



RISK AND OPPORTUNITY MANAGEMENT

FORTIFYING VALUE THROUGH PROACTIVE RISK AND OPPORTUNITY MANAGEMENT

At Hindustan Zinc, we integrate ISO 31000 certified risk management framework into our core strategy to drive sustainable growth. By combining risk aware culture with advanced ESG foresight, we transform potential uncertainties into opportunities for value creation. Our partnership with PwC enhances this framework, providing the expert guidance needed to navigate the ESG and emerging risk landscape. This proactive approach ensures operational resilience while maintaining the highest standards of governance and excellence across the entire value chain.

As a member of the International Council on Mining and Metals (ICMM), we align our Enterprise Risk Management (ERM) framework with the ICMM Mining Principles, including Principle 4 on effective risk management. The ERM framework integrates sound science, operational data and stakeholder perceived risk, combining quantitative assessments with qualitative inputs from stakeholder engagement, grievance mechanisms, regulatory interactions, internal audits, and management reviews. This approach enables the early identification and management of environmental, social and governance risks, including those related to human rights, biodiversity, water, and climate, even where such risks are not classified as principal enterprise risks, thereby strengthening resilience, regulatory preparedness and sustainable long-term value creation.

APPROACH TO RISK MANAGEMENT

BOARD OVERSIGHT

The Audit and Risk Management Committee oversees the Enterprise Risk Management (ERM) framework, reinforcing accountability, regulatory compliance, and sound risk governance in line with the Companies Act, 2013 and SEBI (LODR).

GLOBAL RISK MANAGEMENT STANDARDS

Our ERM framework aligns with ISO 31000, the Committee of Sponsoring Organisations (COSO) framework, and ICMM principles, along with the other statutory requirements in India.

INTEGRATED RISK MANAGEMENT APPROACH

Risks are holistically managed across the organisation, including capital investments, mergers and acquisitions, project activities, and crisis response management.

CRISIS AND BUSINESS CONTINUITY MANAGEMENT

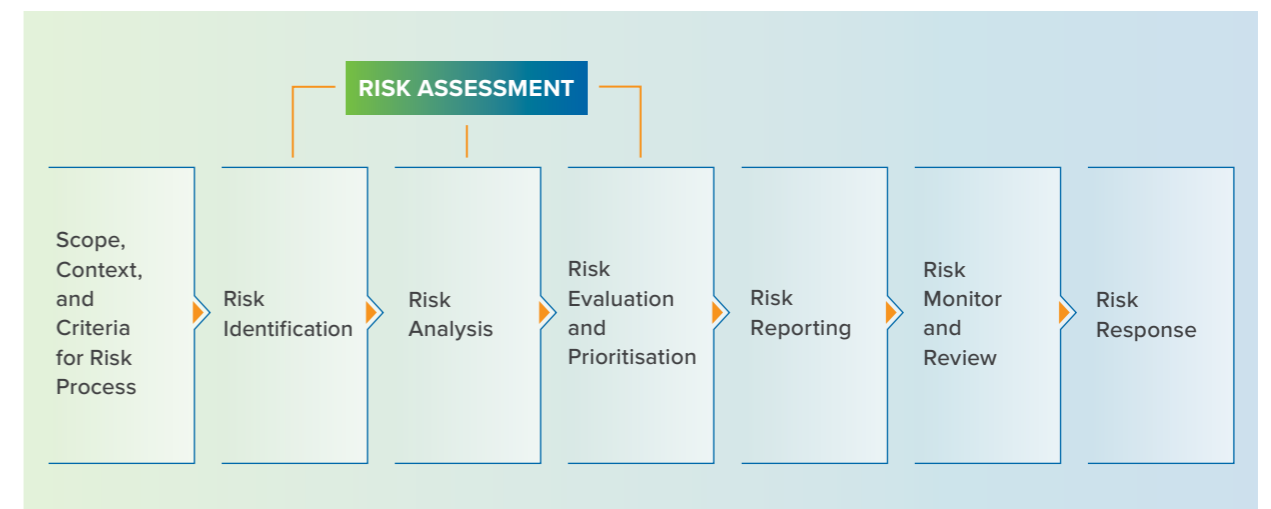
Crisis management and business continuity arrangements are maintained for critical scenarios, with defined roles, escalation protocols, and periodic testing. Learnings from drills/incidents and external developments are incorporated into the risk register, controls, and management reporting to strengthen operational resilience.

STAKEHOLDER-INCLUSIVE RISK IDENTIFICATION

Internal functions such as security, CSR, and corporate communications integrate and monitor key risk indicators (KRIs) based on stakeholder touchpoints such as community grievance mechanisms, employee safety observations, regulatory inspection outcomes, supplier assessments, and periodic interactions with local administrations. These insights combined with quantitative risk scoring, enable early detection of emerging ESG risks and support ICMM-aligned responsible mining practices.

RISK MANAGEMENT FRAMEWORK

We have laid down an ERM framework and manual, that provide guidance to our business units, corporate functions, and executive management in identifying, analysing, and responding to the top potential internal and external risks in a timely manner.



SCOPE, CONTEXT AND CRITERIA FOR RISK PROCESS

Defining the scope, context, and criteria establishes the risk management process, identifies internal and external factors, and sets the risk appetite alongside tolerance limits for effective risk measurement.





RISK IDENTIFICATION

- Identify potential uncertainties or risks that could affect our functional, organisational, and business objectives, or disrupt overall business continuity
- Identify emerging risks that currently have limited response plans due to their nature, but may need future inclusion in the risk register
- Adopt a multi-stakeholder approach, encouraging employees participation in the risk management process to facilitate early detection and understanding of emerging risks
- Engage key stakeholders, such as customers and suppliers through discussions and periodic surveys to identify external risks, gaining valuable insights that help

mitigate potential impacts on the Company's broader operations

- Use our understanding of regulatory and legal requirements to anticipate potential risks and events that typically precede their emergence



Identifying Emerging Risks

- We have initiated global risk sensing to determine relevant emerging risks
- Employees are encouraged to submit potential risks for review to the unit risk officers or the Chief Risk Officer (CRO)
- Employees are necessitated to stay updated on industry trends through leading publications, participation

in sector-specific events and continuous engagement with the senior management

RISK ANALYSIS, EVALUATION, AND PRIORITISATION

- Risk Attribute Analysis:** We understand the causes, likelihood of occurrence, potential positive or negative impact, and velocity or the time taken for impact since their occurrence

- Scoring & Prioritisation:** Using a 5-point scale, we assign risk scores and ratings based on its attributes to formulate appropriate response strategies
- Severity Matrix:** Risks are classified as critical, severe, moderate, or acceptable risks, ensuring prioritised resource allocation and governance

RISK RESPONSE, MONITORING AND REVIEW

To address the evolving risk dynamics, we continuously monitor the external environment and internal controls in alignment with our business strategy. Quarterly risk reviews foster organisational agility, enabling timely actions and implementation of appropriate mitigation measures.

Governance and Monitoring

- Conduct quarterly Mancom-level reviews and biannual Board-level oversight to monitor risk exposure
- Risk owners review principal risks at least quarterly, while moderate and acceptable risks are reviewed biannually and annually, respectively
- Implemented the SAP governance, risk and compliance (GRC) risk management module for automated key risk indicator (KRI) monitoring, workflow-based risk submissions, assessments, mitigation planning, escalations, and reporting

KRI Tracking and Escalation

- All risk owners track assigned KRIs, either manually or through SAP-based "warning lights"
- All risk owners escalate KRI breaches, particularly those in 'red-high level' category, to the unit/corporate risk officer

Collaborative Mitigation

- Risk owners communicate response plans with implementation status to the unit/corporate risk officer
- The risk and response owner jointly develop new response strategies based on periodic reassessments of effectiveness of mitigation plans
- Moderate and acceptable risks exceeding KRI thresholds are reassessed and reviewed by risk owners for severity as per the severity matrix

Resilience Testing

- Perform stress testing and sensitivity analysis using scenario modelling and simulations through a 'what-if' analysis and techniques like Monte Carlo simulation, to predict a range of possibilities and outcomes for an uncertain event

During FY2026, our ISO 31000:2018 certification was successfully validated through an external surveillance audit. We also conducted an internal audit during the year to verify the ongoing effectiveness and rigour of our risk management process.

RISK APPETITE AND TOLERANCE

We have established a well-defined risk appetite and corresponding tolerance thresholds to objectively assess our capacity for risk-taking and enable effective evaluation of identified risks. The Board-approved risk appetite articulates the level and nature of risks the Company is willing to take in pursuit of its strategic objectives. Risk tolerance operationalises this appetite through clearly defined quantitative metrics.

Each identified risk is evaluated using a 5-point impact scale. A potential impact exceeding 10% of the projected EBITDA, constituting a breach of risk tolerance, is categorised as a 'Very High' impact and assigned the maximum risk score of 5.



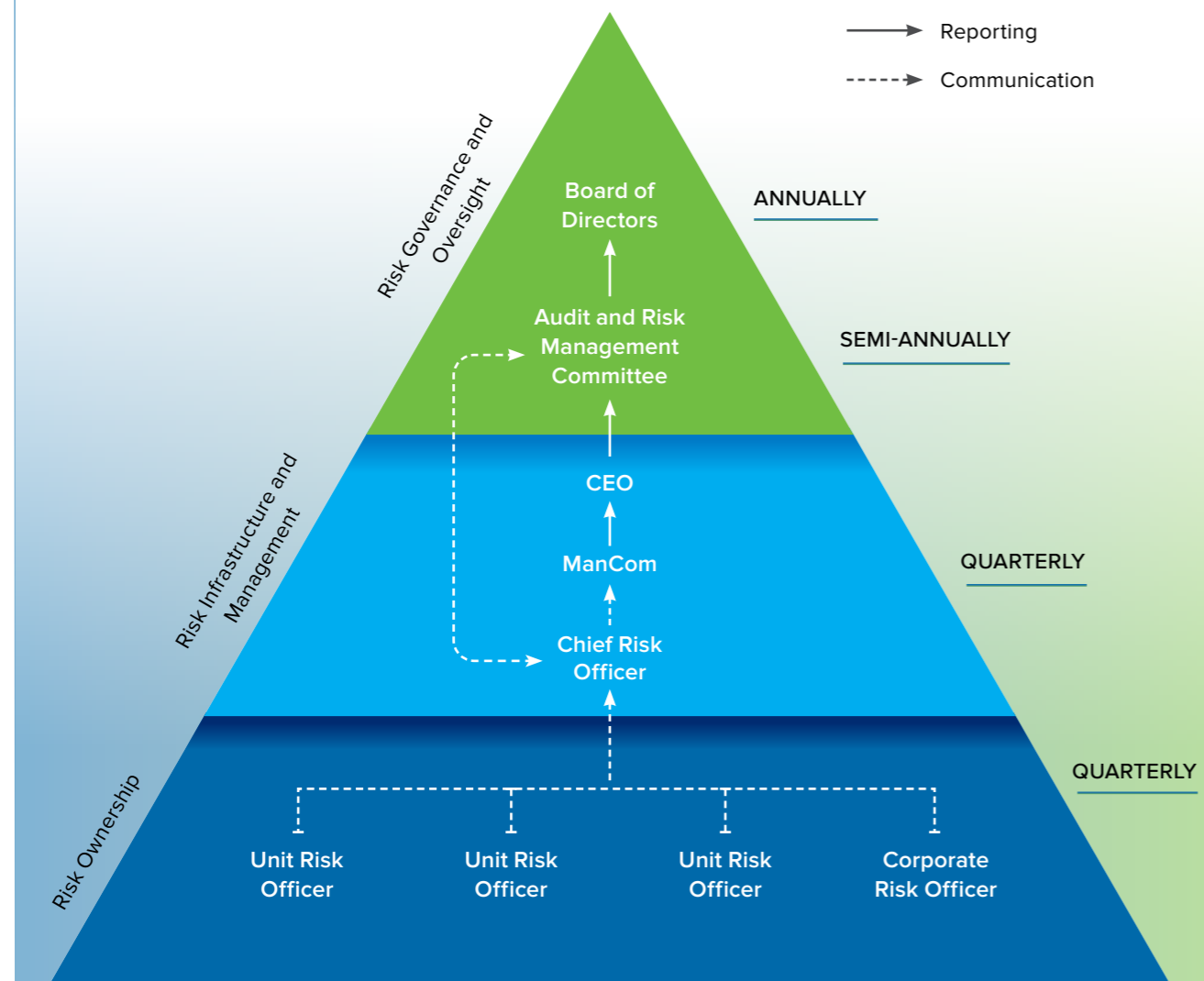


RISK GOVERNANCE

OUR THREE-TIER RISK GOVERNANCE FRAMEWORK

Integrates the Enterprise Risk Management (ERM) framework into strategic planning and executive decision-making processes.

- 1** Establishes a comprehensive governance framework for risk oversight, infrastructure, and management along with defined ownership
- 2** Enables rigorous quarterly risk assessments, monitoring, and reviews at appropriate governance levels
- 3** Clearly assigns roles, responsibilities, and accountability across every organisational tier



Governance Structure with Defined Roles and Responsibilities

Governance and Oversight	Board of Directors (BOD)	<ul style="list-style-type: none"> Provides enterprise-wide risk oversight and approves critical risk policies
	Board-Level Audit and Risk Management (ARM) Committee	<ul style="list-style-type: none"> Comprises majority of Independent Directors, with at least one member possessing accounting or financial management expertise Reviews risk management practices semi-annually and apprises the Board annually
Risk Infrastructure and Management	Chief Executive Officer (CEO)	<ul style="list-style-type: none"> Chairs the Management Committee (ManCom) that includes risk management matters in its agenda and ensures timely and adequate mitigation Monitors quarterly risk exposure, including the impacts of significant global developments Presents risk reviews before the ARM Committee
	Chief Risk Officer (CRO)	<ul style="list-style-type: none"> Reports to the CEO as an overall custodian of the risk management process Leads the risk management team and guides unit and corporate risk officers Updates the ARM Committee on the existing and emerging risks Oversees and coordinates risk management activities at the operational level Guides management in determining risk appetite and identifying trends and emerging risks Monitors enterprise-level principal residual risks, reviews cost, adequacy, effectiveness of the response plans, and accuracy and completeness of reporting
Risk Ownership	Unit/Corporate Risk Officers	<ul style="list-style-type: none"> Dedicated risk officer at each unit identifies and monitors location-specific risks Reports unit-level risks to the CRO Conducts quarterly Unit Risk Council meetings to evaluate mitigation plans Primary contact for employees to submit risks

Risk Management Process Audit

The Head of Internal Audit is responsible for evaluating the effectiveness of the risk management process and providing independent assurance on its compliance with the Company's risk strategies and policies. Findings from these audits are documented in a report, which is submitted to the Audit and Risk Management (ARM) Committee and the Head of Management Assurance System at the corporate level.

FOSTERING A RISK-AWARE CULTURE

Risk management is embedded into every business function through awareness initiatives and risk mitigation discussions, which promote a risk-focused culture centred on the following pillars:

Accountability through Performance

- A comprehensive risk scorecard with defined KPIs and targets helps scrutinise performance at the management and senior leadership level, ensuring risk management is a measurable component of organisational success

rewarding proactive risk reporting and the timely implementation of risk mitigation plans

members, with the Company's risk management processes and emerging global risk trends

Continuous Risk Education and Training

- Periodic refresher training and awareness sessions for senior management on risk identification, resilience planning, and mitigation, as deemed necessary by the Board

Organisation-wide training, workshops, and communications, including e-mailers on risk management principles instil a risk-intelligent culture

Rewarding Proactive Risk Management

- Incentive programmes align senior management and employees with risk and compliance metrics,

Tailored sessions familiarise Executive and Non-Executive Board members, including ARM Committee

Annual surveys assess and enhance risk culture and awareness across the organisation



STRONG RISK MANAGEMENT FOUNDATION — DEMYSTIFIED BY THE RISK CULTURE SURVEY

The Foundation: A Purpose-Built ERM Architecture

At Hindustan Zinc, enterprise risk management (ERM) is an integral part of business operations rather than a standalone function. The framework is built on globally recognised standards and enabled through the SAP GRC ERM platform, ensuring structured risk governance. Leveraging a globally benchmarked ERM framework and a fully implemented SAP GRC ERM module, the Company ensures comprehensive risk visibility and governance. The deployment of AI-enabled risk sensing capabilities further strengthens its ability to anticipate and address dynamic risk scenarios. This framework is guided by experienced in-house experts and complemented by leading risk advisors, resulting in a strong and adaptive risk management ecosystem.

Hindustan Zinc firmly believes that the success of its risk management framework is anchored in the strength of its organisational culture. In line with this philosophy, the Company commissioned a comprehensive Risk Culture Survey to evaluate the degree to which risk awareness and accountability are embedded in employee mindset, behaviours, and decision-making across the enterprise.

The Survey at a Glance

A strategic diagnostic exercise was conducted to assess how risk is understood, embedded, communicated, and acted upon across the organisation. The survey encompassed:

- A near-complete participation rate of 98.4% (246 respondents out of 250), which in itself is a powerful indicator of organisational engagement with risk governance

- Multi-strategic business unit (SBU) and cross-functional coverage, ensuring representation across all major business verticals and operational layers
- 25 parameters assessed across four foundational pillars of risk culture - competence, communication, governance, and motivation

The Verdict: Risk Intelligent — The Apex of Maturity

The survey delivered a definitive and resounding outcome:

9.26 / 10

Overall Risk Culture Index

The Company is now positioned at the “Risk Intelligent” stage, the highest tier on the five-level risk culture maturity continuum. At this level:

- Risk actively drives strategic and operational decisions, not merely informs them
- Clear ownership, escalation, and accountability are embedded across the enterprise
- Risk management is no longer a function, it is an organisational reflex

This represents a maturity level where risk practices have transcended process compliance and become a source of competitive resilience and institutional strength.

A Compelling Trajectory: Three-Year Maturity Progression

The current score is not an isolated achievement; it is the culmination of a deliberate and sustained cultural evolution:

Year	Score	Maturity Stage
FY2024	8.30	Institutional
FY2025	8.90	Proactive
FY2026	9.26	Risk Intelligent

The consistent upward trajectory, reflected in an improvement of nearly one point over the past two years, underscores the effectiveness of the Company’s investments in ERM architecture, leadership commitment, capability building, and cultural reinforcement. This steady progression from ‘Institutional’ to ‘Proactive’ and further towards ‘Risk Intelligent’ signifies a disciplined and phased maturity journey, characterised by systematic and sustained advancement rather than isolated improvements.

Pillar-Level Performance: Strength Across All Dimensions

All four foundational pillars registered scores in excess of 9.0 out of 10, affirming that the risk culture is uniformly strong and not reliant on any single dimension:

Pillar	Score	What it Means
Competence	9.33	Risk Competence emerged as the strongest pillar, indicating a strong understanding of risk exposure, escalation pathways, and enterprise-wide impact of decisions.
Communication	9.25	Risk Communication demonstrated high levels of psychological safety, supported by a strong speak-up culture and confidence in fair review of escalated risks.
Governance	9.24	Risk Governance reflected a credible leadership tone and clear accountability structures, though with scope to further enhance frontline visibility of governance mechanisms.
Motivation	9.14	Risk Motivation, while improving year-on-year, remained the lowest-scoring pillar, highlighting opportunities to strengthen reinforcement through incentives, periodic reviews, and near-miss learning.

The consistency across pillars confirms that the Company’s risk culture is balanced, broad-based, and deeply embedded, exhibiting strength not only in what people know about risk, but equally in how they communicate it, how it is governed, and how they are motivated to act upon it.

What This Means

The FY2026 Risk Culture Survey highlights the effectiveness of the Hindustan Zinc’s investments in ERM, with an overall index of 9.26/10 and a consistent upward trajectory over three years. Strong performance across all dimensions reflects a well-embedded risk culture and a high degree of organisational maturity, positioning the Company to remain resilient in a dynamic risk landscape.



INTEGRATING RISKS AND OPPORTUNITIES WITH STRATEGY

Hindustan Zinc systematically integrates risks and opportunities into its strategic planning process to drive value and resilience. By embedding these evaluations into decision-making, the Company proactively manages uncertainties and makes informed choices, supporting organisational goals and securing long-term sustainable performance.

Risk Appraisal for Capital Projects

- A rigorous three-step risk assessment is in place for all capital expenditures prior to the approval of both payback and non-payback projects, including new product development projects
- Projects team conducts mandatory risk assessment for all capex projects to highlight critical risks
- The centralised risk team conducts mandatory risk assessments for all growth projects, unbudgeted capex for non-payback projects, and sustenance payback projects above a certain threshold

Incorporating Risk Criteria in Product and Service Development

- Risks are integrated across the entire product lifecycle to safeguard innovation
- Mitigating business partner risks with potential to impact the product development, using risk management frameworks, standard operating procedures (SOPs), and business partner management policy
- Rigorous reviews of product development risks address evolving customer expectations or regulatory requirements through proactive process adaptation
- The R&D department addresses innovation and product application risks through pre-commercialisation piloting and testing

ENTERPRISE RISKS AND OPPORTUNITIES

#	Risk & trend	Risk Category	Risk rating			Risk appetite
			Impact	Velocity	Likelihood	
R1	Environment regulation ↔	Environmental				Low
R2	Non-adherence to safety protocols ↑	Societal				Low
R3	Local community issues ↑	Societal				Low
R4	Structural stability ↔	Societal				Low
R5	Tailings dam collapse ↑	Environmental				Low
R6	Fall of ground ↓	Societal				Low
R7	LME/LBMA price decrease ↓	Economic				Very High
R8	Fire ↓	Societal				Low
R9	Occupational hazards (exposure to gases and fumes) ↔	Societal				Low
R10	Cyber-attacks and data loss ↔	Technological				Medium
ER1	Geopolitical trade wars	Geopolitical				
ER2	Geoeconomic fragmentation	Geopolitical				
ER3	AI-driven technological integration	Technological				

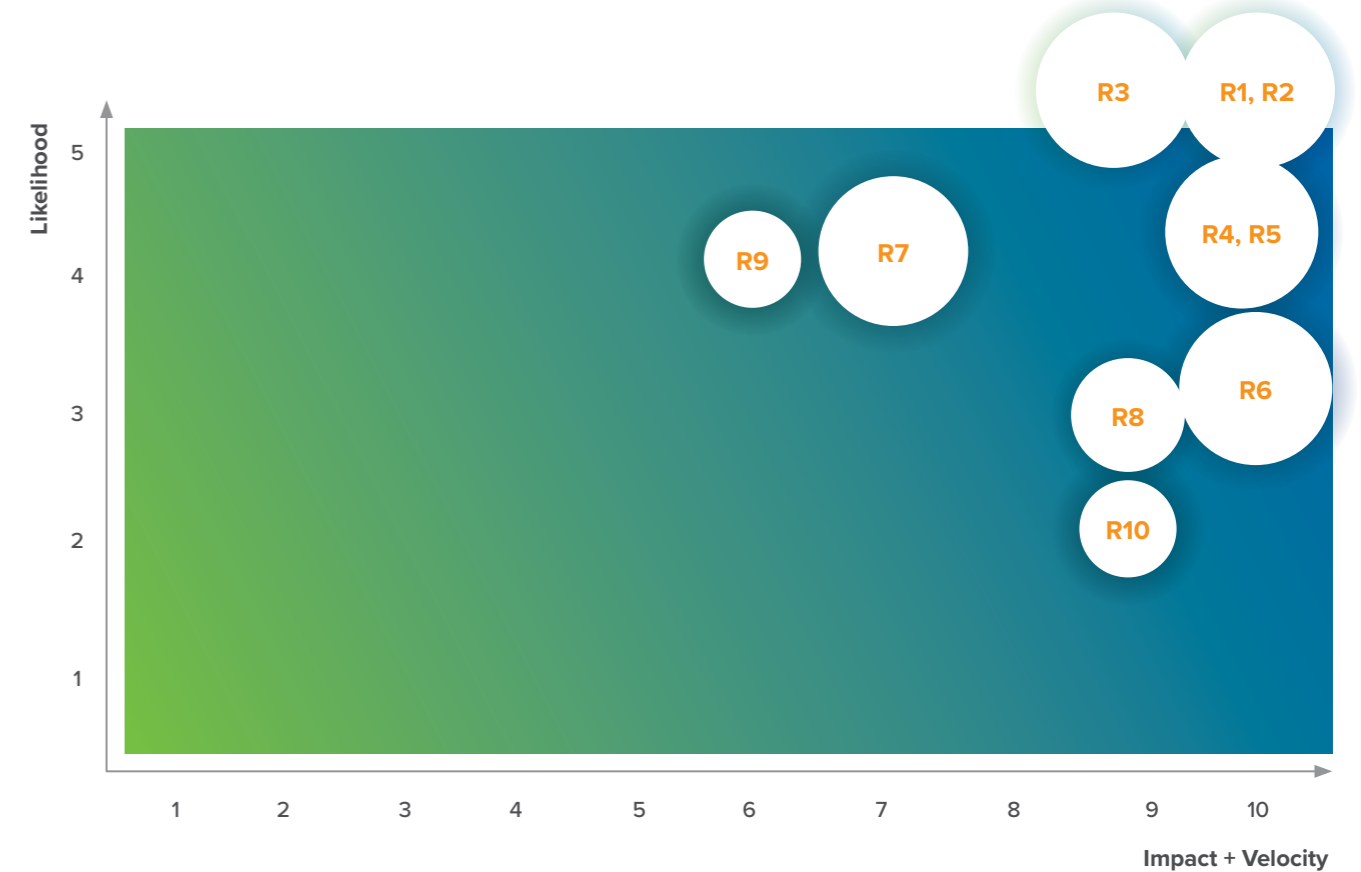
Risk Rating

Very Low Low Medium High Very High

Risk Appetite Level

Low Medium High Very High

RISK HEAT MAP





R1 Environment Regulation

Risk Description

Non-compliance with regulatory norms on emissions (SOx, NOx, PM), waste management (hazardous waste, jarofix), effluents management, noise, and green belt area poses a significant risk to the business.

Material Topic



Impact on Capitals



Risk Outlook

We ensure strict compliance with all emissions and waste management regulations and maintain emissions within the permissible limits while pursuing ambitious ESG targets to strengthen our global sustainability leadership.

Risk Mitigation Strategy

- Strong monitoring mechanisms to track compliance with mining and smelting industry norms
- Investing in low emission technologies and zero liquid discharge (ZLD) plants in mines
- Innovative waste management through dry tailings stacking, construction of secured landfill (SLF) and jarofix yard and its green capping
- Installing dust extraction system, tail gas treatment (TGT) plant and additional wastewater treatment facilities to maintain statutory licence compliance

Associated Opportunities

- Generating value through tailings reprocessing, waste commercialisation, and development of responsibly produced metal offerings
- Boosting waste minimisation and rehabilitation performance to access lower cost, sustainability-linked financing
- Using Environmental Product Declarations (EPDs) to meet the EU's transparency demands and securing long-term contracts

R2 Non-Adherence to Safety Protocols

Risk Description

Failure to adhere to safety protocols or errors in judgement by employees/contract workers (man-machine or machine-machine interactions, electrocution, fall from height, explosives handling) may lead to injuries and fatalities.

Material Topic



Impact on Capitals



Risk Outlook

Safety incidents may arise from negligence, procedural non-adherence, and equipment failure. We mitigate these risks by continuously strengthening our safety culture and deploying best-in-class monitoring technologies.

Risk Mitigation Strategy

- Strong safety protocols across all sites, including critical risk management (CRM) and critical control management, such as FSIPP, hazard identification and risk assessment framework
- Deployed proximity warning, anti-collision system, CCTV surveillance, remote operations, and automation across mines, mills, and smelters
- Systematically upgrading and replacing outdated systems and equipment
- Equipment and machinery training, monthly safety trainings, and lifesaving rules (LSR) for business partners
- Earth-leakage circuit breaker (ELCB) and neutral grounding resistance for transformers
- Vehicular safety best practices, such as underground workshops to minimise vehicular movement, a "Zero" vehicle reversal policy, NO-GO zones, and designated parking and pedestrian pathways
- Remote operations for stope bogging across all mines
- Increased automation at smelter plants to minimise human contact with calcine/hot metal

Associated Opportunities

- Proactive accident prevention and HSE compliance strengthen sustainability and environmental performance
- A strong safety culture supports the Group's initiative to obtain Zinc Mark certification, creating an opportunity to enhance operational resilience and market reputation

R3 Local Community Issues

Risk Description

Social discontentment, agitations, public protests, and disputes can potentially disrupt business operations and impact profitability.

Material Topic



Impact on Capitals



Risk Outlook

We continue to take proactive steps in managing social sensitivities through structured stakeholder engagement and transparent communication. By prioritising inclusive growth, livelihoods, and infrastructure development, we build community trust and mitigate grievances to ensure long-term social stability and responsible operational continuity.

Risk Mitigation Strategy

- Active community engagement and development programmes for education, livelihoods, women empowerment, health, water, infrastructure development, etc.
- Strong network with law enforcement and local authorities
- Strengthened crisis response with security measures at gates and critical installations, communication protocols, and escalation matrix
- Digital surveillance at mines through Build-Own-Operate-Transfer (BOOT) model, including CCTV, drones, automated gate, digital locking, walkie-talkie, and control rooms
- Mechanisms to monitor any community discontent, grievance mechanisms, strategic volunteering and brand ambassadors initiatives

Associated Opportunities

- Aligning contractor recruitment with local labour sourcing requirements through clear roles and contractual obligations
- Enhancing our social performance strategy to enhance stakeholder trust and community partnerships
- Securing long-term social licence to operate through formal community engagement, grievance mechanisms, and co-investing in shared community infrastructure

R4 Structural Stability

Risk Description

Failures in structure or equipment (acid tank and roaster dam collapses, smelting furnace and shaft failures) from excessive wear and tear, ageing of assets, and improper/inadequate maintenance, may cause injuries, fatalities, and operational disruptions.

Material Topic



Impact on Capitals



Risk Outlook

We have established comprehensive preventive and maintenance frameworks, leveraging technology-driven monitoring and periodic inspections to mitigate structural integrity risks from design inefficiencies, harsh operating environments, high temperature and pressure levels, and corrosion.

Risk Mitigation Strategy

- Standard operating procedures (SOPs) for permissible limits and equipment usage, and scheduled shutdowns for repairs and ageing/malfunctioning part replacements
- Upgrading old equipment with the latest ones and/or repairing and redesigning existing ones to enhance safety, corrosion resistance and material of construction (MOC)
- Remote-controlled operations to reduce manual intervention in high-risk structures like acid tanks
- Digital initiatives for real-time analysis of indicators signalling equipment degradation and distributed control systems (DCSs) for monitoring process parameters and health of various sections of the plant
- Training sessions for operators on equipment maintenance, troubleshooting, and safe operating methods

Associated Opportunities

- Reducing unplanned downtime improves throughput and cash flow predictability
- Advanced digital optimisation of processes boosts energy efficiency, metal recovery, asset performance, capital efficiency, and long-term operational resilience



R5 Tailings Dam Collapse

Risk Description

Catastrophic failure or operability loss of tailings facilities (wet dams, dry stacks, and hybrid) driven by overtopping, stability/internal erosion, excessive rainfall, and land/permit constraints.

Material Topic

M1 M3 M16

Impact on Capitals



Risk Mitigation Strategy

- Implementation of dry tailings technology with support from expert agencies
- Using tailings and waste rock in underground backfilling via paste-fill and hydro-fill to reduce surface storage, securing residual tailings in engineered facilities for long-term stability and risk mitigation
- Bi-annual studies on structural stability and ongoing geotech monitoring to identify abnormal pressure in embankments
- Regular water reclamation and evaporation and construction of additional reservoirs relieve tailings dam pressure
- Procuring new land for expanded tailings storage and maintaining a one-meter freeboard to prevent spills and ensure safety buffer
- Construction of reinforced earth wall and cement concrete drains for dry tailing stacking and managing water flow

Associated Opportunities

- Stronger dam design, monitoring, and emergency preparedness enhance community trust, safety, and environment, reducing catastrophic impacts and securing our social licence to operate
- Strong regulatory compliance and ESG practices boost our reputation, promoting trust with authorities and communities
- Financial and long-term strategic value creation via lower insurance and remediation costs, access to sustainable finance, operational resilience, and competitive leadership in responsible tailings management

Risk Outlook

As our underground operations expand, increasing storage needs and volatile rainfall patterns due to erratic climate patterns could heighten overflow risks. To mitigate this, we continue to prioritise reducing wet tailings and conduct rigorous structural monitoring, ensuring dam safety.

R6 Fall of Ground

Risk Description

Instances of fall of ground (FOG) due to poor geotech conditions or heightened seismicity may lead to fatalities, damage to assets such as shafts and equipment, and operational disruptions.

Material Topic

M1

Impact on Capitals



Risk Mitigation Strategy

- Integrated critical control and Fatality and Serious Injury Prevention Plan (FSIPP) for safety across all sites
- Monthly safety trainings and skill upgradation of geotech engineers
- Strict adherence to the Ground Control Management Plan (GCMP) and executed Structural Stability Report (SSR) recommendations
- Regular inspections, annual audits, damage mapping, timely rehabilitation, and advanced footwall drive cable bottling
- Implementing online stress & seismic monitoring and tele-remote operations of the loaders and drill machines
- Using smooth wall blasting practices, slope stability radar, void reduction mechanism, paste-fill optimisation, and rock breaker in stopes across all locations

Associated Opportunities

- Optimised ground support design reduces unplanned stoppages and improves mining productivity
- Improved safety performance strengthens workforce confidence, social licence to operate, and can secure favourable insurance terms

Risk Outlook

Underground mining carries inherent fall-of-ground risks from unpredictable rock mass behaviour or seismic activity, etc. While our experienced geotechnical team and seismic monitoring technology have minimised this risks, we remain vigilant against potential equipment malfunctions or human negligence.





R7 LME/LBMA Price Decrease

Risk Description

Unfavourable changes in the commodity prices on the London Metal Exchange (LME) and London Bullion Market Association (LBMA) may impact profitability.

Material Topic

M18

Impact on Capitals



Risk Outlook

Current geopolitical events may trigger global metal volatility, yet current lead and zinc LME price forecasts remain favourable in the short term. The long-term outlooks for silver remain bullish.

Risk Mitigation Strategy

- Formal hedging strategy in line with hedging policy to maintain monthly average LME prices on shipments
- Negotiating higher premiums through 100% e-commerce sales
- Enhancing domestic market share while cutting structural costs for cost-efficiency
- Diversifying into value-added products and minor metal recovery to buffer against price volatility

Associated Opportunities

- Securing transparent and standardised contracts with global customers. The Company can structure contracts with pricing floors, ceilings, or hybrid formulas to reduce volatility exposure while preserving relationships with large industrial buyers
- Improved project IRRs and long-term reserve strength

R8 Fire

Risk Description

Fire incidents at operational sites threaten life, property, and equipment on site.

Material Topic

M1 M2 M10 M16

Impact on Capitals



Risk Outlook

Short circuits and mishandling of combustibles and explosives pose high risk of fire incidents. We mitigate these through strict SOPs, automated suppression systems, workforce training & awareness, and specialised rescue teams

Risk Mitigation Strategy

- 24x7 preparedness at all locations through fire extinguishers, suppression systems, firefighters, rescue teams, barriers, protection equipment, multipurpose tenders, hydrant points, sprinkler systems, etc.
- New-age firefighting vehicles, auto fire suppression systems, fire hydrant lines, early fire detection systems, fire banks, and fire walls for mills and underground mines
- Upgrading alarms, sensors, and nitrogen purging systems for accident prevention in smelters
- Fire safety training and awareness programmes, SOPs, and FSIPP for all workers at all locations
- Grounded fuel storage systems with lightning arrestors, and regular checks on earth connections and resistances

Associated Opportunities

- Stronger ESG ratings, investor confidence, and social licence to operate alongside reduced downtime, insurance premiums, and asset loss, ensuring sustained production

R9 Occupational Hazards (Exposure to Gases and Fumes)

Risk Description

Exposure to sulphuric acid fumes and hazardous gases, such as carbon monoxide (CO), lead and metal dust, sulphur dioxide (SO₂), chlorine, and propane, can pose a serious occupational health risks.

Material Topic

M1 M2 M16

Impact on Capitals



Risk Outlook

Structural failures and technology glitches or inadequate monitoring may pose occupational safety risks. However, our investments in state-of-the-art technology, including sensors and AI/ML, etc., mitigate such hazards.

Risk Mitigation Strategy

- Conduct regular inspections, audits for internal and external structural integrity, and non-destructive testing (NDT) in all smelters
- Online hazardous gases monitoring sensors, work zone cameras, and personnel monitoring sensors to detect leaks
- Installing air filters and tail gas treatment (TGT) systems on all relevant equipment to reduce harmful and poisonous emissions
- Stringent use of personal protective equipment (PPE), including gas masks, eye protection, and gloves during operations
- Investing in new technologies, such as powered air purifying respirators (PAPR), safety showers, and diphtheriae kits in acid plants and auto cut-off systems for chlorine tonner leakage
- Structure strengthening and hygiene installation

Associated Opportunities

- Improving regulatory compliance and ESG ratings strengthens investor confidence and social licence to operate
- Reduced compensation costs and improved talent retention for long-term operational stability and competitive positioning





R10 Cyber-Attacks and Data Loss

Risk Description

Cyber-attacks (malware, phishing, ransomware), security breaches of information technology/operational technology (IT/OT) systems, and loss of confidential/sensitive data such as unpublished price sensitive information (UPSI), generation data, personally identifiable information (PII), threaten operational continuity.

Risk Mitigation Strategy

- Implemented Incident Response and Security Information and Event Management (SIEM) for threat detection, compliance, and security incident management
- Up-to-date endpoint security with regular updates and continuous traffic monitoring
- Annual Certified Security Analyst (CSA) and IT infosec infrastructure configuration reviews
- Control of confidential data via manual tagging and business partner confidentiality agreements to prevent leaks
- Cloud proxy solutions, Endpoint Detection and Response (EDR) and secure hosting of IT systems on Azure or other cloud systems
- Mandatory virtual private network log-in for remote employees and contract staff ensures restricted access with multiple security layers

Read more about cybersecurity measures on page 278

Associated Opportunities

- Gain competitive advantage by safely adopting innovative technologies, expanding remote operations and integrated supply chain solutions

Material Topic

M17

Impact on Capitals



Risk Outlook

Despite state-of-the-art measures and information policies, escalating cyberattack sophistication may create advanced persistent threats, requiring the Company to continuously evolves its defenses and stay ahead of the emerging risks.

Beyond the above principal/critical risks, we have identified additional risks. These include climate change, water management, talent management, etc., categorised into severe to moderate categories, based on their impact, likelihood, and velocity. Understanding their potential to escalate in future, we have proactively initiated mitigation actions to manage them.

SUSTAINABILITY RISK MANAGEMENT

Guided by our Enterprise Risk Management (ERM) policy and ICMM-aligned approach, we adopt an integrated lens to evaluate risks and opportunities across geographies, business segments, and time horizons.

The Chief HSE & Sustainability Officer oversees ESG and climate risks, reporting to the Board's Risk Management Committee to ensure accountability and proactive governance. This approach not only mitigates threats across World Economic Forum's assessment categories but also leverages ESG insights to drive resilience, sustainable value creation, and business opportunities.

SUSTAINABILITY GOVERNANCE

Integrated Alignment

The ESG function collaborates with each business unit and function to ensure coordinated action while maintaining independence from service lines and other operational functions within our risk management framework.

Strategic Oversight

The Chief Risk Officer (CRO) oversees enterprise-wide risk management, including ESG risks, and provides bi-annual progress reports to the Board's Audit & Risk Management Committee.

Audits and Independent Assurance

The Internal Audit function provides strategic advisory on business activities, risks, and controls, while independent assurance validates the strict adherence of our risk management processes with the Company's established policies and procedures.

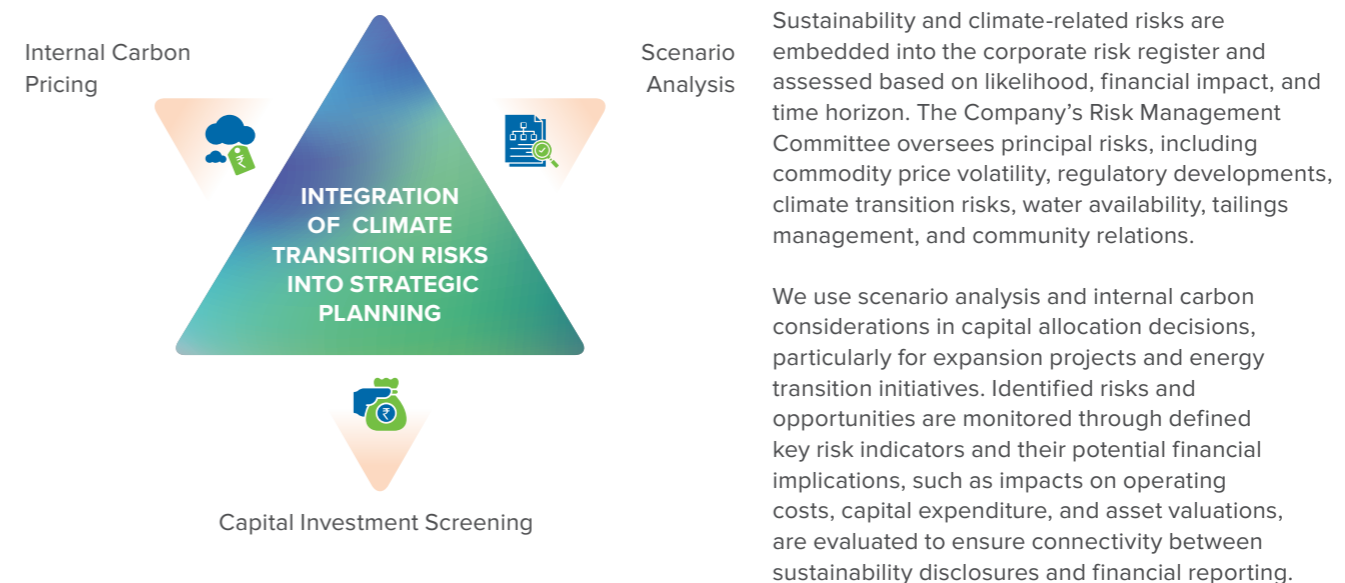
MANAGING SUSTAINABILITY RISKS AND OPPORTUNITIES

At Hindustan Zinc, ESG risk management is embedded into enterprise decision-making through continuous stakeholder engagement, materiality-based prioritisation and proactive mitigation of emerging risks. Our approach enables us to identify, assess and manage sustainability risks while unlocking long-term value creation.



Air emissions and quality, tailings management, and water management are our top three material topics. Additionally, we treat biodiversity, climate change, and waste management as key enterprise risks.

CLIMATE-RELATED RISKS AND OPPORTUNITIES ASSESSMENT





EMERGING RISKS

ER1

Escalating Global Regulatory Fragmentation, Geopolitical Trade Wars, and Compliance Mandates

Risk Description

- Punitive Intermediary Timelines:** Strict timelines for developing auctioned blocks under the MMDR 2025 Act, with 1% monthly confiscation of total performance security on bidder-related delays
- Mandatory Nature-Positive Assurance:** ESG reporting now requires mandatory financial assurance. SEBI's BRSR Core mandates external, audit grade verification of sustainability metrics, while Taskforce on Nature-related Financial Disclosures (TNFD) gains prominence and calls for quantified, geographically mapped local biodiversity disclosures
- EU and UK CBAM Implementations:** The EU Carbon Border Adjustment Mechanism (CBAM) became fully operational on January 1, 2026, transitioning from voluntary reporting to mandatory carbon cost imposition on embedded emissions in imports like steel and aluminium, with the UK CBAM set to follow in 2027
- Geopolitical Scenarios and Trade Wars:** Escalating trade wars and geopolitical fragmentation are reshaping the global economy, disrupting supply chains and market access. Uncertainty in US trade policy, including recent US Section 232 investigations into critical minerals and January 2026 tariff-related proclamations has increased severe unpredictability into global metal trade flows and dents exporter confidence

Possible Impact

- Catastrophic Contingent Liabilities:** The 1% monthly penalty on performance securities for project delays, potentially destroying the net present value (NPV) of the Company's highly complex, multi-year capacity expansion projects

- Erosion of Export Competitiveness:** Indian steel exporters may need to cut prices by 15-22% to absorb the CBAM tax burden. As zinc is primarily used in steel galvanisation, the reduced competitiveness of Indian steel directly threatens the Company's downstream demand and may push it to explore alternative export markets at potentially lower premiums
- Supply Chain and Market Disruptions:** Rising tariffs, economic sanctions, and trade wars can disrupt our procurement of critical raw materials (such as coal and explosives) and limit market access, exposing the Company to revenue volatility, project cancellations, and increased logistics expenses
- Loss of Capital Access:** Inability to produce transparent, standardised and forward-looking transition metrics that satisfy ISSB S2 auditors under the BRSR Core or TNFD frameworks could exclude Hindustan Zinc from global sustainable finance markets, drastically elevating the weighted average cost of capital (WACC)

Mitigating Actions

- Leveraging Low-Carbon Zinc (EcoZen):** Proactively scaling the production and supply of EcoZen, Asia's first low-carbon zinc with a footprint of less than 1 tCO₂e per tonne of zinc, to help downstream steelmakers minimise their Scope 3 emissions and subsequent CBAM liabilities
- Geopolitical Supply Chain Diversification:** Actively exploring alternative export markets with less stringent carbon taxes (such as the Middle East and ASEAN) and diversifying critical raw material suppliers to navigate global trade

war uncertainties and mitigate single-region dependency

- Agile Regulatory Navigation and Specialised PMO:** Establishing a dedicated, executive-level Project Management Office (PMO), operating independent of local site management, to exclusively monitor compliance with the MMDR 2025 intermediary timelines. This PMO must utilise advanced predictive analytics to foresee critical path delays and secure early production incentives
- Enterprise-Grade ESG Data Architecture:** Transitioning all sustainability data from siloed, manual reporting systems into an integrated, blockchain-enabled, or enterprise resource planning (ERP) linked ESG data architecture. This ensures that metrics related to Scope 1, 2, and 3 emissions are recorded with the immutable, audit-grade fidelity required by external ISSB S2 and BRSR Core assurance auditors
- Proactive TNFD Ecosystem Modelling:** Accelerating the deployment of drone technology, IoT sensors, and spatial AI to continuously map, quantify, and document the health of local ecosystems surrounding Rampura Agucha, Sindesar Khurd, and Zawar mines to empirically validate our "Nature-Positive" trajectory to TNFD-aligned institutional investors
- Strategic Industry Advocacy:** Leveraging the Company's prominent position on the Governing Council of the Federation of Indian Mineral Industries (FIMI) to collaboratively shape the implementation guidelines of the State Mining Index and the National Critical Mineral Mission

ER2

Geoeconomic Fragmentation and Base Metal Margin Volatility

Risk Description

- Macro Volatility:** The global macroeconomic environment governing base and precious metals is entering a phase of acute structural instability. While long-term demand for transition metals remains robust, the immediate 2026 forecast for zinc is characterised by price volatility
- Tariff Architectures and Geopolitics:** Geopolitical risk is at a zenith. The implementation of aggressive US trade tariffs (e.g., Section 232 investigations into critical minerals) and the strategic recalibration of China's 15th Five-Year Plan create massive unpredictability in global manufacturing demand and metal trade flows
- US-Iran-Israel Conflict and Regional Escalation:** The escalating Israel and Iran conflict, alongside US engagement in the broader Gulf region, have evolved into an active operational challenge for the Company's export operations in the following ways:
 - Material disruptions to established shipping corridors to our Middle East and Africa (MEA) markets, including vessel cancellations, sailing postponements, and emergency freight surcharges on Gulf-bound cargo
 - Introduced complexity into the Company's trade finance arrangements
 - Created downstream exposure on commodity hedging positions linked to affected shipments
- Silver Cross-Commodity Dependency:** Hindustan Zinc is aggressively pursuing a multi-metal future, with its silver portfolio surging to rank among the top 10 globally. The structural hike in global silver prices is currently providing

a massive financial buffer as silver contributed towards c.45% of the Company's overall profitability

Possible Impact

- Cash Flow Variability:** Sustained price volatility may moderate the Company's cash flow predictability, integral to self-funding its annual project capex requirements and ongoing capacity expansions. A prolonged softening in global manufacturing demand, potentially exacerbated by evolving tariffs, could push LME prices downwards, necessitating reassessment of operational priorities and capital allocation across the asset portfolio
- Energy Cost Inflation and Margin Erosion:** A sustained Hormuz-linked energy price shock and the Red Sea rerouting linked freight cost escalation could materially inflate the cost of diesel, explosives, and inbound raw material procurement, thereby threatening to inflate Hindustan Zinc's logistical, operational, and power procurement costs, directly compressing margins
- Collapse of Cross-Commodity Subsidisation:** Any sudden cyclical macroeconomic correction in silver prices, with subdued or highly taxed zinc via carbon border adjustments could contract the enterprise EBITDA
- Loss of Competitiveness against Global Supermajors:** As major global peers aggressively consolidate or sequence their portfolios to dominate the 1st quartile, wild margin fluctuations could leave Hindustan Zinc undercapitalised, limiting its competitiveness in the global export market or inhibiting ability to execute growth strategies

Mitigating Actions

- Dynamic Strategic Hedging:** Expanding the enterprise risk management focus on financial

derivatives to lock in favourable forward prices, Hindustan Zinc must deploy dynamic hedging strategies across its portfolio. Strategic hedging at Hindustan Zinc acts as a safeguard for margin protection to a certain extent of the annual production

- Agile Export Market Reorientation, Geopolitical Supply Chain Diversification, and Logistics Resilience:**
 - Realigning near-term export strategy by redirecting contracted MEA-bound volumes towards Southeast Asian markets to sustain sales and minimise inventory risks amid ongoing Gulf disruptions
 - Maintaining active dialogue with international shipping liners to secure prompt vessel bookings
 - Renegotiating trade finance arrangements, including factoring and discounting positions, in coordination with banking partners
 - Reassessing open commodity hedging positions linked to diverted shipments
 - Commissioning supply chain stress tests modelling for Strait of Hormuz disruption and Red Sea rerouting scenarios, building strategic buffer inventories of critically exposed input materials such as explosives-grade ammonium nitrate and industrial diesel
 - Pre-negotiate contingency freight agreements across alternative logistics corridors

- Asymmetric Capitalisation on Silver Dynamics:** Repositioning silver portfolio not as a by-product alone, but as a major critical global energy transition metal and a strategic financial lever, Hindustan Zinc is increasing silver production either



through high-grade silver output initiatives (such as the Sindesar Khurd operations) or recovery improvement initiatives to boost production and strengthen the silver portfolio for enhanced stakeholder value

- **Relentless Cost Curve Obsession:** Hindustan Zinc must maintain strict operational discipline to remain in the 1st quartile of the global cost

curve amid market price fluctuations. This requires optimising power cost by sourcing from 530 MW round-the-clock renewable power agreements and coal sourcing rationalisation, driving higher productivity and better recoveries, and consistently optimising the cost of production across all operational sites

- **Geographical and Value-Chain Diversification:** Hindustan Zinc

must dilute reliance on traditional export markets susceptible to sudden geopolitical tariff barriers and aggressively deepen domestic integration of its refined zinc into India's burgeoning domestic solar and wind infrastructure, railways, and automotive markets. This strategy will help create a localised, captive demand ecosystem that is highly immune to international trade wars



ER3

Operational Complexity and AI-Driven Technological Integration Vulnerabilities

Risk Description

- **The Complexity Ceiling:** As Hindustan Zinc executes its strategic target to double the production capacity, the inherent geological and mechanical complexity of its underground mining and metallurgical operations is expanding exponentially. Globally, the mining sector identifies operational complexity, driven by declining ore grades, deeper orebodies, and aging infrastructure, as its paramount systemic risk
- **IT-OT Convergence and Algorithmic Dependency:** The progressive integration of AI-driven automation and machine learning systems into core smelting and processing operations has inextricably converged Information Technology (IT) and Operational Technology (OT). While reducing manual dependency and optimising yield consistency, this convergence introduces profound new vectors of technological risk. The intersection of highly volatile physical chemistry with algorithmic autonomy means that any failure, miscalibration, or compromise can trigger immediate physical and operational consequences, not merely data or software-level disruptions
- **Model Drift and Algorithmic Fragility:** Machine learning algorithms deployed to control critical metallurgical processes, including chemical dosing and continuous hotspot monitoring, are trained on historical ore profiles and operational data. As the Company increasingly processes ore from newer, deeper underground veins or reprocessed tailings with materially different metallurgical properties, there is a growing structural risk that these algorithms may operate outside their training data. This model drift could result in significant AI miscalculations of critical chemical inputs, leading to metallurgical imbalances, compromised metal purity, infrastructure damage, or acute environmental discharges, without any visible warning to human operators

Possible Impact

- **Systemic Bottlenecking and Catastrophic Process Failure:** Unmanaged AI model drift in smelter dosing could cost millions of dollars in compromised metal purity, smelting infrastructure damages, or acute environmental discharges, with cascading impacts on production continuity and regulatory standing
- **Catastrophic Cyber-Physical Vulnerabilities:** The integration of real-time analytics and cloud-based OT systems vastly expands the Company's cybersecurity attack surface. A targeted cyber-intrusion, ransomware attack, or malicious disruption of the AI command centres could go beyond corporate data breaches to physically halt smelting operations, disrupt automated ventilation in deep underground shafts, or compromise the structural monitoring of highly sensitive assets like dry tailing plants
- **Workforce Disconnect:** Transitioning to highly automated AI environments may alienate the existing workforce. Without requisite digital literacy to interpret AI's autonomous decisions, the human may be unable to intervene safely during critical system failures, turning software glitches into physical safety incidents

Mitigating Actions

- **The Pivot to Agentic AI:** Hindustan Zinc partnered with applied AI firms like Ripik.AI and has deployed "Agentic AI" systems that utilise machine learning and computer vision to autonomously automate the dosing of critical chemical inputs (zinc dust, sodium sulphate, lime) and conduct 24/7 hotspot monitoring at historic assets like the Debari smelter. Critically, these deployments are governed by a strict human-in-the-loop validation architecture that ensures autonomous recommendations are subject to expert metallurgical review during periods of high operational variability

- **Dynamic Algorithmic Recalibration and Feedback Loops:** Mandating continuous, dynamic recalibration of all AI and machine learning models governing metallurgical processes. Establishing a strict closed-loop feedback mechanism to continuously feed real-time assay data from newly extracted ore and reprocessed tailings back into the AI training matrix, preventing model drift and ensuring the algorithms adapt instantly to shifting geological and chemical inputs
- **Advanced IT-OT Convergence Security Protocols:** Elevating cybersecurity from a traditional IT function to an enterprise-wide physical safety imperative. Implementing strict "air-gapping" protocols between core operational technology (OT) controlling physical mining/smelting hardware and broader corporate IT networks. Deploying autonomous threat-hunting algorithms for industrial control systems (ICS) to identify and neutralise anomalous network behaviour before physical infrastructure can be compromised
- **Redundancy and Human-in-the-Loop (HITL) Safeguards:** Despite the increasing focus on automation, critical failure points, such as the Switchyard & Rectifier Hotspot Monitoring System, maintain robust, analog fail-safes. A strict "Human-in-the-Loop" (HITL) architecture ensures AI-driven chemical dosing or automated shutdown recommendations undergo final validation by human metallurgical expert during high operational variability or feed changes
- **Comprehensive Workforce Upskilling and Digital Literacy:** Directly addressing the global mining skills deficit by reskilling the existing workforce, shifting labour allocation from manual execution to advanced digital oversight, ensuring on-site operators possess the requisite data literacy to interpret AI outputs, audit machine learning decisions, and override autonomous systems safely and efficiently during an operational crisis