


Hindustan Zinc Limited



Task Force on Climate-related Financial Disclosures ('TCFD') **Report 2021**

Our journey to managing climate change impacts

About this report



This is our first and inaugural Climate Change report aligned in line with the recommendations of the Financial Services Board's Task Force on Climate-related Financial Disclosures (TCFD). We have made strategic decision to align our reporting process with best practice of global climate reporting.

The Financial Stability Board (FSB) created the Task Force on Climate-related Financial Disclosures (TCFD) to improve and increase reporting of climate-related financial information.

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Hindustan Zinc Limited categorised under Metals and Mining became a supporter of TCFD in February 2021.

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As a part of our commitment to sustainable development, we have initiated the adoption of TCFD framework for climate change risk and opportunity management.

The scope of information covered in the report covers all of operations of Hindustan Zinc, including five mining locations, three smelters, and one refinery plant.

It is our firm believe that this TCFD aligned report enables our stakeholders to evaluate our climate change-related performances for future.

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%. We have our operational presence in the Indian states of Rajasthan, and Uttarakhand, 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 plant namely Chanderia Lead Zinc Smelter (CLZS), Dariba Smelting Complex (DSC) and Debari Zinc Smelter (DZS) and 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 the regarded as the building blocks of society and the economy.

Message from our CEO



Climate change and extreme weather trends have been recognised as key risks faced by industries and are regarded as the greatest risk currently faced by humanity. The complexity of the climate change has resulted in business disruption across the regions. As a mining business, predominantly focussed on the extraction of metals, we are fully aware that our activities have a significant impact on the surrounding environment and the communities. We are taking concrete steps towards tackling the climate crisis believing it is the right thing to do for our customers, society and for our own business.

Our organization remains supportive of the Paris Agreement and became a supporter of TCFD in February 2021. In the longing to reduce

the impact and make our stakeholders aware about our climate-related financial risk disclosure, processes we are publishing our inaugural Task Force on Climate-Related Financial Disclosure (TCFD) report. The report outlines the holistic understanding of our actions towards identification, measurement, management, monitoring and reporting of climate-related risks and opportunities. We are eager to help build a long-term sustainable future for our stakeholders and we believe that our actions will contribute to climate risk mitigation and adaptation.

Further, we identified some Capital and Operating expenditure requirements at each site and we will be making it a part of our financial planning.

We understand that the climate information and knowledge are uncertain and needs to be updated, accordingly, we will update climate risks regularly.

We have followed the TCFD recommendations and guidance to structure this report to provide useful information that is decisive and continue supporting high-value stakeholder engagement. 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 first TCFD report and encourage you to read and provide feedback about the same.

Arun Misra
Chief Executive Officer,
Hindustan Zinc Limited

Executive Summary

Climate change induced by global warming is real and the weather patterns are increasingly changing. The changing climate patterns have potential to affect and disrupt most aspects of business, economy, and society. Thus, the transition to a lower-carbon economy to halt the global warming well below 2 degrees, through reallocation of capital is vital. Only this could avert the large-scale irreversible damages of climate change. The physical changes in climate viz., increasing frequency and severity of climate-related extreme weather events (drought, cyclone) and persistent changes (sea level rise etc.) are of concern to both lives and livelihoods.

G20 viewed climate change as an important factor that could potentially cause Global Financial Instability and accordingly tasked its FSB to recommend measures to manage the climate related risks and their financial consequences. The FSB constituted a Task Force on Climate Related Financial Disclosures (TCFD) which recommended guidance for Climate Related Financial Disclosures by the companies so that the investors and other stakeholders can factor the same in their decisions.

Climate Risk & Opportunity Assessment and Management

In response to these global developments, during FY 2020-21, HZL has assessed physical

and transition risk induced by global warming. Our assessment covered all operational sites (Mining and Smelters). 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 abundant precaution, and would make such investments to ensure water security at our mines and smelter sites and alleviation of heat stress at our smelter sites. Further, we have integrated climate risks as emerging risks in our enterprise risk management and financial planning.

HZLs technology mix and asset configuration sets us apart in our ability to comply with existing climate regulations like Renewable Energy Certificate (REC)/ Renewable Purchase Obligations (RPO) and the emerging regulations 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 decarbonise much earlier than the Competitors by switching to Firm RE could enable us to harness the new markets as also to seek a premium for low carbon or zero carbon metals. Our locations are ideally positioned for cost effective firm RE options. Further, the regulations.

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In line with 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, which in turn improve the demand for our metals.

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At HZL, all the risks and opportunities due to climate change, as delineated above, is steered by our Board and are integrated into our process of risk management and strategy. In our report, we have disclosed our decarbonisation progress and from the next year, we will update our progress on harnessing the opportunities and adaptation plans. We are also considering aligning incentives with success in managing climate risks and harnessing opportunity in both medium and long term.



Hindustan Zinc Limited has made continuous efforts to reduce the GHG emissions, and have also committed to Science Based Targets Initiative (SBTi) and submitted the stringent targets.



Besides, we recognize that the physical climate changes will occur despite global efforts to mitigate GHG emissions. These physical climate changes, regulations, and other transitional actions would impact our business both as risks and opportunities across the value chain. We have also been presenting the company's

mitigation and adaptation efforts to climate change in CDP disclosures. The company continues to make notable progress to reduce its GHG emissions through several measures, which include an increasing share of renewable energy and energy efficiency.

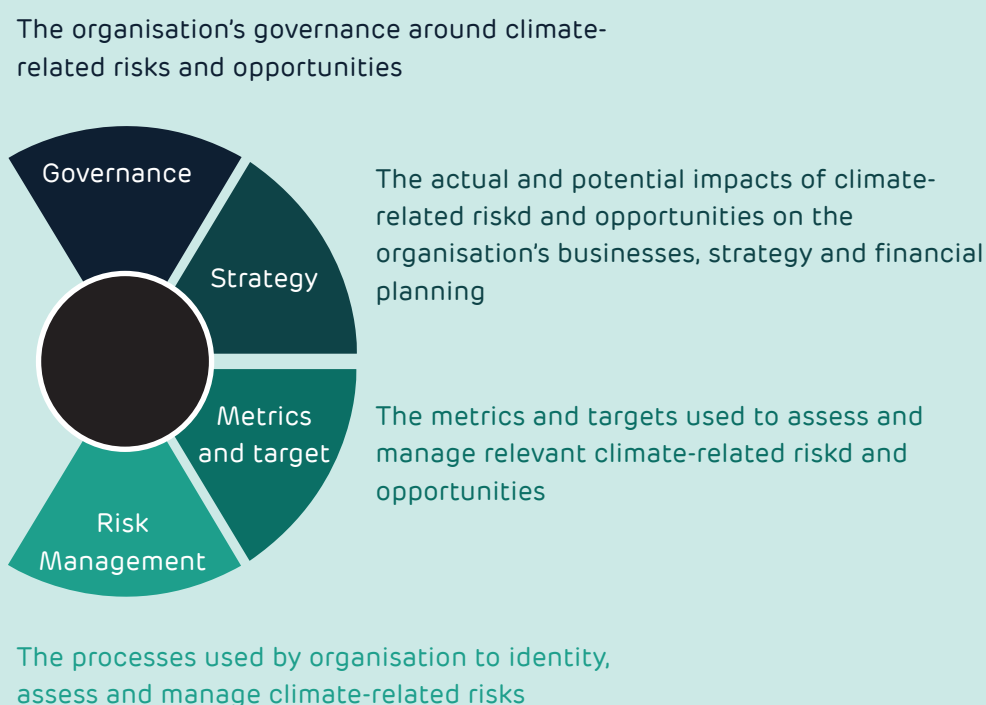
About the Task Force on Climate-related Financial Disclosures

How much value would be at risk for each company would require adequate information to understand and further assess the impact of both transition and physical risks on the value of a business. The recommendations from the Task Force on Climate-Related Financial Disclosures (TCFD) address this challenge and provide guidelines for disclosures that can be used by the stakeholders to make an

informed decision. Established in 2016 by the Financial Stability Board (FSB), the TCFD developed a singular, accessible framework for a more efficient and standardized disclosure of material climate-related risks and opportunities to promote more informed investments and sustainable markets.

Structured around four thematic areas that represent core elements of the operation- Governance, Strategy, Risk Management, and Metrics & Targets, supported by recommended disclosures TCFD Assessment builds out the framework with information that will help investors and others understand how reporting organizations assess climate-related risks and opportunities, as well as strategies for mitigating risks and harnessing of opportunities.

Core elements of recommended climate-related disclosures



Notes on Climate-related initiatives in practice at present

Energy and climate change policy at Hindustan Zinc

The impacts of climate change are increasingly being felt around the world through changing weather patterns, changes in regulation and major shifts in technology.



Our approach to climate change is built on adapting to climate risk, mitigating the impact, identifying and taking action on climate change opportunity, building climate resilience business model and emissions reduction.



We support the global shift towards a low carbon economy, and seek to create sustained value through environmental and social leadership.

Addressing climate change and its impacts demands a robust, coordinated effort with a sound policies and its practices. Recognizing the concern due to climate change, Hindustan Zinc has adopted Energy and climate change policy signed by the CEO which provide guidance and integration towards sustainable development and its overall business vision and mission reflecting the priorities. The policies provide guidance towards

reducing footprint, stakeholder engagement, influencing supply chain, and adaptation to climate change including future-proofing.

Physical and Transitional Risk Assessment

Our approach to applying TCFD recommendations for climate-related financial disclosures included:

1. Studying the risk due to existing and emerging climate change regulations, voluntary industry codes, and the risks due to acute and chronic physical changes in climate, in the short, medium, and long term for our own operations.
2. Measures are then identified to mitigate the risk. The opportunities identified have also been taken up for further development and monetization.
3. The implications of climate risk mitigation measures to business strategy and financial planning are identified.

Integration into Enterprise Risk Management and Board Processes

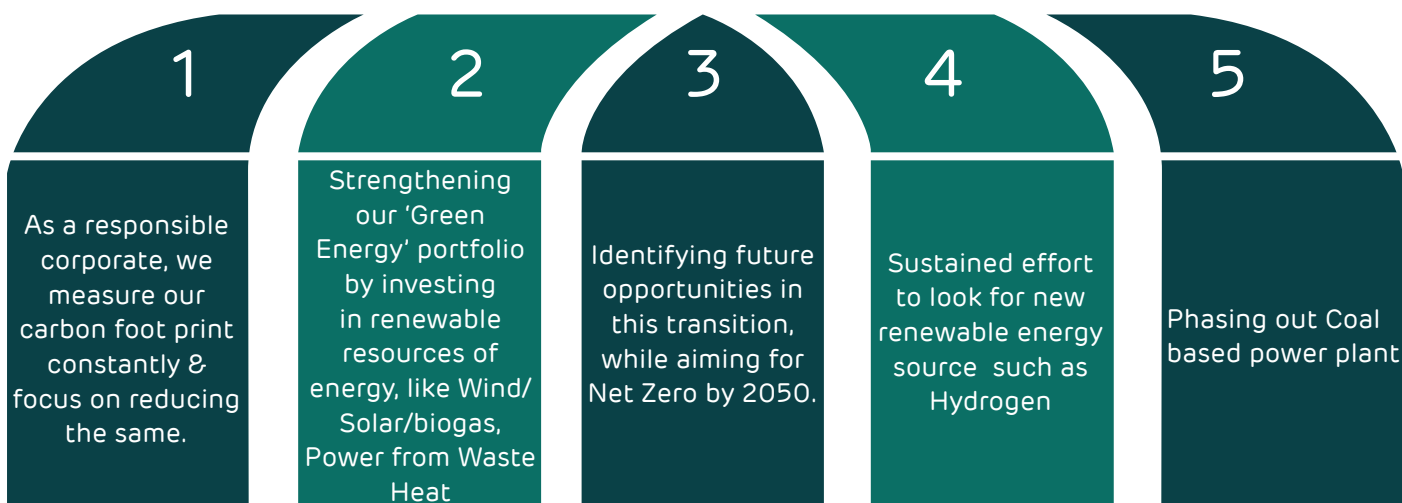
1. Integrating climate risk in enterprise risk management as emerging risk
2. The climate risk assessment were presented to the Board for further guidance on climate risk management, TCFD and our Net Zero plans

We have been presenting the company's mitigation and adaptation efforts to climate change in CDP disclosures.



Supporting low carbon transitions

We believe that Climate Change is inevitable and therefore subscribe to the regional action for adapting to climate change across our operating sites.



In FY 2020-21, we implemented a scenario analysis to further understand our climate risks. These scenario analysis were in accordance with the Financial Stability Board Task Force on Climate-related Financial Disclosures (TCFD) recommendations and were used to ensure HZL is identifying and managing its physical and transition risks. The resulting analysis were used to further augment all of HZL's current risk management practices.



"Hindustan Zinc, Epiroc sign MoU for underground electric vehicles "

Governance

Maintaining a strong corporate governance framework, which adheres to best practices and principles, is fundamental to climate change strategy. We manage our business affairs and work to meet its financial, operational, strategic objectives and achieve long-term sustainability through adherence to best practices and principles of corporate governance, that serve

to provide effective management and board oversight. The board oversees and guides on strategy and its deployment to enhance value generation, retention of sustainable business operations and distribution amongst stakeholders, following the 'art of balancing'.

The Company has six Board-level committees:

1. Audit Committee,
2. Stakeholders Relationship Committee,
3. Corporate Social Responsibility Committee,
4. Nomination & Remuneration Committee
5. Risk Management Committee and
6. Committee of Director (CoD).

Board's oversight of climate-related risks and opportunities

- Board oversees the climate-related risks and opportunities through its Risk Management & Audit Committee
- Board is briefed of the climate-related risks and opportunities. Climate related risks and opportunities are now part of Enterprises Risk Management as Emerging risk

Management's role in assessing and managing climate-related risks and opportunities

- HZL established a two-tier structure for governing the risks and opportunities related to climate change
- Tier-1: Executive-level sustainability committee
- Tier-2: Energy and Carbon Community
- Further, HZL participates and adheres to guidance of Vedanta Sustainability Committee and Vedanta Carbon Forum

The Management is responsible for the operational assessment of climate management across the Company and the subsequent implementation of HZL's climate change strategy.

Executive sustainability committee

Tier 1: 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.

Tier 2: Energy and carbon management community: Under the Executive sustainability committee we also have established Energy and carbon management community, who looks after governance for energy conservation, energy and carbon risk assessment, mitigation strategies and continual improvement in energy and carbon management.

Strategy

The climate-related risks and opportunities the organization has identified over the short, medium, and long term.

HZL identifies and assesses 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. We have identified climate change associated risks and opportunities and its impact on employee health, the existing infrastructure, including the impact of on HZL's ecosystem and the business model.

Climate Change risks management approach consists of an observations at present times and predicting the changes in the future. Unit level managers and other employees relate to EHS, HR, Commercial, Risk Management etc. were consulted to identify these risks and also opportunities, followed by an assessment phase to anticipate responses, and set up of scenarios to figure out how emerging risks may impact the unit level operations and the company's business model. In order to get more insight on risks assessment, we developed scenarios according the climate model for the two time period i.e. Time period I (2020-2039) and Time period II (2040-2059) which are developed for prioritizing risks associate with Climate change.



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The resulting analysis were used to further augment all of HZL's current risk management practices.

We have a formal mapping of risks & mitigation plans in Risk Matrix, monitored with digitalized platform. There are Risk registers at each of the operating sites as well as at corporate level. There is also centralized repository of risk along with risk owners. We also prepare Risk Action Plan to mitigate the risks.

In developing our strategy, we considered a wide range of opportunities and risks across two discrete time horizons to map Physical (Extreme weather

events and Chronic weather changes) and Transition Risks (Regulations, Technology, Markets and Reputation). We used Representative Concentration Pathway (RCP) 4.5 for climate-related scenarios for physical risks and Nationally Determined Contributions (NDCs) for transition risks. We have identified risk, financial impact and vulnerability for scenarios with global warming exceeding 2 degrees and well below 2 degrees for two time periods till 2039 and 2059.

• Time period I (2020-2039) -

This time period enables us to think and look beyond the current scenario and identify milestones towards the longer-term impact which will enable us to navigate through the identified risk and harness opportunities.

• Time period II (2040-2059) -

Recognizing the uncertainties, we used scenario planning 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 risks 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 advanced climate modelling we assessed for each of the sites on the parameters

of Physical Risks (Increase in temperature, Drought, Floods, Extreme weather, Cyclonic pattern, wind speed etc.) and India's NDCs induced Transition Risk (due to change in policy change, technological change, market change, financial resource raising, reputational etc.).

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. During the assessment and the workshop across the HZL unit, from head of the operations to the managers and other employees relate to EHS, HR, Commercial, Risk Management were involved to identify these risks, mitigation and adaptations strategy and also opportunities it presents in the future. We also developed process to establish risk profiles due to climate change which addressed regulatory risks, energy, natural disasters, and contingency plans. Each climate risk were 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. Each team across the units, is looking forward to prepare roadmap to make their respective units more adaptable to these changes.

In response to these global

developments, during FY 2020-21, HZL has assessed physical and transition risk induced by Climate Change. Our assessment covered all operational sites (Mining and Smelters). 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 abundant precaution, and would make such investments to ensure water security at our mines and smelter sites and alleviation of heat stress at our smelter sites. Further, we will integrate the climate risks as emerging risks in our enterprise risk management and financial planning.

Impact of climate-related risks and opportunities on the organization's business, strategy, and financial planning and resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

Transition risk

We have identified our strategy to be resilient to the range of energy transition pathways and scenarios including Paris agreement. Our technology mix and asset configuration sets us apart in our ability to comply with existing climate regulations like Renewable Energy Certificate (REC)/ Renewable Purchase Obligations (RPO) and the emerging regulations 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 decarbonise much earlier than the competitors by switching to Firm RE could enable us to harness the new markets as also to seek a premium for low carbon or zero carbon metals. Our locations are ideally positioned for cost effective firm RE options. Further, the regulations in line with 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, which in turn improve the demand for our metals.

Further, we assessed transition risks i.e. policy and legal, technology, market, and physical risks i.e. acute and chronic in detail for unit locations. We identified and categorized these risks over a time horizon of short, medium, and long-term, considering the progression of climate change as predicted by global models. The climate-related transition risks consisting of those arising from

1. Existing and future policy and regulations,
2. Technological developments, and
3. Reputational issues arising out of the customer, public, industry, sector voluntary commitments, codes, and standards

Physical risk

Physical risks resulting from climate change are one of the 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 of 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).

In order to predict risks arising due to physical risks, we conducted the climate assessment. 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. We used Representative Concentration Pathway (RCP) 4.5 for climate-related scenarios for physical risks and Nationally Determined Contributions (NDCs) for transition risks. Through this activity we carried out the assessment of possible scenarios in the two time period, i.e. 2039 and 2059 and applied possible futures to our business, to test strategic resilience. Using this assessment we identified options for increasing our strategic and business resiliency to plausible climate-related risks and opportunities through adjustments to strategic and financial plans.

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

Study of projected change in parameters Monthly maximum temperature, Precipitation, Severe drought likelihood, Mean drought index and Land projected to be below annual flood level

Extreme Events

India faces some of the highest disaster risk levels in the world, ranked 29 out of 191 countries by the 2019 Inform Risk Index. India

has very high exposure to flooding, including riverine, flash, and coastal, as well as high exposure to tropical cyclones and their associated hazards and drought. These extreme weather events are projected to increase in severity and frequency with climate change.

Impact on the businesses, strategy, and financial planning

Climate-related risks and opportunities pose a significant impact on the business in the long term. In the short and medium-term, the existing measures would have to improve or complemented.

Physical chronic risks like change in precipitation patterns, extreme temperature, might impact productivity in the two time period (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 impact revenues. The mitigation measures could have a financial impact on inventory and insurance costs for the organization. In the current financial year, we assessed.

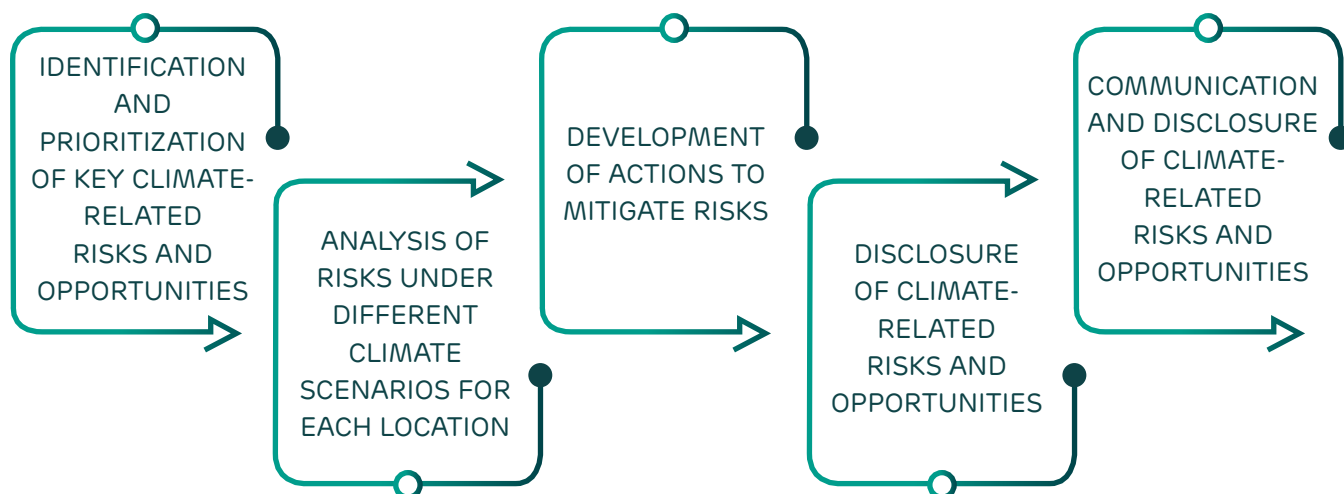
- i. Change in precipitation pattern leading to floods, and damage to asset and property
- ii. Extreme Temperature leading to heat stress and, decreasing the labor productivity
- iii. Cyclones Severity leading to damage to asset and property
- iv. Drought leading to business disruption

These risks impact the business's revenue, disrupt the operations, and increase the Capex and Opex costs, but also creates an opportunity for new product development and market propagation in terms of higher demand of Zinc, Silver and Lead.

Further, we estimated the mitigative costs for the identified additional measures to be undertaken. 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 mitigate the risk in discussions with the Unit level team.





Our assessment were carried out with the help of World Bank climate change knowledge portal and Climate Central and Third Biennial Update Report to the United Nations Framework Convention on Climate Change. (https://unfccc.int/sites/default/files/resource/INDIA_%20BUR-3_20.02.2021_High.pdf)



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; Tmax>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

Physical risk assessment

Assets	Impact due to	Risk and financial impact	Vulnerability	Adaptation Strategies at present	Mitigation & Adaptation Strategies (Futuristic) & Potential Financial Impact			Opportunities
Mines & Smelters	Due to Increase in temperature				Short term	Medium term	Long term	
		<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"> Proper ventilation is maintained through ventilation system to make it favourable working conditions; sufficient water facilities and dehydration's solutions are provided to the employee working in high risk zones. 	<ul style="list-style-type: none"> Implement heat stress management programmes including symptoms 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"> Optimization of ventilation and cooling systems 	<ul style="list-style-type: none"> Installing renewable based energy to mitigate increased costs (Physical modification (CAPEX)) 			<ul style="list-style-type: none"> Improvement in energy efficiency and clean energy
		<ul style="list-style-type: none"> Increased probability of vector borne diseases (Higher operating costs & plant shutdown) 		<ul style="list-style-type: none"> Human Resource initiative on disease prevention and control 	<ul style="list-style-type: none"> Surveys regarding Vector borne diseases (Informational actions) 	<ul style="list-style-type: none"> Actions to be planned to protect / restore biodiversity at the locations. (Operational actions) 		<ul style="list-style-type: none"> Opportunities in developing solutions for sequestration in the mines
		<ul style="list-style-type: none"> Equipment operating thresholds can be reached at a faster rate (Increased operating costs) 			<ul style="list-style-type: none"> Conducting studies on ascertaining the cases of decreased machines/ equipment lifetime due to increase in temperature (Informational actions) 			<ul style="list-style-type: none"> Application of Circular economics on appliances and equipment's
		<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"> Utilizing STP water Harvesting rain water Dewatering from underground and keeping in sumps and it is used; Water efficiency and saving initiatives projects 	<ul style="list-style-type: none"> Site-based freshwater reduction programme Operational actions (OPEX) 			

	Due to drought	<ul style="list-style-type: none"> Restrictions on water availability (Decreased revenues) 	Medium	<ul style="list-style-type: none"> Communities- Prepared ground water recharge structures Use of tailing dam water , Use of seepage mine water Initiatives towards minimization of Ground water / surface water dependency More recycling of water Zero liquid discharge plant Dry Tailing Plant and Udaipur STP plant 	<ul style="list-style-type: none"> Continue to minimize for Ground water / surface water dependency Operational actions (OPEX) 	<ul style="list-style-type: none"> Use of evaporation retardants chemicals for minimizing evaporation in Surface Water reservoirs Operational actions (OPEX) Exploring alternate sources of water and ensuring more recycling of water (Informational actions) 		<ul style="list-style-type: none"> Water Stewardships- Reducing exposure to climate related risks can reduce costs, improved community relationships Reduced fresh water usage and consumption at operational units
	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"> Sufficient drainage system at present Pumping facilities are installed 	<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"> Increased opportunities in collecting freshwater through rain water harvesting
		<ul style="list-style-type: none"> Set back in upstream and downstream supply (Increasing Operating cost) 		<ul style="list-style-type: none"> Emergency planning procedures to manage supply chain 	<ul style="list-style-type: none"> Public Advocacy to improve infrastructure (Informational actions) 			
		<ul style="list-style-type: none"> Mixing of effluents (Change in water quality) 		<ul style="list-style-type: none"> Safety procedures are in place and are maintained in order to avoid mixing of effluents Regular testing of water resources to monitor changes in water quality 				

		<ul style="list-style-type: none"> Higher wind speed leading to damage to infrastructure (Increased Operating Cost) 			<ul style="list-style-type: none"> Incorporate Climate Change impact while developing new sites Physical modification (CAPEX) Ensuring climate-resilient infrastructure is built for all new infrastructure Physical modification (CAPEX) 			<ul style="list-style-type: none"> Reducing exposure to climate related risks reduce costs, preserve or enhance revenues
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Transition risk assessment

Transition Risk	Impact due to	Risk and financial impact	Vulnerability	Adaptation Strategies at present	Mitigation & Adaptation Strategies Futuristic & Potential Financial Impact			Opportunities
					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	In compliance with RPO, Installations of renewable energy & Internal carbon pricing. ~40 MW of solar power plant	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	<ul style="list-style-type: none"> Can be an early adopter due to present extent of electrification and cost-effective RE resources availability
	AIPA Targets for reducing emissions	Increased operating costs	Low	Strengthened monitoring and set reduction targets		Planning for Decarbonisation by 2050 Physical modification (CAPEX)		<ul style="list-style-type: none"> Use of lower-emission sources of energy Use of supportive policy incentives Use of new technologies Shift toward decentralized energy generation Decarbonised premises

Technological change	Change in power production and Electrification	Phasing out Coal powered technologies Electrification of processes	High	Planning's on substitutes/ diversification high emissions technologies	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)	1. Reduced exposure to GHG emissions and therefore less sensitivity to changes in cost of carbon 2. Participation in renewable energy programs and adoption of energy efficiency measures
	Change in metallurgical processes Increased Capital costs	Phasing out Pyro metallurgical processes	High		Reduced Pyro metallurgical processes Operational actions (OPEX)			Use of more efficient production processes
	Need for sequestration Increased Capital costs		Medium		Sequestration in abandoned mines and new location		Carbon Capture and Storage (CCS) and Carbon Conversion technologies	1. Development of new products or services through R&D and innovation 2. Ability to diversify business activities
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	Set up Science based targets for reduction in emissions		Planning for Decarbonisation by 2050 Physical modification (CAPEX)		1. Use of lower-emission sources of energy 2. Use of new technologies 3. Resource substitutes/ diversification 4. Decarbonised premises
	Demand for metals which will be part of the decarbonisation solution	Opportunities for HZL which will help in increased revenue	Low	Assess market, develop product offerings and expand geographies	Assess and develop products	Harness Markets		<ul style="list-style-type: none"> • Access to new markets • Increase in demand of Decarbonised metals: Silver, Zinc • Access to new assets and locations-Exploring Lithium mines • Development and/or expansion of low emission metals • Opportunities to use mines as carbon sequestration premises

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	Set up Science based targets for reduction in emissions		Planning for Decarbonisation by 2050 Physical modification (CAPEX)		<ul style="list-style-type: none"> • Use of lower-emission sources of energy • Use of new technologies • Resource substitutes/ diversification • Decarbonised premises
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 Reduced revenue from negative impacts	Disruption in Social licence to operate	High	Ground water recharge structures, RO installations, Creating and Desilting Ponds etc. Maintaining continuous community relationship management and grievance activities are followed.	Community perception survey regarding water stress Informational actions	Improving on the measures of recycling Physical modification (CAPEX)		1. Reducing exposure to climate related risks can reduce costs, improved community relationships 2. Reduced water usage and consumption

Risk Management

The risk management area aims at disclosing how the organization identifies, assesses, and manages climate-related risks and how these are integrated into existing risk management frameworks.

Hindustan Zinc Limited processes for identifying and assessing climate-related risks

A formal monitoring process at the unit level and at the Company level, which identifies and categorizes existing and emerging risks with respect to both Physical and Transitions risks. The climate hazards have been chosen based on recent climate events on a particular site. 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. Risk management targets and indicators are also part of the scorecard and performance evaluation process at the management levels and above.

Hindustan Zinc Limited processes for managing climate-related risks.

The Climate change vulnerability 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. Risks and mitigation measures are mapped to key responsibilities of select managers and managed with appropriate mitigation plans.

Processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management

Formal mapping of risks & mitigation plans in Risk Matrix, monitored with digitalized platform. There is a centralized repository of risk along with risk owners. We also prepare Risk Action Plan to mitigate the risks

The results from the analysis were provided to leadership and resulted in climate risk being newly classified as an emerging risk in the enterprise risk management cycle.

Assessing climate change-related challenges has therefore become crucial for our both internal and external stakeholders and climate related financial disclosure has become key to support informed and efficient decisions.

We have begun to regularly assess our business continuity plan across our operating locations and revise our response to any emergency across our value chain due to physical damage cause by extreme weather events.

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Identifying, assessing and managing climate risks are fully integrated into the company-wide risk management process. All risks are assessed according to the criterion of environmental impact.

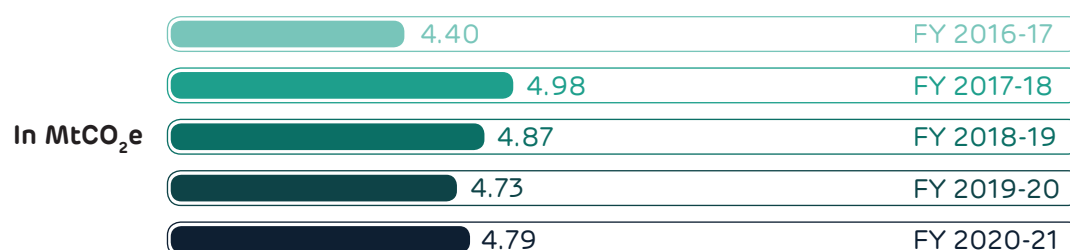
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Metrics and Targets

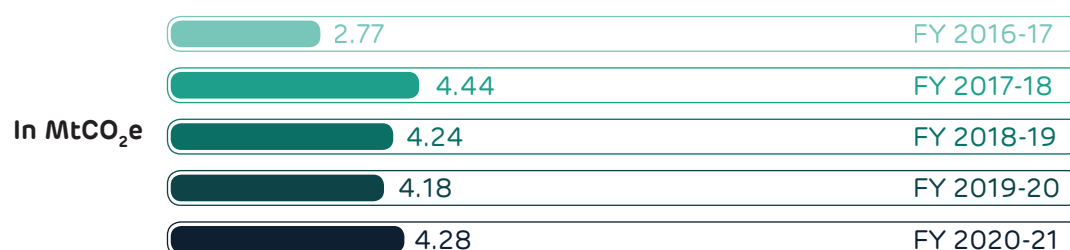
A. Metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.

- Completion Status of Mitigation plans of Physical Climate Risks
- Status of Plans to harness climate opportunity

B. Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions, and the related risks. Scope 1+2 (absolute) emissions



Scope 3 (absolute) emissions



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

C.1 HZL has set a Science based target of

1. 14% Reduction of Scope 1+2 (absolute) by 2026 from a 2016 base-year
2. 20% Reduction of Scope 3 (absolute) by 2026 from a 2016 base-year

C.2 NetZero2050

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 are 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.



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.

Looking Ahead

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 AssetCapture 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.
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.

