization in addressing the climate change challenge. They understand the changes necessary for transitioning to a decarbonized economy and actively drive these improvements. India's first line of low-carbon aluminium, represented by our Restora and Restora Ultra product-lines, demonstrates our commitment to producing metals that support the energy transition.

At Vedanta, we have always maintained our commitment to sustainable and responsible mining practices. We recognize the substantial impact that our operations can have on local communities, ecosystems, and the environment. To address this, we have established a comprehensive sustainability framework that serves as a guiding principle, ensuring a balance between our business needs and the broader concerns related to the environment and society. Our decision-making processes are thus geared toward harmonizing economic advancement with environmental, social, and governance (ESG) considerations.

Progress toward our goal of reducing the greenhouse gas (GHG) intensity is evident with a noteworthy 8.13% reduction in GHG intensity over our FY21 baseline. Energy efficiency projects have also been successfully implemented at multiple sites. Further, recognizing water's critical importance and the risks posed by climate-induced water stress, we have initiated substantial efforts to achieve water positivity.

Our ambitious goals for decarbonization, and achievement of water positivity are in accordance with the United Nations' Sustainable Development Goals. We always strive to match the best practices in our industry, both globally and locally. I am pleased to mention that Vedanta Aluminium has secured the 2nd position in the Dow Jones Sustainability Indices (DJSI) global rankings for the aluminium industry. This achievement underscores our commitment to sustainability and motivates us to strive for continuous improvement each day.

Thank you for your unwavering dedication to Vedanta Aluminium, and I look forward to another year of remarkable accomplishments together.



Sunil Duggal
Group CEO &
Chief Safety Officer

“At Vedanta, we have always maintained our commitment to sustainable and responsible mining practices. We recognize the substantial impact that our operations can have on local communities, ecosystems, and the environment.”

From Aluminium Sector CEO's corner

In light of the escalating impacts of climate change worldwide, the years leading up to 2030 hold paramount significance for climate action. This includes a strong emphasis on the decarbonization of businesses and the accelerated adoption of renewable energy sources. Simultaneously, the global shift towards a low-carbon economy will rely heavily on metals, with aluminium being a cornerstone of this transition. As one of the world's leading aluminium producers and India's largest, Vedanta Aluminium recognizes the need to optimize production capabilities while concurrently transitioning towards cleaner energy sources and enhancing our greenhouse gas (GHG) emissions performance.

Aluminium, widely regarded as the metal of the future due to its infinite recyclable capacity, will assume a pivotal role in existing and emerging clean technologies, encompassing electric mobility, renewable energy, sustainable construction, eco-friendly packaging, battery innovations, and more. While our products have earned certifications from renowned global organizations, including the Bureau of Indian Standards (BIS), Environmental Product Declaration (EPD), and the Aluminium Stewardship Initiative (ASI), attesting to their high quality and sustainability standards, we are working on strategically evolving our product portfolio. This will enable us to leverage these opportunities for business expansion. Hence, last year we introduced India's first low-carbon aluminium, branded as 'Restora.' Under the Restora umbrella, we offer Restora (low-carbon aluminium) and Restora Ultra (ultra-low carbon aluminium) to address the rapidly growing global appetite for eco-friendly aluminium. This positions us among the select few aluminium producers worldwide capable of manufacturing green aluminium.

Vedanta Aluminium reaffirms its commitment to bolstering the electric vehicle (EV) industry by delivering aluminium products tailored to its evolving requirements. The utilization of aluminium in EVs represents a pivotal stride towards achieving environmental sustainability.

At BALCO, we have successfully initiated the application of biodiesel in our fleet as part of our decarbonization strategy. Biodiesel is an eco-friendly fuel derived from organic sources, offering a substantially lower carbon footprint compared to conventional non-renewable fuels. This initiative reflects our ongoing efforts to curtail carbon emissions and advance our sustainability agenda.

Our dedication to strategic investments and prudent financial management remains steadfast. We continually invest in expanding volume, backward integration, value-added goods, and digitalization. In the past fiscal year, we secured a Sustainability Linked Loan of USD 250 million based on our decarbonization performance. To further advance decarbonization, Vedanta has also introduced an Internal Carbon Price (ICP) of USD 15/tCO₂e.

Managing climate risks and seizing opportunities through advanced climate science and comprehensive scenario analysis is a commitment we uphold. The coming decade is pivotal for limiting global warming to 1.5 degrees Celsius, with potential policy changes that may impact our operations. Vedanta Aluminium is prepared to manage both the physical and transition risks associated with climate change. Hence, I invite you to read Vedanta Aluminium's climate action report for the year 2022-23.



Rahul Sharma
Aluminium Sector CEO

“We have embarked on the electrification of our own vehicle fleet and currently host one of India's largest fleets of electric lithium-ion forklifts. We are dedicated to decarbonizing a significant portion of our Light Motor Vehicle and mining fleet by 2030 and 2035, respectively.”

Note from the Chief Transformation Officer

Through our second Climate Action report, I am pleased to report the significant progress we made this past year. Vedanta is committed to becoming a net zero carbon organization by 2050 or sooner. To achieve this goal, we are working on our action plan that includes a combination of emissions reduction initiatives, renewable energy procurement, and carbon offsets.

We made some remarkable strides in FY 2023 by producing 55 KT of green aluminium, deploying 27 electric forklifts in Jharsuguda, and purchasing 1.3 billion units of green power. BALCO has also signed a 200 MW Renewable Energy round the clock power purchase agreement. We cofired 5141 MT of biomass in our power plants and are on track to complete the switch to alternative fuel for fuel oil at the calciner at Lanjigarh by FY25.

We implemented our own pot controller technology with indigenous lining design having a potential reduction of specific power consumption by 200 KWh/MT. This is the first time this technology has been used in India. It will examine, monitor and control pot parameters and increase the life of pot, avoiding early pot cut outs and reducing spent pot line generation. The technology has the potential to reach the world's best specific power consumption, making it Vedanta's Dream Pot.

In this report, we present our commitments to manage climate-related issues along with our strategy on managing such risks. Vedanta is committed to addressing climate change and its associated risks and opportunities. We have developed a comprehensive climate change action plan to identify and integrate climate related risks and opportunities as part of business risk management process. This information will be integrated into the company's overall risk management process to ensure that climate risks are effectively managed.

We are also focused on working closely with our neighbouring communities to support climate resilience actions. This may include initiatives such as planting trees, advancing sustainable farming, restoring wetlands, and building infrastructure to protect against extreme weather events.

Lastly, we have improved our disclosures on climate-related risks and opportunities for our stakeholders through our efforts on being a transparent with our data and initiatives. This will help stakeholders to understand the company's climate change strategy and the potential impacts on the business.

Our climate change action plan is ambitious but achievable, and we are committed to playing our role in addressing climate change and building a more sustainable future.



Abhijit Pati
Chief Transformation Officer

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“We implemented our own pot controller technology with indigenous lining design having a potential reduction of specific power consumption by 200 KWh/MT. This is the first time this technology has been used in India.”



2023 Highlights

In-house ESG dashboard to track performance across ESG KPIs

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Introduced Shadow Carbon Price

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Became a member of Aluminium Stewardship Initiative (ASI)

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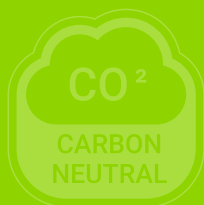
Partnered with TÜV SÜD for water risk assessment

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Working towards decarbonizing our supply chain

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Commissioned India's Largest Fleet of Electric Lithium-Ion Forklifts.

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Net Zero by 2050 or sooner

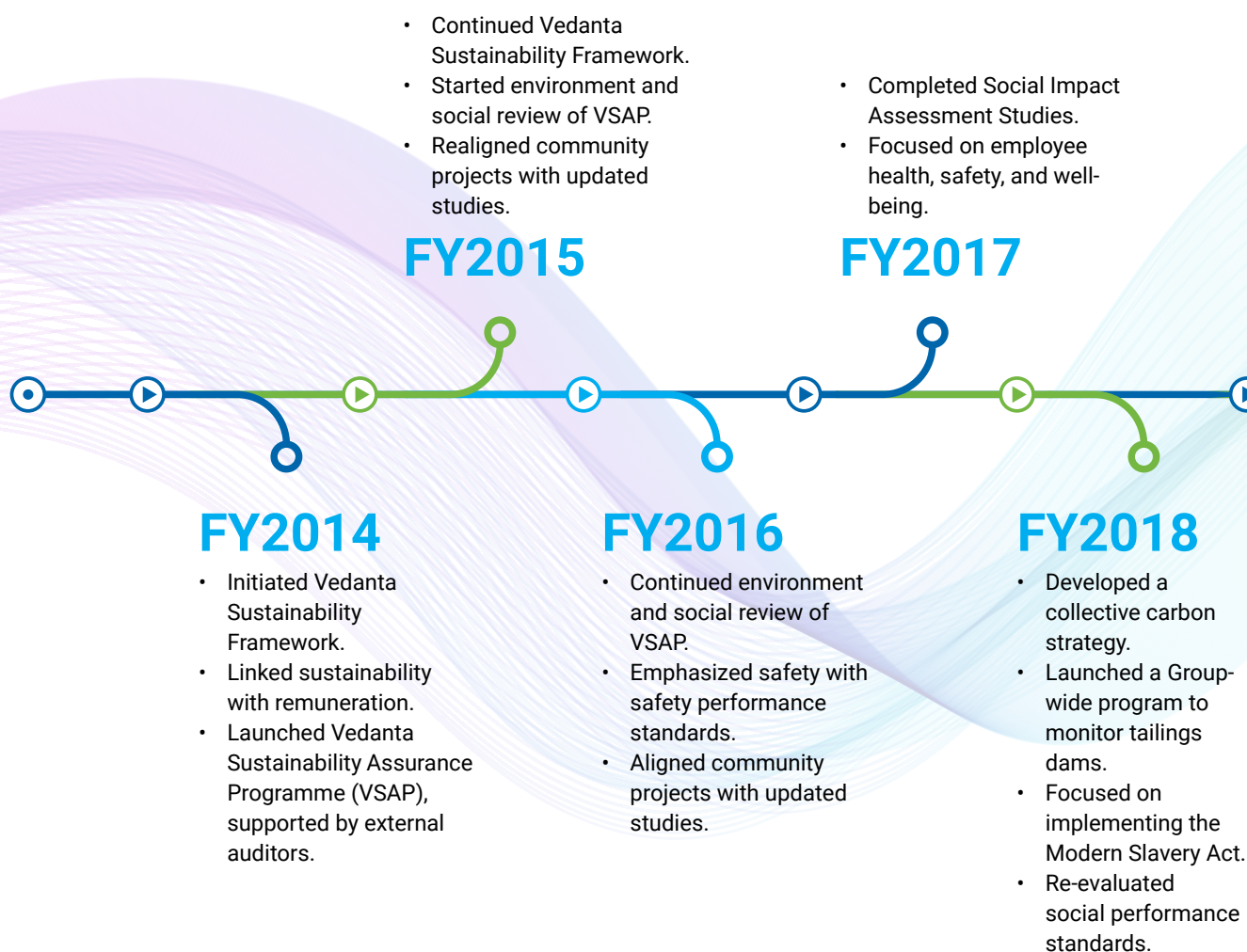
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ESG Progress over the years



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- Implemented a strategy for increased leadership engagement on workplace safety.
- Commenced initiatives to upgrade tailings dam facilities and improve social license to operate.
- Conducted perception surveys, materiality assessment, social performance review, and FPIC requirements review.

FY2019

- Expanded the scope of the Board Sustainability Committee.
- Formed Social Performance Steering Committees at sites.

FY2021

- Dispatched the first fly-ash rake for 'green' cement manufacturing.
- Expanded workforce diversity by hiring transgender employees.
- Announced long-term sourcing of 380 MW renewable power.
- Developed an Extended Reality experience zone for workforce safety.
- Commissioned India's Largest Fleet of Electric Lithium-Ion Forklifts.
- Became a signatory to CII Climate Action Charter.
- Partnered with TÜV SÜD for water risk assessment.
- Raised USD 250 million in sustainability-linked Loans.

FY2023

FY2020

- Committed to substantial decarbonization by 2050.
- Emphasized circular economy solutions.
- Collaborated with Runaya for circular economy solutions.

FY2022

- Refreshed Vedanta's ESG vision.
- Adopted ESG strategy pillars.
- Committed to become a Net Zero Carbon company by 2050.
- Became the largest industrial consumer of renewable power in India.
- Launched low-carbon, green aluminum products: Restora and Restora Ultra.
- Ranked 2nd in S&P Dow Jones Sustainability Index (DJSI) 2022 rankings.
- Published the first TCFD report.
- Published 'Accelerating to Net Zero,' Vedanta Aluminium's Sustainable Development Report for FY2022.

Governance

Board Roles and Responsibilities

Climate change has material and strategic significance for Vedanta. Consequently, it remains a subject of continual deliberation and examination at the highest levels of leadership, including the Board and senior management. Furthermore, it assumes a central role in discussions between the Board, Executive Committee, investors, and civil society organizations. These include strategic dialogues, evaluations of business performance, investment determinations, scenario assessments and targets.

The board has expertise spanning across sectors like resources, energy, finance, government, and public policy among its members. The board leverages its extensive experience to evaluate climate change’s potential impacts on the company and its operations. They stay informed about the evolving climate change discourse and international policy responses. With their collective knowledge and skills, they effectively allocate financial resources to create long-term stakeholder value, recognizing the importance of meeting stakeholder expectations, particularly regarding environmental concerns. The board also possesses a deep understanding of systemic risks and their potential effects on Vedanta’s assets. To ensure well-informed decision-making, the board actively incorporates climate change science and expert advice into their considerations.

At Vedanta, we have established a comprehensive governance framework to seamlessly integrate climate change considerations into our business operations and strategic planning.



Board and Management Oversight:

Vedanta Board

- Oversees strategy, culture, ESG, and community aspects, prioritizing business performance.
- Ensures that the group follows the risk management framework, including climate risks & opportunities.
- Provides rigorous oversight of climate-related risk management, reviewing goals, incentives, targets, and KPIs.

Board ESG Committee

- Consists of the Group CEO and two independent Directors, who meet biannually and report to the board.
- Offers strategic direction on climate-related issues, formulating policies and systems.
- Advises the Board on regulatory changes concerning climate and sustainability. Oversees short, medium, and long-term targets for climate and ESG topics.
- Recommends enhancements to established carbon management governance structures.
- Assesses company progress on Net Zero and other ESG goals as well as suggests areas of improvement.
- Ensures effective ESG and Climate Change governance, advocacy, and public relations.
- Proposes initiatives to instil a sustainability and climate change culture throughout the organization.
- Evaluates emerging sustainability and climate risks.
- Guides management on mitigating potential adversities to sustained growth posed by these risks.
- More details on ESG committee can be read here: [ESG Committee Charter](#)

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Chief Executive Officer

- Oversees implementation of ESG Strategy, including climate change risks & opportunities

Group Executive Committee (ExCo)

- Coordinates geographical business scopes and functional leadership at the Executive Board level.
- Discusses key KPIs, including GHG emissions, RE usage, new product launches, and R&D initiatives with the board.
- Advises the Board ESG committee alongside the ESG Management Committee (Man-Com).
- Monthly meetings to report progress to the full Executive Board.

ESG Management Committee (ESG Mancom)

- Provides governance, strategic leadership, and execution support.
- Drives the implementation of Vedanta's sustainability strategy, including the 2050 net-zero roadmap.
- Meet fortnightly to oversee progress updates on the 9 aims.

Chief Transformation Officer, Aluminium Sector

- Involved in making strategic decisions on ESG, quality, R&D, digital projects and asset optimization.
- Allocates resources and support to BUs for successful transformation initiatives.
- Identifies and addresses project bottlenecks at the sector level as needed.
- Serves as the primary leader for ESG initiatives within the Aluminium Sector.

Chief Sustainability Officer, Aluminium Sector

- Drives climate action plans and Net Zero Commitments
- Regular Benchmarking and Implementation of HSE & Sustainability related best practices through Group ExCo, Group risk committee, Management & Board Committees
- Implement and reports compliance to HSE&S related business risks in the Risk Register to Group level

ESG Head (Jharsuguda, BALCO, Lanjigarh)

- Ensure transparent reporting and disclosure
- Reviews the ESG CoP at Business Unit level
- Mitigation of HSE & Sustainability risks

In addition to our routine assessments of our progress toward becoming low-carbon operations, we have implemented a system where management compensation is tied to the performance of our business in relation to climate matters and internal carbon pricing. This measure is aimed at accelerating our efforts to achieve decarbonization.

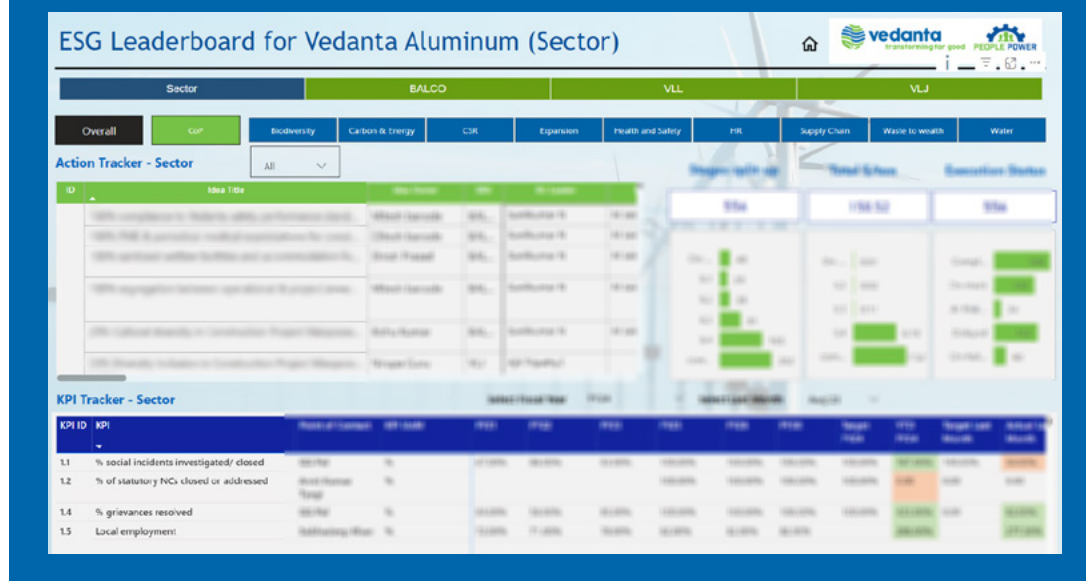


Incorporating Climate-Related Performance into Management Compensation

We at Vedanta Aluminium have committed to reducing its greenhouse gas (GHG) intensity by 14% by FY 2025 and 28% by FY 2030, compared to the FY 2021 baseline year.

To achieve these goals, each of Vedanta Aluminium's business units has set annual targets for reducing GHG intensity and developed plans to meet them. These annual targets are just one part of Vedanta Aluminium's ambitious environmental, social, and governance (ESG) objectives, which make up 10% of the senior management's key responsibility areas (KRAs) at both the sector and business unit levels.

Vedanta Aluminium monitors progress towards its ESG objectives using an in-house ESG dashboard that tracks performance across all ESG key performance indicators (KPIs). These evaluations are also reviewed during annual performance appraisals.



In addition, Vedanta Aluminium has established a robust internal awards program that recognizes the outstanding contributions of individuals, teams, and business units in advancing ESG performance within the organization. These contributions cover areas such as GHG emission reduction, supply chain management, energy efficiency, and other ESG-related aspects of the business.





Shadow
Carbon Price:
USD 15/
tCO₂e

Incorporating Climate-related issues in our Financial Planning

Advocating for Appropriate Carbon Pricing Policies

India has set a target to achieve Net Zero Carbon emissions by 2070, while we have committed to reach this goal by 2050. Globally, efforts are underway across all sectors to combat climate change and expedite the decarbonization of entire economies. One effective strategy emerging is the implementation of carbon pricing mechanisms, which offer incentives for decarbonization. Internal Carbon Pricing serves as a means for companies to account for emission costs and assess climate change-related risks and opportunities. Although there are diverse viewpoints on forecasting the future financial implications of adopting carbon pricing, we anticipate a growing global acceptance of this approach. Potential adoption of regional or global carbon pricing mechanisms could have adverse impacts on our operations. To address this, we are introducing a shadow carbon price to better understand these risks and adjust capital investments accordingly.

Our Energy and Carbon concrete steps to enact a shadow carbon price of USD 15 for each tonne of CO₂ emissions. Following a thorough assessment within the aluminum sector, we have adopted the same carbon pricing as established by the Group. This demonstrates our commitment to addressing carbon emissions and environmental responsibility.

CII Climate Action Charter

We have become a signatory to the Confederation of Indian Industry (CII) Climate Action Charter, a collaborative initiative aimed at promoting structured climate action among Indian businesses. The charter is based on several guiding principles that help businesses identify and actively address climate risks:



Reducing greenhouse
gas (GHG) emissions



Transitioning the
value chain



Building
resilience



Mobilizing
green finance

Sustainability Linked Loan (SLL)

We have also successfully secured our first-ever sustainability-linked loan (SLL) amounting to USD 250 million to finance our capital expenditure initiatives and reduce our carbon footprint. These loans are granted based on specific performance parameters related to decarbonization and safety. With our performance we were able to attract lenders from major international banks from the Middle East and Far East.

“The funds raised via Sustainability Linked Loans will be invested towards growing our business sustainably and responsibly,”

Rahul Sharma, Aluminium Sector CEO



We are committed to advocate for our positions and objectives concerning climate change within the associations and organizations of which we are a member.

Climate Policy and Commitments

We acknowledge the global concerns regarding climate change and recognize the need for collective and sustained global efforts to address this pressing issue. In response to these concerns, we are committed to taking action through our own energy and carbon policy, which is an integral part of the company's vision for sustainable development.

Our Energy and Carbon policy is a core part of the Vedanta Sustainability Framework and promotes investment in renewable energy and R&D for emission reduction. Oversight of this policy is provided by the Vedanta Board of Directors, and the accountability for energy and carbon performance lies with executives, while line managers are responsible for its full implementation.

We actively collaborate with industry associations on a global, regional, national, and local scale. This collaborative effort aims to promote best practices, align with regulatory frameworks, enhance communication with governmental entities, and raise awareness of the industry's significance.

In line with our vision, we are now a member of Aluminium Stewardship Initiative (ASI), in addition to being a signatory to the Confederation of Indian Industry (CII) Climate Action Charter. ASI is a global non-profit standard setting and certification organization that promotes sustainability in the aluminium value chain. We aim to collaboratively utilize our efforts to foster responsible sourcing, production, and stewardship of aluminium. CII is another cross-sector initiative to promote structured climate action among Indian businesses. This step reaffirms our commitment to realizing Net Zero carbon operations and will also help us align with industry best practices, for long-term competitiveness and realization of sustainability targets.

We continue to assess the extent to which our climate commitments align with the stances and commitments of our associations. This evaluation takes into account the following criteria:

01

Whether the association publicly supports the goals of the Paris Agreement regarding climate.

02

Whether the organization has been involved in opposing climate-related legislation, lobbying efforts, or campaigns within the past year.

In cases where significant misalignment is identified, we will engage with the association to address any disparities related to our dedication to implementing the Paris Agreement.



ENERGY AND
CARBON POLICY



VEDANTA
SUSTAINABILITY
FRAMEWORK















Net Zero
Carbon by
2050 or sooner

Our Commitments

Vedanta Group's 10 Net Zero Commitments

01  <p>Net Zero Carbon by 2050 or sooner</p>	02  <p>Use 2.5 GW of Round-The-Clock (equivalent) renewable energy and reduce absolute emissions by 25% by 2030 from a FY 2021 baseline</p>	03  <p>Aim to spend US\$5 billion over the next 10 years to accelerate the transition to Net Zero Carbon</p>
04  <p>No additional coal-based thermal power and use of coal-based power only till the end of the existing power plants' life</p>	05  <p>Decarbonize 100% of our Light Motor Vehicle (LMV) fleet by 2030 and 75% of our mining fleet by 2035</p>	06  <p>Commit to accelerate adoption of hydrogen as fuel and seek to diversify to hydrogen fuel or related businesses</p>
07  <p>Ensure all our businesses account for their Scope 3 GHG emissions by 2025</p>	08  <p>Work with long-term Tier 1 suppliers to submit their GHG reduction strategies by 2025 and align with our commitments by 2030</p>	09  <p>Disclose our performance in alignment with Taskforce on Climate-Related Financial Disclosures (TCFD) requirements</p>
10  <p>Help communities adapt to the impacts of climate change through our social impact/CSR programs</p>		

Aluminium Sector's Climate Management Commitments

<p>Identify and integrate climate related risks and opportunities as part of business risk management process</p>	<p>Become a Net Zero Carbon organization by 2050 or sooner</p>
<p>Reduce Scope 1 and Scope 2 emissions intensity for aluminium business by 14% and 28% by 2025 and 2030 respectively over 2021 as baseline. And reduce Scope 3 emissions intensity for Aluminium sector by 25% by 2030 over 2021 as baseline.</p>	<p>As part of our decarbonization journey we aim to increase the share of renewable energy consumption in our operations by 7% by 2025 and 30% by 2030. This will be achieved by entering into PDA and using of 400 MW of renewable energy by 2025 and 1500 MW of renewable energy by 2030.</p>
<p>Support climate resilience actions in our neighboring communities</p>	<p>Increase disclosures on climate-related risks and opportunities for our stakeholders</p>





Annual energy savings:
1.4 million gigajoules

Cost savings of
INR 2.03 billion

Strategy

At Vedanta Aluminium, we recognize that the effects of climate change are significantly, impacting people, organizations, and ecosystems in our vicinity. To address climate-related risks, leverage opportunities, enhance our resilience to climate change, and take decisive measures to reduce greenhouse gas (GHG) emissions, we have formulated strategies and initiatives to realize our goals and facilitate the shift to a low-carbon economy.

Our commitment to sustainable production is evident in our transition to low-carbon operations. Our collective efforts in energy conservation projects have resulted in annual energy savings of approximately 1.4 million gigajoules and cost savings of INR 2.03 billion.

Our growth strategy centers on aligning our core capabilities and competitive strengths with key external megatrends, both today and in the future. This approach involves identifying existing and potential business risks and devising strategies to transform them into opportunities, thereby benefiting us and our stakeholders. Given the increasing emphasis on climate action, we continue to incorporate climate change considerations into our long-term strategies and promote climate-related disclosures to reinforce the trust our stakeholders have placed in us.

Our strategy is underpinned by the following framework:



Reducing Carbon Footprint Throughout the Value Chain:

We have set an ambitious goal to achieve Net Zero Carbon emissions by 2050. By 2030, we aim to reduce the GHG intensity of our operations by 28% compared to the 2021 baseline. We are also in plan to collaborate with our customers and logistics partners to lower downstream Scope 3 emissions stemming from our business.



Capitalizing on Opportunities in the Low-Carbon Transition:

Recognizing the critical role of metals in the global transition to a low-carbon economy, we have introduced India's first low-carbon aluminium, known as Restora and Restora Ultra.



Policy and Governance for Internal Carbon Pricing:

Vedanta Aluminium has embedded carbon pricing into investment decision-making process. In FY23, ICP mechanism has been created to introduced shadow prices to redirect new investments, promoting clean technologies, low-carbon solutions, and renewable energy projects.





Supporting Climate Resilience:

We are proactively enhancing the resilience of our operations and assisting neighbouring communities in preparing for the physical impacts of climate change. This includes factoring in various climate-related risk scenarios into our project designs.

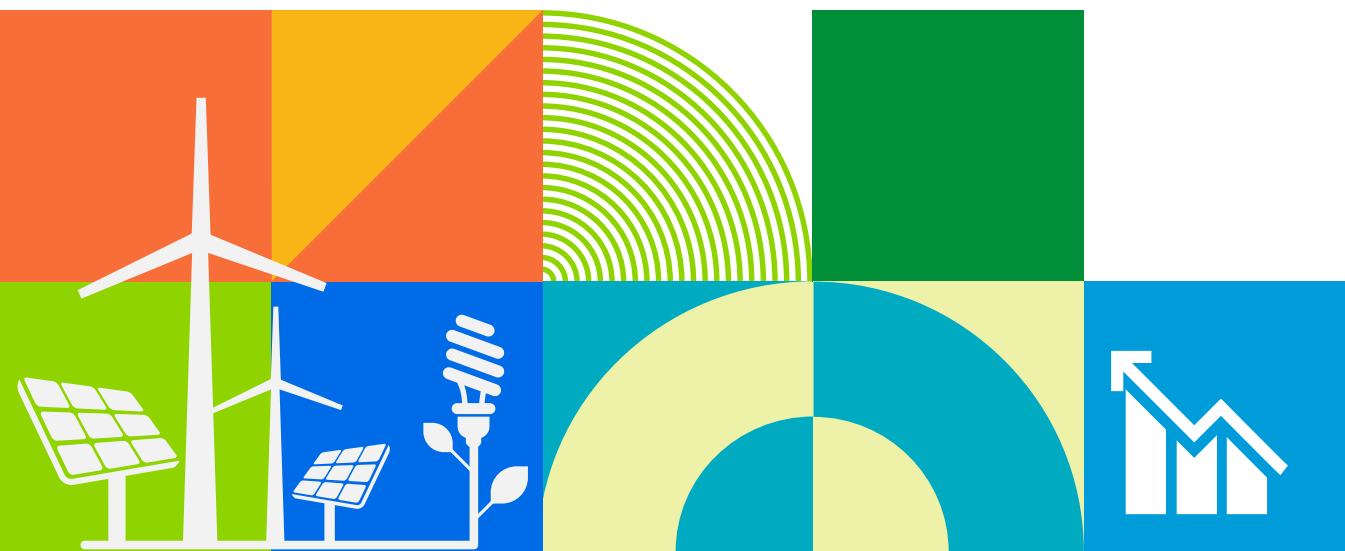
This strategy outlines how we approach the assessment and management of climate change-related risks and opportunities. Our objective is to effectively control our energy usage to minimize our carbon emissions, all the while ensuring that both our business and our communities are well-prepared for the effects of climate change. This strategy is reinforced by our governance procedures and is seamlessly incorporated into our strategic and day-to-day decision-making processes.

Scenario analysis

Our climate scenarios are the product of our 2022 scenario analysis, which included an evaluation of both transition and physical climate risks. This analysis was further examined by an expert third party, offering additional insights tailored to our business. To ensure robustness, we have aligned our approach with the IPCC Representative Concentration Pathways (RCPs) aligned with Shared Socioeconomic Pathways (SSP), and incorporated the technical guidelines outlined in the TCFD report from 2017. The two main scenarios that we used are:

	<p>High Climate Change Scenario (RCP 8.5) or SSP5:</p> <p>This scenario envisions business as usual, with emissions continuing at current rates. It is projected to lead to global warming exceeding 4 degrees Celsius by 2100.</p>
	<p>Moderate Climate Change Scenario (RCP 4.5) or SSP2:</p> <p>In this scenario, aggressive mitigation measures are taken to reduce emissions to half of current levels by 2080. It is more likely than not to result in warming exceeding 2 degrees Celsius by 2100.</p>

Our chosen scenarios also align with prominent IEA scenarios, such as the Sustainable Development Scenario and Net Zero 2050. These climate scenarios have been made using the IPCC projections, extended macroeconomic forecasts, and internal evaluations of climate-related risks. These are built around our present array of operations and ongoing projects, with a focus on development, covering short-term (0-5 years), medium-term (5-10 years), and long-term horizon up to the year 2060.



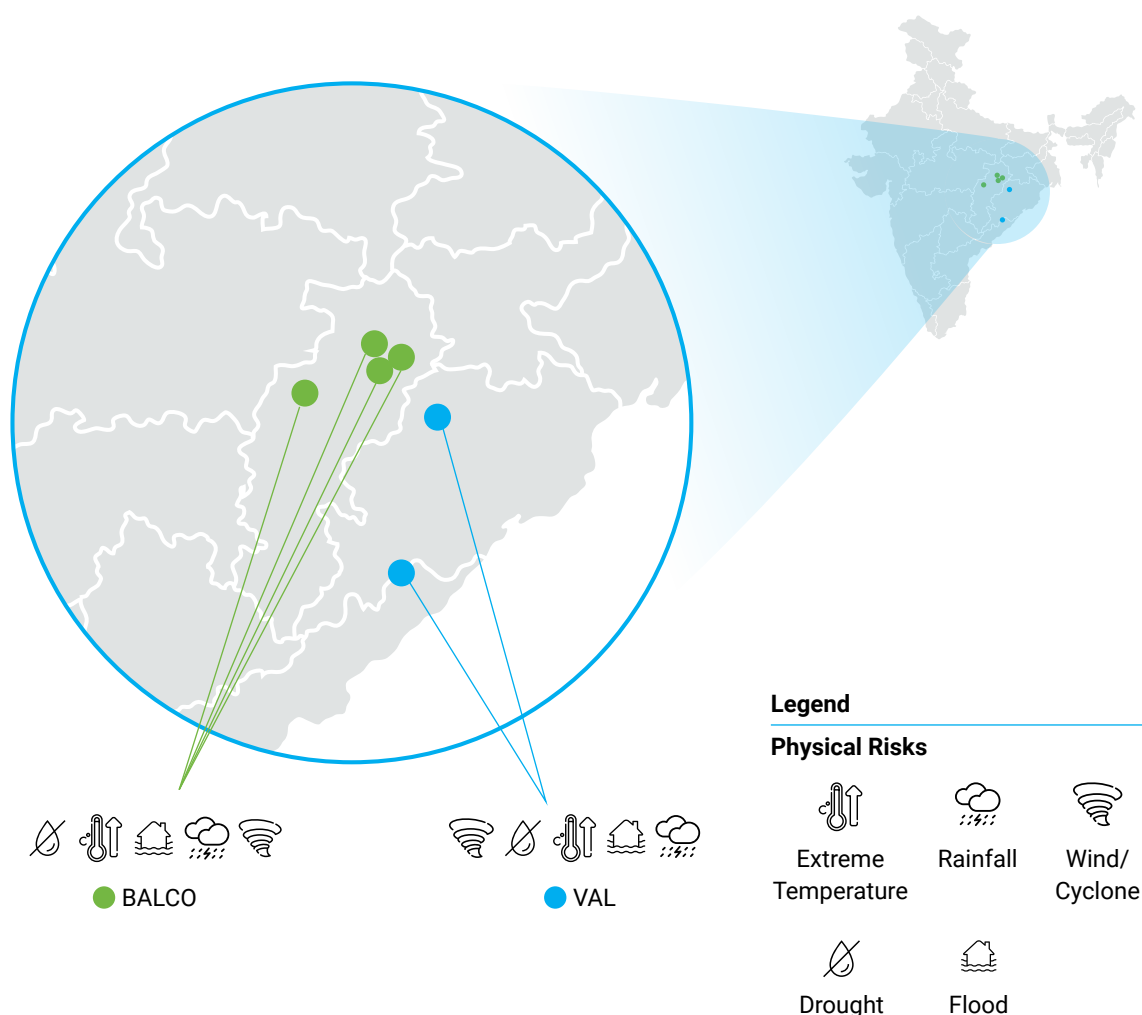
Physical Risk Scenario Analysis

Our operations are located in Odisha and Chhattisgarh, characterized by a tropical climate with high temperatures, humidity, medium to high rainfall, and short mild winters. The states experience uneven and erratic distribution of rainfall, leading to recurring floods and droughts of varying intensity.

Climate change impacts have become evident in recent years in Odisha and Chhattisgarh, prompting a physical risk assessment of our three sites, namely Jharsuguda, Lanjigarh and BALCO through IPCC scenarios: High Climate Change Scenario (RCP 8.5) or SSP5 and Moderate Climate Change Scenario (RCP 4.5) or SSP2. We carried out this scenario analysis for our operations, upstream and downstream activities using the World Bank's Climate Change Knowledge Portal which takes into consideration future business risks and opportunities.

Our operations, including upstream and downstream activities, are susceptible to both acute and chronic physical risks associated with climate change. These risks encompass exposure to events such as cyclones, droughts, extreme temperature, floods, and rainfall patterns. The impact of each risk on our business depends on our geographic locations and the pace at which the world achieves its net-zero emissions goal.

For the assessment, location-specific data were collected to analyse historical trends and identify vulnerability to floods, droughts, erratic rainfall, etc., for both present and future projections (from 2020-2039 and 2040-2059). Data sources included the World Bank CCKP, WRI, NOAA IBTrACS, among others. Normalization was carried out to convert values into dimensionless units, and risk indicators were averaged using a simple arithmetic mean to determine the risk index.



Transition Risk Scenario Analysis

Aluminium is one of the most widely used metals globally and is increasingly utilized in low-carbon technologies. It plays essential roles in battery packaging, cathodes for lithium nickel cobalt aluminium oxide (NCA) batteries, hydrogen fuel cells, wind turbine blades, permanent magnets, photovoltaic panels, and power infrastructure. However, the aluminium sector, despite its importance in low-carbon technologies, contributes to global greenhouse gas emissions, making it a key candidate for decarbonization.

Our analysis used 5 of the NGFS reference scenarios: Current Policies Scenario, Nationally Determined Contributions (NDCs) Scenario, Below 2°C scenario, "Net Zero 2050" Scenario, and Delayed Transition Scenario.

Transitioning to a lower-carbon economy may necessitate significant policy, legal, technological, and market changes to address climate change mitigation and adaptation requirements. Depending on the nature and extent of these changes, transition risks can pose financial and reputational challenges for organizations. Our study examines various transition risk factors as defined by the TCFD:



Policy and Legal Risks:

These risks arise from policies aimed at restricting activities contributing to climate change or promoting climate change adaptation. Legal risks may increase as the financial implications of climate change-related losses and damages grow, potentially manifesting through higher carbon taxes or other carbon pricing mechanisms.



Market Risk:

This relates to shifts in supply and demand for specific commodities, products, and services as climate-related risks gain increased consideration.



Technology Risks:

Innovations and technological advancements supporting the transition to a lower-carbon, energy-efficient economy can significantly impact organizations.



Reputational Risk:




Organizations face reputational risk stemming from changing customer perceptions regarding their contributions to or detractions from climate change mitigation.










Climate-related Business Risks




Physical Risks

Physical risks with impacts on business operations analysed through scenario analysis




Hazard	Wind/ Cyclone		
 <p>Risk Statement High wind speed can make major damage to non-critical infrastructure or minor damage to critical infrastructure.</p>	 <p>Impacts Building/ infrastructure Infrastructure at our units is susceptible to cyclone damage due to their cyclone-prone locations. Cyclones can result in severe consequences, including the complete collapse of galvalume roofing systems, structural failures, broken windowpanes, and the progressive collapse of roof steel trusses. Additionally, heavy debris and uprooted trees within our facilities can pose hazards to employees.</p>		
 <p>Risk Type Acute Risk</p>	<p>Community/ Staff In disaster events like cyclones, female and disadvantaged groups within the community and staff are particularly vulnerable. Without cyclone shelters or proper evacuation and disaster response training, there is an increased risk of injuries and fatalities from flying debris. Disruptions in essential services like internet, phone, and electricity can also impact operations. Furthermore, flooding can lead to water stagnation and pollution of waterbodies, potentially causing disease outbreaks within the plant.</p>		



Hazard	Drought		
 <p>Risk Statement Drought can increase surface evaporation, reducing water storage, and also increase dust damage.</p>	 <p>Impacts Building/ infrastructure VAL sites face a significant drought risk that can affect their production and operations, primarily due to water scarcity. While drought is a probable scenario based on RCP projections, it doesn't directly impact the plant infrastructure aside from the challenge of reduced water availability.</p>		
 <p>Risk Type Acute Risk</p>	<p>Community/ Staff Water scarcity not only affects the health of the local community, including disadvantaged groups and women, but also hampers their economic prospects. Women, especially, are disproportionately impacted as they spend significant daily time collecting water, disrupting their work and education. This leads to higher absenteeism due to water-related illnesses, and inadequate water supplies at the business unit can particularly affect women's health and access to suitable restroom facilities.</p>		

Hazard	Extreme Temperature
 <p>Risk Statement Medium to high change in maximum temperature negatively impact on the workforce, ores, raw material storage and reducing efficiency by affecting the maintenance of plant</p> <hr/>  <p>Risk Type Chronic Risk</p>	 <p>Impacts Building/ infrastructure Temperature rise is likely to occur. This rise in temperature can cause damage to BU infrastructure through expansion of metal joints, substructure damage, asphalt deterioration, increased O&M costs including painting, cracks etc. The most important factors of temperature rise affect are experienced on concrete structures.</p> <p>Community/ Staff Challenges from rising temperatures include discomfort while working outdoors due to heat, water scarcity issues for daily office use, and increased health risks for both staff and the local community, particularly from heatwaves. As temperatures continue to rise, heatwaves are expected to become more frequent, intense, and prolonged, potentially leading to the urban heat island effect. These heatwave events can disrupt work schedules, and it's worth noting that studies have shown that women tend to be more affected by the health impacts of climate change than men.</p>

Hazard	Flood
 <p>Risk Statement The flooding may also result in damage to infrastructure and can represent a risk to workplace safety.</p> <hr/>  <p>Risk Type Acute Risk</p>	 <p>Impacts Building/ infrastructure While flooding may not have a direct impact on the business unit itself due to its distance from rivers or floodplains, it is important to note that local flooding can still disrupt construction or regular production processes at the unit</p> <p>Community/ Staff Women and disadvantaged groups are at higher risk of death and injury during natural disasters like floods. Furthermore, disruptions in internet, phone services, and electricity can lead to operational and scheduling issues. Additionally, post-flooding, there is a risk of disease outbreaks at the Business Unit due to water stagnation or pollution of existing water bodies.</p>






Hazard	Rainfall	
 <p>Risk Statement Droughts are usually caused by lack of rainfall and limited water retention capacity of reservoirs, aggravated by hot and sunny weather.</p>	 <p>Impacts Building/ infrastructure Extreme changes in rainfall can lead to structural damage, resulting in additional operation and maintenance costs. Moreover, inadequate measures to address increased inundation may impact storage rooms, power backup facilities, and office document storage.</p> <p>Community/ Staff Could cause absenteeism for employees and disruption of work in cases of heavy rainfall and waterlogging</p>	
 <p>Risk Type Acute Risk</p>		

Hazard	Overall Risk	
 <p>Risk Type Chronic Risk</p>	 <p>Impacts The projected temperature rise poses a risk to building infrastructure, potentially causing damage. Additionally, the Business Unit's vulnerability to high cyclone risk could impact its production and operations. Climate change, characterized by increasing temperatures and heatwaves, may also have health and safety implications for VAL staff. Furthermore, the heightened risk of drought is expected to increase water demands and competition for resources, potentially leading to social conflicts. To address these challenges, adaptation measures are essential to mitigate future heat stress and water scarcity.</p>	

Transition Risks

Transition risks with impacts on business operations analysed through scenario analysis

Type of risk	Policy and Legal	
	Climate-related risks <ul style="list-style-type: none">• Emerging Regulations: Increasing regulation of greenhouse gas emissions such as Perform, Achieve, Trade (PAT) scheme and Renewable Purchase Obligations (short-term).• Carbon Pricing: Introduction of carbon emissions trading mechanisms (long-term) in and outside India• Reporting Obligations: Enhanced emission-reporting obligations in accordance with the Paris Agreement, will push for higher accountability for the Private Sector• Litigation: Exposure to litigation can be for numerous reasons some of them being non-compliance with reporting, negative impacts to climate change/ environment	
	Potential Impact <ul style="list-style-type: none">• Increased operational costs (higher compliance costs, increased insurance premium)• In case of a domestic carbon tax or ETS in India, the more Unit emits, it will be subjected to greater levels of carbon taxation.• Impact through increased costs and/ or reduced demand for aluminum products resulting from environmental fines and judgements.• Increases local and national reporting requirements	

Type of risk Technology



Climate-related risks

- Low Carbon Product Substitution: London Metal Exchange has proposed to introduce LME passport which specifies Carbon Footprint of produced Aluminum. There is an increasing trend for Green Aluminum or low carbon metal among the consumers.
- Costs to transition to lower emission technology



Potential Impact

- Increased research and development (R&D) expenditures in new and alternative technologies such as low-carbon aluminum or for recycling technologies, use of electric vehicles and utilising renewable sources for electricity etc.
- Costs to adopt/ deploy new practices and processes by changing the current functioning of the company will incur costs

Type of risk Market



Climate-related risks

- Changing consumer behaviour due to the Paris Agreement and the European Green Deal
- Carbon Border Adjustment Mechanism (CBAM) can impose a cost on aluminum goods imported into the European Union.
- High dependency on coal owing to the locations being in India
- Increased cost of raw materials



Potential Impact

- Reduced demand for high carbon aluminum due to shift in consumer preferences
- Increased production costs due to changing input prices (energy, water) and output requirements (waste treatment)

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Type of risk Reputation



Climate-related risks

- Stigmatization of sectors such as those highly contributing to the GHG emissions
- Shift in interest of the investors



Potential Impact

- Reduced revenue from decreased demand for goods
- Reduced revenue from decreased production capacity (supply chain interruptions)
- Fines and non-compliance will ultimately affect the reputation of the company, which will impact access to financing and insurance policies



Financial Impact of Climate Change

The global perspective on climate change and its effects on investments, assets, and business operations has generated growing interest among investors and other important stakeholders. They seek indicators that provide insights into how climate-related factors might impact a company's financial standing and performance.

The financial amount represents the total value of assets within Vedanta's subsidiaries that could potentially be affected by climate-related risks. This exposure might materialize in the form of required capital investments for asset replacement or increased operational expenses, maintenance costs, etc., resulting from climate-related impacts. The comprehensive value at risk, considering various climate scenarios both with and without adaptation measures, is as follows:

Sl. No.	Site	Hazard	Exposure (million INR)	% of total asset value at risk	
				Without Adaptation	With Adaptation
1	Jharsuguda	0.38	368022.9	21.22	0.14
2	Lanjigarh	0.39	141937.1	22.05	0.15
3	BALCO	0.39	89818.2	29.15	5.02

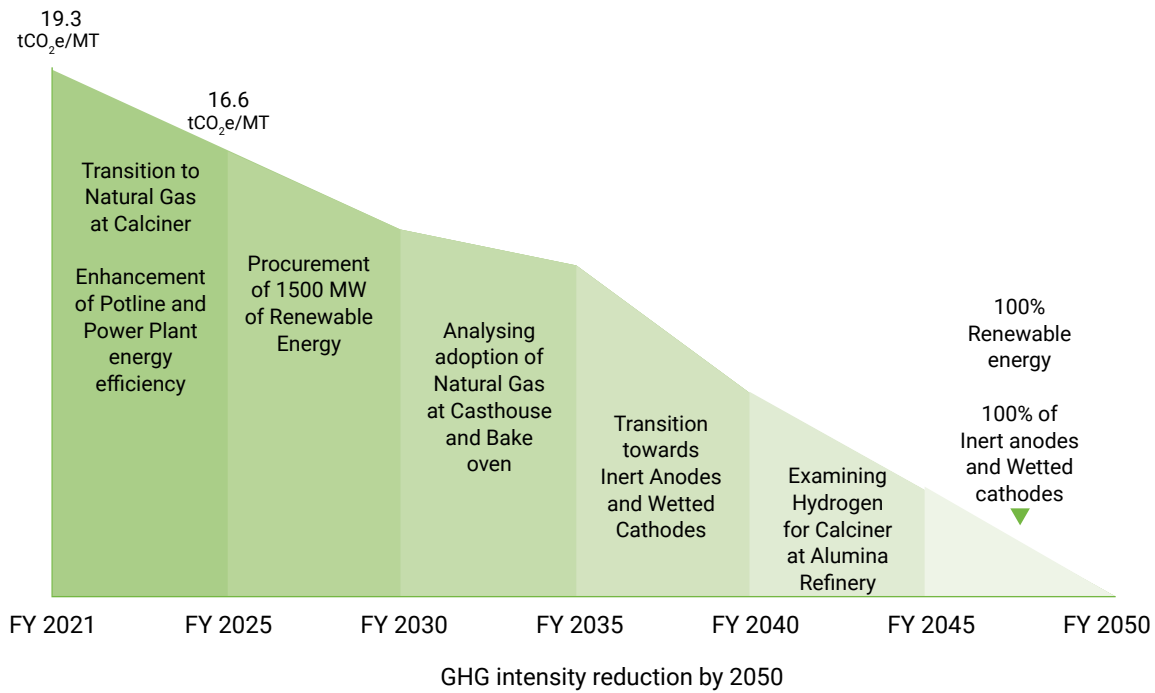
At Vedanta Aluminium, we acknowledge the influence of climate-related risks and opportunities on tangible assets, capital expenditures, liabilities, and cash flow. We actively monitor these climate-related risks across our operations, including both fixed and movable assets, as well as the broader reputational risks associated with climate change. This information is integral to our strategic decision-making processes.



Risk Management

Decarbonization roadmap

Phase wise action plan till FY 2050 for GHG intensity reduction (tCO₂e/MT)



Action Plan

I) Our journey towards regeneration:

Enhancing potline energy efficiency through initiatives such as pot graphitization, smart pot controllers, readily deployable cathodes, voltage reduction, and auxiliary power reduction.	Improving power plant efficiency by implementing annual and capital overhauling, as well as employing variable frequency drives (VFD) on auxiliary pumps and fans.	Transitioning calciner operations from oil to natural gas at our alumina refinery.	Establishing Power Purchase Agreements (PPA) and integrating 200 MW and 180 MW of renewable power sources for our aluminium smelters at BALCO and Jharsuguda plants, respectively.
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II) Anticipated reductions by 2035:

Integration of Biomass Co-firing up to 5% in 135 MW Power Plants at BALCO and Jharsuguda Facilities.	Procurement of 1500 MW of Renewable Energy for smelters at Jharsuguda and BALCO facilities.	Adoption of Natural Gas at BALCO and Jharsuguda Plants, specifically at the Cast House and Bake Oven Plant.	Memorandum of Understanding (MoU) and Pilot Trial for Inert Anodes and Wetted Cathode Implementation at our Smelters.
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III) Scaling up:

Maintain the Transition Towards Inert Anodes and Wettable Cathodes.	Examine the Potential of Hydrogen Fuel for the Calciner Operation at the Alumina Refinery.
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IV) Delivering our promise:

By 2050, 100% of our anodes will be mandated to be inert, and all cathodes will be required to be wetted cathodes without exception.	100% of the power supply for smelters will be exclusively sourced from renewable energy.
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Addressing impact of climate change

We firmly believe that tackling the challenges posed by climate change necessitates a comprehensive strategy that encompasses various aspects of our operations. Our approach to climate change management is designed with a feedback mechanism, which enhances our ability to proactively mitigate climate-related risks and their potential impacts on our business performance. Similar to our management of other ESG risks, climate change risks are integrated into our Enterprise Risk Management framework. This integration aids in enhancing the internal capabilities of our stakeholders, monitoring our progress in reducing or eliminating these impacts, and ultimately allows us to assess our efforts in comparison to industry benchmarks. Our goal is not only to minimize our own climate-related impacts but also to contribute valuable insights to the broader sector.



Partnered with TÜV SÜD to chart the roadmap for the company's water positivity goal.

Received BIS certification for 15 of its products and applications.

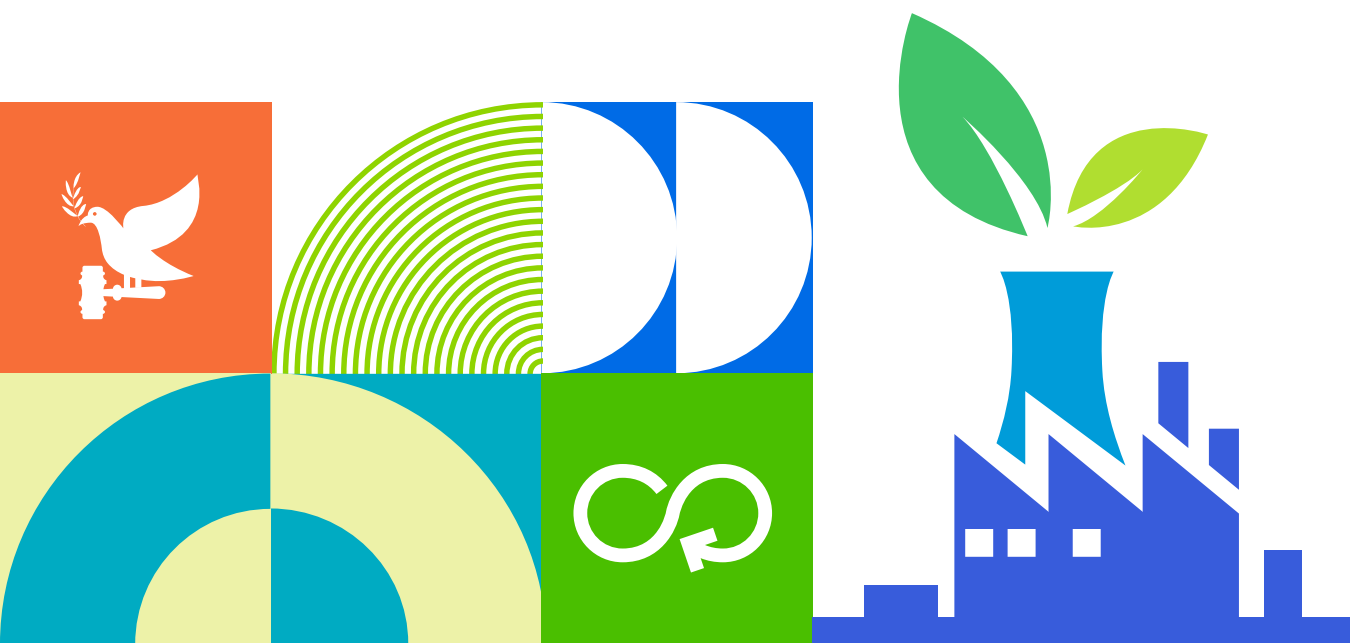
Partnership with TÜV SÜD

We collaborated with TÜV SÜD, a global leader in sustainability solutions, towards achieving net water positivity. This commitment aligns with the Vedanta Group's overarching goal of realizing net water-positive operations by 2030. The partnership with TÜV SÜD encompasses various critical aspects, including conducting baseline studies, refining water consumption accounting procedures, enhancing capacity for water conservation and improvement, and introducing innovative sustainability initiatives.

We were able to carry out water screening assessments across our business units, helping to identify sensitive aquatic habitats, assess water availability, and determine dependencies on shared water sources. This information helped us in anticipating and addressing potential environmental and social water-related risks by developing customized water management plans.

Our sustainable water management strategy rests on four pillars: continuous monitoring of water usage, maximizing water reutilization through advanced recycling systems, creating a positive water footprint through rainwater harvesting, and empowering communities with access to water and climate-smart agriculture techniques.

In the fiscal year 2023, we successfully recycled a staggering 14.46 billion liters of water for in-house consumption.



Our Climate Management Initiatives

Climate Mitigation Initiatives

01 Biomass Co-firing



Successfully conducted trial runs of biomass co-firing.



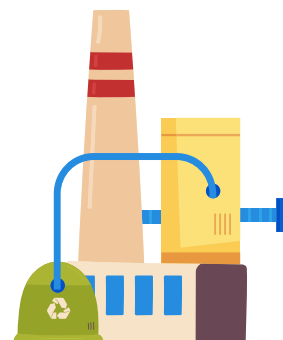
Aligning with Vedanta Aluminium's Net Zero Carbon goal by 2050.



Potential annual reduction of 0.43 million tonnes of CO₂ equivalent emissions.



Used ~5100 MT of biomass instead of coal for thermal power generation



02 Biodiesel Implementation



Introduction of biodiesel in technological vehicles.



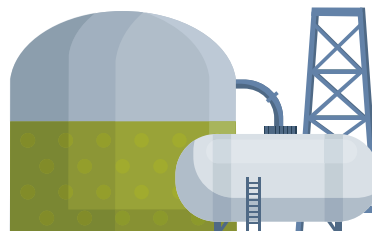
Aiming to contribute to zero carbon emissions by 2050.



Biodiesel derived from organic matter with a significantly lower carbon footprint.



Trial runs for preheating metal-carrying vehicles ('ladles').



03 Rainwater harvesting and recharge system



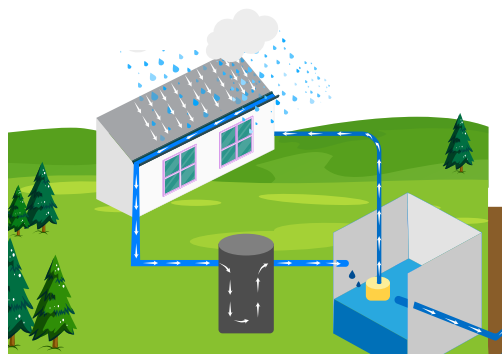
Commissioning a rainwater harvesting and recharge system.



Terrain-specific design to capture rainwater.



Recharging groundwater with capacity of ~ 0.2 million m³ of rainwater annually.



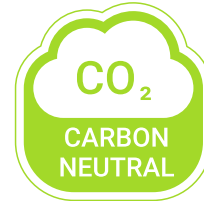
04 Decarbonizing Supply Chain



Expansion of supply chain with the addition of a new Bogey Tank for Alumina Powder (BTAP) rake.



Strengthening and decarbonizing the supply chain.



Contributing to sustainable inventory levels of alumina.



Using rail instead of road (for transportation of raw materials, ash etc.) to reduce scope 3 emissions



Reducing costs and Turn Around Time (TAT) through bulk materialization via railways.

05 Support for Carbon pricing policies



Advocating for carbon pricing as a tool for decarbonization.



Internal Carbon Pricing to analyze emission costs and climate risks.



Introduction of shadow carbon price of USD 15 per tonne of CO₂ emissions to understand and manage risks.



The shadow price will enable us to address long-term strategies for future emissions and invest in low-carbon infrastructure and practices



Incorporating carbon pricing into return on investment calculations for projects.

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06 Dedicated Disaster Management Cells



Dedicated rescue teams at site for both inside and outside the plant in case of any floods or cyclones



Flood control centre providing equipments (life jackets, dewatering pumps, PPEs, cutting tools, lifting tools etc.)



Proper layout planned for inside the plant.



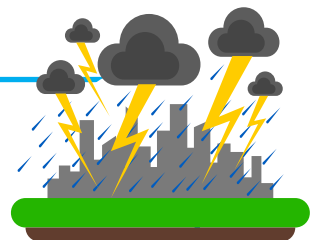
Emergency Response Centre at the District Collector's Office in Jharsuguda to bolster the safety and security of the local communities.



24x7 emergency helpline number, essential safety gear (PPEs) for authorities to reduce their response time.



It will ensure preparedness for any physical risks like fire, floods, cyclones etc.

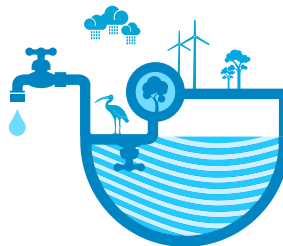


Climate Adaptation Interventions

01 Water and Energy Conservation



Several energy efficiency related initiatives in our operations like potline and cathode optimization, boiler and heating system improvements, energy efficient motors, and other process and equipment enhancements.



Recycled 14.46 billion litres of water during FY 2022-23 aligning with the company's commitment to become Net Water Positive by FY 2030



IoT integration in water conservation



Performance evaluation and monitoring of sewage treatment plants



Rainwater harvesting structure for water reuse in process

02 Collaborative Efforts with Local Communities



Advancing sustainable farming through the Jeevika Samriddhi and Mor Jal Matti project.



Cooperation with the district administration, local communities, employee, volunteers to provide drinking water during the summer season.



Revitalization of more than 40 village ponds for year round water supply with positive impact on over 3,000 local residents.



Awareness in communities about heat stress, ozone depletion, water management, providing required support for winter preparedness, equipments to district forest office for prevention of forest fires etc.

03 Low Carbon Aluminium Products



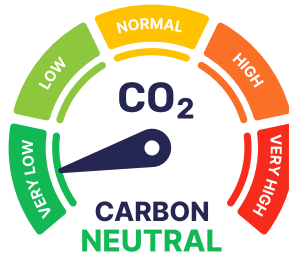
Within the Restora brand, Vedanta Aluminium provides customers worldwide with two product options: Restora, characterized as Low Carbon Aluminium, and Restora Ultra, which represents Ultra-low Carbon Aluminium.



Restora is manufactured using renewable energy sources to minimize its carbon footprint.



Restora Ultra is produced using aluminum recovered from dross, a by-product of the aluminum smelting process. This is achieved through a collaborative partnership with Runaya Refining LLP.



04 Green Material and Electrification of Fleet



Certification by leading global bodies, including Bureau of Indian Standards (BIS), Environmental Product Declaration (EPD), and the Aluminum Stewardship Initiative (ASI), indicating high quality and sustainability standards.



Host one of India's largest fleets of electric lithium-ion forklifts and aims to decarbonize a significant portion of its Light Motor Vehicle and mining fleet by 2030 and 2035, respectively.

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05 Climate Smart Agriculture



Collaborating with local farming communities on climate-smart agriculture.



Training farmers in efficient land and water management techniques.



Introduction of small-scale farmers to new technologies and expert consultation.



Proactive steps to mitigate water-related risks.



Focus on making agriculture in operational areas climate-resilient.

Metrics and Targets

We have incorporated climate-related risks and opportunities into its business, including financial, operational, technological, and ESG performance. We use a variety of metrics to assess the current and future implications of these factors.

As part of our commitment to achieving net-zero emissions, we have set specific targets to mitigate the impact of activities that generate emissions. These targets are a fundamental part of our strategy for managing climate-related risks and opportunities. By actively reducing emissions, we not only contribute to our sustainability objectives but also enhance our overall risk management approach to address the challenges posed by climate change.

Summary of our progress towards Net Zero Emission by 2050:

	Summary of progress in 2023	Target 2023	Target 2025
(Scope 1+ Scope 2) GHG intensity	From 19.3 tCO ₂ e/T in FY 21 to 17.69 tCO ₂ e/T in FY 23 which is a reduction of 8.13% from the FY 21 baseline intensity and an increase of 0.5% from FY 22 for our aluminium business. The GHG Intensity of Power business is 0.96 tCO ₂ e/MWH.	18.3 tCO ₂ e/T from 19.3 tCO ₂ e/T in FY 21 baseline for our aluminium business.	16.6 tCO ₂ e/T from 19.3 tCO ₂ e/T in 2021 leading to around 14% intensity reduction from FY 21 baseline for our aluminium business.
(Scope 1+ Scope 2) Absolute emission	The absolute emission for aluminium business is 37.88 million tCO ₂ e, an increase of 5% from FY 21 baseline and 0.6% increase from FY 22 baseline.	The target for the aluminium business was 40.24 million tCO ₂ e.	Vedanta Aluminium's target is 43.8 MT of CO ₂ emission.
	The absolute emission for power business is 4.11 million tCO ₂ e.		
Scope 3 emissions	The absolute emission for aluminium business is 8.1 million tCO ₂ e.	Improving data availability for accurate calculation Estimation of Scope 3 emission for the business.	10% reduction in Scope 3 emission intensity from FY 21 baseline
	The emission intensity for the aluminium business is 3.87 tCO ₂ e/ t of aluminium.		

Scope 1 and Scope 2 emissions

We have been reporting our Scope emissions as per the GHG Protocol's Standards. This year we saw a reduction in our scope 1 and 2 emission intensities by 8.13 % and are well in line to achieve our target for FY 25.

Business		Scope 1 Emission (metric tonnes CO ₂ equivalents)			
		FY 2022-23	FY 2021-22	FY 2020-21	FY 2019-20
Aluminium	BALCO	87,47,945	97,50,329	98,00,513	99,88,944
	Jharsuguda	2,13,98,139	2,38,95,267	2,39,26,260	2,28,89,717
	Lanjigarh	18,45,992	18,73,120	17,87,966	17,86,097
Power Business	BALCO IPP	9,30,058	23,72,262	31,21,348	30,06,835
	Jharsuguda IPP	31,78,797	20,30,074	27,28,097	7,52,210
Total		3,61,00,932	3,99,21,052	4,13,64,184	3,84,23,803

Business		Scope 2 Emission (metric tonnes CO ₂ equivalents)			
		FY 2022-23	FY 2021-22	FY 2020-21	FY 2019-20
Aluminium	BALCO	4,64,162	1,55,715	2,143	0
	Jharsuguda	53,99,730	19,56,916	5,10,837	8,02,664
	Lanjigarh	22,443	4,856	6,595	1,593
Power Business	BALCO IPP	0	0	0	0
	Jharsuguda IPP	0	0	0	0
Total		58,86,335	21,17,487	5,19,576	8,04,257

Note:

We have used the following methodologies for collecting activity data and calculating emissions-

- IPCC Guidelines for National Greenhouse Gas Inventories, 2006
- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
- The Greenhouse Gas Protocol: Scope 2 Guidance
- CO₂ Baseline Database for Indian Power Sector
- IPCC Guidelines 2019 GHG Inventory



Scope 3 emissions

Given the nature of our operations, Scope 3 emissions include many activities which occur beyond our operational boundaries. The following Scope 3 categories are material to our business. The estimated scope 3 emissions from our value chain are summarized below.

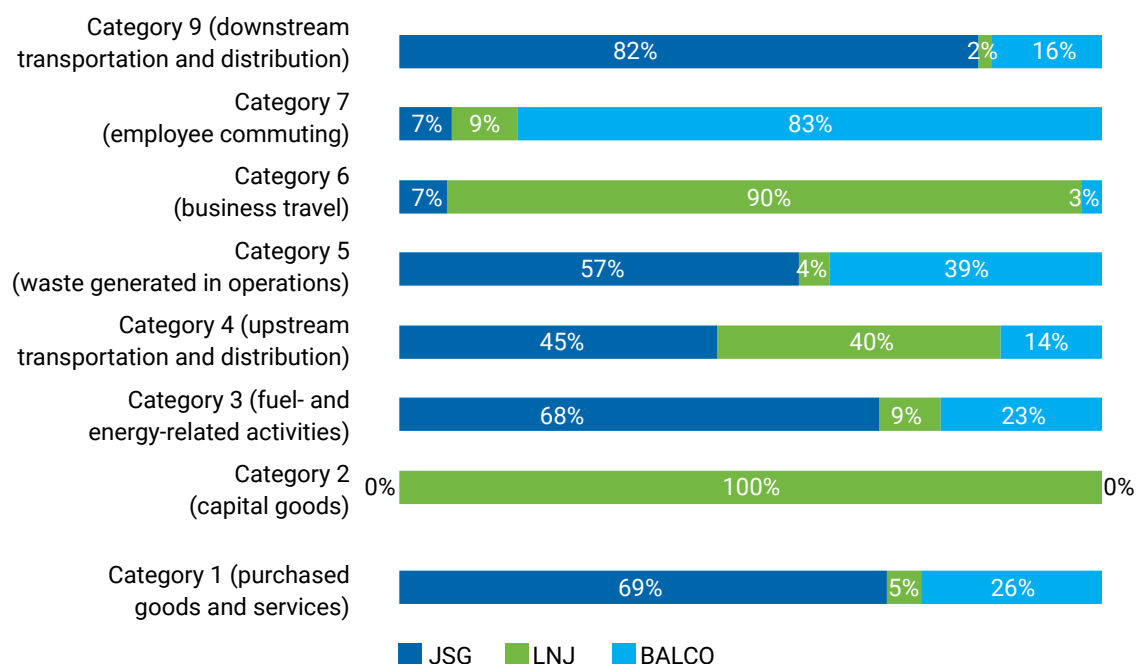
Business	Scope 3 Emission (metric tonnes CO ₂ equivalents)					
	FY 2022-23			FY 2021-22		
Aluminium	Jharsuguda	BALCO	Lanjigarh	Jharsuguda	BALCO	Lanjigarh
	55,67,124	19,91,987	5,42,965	50,05,928	12,37,119	5,40,241
Total*	81,02,074			67,83,289		

* Emission from BALCO are included in FY 22-23 which are from fuel (coal and HFO) combustion, calculated based on sulphur content present in the fuel.

Scope 3 categories data

SCOPE 3 EMISSIONS	SECTOR
Category 1 (purchased goods and services)	60,01,286
Category 2 (capital goods)	2,164
Category 3 (fuel- and energy-related activities)	14,68,663
Category 4 (upstream transportation and distribution)	2,90,074
Category 5 (waste generated in operations)	34,477
Category 6 (business travel)	2,083
Category 7 (employee commuting)	7,523
Category 9 (downstream transportation and distribution)	2,95,807
TOTAL	81,02,077

Scope 3 emissions



Note:

- The Scope 3 accounting was prepared in accordance with the GHG Protocol's Scope 3 Value-Chain Accounting and Reporting Standard.

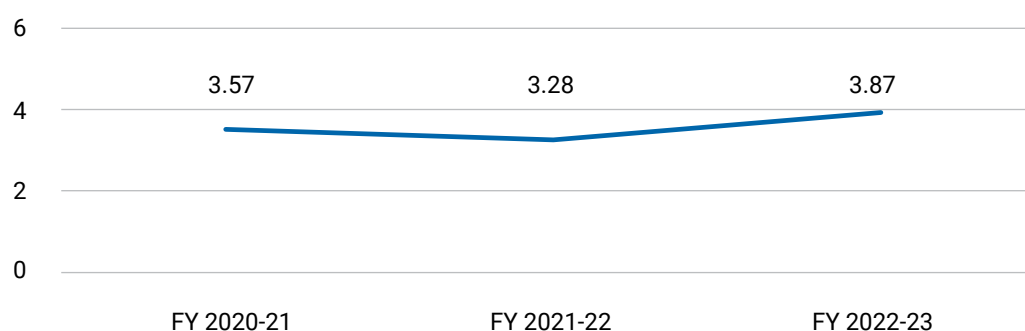
GHG emissions intensity

Scope 1 and 2 emission intensity

Aluminium (TCO ₂ e/MT)	FY 2022-23	FY 2021-22	FY 2020-21	FY 2019-20
	GHG Intensity (TCO ₂ e/MT)	GHG Intensity (TCO ₂ e/MT)	GHG Intensity (TCO ₂ e/MT)	GHG Intensity (TCO ₂ e/MT)
BALCO	16.26	17.03	17.21	17.79
Lanjigarh	1.01	0.95	0.97	0.98
Jharsuguda	15.58	15.33	17.46	17.65
Sector	17.69	17.60	19.26	19.58

Scope 3 emission intensity

Scope 3 emission intensity (tCO₂e/MT)



PFC Emissions

The primary aluminum production process represents one of the largest human-made sources of emissions for two perfluorocarbons (PFCs), namely tetrafluoromethane (CF₄) and hexafluoroethane (C₂F₆). We had set a goal to limit PFC emissions to 0.1 kg per metric ton of aluminum produced and our actual performance reached 0.05 kg per metric ton. We are actively planning to further reduce these emissions in the future through process optimization and enhanced controls.

Direct PFC emissions	Unit	FY 2019-20		FY 2020-21		FY 2021-22		FY 2022-23	
		JSG	BALCO	JSG	BALCO	JSG	BALCO	JSG	BALCO
Direct PFC emissions	kg PFC/MT	0.10	0.06	0.07	0.04	0.07	0.02	0.05	0.04
TOTAL		0.08		0.051		0.052		0.05	



Other Metrics

TCFD recommends including a variety of metrics to enable tracking of overall climate performance. Hence, we actively track metrics associated with renewable and non-renewable energy consumption, water as well as waste along with our non-GHG related targets to approach sustainability in a holistic manner. These metrics and targets allow us to identify risks and leverage opportunities. For detailed information on these metrics, refer to our Sustainable Development Report 2023. The following non-GHG related metrics and targets have been set:

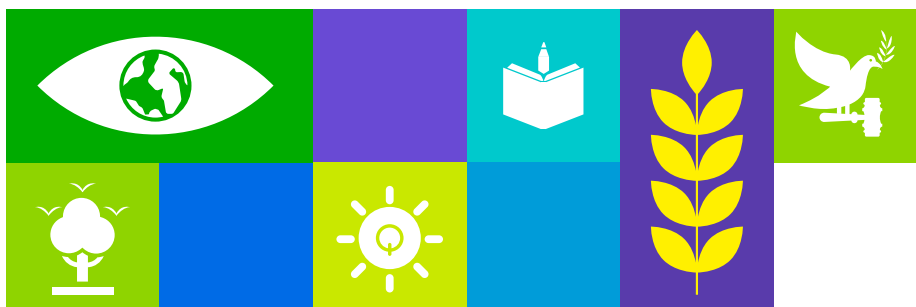


SDR 2023

Renewable and Non-Renewable Energy Consumption:

Total energy consumption unit GJ	FY 2022-23			TOTAL
	JSG	BALCO	LNJ	
Total non-renewable energy consumption	21,45,38,910	8,26,00,641	2,04,22,475	31,75,62,025
Total renewable energy consumption	26,64,969	20,37,420	24,002	47,26,391
Total energy consumption unit GJ	21,72,03,878	8,46,38,061	2,04,46,719	32,22,88,658

Sustainability Strategy	Summary of progress in 2023	Target 2023	Target 2025	Target 2030
100% Renewable Energy by 2050	<ul style="list-style-type: none"> 4% of total energy procured across all BUs was renewable energy. 1.37 billion units of renewable energy consumed 	3% of power requirement of the Sector to be met through renewable energy	<ul style="list-style-type: none"> 7% of power requirement of the Sector to be met through renewable energy Enter into PDA for 400 MW of Power and use of 400 MW of RE power 	<ul style="list-style-type: none"> 30% of power requirement of the Sector to be renewable energy Installation and use of 1500 MW of RE power



Water:

Unit (m ³)	FY 2022-23		FY 2021-22	
	Ground Water (m ³)	Surface Water (m ³)	Ground Water (m ³)	Surface Water (m ³)
BALCO	0	2,50,36,355	0	3,00,31,250
Lanjigarh	0	62,59,247	0	54,48,365
Jharsuguda	0	6,48,94,268	0	7,20,05,617
Total	0	9,61,89,870	0	10,74,85,232

Sustainability Strategy goals	Summary of progress in 2023	Target 2023	Target 2030
Goal: Water positive by 2030	Freshwater withdrawal is 96.19 million m ³ compared to 107.49 million m ³ last year for Aluminium business.	Our net freshwater withdrawal target was 111 million m ³ if we had considered business as usual scenario. The water savings is due to reduction in specific water consumption.	The Company's goal is to become water positive by 2030. We are aligned to the vision and intend to support in the materialisation of the goal by growing our business but not the water footprint over FY 21 baseline.



Climate Strategy

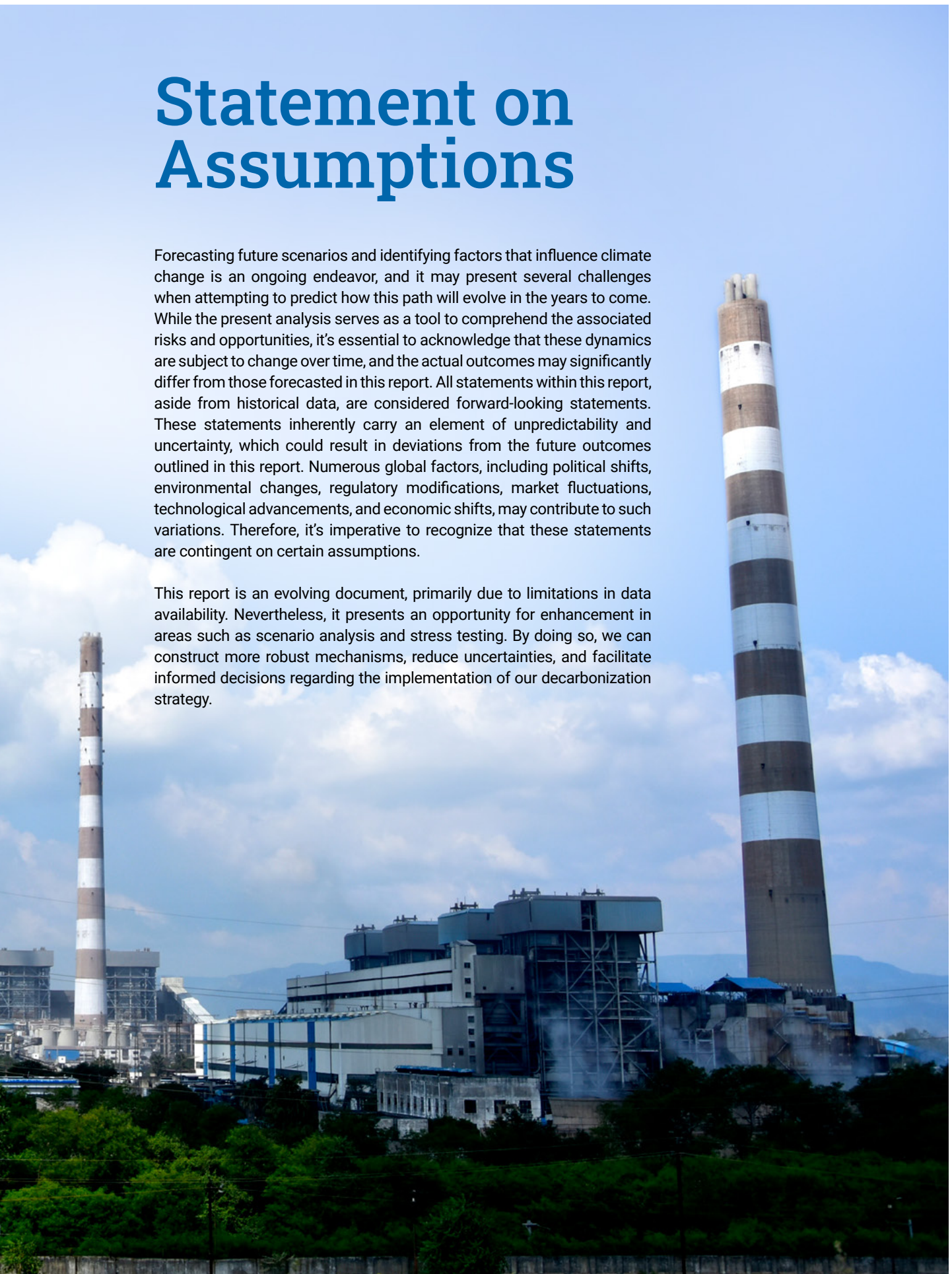
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Statement on Assumptions

Forecasting future scenarios and identifying factors that influence climate change is an ongoing endeavor, and it may present several challenges when attempting to predict how this path will evolve in the years to come. While the present analysis serves as a tool to comprehend the associated risks and opportunities, it's essential to acknowledge that these dynamics are subject to change over time, and the actual outcomes may significantly differ from those forecasted in this report. All statements within this report, aside from historical data, are considered forward-looking statements. These statements inherently carry an element of unpredictability and uncertainty, which could result in deviations from the future outcomes outlined in this report. Numerous global factors, including political shifts, environmental changes, regulatory modifications, market fluctuations, technological advancements, and economic shifts, may contribute to such variations. Therefore, it's imperative to recognize that these statements are contingent on certain assumptions.

This report is an evolving document, primarily due to limitations in data availability. Nevertheless, it presents an opportunity for enhancement in areas such as scenario analysis and stress testing. By doing so, we can construct more robust mechanisms, reduce uncertainties, and facilitate informed decisions regarding the implementation of our decarbonization strategy.





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ALUMINIUM, VEDANTA LIMITED

REGISTERED OFFICE: Vedanta Limited, 1st Floor, 'C' wing,
Unit 103, Corporate Avenue, Atul Projects, Chakala,
Andheri (East), Mumbai – 400093, Maharashtra, India

T +91 22 6643 4500 | F +91 22 6643 4530

CIN: L13209MH1965PLC291394

www.vedantalimited.com

www.vedantaaluminium.com