

Hindustan Zinc Limited

Task Force on Climate-related Financial Disclosures ('TCFD')

Report 2022



List of Abbreviations

AIPA	Apex Committee for Implementation of Paris Agreement
CAPEX	Capital expenditure
CLZS	Chandaria Lead Zinc Smelter
CoD	Committee of Directors
CPCB	Central Pollution Control Board
DSC	Dariba Smelting Complex
DZS	Debari Zinc Smelter
ELT	Executive Leadership Team
FCR	Forum on Corporate Responsibility
FSB	Financial Stability Board
GHG	Greenhouse gas
HZL	Hindustan Zinc Limited
IIRC	International Integrated Reporting Council
IPCC	Intergovernmental Panel on Climate Change
KM	Kayad Mine
KPIs	Key Performance Indicators
NDCs	Nationally Determined Contributions
OPEX	Operating expense
RAM	Rampura Agucha Mines
RCP	Representative Concentration Pathway
RDM	Rajpura Dariba Mines
REC	Renewable Energy Certificate
RPO	Renewable Purchase Obligations
SBTi	Science-Based Targets Initiative
SEBI	Securities and Exchange Board of India
SPCB	State Pollution Control Board
SKM	Sindesar Khurd Mines
TCFD	Task Force on Climate-related Financial Disclosures
ZM	Zawar Mines

Our Highlights

Commitments and Targets

- Committed for Net Zero emission by 2050 in line with Business Ambition for 1.5 C campaign led by the Science Based Targets initiative (SBTi)
- Sustainability goals 2025 - 0.5 Mn tCO₂e savings in our operations from base year 2017 by 2025
- Sustainability goals 2025 - 5 times Water positive company & achieve 25% reduction in freshwater consumption by 2025
- Approved science-based targets to reduce absolute emission –
 - Scope 1 & 2 GHG emissions by 14% by FY 2027
 - Scope 3 GHG emissions by 20% by FY 2027 from 2017 base year

Actions

- 200 MW RE RTC power agreement by 2022
- MoUs with global OEMs to introduce battery-powered equipment and vehicles in underground mining
- Implemented decarbonisation initiatives including Turbine revamping, biomass utilization, EV, waste heat recovery boiler, cell house efficiency improvement.
- All Units are certified to ISO: 50001 Energy Management System
- Saved 1309885.7 GJ of energy and 148388.4 tons of CO₂e
- 4.16% decrease in GHG intensity – from 5.15 MT to 4.97 MT per Ton of Metal

Budget allocation

- Committed to invest US\$ 1 billion over the next five years in our climate change initiatives
- Invested INR 3070 million for Environmental conservation activities in FY22
- Internal carbon price of \$14 / tCO₂e

Governance

- Unique 3 tier governance structure
- Formation of new sustainability and ESG committee at board level
- Dedicated Community for Energy and Carbon Management

CEO STATEMENT



TO OUR STAKEHOLDERS,


Hindustan Zinc is pleased to provide our second report aligned to the recommendations of the Task Force on Climate-Related Financial Disclosures ("TCFD"). The report is aimed at fostering future dialogue and action towards climate change mitigation plans, besides providing insights into the Company's resilience to climate-related risks & opportunities as we transition to a clean energy future.

The greatest risk currently facing humanity is thought to be the climate change and extreme weather trends, which are recognised as major risks faced by companies. Businesses across the areas have been disrupted as a

result of the intricacy of the climate change. As a mining company that focuses primarily on the extraction of metals, we are fully aware that the effects of our operations on the local environment and communities are considerable. We are making strides to address the climate catastrophe because we believe it is the right thing to do for our stakeholders and our own business.

I would like to share here that we have decided to undertake a long-term captive renewable power development plan – up to a capacity of 200 MW – in furtherance of our net-zero goal. The move is in line with our strategic purpose of reducing dependence on thermal power

by scaling up our renewable energy to cover 50% of our energy requirement by 2030 and reduce the GHG emissions from our operations. During FY 2021-22, we also signed an MoU with CDP science-based incubator programme for setting targets for our SBTi aligned net-zero commitment. Additionally, we inked two key MoUs with global OEMs to introduce battery-powered equipment and vehicles in underground mining to achieve our aim of inducting electric and battery-operated equipment against equipment that goes for replacement five years from now. We have already launched passenger EVs to reduce our carbon footprint. We are also working on plans to charge our



electric fleet using our own solar power thus completing the end-to-end environment-friendly cycle. We are also committed to invest US\$ 1 billion over the next five years in our climate change initiatives, which will further enhance our ESG value proposition.

Since joining TCFD in February 2021, our company has continued to support the Paris Agreement. In an effort to lessen the impact and inform our stakeholders about our disclosure procedures for financial risks related to climate change, we released our first TCFD report in August 2021. The report provided a comprehensive understanding of our approach to the identification, measurement, management, monitoring, and reporting of opportunities and risks related to climate change, and our second report included analysis for each impact and transition risk in accordance with IEA steps and NDCs. Our activities, in our opinion, will help with climate risk mitigation and adaptation since we are eager to contribute to the creation of a long-term sustainable future for our stakeholder.

As part of our financial planning, we have also determined some capital and operating spending requirements for each site. We will routinely update climate risks since we recognise that the information and understanding about the climate are unsure and need to be

updated.

We have structured this report in accordance with the guidelines and advice of the TCFD in order to continue enabling high-value stakeholder engagement while providing relevant information that is decisive. We hope that this report helps to foster future action towards climate change mitigation, promote important dialogue, and expand opportunities for collaboration with our stakeholders and communities, as we explore the best strategies to address climate change and transition to a clean energy future. I am pleased to deliver our second TCFD report.

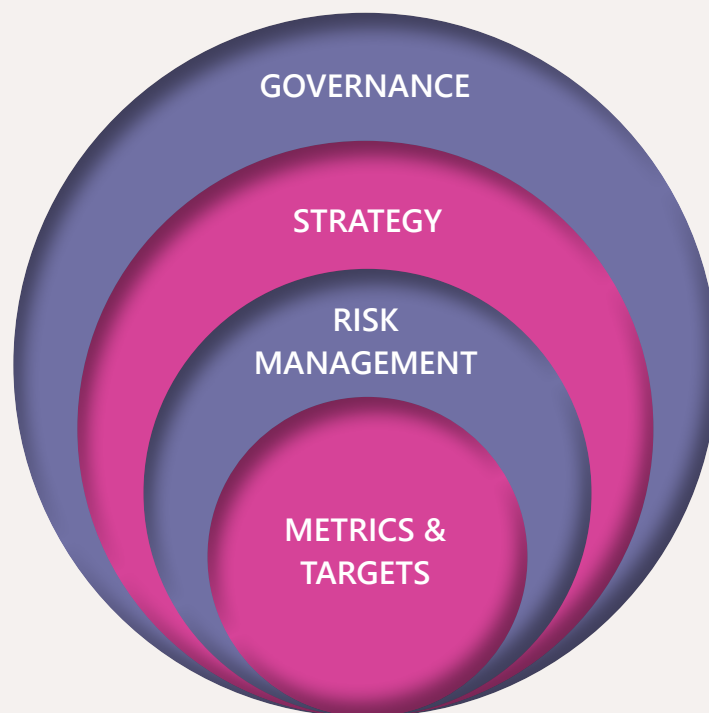
Arun Misra

CEO & Wholetime Director, HZL

About the Report

This is our second Climate Change report aligned in line with the recommendations of the Financial Services Board's Task Force on Climate-related Financial Disclosures (TCFD). We at HZL have adopted TCFD framework for climate change risk and opportunity management to ensure our sustainability commitment. We have made strategic decision to align our reporting process with best practice of global climate reporting.

This report contains our disclosures against the four core elements recommended by the TCFD - Governance, Strategy, risk management, and metrics & targets for all our operations including five mining locations, three smelters, and one refinery plant. It is our firm belief that this TCFD aligned report enables our stakeholders to evaluate our climate change-related performances for future.



We have considered TCFD's Fundamental Principles for Effective Disclosure while developing this report to achieve high-quality and decision-useful disclosures that enable users to understand the impact of climate change on organizations

About the Company

Hindustan Zinc Limited (Hindustan Zinc) is India's only and world's leading producer of zinc, lead and silver. Hindustan Zinc is a subsidiary of Vedanta Limited which owns 64.9% stake, along with the Government of India, which owns 29.5%.

Vision



Be the world's largest and most admired Zinc-Lead & Silver Company

Mission



- Enhance stakeholder value through exploration, innovation, operational excellence, safety and sustainability.
- Be a globally lowest cost producer
- Maintain market leadership and customer delight

We have our operational presence in the Indian state of Rajasthan, with 5 mines, namely Zawar Mines (ZM), Kayad Mine (KM), Rampura Agucha Mines (RAM), Rajpura Dariba Mines (RDM), Sindesar Khurd Mines (SKM) and 3 smelting plants namely Chanderia Lead Zinc Smelter (CLZS), Dariba Smelting Complex (DSC), Debari Zinc Smelter (DZS) and in state of Uttarakhand with 1 refinery - Pantnagar Metal Plant.

Our products are used for various application from mobile phones and renewable energy products to medical equipment and automobiles to infrastructure such as bridges. These metals are regarded as the building blocks of society and the economy.

REFINED ZINC

776 kt

Production Volume

₹ 20,299 crore

Revenue

Applications

- Roadways and bridges
- Power generation and transmission
- Renewable energy
- Construction
- Railway Infrastructure
- Automotive
- Chemicals
- Telecom Tower

Value-Added Products

- Continuous Galvanising Grade
- Die-cast alloys
- SHG Jumbos

REFINED LEAD

191 kt

Production Volume

₹ 3,550 crore

Revenue

Applications

- Lead Acid batteries
- Construction
- Defence Applications
- Electrical Cables

REFINED SILVER

647 MT

Production Volume

₹ 4,206 crore

Revenue

Applications

- Jewellery
- Tableware
- Electrical contacts
- Investments

Value-Added Products

- 1 Kg silver bars
- Silver powder
- Silver nitrate

Executive Summary

We have made significant progress in all the four core elements of the TCFD framework towards managing climate change risks to business. An overview of our approach and actions is presented below

Report section	Highlights
GOVERNANCE	
	<p>Our climate governance structure ensures that all our operations adhere to best practices, principles, legal requirements and highest level of ethical standards.</p> <p>We have established a three-tier structure comprising:</p> <ul style="list-style-type: none">• Tier-1: Board level Risk Management & Audit Committee and Sustainability & ESG Committee• Tier-2: Executive-level Sustainability Committee<ul style="list-style-type: none">- Energy and Carbon Community• Tier-3: SBU level ESG committee <p>The board oversees and guides on strategy and its deployment to enhance value generation, retention of sustainable business operations and distribution amongst stakeholders,</p> <p>KEY BOARD DECISIONS TAKEN IN FY22</p> <ul style="list-style-type: none">• Approved formation of new sustainability and ESG committee at board level• Approved a proposal for entering a long-term group captive renewable power development plan, up to a capacity of 200 MW
STRATEGY	
	<p>We carried out the Scenario analysis and stress testing for understanding the implications of climate change on our operations across the units and to have longer term strategy about risks and opportunities possessed by climate change.</p> <p>We used Advanced Climate Modelling, Representative Concentration Pathway (RCP) 4.5 and RCP 6.0 and Stated Policies Scenarios (STEPS) of International Energy Agency to predict the likely physical and transition changes for two time periods 2020-39 and 2040 -59</p> <p>As per our assessment, heat wave is the only physical risk that is very high at all sites except Pantnagar till 2039. Beyond 2039, Heat Wave, Drought and High Temperature could impact all sites except Pantnagar and Debari.</p> <p>The transition risk can cause significant revenue losses and penalties or purchases of RECs, Escerts or Emission Reduction Units. This revenue loss and expenditure can be overcome by investment of INR 2340 crores till 2030</p> <p>The capital investments to mitigate physical and transition risks include:</p> <ul style="list-style-type: none">• 200 MW renewable power plant set up by 2025 - Meet RPO and SBTi targets• Battery operated Vehicles

- Strengthening of water recycling system through Zero Liquid Discharge (ZLD) and Dry Tailing Plant (DTP)

Each climate risk was identified by its own natural characteristics, including geographic area (areal extent), time of year it is most likely to occur and its severity.

Through in-depth analysis and workshop, we assessed our preparedness at present and identified measures for future scenarios. We have identified our strategy to be resilient to the range of energy transition pathways and scenarios including Paris agreement.

RISK MANAGEMENT

Hindustan Zinc's risk management philosophy integrates strategy and operations and aims to proactively identify, address, and reduce both current and future risks. Our Company has a strong framework for risk management to identify and reduce risks caused by both internal and external causes.

We foster effective risk management culture through continuous and sustained initiatives aimed at creating awareness, discussing mitigation and encouraging discussion across the hierarchy. Risk management is ingrained in all of our essential company operations, procedures, and activities. New risks detected are classified according to impact and likelihood, mapped to the primary responsibilities of selected managers, and managed with the appropriate mitigation plan as part of a formal monitoring process at the unit and company levels.

Our Chief Risk officer manages the overall risk management process, provides ongoing guidance, tools and analytical support to the site teams, and facilitates ongoing communication between the parties, as well as with HZL's Board Committee. The risk management process is coordinated by the Management Assurance function and is regularly reviewed by the Company's Audit & Risk Committee.

METRICS & TARGETS

Approved science-based targets to reduce absolute emission

- Scope 1 & 2 GHG emissions by 14% by FY 2026- 27
- Scope 3 GHG emissions by 20% by FY 2026-27 from 2017 base year

Committed for Net Zero emission by 2050 in line with Business Ambition for 1.5 C campaign led by the Science Based Targets initiative (SBTi)

Sustainable Development Goals 2025- Committed for 0.5 Mn tCO₂e savings in our operations from base year 2017 by 2025

Internal carbon price of \$14 / TCO₂e in FY22

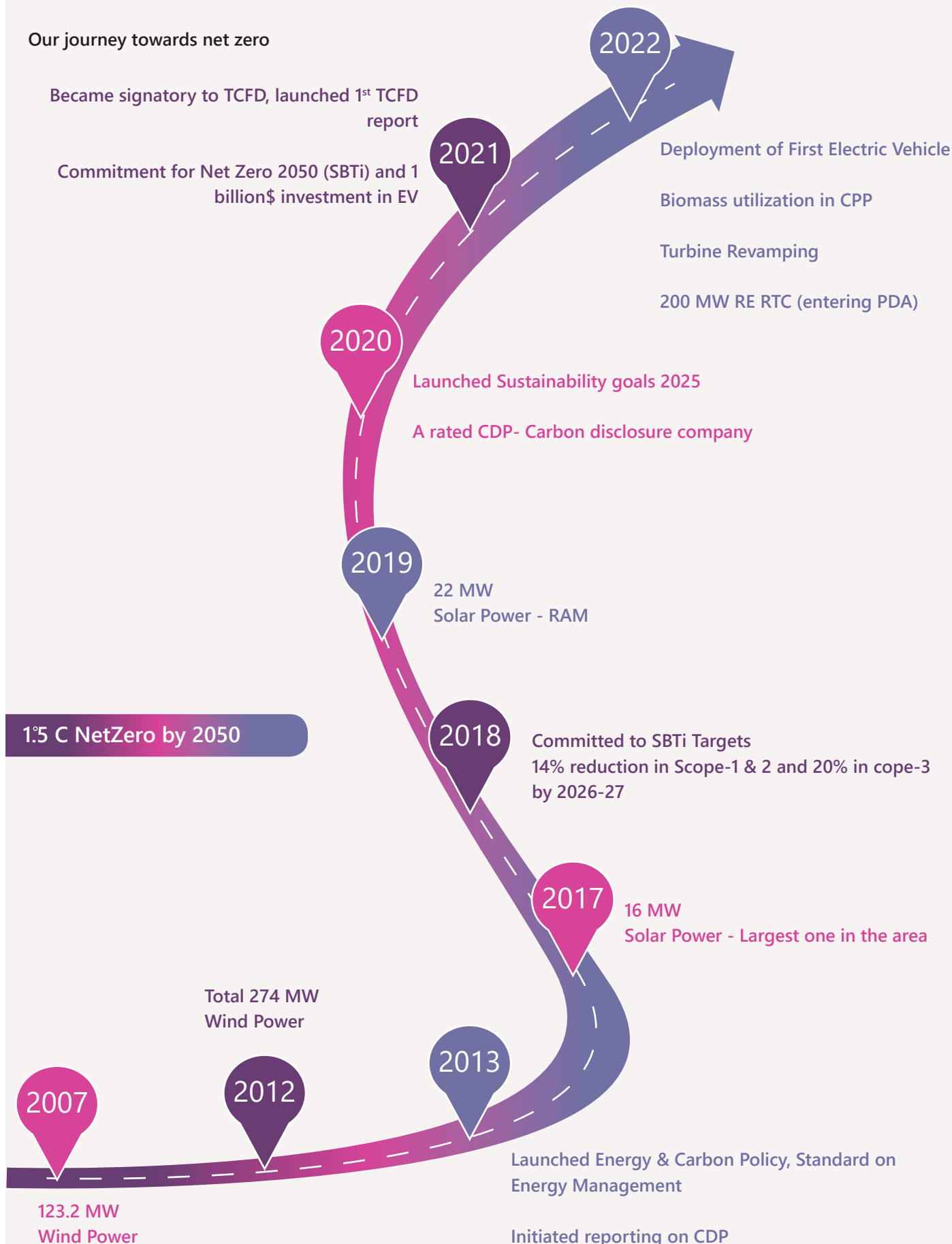
Performance 2021- 22

- Scope 1 + Scope 2 emissions (absolute) – 4.81 million Tonnes CO₂e
- Scope 3 emissions – 4.01 million Tonnes CO₂e
- Emission intensity – 4.97 MT / Ton of metal produced.

Supporting low carbon transitions

We believe that Climate Change is inevitable and therefore committed to take the mitigation and adaptation efforts for addressing climate change across our operating sites.

Our journey towards net zero



Hindustan Zinc commits to 'Long-term target to reach net-zero emissions by 2050' in alignment with Science Based Targets Initiative (SBTi)

C.2 Net Zero 2050

2026-Transition to Clean Energy

- Firm Renewable Energy
- Efforts on Scope 3

Scopes 1 & 2 - 18%
Scope 3 - 20%

2030-In line with NDC

- Firm Renewable Energy
- Explore Hydrogen Fuel & others
- Efforts on Scope 3

Scopes 1 & 2 - 40%
Scope 3 - 30%

2040-Scaling Up

- Firm Renewable Energy
- Hydrogen Fuel
- Carbon Capture, Utilization and Storage
- Circular Economy

Scopes 1 & 2 - 90%
Scope 3 - 60%

2050-Delivering Commitment

- Firm Renewable Energy
- Hydrogen Fuel
- Carbon Capture, Utilization and Storage
- Circular Economy

Scopes 1 & 2 - 100%
Scope 3 - 100%



Governance

Governance is the most vital component of our company's climate risk structure. It covers the framework, roles & responsibilities, and decision-making procedures by which our company adheres to its goals and targets related to climate change. This helps our key stakeholders understand the Board and Management's role in assessing and managing climate-related risks and opportunities.

Our Board is responsible for all aspects of sustainability across the company.. During FY22, in order to strengthen our climate governance and enhance our focus on sustainability and ESG, separate sustainability & ESG committee was formed at Board level and its charter was approved by the Board.

Board Structure



Audit and Risk Management Committee (ARC) of the board oversees the climate-related risks and opportunities. As climate risks is integrated as emerging risk in our enterprise risk management and financial planning, it is the primary responsibility of ARC Committee to provide oversight on Climate related risks & Opportunities, and report progress on risk mitigation efforts to the Board on a quarterly basis. The Committee also reviews potential impacts to production disruptions due to climate-related physical and transition risks that may impact HZL's core business. The Sustainability and ESG committee is responsible for overseeing the strategy, climate action, implementation of policies & processes, setting & reviewing long-term goals & targets to achieve net-zero by 2050 and enhancing a commitment towards stakeholders. The committee members meet every 6 months. Our CEO is one of the members of the Committee. To ensure that all have a common approach that is also consistent with the HZL's strategy and policy on climate change, Risk Management Committee meet Quarterly.

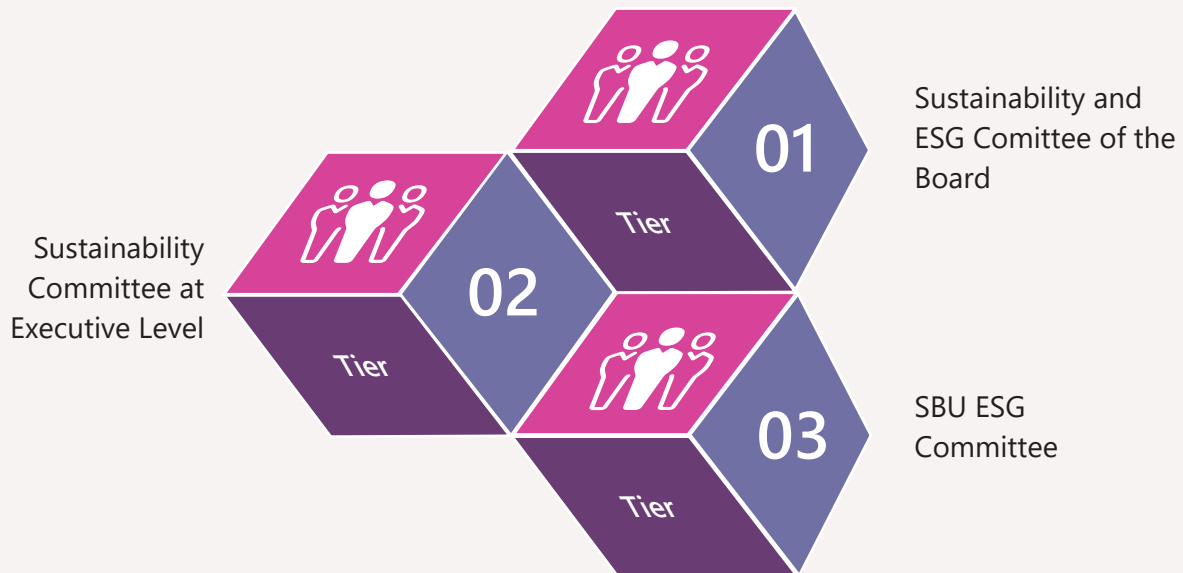
Climate related issues plays a key strategic role in all our long-term strategies and directional decisions. We have included ESG criteria in our Supplier Pre-Qualification requirement to ensure value chain partners compliance. Our annual financial incentives are related to outcome of climate-related goals and related KPIs. Our remuneration structure has weighed sustainability parameters (which includes climate change) at 10% to drive our sustainability commitments and targets.

KEY BOARD DISCUSSIONS AND DECISIONS IN FY22

- Board approved formation of new sustainability and ESG committee at board level
- Board approved a proposal for entering a long-term group captive renewable power development plan, up to a capacity of 200 MW

MANAGEMENT OVERSIGHT

Our Management is responsible for the operational assessment of climate management across the Company and the subsequent implementation of HZL's climate change strategy. CEO is the highest management position, who is responsible for taking decisions related to climate change. Our CEO is also authorized to sanction CAPEX & OPEX budgets and other necessary resources for the implementation of climate adaptation and mitigation actions. Hindustan Zinc has established a three-tiered sustainable governance framework for governing the risks and opportunities related to climate change



Tier 1:

BOARD LEVEL SUSTAINABILITY AND ESG COMMITTEE

The role of the Sustainability and ESG Committee is to assist the Board in meeting its responsibilities in relation to the Environmental, Social and Governance (ESG) matters and ensuring strong governance for sustainability. Our CEO is one of the members of HZL's Board of Directors and is part of this Committee. The committee is responsible for the following

- Providing guidance to ensure continual improvement in Sustainability performance and implementation of appropriate processes and policies across the company.
- Laying out Sustainability Strategy and long-term objectives.

Our Board meets every 6 months to discuss climate-related strategies and reviews progress against the targets and goals.

Tier-2:

EXECUTIVE LEVEL SUSTAINABILITY COMMITTEE

Executive sustainability committee at Hindustan Zinc is responsible for formulating sustainability strategy and long-term goals and targets. The committee plays a strategic role in all business decisions to ensure workplace safety, eliminating any potential damage to the environment, enhancing a commitment towards stakeholders, and maintaining our reputation etc. The committee consisting of CEO, CFO, functional heads, community chairmen and SBU Directors meets monthly to discuss the status of sustainability goals.

The performance against the sustainability goals and way forward are being presented by management representative of executive sustainability committee to the Board level sustainability and ESG committee on six monthly basis.

The following sustainability communities have been formed under executive sustainability committee to monitor progress toward Sustainability Goals 2025. Each of these communities are made up of the unit champions and meet once a month.



ENERGY AND CARBON MANAGEMENT COMMUNITY

Energy and Carbon Management Community, a part of the Executive Sustainability Committee, is established to ensure strong governance for working towards climate resilience for our host communities & operations, climate change modelling including risk assessment, Carbon pricing and financial implications, identifying strategies for Energy conservation, identify innovative solutions, equipment's and processes that consume less energy and results in significant GHG emissions. It is a taskforce under the Executive Sustainability Committee, chaired by a senior leader at the corporate level and Energy and carbon representatives from each site.

The community is responsible for the following

- Carrying out Audits and Energy & Carbon Risk Assessments and implementing the recommendations.
- Providing guidance to ensure continual improvement in Energy and Carbon Management by implementation of appropriate processes and policies across the company
- Implementation of TCFD recommendations including scenario analysis and stress testing

The community is tracking the performance against Energy conservation, Clean Development Mechanism (CDM) projects, targets and report its progress to Senior Management. The community is meets on monthly basis and appraise the chairman on the various Energy and Carbon Management projects progress and seek guidance.

Tier-3:

SBU ESG COMMITTEE

This committee continuously evaluate, identify, and reduce risks from both internal and external causes. In order to manage risks with a suitable mitigation strategy and to advance the ESG agenda including climate change, more than 100-line managers are aligned within a structural governance set-up across all SBUs. New risks are identified, categorised as per impact and likelihood, and mapped to key responsibilities of certain managers for ensuring an internal formal monitoring process at the Company level.

Energy & carbon representatives nominated by the SBU are responsible for coordinating audits, energy, and carbon risk assessments and implementing the mitigation measures at site level. They update on the progress of the energy conservation projects, CDM projects, energy & emissions including GHG emissions

Strategy

Climate-related risks pose financial implications for organizations, such as direct damage to assets and indirect impacts on the supply chain. The Strategy pillar of the TCFD disclosures provides information about the company's exposure to climate-related risks and opportunities. In alignment with TCFD recommendations, we have covered different climate-related risks and opportunities that HZL might face, along with resilience measures adopted to minimize the impact.

RISKS

HZL has identified and categorized climate-related risks and opportunities over the short, medium, and long term with respect to both Physical (Increase in temperature, Drought, Floods, Extreme weather, Cyclonic pattern, wind speed etc) and Transitions risks (risks due to change in policy change, technological change, market change, financial resource raising, reputational etc). According to the Financial Stability Board Task Force on TCFD, we have identified our climate related risks using scenario analysis. For identifying and assessing physical risks, we used Advanced Climate Modelling and Representative Concentration Pathway (RCP) 4.5 and RCP 6.0 and for transition risks, we used India's Nationally Determined Contributions (NDCs). In developing our strategy, we have considered a wide range of opportunities and risks across two discrete-time horizons for mapping Physical and Transition Risks.

• *Time Period I (2020-2039)*

This time period enables us to think and look beyond the current scenario and identify milestones toward the longer-term impact, allowing us to navigate the identified risk and harness opportunities.

• *Time Period II (2040-2059)*

Recognizing the uncertainties, we used scenario analysis to explore energy transitions in the next 20-30 years considering changes in policy, societal preferences, economic growth and technological progress

HZL undertook the Climate change associated risk assessment across its operating sites having 5 mines, 3 smelting plant (including thermal power plant) and a refinery to check the preparedness of mitigation and adaption at present and in the future time period of up to 2039 and 2059 with respect to the identified risks in the future.

Through these assessments, we have identified climate change associated risks and opportunities and its impact on production, employee health, the existing infrastructure, markets etc for scenarios with global warming exceeding 2 degrees and limited to below 2 degrees for two periods 2020 - 2039 and 2040 - 2059. These risks can impact the business's revenue, disrupt the operations, increase the Capex and Opex costs, and create new product development and market opportunities in terms of higher demand for Zinc, Silver, and Lead. The financial impacts of potential loss of revenue, to avoid such loss in revenue, the Capex and Opex expenditures, changes in the market opportunities and costs result

in changes in p&L- all this impacts our financial planning. The resulting analysis were used to further augment all of HZL's current risk management practices.

As our operations are related to mining which have high probability of facing the harsh climate impact in the period of 2040-2059, our operations have to be made resilient to the present and futuristic conditions. There are predictions and forecasts of hazards such as heavy precipitation, drought, and heat indicate these effects will get more frequent and intense, increasing the challenges to mining operations. Through a workshop and assessment conducted by us, which included all key stakeholders, the risks were identified, a mitigation and adaptations strategy was developed, and the opportunities were predicted. A process was designed to establish climate change risk profiles. These risk profiles addressed regulatory risks, energy, natural disasters, and contingency plans.

Through in-depth analysis and

workshop, we assessed our preparedness at present and identified measures for future scenarios. We are pleased to discover from this assessment that the assets, safety margins maintained in engineering designs, insurance provisions, and governments' proactive climate change adaptive actions could be sufficient to mitigate much of the impacts. We identified some additional adaptation measures as precaution, and would make investments to ensure water security at our mines and smelter sites and alleviation of heat stress at our smelter sites. Each team across the units, is looking forward to prepare roadmap to make their respective units more adaptable to these changes.

We also have prepared Risk Action Plan to mitigate the risks. The mitigation measures could have a financial impact on inventory and insurance cost for the organization. We have also estimated the mitigative costs for the identified measures. These measures are additional to,

- Existing margins in the engineering design,
- Site conditions that mitigate flood or heat stress, and
- The actions and plans of the regional /local government to minimize the risk in are discussions with the Unit level team.

PHYSICAL RISK

Physical risks resulting from climate change are two central sources of climate-related risk that companies consider in their strategy, risk management, and reporting. A distinction is made between an increasing accumulation and intensity:

- Acute extreme weather events (e.g., heat waves, storms, floods) and
- Longer-term chronic changes in mean values and ranges of fluctuation of various climate variables (e.g., temperature, precipitation, sea levels).



Our climate risk assessment is studied for Period 2020-2039 (Medium) and 2040-2059(Long) using following scenarios
IPCC Emission Scenario 1: RCP 4.5 (medium low emission, global average CO2 concentration about 600 ppm)

IPCC Emission Scenario 2 – RCP 6.0 (Global average CO2 concentration about 700 ppm)

Physical chronic risks like changes in precipitation patterns and extreme Temperature might impact productivity in the two time periods (2039 and 2059), and the severity of impact may increase with time. Also, Physical acute risks like cyclones and floods would cause logistical disruptions to damage the property and assets, thereby impacting revenues. In the FY21-22, we assessed

- Change in precipitation pattern leading to localized floods, and damage to assets and property
- Extreme Temperature leads to heat stress and decreases the labour productivity
- Cyclones Severity leading to damage to assets and property
- Drought leading to business disruption

SCENARIO 1 : RCP 4.5 (CLIMATE CHANGE KNOWLEDGE PORTAL)

Expected Climate Change: Time Period- (2020-2039)

Asset Locations	Average Temperature (Projected Change in Hot Day; max>40^c), Ensemble Median Range	Heat Wave(Heat Index 35, Ensemble Median Range)	Drought (Ensemble Median Range(Projected change in Annual Mean Drought Index; SPEI))	Severe Drought (Ensemble Median Range(Probability))	Annual flooding (Projected Change in Days with Rainfall> 50mm)	Cyclones
Zawar Mines (ZM)	Medium	Very High	Medium	Low	Low	No direct impact of Cyclones
Kayad Mine (KM)	Low	Very High	Low	Low	Low	No direct impact of Cyclones
Rampura Agucha (RAM)	Low	Very High	Low	Low	Low	No direct impact of Cyclones
Rajpura Dariba Mines (RDM)	Low	Very High	Low	Low	Low	No direct impact of Cyclones
Sindesar Khurd Mines (SKM)	Low	Very High	Low	Low	Low	No direct impact of Cyclones
Chandaria Lead Zinc Smelter (CLZS)	Low	Very High	Low	Low	Low	No direct impact of Cyclones
Dariba Smelting (DSC)	Low	Very High	Low	Low	Low	No direct impact of Cyclones
Debari Zinc Smelter (DZS)	Medium	Very High	Low	Low	Low	No direct impact of Cyclones
Pantnagar Metal plant (PMP)	Low	Low	Low	Low	Low	No direct impact of Cyclones

Expected Climate Change: Time Period- (2040-2059)

Asset Locations	Average Temperature (Projected Change in Hot Day; max>40^c), Ensemble Median Range	Heat Wave(Heat Index 35, Ensemble Median Range)	Drought (Ensemble Median Range(Projected change in Annual Mean Drought Index; SPEI))	Severe Drought (Ensemble Median Range(Probability)	Annual flooding (Projected Change in Days with Rainfall> 50mm)	Cyclones
Zawar Mines (ZM)	Very High	Very High	Very High	Medium	Low	No direct impact of Cyclones
Kayad Mine (KM)	Very High	Very High	High	Medium	Low	No direct impact of Cyclones
Rampura Agucha (RAM)	Very High	Very High	High	Medium	Low	No direct impact of Cyclones
Rajpura Dariba Mines (RDM)	Very High	Very High	Very High	Medium	Low	No direct impact of Cyclones
Sindesar Khurd Mines (SKM)	Very High	Very High	Very High	Medium	Low	No direct impact of Cyclones
Chandaria Lead Zinc Smelter (CLZS)	Very High	Very High	High	Medium	Low	No direct impact of Cyclones
Dariba Smelting (DSC)	Very High	Very High	Very High	Medium	Low	No direct impact of Cyclones
Debari Zinc Smelter (DZS)	Very High	Very High	Medium	Low	Low	No direct impact of Cyclones
Pantnagar Metal plant (PMP)	Very High	Medium	Medium	Low	Medium	No direct impact of Cyclones

SCENARIO 2 : RCP 6.0 (CLIMATE CHANGE KNOWLEDGE PORTAL)

Expected Climate Change: Time Period - (2020-2039) & (2040-2059)

Asset Locations	Time Period	Temperature Increase		Water Availability	Flooding	Extreme events
		Average Temperature (Projected Change in Hot Day; max>40 [^] c), Ensemble Median Range	Heat Wave(Heat Index 35, Ensemble Median Range)	Drought (Ensemble Median Range(Projected change in Annual Mean Drought Index; SPEI))	Annual flooding (Projected Change in Days with Rainfall> 50mm)	Cyclones
Rajasthan	Period (2020-2039)	High	Very High	Medium	Medium	No direct impact of Cyclones
	Period (2040-2059)	Very High	Very High	Medium	Medium	No direct impact of Cyclones
Uttarakhand	Period (2020-2039)	Very High	Very High	Low	Medium	No direct impact of Cyclones
	Period (2040-2059)	Very High	Very High	Medium	Medium	No direct impact of Cyclones



Present Strategies for tackling physical risks

Assets	Impact due to	Risk and financial impact	Vulnerability	Mitigation & Adaptation Strategies (Futuristic) & Potential Financial Impact		
Mines & Smelters	Due to Increase in temperature			Short term (0 to 1 year)	Medium term (1 to 10 year)	Long term (10 to 30 year)
		<ul style="list-style-type: none"> Operational disruptions- plant closure (Reduced revenue) Employee heat exhaustion and dehydration (Lower Productivity) 		<ul style="list-style-type: none"> Implement heat stress management programmes checking (Operational actions) Heat stress awareness campaigns and monitoring (Informational actions) 		
		<ul style="list-style-type: none"> Increased electricity cost due to installations of cooling devices (Increased operating costs) 	Medium to high	<ul style="list-style-type: none"> Installing renewable based energy to mitigate increased costs (Physical modification (CAPEX)) 		
	Due to drought	<ul style="list-style-type: none"> Disruption of operations or downsizing of the same & scarce water resources. (Higher operating costs & plant shutdown) 		<ul style="list-style-type: none"> Site-based freshwater reduction programme Operational actions (OPEX) 		
		<ul style="list-style-type: none"> Restrictions on water availability (Decreased revenues) 	Medium	<ul style="list-style-type: none"> Continue to minimize for Ground water / surface water dependency Operational actions (OPEX) 	<ul style="list-style-type: none"> Exploring alternate sources of water and ensuring more recycling of water (Informational actions) 	
	Seasonal Flood Extreme rainfall Higher wind speed during Cyclones	<ul style="list-style-type: none"> Disruption of operations or downsizing of the same (Increased operating costs) Increased damage to infrastructure due to flooding/ wind speed (Physical damage to asset; Increased operating costs) 	Low to Medium	<ul style="list-style-type: none"> Continuous monitoring of flood management and storage capacity (Ponds, Dams etc.) (Informational actions) 	<ul style="list-style-type: none"> Further improvement in pumping facilities keeping excessive rainfall event(changing rainfall patterns) (Physical modification (CAPEX)) 	<ul style="list-style-type: none"> Ensuring climate-resilient infrastructure is built for all new infrastructure (Physical modification (CAPEX))
		<ul style="list-style-type: none"> Set back in upstream and downstream supply (Increasing Operating cost) 			<ul style="list-style-type: none"> Public Advocacy to improve infrastructure (Informational actions) 	
		<ul style="list-style-type: none"> Higher wind speed leading to damage to infrastructure (Increased Operating Cost) 			<ul style="list-style-type: none"> Ensuring climate-resilient infrastructure is built for all new infrastructure (Physical modification (CAPEX)) 	

OPPORTUNITIES IDENTIFIED

- Improvement in energy efficiency and clean energy
- Opportunities in developing solutions for sequestration in the mines
- Application of Circular economics on appliances and equipment's
- Reducing exposure to climate related risks reduce costs, preserve or enhance revenues
- Increased opportunities in collecting freshwater through rain water harvesting
- Reduced exposure to climate-related risks leading to reduced costs, and improved community relationships
- Reduced fresh water usage and consumption at operational units

TRANSITION RISK

HZL has assessed Transition Risk induced by climate change using the IEA STEPS scenario which conforms to 500 GW of non-fossil-based power generation capacity and is part of India's NDCs. A variety of transition risk factors (as defined by the TCFD) were reviewed for our scenario analysis:

Market risks:

- Increased demand for decarbonized mining commodities – Only those mining companies that power their operations with renewable energy, operate electric or hydrogen-powered truck fleets and integrate recycling in their value chains will be best placed to sell low-carbon minerals. Companies with high carbon footprint will be left behind with reduced demand and loss the market share to competitors with cleaner and greener production.
- Increased demand for metals which will be part of the decarbonisation solution - Transition to a low-carbon economy is positive for zinc demand. Zinc demand is tied to low-carbon applications are set to grow across all scenarios: the more aggressive the world is in adopting renewables, the greater the demand for zinc. Zinc has multiple applications in the renewable energy and transportation sectors. One of the major uses of zinc in this context is the use of zinc to galvanize steel that is, in turn, used in low-carbon applications. For example, zinc coatings significantly extend the service life of wind turbines.

Policy and Legal risk:

- PAT scheme – Our mining operations and smelters are covered by Renewable energy obligations as well as PAT scheme. We are anticipating the PAT enforcement and obligation

to start impacting HZL in next 2-3 years. Once enforced, it may lead to increased expenditure, impacting our revenue. Any non-compliance on these aspects may also adversely impact our revenue, operations, create reputational risk and hamper growth.

- NATIONAL CARBON MARKET - Government of India has proposed to create National Carbon Market to involve corporate and private sectors towards energy saving and carbon emission reductions. Last year, Bureau of Energy Efficiency came up with a blueprint document that proposed a phase-wise approach for the creation of the Voluntary Carbon Market (VCM) in India subsuming existing Perform, Achieve and Trade (PAT) Scheme and Renewable Energy Certificates (REC) scheme along with a proposed cap and trade system in long term. When implemented, this may lead to increased operating expenditure by putting price on carbon and reduced revenue. Implications of this proposed system is not yet completely clear.
- AIPA (Apex Committee for Implementation of Paris Agreement) stringent targets for reducing emissions leading to increased operating costs

Technological risk:

- Change in metallurgical processes resulting in increased Research and Development expenditures.
- Change in power production and Electrification leading to increase in capital & operating cost
- Sequestration of unabated carbon emissions - High costs for investing in CCUS and other emission reduction technologies as most technologies are still unviable.

Reputational risks:

- Disruption in Social licence to operate - As climate change begins to impact host communities and local environments, increased competition for natural resources between operators and local communities create increased tensions between two affects social consent to operate and leads to increased cost and reduced revenue.

Financial resource raising risk:

- Increased difficulty in raising capital - Financial companies and institutions will be devising strategies to decarbonize their investment portfolio by reducing their exposure to companies and sector with significant exposure to climate related risks

We have entified our strategy to be resilient to the range of energy transition pathways and scenarios including Paris agreement. Our technology mix and asset configuration set us apart in our ability to comply with existing climate regulations like Renewable Energy Certificate (REC)/ Renewable Purchase Obligations (RPO) and the emerging rules that are likely to be put in place by the inter-ministerial Apex Committee for Implementation of Paris Agreement (AIPA) of Government of India. Our ability to decarbonize much earlier than the competitors by switching to Firm RE could enable us to harness the new markets and seek a premium for low carbon or zero carbon metals. Our locations are ideally positioned for cost-effective firm Renewable Energy options. Further, the regulations in line with a race to zero or regulations in line with India's nationally determined contributions (NDCs) would increase the demand for solar PV panels and energy storage systems, improving the need for our metals.

Transition Risk	Impact due to	Risk and financial impact	Vulnerability	Mitigation & Adaptation Strategies Futuristic & Potential Financial Impact		
				Short term	Medium term	Long term
Policy change	Laws related to decarbonisation-REC, RPO, PAT	Increased cost, requirement of capex and retirement/right-off	High	Increasing share of Renewables Physical modification (CAPEX)	Electric vehicles in the transports Electrification Physical modification (CAPEX)	Hydrogen or Electric/Induction Furnaces only Carbon Capture, Storage and Utilisation
	AIPA Targets for reducing emissions	Increased operating costs	Low		Planning for Decarbonisation by 2050 Physical modification (CAPEX)	
Technological change	Change in power production and Electrification	Phasing out Coal powered technologies Electrification of processes	High	Phasing out few coal powered plant by 2030 as part of SBTi commitment Operational actions (OPEX)	Shifting to Hydrogen based energy solutions Research and development (R&D) expenditures in new and alternative technologies Physical modification (CAPEX)	Expansion of capacity only with NetZero options Physical modification (CAPEX)
	Change in metallurgical processes Increased Capital costs	Phasing out Pyro metallurgical processes	High		Reduced Pyro metallurgical processes Operational actions (OPEX)	
	Need for sequestration Increased Capital costs		Medium			Carbon Capture and Storage (CCS) and Carbon Conversion technologies
Market	Buyers wanting to have decarbonized upstream mining commodities Increased operating costs (e.g., higher compliance costs, increased insurance premiums)	Opportunities to have low emission infrastructure.	High		Planning for Decarbonisation by 2050 Physical modification (CAPEX)	
	Demand for metals which will be part of the decarbonisation solution	Opportunities for HZL which will help in increased revenue	Low		Harness Markets Assess and develop products	
Financial resource raising	Financial companies devising strategies to decarbonize their investment portfolio, mitigating their exposure to climate related risks Access to capital	Opportunities to have low emission infrastructure.	Low		Planning for Decarbonisation by 2050 Physical modification (CAPEX)	
	Dismal ESG rating of the company could lead impacting access to finance Access to capital	Increased cost	Low	Continuous Gap assessment Informational actions		
Reputational	Increased competition for natural resources and tensions between operators and local communities & Social licence to operate may be affected as climate change begins to impact host communities and local environments	Disruption in Social licence to operate	High	Community perception survey regarding water stress Informational actions	Improving on the measures of recycling Physical modification (CAPEX)	
	Reduced revenue from negative impacts					

The following is the summary of the impacts on the business due transition risk and the strategy is designed to address these impacts.

Short Term Impacts- 2030

Legal: As Minerals do not display a carbon price (copper, zinc) but International organisations like CBAM may have ramifications for regulation. RPO, storage obligations, and hydrogen obligations are all quite probable in India. Accordingly, the company's energy plan is in line. By 2030, India will reduce the carbon intensity of its economy by less than 45 per cent. Furthermore, the environmental subjects are encouraged to make behavioural decisions based on market signals, so that the marginal costs of pollution reduction will be equal among the emitters, and the total amount of pollutant emissions will be controlled at the lowest overall cost, ultimately achieving sustainable development. The practice of carbon emission trading can reduce the emission reduction costs of enterprises. The scheme will be launched by the Central Government and the contours of the scheme will be known only when the scheme is announced. However, it is clear that with the passing of this Bill, the country is all set to launch carbon credit markets in India. With the passing of the Bill and being subject to the carbon credit trading scheme, there will be a "push and beat" for the carbon credits trading market in India.

Market: The shift to a low-carbon economy will boost demand for minerals. First movers club at COP 26 might increase interest in Net Zero metals. There is a chance that rising coal costs will have an adverse effect on business viability.

Technology: The costs associated with implementing new procedures and methods by altering the way things are now done, such as phase-outs of pyrometallurgical processes and the production of copper from recovered electronic scrap.

Reputation: The low-carbon transition has no effect on reputational risk. However, if climate change starts to influence host communities and local habitats, social permission to operate the mines may be compromised.

Long Term Impacts 2050

Legal: Carbon price is likely in India and the market mechanisms may draw heavily from PAT. Obligations on the use of Hydrogen, Storage and RE is likely to come. India has proposed that the interregional carbon trading market can produce cost-saving effects, and the cost savings are enhanced if more enterprises are involved in the transactions. Furthermore, carbon emission trading encourages enterprises to make profits by reducing the emissions through market transactions. The regulations with respect to same are to be in place.

Market: Diminished market share as a result of rivals' production of cleaner products

Technology: Increasing the amount spent on new and alternative technologies, as well as switching to different types of energy

Increased rivalry for natural resources and conflicts between mining operators and local populations are among the reputational drawbacks.

OPPORTUNITIES IDENTIFIED

- First mover advantage: present extent of electrification and cost-effective RE resources availability
- Reduced exposure to climate-related risks water usage and consumption and improved community relationships
- Reduced exposure to GHG emissions (less sensitivity to changes in the cost of carbon) ,Participation in renewable energy programs and adoption of energy efficiency measures
- Low carbon emission: Use of lower-emission sources of energy, supportive policy incentives, and new technologies , Shift toward decentralized energy generation ,Decarbonised premiss
- Phasing out Pyro metallurgical processes leading to use of more efficient production processes
- Increase in demand for Decarbonised metals like Silver and Zinc : Access to new assets, market,s and locations-Exploring Lithium mine , Development and/or expansion of low emission metals, opportunities to use mines as carbon sequestration premisses
- Use of new technologies and Resource substitutes/ diversification

Financial Impact due to Transitional Risk

Impact Area	Cost occurred for the mitigation measures in Crs	Mitigation Measures	Impacts
Expenditure	350	200 MW renewable power plant by 2025	Will help lower the emissions, fulfilling the RPO & SBTi targets and reduce dependency on the Grid
	1950	549 MW Renewable power plant	Complete switchover to the renewable energy, Scope 2 Carbon neutral operations
	40	Switchover to Biomass and Bio-diesel	Help achieve SBTi targets and reduction in emissions

HZL has plans to undertake a number of mitigation actions to overcome the revenue loss due to climate change. The mitigation measures include:

1. Development of Heat stress management programmes and Exploring more opportunity to improve ventilation to overcome Heat Stress
2. Designing the infrastructure keeping the strong winds and rainfall of more than 180mm;

HZL has undertaken a number of mitigation measures some are listed as below,

1. Community level water engagements under CSR
2. Expansion of STPs and commissioning of ZLDs
3. Installed VFDs and improved ventilation systems



Adaptation strategy

HZL proactively undertakes adaptation measures to address physical climate changes at the site and amongst the communities. It does not expect the public authorities to initiate adaptive actions, but proactively undertakes such actions on its own and then cooperates with public authorities to address the climate change challenges in the neighbourhood community. While designing adaptive actions, HZL is mindful and diligent not just shift the problem away from its operations but comprehensively resolve the problem. As evidenced by our experience with events like water scarcity, flooding, and heat waves as well as our climate risk assessment, our assets, infrastructure, communities, and wider value chains are vulnerable to the effects of extreme weather events linked to climate change. Therefore, we are focused on managing the potential physical risks and opportunities that may result from the ongoing changes to our climate in addition to the actions we are taking to reduce the effects of climate change by lowering emissions while advocating for progressive climate action strategies.

Parameters	Currently in place	Targeted for future evaluation
Executive compensation	HZL includes climate change considerations as a standalone element of its executive scorecard.	Extending Climate Change elements on executive performance to connect directly to the achievement of the 1.5°C and net-zero 2050 targets as well as NDC targets
Procurement	Procurement is reviewing metrics and evaluation processes regarding energy efficiency and estimated GHG emissions during the request for proposal (RFP) selection process	Procurement will develop a Scope 3 emissions strategy for suppliers. Procurement to consider risks associated with potential physical risks of climate change on supply chains and/or purchases.
Operational strategy	Prioritizing opportunities to access cost-effective renewable electricity in our operational strategy. Our operational strategy is influenced by potential future water stress and a changing environment whereby, for example, recycling water is prioritized, and fresh-water intake is minimized.	Switchover to Biomass and Bio-diesel
Capital Allocation	We have strategic assessment of emissions abatement project options and capital allocation for projects identified to meet our 1.5°C science-based target (SBT) in place.	Projected carbon emissions will be considered in capital allocation decisions.
Innovation	We continually explore innovative GHG abatement technologies, such battery electric haul trucks and pick-up trucks at multiple sites, and	
Mitigation and Adaptation	we conducted a site-by-site review of potential GHG mitigation opportunities and adaptation recommendations.	
Mining	We are in the initial stages of evaluating the impact GHG abatement technologies can have on the cost per zinc equivalent, which in turn affects critical aspects such as the cut-off grade and ultimately mine life. Since 2021, we have been reviewing the impacts of physical climate change on our operations (e.g. tailings storage facilities, infrastructure design).	Future mineral resources and mineral reserves estimation, and mine planning will incorporate climate-related aspects (e.g. emissions projections, low-carbon capital and operating costs, carbon pricing, etc.) more explicitly.
Financial planning	We are currently exploring how climate change risks and opportunities affect our financial planning, including CAPEX	In 2023, we will explore the establishment of an internal carbon price factor into the life of mines (LOM) and financial planning cycles.

Natural climate solutions strategy

Natural processes are not to be tampered with while designing adaptative strategies. Accordingly, while addressing heat stress or extreme rain fall events, HZL would focus on strengthening the local ecosystems that potentially can provide sustainable adaptation solutions to the climate change.

All pathways to achieving the Paris Agreement include protection of forests and conservation, restoration, and sustainable use of natural ecosystems. Nature-based solutions

offer a way of addressing the climate and biodiversity crises in a synergetic and cost-effective manner. Nature-based solutions also play a key role in climate change adaptation and building resilience in landscapes and communities. Several nature-based solutions are being used by us to help manage disaster risk and reduce the incidence and impact of flooding, mudslides, and other disasters. They are a cost-effective way of addressing climate change while also addressing biodiversity and land degradation. Some of them include the plantations at higher scale, rain gardens, etc.

Climate resilience in the community

We are focused on interventions through our CSR to enhance community resiliency to address susceptibility and increase adaptation to risks brought on by climate change, in addition to lowering our emissions and taking efforts to lessen the impact of climate change on our company and operations. Through a variety of programmes and related activities, we use CSR as a tool to reduce the negative effects of climate change on our communities. In order to achieve dual outcomes in terms of climate action, environmental, and

social sustainability, the mitigation measures are linked with the community development goals.

Hindustan Zinc's primary CSR initiative, Samadhan, uses agricultural interventions to reach 13,838 farmers. To help the agricultural community become resilient to climate-related problems including water shortages and drought, HZL implemented the above measures as part of this project.

Initiative	Description	Impact
Bunding	Bunding is the activity of restricting the runoff of rainwater in hilly terrains.	This allows the land to absorb more moisture and increases the water percolation. With improved moisture content of soil, the farmers are able to cultivate more crops during winter season.
WADI	WADI is the approach of the tree-based farming system focused on a family as a unit of development.	The system also uses better water management practices and water resources development on the farm. One of the outcomes of WADI planting in the SAMADHAN project is the achievement of twofold asset creation, i.e., income generation and biodiversity development in the region.
Hydrogel	The application of Hydrogel on fields helps in improving the water retention capacity of soil. This helps in the overcoming the issue of erratic monsoon rainfall.	It was found that by application of Hydrogel treatment, the germination rate improved significantly when compared to the lands where there was no intervention
Ultra-high-density plantation	In this method, high tree density is combined with drip irrigation and specialized pruning process. This technique conserves land and water resources. Gestation period is also less compared to conventional method.	In addition to helping farmers to manage water related challenges, these measures are also understood to help minimise the risk of floods, soil erosion and provide livelihood to community

To help the agricultural community become resilient to climate-related problems including water shortages and drought, HZL implemented the above measures as part of this project.

Advocacy strategy

Hindustan Zinc is a member of several national and international industry associations, and plays an active role in propagating good practices, sharing knowledge, and taking opportunities to contribute to the development of relevant industry standards. We proactively engage with government, regulators, industry forums, and conservation community for capacity building and to influence policy and promote good practices on matters related to climate change and sustainable development.

We are a member of FIMI-Sustainable Mining Initiative (SMI), which promotes tangible and measurable concepts of sustainable mining, and also assists the mining sector in inculcating sustainable practices in mining operations and tackling industry-wide challenges of environmental management and socio-economic development. We annually submit communication on progress against the 10 sustainable mining principles. We are working in partnership with NGOs, international institutions, and governments to advance our biodiversity agenda and gain expert insights. We have joined the Taskforce on Nature related Financial Disclosures (TNFD), which is committed to facilitate action and reporting on evolving nature-related risks.

We actively participated in COP26 Business Working Group. The partnership underscores our firm commitment to working with trade associations to formulate a new set of guidelines for effective transition to a low-emissions and climate-resilient future. We also joined the IZA Climate Change Task Force, actively participating in characterising the carbon footprint of recycled content in SHG zinc production. The partnership is also aimed to drive societal benefits of increased resource recovery in a circular economy. We have partnered with some government agencies like NCCBM, NEERI and CRRI for the utilisation of jarosite in cement and road construction, thus promoting circular economy through 100% waste utilization.

We partnered with Confederation of Indian Industries on promoting race to zero through various run-up events to COP26. We are also member of CII Working Group on Driving Accelerated Climate Action by Indian Businesses, and are actively participating with other Indian Company CEO's on shaping the agenda for the upcoming COP27.

Risk Management

Assessing climate change-related challenges has become crucial for our both internal and external stakeholders and climate related financial disclosure has become key to support informed and efficient decisions. The risk management area of TCFD aims at disclosing how the organization identifies, assesses, and manages climate-related risks and how these are integrated into existing risk management frameworks.

HZL leverages enterprise risk management (ERM) framework to identify, assess, and respond to climate-related risks. The risk management framework is built on Vedanta Risk Management Standard that delineates process of risk assessment, compilation of risk registers and associated action plans, mapping of events and its mitigation. Our risk management framework is well-structured and allows us to identify, assess, categorise, address, and mitigate both positive opportunities and negative consequences associated with our business. These are regularly monitored, tracked, and reviewed through a robust Governance and Process architecture, with roles and responsibilities clearly defined for each stage. Hindustan Zinc's risk management system is certified as per ISO 31000:2018

OUR CLIMATE RISK IDENTIFICATION AND ASSESSMENT PROCESS:

We have a documented enterprise risk management programme, a method to identify new risks as they emerge, and a thorough business continuity planning strategy. HZL identifies climate change risk through



a formal monitoring process at the unit level and at the corporate level, which identifies and categorizes existing and emerging climate-related risks and opportunities with respect to both Physical and Transitions risks. The Climate change risk assessments provides a critical tool for our improved understanding of the cause/effect relationships between climate change, its various impacts on the socio-economic and ecological systems within which we operate and how these impacts could affect our business operations. It also assists with identifying our risks and opportunities from an interlinked perspective, considering how water, energy and climate change impact one another.

Once identified, climate risks are assessed on a scale of 1-5 based on its impact on the business and likelihood of occurrence. The risks are prioritized based on frequency of its occurrence or recurrence

and on the degree of its impact on revenue & cost including its ability to disrupt our primary operations. Any issue that brings a change of $\pm 5\%$ to the EBITDA; causes $> 15\%$ production capacity ramp down in major product category, results into Fatality or serious nature and irreversible injury, causes long term serious reversible environmental impact (typically 3 months), results into Category IV incident; results into significant breaches, financial penalties & prosecution of staff / stoppage of business, negative media coverage are defined as having substantive financial or strategic impact on the business. Those which have a Substantial & financial impact and have an overall scoring of above 4 are considered. Our teams across hierarchies are encouraged to report any type and category of risks through available online reporting platforms and escalate them to the next level. After the risk prioritization has been carried out, formal mapping

of risks and mitigation plans on a risk matrix is done.

Our risk assessment procedures were methodical and extensive, and they were carried out with the assistance of third party specialists. We first selected physical acute and chronic climate change factors (such as precipitation) and related risk exposures at the regional level (e.g., extreme rainfall). We next evaluated vulnerabilities, possible effects of these vulnerabilities (i.e., risk characterisation), and the prognosis under each of the two climate RCP temperature scenarios in a series of workshops with each operational units. The likelihood, relative impact severity, implications, and any existing or necessary risk management procedures were then used to characterise the risks in order to determine their scale and scope. The most suitable risk mitigation measures for adaptation that have been or will be implemented and monitored by our operations were identified during this last stage, which was also carried out through joint workshops.

This process also took into account a wide range of pertinent transition risks, such as changes in carbon pricing, energy efficiency and water management regulations, renewable energy law, insurance premium changes, technology obsolescence or financial viability, changes in the supply and demand for zinc, shifts in public perception, and community perceptions.

Each of our sites has a particular committee and significant risk management group that, via discussion at regular meetings, pinpoints the risks and possibilities existing there. Our activities evaluate environmental effects, health and safety risks and hazards, incident

SEVERITY		LIKELIHOOD				
		1	2	3	4	5
		Rare	Unlikely	Possible	Likely	Almost Certain
Catastrophic	5	5	10	15	20	25
Serious	4	4	8	12	16	20
Moderate	3	3	6	9	12	15
Minor	2	2	4	6	8	10
Negligible	1	1	2	4	4	5

For the table provided in Figure 4.3 presented, the risk categories are as follows:

- **Risk Factor 20 to 25 - Very High** – A risk factor in this range would indicate an "unacceptable" level of risk. It would be appropriate to prohibit the activity until suitable improvements have been implemented to reduce the level of risk to an acceptable level;
- **Risk Factor 10 to 16 - High** – Hazards within this range should be proactively managed to reduce the risk to a level as low as reasonably practicable;
- **Risk Factor 5 to 9 - Medium** – Risk factors within this range may be regarded as "tolerable" and identified hazards within this range should be actively managed; and
- **Risk Factor 1 to 4 - Low** - Risk factors within this range would indicate that the level of risk is "acceptable" and therefore no further action would be necessary. However it would still be important to ensure that any existing controls are maintained.

analysis, and significant risks that have been recognised. These factors take into account both the physical dangers brought on by a changing climate and the risks posed by the move to a low-carbon future. In order to assist with decision-making and action prioritisation, the risks are identified and assessed. The process of identifying and evaluating risks is ongoing as well as during specific risk assessments.

To establish adequate accountability with decision-makers, we inform the Board of Directors as well as senior management of substantial risks. Also, to ensure that we prepare for and communicate impending and/or possible regulations throughout the organisation, we have delegated responsibility for detecting and managing forthcoming climate regulation changes to both the corporate and regional levels.

OUR RISK MANAGEMENT PROCESS:

Our Chief Risk officer manages the overall risk management process, provides ongoing guidance, tools and analytical support to the site teams, and facilitates ongoing communication between the

parties, as well as with HZL's Board Committee. The risk management process is coordinated by the Management Assurance function and is regularly reviewed by the Company's Audit Committee. The Audit Committee is aided by the Risk Management Committee, which meets regularly to examine risks and the progress against the planned actions. The primary function of the Risk Management Committee is to review the significant risks identified by the Management, along with its mitigation plan, to monitor and review the Company's risk management plan, and to appraise the Board on risk assessment and minimization procedures. The overall internal control environment and risk management program, including financial risk management, is reviewed by the Audit Committee.

Risk Matrix

Climate related risks and opportunities are now part of Enterprises Risk Management as Emerging risk. Once Risks are identified and prioritised, Risk Action Plan are prepared to mitigate the risks. We have a formal mapping of risks & mitigation plans in Risk



Matrix, monitored with digitalized platform. The Risk Matrix comprises of the Company's assessment of impact and probability of each significant risk and mitigation steps taken or planned. The Company has unit-wise Risk Matrix which is reviewed quarterly by Unit and Location Management. The Risks and mitigation measures are mapped to key responsibilities of select managers and managed with appropriate mitigation plans. There are also risk registers at each of the operating sites as well as at corporate level along with a centralized repository of risks and risk owners. Risk management targets and indicators are also part of the scorecard and performance evaluation process at the management levels and above.

RISK MANAGEMENT CULTURE:

We believe it is important for an organisation to be imbued with a culture of proactive risk management. At Hindustan Zinc, we foster such a culture through continuous and sustained initiatives aimed at creating awareness, discussing mitigation and encouraging discussion across the hierarchy. These include

- Financial incentives
- Risk education and training
- HR Review process
- Risk identification and disclosure
- Periodic improvement in risk mitigation and management
- Vendor and supplier related risk identification

INTEGRATING CLIMATE CHANGE INTO INTERNAL RISK MANAGEMENT SYSTEMS

HZL will adapt the measures laid out by Vedanta for strengthening the risk management system by integrating climate related issues.

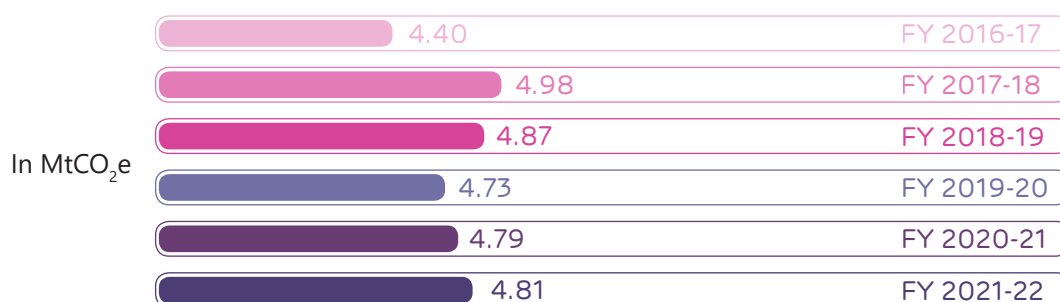
Following are the measures laid out by Vedanta,

Short term	Medium term	Long term
<ul style="list-style-type: none"> • Adapt existing enterprise-level and other risk management processes to take account of loss and damages incurred/projected from cyclone events or heat waves • Plan to use the same quality assurance and compliance approaches for climate-related information as for finance, management, and governance disclosures • Embed Internal Carbon Pricing into the business decision-making process 	<ul style="list-style-type: none"> • Develop BU-level adaptation plans based on identified climate risks and the techno-feasibility assessments • Engage with external key stakeholders (along the supply chain) to manage risks • Identify/validate business-critical suppliers of goods and services who are exposed to high physical and transition risks • Assess and quantify the impact of the loss of the critical suppliers in the event of climate disasters, or in case of low carbon transitions 	<ul style="list-style-type: none"> • Consider insurance or additional climate fund (enhanced ICP) for emergency purpose • Install measures to reduce exposure to physical climate risks identified

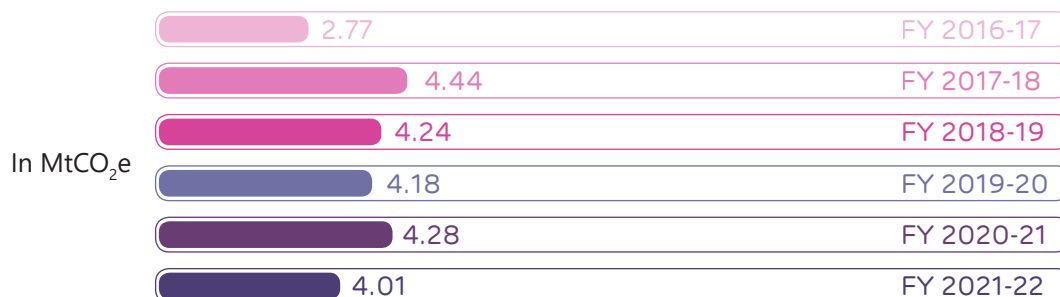
Metrics and Targets

Metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.

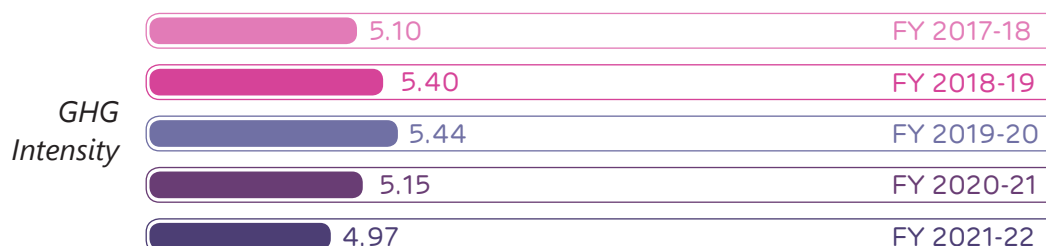
Scope 1+2 (absolute) emissions



Scope 3 (absolute) emissions



Scope (1 & 2)/MT



SCOPE 3 EMISSION CATEGORIES		
Category 1: Purchased goods and services	369316.87	MT
Category 2: Fuel-and-energy-related activities (not included in Scopes 1 or 2)	404006.05	MT
Category 3: Upstream transportation and distribution	9727	MT
Category 4: Waste generated in operations	0	MT
Category 5: Business travel	155.00	MT
Category 6: Employee commuting	1827	MT
Category 7: Upstream leased assets	40.97	MT
Category 8: Downstream transportation and distribution	26060	MT
Category 9: Processing of sold products	319263	MT
Category 10: End-of-life treatment of sold products	2881698	MT
Total Scope 3 emission in FY22	4012094.17	MT

Transition Risks - Amount and extent of assets or business activities vulnerable to the risk

The transition risk can cause significant revenue losses and penalties or purchases of RECs, Escerts or Emission Reduction Units. This expenditure will be overcome by investment of INR 2340 crores till 2030.

ALIGNMENT OF REMUNERATION POLICY WITH CLIMATE GOALS:

Our Annual financial incentives are related to outcome of climate-related goals and related KPIs

All employees including business heads and CEO are eligible for short-term incentive plan and are held accountable for the Company's health, safety and sustainability performance through HZL's performance-based compensation structure. Employees have business as well as personal objectives aligned with organisational goals, Health & safety parameters, Sustainability performance, and People Metrics. Sustainability which includes Climate Change makes up 10% of the overall compensation criteria.

Stock-based long-term performance incentives represent the largest component of executive pay to encourage sustained performance for 3 years aligned with shareholder interests. Performance on ESG & Carbon Footprint makes up to 6% of the overall criteria for computing the long-term bonus share allotment. Climate aligned Incentive Metrics for FY22 are,

- a. Emission reduction in line with SBTi targets and
- b. Low Carbon transition in line with Net-Zero Plan.

The Individual performance criteria of the Business Heads takes into account KPIs related to performance on Sustainability Goals 2025. For example - Energy & Carbon Community Head, is a leader of implementing processes and initiatives to advance climate action across the company. The annual performance bonus of Energy and Carbon Community head is based on the achievement of climate targets

& KPIs (e.g. reduction in Energy requirements, reduction in Scope 1 & Scope 2, Implementation of Renewable Energy projects).

As part of the annual competitions such as Kaizen, HZL recognizes employees who help attain HZL's sustainability goals, thereby reducing our environmental footprint. Champions who contribute best innovative ideas leading to significant reductions of emissions and energy are rewarded.

INTERNAL CARBON PRICING

The internal carbon pricing is applicable to all HZL's units, which includes all business units, corporate divisions, facilities etc. HZL assumes that the carbon credit regulation in India may come into force in three years and hence, carbon price may evolve or vary in future depending upon the local carbon tax regulations applicable.

Hindustan Zinc has defined an internal carbon pricing mechanism, applicable to all units, to bring in organizational change by influencing internal behavior and to drive energy efficiency. We have introduced carbon pricing as a component in all our capital expenditures. The internal carbon pricing helps us implement energy conservation/efficiency projects in our operations, facilitate decision-making for low carbon transition, direct investment towards renewable portfolio addition, mitigate carbon compliance risk, and meet SBTi targets for emission reduction.

We are using the shadow carbon pricing of INR 1083.33 as a method of assessing procurement decisions- that adds a notional surcharge to the

cost of procurement commensurate to the degree of carbon emissions. This will support procurement decision making that are more emissions efficient, rather than being price competitive.

We are using the internal carbon price to help achieve our sustainability goals. By 2025, the company aims to reduce both scope 1 + 2 emissions. Setting a price on carbon enables teams to test and assess the profitability of projects in different scenarios to make better decisions to future-proof our business. This can also serve to stimulate innovative ideas on how to best allocate capital to deliver higher returns in a low-carbon economy.



Targets used by the organization to manage climate-related risks and opportunities and performance against targets.

1. HZL has set a Science based target of

- 14% Reduction of Scope 1+2 (absolute) by 2026-27 from a 2016 base-year
- 20% Reduction of Scope 3 (absolute) by 2026-27 from a 2016 base-year 22 Hindustan Zinc Limited

2. Our Climate related Sustainability Goals - 2025



3. Net Zero - 2050

HZL has committed to Business Ambition for 1.5°C campaign of the Science Based Targets initiative (SBTi), a landmark decision taken under the oversight of CEO to align company's climate mitigation targets with the most ambitious Paris Agreement - **reaching net-zero global emissions by 2050** at the latest in order to limit global warming to 1.5°C. Reaching net-zero emissions for a company means achieving a state in which the activities within the value-chain of a company result in no net impact on the climate from greenhouse gas emissions. This is achieved by reducing value-chain greenhouse gas emissions, in line with 1.5°C pathways, and by balancing the impact of any remaining greenhouse gas emissions with an appropriate amount of carbon removals.

Our reductions in CO₂ emissions between now and 2035 will come from currently-available technologies. We have developed a pathway to Net Zero in spite the abatement for us is hard. Our intent to becoming Net Zero reflect our action towards mitigating the impact of climate change. Our GHG emissions can be set to Zero by transitioning to RE 100- 100% Renewable Energy (by 2035) as about 90% of emission is due to electricity. As the company expands, organically and inorganically we will harness the opportunity presented by the growth of energy storage and PV panels, the Firm RE availability and shift will be a critical consideration. The last 8-10% of emissions, we can address by using Green Hydrogen for reduction post 2035.

Our Transitioning pathway to a low-carbon economy

2026-Transition to Clean Energy

- Firm RE
- Efforts on Scope 3

Scopes 1 & 2- 18%
Scope 3 –20%

1. Renewables to displace 18% of Electricity from the Grid & Captive Plants
2. Energy Efficiency to achieve 0.5% decarbonisation
3. Exploration of electrification of furnaces
4. 10% shift towards Electric Vehicles
5. Explore use of recycled Zinc scrap for emission reduction
6. Explore use of CO₂ to carbiose waste materials and form artificial aggregate.
7. Engage with the suppliers to assess and determine 20% decarbonisation from 2016
8. Plantation of 2.5 million trees (cumulative)

2030-In line with NDC

- Firm RE
- Explore H2 & others
- Efforts on Scope 3

Scopes 1 & 2- 40%
Scope 3 –30%

1. 40% electricity from 80% firm renewable energy sources to effect 36% decarbonisation
2. Debottlenecking and energy efficiency to increase the capacity by 5-10%
3. 20% shift towards Electric Vehicles
4. Consider expansion of capacity only using technology that has feasible and cost- effective Carbon Neutral Transition- Electrified and amenable for H2 Reduction
5. Exploring use of hydrogen to substitute Coke in Reduction
6. Reducing scope 3 emissions by Innovation in product development to achieve recyclability and other emission reductions in downstream while usage of final products to achieve total 30% reduction
7. Reduction in emission intensity/tonnes of Metal by 40% in exceedance of India's NDC
8. Achieve Net Zero for one of the plants by 2030
9. Plantation of 3 million trees (cumulative)

2040-Scaling Up

- Firm RE
- H2
- CCUS
- Circular Economy

Scopes 1 & 2- 90%
Scope 3 –60%

1. 100% Firm 24x7 renewable electricity at all sites
2. 100% shut down of thermal power plants
3. 100% shift towards Electric or hydrogen driven vehicles
4. Recycled scrap in production
5. Explore recycling and reprocessing off gases (40%) for chemical production
6. Begin preferring supply chain partners with Net Zero Commitments
7. Plantation of 4 million trees (cumulative)

2050-Delivering Commitment

- Firm RE
- H2
- CCUS
- Circular Economy

Scopes 1 & 2- 100%
Scope 3 – 100%

1. 100% renewable electricity consumption in all sites
2. Hydrogen and Biomass to constitute 100% of fuel and reducing agents
3. Net Zero facilities
4. Recycled scrap in production
5. All off gases are captured and 50% converted to concrete and 50% is used for biomass cultivation or soil carbon enhancement
6. Engage value chain partner with Net Zero commitment
7. Plantation of 5 million trees (cumulative)
8. Offsetting of the remaining GHG emission.

Way Forward

Tackling climate change requires the integrated efforts of all stakeholders. HZLs Climate Risk Assessment Report is just one step towards communicating our climate strategy and the climate-related risks and opportunities addressed. We initiated the climate-related risk assessment and disclosed the financial impacts of climate change on our business following TCFD recommendations. Going forward, we will strengthen and extend the scope and coverage of risk management. In this direction, the following steps will be taken.

1. **Business Growth** - Study of Climate-related risks and opportunities will be a key element for the pursuit of new business opportunities, Divestments, Mergers & Acquisitions, and Asset Capture across geographies.
2. **Financial Planning** - Further, we plan to prepare a separate budget provision to address climate-related risks and opportunities with the approval of the Board and also refine the financial cost estimates. The financial planning will be assessed every year considering the climate change targets aligned as per SBTi and internal commitments after accounting the both risks and opportunities
3. **Supply Chain** - Going forward, Climate-related assessment will be an integral element while assessing critical suppliers.
4. **Market & Product** - In the coming years, we will evaluate opportunities for new products to address climate change induced opportunities in global markets and also explore with our customers as to how can we be a contributor due to the climate-related opportunities.
5. **Metrics & Targets** - We have committed to short, medium, and long-term targets to achieve carbon, water, and waste stewardship. We are committed to adopting additional climate-related KPIs emphasizing on vulnerability and impacts like duration of heat waves, green products, reputational risk score, etc.
6. We have already begun aligning our strategy and governance to support the mitigative and adaptive measures and harnessing of future possibilities. We endeavour to support the TCFD Recommendations and are fully committed to climate-related quantification, analysis, and assessment. We believe we are on the right path towards the alignment of the business and climate-related risks and opportunities.



Forward Looking Statements

This report's disclosures are being made in an effort to fulfil TCFD reporting requirements, to meet investor and other stakeholder requests, and to improve our collective comprehension of how climate risk relates to HZL's major risk categories. As was mentioned above, we take a different approach to the disclosures in this report than we do to those in our mandatory disclosures.

This report contains "forward-looking statements," some of which concern our net zero aims, goals, strategy, and ambitions, among other things. Additionally, we could include forward-looking statements in other publicly accessible publications, and our management might do the same when speaking verbally with analysts, investors, members of the press, and other parties. Forward-looking statements often don't reflect historical truth but rather our and our management's expectations for the future.

Forward-looking statements include risks, uncertainties, assumptions, and changes in circumstance that are hard to foresee and frequently outside of our control. These assertions do not represent assurances of future performance, outcomes, or conditions. Furthermore, a lot of the standards, metrics, and measures that were used to prepare this report are still evolving and were based on assumptions that were deemed plausible at the time of preparation, but they shouldn't be taken as assurances. We might not be able to predict in advance whether or to what extent we will be able to achieve our plans, aims, or goals due to the inherent uncertainty of the estimates, assumptions, and timescales mentioned in this report. Furthermore, HZL has not independently verified data from third parties and does not plan to. Due to a number of factors, including, among others, global socio-demographic and economic trends, energy prices, technological advancements, climate-related conditions and weather events, legislative and regulatory changes, our ability to gather and verify data regarding environmental impacts, and our ability to successfully implement our business strategy, actual results and financial condition or outcomes may differ materially from those expressed in or implied by any of these forward-looking statements. This report and other disclosures are accessible on our corporate website at <https://www.hzlindia.com>. These risks, along with others, could cause actual results and financial position to substantially differ from those predicted in forward-looking statements. This report includes claims that are based on hypothetical or extremely unlikely situations and assumptions; these comments shouldn't be taken as predictions of expected risk or as being indicative of existing or real danger.

Any forward-looking statement is only accurate as of the date it was made and is based on management's assumptions at the time; we do not undertake to amend any forward-looking statement to account for circumstances or events that have changed after the statement was made.



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