

REFINE TOMORROW'S VALUE

KOREA ZINC
SUSTAINABILITY REPORT 2020



About This Report

Overview

Korea Zinc publishes this Sustainability Report to disclose its sustainability management performance to stakeholders. This report consists of three categories, : Sustainability Value, Sustainability Fundamentals and Sustainability Performance.

Principles

This Report has been prepared based on the Core Option of the Global Reporting Initiative (GRI) Standards. More detailed information can be found in the GRI Index.

Period and Scope

This Report is based on data for the full year 2020. It additionally contains some performance data for the first half 2021 and the three year quantitative data between 2018 and 2020.

Data and information in this report is based on business activities and performance of domestic business sites as well as selective overseas business sites.

Assurance

The contents of this Report have been verified by an independent assurance provider, Korean Standards Association. The results of the verification are provided on page 94 of this report.

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Introduction

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Storytelling

A Journey towards Sustainable Future

Since its establishment in 1974, Korea Zinc has grown into a general nonferrous metal refining company that produces basic materials that are indispensable in our everyday lives such as construction materials, bridges, medicines, textiles, precious metal accessories, medical devices, cosmetics, automobiles, semiconductors, mobile phones, and more. Thanks to continuous investment and improvements, from the completion of Onsan Zinc Refinery with an annual production capacity of 50,000 tons in 1978, Korea Zinc has grown into a global refining company that currently produces 640,000 tons of zinc and 430,000 tons of lead, as well as various nonferrous metals such as gold, silver, copper, and sulfuric acid. Recognizing the importance of sustainability management, Korea Zinc has been promoting sustainability management since 2017 as one of the company's three major management policies. As a result, we have reestablished environmental and safety standards that are in accordance with the priorities of the new paradigm and made strenuous efforts to prevent accidents through systemic improvements. In addition, while responding strategically to rapidly changing energy policies, the company has devoted efforts to establishing an energy efficiency system. In the meantime, Korea Zinc has devised policies and conducted various investment activities in all areas of the environment, society, and governance, investing in company-wide capabilities to protect the human rights and welfare benefits of employees, and to establish transparent governance.

Transforming Environmental Crises into Opportunities for Sustainable Management

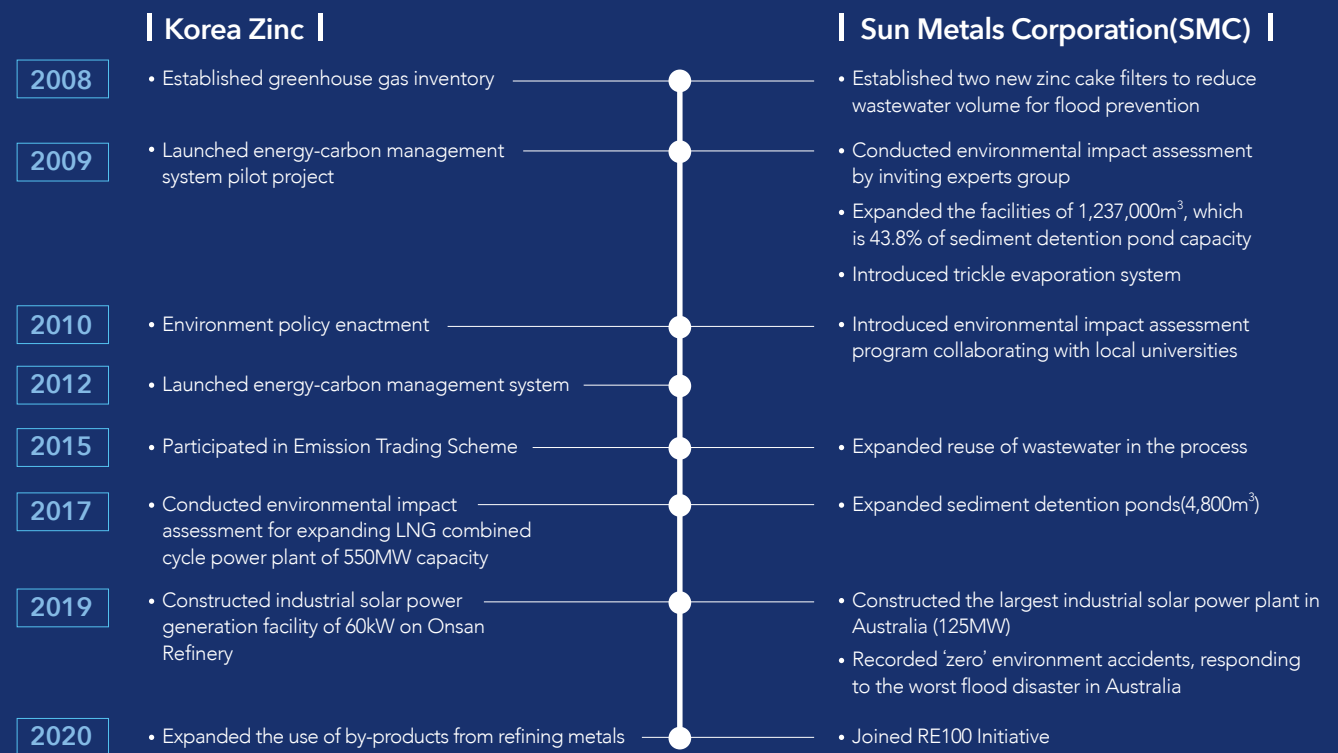
Sun Metals Corporation(SMC), Korea Zinc's first overseas refinery, demonstrates Korea Zinc's future-oriented spirit of challenge. Established in Australia in 1999, SMC is continuously pursuing two goals of achieving the world's highest level of "nature-friendliness," and "productivity efficiency." Australia experienced unprecedented heavy rainfall in 2009. SMC was compelled to discharge from the sediment detention pond due to the unexpected natural disaster, but the incident instead became an opportunity for the company to recognize the importance of eco-friendly environmental management. Accordingly, Korea Zinc and SMC immediately started to build an environmental management system. Over the succeeding 10 years, the company has strengthened its wastewater management, through four management measures of diagnosis-expansion-evaporation-wastewater recycling, closely cooperating with the relevant authorities. Based on its enhanced environmental management, SMC was able to prevent environmental damage when Australia suffered its worst floods, in 2019, due to exacerbated climate change. Korea Zinc is now developing itself into a world-class eco-friendly refinery.

Awareness towards the importance of environmental management influenced the company's eco-friendly energy strategy as well as wastewater treatment. As a result, SMC built the largest industrial solar power plant (125 MW) in Australia in 2018, and has been producing power equivalent to 25% of the total power demand of the refinery. SMC joined the "Renewable Energy 100 Initiative (RE100)" in 2020 for the first time in Zinc industry, with a strategic declaration that it will supply 80% of electricity by 2030 and 100% by 2040 with renewable energy.

SMC is currently implementing a plan to participate in a wind power project of about 923MW to achieve these eco-friendly energy goals. In addition, SMC signed an MOU with the Townsville City Council in Australia to receive 4.5 mega liters of reusable water on a daily basis from the next 25 years, allowing sustainable water procurement. Korea Zinc plans to install a hydrogen production pilot plant within the refinery in accordance with the policy of the Queensland State Government, and intends to lay the foundation for advancing into the hydrogen production, transportation, and export businesses.

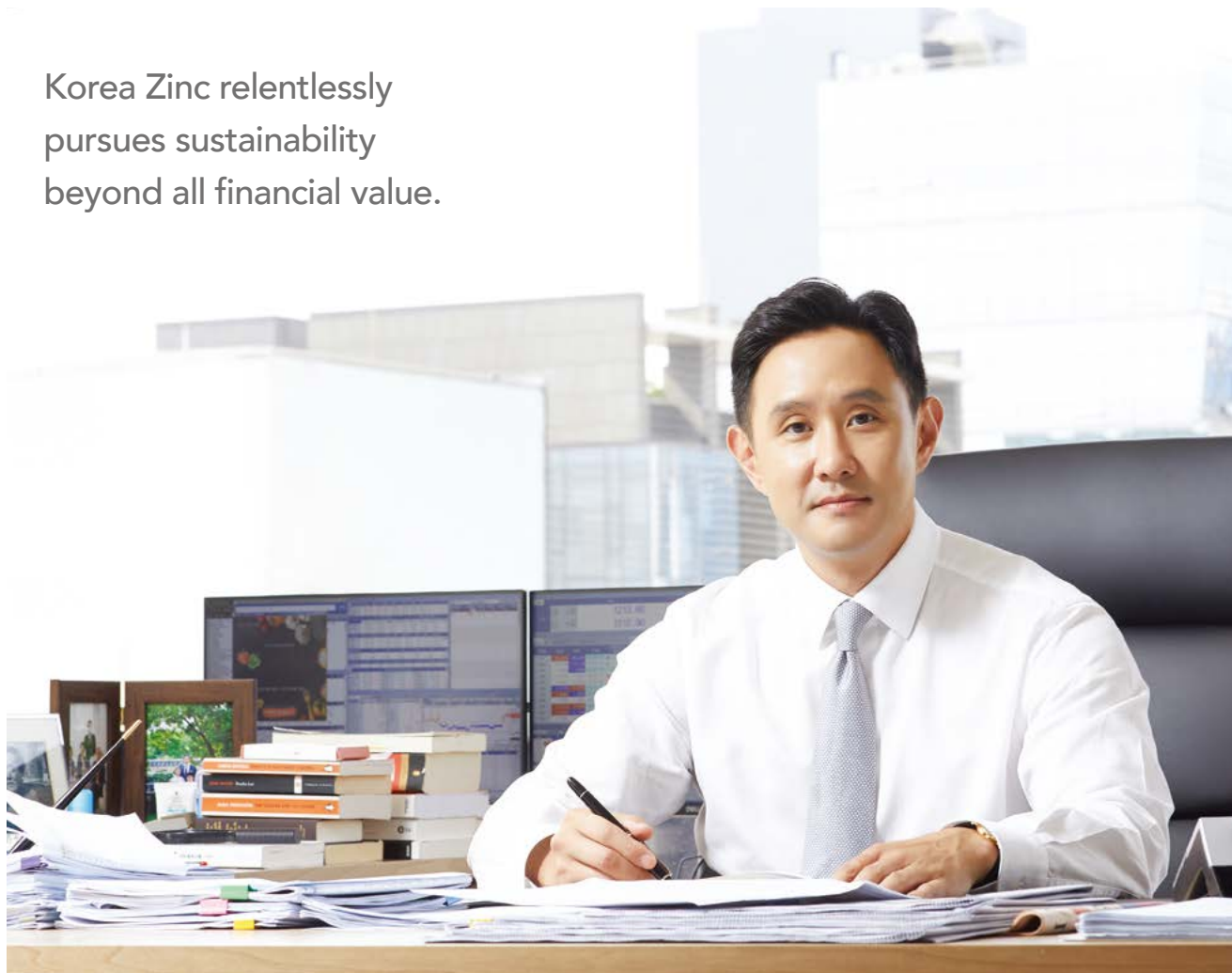
Korea Zinc's sustainability management efforts are not limited to SMC. The will and DNA for sustainable management are the fundamental factors of Korea Zinc and all its affiliates, with efforts made equally by all affiliates around the world. Becoming the best nonferrous metal company while creating the most environmentally friendly and most price-competitive zinc refinery has been the unchanging vision of Korea Zinc. This Sustainability Report was published to review Korea Zinc's sustainability management and communicate with various stakeholders on ESG management. Korea Zinc promises to look back to learn from our past performance on sustainability management and to make 2021 the first year for new ESG management.

Chronology of Our Eco-friendly Refineries



CEO Message

Korea Zinc relentlessly
pursues sustainability
beyond all financial value.



Dear Valued Stakeholders

As Korea Zinc prepared our very first Sustainability Report in the history, all of our directors and employees felt extremely heartwarmed. During the preparation, we were able to look back on the successful 48-year history of Korea Zinc, and rediscover our management philosophy and mission that inspired us through almost five decades. I would like to extend my sincere gratitude to you all for joining our first step in presenting a sustainability management story that connects the past to the present and the future.

By focusing in the single industry of refining, Korea Zinc has become a global company and Onsan refinery boasts the world's largest scale and efficiency. We believe that such choice and concentration strategy have in itself been an important foundation for sustainability.

However, suffering from the loss of our family in a recent safety tragedy, we reflected critically on ourselves with anguish. We have paused from the breathless race for a moment and pondered the key values that we have been lacking. Korea Zinc reaffirmed that respect for life cannot be sacrificed for any value or success.

Now it is Korea Zinc's destiny to keep striving for a brighter future, rather than settling with previous accomplishments and current dominant position. For Korea Zinc, a better future means more than higher sales or profits. Korea Zinc is clarifying strategic management goals to ensure that fundamental values including safety and the environment are not overshadowed by financial performance. The board will prioritize the safety and health of our employees and stakeholders, and we will put weight on climate change response and environmental conservation projects such as carbon reduction and waste management.

Korea Zinc aims for sustainable future through our three key subsidiaries: Sun Metals Corporation (SMC) - the world's greenest zinc refinery since its completion in 1999, Zinc Oxide Corporation (ZOC) - a circular industry leader with advanced recycling techniques, KZAM Corporation - a newly introduced battery copper foil company moving towards a sustainable future, and Ark Energy Corporation - Korea Zinc's dedication to a new sustainable future in renewable energy.

To constantly change and grow Korea Zinc while keeping these goals in mind, we proclaim the following:

First, we will take the same approach to the value of management and the value of society. In the decision-making and execution process, we will always consider the shared values of the community including the environment, safety, and co-prosperity.

Second, we will constantly communicate and cooperate with our stakeholders in creating sustainability in both management and social values. Needless to mention, communication and cooperation are important values themselves.

Third, we will establish necessary strategies, organizational system, and make bold investments for visible outcomes.

For the past 48 years, Korea Zinc has been committed to producing metals that are essential for human life. In the future, we will strive to generate sustainable value in all of our business areas beyond financial value. We look forward to working together with all our stakeholders on this mission.

Thank you.

September 2021
Korea Zinc Vice Chairman
Yun-Birm Choi

YUN B. Choi

Overview of Korea Zinc

Korea Zinc, as a nonferrous metal refining company, specializes in producing and selling zinc and lead. Additionally, we produce precious metals including gold and silver, and sulfuric acid as by-products from zinc and lead refining. Korea Zinc's head office is located at Young Poong B/D 542 Gangnam-daero, Gangnam-gu, Seoul; and "Onsan Refinery" is located at 139, Ijin-ro, Onsan-eup, Ulju-gun, Ulsan, South Korea. As of December 2020, Korea Zinc has a total of 1,455 employees, and the consolidated sales amount to KRW 7.5819 trillion.



▲ Headquarter



Onsan Refinery

Major History

Foundation 1974 ~ 1990

- 1974.08 Incorporated Korea Zinc Co., Ltd.
- 1978.04 Completed Zinc Refinery
- 1982.12 Established R&D Center
- 1986.06 Completed Lead Refinery
- 1990.07 Listed on Korea Stock Exchange

Growth 1991 ~ 1999

- 1992.05 Completed Slag Fumer
- 1993.05 Completed Combined Heat & Power Plant
- 1994.10 Completed Direct Leaching Plant
- 1995.07 Completed No.1 Onsan Fumer

Globalization

- 1997.06 Incorporated Sun Metals Corp. in Australia
- 1999.08 Expanded Direct Leaching Factory
- 1999.11 Received an export award for exporting products worth USD 500 million
- 2000.07 Completed TSL Plant
- 2000.09 Awarded KT(Excellent Korean Technology) mark from the Ministry of Science and Technology
- 2001.06 Acquired ISO 9001 Certification
- 2002.09 Received the Environmental New Excellent Technology Certification from the Ministry of Environment

Globalization Growth 2010 ~

- 2019.11 Completed Zinc leaching process improvement
- 2018.02 Completed energy-saving system
- 2018.01 Completed #10 Zinc electrolysis plant
- 2015.12 Completed the Second nonferrous metal complex
- 2014.08 Completed #9 Zinc electrolysis plant
- 2013.12 Received an export award for exporting products worth USD 3 billion
- 2012.12 Completed No.5 Onsan Fumer
- 2011.12 Received an export award for exporting products worth USD 2 billion
- 2011.02 Expanded Lead refinery and Precious metal plant capacity
- 2010.12 Completed No.2 TSL plant
- 2010.11 Completed #8 Zinc electrolysis plant

2000 ~ 2009

- 2009.12 Completed No.4 Onsan Fumer
- 2009.03 Industrial Service Merit Award(Gold Tower Medal)
- 2007.07 Completed No.3 Onsan Fumer
- 2006.12 Received an export award for exporting products worth USD 1 billion
- 2004.12 Completed Indium Plant
- 2004.10 Completed Copper Plant
- 2003.03 Completed No.2 Onsan Fumer
- 2002.12 Received World Class Product of Korea from the Ministry of Trade, Industry and Energy

Major Affiliates

Major affiliates of Korea Zinc include Sun Metals Holdings Ltd., Sun Metals Corporation Pty. Ltd., Zinc Oxide Corporation Ltd., and Zinc Oxide Vietnam Ltd, all of which engage in nonferrous metal production and sales; Seorin Industrial Co., Ltd. which imports and exports nonferrous metals; KZ Minerals Bolivia S. A. which engages in mine development and iron concentrate exports; Pan-Pacific Metal Mining Corp; KZ Minerals Holdings PTE Ltd; and ICM Pachapaqui S.A.C. Major affiliates are companies included in the consolidated financial statements according to the K-IFRS standard introduced in 2011.

Sun Metals Corporation (SMC)

Sun Metals Corporation (SMC), located in the city of Townsville in Queensland, Australia, built the largest industrial solar power plant (125MW) in 2018, with a purpose of being "environment-friendly refinery" and "the most competitive zinc refinery" in the world. In 2019 as a breakout year for the company, SMC commenced a plant upgrade project. Once the project is complete with a new electrolysis plant by the end of 2021, SMC's annual production will increase from 230,000 to 300,000 tons through enhanced efficiency and productivity. SMC's mission is to be the most sustainable zinc refinery founded upon four pillars of health and safety, environmental protection, technology, and cost competitiveness.

Zinc Oxide Corporation (ZOC)

Zinc Oxide Corporation (ZOC) produces halide zinc oxide, high-quality zinc products, by treating Electric Arc Furnace Dust (EAFD), a zinc-rich waste generated at steel mills. Located in Gyeongsangbuk-do in Korea, the center of world steel production, ZOC is able to recycle 180,000 tons of EAFD collected from international and domestic steel mills, and sell 100% of products to Korea Zinc as raw material. ZOC makes a significant contribution to environmental preservation by minimizing landfills and maximizing metal recovery from hazardous waste.

Zinc Oxide Corporation Vietnam (ZOCV)

ZOCV was built in the industrial zone of Ba Ria-Vung Tau province, Vietnam, in July 2019 to produce high purified industrial zinc oxide, a value-added product that significantly increases economic returns. ZOCV produces 25,000 tons of high-grade industrial zinc oxide (containing 80% zinc metal) per year by recycling hazardous EAFD from the steel mills. ZOCV's target customers include the international ceramic and rubber companies around the world. ZOCV has the world's first commercial facility to produce high-grade zinc oxide from steel dust and discharge only clean slag, aligning with the environment-friendly global transition.

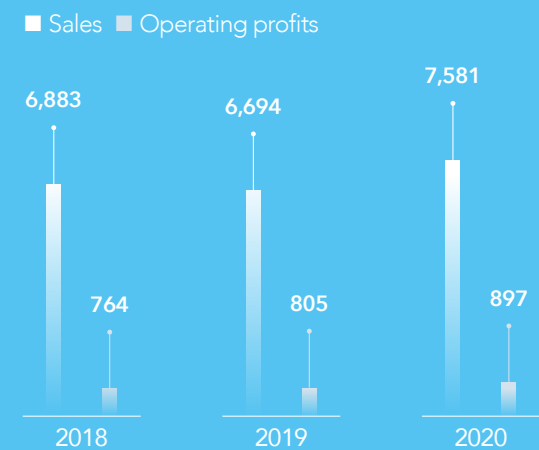
2020 Performance Highlights

Business Performance

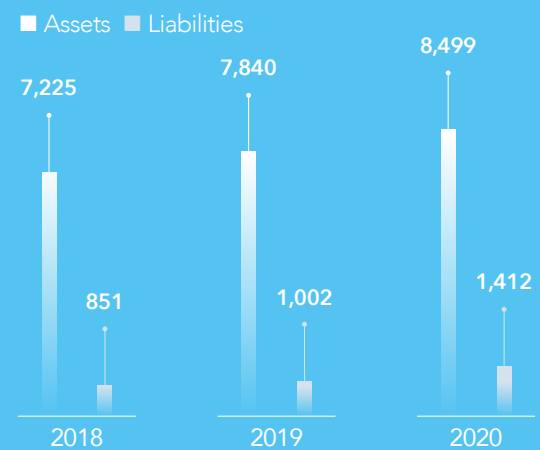
Based on a stable financial structure, Korea Zinc is expanding into a variety of business areas, becoming an international leader with global competitiveness through constant R&D. As of 2020, Korea Zinc's consolidated total sales amounted to KRW 7,581 billion. As of 2020, the company's R&D expenditure reached KRW 2,432 million, with CAGR of 23.9% over the past three years.

* Data below are based on Consolidated Financial Statement.

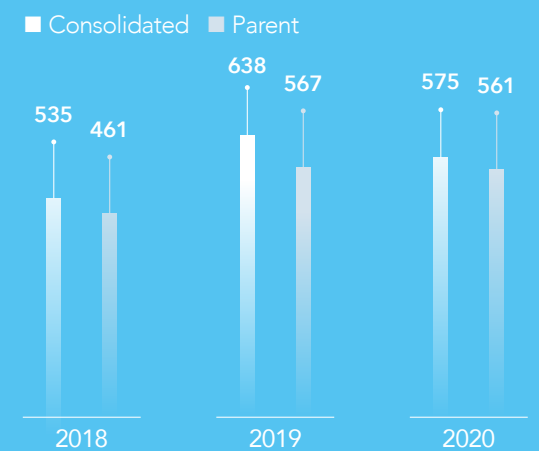
Sales/Operating profits Unit: KRW billion



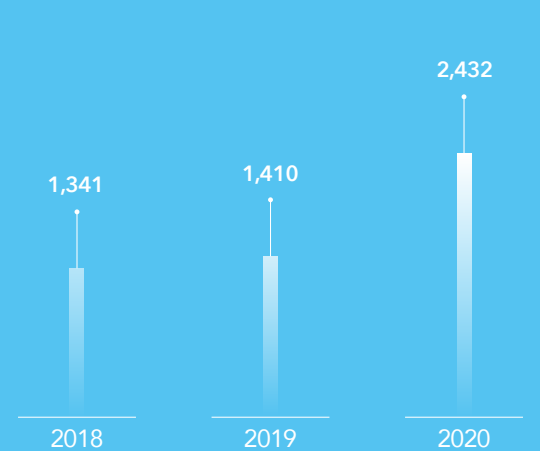
Assets/Liabilities (liability ratio) Unit: KRW billion



Net income Unit: KRW billion



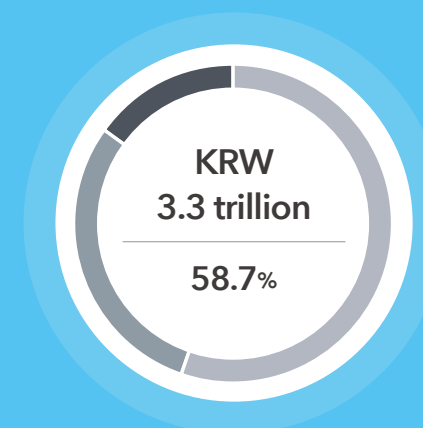
R&D expenditure Unit: KRW million



Production Status

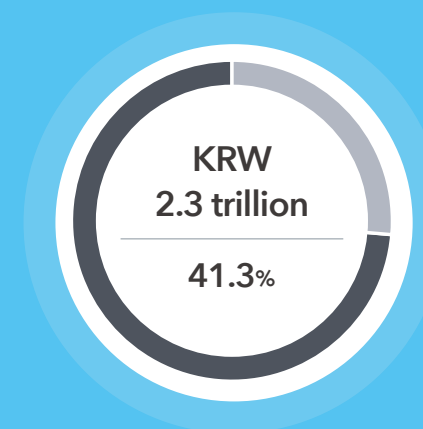
Korea Zinc has the capacity to produce 650,000 tons of zinc, 430,000 tons of lead, 12 tons of gold, 2,500 tons of silver, and 1,500,000 tons of sulfuric acid per year. For zinc products, Korea Zinc is maximizing production efficiency by maintaining a 100% annual operation rate. As of 2020, the proportion of sales by respective product is zinc 32.5%, silver 30.3%, lead 17.5%, gold 11.0%, and other metals 8.8%.

Base Metals



Zinc	KRW 1,835.4 billion	32.5%
Lead	KRW 987.4 billion	17.5%
Others	KRW 496.7 billion	8.8%

Precious metals



Silver	KRW 1,712.9 billion	30.3%
Gold	KRW 620 billion	11.0%



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Sustainability Value

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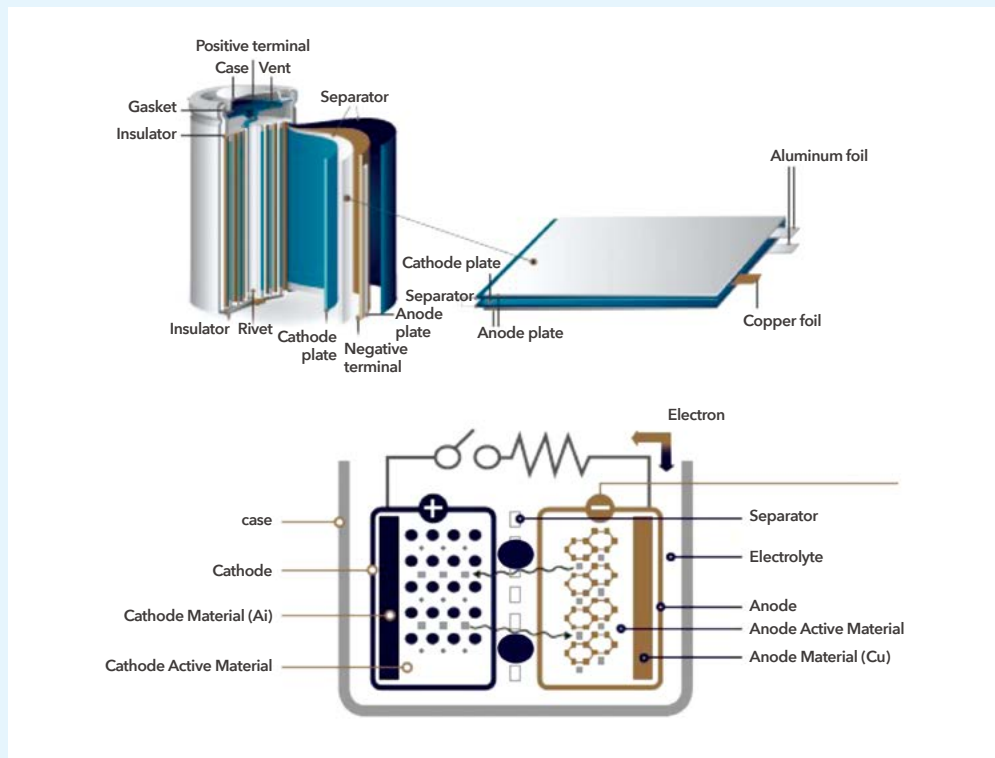
SPECIAL SECTION

Battery Copper Foil Business for a Sustainable Future

Copper Foil, the Core Material for Lithium-ion Battery

As climate change and carbon neutrality emerging in the global society, vehicles powered by internal combustion engines are cited as the main pollutant of the environment. As a key solution to the deepening climate crisis, the electric vehicle market has been the fastest-growing sector. While the lithium-ion battery, the power storage, is a core part of electric vehicles, copper foil is one of the key materials of the lithium-ion battery. Unlike the non-reusable primary batteries, the lithium-ion batteries are semi-permanent, rechargeable batteries that can be recovered multiple times.

Structure of Copper Foil and Lithium-ion Battery



Copper foil is a foil made by separating copper sulfate solution with electricity into the thickness of 10µm (1µm=a millionth meter) or thinner. Copper foil is the key material used for anode material among the four core materials of lithium-ion batteries: cathode, anode, separator, and electrolyte. Copper foil works as an essential part in electric vehicle batteries since it could discharge the heat from the battery with maintaining the shape of the electrode. The thinner the foil, the more lithium-ion can be stored, increasing the efficiency of the battery. Accordingly, copper foil is closely related to the technical capability of electric vehicles in extending the travel distance from a single charge. Just as an electric vehicle without a battery is unimaginable, a battery without copper foil is unattainable.

Electrolysis Technology: The Core Technology for Copper foil Manufacturing

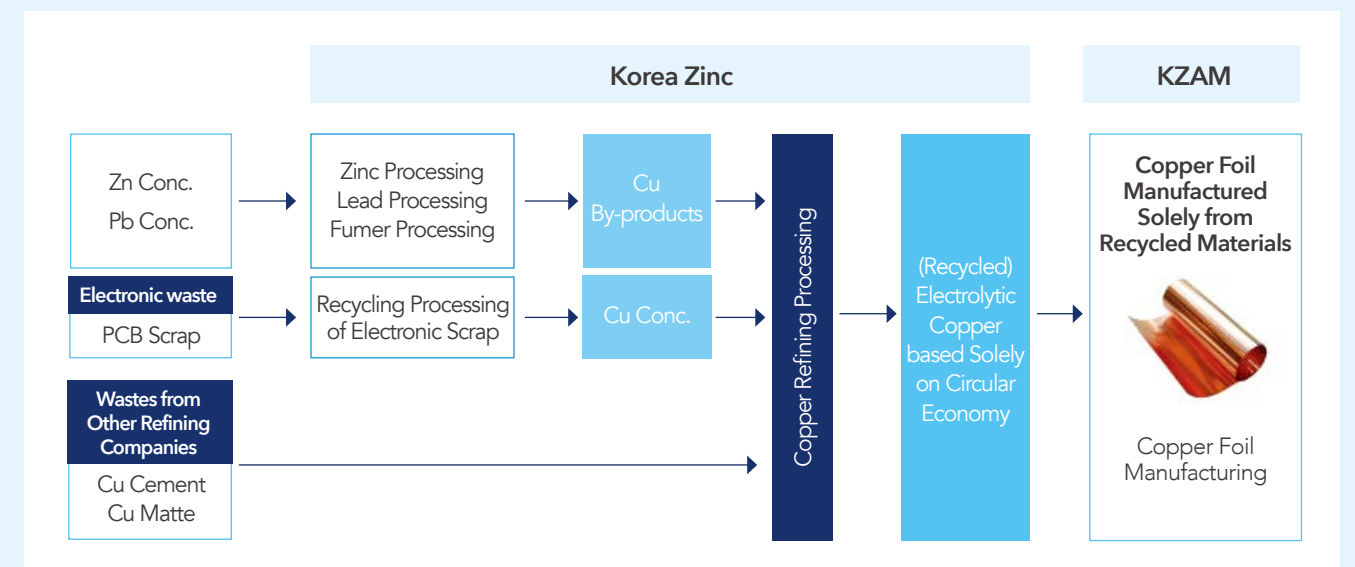
The electrolysis technology developed by Korea Zinc for ages is applied in the manufacturing process of the copper foil, working as a cornerstone of lithium-ion batteries. Accordingly, Korea Zinc has entered the lithium-ion battery copper foil business by establishing KZAM in March 2020 as a reflection of our determination to advance the zinc electrolysis technology into the future growth engine.

Korea Zinc has been refining the purest zinc by applying the electro winning electrolysis method from the foundation. The zinc electrolysis plant of Korea Zinc has the world's largest manufacturing capacity as a single refining plant, and the manufacturing capacity has been growing and advancing based on top-notch technology. KZAM delivers timeless values by applying the electrolysis technology of Korea Zinc for existing products as the groundwork technology of manufacturing electrolytic copper foil.

The Lithium-ion Battery Copper Foil Expert

The copper foil business of KZAM is closely linked to the circular economic value since the electrolytic copper foil of KZAM is manufactured from Korea Zinc's electrolytic copper, which is produced solely from secondary materials. Unlike other companies who manufacture copper foils with high-purity copper wires, KZAM has the ability to manufacture copper foils even from low-grade, highly impure raw materials without pre-treatment, based on the Korea Zinc's expertise in producing electrolytic copper. This is a KZAM-exclusive technology that allows to employ a variety of resources, including secondary materials, thereby serving as a foundation for stable supply of products.

Eco-friendly Procurement System of Copper Foil Business



Timeless Value

From Automobiles to Bridges: Building Stable Industrial Foundation

Zinc, the main product of Korea Zinc, has anti-corrosive properties. When combined with other industrial materials through plating or alloying, it protects the internal industrial materials safely until the zinc plated on the outside is completely corroded, and delivers the original function and value of the industrial materials.

Korea Zinc is creating sustainable value through metal refining that delivers timeless value. Korea Zinc's Onsan Refinery has the world's largest zinc production capacity as a single refinery. Zinc, the company's main product, is used in various forms such as plating, brass, semi-finished products, zinc alloys, and compounds as a major raw material for steel, automobiles, electricity, electronics, and construction industries. By growing together with other industrial areas, nonferrous metals support the establishment of a stable industrial foundation by retaining timeless values.

Product Introduction

Zinc

Korea Zinc produces the best-quality zinc product with a purity of 99.99%. Zinc, the essential industrial material, is used to prevent steel corrosion in general. Furthermore, it is applied to plate steel tube, steel plate, wire, iron structures and other materials used for machines, electric home appliances, paint/tire additives, and social infrastructure facilities. Zinc deliver countless value to ensure stable maintenance of most of the products and facilities that are close to our lives.

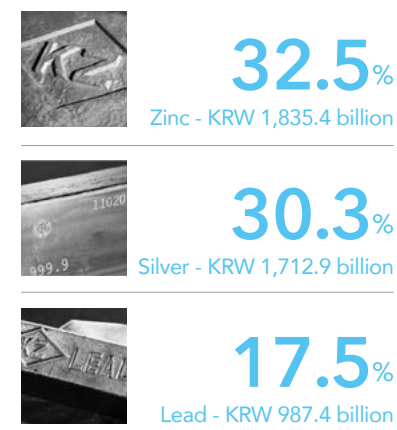
Silver

Korea Zinc produces silver with purity grade of 99.99% to satisfy the growing demand of the renewable energy and lithium-ion battery sector, along with future key industries such as semiconductors or IoTs. Silver products account for 30% of total sales of Korea Zinc.

Lead

Korea Zinc produces high-quality pig lead having a purity of 99.99%. It is used in diverse fields such as storage batteries, pigments, and radiation shielding materials. Its density and corrosion-resistance are the highest among all the practical materials.

Sales of Key Products (2020)



Circular Economic Value

Establishing Circular Ecosystem by Recycling By-Products

While the creation and management of wastes has become a social issue, Korea Zinc is leading in reducing waste by achieving resource circulation not only within an industry but also across industries.

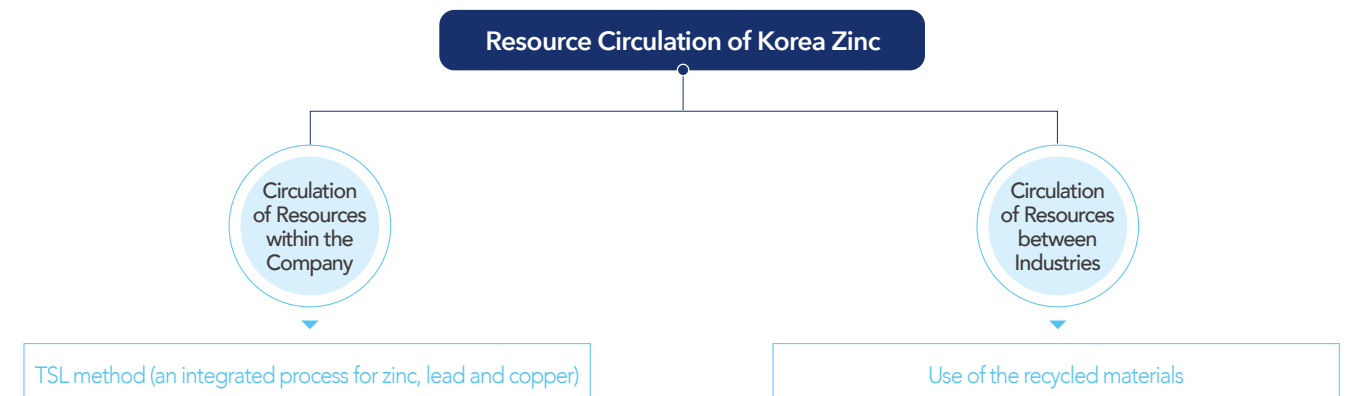
Korea Zinc is materializing its circular economic value through its two pillars of "intra-industrial resource circulation" — achieved by the Top Submerged Lance (TSL) method which recycles the by-products from the company's manufacturing processes — and "inter-industrial resource circulation" — attained by using the recycled materials, the by-products discharged by other companies.

Korea Zinc's circular economic ecosystem tackles societal issues by boosting productivity through raising valuable metal recovery rates, reduce wastes by utilizing by-products that were previously classified as impurities, and lowers mining demand by utilizing variable raw materials.

Korea Zinc has secured the world's best cost-competitiveness based on a proprietary integrated production process and advanced technologies. Our eco-friendly refining technologies were commercialized for the first time in the world through our continued technology development and investment. They have become a new global standard, enabling Korea Zinc to take competitive advantage over the world's leading refineries despite the rapidly changing business environment.

Since 2018, the company has been working hard to reduce waste and increase the proportion of reuse and recycling of waste in line with the resource recycling goal of minimizing the final waste at each business site. Furthermore in 2020, the company signed the 'Agreement for a Pilot Project to Reduce Waste from Business Sites' with the Ministry of Environment. By signing the Agreement, we committed to reducing synthetic resin waste by improving the process and packaging from the production stage, and converting waste into resources.

Korea Zinc's Resource Circulation Ecosystem

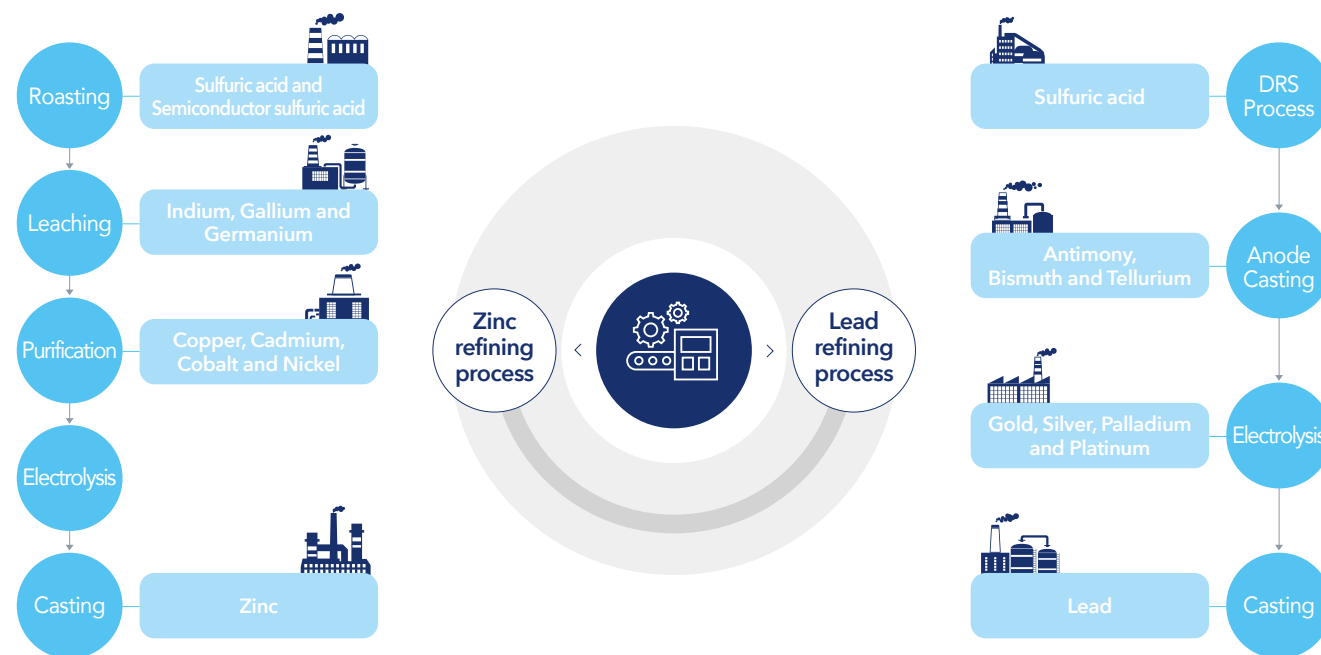


Recycling By-Products Generated from Refining

Since 2000, Korea Zinc has adopted the Top Submerged Lance (TSL) method to additionally extract valuable metals from by-products left after refining zinc and lead. Recycling by-products through these processes is the best way to minimize the environmental impact as such recycling decreased the mining needs. In addition, resource circulation is achieved by putting by-products of each process, which has been treated as waste, as raw materials for refining other metals by organically integrating the process of producing zinc, lead, gold, silver, copper, etc. The recovery rate of valuable metals has reached 96.5%, along with efforts in preventing environmental pollution by selling by-products left after the recovery of valuable metals as a raw material for the cement production or industrial aggregates, thereby discharging it as a clean slag. Such integrated refining process not only maximizes productivity but also minimizes waste and protects the environment by lowering the demand for mining.

Electrolytic copper production processes, which manufacture raw materials for copper foils, are recycled from the following resources: electronic scraps, recycled material extracted from by-products of zinc and lead processing, and by-products generated by external refiners. As a result, Korea Zinc is manufacturing products 100% from recycled raw material. Korea Zinc implements a differentiated resource circulation system by achieving 100% recycling in terms of raw materials, instead of simply applying elementary recycling process. We are planning to produce electrolytic copper foil in batteries using eco-friendly produced electrolytic coppers. The copper foil business of Korea Zinc leads the efforts in environmental protection and expansion of sustainable refining business, becoming the new driver in creating both circular economic values and future values.

Collecting Valuable Metals from Zinc and Lead Refining Processes

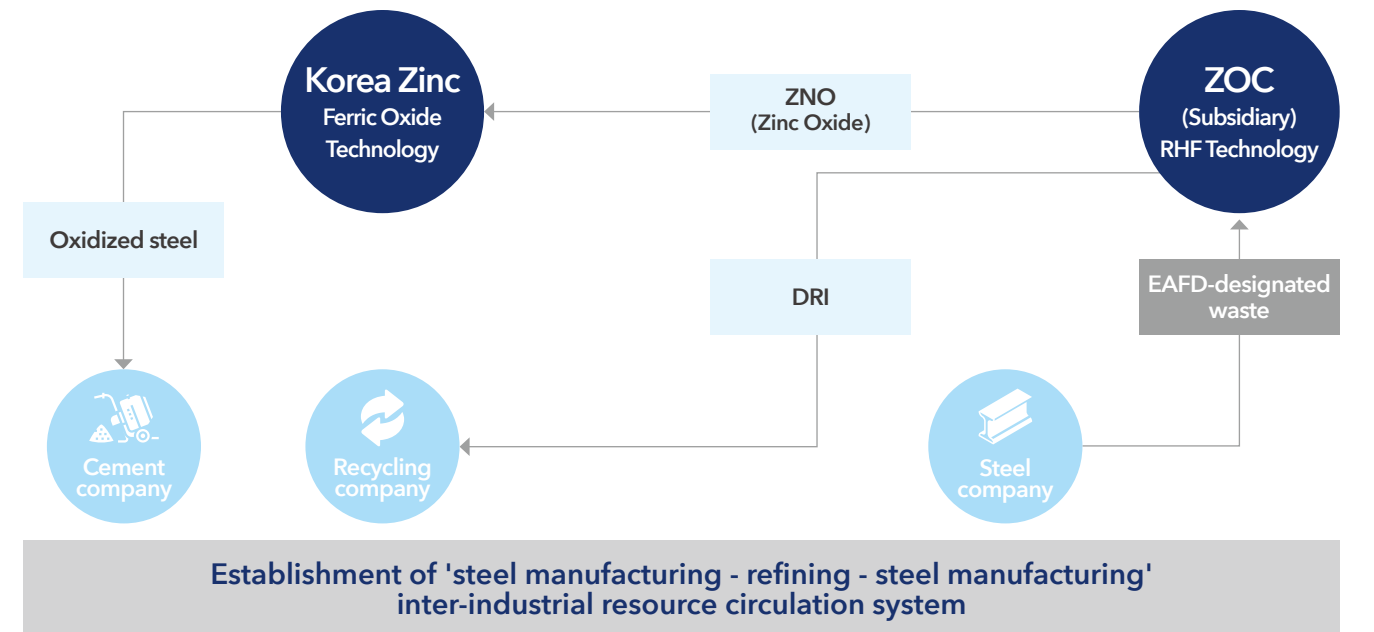


Establishing a Circular Ecosystem across Diverse Industries

Electric Arc Furnace Dust (EAFD), which is produced in Korea at a rate of over 400,000 tons per year, comprises not only valuable commodities like zinc and iron powder but also heavy metals like lead and mercury, costing around KRW 18 billion per year to handle or bury. Since 2011, Korea Zinc has been collecting such dust from Korea's leading steelmakers and utilizing it as a raw material for the production of valuable metals. Furthermore, we continue to make efforts to reduce waste disposal and landfill costs by employing a variety of recycled materials, including zinc dioxide from the aforementioned process.

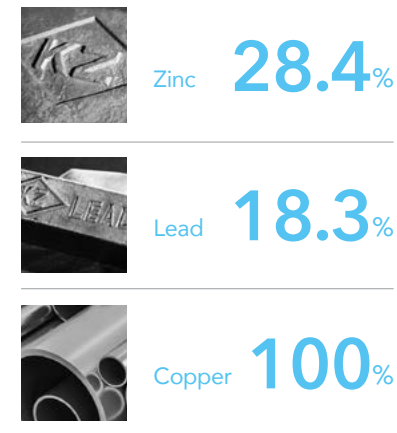
Zinc Oxide Corporation (ZOC), a Korea Zinc subsidiary, collects the steelmaking dust and processes it in a Rotary Hearth Furnace (RHF) to supply crude zinc oxide as the raw material for zinc refining. Korea Zinc uses the crude zinc oxide manufactured by ZOC as its raw material. As of 2020, approximately 30% of the entire raw materials are used as the recycled materials, including the forementioned crude zinc oxide. Also, Korea Zinc supplies Direct Reduced Iron (DRI) to steel companies, which is a by-product generated in the crude zinc oxide manufacturing process. Thereby Korea Zinc established an inter-industrial resource circulation system of 'steel manufacturing - refining - steel manufacturing', contributing to protect the environment by reducing the landfill costs and the demand for raw material mining.

Establishment of the inter-industrial resource circulation system by utilizing recycled materials

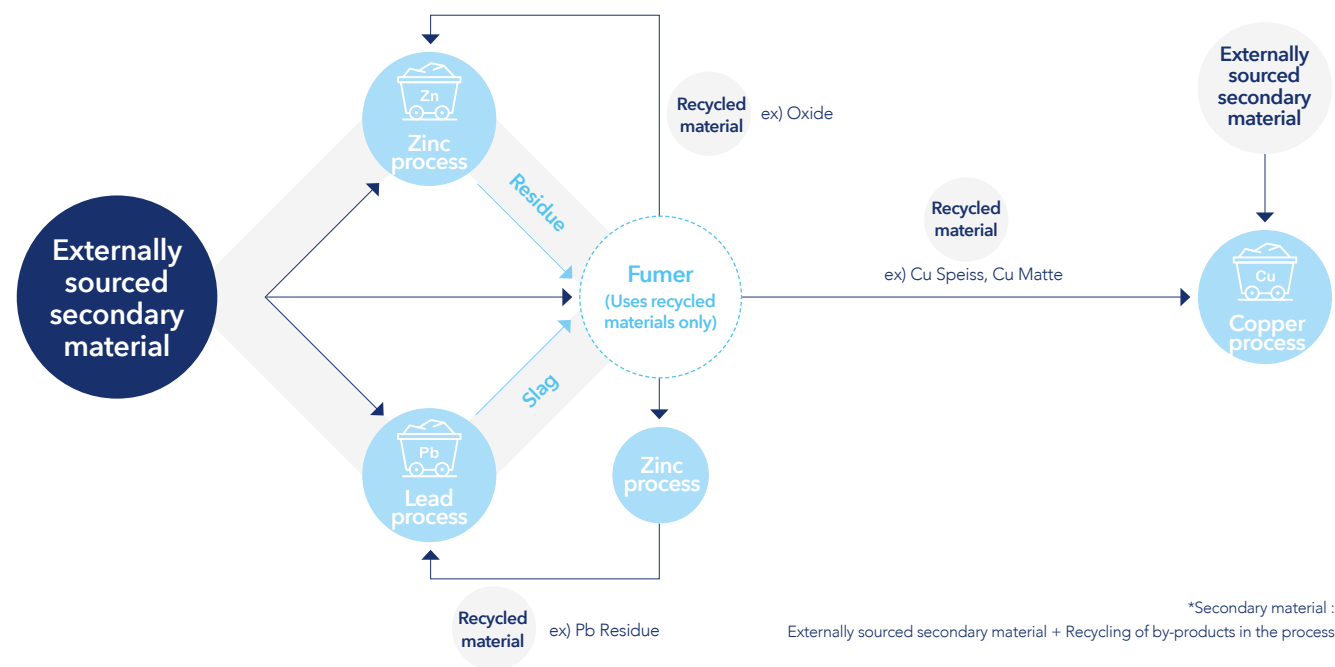


The secondary materials used by Korea Zinc can be divided into externally sourced secondary materials and recycled materials from the process. Some of the externally sourced secondary materials are directly used for zinc, lead and copper processes. Secondary materials that are not directly used for the process are treated in the fumer with the residue of zinc and lead refining, then used as raw materials for zinc, lead, and copper processes. The fumer treats the residue of Korea Zinc and other industries as raw materials for metal refining, using all of the input materials as secondary materials. As of 2020, the input rate of secondary materials for zinc, lead, and copper was about 26.3%, and especially for copper, we use 100% recycled materials in production. Through high level of secondary material utilization, Korea Zinc establishes a circular economy of resources and contributes to lowering mining demand and minimizing waste generation.

Percentage of Secondary Material Input by Product (2020)



Secondary Material Utilization



In addition, Korea Zinc supplies steam and carbon dioxide generated from the production process to nearby companies. Steam generated by Korea Zinc's cogeneration power plant is sold to 18 nearby factories, and sales of KRW 63.6 billion were generated on average over the three years from 2018 to 2020. Korea Zinc leads the industry in increasing the efficiency of raw materials and energy, reducing waste, and creating economic value by building a resource circulation ecosystem that recovers waste resources from processes and reuses them.

Future Value

Refining Business : a Future Industry Keystone

In pursuit of the sustainability future values, Korea Zinc has been investing in various future industries. Through the proprietary TSL method, Korea Zinc has been producing gold, silver, indium, nickel, platinum and bismuth that are used for producing semiconductor, display panel, lithium-ion battery and PV panel. Silver, being a key material for eco-friendly businesses such as solar panels and LCD businesses, accounted for about 30% of total sales as of 2020.

Since 2017, the company has been advancing into the lithium-ion battery material industry as a new growth engine to support changes in the domestic industry, and utilize our technology and resource capabilities. The lithium-ion battery business will be a crucial industry for a sustainable future as the market is expected to show an average growth rate of 40% by 2025 and domestic cell producers accounting for 34% of the global market share.

Korea Zinc acquired 35% equity in Kemco, a nickel sulfate manufacturer, which is a core cathode material for battery cells in 2018, with manufacturing capacity of 100,000tons per year expected by 2022. In 2020, we founded KZAM, another battery related business for the production of electrolytic copper foil. We are planning to invest KRW 160 billion to construct the production plant with an annual capacity of 13,000 tonnes. The construction of the new plant will be completed in 2022, and commercial production will begin in 2023, targeting a 2.4% market share in the global copper foil market.

Korea Zinc's plan to expand into the rapidly growing lithium-ion battery materials is unique in that it builds on our existing technologies from roasting to leaching, refining and electrolysis. This is our unique sustainability management strategy to connect the past, present and future in a timeless perspective.



3

Sustainability Fundamentals

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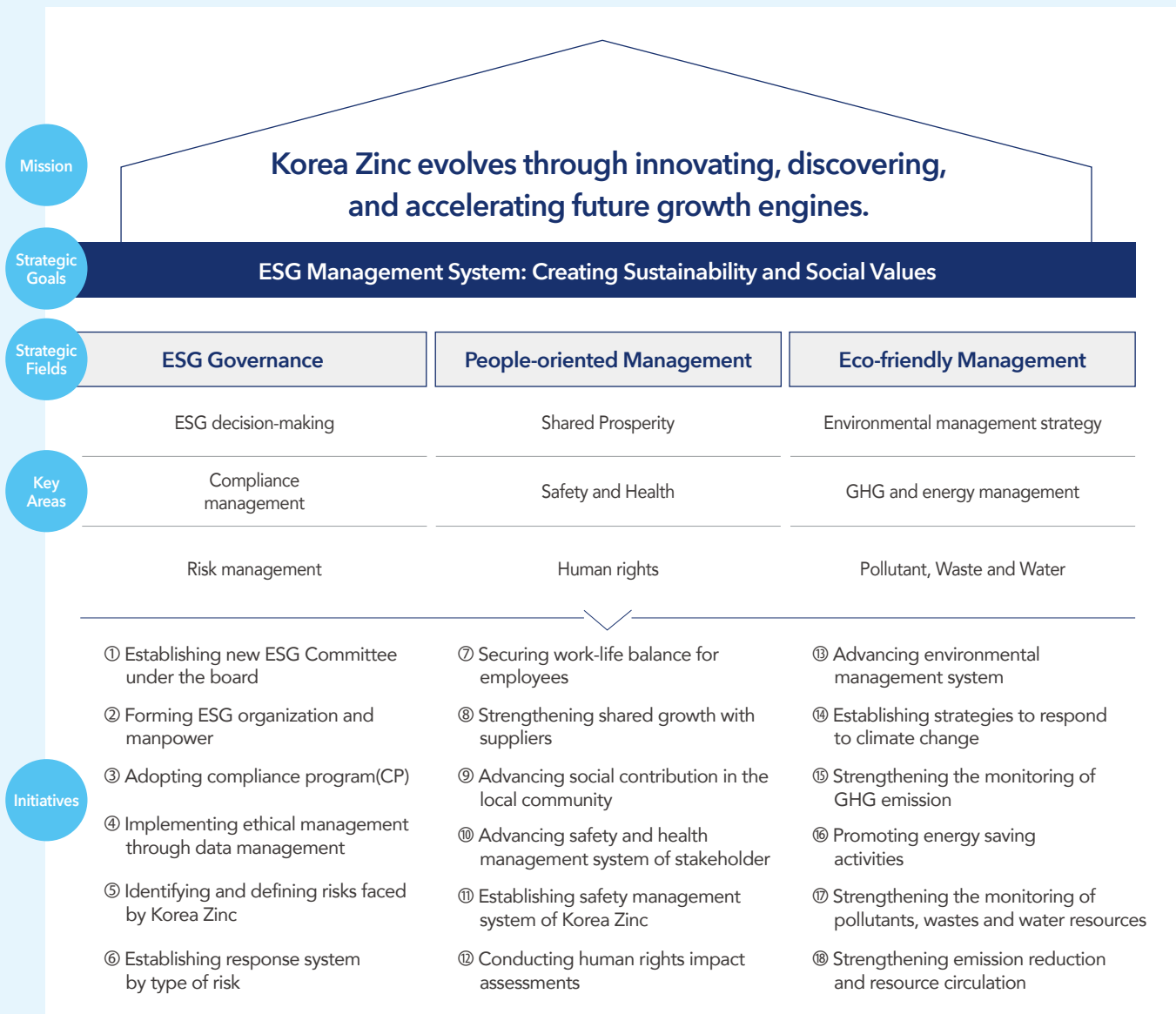
SPECIAL SECTION

ESG Management and UN SDGs

ESG Management System

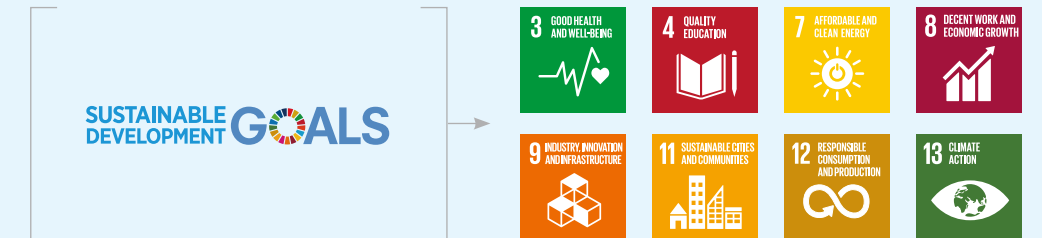
Korea Zinc has established a long-term sustainable management strategy with nine key areas and 18 initiatives, to achieve three strategic fields : ESG governance; People-oriented management; and Eco-friendly management.

ESG Strategy System



Accomplishments of Korea Zinc

As a responsible member of the international community, Korea Zinc advocates the sustainable development of humankind and society through sustainable corporate pursuits.



UN SDGs of Korea Zinc

UN SDGs	Relevant Activities	On this report
3 GOOD HEALTH AND WELL-BEING	Ensure healthy lives and promote well-being for all at all ages	Ensuring employees' safety and health 58
4 QUALITY EDUCATION	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Providing education tailored to the needs of employees 55-56
7 AFFORDABLE AND CLEAN ENERGY	Ensure access to affordable, reliable, sustainable and modern energy for all	Producing clean energy 44
8 DECENT WORK AND ECONOMIC GROWTH	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Hiring talents 55
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Making climate change-conscious investments; Reduction of air pollutants Improving facilities to reduce GHG 36-37, 45
11 SUSTAINABLE CITIES AND COMMUNITIES	Make cities and human settlements inclusive, safe, resilient and sustainable	Improving living conditions of the local community and vulnerable groups 65-66
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Ensure sustainable consumption and production patterns	Enhancing resource efficiency through process improvement 40-41
13 CLIMATE ACTION	Take urgent action to combat climate change and its impacts	Environmental investments, Disclosure by applying TCFD recommendations 36, 48-53

SPECIAL SECTION

Stakeholder Relations

Definition of Stakeholders and Communication Channel

Korea Zinc complies with the definition and identification of stakeholders stated in ISO 26000, an international standard on corporate social responsibility. Stakeholder refers to an individual or a group who has a shared interest in the decision-making process or activities of an organization. We classify our stakeholders into five groups ; customers, shareholders and investors, employees, suppliers, government agencies and civil society - according to the stakeholder identification method of the guidelines.

Korea Zinc identifies major issues which may affect its business through industrial and international trend analysis. We are monitoring the impact of each issue on the stakeholder group. While collecting various opinions by operating stakeholder communication channels, we conducted materiality assessment in 2020 to reflect opinions from various stakeholder groups on Korea Zinc's sustainable management and major issues in this Sustainability Report.

Interests of each Stakeholder and Communication Channel



Materiality Assessment

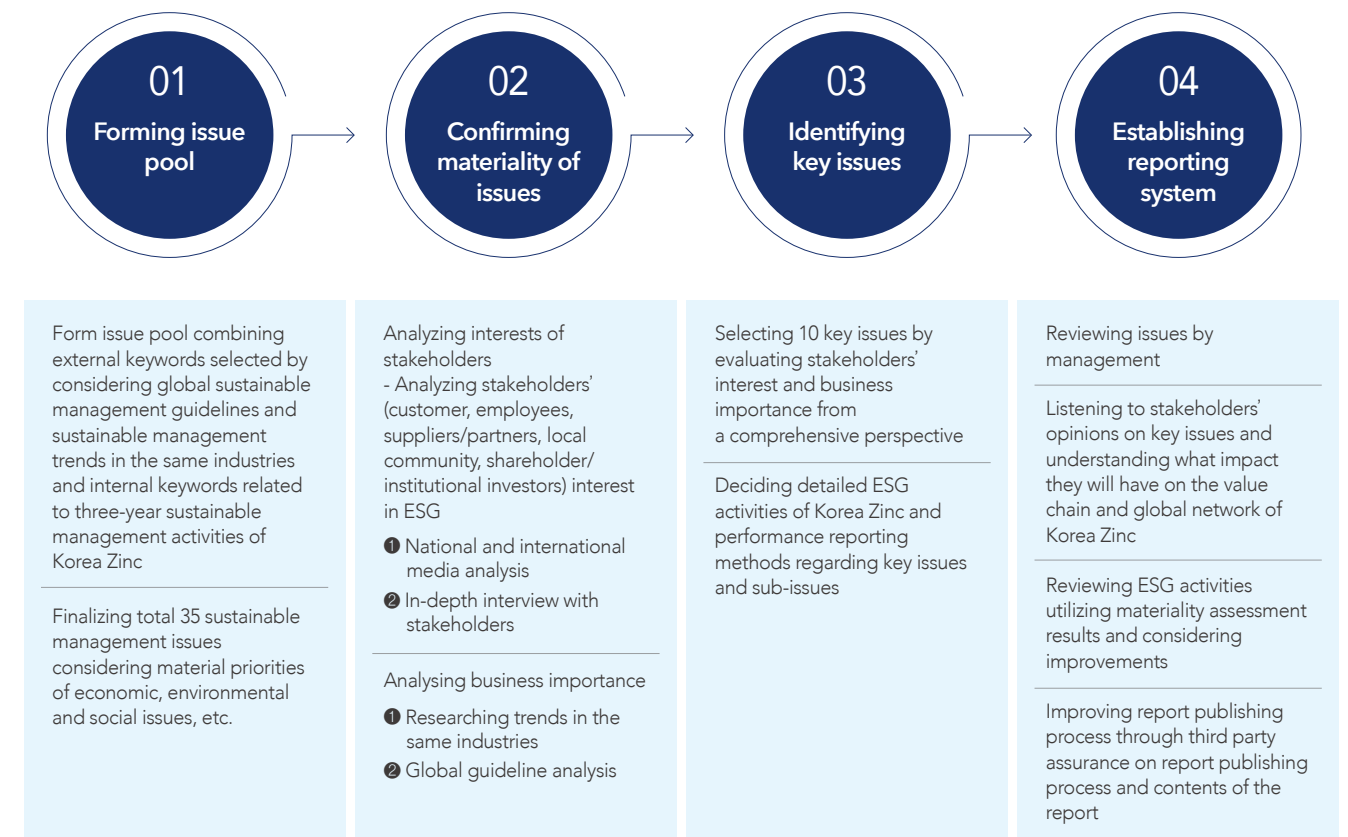
Assessment Process

The materiality assessment of Korea Zinc was performed through four steps: Issue pool selection, materiality assessment of issues, business impact measurement, and reporting of measures to derive material issues and focus areas for the enhancement of ESG competitiveness.

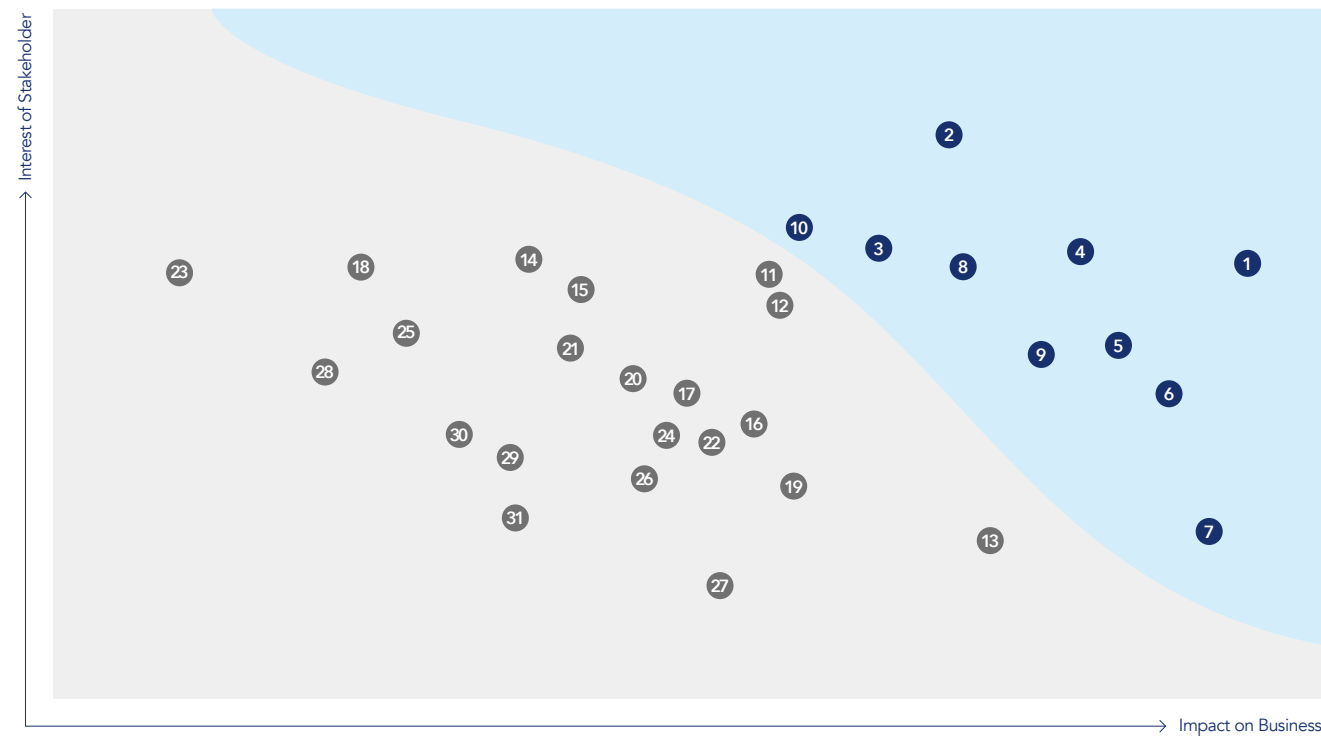
Assessment Results

Korea Zinc has organized a materiality pool of 35 items that reflect the issues of global guidelines related to sustainability management and domestic media analysis results. Each item was analyzed through a variety of stakeholder surveys including employees, suppliers, investors, customers, government agencies, academia, and civic groups, and media analysis.

Assessment Process in 2020



Materiality Assessment Mapping Results



Order	Fields	Materiality Issues
1	Environmental	Pollutants management and reduction
2	Social	Employee health and safety
3	Social	Stakeholder engagement and communication
4	Environmental	Climate change strategy and response system
5	Social	Human rights protection of employees and business partners
6	Governance	Ethical management practices
7	Governance	Competent board
8	Social	Supply-chain risk management
9	Social	Promotion of sound workplace culture
10	Social	Impact on the local communities
11	Environmental	Energy saving
12	Environmental	Greenhouse gas emissions reduction
13	Environmental	Monitoring environmental performances of plants and supply chains
14	Governance	Integrated management system for financial and non-financial risks
15	Governance	Transparent internal control system
16	Governance	Corporate responsibility
17	Social	Employee skill development program and compensation system

Order	Fields	Materiality Issues
18	Governance	Social and environmental investment
19	Governance	Transparent tax payment and disclosure
20	Environmental	Water consumption reduction and risk management
21	Environmental	Environmental management system and strategy
22	Environmental	Material flow management
23	Social	Product safety and quality
24	Environmental	Compliance with environmental regulations and participation in global initiatives
25	Governance	Responsible disclosure of business activities
26	Governance	Integrated management system for financial and non-financial risks
27	Environmental	Biodiversity conservation
28	Governance	Economic value creation
29	Environmental	Transparent disclosure of environmental performance
30	Governance	Efficient remuneration system of the board
31	Governance	Fair competition in business
32	Social	Communication with clients
33	Social	Non-financial performance disclosure
34	Governance	Strategic vision and business goals
35	Social	Client information and data protection

Korea Zinc's Approaches to Materiality Issues

For the material issues derived through materiality assessment, Korea Zinc strengthens the connection between ESG key issues & management strategies and international standards, including the global disclosure frameworks and UN SDGs. This report demonstrates the management status and performance of key issues identified through the materiality assessment. Going forward, we plan to report the mid-to long-term goals and progress in connection with the corporate value chain regarding the key tasks by the sectors selected according to Korea Zinc's sustainability strategies.

Korea Zinc's Approach to Key ESG Issues

	Management Approach	Key Issues	GRI Index
Corporate Governance	Corporate governance allows a company to make transparent and rational decisions, which are of great significance to Korea Zinc. Korea Zinc strives to enhance transparency and efficiency in corporate governance by communicating with various stakeholders including shareholders, customers, employees, suppliers, and local communities through a professional board of directors, stakeholder surveys, internal ethics report (whistleblowing system), and engagement activities.	Competent board	GRI 102 General disclosure
		Stakeholder engagement and communication	
		Ethical Management Practices	
Society	Employees, suppliers, and local communities are the driving forces of Korea Zinc's competitiveness and innovation. In addition, the environmental and social demands of the local community for Korea Zinc conform to the customers' needs for safe and environmental products, and that can be achieved in a safe and pleasant working environment. Accordingly, Korea Zinc enhances the safety and health of employees, protection of human rights, and risk management of suppliers.	Employee health and safety	GRI 403 Occupational safety and health
		Human rights protection of employees and business partners	GRI 412 Assessment on human rights
		Supply-chain risk management	GRI 414 Assessment on supply chain network
		Promotion of sound workplace culture	GRI 401 Employment GRI 404 Training and education GRI 405 Diversity and equal opportunity
		Impact on the local communities	GRI 413 Local Community
Environment	The environmental issues are the biggest challenge for Korea Zinc in conducting business and at the same time, it is an important issue that can determine the future competitiveness of the company. Korea Zinc's approach to responding to environmental issues is to increase process efficiency based on technology and establish a climate change management system. Korea Zinc minimizes the emission of pollutants and wastes by improving process efficiency through advanced engineering methods. In order to spread the use of clean energy in Onsan Refinery, Korea, we installed solar power generation facilities and has constructed LNG combined cycle power plant. Furthermore, SMC has joined RE100 for the first time in the global zinc refining industries, taking the lead the world toward "Net zero".	Pollutants management and reduction	GRI 306 Waste
		Climate change strategy and response system	GRI 305 Emission (Discharge)



4

Sustainability Performance

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01 Environment

Environmental Management Strategy

Since 2017, Korea Zinc has set three major management policies - sustainable management, strategic management, and talent management - and has established detailed initiatives every year. To achieve the goal of eco-friendly management, Korea Zinc aims to become an eco-friendly company through minimization of pollutant emissions, environmental improvements, natural environment assessments, and eco-friendly technology development. Korea Zinc strives to create a pleasant work environment and conserve local environments through strict operation of air and water pollution prevention facilities.

Environmental Policy



As a global leader in the nonferrous metal industry, our nonferrous metal recycling and reprocessing technology has been significantly contributing to the preservation of nonferrous metal.

The goal of building an eco-friendly corporation in harmony with nature is to reduce pollution emissions, engage in environmental improvement activities, assess natural environmental conditions, and develop eco-friendly technologies. We are actively pursuing the following policies to set higher goals, regularly revisit them, and make sustainable improvements.

- Establishment and observance of in-house environmental laws and regulations stricter than the environmental protection regulations regarding air and water quality.
- Adoption of optimal preventive facilities.
- Expansion of clean fuel usage.
- Expansion of investment for the preservation and development of the environment.

We establish and perform environmental policies for the sustainable environmental preservation to keep these promises.

- We establish, operate and develop the environmental management system consecutively to minimize the environmental impact arising from the management activities.
- We improve the environment with the participation of all staff for the environmentally friendly management as well as the production of global first-class products.
- We prevent environmental contamination accidents by strengthening preventive environmental management and observe the environment related laws and regulations.
- We establish environmental objectives, quality and safety objectives through objective management and establish, perform concrete action plans and carry out continuous improvement activities through appraisals for the outcome.
- We clarify the responsibilities and role of the organization for the preservation of the environment, and provide continuous education for the inspiration of environmental awareness of employees.
- We deeply realize the importance of preservation of the environment, and take part in preservation activities for the regional environment.

To fulfill the above policies, all directors and employees,

Promise to understand and fulfil all regulations and help the people concerned to get to know about these where necessary. This environmental management system should be implemented in cooperation with our suppliers for the purchase and production of eco-friendly products.

Environmental Management System

Since 2010, Korea Zinc has systematically implemented environmental strategies and initiatives in five areas - carbon emission management, production systemization, potential growth engineering, company-wide green management participation, and ethical foundation reinforcements - to collect information and implement environmental policies impacting the local communities.

Korea Zinc strives to create an environment where nature and people can live together through sustainable development harmoniously with development and conservation. To this end, Korea Zinc plans not only to comply with regulations, but also to actively promote environmental management by carrying out continuous improvement activities such as setting better goals and reviewing them on a regular basis. In addition, Korea Zinc evaluates whether suppliers have established clear environmental management plans to prevent or deal with major environmental issues.

Five Core Areas of Environmental Management System



Environmental Investment

Since 2011, Korea Zinc has continued to improve air and water quality by allocating 5% of the total annual investment to maintain and upgrade of aging facilities and install of new facilities.

The total environmental investment spent over five years amounted to KRW 61.9 billion, and the expenditure on environmental investment in 2020 came to KRW 23.7 billion, accounting for about 6.8% of the total investment. Starting from the establishment of SMC in 1999, Korea Zinc has continued to make overseas expansion, the latest one being the establishment of ZOCV in Vietnam. When making an investment decision, Korea Zinc follows the environmental safety standards (air, water quality, chemicals, etc.) conforming to the individual countries' and global standards to minimize environmental impact.

Environmental Investment

(Unit: KRW million)

	Air	Water quality	Chemical	Total
2016	5,515	2,000	-	7,515
2017	5,867	2,000	-	7,867
2018	3,348	2,000	-	5,348
2019	9,644	4,000	3,900	17,544
2020	18,686	4,000	1,000	23,686

In particular, SMC joined RE100 and preemptively carried out solar power generation to become an eco-friendly company in all environmental areas, and the company is proactively looking into additional environmental investments including wind power generation. When it comes to the planning of new investment projects, SMC conducts an assessment of climate change impact. In particular, pursuant to the Coastal Protection and Management Act 1995 of Australia, SMC intensively investigates the sea level rise scenario in the adjacent areas which are vulnerable to coastal erosion and tidal flooding due to heavy rain. Going forward, SMC plans to make investments in the steps of production, transportation and exportation of hydrogen in accordance with the policies of the Queensland state government. As part of the initial investment project, SMC plans to install a hydrogen production pilot plant on the refinery site.

Environmental Management Certification

Korea Zinc's Onsan Refinery has acquired ISO 14001, the international standard for environmental management. It regularly assesses and improves the environmental management system through external diagnosis by an independent organization



▲ ISO14001 Certification

Environmental Impact Management

Reduction of Air-Pollutants

Korea Zinc makes various efforts to reduce air pollutants emitted in the production process and to improve air quality. A selective non-catalytic reduction (SNCR) facility has been installed at the furnace to reduce nitrogen oxides, and new technology removing nitrogen oxides by ozone oxidation has been introduced to reduce nitrogen oxides. Pollutants discharged in our business site are monitored in real time through a tele monitoring system (TMS) linked to a gas scrubber, through which air pollutants are stably managed.

In 2020, more than 200 local exhaust systems were continuously maintained and repaired to more effectively collect dust. By doing so, we were able to comply with the reinforced Clean Air Conservation Act as we promptly addressed urgent issues and stabilize the process efficiency. Korea Zinc reduces air pollutant emissions by continuously establishing and expanding air pollution prevention facilities, and continuously maintains the efficiency of facilities through periodic diagnosis of air pollution prevention facility to reduce air pollutants.

Air Pollutant Emissions (Unit: kg)

	Dust	NOx	SOx
2018	101,958	1,037,748	2,007,709
2019	92,237	1,142,980	2,236,366
2020	91,766	766,675	1,261,335

Emission Concentrations of Specific Atmospheric Harmful Substance (2020)

	Lead	Nickel	Fluorine	Hydrogen Chloride	Cadmium	Chrome
Effluent limitation	1.5	2	2	4	0.2	0.4
Mean concentration	0.138	0.02	0.133	0.33	0.014	0.017

(Unit for lead, nickel, cadmium, and chrome: mg/m³, Unit for fluorine and hydrogen chloride: ppm)

Reduction of Wastewater Discharge

Korea Zinc is mainly focusing on three areas of reducing the industrial use of water, managing the quality of wastewater, and recycling wastewater to conserve water resources and prevent pollution.

For water-use efficiency, we established a plan to reduce raw water resources every year, and have been constantly diagnosing and improving each factor. Industrial water is supplied through the water intake facility in the industrial complex and is used in the process for product manufacturing and cooling tower replenishment. In each operation, the wastewater is recycled as heavy water through the reverse osmosis system (RO System), which is a water treatment technology, so that about 1,099,000 m³, 9% of annual total industrial water, are being reused in the process. After the water is used, it is classified as surface water in the sediment detention pond and then finally discharged. We are striving to reduce the amount of finally discharged water by continuously exploring facilities and activities that can reduce industrial water use.

Wastewater generated from each plant is treated to achieve water-quality criteria of 80% or less of the legal standard through physical/chemical treatment methods, and discharged to Onsan sewage treatment plant. The discharge amount is 2,461,000 m³ as of 2020.

Management of Chemical Substances

Pursuant to Article 41 of the Occupational Safety and Health Act, Korea Zinc posted a Material Safety Data Sheet (MSDS) that informs all interested parties the hazards and dangers of a total of 16 products sold by Korea Zinc on our official website. MSDS includes information on: hazards and dangers of a product, names and contents of components, first aid measures, countermeasures in case of explosions, fires, countermeasures in case of leakage accidents, handling and storage methods, stability and reactivity, toxic data, environmental impact, and precautions on disposal/transport.

A total of 111 chemical products used by Korea Zinc (including the same substances with different concentrations and specifications) should be disclosed as hazardous chemicals in accordance with the Chemical Substances Control Act. Of these, 82 chemical substances are managed in accordance with detailed categories such as hazardous chemicals, harmful factors, dangerous substances, and toxic gases pursuant to four laws and regulations including the Chemical Substances Control Act, the Occupational Safety and the Health Act, Safety Control of Hazardous Materials Act, and High Pressure Gas Safety Control Act. Annual volume of storage in warehouse, usage and sales are reported. All related information is disclosed through the National Chemical Information System (NCIS) of the National Institute of Chemical Safety under the Ministry of Environment.

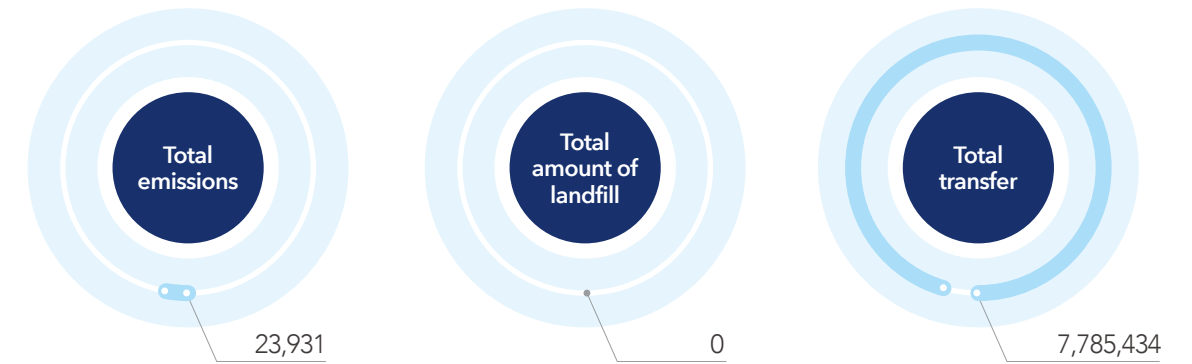
Chemical substances emitted from the manufacturing process are reported to the Ministry of Environment, and the amount of emissions and transfer of up to 28 chemical substances is reported. All wastes are managed by collecting information on transfer and weight by type through the Ministry of Environment's "Allbaro System." In addition, emissions are classified according to the final treatment area, such as air, water, and soil treatment system. Environmental measurement results at business sites are monitored in real time, and aggregated environmental measurement data and waste disposal information are transmitted to government agencies. As of 2018, the amount of release and transfer of chemical substances reached 23,931 kg and 7,785,433 kg, respectively.

MSDS Data Portfolio



Pollutant Release and Transfer

(Unit: kg/year)



Name of chemical substance	Transfer			Air emissions
	Transfer of wastewater	Transfer of waste	Total	
Cobalt and its compounds	-	325	325	-
Copper and its compounds	10	237,234	237,244	6,991
Zinc and its compounds	3,184	3,785,026	3,788,210	9,614
Selenium and its compounds	874	268,614	269,488	-
Manganese and its compounds	2,352	110,482	112,834	-
Fluosilicic acid	-	-	-	601
Antimony and its compounds	310	1,063,038	1,063,348	-
Aluminum and its compounds	-	342,173	342,173	-
Nickel and its compounds	147	4,104	4,251	775
Cadmium and its compounds	88	49,982	50,070	853
Chromium and its compounds	-	-	-	448
Lead and its compounds	111	1,917,380	1,917,491	4,494
Other compounds*	-	-	-	155

*Other compounds: Hydrogen chloride, Hydrogen fluoride, Sulfuric acid, Nitric acid, Sulfur, Hydrogen Peroxide, Chlorine, Hydrazine hydrate
 ** Based on 2018 statistics (recent data)

In addition, pursuant to Article 23 of the Chemical Substances Control Act, Korea Zinc notifies local residents of the chemical accident prevention & management plan that specifies dangers of chemical accidents; and conduct guidelines on an accident that could take place due to the release of three chemical substances (hydrogen fluoride, hydrochloric acid, sulfuric acid) related to our business activities out of 97 accident-prevention-required substances stipulated by the Ministry of Environment. Korea Zinc manages chemical products and substances in accordance with strict chemical substance control laws and regulations as well as related procedures, and we will continue to do our utmost to improve the environment and safety in business sites and local communities.

Circular Economy

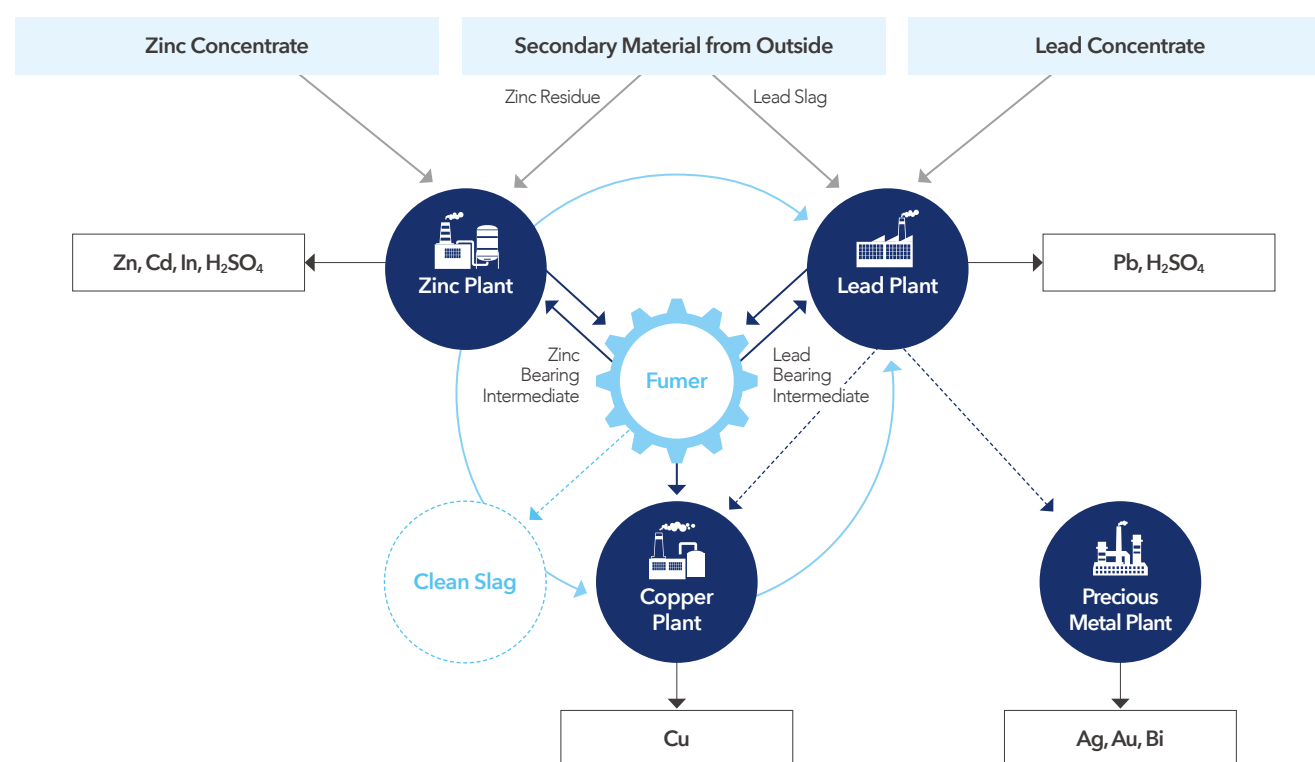
Korea Zinc adopts an innovative resource circulation approach throughout the value chain, including raw material procurement, manufacturing, and sales. In terms of raw material procurement, recycled raw materials such as crude zinc oxide are used in the process, and the amount of final waste generated in the manufacturing process is reduced through eco-friendly manufacturing methods. In addition, we are committed to reducing environmental pollution and establishing a resource circulation ecosystem through three innovative resource circulation approaches that recover and treat wastes generated from other industries (e.g. steel) and restore them to high-quality raw materials for resale.

Reinforcement of Resource Circulation in the Process

Integrated Processing of Zinc, Lead, Gold, Silver and Copper

Zinc, lead, and copper exist only in the form of minerals. When the refining process of each metal is in isolation, components in raw material other than the target metal are considered as impurities. Such process is destined to cause financial and environmental inefficiency. Korea Zinc resolved these strategic issues by adopting an integrated refining process where the refining of zinc, lead, and copper are interconnected, and thereby by-product of each refining is further treated and put back in the refining process as raw materials. By achieving nearly 100% of metal recovery, enhanced productivity and minimized environmental impact are realized.

Diagram of Integrated Process of Zinc/Lead/Copper



Slag that is unavoidably generated when refining various nonferrous metals including zinc and lead has been treated as a toxic substance and disposed of. TSL technology, a nonferrous metal slag processing technology introduced by Korea Zinc, puts zinc slag and wastes discharged from other industries into the fumer to recover valuable metals (zinc, lead, copper, etc.) all the way to the final processing stage. It is a representative eco-friendly technology of Korea Zinc that recovers and discharges the final by-products as clean slag that can be used as industrial aggregates and cement raw materials to prevent environmental pollution. Being recognized as a method that is able to improve productivity ensure more eco-friendly production, TSL technology was certified as new Korean technology (KT) and new environmental technology (ET) by the Ministry of Science and ICT and the Ministry of Environment.

Cross-industry Resource Circulation

ZOC (Zinc Oxide Corporation) and ZOCV (Zinc Oxide Corporation Vietnam), use EAFD, the designated hazardous waste generated in the production process of steel mills, as raw materials, and produce crude zinc oxide, a raw material for zinc refinery. By adopting RHF(Rotary Hearth Furnace) technology, both ZOC and ZOCV supply metal-rich crude zinc oxide to Korea Zinc and DRI (Direct Reduced Iron) to the steel producers. Our recycling technology significantly lowers environmental impact by reducing hazardous waste and mining needs.

In order to meet domestic environmental policies and international ESG trends, Korea Zinc reduces environmental pollution and processes wastes generated from other industries through eco-friendly technologies to supply them as raw materials. As such, we strive to reduce environmental pollution and establish a resource circulation eco-system through innovative processes.

Climate Change Response

Monitoring GHG Emissions

Control System

Korea Zinc manages greenhouse gas emissions by keeping a close relationship between business site and head office. For a productive energy management system, the energy management team and each production line collaborate on monitoring the CO2 emission and energy use. In monthly energy meetings, major climate change issues including energy saving program and GHG reduction activities are reported to the management under the title of "Energy Usage & Performance."

As a preemptive response to the reinforced GHG emission regulation including the Emission Trading Period 3 (2021-2025), Korea Zinc performs GHG reduction scenario analysis through forecasting GHG emission allowance and analyzing emission price (KAU) on KRX. Moreover, we operate a carbon emission consultative organization to review the energy consumption and GHG emissions in the operation of prospective facilities. When the investments on facilities are made, it reports the results of the investments to the management to supervise from the preview stage to post-evaluation stage. In addition, the Board of Directors and the Management Committee are reviewing important climate change-related financial and non-financial issues as the meeting agendas.

GHG-Energy Integrated Information System

Onsan Refinery, a major emission business site of Korea Zinc, calculates monthly GHG emissions in accordance with the guidelines for reporting and certification of GHG emissions trading system under the Act on the Allocation and Trading of GHG Emissions. Major energy-related data including fuel consumption data such as coal, limestone, and natural gas, and the electricity purchases are automatically collected from the Enterprise Resource Planning System to analyze direct and indirect emissions. The carbon analysis of raw materials is collected by the analysis management system (LabMate), and GHG emissions are calculated based on the carbon emission factor for each major substance. We are managing basic emission of CO₂ (tCO₂-eq) of major products (including semi-finished goods) by each cost sector.

Carbon-Emission Management History

Korea Zinc has strived to reduce GHG emissions starting with a voluntary agreement to conserve energy and reduce GHG emissions signed in 2003 in order to follow the reinforced sustainable management stance and policy changes. In 2008, we established a greenhouse gas inventory, and actively joined forces in implementing management system for energy and GHG emissions, such as Greenhouse Gas/Energy Target Management in 2014 and Emission Trading Scheme in 2015.

Activities to Reduce GHG Emission

As the largest non-ferrous metal business in Korea, Korea Zinc is leading "Nonferrous Metal Carbon Neutral Committee," an industry-academia research institute-government collaboration body for promoting carbon neutrality in the non-ferrous metal industries. With the signing of the "2050 Carbon Neutral Joint Declaration", the company has declared a strong commitment to the carbon neutrality.

Korea Zinc seeks to become an eco-friendly smart refinery through innovative technology development such as application of eco-friendly manufacturing method and development of carbon capture/conversion technology, and to secure global competitiveness through carbon neutrality and pioneer new opportunities to prepare for the future.

2050 Carbon Neutrality Challenge of the Nonferrous Industry

As a non-ferrous metal industry, recognizing that reducing GHG is the most urgent task of our era for coexistence and prosperity, we declare our participation in 2050 carbon neutrality as follows:

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Non-ferrous metal industry pursues the goal of carbon neutrality by 2050 through technological progress and structural change.

 - In the short term, establish a circular economic system and streamline processes through 'Improving energy efficiency', 'Using low carbon raw materials' and 'Recycling of metal scrap', so as to reduce GHG.
 - In the mid-to long-term, make efforts to implement carbon-neutral eco-friendly smart refineries by developing innovative technologies such as 'Production of low carbon nonferrous metal' and 'Carbon capture and conversion'.

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02

Non-ferrous metal industry strengthens the mutual cooperation system by forming the 'Non-ferrous metal carbon neutral committee' with industry-academic experts, discussing common tasks for the eco-friendly and future-oriented industrial structure.

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03

Non-ferrous metal industry improves future industrial competitiveness based on government's R&D, establishment of a foundation for expanding resource circulation, and support for changing the production structure.
To this end, we actively communicate to strengthen global competitiveness of front-end industries and establish a new carbon-neutral industrial model to create new demands, by discovering and improving policy tasks in cooperation with the government.

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04

Non-ferrous metal industry strengthens international cooperation to realize a global low carbon society, with International Copper Association(ICA), International Zinc Association(IZA) and non-ferrous metal industries in each country.

Production and Procurement of Clean Energy

In Onsan Refinery, we generated 79MWh of electricity by using solar power with a capacity of 60kW installed on the roof of the main building. In addition, SMC was applauded as the world's most eco-friendly refinery in 2020 through its environmental pollution prevention system and renewable-energy generation. The solar-power generation facility with 125MW capacity, which is acknowledged as the largest industrial facility in Australia when it was built, supplies about 25% of the total power consumption of SMC. After joining RE100 for the first time in the zinc refining industry, SMC is actively reviewing participation in a wind power project with a 923MW capacity. In addition, ZOCV, located in Vietnam, is planning to procure eco-friendly power through renewable energy generation.



▲ Large-Scale Industrial Solar Power Plant in SMC

In addition, as a step forward to carbon neutrality, we invested a total of KRW 214 billion and built a 270 MW LNG power plant. One steam turbine, two gas turbines and two waste heat recovery boilers have been installed to generate power, and at the same time, we have also established a system that can efficiently use heat energy. This will supply about 60% of the total power demand and the effect of reducing greenhouse gases through LNG power generation is expected to reach 210,000 tons per year.



▲ LNG Power Plant Construction Site

Investment in Low Carbon Technology

Korea Zinc produces steam by recovering heat from the dry refining process, and the produced steam is used as a source for self-heating, power generation, and external supply, contributing internally and externally to energy saving and greenhouse gas reduction. In 2017, we invested KRW 15.2 billion to install an additional 20 MW steam turbine generator, thereby increasing our own power generation volume and power-generation efficiency. In 2020, we generated 145,830 MWh per year with steam recovered from the refining process, and supplied 100,000 tons per year to other companies. As such, we are continuing our energy and GHG reduction activities using process heat. Furthermore, we invested KRW 10 billion in process and facility efficiency improvement to save energy in 2020. Representative examples include energy loss prevention through air volume control, steam turbine efficiency improvement, application of absorption chiller using process heat source, and efficiency improvement of air compressor, a representative utility supply facility.

GHG Reduction through Technology Development

Slag, one of the by-products generated in the lead production process, is used as a material for construction cement and it contains a large amount of steel and valuable metals. The DRS lead refining technology, developed by Korea Zinc and certified by the Ministry of Environment, integrates the existing two-stage process into one blast furnace to save energy.

Facility Improvement for GHG Emission Reduction

Every year, Korea Zinc conducts annual renovation of five facilities and processes, including absorption chiller, steam turbines, air compressors, cooling towers, and some processes that consume large amounts of energy. In 2020, a total of eight facility and process improvements were carried out to reduce GHG of 24,039 tCO₂e

GHG Reduction through Facility Improvement

(Unit: tCO₂-eq)

Improvement/ CO ₂ emission reduction	Details	2018	2019	2020
Installation and Improvement of absorption chiller	Installation of low energy used absorption chiller	3,064	1,003	3,064
	Reduction of power through improvement of heat exchanger of the chiller	484	381	733
Steam turbine efficiency and steam loss prevention	Increase of power generation efficiency through improvement of steam turbine generator	1,307	1,274	2,349
	Prevention of energy-loss through steam trap optimization	1,042	1,562	2,920
Air compressor facility management	Operating power-saving through improvement of air compressor performance*	645	11,864	2,342
Management of cooling tower load power	Power savings through improvement of cooling tower operation efficiency**	3,474	1,767	1,392
Process improvement ***	Prevention of heat-loss of melting furnace through improvement of refractory and burner	2,537	-	11,240

* Saved power through optimization of compressed air pressure in 2019

**Including optimization of cooling water supply pressure and use load

***Including process improvements such as low energy used cooling system, heat exchanger improvement, air volume control, etc.

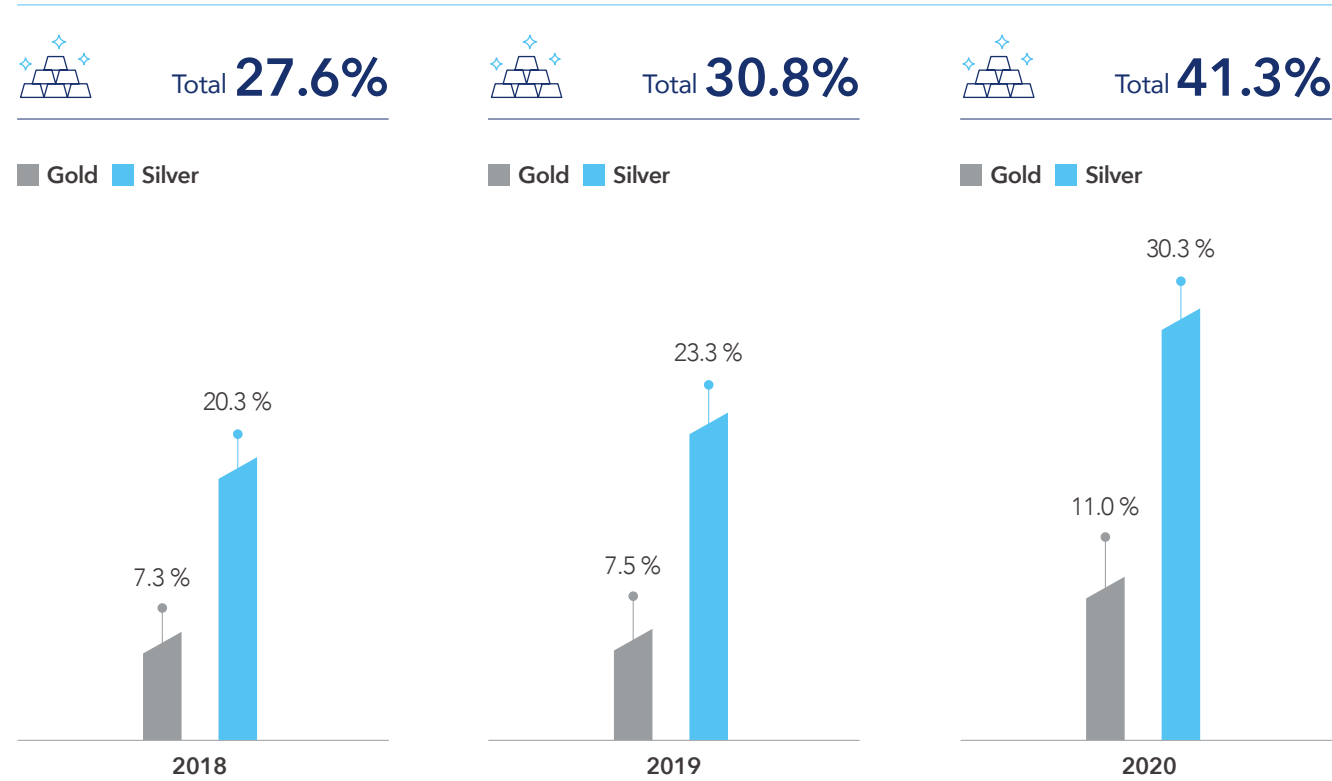
Eco-friendly Development for GHG Emission Reduction

Recently, companies have been expanding business in environment-friendly industries including marine vessel, automobile, and power generation. In order to respond to reinforced environmental regulations and policies, and to seek opportunities in the changing market environment. Korea Zinc also strives to develop eco-friendly new businesses based on our own technology and know-how in line with such changes.

Since 2017, Korea Zinc has diversified eco-friendly product lineup through the production of core materials for eco-friendly business. In 2020, we entered into the electrolytic copper foil business by starting construction of the factory with an annual production capacity of 13,000 tons. Copper foil is a major part of lithium-ion battery cells as an anode current collector. Such capacity can be used for about 180,000 electric vehicles per year, and a corresponding carbon dioxide reduction effect is expected.

Korea Zinc considers sustainability management as one of its three management policies, and plans to continue its investment for stable growth of the lithium-ion battery material business. In addition, we expand the production of precious metals such as gold and silver, which are key materials for eco-friendly business such as solar panels and LCDs. As of 2020, precious metals, thanks to the continued growth continued growth, accounted for 41% of total sales.

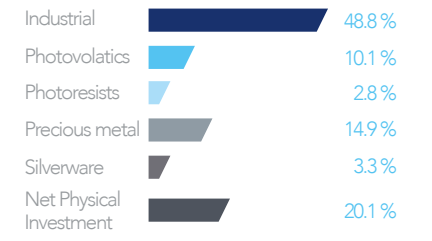
Precious Metals as % of Sales



Business Portfolio Aligned with Future Industries

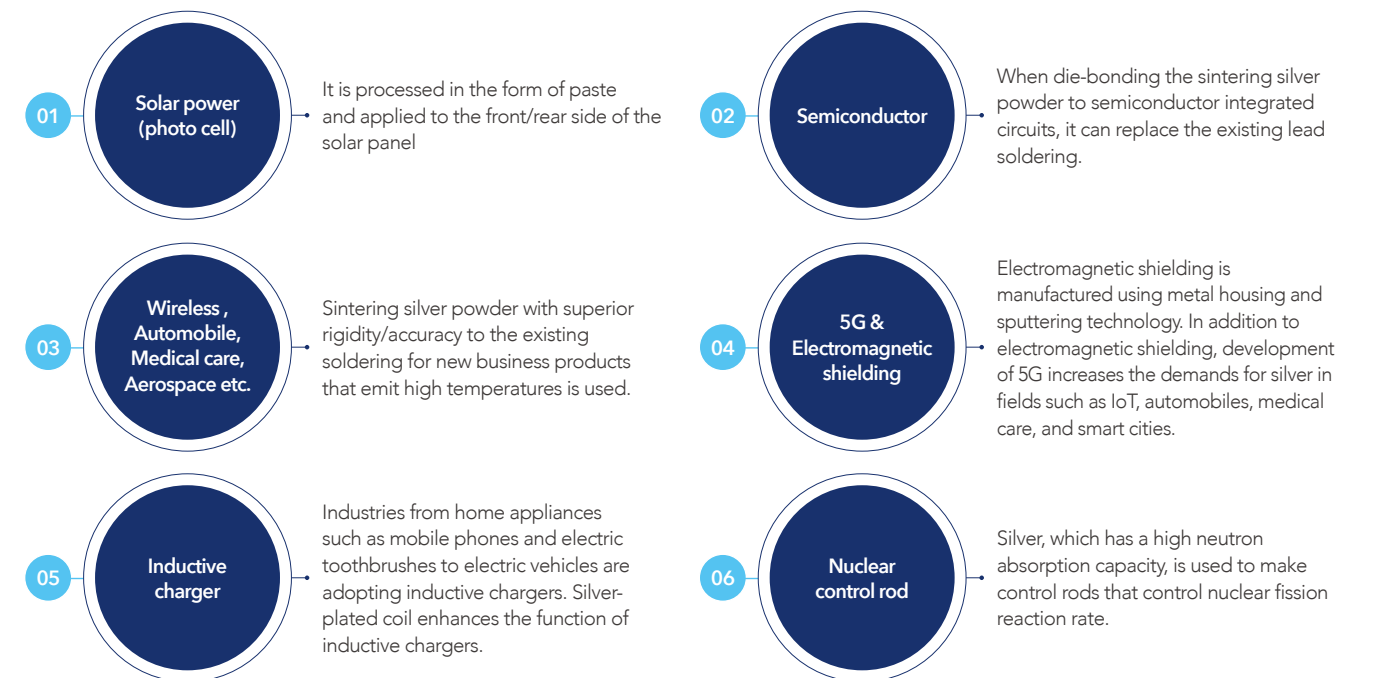
Silver has been used as a precious metal with its high albedo and luster, but as of 2020, about 49% of global silver consumption came from industrial sectors. In the past, silver was mainly used for photoresists, precious metals, coins, etc., but recently, due to its excellent electrical and thermal conductivity, silver is used as material for eco-friendly energy facilities such as solar power and lithium-ion battery as well as semiconductors, IoT, cables, etc., which are referred to as the future key industries, coming into the spotlight again. Korea Zinc produces silver with purity grade of 99.99%, and silver accounts for 30% of total sales of Korea Zinc.

Global Silver Consumption



(Source: World Silver Survey 2021)

Silver Application



Electrolytic Copper Foil

KZAM is a newly created subsidiary that will focus on electrolytic copper foil business, building on key technologies of Korea Zinc, such as electrolysis, refining and chemical management.

Electrolytic copper foil is a material included in the anode which is one of the four major elements-anode, cathode, electrolyte, and separator-in the lithium-ion battery. It is predicted to expand in tandem with the growing demand for electric vehicles. The copper foil business, which is essential for the transformation of the carbon-saving electric vehicle ecosystem including energy storage systems (ESS) and electric vehicle batteries, is a new challenge and opportunity as well for Korea Zinc.

SPECIAL SECTION

Task Force on Climate-related Financial Disclosure(TCFD)

As extreme climate events become increasingly frequent, the global community is thus intensifying discussions about the seriousness of climate change. In 2015, leaders from many countries adopted the Paris Agreement, at the 21st Framework Convention on Climate Change, and committed to maintaining the global average temperature rise below 2°C compared to pre-industrialization through the Agreement.

Sustainable investment is an indispensable driving force for overcoming the global issue of climate change. In 2015, the Financial Stability Board (FSB), launched the Task Force on Climate-related Financial Disclosures (TCFD) to support sustainable investment by institutional investors around the world. In 2017, FSB presented a recommendation linking major disclosure factors and financial information to recommend the globally unified disclosure of climate-change information. The recommendations are structured around four themes of core elements in corporate operation: governance, strategy, risk management, and metrics and targets. In this Report, Korea Zinc discloses the first financial information related to climate change that reflects the TCFD's recommendations.

This Report is based on the Sustainable Development Scenario that the International Energy Agency (IEA) set to keep the temperature rise resulting from climate change to a level lower than 2°C and limit it to 1.5°C.

Climate Related Risks, Opportunities

Korea Zinc belongs to the metals and mining industry within the materials and building section under TCFD's industrial classification standard. Because of the capital-intensive and fixed-location features, and limited areas when procuring raw materials and selling products, the metals and mining industry is restricted in flexibly responding to climate changes. In addition, costs are expected to rise due to GHG emissions and energy consumption and we are also vulnerable to water shortages and acute or chronic climate impacts.

Transparent disclosure of R&D plans and progress is critical to understand the current and future situation of the organization, and climate change is expected to affect the organization's strategy, metrics and targets, costs and financing.

Financial Impact by Climate Change Risk and Opportunity

Transition Risks	Risk Factors	Profit and Loss	Financial Status
Policy and Legal	Increased pricing of GHG emissions	Increase in operating costs due to increased emission permit price	Increase in the amount of allowance for emission permits
	Reinforcement of environmental regulations on products and processes	Increase in operating costs due to policy response costs	Increase in depreciation and early write-off of existing assets
	Introduction of Carbon border adjustment mechanism in advanced countries such as the EU	Increase in product export cost	Reduction of capital (retained earnings)
	Exposure to litigation	Costs required to respond to legal dispute caused by non-compliance with national and regional climate change financial disclosure requirement	Reduction of capital (retained earnings)
	Technology transition	Technology conversion cost	Increase in depreciation costs, early write-off of existing assets, and asset mix changes due to reorganization of production facilities
Technology risks	Increasing customer requirements for process inputs	Increase in production cost, increase in international standard response cost	Reduction of capital (retained earnings)
Market risks	Increase in raw material price	Increase in raw material procurement cost	Reduction of capital (retained earnings)
	Changes in customer preferences	Decrease in sales due to reduced demand for product	Reduction of capital (retained earnings)
Reputation	Sector stigmatization	Increase in talent attraction and maintenance costs	Reduction of capital (retained earnings)
	Increased stakeholder concern	Increase in capital raising cost and business suspension due to cancellation of investment	Reduction of capital, debt ratio change
Physical Risks	Risk Factors	Profit and Loss	Financial Status
Acute	Increased severity of extreme weather events such as cyclones and floods	Decrease in sales due to reduced production	Reduction of capital
		Response to environmental safety and health, increasing regulatory compliance costs	Reduction of capital
Chronic	Changes in precipitation patterns and extreme variability in weather patterns	Cooling water supply disruption and increasing costs	Reduction of capital, Increase in related asset investment
	Rising mean temperatures	Increased heating and cooling cost, increase in facility maintenance cost	Reduction of capital, Increase in related asset investment
	Rising sea levels	Increase in facility maintenance costs, increase in insurance premiums for assets in hazardous areas	Reduction of capital, assets impairment, increased depreciation and early write-off of existing assets

Opportunity	Opportunity Factors	Profit and Loss	Financial Status
Resource efficiency	Increase in production efficiency	Decrease in operating costs and increase in sales due to increased production capacity	Reduction of capital, Increase in efficiency related asset
	Resource Circulation (recycled use)	Decrease in raw material cost and cost of sales	Reduced inventory and working capital
	Reduction of resource use (water use)	Decrease in raw water and wastewater costs	Increased asset value due to increased energy efficiency
	Efficient building use	Decrease in heating and cooling costs	Capital increase
Energy Sources	Use of low-emission energy source	Increasing profits through the trading of carbon emission amounts reduced	Capital increase
	Resource policy incentives	Increasing profits through sales of new and renewable energy power	Capital increase
	Introduction of new technology	Decrease in development cost, and other costs due to increased efficiency	Capital increase
	Participation in the carbon market	Increase in revenue/costs related to emission permits	Increase in assets/liabilities related to emission allowance
	Power generation with new and renewable energy	Reducing electricity procurement cost	Asset increase
Products and Services	New product/service development through R&D and innovation	Increase in sales through technical alliances	Increase in assets such as intellectual property rights and royalties
	Expansion of technology and services for low emission	Increase in sales through new product portfolio targeting future industries	Asset increase
	Expansion of business portfolio	Increase in sales through collaboration between different industries	Increase in assets/liabilities related to new business
Markets	New market access	Increase in sales due to the development of new and emerging markets	Increase in foreign currency assets
Resilience	Securing production facilities capable of operating in various climatic conditions	Facility installation and maintenance costs	Increase in assets with resilience

Korea Zinc's Approach to Climate Change Risk

Governance

Governance around climate-related risks and opportunities

The Board of Directors reviews and approves investment proposals that reflect climate change. In particular, the board is reported on the operation status of overseas subsidiaries in Australia and Vietnam and the respective impacts of climate change. When making decisions on projects and facility investment, the board considers maintenance/management plans, annual operating costs of climate change on business site, operation facilities, and power generation facilities into account. Currently, the board pursues the establishment of the ESG Management Committee to lead ESG management and plans to manage climate change risks at the company-wide level.

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

The Energy Management team in Onsan Refinery oversees energy use and GHG management, and the team prepares the <Energy Use Performance Report> on a monthly basis and reports it to the technical office under the CEO. The Sustainability & Innovation team monitors market trends to effectively respond to the reinforced GHG emissions regulations such as the '3rd Basic Plan for Emissions Trading (2021-2025)', and reports all data required to assess climate change risks such as data on energy use performance, GHG emissions and water resource usage to the management on a regular basis, and the top management, including the vice chairman, and the Board of Directors evaluate the relevant data and establish strategies thereto.

Strategy

Climate-related risks and opportunities identified over the short, medium, and long term

In the early 2000s, Korea Zinc recognized the seriousness of climate change on its assets and businesses as we suffered from flood damage. In addition, as customers' demands for products that take climate change into account are increasing across the world, including Europe, the Americas, and Asia, Korea Zinc is conducting analyses to respond to the risks of climate change and secure opportunities.

The climate change transition risks that Korea Zinc identifies from a short-term perspective include policy and legal risk, market risk, and reputation risk. In order to respond to these risks, we have expanded our investment in facilities to reduce GHG emissions since 2018, seeking additional opportunities through the activities such as sales of steam and its by-products, and thorough management of emission right-related risks by constantly monitoring the emissions trading market.

When carbon border adjustment mechanism is introduced in regions where major customers are located, such as the European Union and the United States, an additional tax burden is expected. The main physical risks include frequent abnormal temperatures and extreme climate events such as those occurred in Australia. We are paying special attention to the environmental safety and health regulations, building resilience to climate change based on our long-accumulated response experience. In the medium term, we plan to reorganize our systemic structure to respond to climate change and develop research and reduction projects to measure the impact of GHG reduction on the nonferrous metal field. In the long term, we plan to expand new and renewable energy facilities that can reduce the impact of climate change and strengthen the establishment of a domestic resource circulation ecosystem.

In terms of opportunities, Korea Zinc is expected to secure them through technological properties such as increasing resource efficiency and resource circulation in the short term. In the medium term, we are seeking additional market participation opportunities by taking part in the carbon market, providing renewable energy sources, sharing technologies, and utilizing advanced technologies. In the long term, as a provider of industrial materials for future businesses, resource efficiency and climate change resilience will become the main competency of Korea Zinc.

Impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Korea Zinc makes investment in important areas within the value chain such as R&D and manufacturing to manage the transitional and physical risks of climate change. In the R&D sector, about KRW 2.4 billion was executed in 2020 to develop the copper foil manufacturing process for lithium-ion battery anode current collectors. In addition, the environmental investment took 6.8% of the total investment budget in 2020, and the investment was mainly used for improving facility to reduce GHG emissions. The company plans to gradually increase the portion of environmental investments. Going forward, we plan to make efforts to further expand products which consider the climate change by conducting joint researches and sharing information with stakeholders such as customers, suppliers, and local research institutes.

Resilience of the strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario

Korea Zinc manages the organization's climate change according to the IEA's Sustainable Development Scenario. In Australia, we predict the impact of climate change around the business site based on a scenario of sea-level changes up to the year 2100 provided by the Queensland state government, also coming up with relevant countermeasures.

Risk Management

Processes for identifying and assessing climate-related risks

We have established an environmental management system (EMS) based on ISO 14001 to regularly identify and evaluate climate change risks at the enterprise level. SMC monitors the impact of climate change near the business site using climate change data provided by the Queensland state government.

Processes for managing climate-related risks

Climate change risk is managed through the process of monitoring, diagnosing, analysing, and reporting carbon emission and sea level rise scenarios, and risks related to climate changes are managed through the Board of Directors, the highest decision-making body of the company.

How processes for identifying, assessing, and managing climate-related risks are integrated into the overall risk management

Climate change risk is managed as a part of environmental risk among non-financial risks. Direct and indirect emission data of greenhouse gases which is a major factor causing the climate change risk, is collected through the Enterprise Resource Management System. Information is disclosed on the public online platform such as National GHGs Management System after being verified by an independent third party. In addition, when the planning team reviews new investments, the mid- to long-term impact on climate change is analysed from the project review stage.

Metrics and Targets

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

The indicators used to assess climate change risks and opportunities include greenhouse gas emissions, energy consumption, and the area of business sites exposed to disasters such as floods, etc., which can be found on the TCFD Index page of this Report.

GHG emissions



Targets used to manage climate-related risks and opportunities and performance against targets

Korea Zinc believes that global climate change will expedite the structural change of the metal industry and our main products including zinc and silver will also benefit from the surging demand for metals used in the renewable energy and electric vehicle industry. To achieve environmental goals related to climate change, Korea Zinc will continue to invest in three key areas: expanding product line-up related to climate change, enhancing overall production efficiency, and reducing GHG emission.

02 / Society

Responsible Mineral Sourcing

Definition of Conflict Minerals

Conflict minerals refer to minerals mined by armed rebels in conflict areas around the world, including tantalum, tin, tungsten, and gold. As the demand for these minerals causes human rights abuses such as child labor and sexual assault, global industries had grown interest in this area. To avoid this, the industry-led Responsible Minerals Initiative's (RMI) "Conflict Minerals Reporting Template" and "Responsible Minerals Assurance Process" were developed in 2008, and the "OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas" became the international standards to prevent the purchase of conflict minerals in 2011.

Conflict Mineral Policy

Under the enactment of the "Responsible Supply Chain Policy" in 2016, Korea Zinc stated the commitment for transparent and responsible supply chain management. We established the principle of avoiding the use of conflict minerals produced through an inhumane process or involved in accounting fraud. In addition, in order to fundamentally prevent the use of conflict minerals, we may ask for due diligence survey when making a bidding contract with 3TG (Tungsten, Tantalum, Tin and Gold) raw materials suppliers, and do not trade with suppliers who are not complying with the "Responsible Supply Chain Policy". Related information can be found in the Conflict Minerals Policy section of Korea Zinc's website.

Responsible Supply Chain Management

Korea Zinc uses tin and gold in zinc refining, and such mineral supply chains have been regulated according to international standards. To ensure a more active and transparent supply chain and responsible product manufacturing, Korea Zinc established its "Responsible Supply Chain Management Policy" in 2016 and joined the "Responsible Minerals Initiative (RMI)" in 2020.

Korea Zinc inspects the raw materials from Tier-1 suppliers whether conflict minerals are included by applying the Responsible Minerals Initiative (RMI) and the OECD due-diligence guidance. All of the Tier-1 suppliers of Korea Zinc must document the proofs and procedures for non-conflict mineral verification and report them to the organization in charge.

Human Resource

Since 2020, Korea Zinc has been using the "performance-based employment" approach based on scientific measures to hire suitable talents. The performance-based employment approach minimizes the differences among evaluators through a systematic interview and multi-staged evaluation using diversified methods. It enables to hire the right applicant who is apt to the position, aligning with our values. Employment is processed in the order of application-document screening-aptitude test-interview-decision notification.

In addition to the college graduate recruitment held in the second half of each year, the company is actively using career recruitment, faculty recommendation system, and occasional recruitments. Furthermore, by introducing the industry-academia cooperation system, we select and foster talented individuals with potential capabilities at an early stage. In addition, we are operating an employment policy that gives preferential advantages to the socially disadvantaged or national veterans. Upon recruiting and evaluating performance, a principle of non-discrimination is applied to prevent any disadvantages based on gender, race, or nationality.

Korea Zinc People

Korea Zinc, a global nonferrous metal industry leader, creates the highest value by innovating and integrating in various areas based on its half-century history in the refining industry. Metals must be heated to a certain temperature to be developed into a high-purity product, and they are occasionally combined with other materials for additional values. The best talent for guiding Korea Zinc's new future, like the aforementioned refining process is someone with a strong dedication to the best, innovation in pursuit of new ideals, and flexibility that can be integrated in a myriad of areas.

Korea Zinc Character Traits

01 Passionate and Adventurous

- Expanding, embodying, and implementing small ideas.
- Engaging in their jobs and leading their efforts into achievements.
- Consistently unwavering talents towards a goal with positive mindsets

02 Persistent and Innovative

- Accurately understanding the nature of the problem from a holistic perspective and presenting specific solutions.
- Learning new and diverse fields with curiosity, and seeking development and innovation in the process.
- Pursuing bold changes escaping from the existing practices

03 Open-minded and Cooperative

- Expressing his/her opinion honestly and clearly, discussing and negotiating logically.
- Respecting and caring others and achieving common goals through cooperation.
- Understanding their roles and goals as well as colleagues', maintaining reasonable relationships and communicating with flexibility to achieve the goals together.

Customized Training

Korea Zinc is at the forefront in developing employee skills through various training programs in line with the rapidly changing work environment. Through company-wide training and coaching sessions for the newly promoted employees, we help them adapt to their new roles and increase productivity. Through this, we are developing their capabilities as middle managers and supporting them so that they can boost in higher roles.

In addition, Korea Zinc provides online English language courses to globalize our workforce and strives to provide educational contents.

Lastly, we provide training for reemployment to help retirees with their future. Also, legal and ethical training is provided to protect employees, which subjects on sexual harassment prevention, workplace harassment prevention, and personal information protection.

In particular, starting this year, we plan to further expand education on mutual respect, reinforce the employees' happiness index, and conduct a happy workplace culture campaign to increase the satisfaction of our employees and customers.



▲ Life planning program for all employees

Work-Life Balance

Korea Zinc encourages employees to have a healthy work-life balance so that they may work autonomously, take pride in their work, and realize their goals.

Introduction of Flexitime System

Korea Zinc strives to make the 52-hour workweek system, which is the legally-stipulated working hour per week. In 2018, we introduced four types of flexitime: differentiation of office attendance hours, permanent part-time work, flexible workplace system, and discretionary work system. Also, work guidelines are being conducted to comply with the Labor Standards Act and to keep our employees' work-life balance.

Family-Friendly Systems

Korea Zinc operates a variety of welfare benefits programs to support employees and their family lives. We operate a number of family-friendly systems such as parental leave, miscarriage or stillbirth leave, and shortened work hour for child-raising, and support for male employees to use parental leave without any pressure so that they can actively engage in childbirth and parenting. Every year, we survey the preferred summer vacation destinations and provide them to employees through lotteries. We partnered with condominiums across South Korea for our employee-exclusive discounts. In addition, the company funds all education expenditures for employees' children. When deciding not to attend college, we cover the early career education expenditures for equity.

In addition, 200 employee families are selected annually on a weekend farm trip. For employee welfare, we also hold labor-management councils on a quarterly basis in order to actively represent employees' ideas on welfare benefits.

Company housing

Korea Zinc provides company housing for employees' work-life-balance. The company housing built at Onsan Refinery is an apartment complex with 760 households and is equipped with sports facilities, childcare facilities, and welfare centers to give optimal convenience to the residents. In Seoul metropolitan area, 25 households is provided for the convenience of employees, and as of 2020, the use rate of company housing is 84%. Self-development classes, such as ceramic art classes and yoga classes, are also provided in the company houses to cherish their afterwork lives.

Welfare Benefits

Once a year, employees and their spouses receive a general checkup worth KRW 1 million. When medical expenses exceed KRW 500,000 or more per year for the same disease, the company funds the medical expenses. Nurses are assigned to each plant in Onsan Refinery, and campaigns are promoted to prevent diseases and accidents. In addition, by introducing the Employee Assistance Program (EAP), the company strives to support the emotional stability and daily life of employees.

Safety and Health

Korea Zinc considers the safety of each and every employee as a top priority, and makes best efforts to build a safety culture in the business sites.

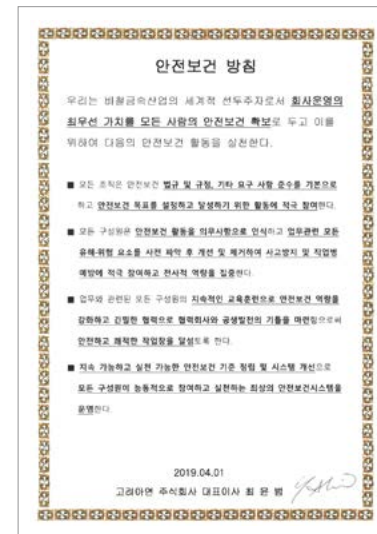
Safety and Health Policy and Organization

For sustainable management, Korea Zinc has designed a company-wide management strategy that states, "The safest and most eco-friendly organization by strengthening the environment and safety management system," and all employees are dedicated to achieving an accident-free workplace.

With the safety and health policy, Onsan Refinery puts the top priority on securing the safety and health of all people. By preventing incidents and internalizing safety culture, we will do our best to achieve the number one goal of "Zero Severe Accident". To this end, we are continuously investing various resources and workforces to prevent safety accident and establish a substance safety culture. In addition, reflecting on our past poor reputation as a high-risk workplace, we are currently striving to protect human and physical resources at all business sites through various programs and activities, focusing on the advancement of safety and health management and process safety management system. In order to comply with social regulations on safety and health that are continually strengthened and to meet the demands of stakeholders, we will continue to support and invest so that all employees can consider the safety as the top priority.

Safety and Health Policy

- ☑ All organizations comply with safety and health laws and regulations, and actively engage in activities to set and achieve safety and health goals.
- ☑ All members recognize safety and health activities as obligatory matters actively engaging in the efforts to prevent accidents and occupational diseases by identifying, improving and removing all hazardous and risk factors related to work in advance, and put the company-wide competency in the enforcement.
- ☑ Our safe and pleasant workplace is made by strengthening safety and health capabilities through continuous education and training of all employees, as well as establishing the groundwork for win-win development with suppliers through close collaboration.
- ☑ All members comply with an optimal safety and health system that is actively carried out by all of them through the establishment and improvement of sustainable and feasible standards for safety and health.



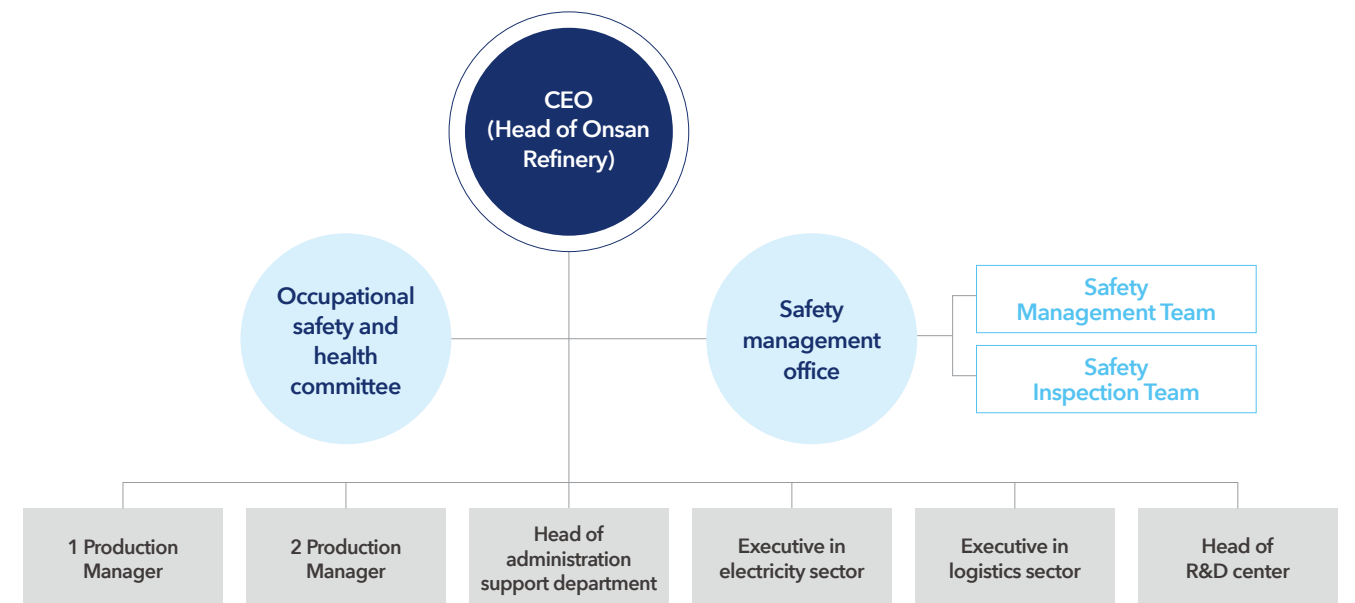
▲ Korea Zinc Safety and Healthy Policy

Safety and Health Management Organization

The head of the refinery sector, the chief management officer of Onsan Refinery, acts as the general manager of safety and health policy management. As a safety control tower of the site, the officer strives to identify and improve irrational factors by providing all necessary resources such as internal/external safety diagnosis and consulting, as well as continuous investments in safety and health. Also the head manager ensures the participation of all members in the process. Onsan Refinery's safety control office creates safety and health-related policies, monitors implementation, supports administration/education resources, and constantly improves the system through performance evaluation based on the will of the top management including the head of Onsan Refinery. It keeps a close eye on our employees' health and safety by using a systemic PDCA (Plan-Do-Check-Action) cycle.

Heads of first and second of each wet and dry plant primarily practice safety policy for our business site and control safety measures customized to features of each production process, under the supervision of the head of Onsan Refinery, in order to achieve an accident-free workplace. In addition, under the common goal of an accident-free workplace, Korea Zinc develops safety culture of co-prosperity through continuous communication with labor union, a representative employee organization, and their participation for Korea Zinc's sustainability management. As a step further than the mandated quarterly Industrial Safety and Health Committee and the labor-management consultative body, we continue to collaborate to improve safety and health by going through discussions on our development direction through monthly labor-management safety council.

Safety and Health Control Organogram

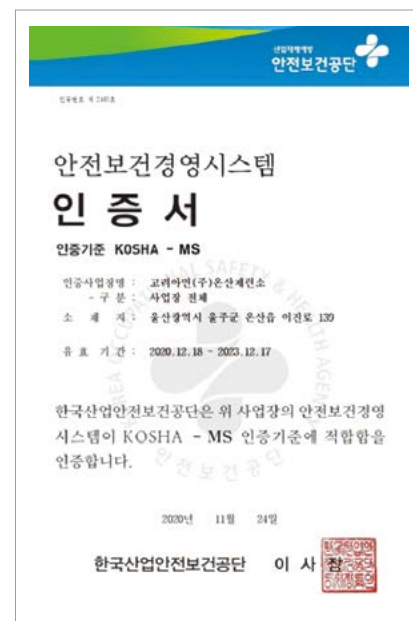


Safety Management System

Occupational Health and Safety Management System

Onsan Refinery introduced and implemented the occupational safety and health management system through the OHSAS18001 and KOSHA18001 certifications, and successfully converted it to the international standard ISO 45001 and the domestic standard KOSHA-MS certification to operate an advanced safety and health management system. Through this, we plan to create a safety culture in which all employees engage, and strengthen safety consciousness and capabilities, so that all people are protected from safety and health risks, work in a pleasant environment, and improve quality of life. All organizations in the business site implement annual plans in parallel with company-wide goals and action plans, and are evaluated through quarterly performance measurements reported to the top management. From 2021, annual safety/health performance and plans are presented to the Board of Directors so that all levels of employees communicate related issues. We are securing the ability to proactively monitor and respond to safety/health risks, by ensuring engagement of all members.

Certification of ISO 45001 and the domestic standard KOSHA-MS



Process Safety Management (PSM)

We are well aware of the importance of safety management for facilities through medium and large-scale disasters caused by process accidents such as fire, explosion, and leakage. In order to comply with the process safety management system (PSM) required under the domestic laws and regulations, we have invested resources and capabilities in securing safety for PSM subjected processes. Also, we require the same level of management system to non-subjected processes as we do for target processes. To this end, we are in the process of upgrading our system.

Process Safety Management Factors

01 Process-safety data

Definition : The most basic material to run the process
Purpose : To systematically manage process safety data (drawings/documents, etc.) to ensure safe operation and work based on the data

Takeaway : Knowledge-based safety

04 Facility inspection and maintenance

Definition : Check/inspection/maintenance procedures to ensure facility safety
Purpose : To document management methods/standards for facilities, classify facilities according to importance, and repair/maintenance according to plans

Takeaway : Brake Repair vs. Washer Refill; What should come first?

07 Employee training plans

Definition : Comprehensive training for safe operation
Purpose : To prevent process accidents by establishing and implementing training plans for all personnel related to the PSM system.

Takeaway : Know for Compliance

10 Self-inspection

Definition : Self-check of PSM implementation status
Purpose : To continuously improve by evaluating and checking whether each element of the PSM system is being faithfully implemented according to the guidelines.

Takeaway : We can identify our weaknesses for ourselves

02 Risk assessment

Definition : Identification and elimination of risk factors
Purpose : To reduce the likelihood of occurrence of risks by checking and improving potential risks that may occur during work and equipment operation

Takeaway : Understanding risk is the beginning of safety

05 Safe work permission

Definition : Permission system to identify/remove risk factors incidental to work
Purpose : To execute/confirm/approve safety measures to protect workers and facilities before starting dangerous work (fire/confinement/electricity)

Takeaway : The Most powerful tool for occupational accident prevention

08 Pre-operation guidelines

Definition : Checking and removing risk factors before facility operation
Purpose : To inspect the facility before operating the facility for safe operation of the facility after installation of new facilities and change of process

Takeaway : Do not operate if it's not safe

11 Process accident investigation

Definition : Identifying the cause of an accident and establishing a countermeasure to prevent recurrence
Purpose : To prevent large or recurrent accidents by quickly investigating the sources and establishing countermeasures

Takeaway : Preventing accidents rather than identifying responsibilities

03 Safe operation guideline

Definition : Detailed procedures for safe operation of the process
Purpose : To operate efficiently and safely in various types of operation (normal/emergency operation, shutdown, start-up)

Takeaway : Easy, clear, and specific

06 Supplier safety management

Definition : Securing supplier safety at the same level as Korea Zinc
Purpose : To ensure the safety of the supplier's process/work so that the supplier is managed at the same level as the safety standards of Korea Zinc

Takeaway : Supplier management determines a safe workplace

09 Variable Factors Handling

Definition : Prior risk review of changed matter
Purpose : To safely operate/manage the process by reviewing in advance so that there is no additional risk in the event of a change, and confirming necessary procedures/data

Takeaway : Upon changes, there is a new risk

12 Emergency measures

Definition : Prompt response and protection of people/property in case of emergency
Purpose : To minimize human/physical/environmental damage by promptly responding to emergencies

Takeaway : Quick response and continuous training is the solution

Employee Safety

Safety and Health Communication

Korea Zinc provides safety and health information regularly and strengthens communication to all members including our suppliers. At the KZ Safety meeting, we share monthly safety and health status and communicate on directions for future policies and activities. In addition, by sharing safety and health issues and information through weekly safety information leaflet and internal newsletter 'KZ People,' we enhance knowledge and safety awareness of all members. Suppliers are provided with relevant information through regular e-mails and monthly contractor meetings.

Safety Work Procedure (SWP)

Korea Zinc has standardized each safety work procedure into a total of 14 items. This enables all workers to comprehend material's properties, work tools/equipment information, work process information, safe work method and sequence, risk factors, risk assessment, etc. so that they could recognize measures to prevent safety accidents when performing the relevant work.



▲ Visitor's Safety Information Card

Safety and Health Evaluation and Awards

On a half-yearly basis, Korea Zinc offers achievement awards based on the safety and health evaluation of internal departments and contractors. Since 2019, the prize was significantly increased to emphasize the importance of identifying potential risks through the discovery of negligent accidents, stimulating and reviving all members' autonomous safety management.

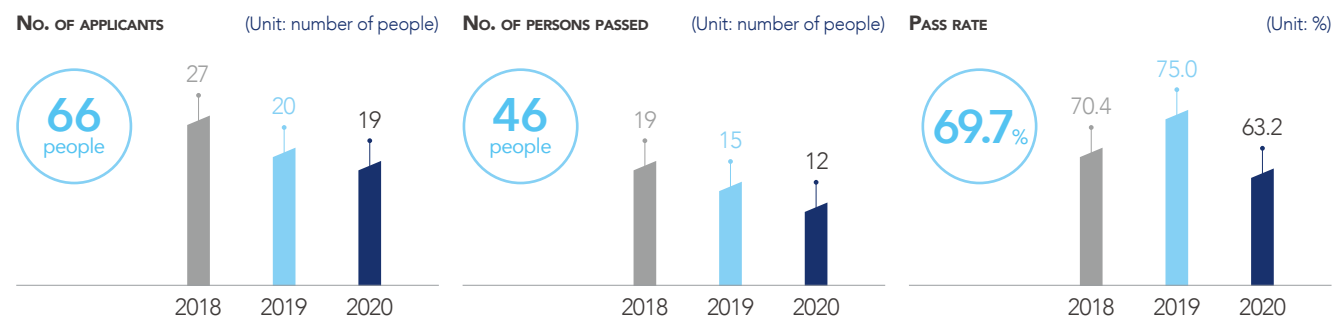


▲ Reward Giving Ceremony for Safety and Health in 2020

Safety Training Support Program

With the aim of making all employees a safety manager, Korea Zinc supports full training expenses for obtaining occupational safety-related qualifications. The average pass rate for the past three years has reached about 70%. We strive to improve the safety management knowledge and awareness of our members by continuously expanding the qualification courses and encouraging members' participation.

Number of persons obtaining the occupational safety related qualification and pass rate



Occupational Accident Prevention

Declaration of Golden Rule in Business Site

In performing all work on the site, Korea Zinc defines and proclaims a total of six items that must be recognized as essential safety rules (Golden Rules). All members of Korea Zinc are obligated to comply with this Golden Rules, which are shared with all members through posts and various educational materials at all business sites.

Golden Rules of Business Site

<p>01 Prohibition of arbitrary disassembly and damage of protective devices(guard fences, emergency stop devices) installed at dangerous facilities</p>	<p>02 Compliance with the speed limit(20km/h) when driving an in-house vehicle/Fastening a seat belt and prohibition of use of mobile phones</p>	<p>03 Wearing of personal protective equipment by all workers</p>
<p>04 Falling accidents prevention measures when working at high altitude (2m) (fasten seat belt)</p>	<p>05 Measurement of oxygen and harmful gas concentration before starting work in a closed space</p>	<p>06 After the maintenance of facility, operating the facility with inspection approval before starting operation (commissioning)</p>

TOP Diagnosis

The weekly TOP diagnosis is directly supervised by the chief management officer of Onsan Refinery, who is in charge of safety and health management, to directly oversee and address irrational issues at the workplace through a horizontal meeting system. In addition, we are actively removing forementioned defects identified through complete (100%) improvement.

Irrational Issues in the Workplace addressed by TOP Diagnosis

(Unit: case, %, KRW 100 million)

CATEGORY	NO. OF IDENTIFIED CASES	NO. OF IMPROVED CASES	IMPROVEMENT RATE	AMOUNT IMPROVED
2018	4,331	4,299	99.3	55.2
2019	3,730	3,677	98.6	34.2
2020	2,185	2,096	95.9	21.7
Total	10,246	10,072	98.3	111.1

* Unimproved issues: issues requiring long-term improvement(including issues under improvement) or issues requiring review for improvement director and appropriateness

Reinforcement of Inspection of High-risk Duties

Korea Zinc designated six tasks as high-risk work including works in closed space, high altitude (over 10m in height), and mobile crane work. We check and improve whether a work is safely performed at all times, through cross-checks among the production department, supervision department, and safety and health department.



▲ Safety Consulting by Third-Party Agency

Safety Diagnosis by Third-Party Agency

For professional management of safety, health, firefighting, gas, and dangerous goods, Korea Zinc continuously conducts safety diagnosis through the best external professional agencies in each field in Korea.

Through this, we are striving to discover irrational factors and potential risks, conduct risk assessment, and come up with engineering and technical improvements. We are also making active investments in establishing customized safety management policies through the improvement of personal safety management ability and verification of efficiency.

Work Environment Management

In order to protect the health of all members and create a pleasant working environment, Korea Zinc manages exposure standards of each factors below the legal standards through regular work environment measurements stipulated by laws and regulations. In addition, although it hasn't been exceeding the legal standards, if a risk of environmental hazards such as exposure of workers is identified, efforts to reduce external leakage of harmful factors are continuously made through self-inspection and improvement of ventilation systems including local exhaust ventilation and pressurization system.

Supplier Safety

Win-Win Collaboration for Safety and Health of Suppliers

Korea Zinc recognizes both internal and external suppliers as key stakeholders required for sustainable management. With the aim of reinforcing collaboration for zero accidents, the Safety and Health Council was formed to actively communicate the information on safety and health and measures for preventing safety accidents on a regular basis. We are ensuring mutual cooperation to create a safe working environment without discrimination by actively gathering feedback also for the stakeholders. In addition, through the operation of a win-win collaboration program, we are continuously improving the level of safety and health, and the appropriateness and effectiveness of its operation are regularly evaluated through the Korea Occupational Safety and Health Agency.



▲ Preventive Training on Safety and Health through Safety and Health Council

Daily Safety Training for New Visitors

In addition to the statutory training required by laws and regulations, Korea Zinc provides daily safety training for new visitors including suppliers' workers entering our workplace. Through this, we are providing information on safety rules, regulations, and risk factors of our business site, and selecting those who are subject to health management through blood pressure measurement. And we are also pursuing personal safety during work, improving safety awareness and promoting voluntary health improvement. In addition, through the biannually-provided education programs, we continue to maintain the effectiveness of safety training.

Increased Support for Occupational Safety and Health Management Expenses for Constructions.

According to the law and regulations on ordering and contracting construction works, Korea Zinc has enlarged the payment of occupational safety and health management fees for constructions amounting more than KRW 20 million. We also continue to assist and seek to improve construction companies' safety and health management capabilities and extend safety facilities by voluntarily paying safety and health management expenses for construction projects under KRW 20 million.

Safety and Health Consulting for Suppliers

Korea Zinc actively supports consulting with external professional agencies to improve the safety and health management capabilities of suppliers. Furthermore, we are considering and pursuing provision of administrative and cost support with the aim of acquiring the safety and health management system certification for all internal contractors. Credits are given to those contractors who obtain the certification voluntarily when selecting contractors and evaluating their safety and health performances. As such, we plan to provide various benefits.

Employee Health

Healthcare for Employees

Korea Zinc supports regular health checkups for employees including their spouses to prevent diseases and care for the health of employees. Recognizing that the health of employees and harmony between family members are directly connected to the company's business success and continuity, we are strengthening our responsibilities and obligations in securing human resources through preemptive disease control.

We increase access to medical support for those in need including employees of contractors, by opening an additional healthcare office in the workplace and promoting members' interest by inducing their participation in monthly health quiz events. A sleeping room is operated for nighttime workers, and a psychological counseling center opened at Onsan Refinery and head office to help employees and their families manage stress, recover self-esteem, and overcome trauma through counseling and psychological support.

In addition, Korea Zinc operates an antismoking program as part of voluntary healthcare efforts for all members. We provide antismoking treatment drugs and supplements for free to participants in the antismoking program, and provide professional and continuous cessation counseling by signing agreements with external expert treatment organizations.

Overcoming the Pandemic

Korea Zinc makes utmost efforts to prevent the spread of the COVID-19 global pandemic. Recognizing the possibility of rapid spread in the community from the first confirmed case in Korea, we started to track and monitor persons visiting and coming from overseas and clusters of mass infection areas. We measured body temperature and checked medical examination result for those entering the workplace to prevent COVID-19 from being transmitted from outside. We are constantly providing related facilities and preventive items such as thermal imaging thermometers and preventive items so that members can carry out continuous quarantine activities and preventive activities such as regular body temperature checks, mask wearing, and handwashing on a voluntary basis.

In addition, the company established a "Continuity Management Plan for Infectious Diseases" to adopt a response system for minimizing damage to all business activities caused by the occurrence of confirmed positive cases. The company continues the guidance and publicity activities so that all members of Korea Zinc can recognize the crisis situation and actively and voluntarily participate in infection prevention activities. Furthermore, we plan to revise and standardize related procedures based on our experience in responding to the current situation and at the same time, continue to improve our management capabilities so that we can quickly respond to the outbreak of new infectious diseases by nurturing preventive awareness among all staff members.



▲ Visitor Temperature Screening



▲ Control Activities

CSR Program

Supporting the Socially Vulnerable

Korea Zinc conducts various projects to support the vulnerable and social contribution activities every year for shared growth with local stakeholders. In 2020, about KRW 6.622 billion of donations* and contributions were paid for social contribution projects such as supporting the living expenses for the vulnerable, helping the neighborhoods affected by flood damage, emergency support for those affected by COVID-19, and support for sisterhood schools; and in addition to this, we are hosting events such as sharing holiday food and sharing briquettes of love to reach local residents.



▲ Residence Renovation Project

Supporting the Socially Vulnerable: Residential Renovation Project with Habitat Korea

The residential environment improvement project was conducted to improve residential efficiency by improving the inefficient factors of buildings for low-income families and welfare facilities. From May to December 2020, we conducted the residential environment improvement project in Seoul and Ulsan (two households in Seoul, and 12 households in Ulsan) for households with poor residential environments, and a total of KRW 150 million was spent on these social contribution expenses.

Supporting the Local Economy

To promote the local economy, Korea Zinc has carried out activities to purchase local agricultural products. Ulsan area where Onsan Refinery is located is vulnerable to rainy seasons and typhoons, which damage farmhouses every year. Accordingly, Korea Zinc purchases agricultural products from farmers severely affected by natural disasters. In 2020, we supported local farmers affected by the rainy season and typhoons by purchasing local agricultural products worth about KRW 46 million.



▲ Purchasing activity in typhoon-hit areas

Shared Growth

Shared Growth Promotion System

Korea Zinc is the No. 1 general nonferrous metal refining company in Korea, creating a sound industrial ecosystem that grows together with SMEs and suppliers. Under the principle of "Shared Growth and Cooperation," we are operating shared growth program with three goals, namely: "Practicing win-win management and establishing a fair trade order;" "Fostering excellent business partners and enhancing competitiveness;" and "Strengthening Korea Zinc's competitiveness." We have improved the Fair Trade Agreement, which has been in force since March 2012, and renewed it every year through an electronic agreement. In the shared growth index evaluation conducted by the Fair Trade Commission in 2020, Korea Zinc received a "good" grade.

Organization promoting shared growth



Shared Growth Partnership

As of 2020, Korea Zinc has signed and implemented partnerships with 82 suppliers, starting with the signing of fair trade and shared growth agreements in 2012. By signing them, Korea Zinc pledged financial support for suppliers, including the improvement of trading conditions, support for technology development, quality improvement, technology protection, education and training, and other welfare benefits. Korea Zinc made a commitment to support shared growth by sharing performance including the offering incentives, reflecting the increases in raw material prices in the unit price of supplied goods, and signing long-term supply contracts. In addition, we are supporting the technological independence of suppliers by supporting research on localization of component production. In 2017, four commitments were enacted to establish a foundation for rational and transparent trading relationships between Korea Zinc and suppliers by properly reflecting the interests of them, enhancing transparency and fairness in the selection and operation process, reviewing fairness and legality of subcontracting transactions, and defining documentations' issuance and preservation during the transaction process.

The Four Commitments



Supplier Support Program

Since 2017, Korea Zinc has raised a total of KRW 40 billion through financial institutions to support interest expenses for suppliers who signed fair trade and shared growth agreements when lending operating funds. The Shared Growth Fund supports suppliers' financing costs to reduce their financial burden and contributes to the operation of a stable supply chain through smooth fundraising. In 2020, we provided six cases of technical supports worth KRW 3.9 billion to six companies. In addition, Korea Zinc contributes to the economic development of local communities and pursues win-win cooperation with suppliers by providing gift certificates celebrating the Lunar New Year and Chuseok every year.

03 Governance

Corporate Governance

Board Composition

The Board of Directors of Korea Zinc consists of five executive directors and six non-executive directors. At the 47th annual general shareholders' meeting held on March 24, 2021, Kim Bo-young, a professor at Hanyang University Business School, was appointed as female director, and Kim Eui-hwan, attorney at Kim & Chang Law Office was reappointed as non-executive director. Rho Jin-su, president of Korea Zinc, Baek Soon-hum, vice president of Korea Zinc and Choi Chang-geun, Chairman of Korea Zinc were re-appointed as executive directors.

Principles of the Board Composition

Korea Zinc appoints non-executive directors through an independent and transparent process. Korea Zinc's Nomination Committee for non-executive directors, which consists of one executive director and two non-executive directors, recommends candidates after screening their qualifications as a director. Recommended candidates are appointed at the shareholders' meeting.

Board Operation

Regular board meetings are held at least four times per year, and special board meetings are held upon request. Prior to the general shareholders' meeting that is held in late March, the board meetings are held in February and March to approve financial statements and the general shareholders' meeting agenda. Korea Zinc provides explanations on each agenda by attaching interview data and information up to one week before the meeting date so that each director can make a decision with sufficient consideration in deliberating and approving it, contributing to efficiency and substantiality in the board operation. Each board meeting is convened by the chairman according to the BOD regulations of Korea Zinc with the convening notice which is delivered to each director at least a day before the meeting day. As of 2020, there were 13 board meetings held, during which eight resolutions and five reports were made in. Details on the activities of the board from January 2020 to March 2021 are as follows:

BOD Agenda

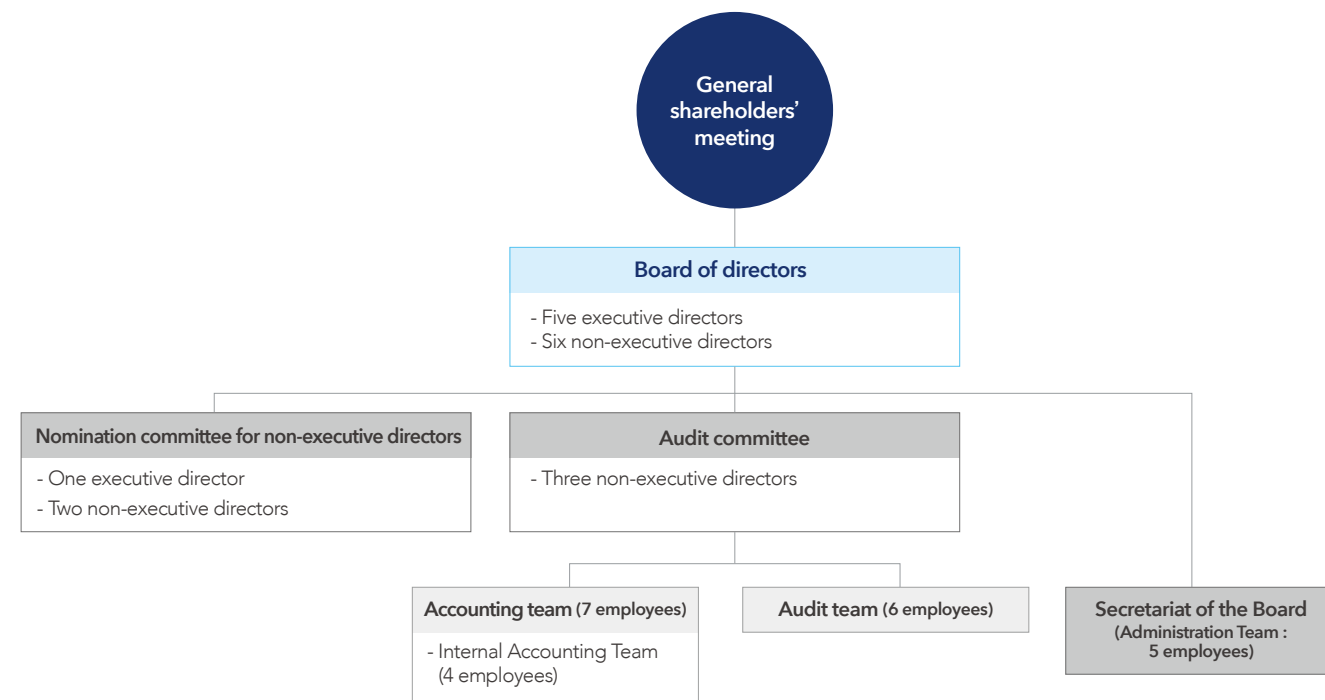
Date	Agenda	Date	Agenda
2020.02.06	Report on an evaluation of Internal Accounting Management Scheme operation Approval of 46 th financial statement and annex	2020.11.13	Report on major management issues and financial performance for Q3 2020
2020.02.13	Capital increase in SMH	2020.12.07	(1) Appointment of director's position (2) Appointment of executive director and its position
2020.03.02	(1) Convocation of 46 th AGM	2020.12.29	Establishment of 2021 plan on safety and health
	(2) 46 th dividend payment	2020.12.30	Expected sales and purchase transaction of major domestic affiliates
	(3) Nomination of director candidate		
	(4) Nomination of Audit Committee member candidate	2021.01.26	Investment in Hyzon Motors' Convertible Bond
	(5) Approval of directors' remuneration ceiling		
	(6) Adoption of e-voting system		
2020.03.12	Report on business plan of Electrolytic copper foil for lithium-ion battery material Investment in KZAM Corporation	2021.02.08	Report on an evaluation of Internal Accounting Management Scheme operation Approval of 47 th financial statement and annex
2020.03.20	(1) Election of CEO	2021.02.22	(1) Convocation of 47 th AGM
	(2) Approval of a director working for competitive businesses		(2) 47 th dividend payment
	(3) Appointment of Nomination Committee member		(3) Amendment of articles of incorporation
	(4) Decision on directors' remuneration Re-delegate the payment method		(4) Nomination of director candidate
(5) Nomination of Audit Committee member candidate			
(6) Approval of directors' remuneration ceiling			
2020.05.14	Report on major management issues and financial performance for Q1 2020	2021.03.24	(1) Election of CEO and Appointment of its position
2020.06.26	Participation in capital increase of KZAM		(2) Approval of the director working for competitive business
2020.08.20	Report on major management issues and financial performance for Q2 2020		(3) Appointment of Nomination Committee member
2020.09.29	Change in sales and purchase transaction amount of major domestic affiliates		(4) Decision on directors' remuneration Re-delegate the payment method
			(5) Appointment of executive director

Board Committees

Korea Zinc operates the Nomination Committee for non-executive director and Audit Committee under the Board of Directors. The Nomination Committee for non-executive director consists of two non-executive directors and one executive director to identify and recommend candidates for non-executive directors in each field including nonferrous metals, fair trade, administration, laws, and accounting.

The nominated candidate is elected and appointed as a non-executive director through an ordinary resolution at the general shareholders' meeting. The Audit Committee consists of three non-executive directors. It may request directors to report on business at any time and inspect the company's property status for its duties. If necessary, the Audit Committee may ask for advice from experts at the expense of the company. The Secretariat of the Board of Directors monitors the activities of non-executive directors. It evaluates overall diverse activities such as deliberation of the board's agenda; non-executive directors' attendance at meetings; whether or not the director expresses highly effective opinions; whether or not the director provides appropriate advice for major management decisions as an expert in the field in charge; internal control of the company's important financial risks as an audit committee member; and contribution to the operation of monitoring devices etc.

Composition of BOD and Committees



Shareholder Value Maximization

Korea Zinc has been able to enhance our international competitiveness through supports from shareholders and stakeholders despite the rapidly changing business environment and uncertainties in the international situation. In March 2020, we set the dividend target to maintain a dividend payout ratio of 30% or more, based on the financial performance of the parent company at the end of the year by publishing the "Dividend Policy for Enhancing Shareholders' Value (2020-2021)".

As a result, at the annual general shareholders' meeting in March 2021, the company set the dividend per share at KRW 15,000 for 2020 an increase of KRW 1,000 per share from 2019, and the payout ratio grew 3.7%p from 43.6% to 47.3%. It's a decision that goes above and beyond the target promised in the dividend policy. In addition, there has been an improvement in the system since 2019, such as implementing the electronic voting system in shareholders' meetings to enhance shareholder convenience.

Board Remuneration

The Board of Directors resolves the remuneration ceiling for non-executive directors at the general shareholders' meeting every year. The remuneration is paid in the same amount to all non-executive directors within the limit approved at the shareholders' meeting. The remuneration ceiling for 11 registered directors determined at the annual general shareholders' meeting held in March 2021 was KRW 7 billion. The amount was determined based on the size of the company, keeping the amount the same as it of 2020. The total amount of remuneration executed in 2020 was KRW 4.1 billion, and the average amount of remuneration per director was about KRW 451.76 million. Executive remuneration is determined on a monthly basis in accordance with the executive wage regulations, considering the position, work environment, and performance results. When evaluating the activities of the non-executive directors, the company uses self-assessment report on each activity of non-executive director to ensure the independence of non-executive directors. We plan to additionally review and adopt internal evaluation standards, external advisory, and remuneration policies within the boundary of keeping independence of non-executive directors.

Compliance

Internal Control System

As an important means of pursuing and achieving corporate goals, an effective internal control system is used to manage and monitor sales activities, prevent and detect abnormal transactions, continuously measure performance, and improve operational productivity. The internal accounting manager reviews the design of internal controls, proposes matters to be improved, and reports major issues to enable further investigation by the management.

Fraud Risk Management System

To effectively manage fraud risks and prepare reliable financial reports, Korea Zinc has established and operated a fraud risk management system, through its internal accounting management department, since 2018. This system manages the risks considering business areas where fraud risks may occur and their impacts, by dividing into fraudulent financial reporting and corruption risks. This enables Korea Zinc to identify and manage company-wide fraud risks by mapping internal controls to respond to them. By regularly controlling variables, we improve the fraud risk management system.

Internal Accounting Management System

In accordance with an amendment of the Act on External Audit of Listed Companies in 2018, the level of auditor assurance in the internal accounting management system has been raised from “review” to “audit.” Accordingly, the company has completely redesigned the internal control system based on the “Internal Accounting Management System Design and Operation Concept System” distributed by the Internal Accounting Management System Operating Committee. In the process, we have established and operated detailed guidelines for internal accounting that include the structure and competence of the internal accounting management system, performance evaluation and compensation, change control, and establishment and implementation of training plans.

The CEO of Korea Zinc has reported the operation results of the internal accounting management system to shareholders, the Board of Directors, and the Audit Committee since FY2019. Internal accounting management is divided into two areas: structural evaluation, which studies whether it can sufficiently control the risk of misstatements and frauds in financial statements and operational evaluation, which checks whether control is effectively performed based on the evidence. Any deficiencies detected in such process are being improved through consultation among external auditors, internal accounting management departments, and according departments in charge. Korea Zinc checks the activities of organization through various audits such as annual regular business audits, safety-related external audit reviews for major facilities or due diligence on financial assets, due diligence on inventory assets, whistleblowing system management, and cyber audits on the reported issue. Detected risks and issues are reported to the management for improvement.

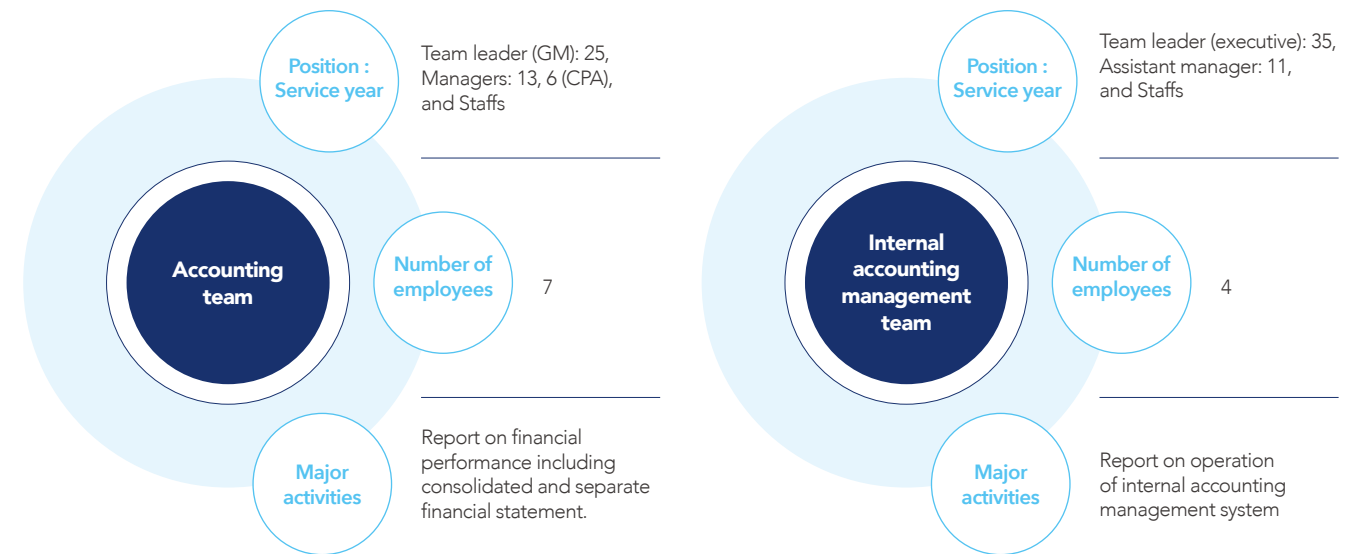
Audit Committee Agenda

Date	Agenda
2020.03.02	Final submission of the 2019 Audit report - 2019 Consolidated and separate financial statements of Korea Zinc - Audit report - Report on the operation status of the internal accounting management system
2020.03.20	Appointment of Audit Committee chairperson - Non-executive director Lee, Jong-kwang
2020.08.20	Report on major management performance in the 1st half of 2020
2021.02.22	Final submission of the 2020 Audit report - 2020 Consolidated and separate financial statements of Korea Zinc - Audit report - Report on the operation status of the internal accounting management system

Training Status of Audit Committee

DATE OF TRAINING	PROVIDER	ATTENDEE	MAIN CONTENTS
Aug. 20, 2020	Internal accounting department	Lee Jong-kwang, Han Cheol-soo, Kim Do-hyun	- Analysis of COVID-19's impact on financial statement - Roles and responsibilities of Audit Committee members

Status of Organization Supporting Audit Committee



Fair Trade Agreements

Korea Zinc entered into fair trade agreements with 61 suppliers in 2012 and has continued to maintain the agreements with suppliers. The agreements were entered into to ensure that Korea Zinc and its suppliers comply with relevant laws and regulations such as the “Act on the Promotion of Collaborative Cooperation between Large Enterprises and Small-Medium Enterprises,” the “Monopoly Regulation and Fair Trade Act,” and the “Fair Transactions in Subcontracting Act,” and pursue win-win cooperation.

Korea Zinc has introduced the “four commitments for subcontractor laws” enacted and revised by the Fair Trade Commission to ensure fair trade with suppliers. We are taking internal steps such as operation of a system to block unfair subcontracting transactions establishment of an in-house fair trade promotion department, introduction and operation of post verification procedure for legality of subcontracting transactions, and giving disadvantages to employees who violate the laws. In addition, Korea Zinc made commitments of financial support for suppliers, improvement of transaction conditions, technology development support, quality improvement, technology protection, education and training, and other welfare support. We provide incentives to improve trading conditions, reflect the increase in raw material prices in the supply price, and support their business stability by signing long-term supply contracts.

Ethics

Code of Ethical Conduct

To establish the judgement standard for just thoughts and behaviors, Korea Zinc enacted the five codes of ethical conduct to be observed by all workers for a company of transparent and trusted, technically superior environment-friendly, and contributing to customer satisfaction and human welfare in accordance with the business philosophy of Korea Zinc.

Whistleblowing Channels

Employees report complaints related to ethics and human rights through designated e-mail and telephone numbers. Depending on the weight of the case, it is reported to the Board of Directors, and measures such as personnel transfer or disciplinary actions may be taken. All reports can be filed anonymously, and reporters and whistleblowers are protected.

Code of Ethical Conduct

To establish the judgement standard for desirable thoughts and behaviors, Korea Zinc enacted the five provisions regarding the code of ethics to be observed by all workers for a company of transparent and trusted, technically superior, environment-friendly, and contributing to customer satisfaction and human welfare in accordance with the business philosophy of Korea Zinc



01 We shall put customer satisfaction as our top priority and gain customer trust through improving the quality of products and services for transparent and trusted business management.

02 We shall handle business on the basis of good faith, and comply the related laws as well as morality and trade order.

03 We shall perform businesses with honesty and passion of sound mind, and lead business innovation on the basis of expertise.

04 We shall maintain the honor of the company and dignity of individuals, and not ask customers or counterparty of the transaction to give any form of monetary or non-monetary benefits.

05 We shall not use properties of the company for private interests, and make judgments considering the interests of the company first when conflicts occur between company interest and individual interest.

In order to practice the the code of ethics mentioned above, we adopted and implemented the separate business ethics regulations.

Ethical Management Program

Korea Zinc conducts ethics training and pledges for new employees, and once a year all employees pledge to comply with the code of ethics. Every January, the CEO delivers a message containing the commitment to ethical management and ethics training is conducted annually for all employees.

In particular, from 2020, we have produced video instructions for ethics training, which can be watched on mobile phone as well as on personal computers for business use, thus enhancing the effectiveness of training.

In every major Korean holidays, such as Lunar New Year and Chuseok, a letter is sent to stakeholders who make business connections with the company to convey the company's determination for transparent ethical management. In addition, we operate a cyber-audit office on the company's website to systematically block unethical behavior, respect customers and shareholders, and induce fair competition through compliance with the laws.

Risk Management

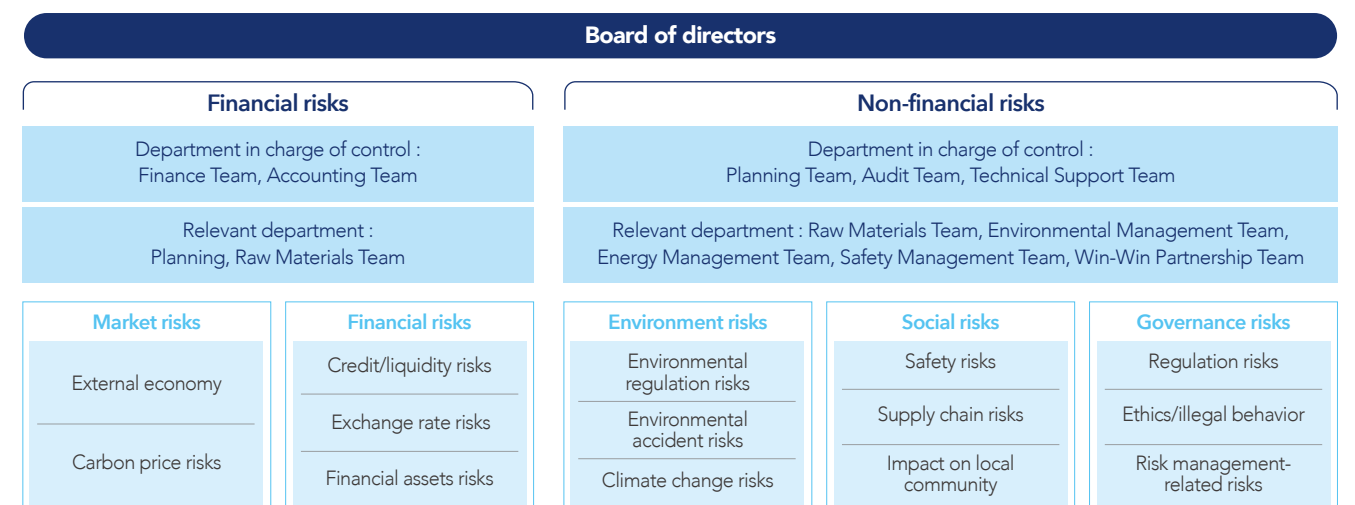
Korea Zinc understands that various risks may arise from business activities, and strives to proactively responds to such risks. Korea Zinc's business risks are roughly classified into financial risks and non-financial risks, and each of such risks related to the business activities is identified and managed by each according department. The results are reported to upper-level departments, the Board of Directors, and the Audit Committee.

Risk Management System

Risk Management Policy and Governance

Korea Zinc's risk management policy was established to identify and analyze the risks, set appropriate limits and controls, and prevent them from surpassing the threshold. The Board of Directors is responsible for establishing and supervising Korea Zinc's risk management system. Risk management policies and systems are reviewed on a regular basis to reflect changes in market conditions and business activities. The Audit Committee supervises the management's compliance with Korea Zinc's risk management policies and procedures, and reviews the adequacy of the risk management system.

Risk Management Governance



Financial Risks

Financial risks are the factors that most affect Korea Zinc's business performance. Financial risks are classified into market risk and financial risk, and includes credit risk, liquidity risk, exchange rate risk, interest rate risk, and price risk, etc.

Non-financial Risks

Non-financial risks are the environmental, social, and governance (ESG)-related risks, referring to ones that may arise from the organization's sales and production activities and stakeholders.

Risk Management Activities

Financial Risk Management

Korea Zinc monitors market and financial risks and evaluates financial assets. In addition, we are analyzing a carbon price risk to participate in the domestic carbon credit markets.

Market Risk Monitoring

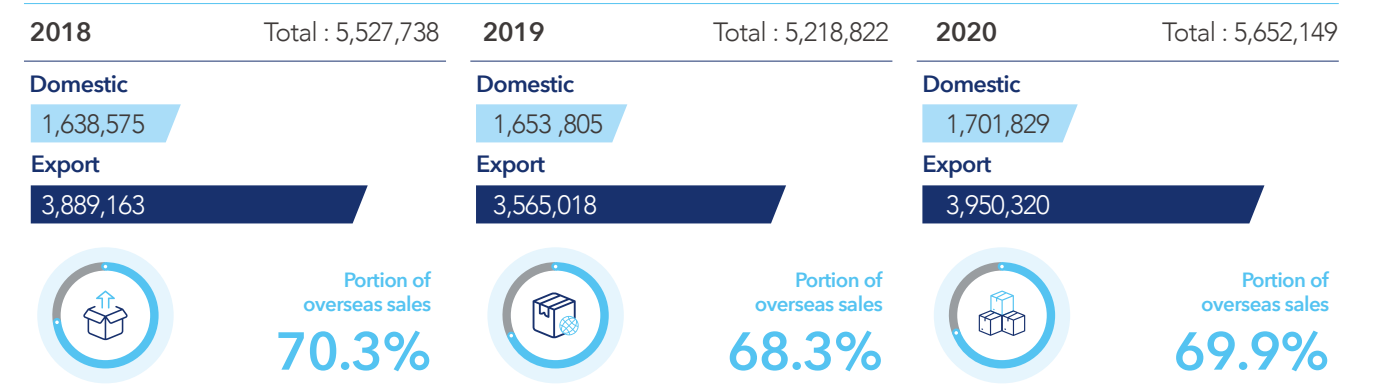
Korea Zinc's main products including zinc, lead, gold, and silver are major industrial and raw materials. The demand and price of nonferrous metal products are affected by market risks such as trends in the upstream industry and global economy. In particular, price risks arise from various factors such as global supply and demand, industry and policy trends, stakeholders, and climate change. Korea Zinc identifies risks by product portfolio and looks into ways to turn the risks into opportunities. The fluctuations in the prices of zinc and lead are monitored on a monthly basis in connection with the international market price (London Metal Exchange, LME) and exchange rates. In particular, we strive to reduce the foreign exchange risk by constantly monitoring the exchange rates of major countries with high volatility.

Financial Risk Monitoring

Domestic demand for nonferrous metals is maintained thanks to upstream industries such as automobiles and construction, but we are expanding overseas sales to avoid risks within such industries that are sensitive to economic fluctuations. About 70% of Korea Zinc's total sales are from overseas, and we are controlling the impact of exchange rate risk on the company's net profits to less than 10% by conducting a sensitivity analysis on the fluctuations of exchange rates for each of the eight major currencies.

2018 to 2020: Export as % of Sales and Sensitivity to the Exchange Rate

(Unit: KRW million)



Assuming all variables remain the same at the year-end of 2019 and 2020, the 10% change in the KRW value against USD, EUR, AUD, SOL, JPY, GBP, CAD, and CNY respectively leads to the change in the earnings before tax (EBT) through the change in assets and liabilities, as follows.

2020 Earnings Before Tax Sensitivity to the KRW exchange value

(Unit: KRW thousand)

Category	Increase by 10%	Decrease by 10%
USD	(20,737,292)	20,737,292
EUR	(18,122)	18,122
AUD	533,534	(533,534)
SOL	1,288,852	(1,288,852)
JPY	(61,478)	61,478
CAD	438	(438)
CNY	134	(134)
Total sum	(18,993,934)	18,993,934

Carbon Price Risks

From the planning phase of new investment, financial impacts of climate change risks such as supply, demand and price of emission rights are considered to preemptively manage financial risks on climate change and environmental regulations.

Allocated and purchased greenhouse-gas emission rights has been calculated into financial impacts, as the 'Act on the Allocation and Trading of Greenhouse-gas Emission Permits' became effective in 2015.

Emission rights held for the purpose of the obligation, which are classified as Other Assets, are calculated into the book value by deducting the accumulated impairment losses from the cost after the initial recognition.

Emission liability is a present obligation of submitting emission rights to the government. It is financially recognized if the possibility of resource outflow is high and the estimated costs for the obligation is reliable.

Emission liability is measured by summing up the book value of the emission rights held for the according year and the expenditure to be incurred in complying to the obligation for emission possession exceeding the allowance. At the year-end of 2020, emission liability stands at KRW 3.4 billion on a consolidated basis.

Non-financial Risk Management

Korea Zinc recognizes various non-financial risks arising from business areas and implements preemptive management activities.

Risk Identification and Supply Chain Management by Product Category

Nonferrous metals such as zinc, lead, gold, and silver, which are major products of Korea Zinc, are industrial intermediate goods, and in recent years, their importance as raw materials is increasing. Based on the risk analysis on the industry and policy trends for each product category, Korea Zinc explores ways to create business opportunities.

Risk Factors by Product and Impact Analysis

	Market/policy factors	Impact	Other factors (environmental, social factors, etc.)	Impact
Zinc	Circular economic policy	Increasing demand	Extreme climate events	Low utilization rate, Short supply
Lead	Environmental regulations	Decreasing investment demand	Extreme climate events	Decreasing demand of battery replacement
Silver	Global environmental policy	Increasing silver demand due to solar power demand increase	Social and environmental issues	Increasing demand due to structural change of market, Suspension of mine production, Divestment
Gold	Growth of premium market	Increasing precious metal demand	Social issues including human rights	Suspension of mine production, Divestment

Before the recent global industry trend of transparent supply chain emerged, Korea Zinc established a “Responsible Supply Chain Policy” and a “Conflict Minerals Control Policy” since 2016 to strengthen the process of identifying risks by each product. Korea Zinc purchases raw materials in accordance with the policy and requests suppliers' cooperation such as providing information on the purchase due diligence survey and information of their status (Know your customer). We are severing trading relationships with suppliers who do not comply with the policy.

In 2016, Korea Zinc joined the Responsible Minerals Initiative (RMI), a trusted international initiative to sanction the distribution of minerals mined in international conflict areas, thereby strengthening transparency in the gold supply chain. In addition, in 2020, the independent auditor conducted an audit in accordance with the “Responsible Silver Guidance” of the “London Bullion Market Association (LBMA)” and the company was listed on the LBMA Good Delivery List in 2020, being recognized for its transparent supply chain.



▲ Responsible Silver Certificate of LBMA

Environment and Climate Change Risks Assessment

The impact of climate change shows different patterns from region to region. Korea Zinc in principle responds more proactively to environmental and climate change than legal requirements, and assesses environmental and climate change risks in consideration of the characteristics of the business area. Onsan Refinery has introduced an environmental management system (EMS) to respond to domestic environmental regulations, and energy used in the process and emission are linked to the enterprise resource planning system (ERP) to systematically manage direct and indirect emission data. SMC considers the impact of rising sea-levels and coastal erosion when setting major business plans, and has operated an environmental monitoring program for the past 10 years with local universities to preemptively review and assess local environmental factors and risks such as wetland, sedimentary layers, biological indicators and surface water.

Identification of Illegal Behaviors inside the Organization

Through cyber audit monitoring, we are eliminating and improving unreasonable issues by making relevant reports to the management and receiving instructions from them. We aim to establish a strict and structural control environment in which all internal members can understand their roles and duties through training and standard controlling procedures.



5

Sustainability Fact Sheet

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Economic Performance

Operation Status of the Board of Directors

(Unit: number of cases)

Category	2018	2019	2020
No. of regular BOD meetings	6	6	6
No. of special BOD meetings	12	9	7
Total No. of BOD meetings	18	15	13
No. of agenda discussed	26	23	24

Remuneration of the BOD

(Unit: number of people, KRW thousand, %)

Category	2018	2019	2020
Executive director	No. of directors	4	4
	Total remuneration paid	2,498,985	3,516,935
Non-executive director	No. of directors	5	5
	Total remuneration paid	330,000	330,000
Employees remuneration	Average	81,015	85,194
CEO	Remuneration	1,012,000	924,000
Highest remuneration	Amount paid	1,852,400	1,944,800
Ratio*	%	1,249	1,085

*CEO Remuneration/Average of Employees Remuneration

R&D Investment

(Unit: KRW million, %)

Category	2018	2019	2020
Investment costs	1,341	1,411	2,432
R&D budget to sales ratio*	0.02	0.03	0.04

*Sales are calculated by cost-method

Shared Growth Support

(Unit: number of corporates, KRW million)

Category	2018		2019		2020	
	No. of recipient	Amount supported	No. of recipient	Amount supported	No. of recipient	Amount supported
Shared Growth Fund	78	40,000	75	40,000	82	40,000

Environmental Performance

Environmental data is based on Onsan Refinery.

GHG Emission

(Unit: tCO₂-eq)

Category	Details	2018	2019	2020
GHG Emission	Scope1	2,214,108	2,215,475	1,891,934
	Scope2	1,631,543	1,629,769	1,642,615
	Total	3,845,651	3,845,244	3,534,550

Energy consumption

(Unit: T.J)

Category	Details	2018	2019	2020
Energy consumption	Electricity	33,593	33,557	33,821
	Fuel	19,416	19,981	16,528
	Total	53,008	53,537	50,347

Water consumption

(Unit: thousand m³)

Category	Details	2018	2019	2020
Water consumption	Industrial water	12,768	12,316	12,156

Wastewater discharge

(Unit: thousand m³)

Category	Details	2018	2019	2020
Wastewater discharge	Reuse amount*	961	961	1,100
	Outflow	2,992	2,472	2,460
	Total	3,953	3,433	3,560

* Reuse amount of surface water such as rainwater, etc.

Water pollutant discharge

(Unit: ton)

Category	2018	2019	2020
Suspended solid(SS)	59.8	22.7	21
Chemical Oxygen Demand(COD)	74.8	56.9	15

Waste generated

(Unit: ton)

Category	2018	2019	2020
General waste generated	37,443	40,691	34,281
Designated waste generated	70,601	63,960	70,641

Emission concentration of specific hazardous air pollutants*

Category	Lead	Nickel	Fluorine	Hydrogen chloride	Cadmium	Chrome
Emission standard	1.5	2	2	4	0.2	0.4
Average concentration	0.138	0.02	0.133	0.33	0.014	0.017

*Based on 2020

(Unit for lead, nickel, cadmium, and chrome: mg/m³, Unit for fluorine and hydrogen chloride: ppm)

By-product generated

(Unit: thousand ton)

Category	2018	2019	2020
Slag	765,415	753,615	708,647

Air pollutant emissions

(Unit: kg)

Category	2018	2019	2020
Dust	101,958	92,237	91,766
NOx	1,037,748	1,142,980	766,675
SOx	2,007,709	2,236,366	1,261,335

Average emission concentration of air pollutants*

(Unit for dust: mg/m³, Unit for NOx and SOx: ppm)

Category	2018	2019	2020
Dust	2.68	2.85	3.22
NOx	34	37	24
SOx	35	47	23

*Air pollutant emissions/actual production

Violation of environmental regulations

(Unit: number of cases)

Category	2018	2019	2020
No. of violation	0	0	0

Economic Performance Environmental Performance Social Performance

Social Performance

Talent Development

(Unit: hour, KRW thousand, number of people)

Category	2018	2019	2020	
Total training hours	59,369	67,857	82,313	
Total training costs	489,407	422,415	322,845	
Male	Training hours	58,653	66,816	81,524
	No. of employees*	4,127	6,770	4,734
	Average training hour	14	10	17
Female	Training hours	632	949	685
	No. of employees	31	31	36
	Average training hour	20	31	19

*Average training hour is calculated by aggregating the number of participants into one when participating in one curriculum per participant

Total Number and Composition of Employees*

(Unit: number of people, %)

Category	2018	2019	2020	
By gender	Male	1,338	1,340	1,367
	Female	52	55	62
By employment type	Full-time	1,352	1,359	1,375
	Non-regular workers	38	36	54
Executives	Male	29	27	32
	Female	-	-	-
	Female ratio	-	-	-
Managers (Level 2 or higher)	Male	216	228	239
	Female	2	3	3
	Female ratio	0.9	1.3	1.2

*Calculated based on year-end data from the department in charge

Manpower Composition Status by Business Site

(Unit: number of people)

Category	2018	2019	2020	
Male	Head office	129	115	125
	Onsan Refinery	1,209	1,225	1,242
Female	Head office	21	24	26
	Onsan Refinery	31	31	36
Full-time	Head office	148	137	149
	Onsan Refinery	1,204	1,222	1,226
Non-regular	Head office	2	2	2
	Onsan Refinery	36	34	52

Employment and Retirement

(Unit: number of people)

Category		2018	2019	2020
Newly hired employees	Male	31	39	63
	Female	4	3	5
	Total	35	42	68
Retirees	Male	35	40	46
	Female	4	1	4
	Total	39	41	50

Employment of Social Minorities

(Unit: number of people)

Category	2018	2019	2020
Employment status of the disabled	23	25	27
Employment Status of Korean Veterans	30	34	37
Employment status of foreigners	1	2	2

Human Rights Training*

(Unit: number of people, %)

Programs	Recipients	Graduate	Non-Graduate	Graduation rate
Workplace Harassment Training	1,457	1,454	3	99.8
Sexual Harassment Training	1,457	1,454	3	99.8
Improving Disability Awareness Training	1,457	1,454	3	99.8

* Based on 2020

** Trainings are subject to all employees, graduation rate is 100% except for non-graduated due to retirement, etc.

Labor Union Membership

(Unit: number of people, %, number of cases)

Category	2018	2019	2020
Union member	923	911	917
Total employees	1,361	1,368	1,397
Union membership rate	68	67	66
No. of Labor Management Councils held	4	4	4

Violation of Internal Regulation and Countermeasures

(Unit: number of cases, number of people)

Category	2018	2019	2020
No. of personnel committees held	15	4	15
No. of disciplinary referrals	42	9	30

Economic Performance Environmental Performance Social Performance

General Check-up Support Status

(Unit: number of people, KRW million)

Category	2018	2019	2020
No. of people	841	845	844
Costs	195	232	244

Retirement Pension

(Unit: number of people, KRW million)

Category	2018	2019	2020
No. of persons subscribed	1,291	1,289	1,290
Operation cost	139,807	155,119	174,648

Childcare Leaves

(Unit: number of people)

Category	2018	2019	2020
No. of persons on child-care leaves	5	4	5
No. of persons returned	5	4	5
Work for 12 months or more after return	5	4	5

Pay rate of Male to Female

(Unit: %)

Category	2020
Managerial position(Level 2 or higher)	105.7
Non-managerial position	170.1

Occupational Accident Rate

(Unit: number of people, %)

Category	Employees of the contractor			Employees of suppliers			Employees of the contractor and subcontractor		
	No. of regular workers	No. of injured people	Accident rate	No. of regular workers	No. of injured people	Accident rate	No. of regular workers	No. of injured people	Accident rate
2018	1,257	2	0.16	1,327	11	0.83	2,584	13	0.50
2019	1,269	2	0.16	1,610	17	1.06	2,879	19	0.66
2020	1,300	1	0.08	1,611	17	1.06	2,911	18	0.62

Investment in Safety and Health

(Unit: KRW million)

Category	Safety	Health	Facilities	Total
2018	3,910	610	96,910	101,430
2019	5,050	610	119,170	124,830
2020	4,470	800	138,550	143,820



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Appendix

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GRI INDEX

Universal Standards (GRI 100)

Classification	Disclosure	Indicators	On this report	Remarks
Organizational Profile	102-1	Name of the organization	10	
	102-2	Activities, brands, products, and services	18	
	102-3	Location of headquarters	10	
	102-4	Location of operations	11	
	102-5	Ownership and legal form	11	
	102-6	Markets served	11	
	102-7	Scale of the organization	11	
	102-8	Information on employees and other workers	85	
	102-9	Supply chain	66	
	102-10	Significant changes to the organization and its supply chain	-	No significant changes
	102-11	Precautionary Principle or approach	34	
	102-12	External initiatives	27	
	102-13	Membership of associations	54	
Strategy	102-14	Statement from senior decision-maker	8	
Ethics & Integrity	102-16	Corporate Philosophy, Corporate Commitment, and Standards of Conduct	73	
	102-17	Mechanisms for advice and concerns about ethics	74	
Governance	102-18	Governance structure	68	
	102-22	Composition of the highest governance body and its committees	68	
	102-24	Nominating and selecting the highest governance body	68	
	102-26	Role of highest governance body in setting purpose, values, and strategy	68	
	102-27	Collective knowledge of highest governance body	68	
	102-31	Review of economic, environmental, and social topics	75-76	
	102-34	Nature and total number of critical concerns	29	
Stakeholder Engagement	102-40	List of stakeholder groups	28	
	102-41	Collective bargaining agreements	86	
	102-42	Identifying and selecting stakeholders	28	
	102-43	Approach to stakeholder engagement	28	
	102-44	Key topics and concerns raised	28	
Reporting Practice	102-45	Entities included in the consolidated financial statements	10	
	102-46	Defining report content and topic boundaries	29	
	102-47	List of material topics	30-31	
	102-48	Restatements of information	-	First-time reporting
	102-49	Changes in reporting	-	First-time reporting

Classification	Disclosure	Indicators	On this report	Remarks
Reporting Practice	102-50	Reporting period	2	
	102-51	Date of most recent report	8	
	102-52	Reporting cycle	-	Annually
	102-53	Contact point for questions regarding the report	2	
	102-54	Claims of reporting in accordance with the GRI Standards	2	
	102-55	GRI content index	90	
	102-56	External assurance	2	

Environmental Performance (GRI 300)

Classification	Disclosure	Indicators	On this report	Remarks
GRI305: Emissions	103	Management Approach	42	
	305-1	Direct (Scope 1) GHG emissions	53, 83	
	305-2	Energy indirect (Scope 2) GHG emissions	53, 83	
GRI 306: Effluents and Waste	306-1	Water discharge by quality and destination	40	
	306-2	Waste by type and disposal method	41	
	306-3	Significant spills	84	

Social Performance (GRI 400)

Classification	Disclosure	Indicators	On this report	Remarks
GRI 401: Employment	103	Management Approach	54-56	
	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	57	
GRI403: Occupational health and safety	403-1	Occupational health and safety management system	60	
	403-2	Hazard identification, risk assessment, and incident investigation	87	
	403-3	Occupational health services	61	
	403-4	Worker participation, consultation, and communication on occupational health and safety	61	
	403-5	Worker training on occupational health and safety	62-64	
	403-6	Promotion of worker health	64	
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	64-65	
GRI404: Training and Education	403-9	Work-related injuries	87	
	103	Management Approach	56	
	404-2	Programs for upgrading employee skills and transition assistance programs	56	

Classification	Disclosure	Indicators	On this report	Remarks
GRI405: Diversity and Equal Opportunity	103	Management Approach	55	
	405-2	Ratio of basic salary and remuneration of women to men	87	
GRI412: Human Rights Assessment	103	Management Approach	55-56	
	412-2	Employee training on human rights policies or procedures	86	
GRI413: Local Communities	103	Management Approach	65-66	
	413-1	Operations with local community engagement, impact assessments, and development programs	65	
GRI414: Supplier Social Assessment	103	Management Approach	54	
	414-2	New suppliers that were screened using social criteria	55	

Non-material Topic Disclosure

Environmental Performance(GRI 300)

Classification	Disclosure	Indicators	On this report	Remarks
GRI301: Materials	301-2	Recycled input materials used	22	
GRI302: Energy	302-4	Reduction of energy consumption	45	
GRI303: Water and Effluents	303-3	Water withdrawal	83	
	303-4	Water discharge	37	
GRI305: Emissions	305-5	Reduction of GHG emissions	43	
	305-7	Nitrogen oxides(NOx), sulfur oxides(SOx), and other significant air emissions	37, 84	
GRI306: Effluents and Waste	306-4	Transport of hazardous waste	84	

Social Performance(GRI 400)

Classification	Disclosure	Indicators	On this report	Remarks
GRI401: Employment	401-1	New employee hires and employee turnover	86	
	401-3	Parental leave	87	
GRI404: Training and Education	404-1	Average hours of training per year per employee	85	
GRI405: Diversity and Equal Opportunity	405-1	Diversity of governance bodies and employees	68, 85	

SASB INDEX

Sustainability Disclosure Topics & Accounting Metrics

Topic	Code	Category	Accounting Metric	Unit of Measure	On this Report
Greenhouse Gas Emissions	EM-MM-110a.1	Quantitative	Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations	Metric tons (t), Percentage (%)	41
Greenhouse Gas Emissions	EM-MM-110a.2	Discussion and Analysis	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	-	50-53
Air Quality	EM-MM-120a.1	Quantitative	Air emissions of the following pollutants: (1) CO, (2) NOx (excluding N2O), (3) SOx, (4) particulate matter (PM10), (5) mercury (Hg), (6) lead (Pb), and (7) volatile organic compounds (VOCs)	Metric tons (t)	37
Energy Management	EM-MM-130a.1	Discussion and Analysis	(1) Total energy consumed, (2) percentage grid electricity, (3) percentage renewable	Gigajoules (GJ), Percentage (%)	83
Water Management	EM-MM-140a.1	Quantitative	(1) Total fresh water withdrawn, (2) total fresh water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	Cubic meters (m ³), Percentage (%)	83
Waste & hazardous Materials Management	EM-MM-150a.2	Quantitative	Total weight of mineral processing waste, percentage recycled	Metric tons (t), Percentage (%)	84
Biodiversity Impacts	EM-MM-160a.1	Discussion and Analysis	Description of environmental management policies and practices for active sites	-	7, 36, 79
Community Relations	EM-MM-210b.1	Discussion and Analysis	Discussion of process to manage risks and opportunities associated with community rights and interests	-	38, 65-66
Labor Relations	EM-MM-320a.1	Quantitative	Percentage of active workforce covered under collective bargaining agreements, broken down by U.S. and foreign employees	Percentage (%)	87
Business Ethics & Transparency	EM-MM-510a.1	Discussion and Analysis	Description of the management system for prevention of corruption and bribery throughout the value chain	-	71-73

*Items that are not applicable to Korea Zinc are not reported

Activity Metrics

Classification	Code	Category	Activity Metric	Unit of Measure	On this Report
Activity Metrics	EM-MM-000.A	Quantitative	Production of finished metal products	Metric tons (t)	13
	EM-MM-000.B	Quantitative	Total number of employees, percentage contractors	Number, Percentage (%)	85

TCFD INDEX

Financial Disclosure	Climate Factor	Description of Metric	Units	Alignment	Risk/Opportunity Type	On this Report
Expenditures	Risk Adaptation & Mitigation	Amount invested in developing low-carbon products, services and/or technology	KRW	GRI 302-5	Opportunity	44, 46
	Energy/Fuel	Total energy consumption	TJ	SASB : EM-MM-130a.1	Opportunity	83
	GHG emissions	A breakdown of reserves by type and an indication of associated emissions factors to provide insight into potential future emissions	KRW	SASB : EM-MM-120a.1	Transition Risk	42
Assets	Risk mitigation	Amount invested in deployment of low-carbon technology, energy efficiencies, etc. Amount invested in resiliency capabilities *	KRW	GRI 302-5	Opportunity for mitigating transition risk	36, 46
Location	Location	Locations within a designated flood zone	m ²	SASB : F0402-13	Physical Risk	7

* Capital facilities, assets

Third-party Assurance Statement

Dear Management and Stakeholders of Korea Zinc

Introduction

The Korean Standards Association("KSA") was commissioned by Korea Zinc Company, Ltd.("Korea Zinc") to perform a third-party Assurance Engagement of 'KOREA ZINC SUSTAINABILITY REPORT 2020'(the "Report"). KSA presents independent opinions as follows as a result of feasibility of the data contained in this Report. Korea Zinc has sole responsibility for content and performance contained in this Report.

Independence

As an independent assurance agency, KSA does not have any kinds of commercial interest in businesses of Korea Zinc apart from undertaking a third-party assurance on the Report. We have no other contract with Korea Zinc that may undermine credibility and integrity as an independent assurance agency.

Assurance Standards and Level

This Assurance Engagement followed the AA1000AS v3 assurance standards to provide Moderate Level assurance. We checked the four principles of inclusivity, materiality, responsiveness and impact in combination with information credibility of the Report. We also reviewed whether the Report content was created in accordance with the GRI Standards.

Assurance Type and Scope

This Assurance Engagement followed the AA1000AS v3 assurance standards to provide Type 2 assurance, which means that the assurance assessed the accuracy and reliability of the company's statements and performance data provided in the Report. The assurance scope is from January 1 2020 to December 31 2020 and the assurance focused on systems and activities including policies and goals, businesses and programs, standards, and achievements of the Company's sustainability management. While the company's environmental and social data as well as financial data was verified, the scope of review concerning stakeholder engagement was limited to the materiality test process.

Assurance Methodology

We used the following methods to gather information, documents and evidence with respect to the assurance scope.

- Analyses of articles related to Korea Zinc's sustainability management published by domestic media outlets.
- Review of management system and process used in improving the performance of sustainability management and preparing the Report.
- Review of the consistency between the financial performance data and the company's audit report/publicly announced data.
- Examination of internal documents and basic materials.

Assurance Results and Opinions is (On an assurance principle/process level)

KSA reviewed the draft version of this Report to present our opinions as an assurance provider. Modifications were made of the Report content if deemed necessary. We were not aware of any significant errors or inappropriate descriptions in this Report as a result of our Assurance Engagement. As such, we present our opinions of the KOREA ZINC SUSTAINABILITY REPORT 2020 as follows.

Inclusivity

- Has Korea Zinc engaged its stakeholders in strategically responding to sustainability?

KSA believe Korea Zinc is aware of the importance of stakeholder participation and is making an all-out effort to establish a process that will increase their participation. Korea Zinc has selected stakeholders including government and related organization, employees, corporate customers, individuals, partner companies, local communities and local government body to receive diverse feedbacks and opinions.

Materiality

- Has Korea Zinc included material information in the Report to help stakeholders make informed decisions?

We are not aware of any significant omissions or exclusions of data that is material to stakeholders. We verified that Korea Zinc conducted materiality test with issues identified from analyses of internal and external environments and reported according to the result.

Responsiveness

- Has Korea Zinc appropriately responded to stakeholder requirements and interest in this Report?

We verified that Korea Zinc responded stakeholders' needs and interests through reflecting stakeholders' opinions in the Report. We are not aware of any evidence that Korea Zinc's response to significant issues of stakeholders was reported inappropriately.

Impact

- Has Korea Zinc appropriately monitored its impact on the stakeholders?

We verified that the Company is monitoring and assessing its impact on the stakeholders by conducting an enhanced verification of its standard business activities. Furthermore, it has been verified that the Company appropriately publishes its findings in the Report.

GRI Standards Disclosure

We confirmed that this Report was prepared in accordance with GRI Standards Core Option. Based on data Korea Zinc provided, we also confirmed a validity of the contents related to General Standard Disclosure and Specific Standard Disclosure.

Universal Standards

We have verified that the Report complied(s) with the requirements of the Universal Standards of Core Option, and (have) reviewed the following disclosures:

102-1 to 102-13(Organizational profile), 102-14(Strategy), 102-16 to 102-17(Ethics and Integrity), 102-18(Governance), 102-40 to 102-44(Stakeholder Engagement), 102-45 to 102-56(Reporting Practice), 103(Management Approach)

Topic-specific Standards

We have checked the material topics identified from a materiality test process in which content to be disclosed. We examined disclosures below:

303-3, 303-4, 305-1, 305-2, 306-1, 306-2, 306-3, 401-2, 403-1, 403-2, 403-3, 403-4, 403-5, 403-6, 403-7, 403-9, 404-2, 405-2, 412-2, 413-1, 414-2

Opinions and Recommendations(Performance /Issues)

We present the following recommendations to help Korea Zinc establish a company-wide sustainability management strategy and respond to continuous issues of sustainability.

Economic

As a global general nonferrous metal refining company, Korea Zinc strives to enhance its corporate value through innovation and exploring and fostering future growth engines. Furthermore, Korea Zinc is an eco-friendly refining company with the world's best cost-competitiveness based on its unrivaled technologies and differentiated integrated process system. Korea Zinc develops together with stakeholders, and pursues environmental & energy management, win-win management, and sharing management by adopting sustainable management (ESG). In order to prepare for the post-COVID-19 era and continue to grow as a global refining company, Korea Zinc is recommended to continuously develop holistic management ability to adapt to changes in the global business environment through cooperation with global companies, and securing reliability and transparency in accounting information, which is recently gaining more importance.

Environment

Recognizing the impact of corporate activities on the environment, society, and the economy, Korea Zinc published a sustainability report in line with global trends in the environmental sector. It represents a positive attempt to collect and disclose environmental indicators as part of corporate responsibility for global climate change and environmental improvement. Such efforts are expected to contribute to reducing environmental pollution. In addition to energy and greenhouse gas, monitoring is conducted based on environmental indicators such as water quality and air quality. However, as per some quantitative indicators, it is necessary to establish standard calculation guidelines and reinforce the data collection system to improve the accuracy and appropriateness of the criteria for global sustainability reporting. In addition, it is recommended that Korea Zinc prepares the report according to a series of specific goals setting an execution-review-evaluation process for environmental management.

Social

Korea Zinc established the ESG strategy system through identifying key ESG issues by collecting opinions from stakeholders, and published its first sustainability report that contains economic, environmental and social performances it has recorded till now. Despite being the first report, Korea Zinc strived to introduce various global initiatives and guidelines such as the UN SDGs, TCFD, and SASB, in which the stakeholders have a high interest, which is worthy of praise. If this year was the time to diagnose how well Korea Zinc meets the global requirements, I expect the company can make an in-depth report on its achievements through continuous improvement activities. Moreover, it is recommended that the company monitors and reports on the impact of its business activities on the ecosystem.



The Korean Standards Association (KSA), established as a special corporation in accordance with the Law for Industrial Standardization in 1962, serves as a knowledge service provider that distributes and disseminates such services as industrial standardization, quality management, sustainability management, KS certification and ISO certification. The KSA is committed to the sustainable development of Korean society as an ISO 26000 national secretary, certified GRI training partner, AA1000 assurance provider, KSI (Korea Sustainability Index) operator, and UN CDM DOE (development operational entity), and as an assurance provider of the Korean government's greenhouse gas energy target management system.

September 2021
Myung Soo Kang
KSA Chairman & CEO

Myung Soo Kang



This report has been printed with soy ink on FSC™ certified paper.



Korea Zinc

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