

KORES SUSTAINABILITY REPORT 2018





○ About This Report

This is the 11th sustainability report published by KORES to share the vision, activities, and outcome of the company's sustainable management with domestic and overseas stakeholders. Economic, social, and environmental projects conducted by KORES for sustainable management and its outcomes have been included as well as main issues that our fellow stakeholders focus on and 'securing a stable supply of mineral resources,' 'creating a safe/ environmentally friendly mining ecosystem,' and 'preparing for future resource development' are some of the main focuses addressed in the report.

The report has been created based on GRI (Global Reporting Initiative) Standards, and contains the present circumstances and outcomes of sustainability management by KORES from January 1, 2018 to December 31, 2018. Three years of quantitative performance data has been provided for a better view of the trends, and while performance of the corporation's head offices and domestic branches have been included, mutual investment companies or subsidiary companies have not been included in the scope of this report. With regards to financial performance, financial audit results have been stated based on the consolidated standard applying the Korean International Financial Reporting Standards (K-IFRS) from 2011, and other included details included have had its reliability verified by THE CSR.

For additional information, please refer to the KORES website, and for further questions regarding this report, please contact each department.

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CEO Message

Dear KORES stakeholders, it is my pleasure to be able to address you through the 11th sustainability management report.

KORES is the only public enterprise in Korea specializing in resource development to secure mineral resources. Since its establishment in 1967, it has played a major role in developing Korea around manufacturing by promoting domestic mining and supporting resource development. Also, it has taken the initiative to secure mineral resources through promoting global resource development against resource nationalism and the resource-related disputes of other countries rich in resources, and is continuing to work hard in securing mineral resources by supporting the advancement of private sectors overseas.

Expectations of new industries are rising in accordance with the recent fourth industrial revolution. Also, the government is conducting five new industry pioneering projects to develop future industries and seek new areas that will drive growth. KORES expects to see a growth in demand for minerals in the future, and to prepare to meet this future demand, has selected 10 industries, and 5 types of critical minerals and 12 types of interest minerals used by these industries.

However, current growth of global resource industries is stagnant due to the sluggish economy and reduced demand which is causing mineral prices to drop. Moreover, Korean mining is becoming less economical due to higher labor costs and the deepening of orebodies, and private sector investment in overseas resource development is also declining. KORES acknowledges that overcoming the external challenges and making efforts to achieve our purpose of establishment would be the key for sustainability of KORES. In this 11th sustainability management report, the effort made by KORES and its outcomes as it moves forward while dealing with the rapidly changing business environment are presented.

First, we promise to contribute to the economy by securing a stable supply of mineral resources.

In order to improve the supply system that is mainly dependent on imports and to prepare for circumstances when supply is uncertain, KORES is building a private sector-oriented resource development

support system and proactively supporting the advancement of private sectors into overseas resource development. Also, while conducting successful restructuring through normalization and sales of assets of our major global projects, we promise to promote sustainable growth and development as a domestic mining partner.

Second, we promise to make efforts to develop a safe and environmentally friendly mining industry.

KORES is conducting safety training for miners in accordance with the recently revised Mining Safety Act, and is supplying safety regulations to mines. Also, KORES introduces modernized mining equipment for the environmental-friendly mining industry in order to build safer and more environmental-friendly mining development.

Third, we promise to make efforts to develop resources for the future.

We promise to deal with the changing environment through developing future workforce and technology management. We acknowledge that creating future value through continuously conducting management innovation projects, respecting variety, and promoting mutual growth is the way to stay competitive and overcome the uncertainty of the business environment. In order to achieve this, we will build a sustainable growth model through active communication with our stakeholders and creating value.

KORES, as a public enterprise, shall continue to pursue social value such as social integration and ethical business. We also promise to provide a better service to our stakeholders and the public. We shall continue to create a stable supply of mineral resources under our vision 'LEADER OF RESOURCE DEVELOPMENT, STAND UP KORES.' as the last defense of the resource industry. We thank you for your continued support and interest in our business.

Thank you

December 2019
Acting President of KORES
Nam Yunhwan





01

KORES, Resource Development Leader

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About KORES



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KORES Value Creation Process

ABOUT KORES

KORES was founded in 1967 with the purpose to create stable supply of mineral resources. KORES promotes feasible development of resources by supporting domestic mining and promotes the stable supply of mineral resources required for the economy through overseas resource development. While stockpiling rare minerals in preparation for supply instability, it is also committed to professional development and technology innovation in preparation for the future. KORES promises to overcome the lack of resources and build a stable supply of industrial materials.

Overview



Company Name	Korea Resources Corporation
Established Date	05 June 1967
Purpose	Stable supply of mineral resources
Organization Type	Public enterprise
Main Office	199 Hyeoksin-ro, Wonju-si, Gangwon-do, Republic of Korea
Employees	483 employees (Jan 2019)
Structure	3 Divisions·9 Departments·38 teams·6 offices



Assets	KRW 3 trillion 959 billion 800 million
Sales	KRW 638 billion 300 million
Credit Rate	Domestic AAA, A1(1) S&P A/Moody's : A1
Shareholder	Korean Government 99.86% Korea Development Bank 0.14%

*Finances : K-IFRS consolidated financial statements (based on end of December 2018)

History

1967~1985

Founded as an integrative mining facility



1967
• Established as a public enterprise

1974
• Completed the head office building in Sindaebang

1974
• Established a technology laboratory

1978
• Introduced the global resource development support business agency

1986~2007

Changed functional direction to overseas resource development

1990

• First investment of overseas resource development

1994

• Began North Korean resource development
• Opened first office in Beijing China

1995

• Provided resource information technology service

1997

• Established office in Sydney Australia

2003

• Joint development agreement with Jeongchon graphite mine

2004

• Established investment agreement with Ambatovy Nickel project in Madagascar

2006

• Completed Jeongchon graphite mine
• Ambatovy joint nickel project in Madagascar

2007

• Started stockpiling of mineral resources

2008~2015

Transformed into mineral resource development & investment organization

2008

• Purchased share in Boleo Copper Project in Mexico
• Changed name to Korea Resources Corporation

2012

• Produced nickel product from the Ambatovy project in Madagascar
• Obtained management rights of the Boleo project in Mexico

2014

• Completed plant for Boleo copper project in Mexico

2015

• Started pilot production for the Boleo copper project in Mexico
• Inauguration of the KORES' new head office in Wonju new town

2016~

Launched as a resource development leader

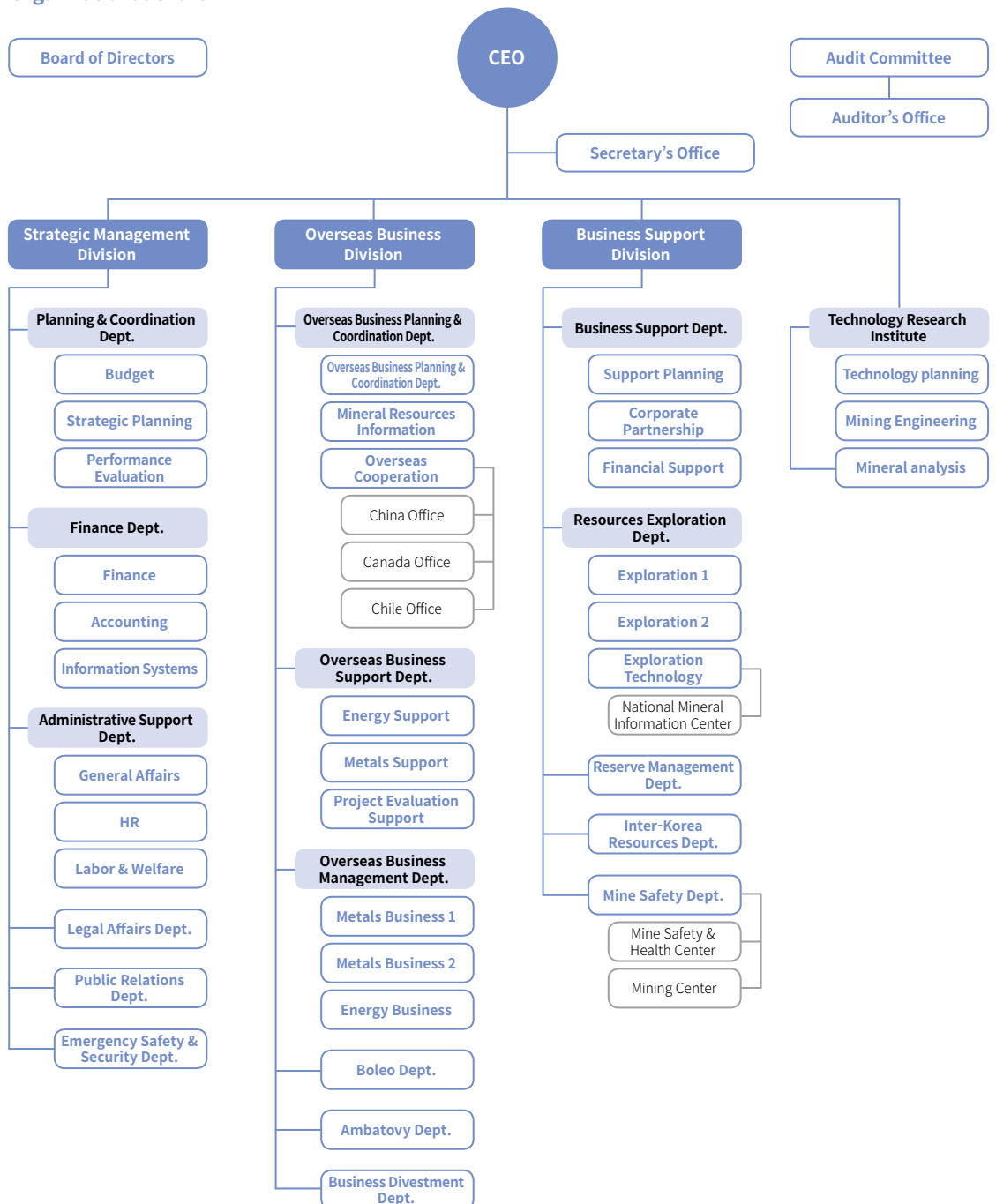


2017
• 50th anniversary

2018
• Established an overseas support division

KORES is made up of 3 division, 9 department, and 38 teams. The three divisions consist of strategic management division, overseas business division and business support division and while the strategic management division manages projects, the overseas business division and business support division conduct projects in it's the project areas that are categorized into overseas and domestic areas. Also, 8 departments are further divided into project units for efficient implementation of each project; and a research laboratory is dedicated to research and development to help prepare for the future.

Organizational Chart

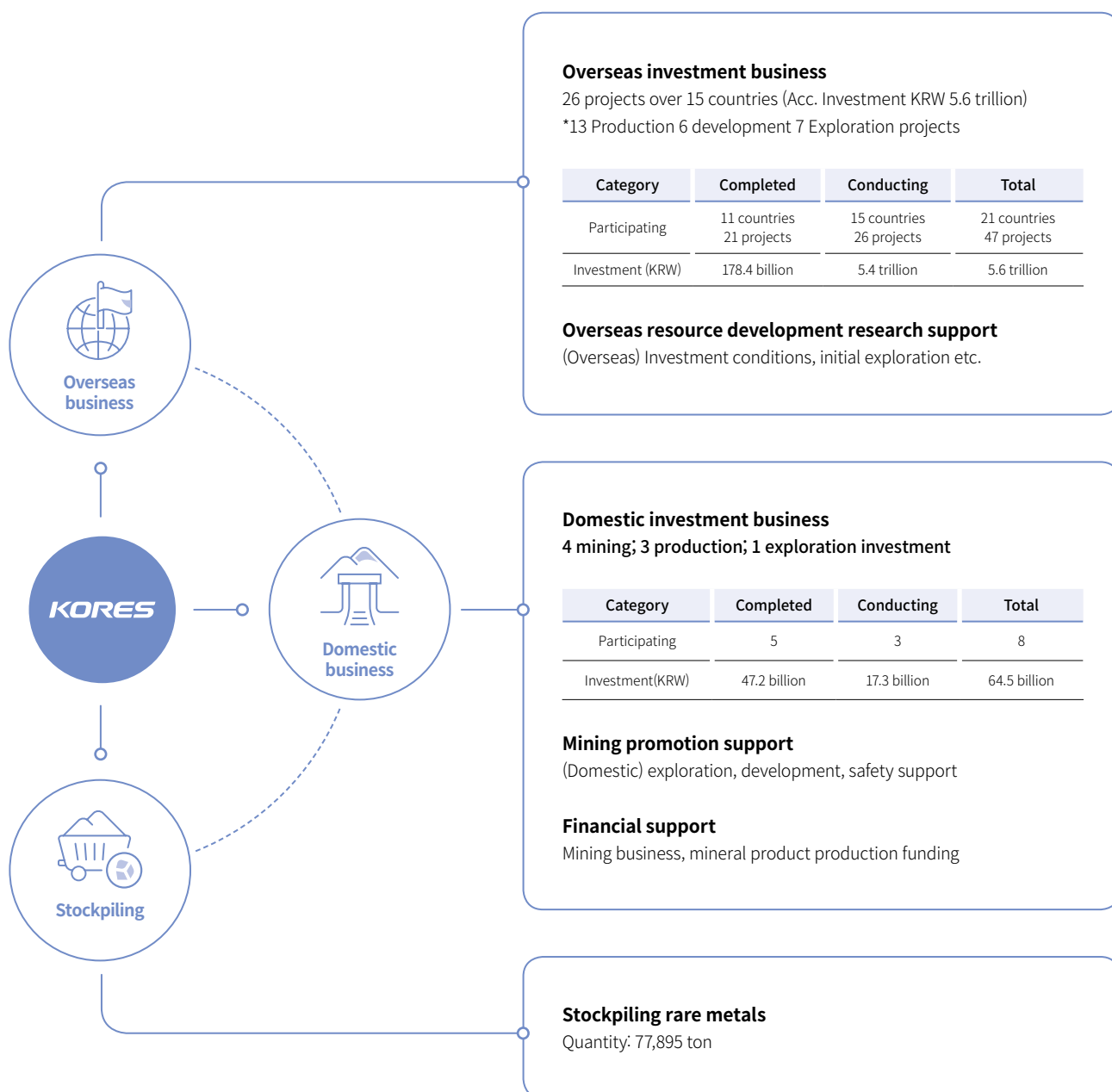


Main Function

KORES is investing in the development of domestic and overseas resources, supporting private sectors and stockpiling rare metals to create a stable supply of mineral resources.

The overseas resource development project started with its first investment made in 1990, and now has expanded into 47 projects over 21 countries and the accumulated investment amount has reached KRW 5.6 trillion. In addition, KORES is striving to enhance the rate of resource development by supporting private sectors to advance overseas.

Domestic business are carried out to promote mining development by supporting domestic mining technologically and financially. Also, by stockpiling rare metals, it is preparing for supply instability, price surge, etc.



Vision & Strategy

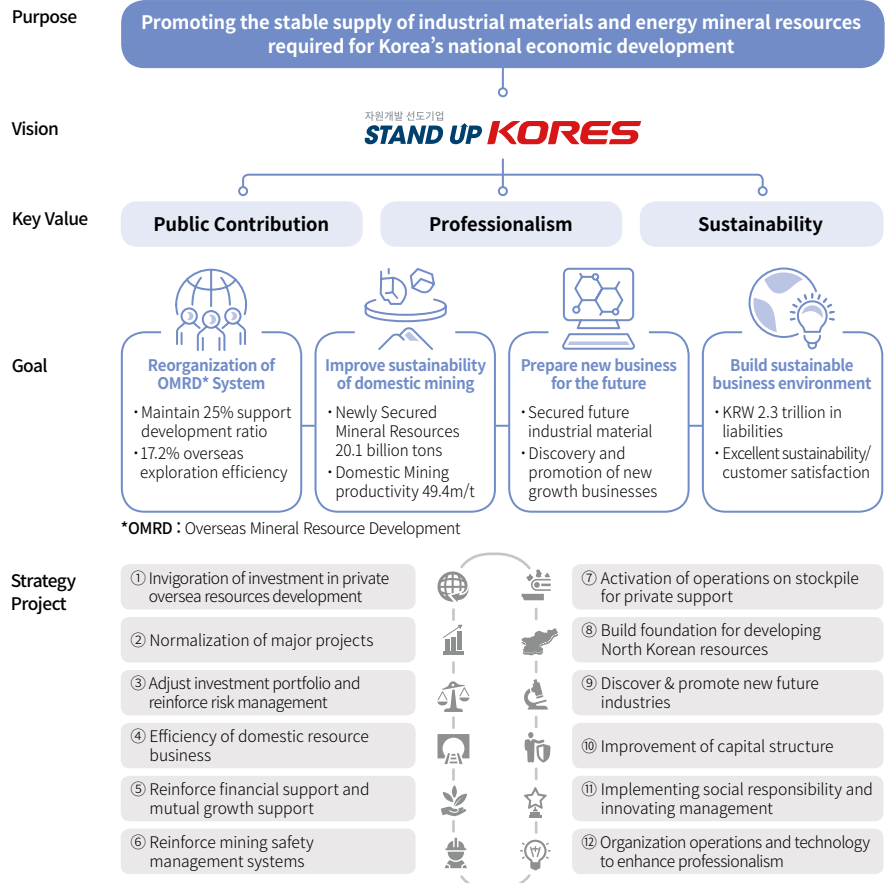
KORES has presented the 'LEADER OF RESOURCE DEVELOPMENT, STAND UP KORES' as its new vision in November 2016 to reflect its new business environment and create a better future. Through this, it shall overcome the current challenges as the leader of Korean resource development and the final defense of the resource industry.



Corporate Act Article 1 (Purpose)

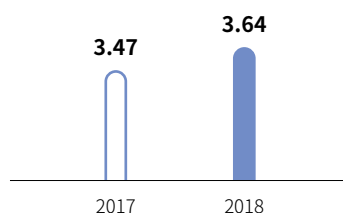
This provision is to establish Korean Resources Corporation to develop domestic and overseas mineral resources, and to effectively conduct development /support of mining resource projects to create a stable supply of mineral resources and contribute to the economy.

The strategic system of KORES created four business goal by three keywords: overcoming crisis, strengthening roles, innovation of the organization, derived from purpose and vision. KORES has established 12 strategic projects to achieve its business goals and created 31 key KPIs to measure/manage its performance.



Satisfaction of the Strategic System

Unit : Point



Sustainability Management Strategy

Action Plan



KORES' sustainability management has a goal to create social value through achieving its purposes and communicating with its stakeholders.

To create a stakeholder-oriented social value, plans promoting social value have been established. Also, to improve implementation, a social value implementation committee has been established. In addition, external advisory groups made up of the public evaluate how KORES' activities impact society while encouraging better communication.

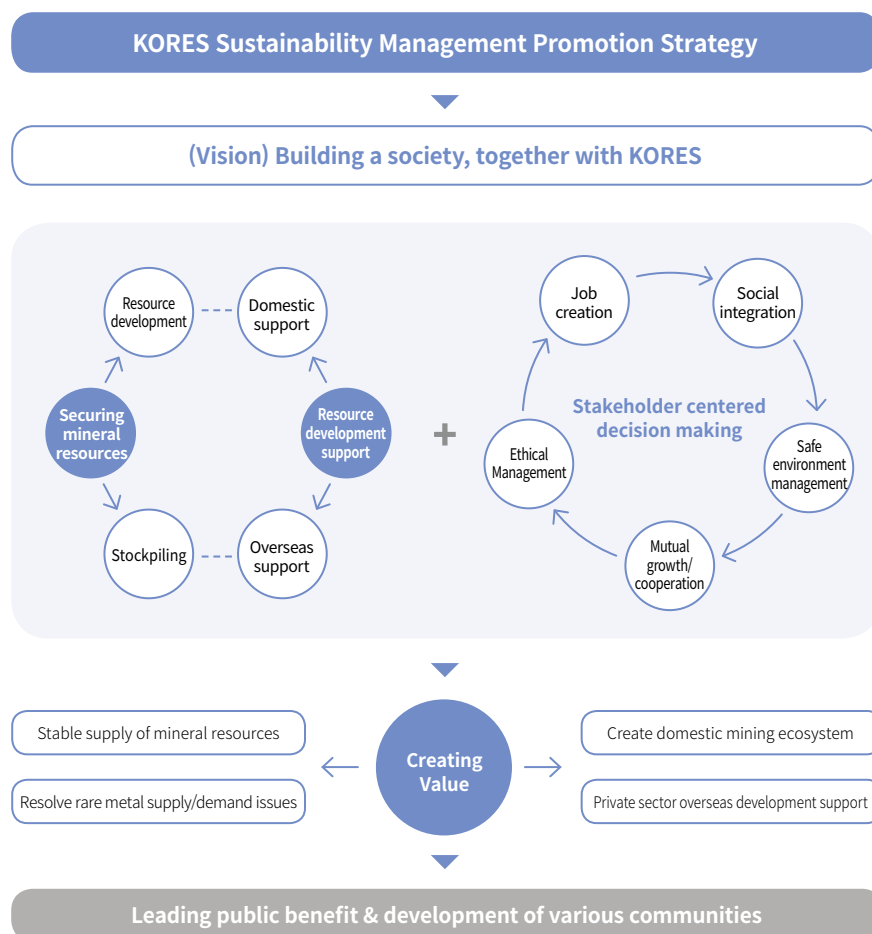
Sustainability management vision

The vision for sustainability management of KORES, "Building a society together with KORES" expresses the company's desire for mutual growth and development with stakeholders in the resource development field.

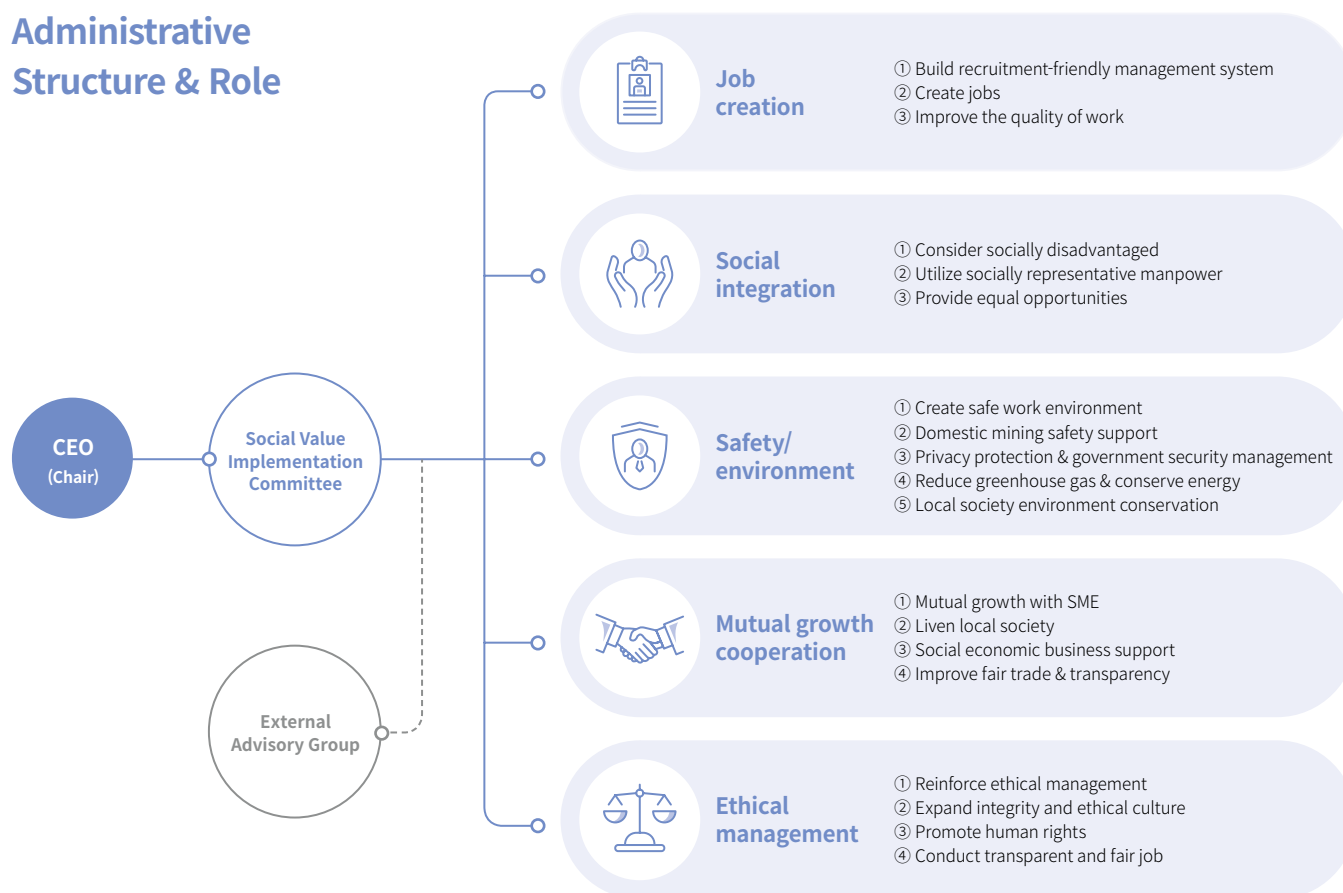
Sustainability management strategy

To establish its sustainability management strategy, first the concept of social value has been defined and five values have been established; ① job creation ② social integration ③ safe/environment management ④ mutual growth/cooperation ⑤ ethics/human rights. Second, to reflect industrial characteristics, the main projects are connected to the five values, and methods are explored to create value within the projects. And finally, implementability is enhanced by matching these with strategic projects.

Social Value Promotion System



Administrative Structure & Role

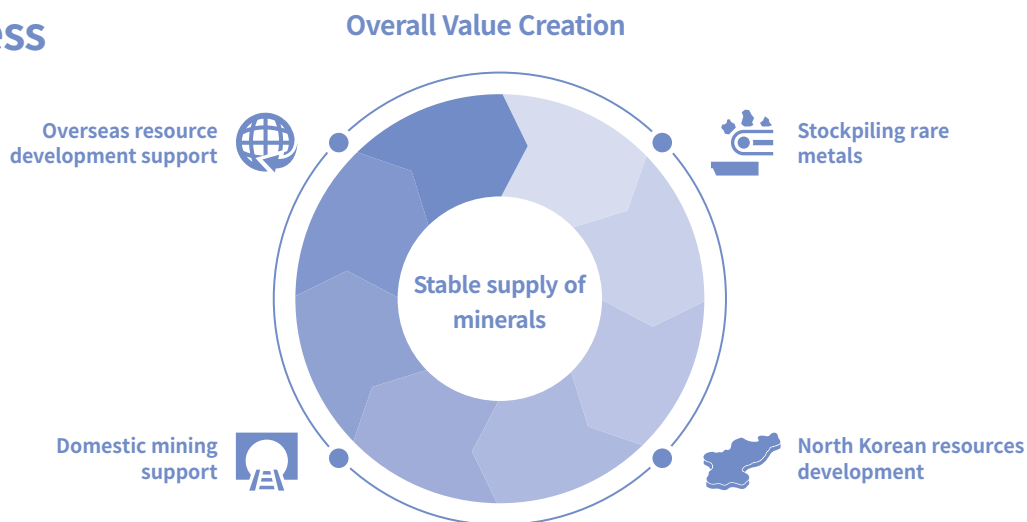


2018 Key Outcome

Major Outcome in Implementing Social Values

Category	Key KPI	2016	2017	2018
Create jobs	Switched from part-time (people/rate)	2	14	43
	Create direct/indirect jobs	New	634	661
Social integration	Increase female management (percentage of grade 2 manager)	5.7%	7.8%	9.8%
Safety/Environment	Efficiency anti-deforestation	New	145.5m ²	184.7m ²
	Supply of safety regulations	New	13%	32%
	Number of Facility inspections	433	1,079	882
	Safety trainees	4,033	3,334	3,183
	Number of cyber attacks	0	0	0
Mutual growth	Government mutual growth grade	Good	Average	Average
	Benefit sharing amount (million KRW)	4.6	10.0	11.9
Ethics human rights	Overall integrity	Grade 2	Grade 2	Grade 2
	Anti-Corruption appraisal rate	Grade 3	Grade 4	Grade 2

KORES Value Creation Process



Overseas resource development support

In order to promote active overseas investment by private sectors in accordance with the private sector oriented overseas resource development policy, KORES is reducing investment risks by providing required information and technological support. Also, by organizing an overseas mineral resource development committee, it is building a network including cooperative issue development investment between industries interested in resource development.



Domestic mining support

Korea depends on overseas import for most of its minerals, and for domestic mining, the mining ecosystem is being threatened by a poor development environment, including lack of high quality ore bodies and ores deepening. KORES is promoting domestic mining through supporting various areas such as research, production, mining safety management etc., to create sustainable value for domestic mining.



Stockpiling rare metals

Rare metals that are key material for future industries bring supply risks such as maldistribution of supplies, production in small amounts etc., KORES is preparing for emergency situations by stockpiling two months worth of the national demand of 10 types of rare metals.

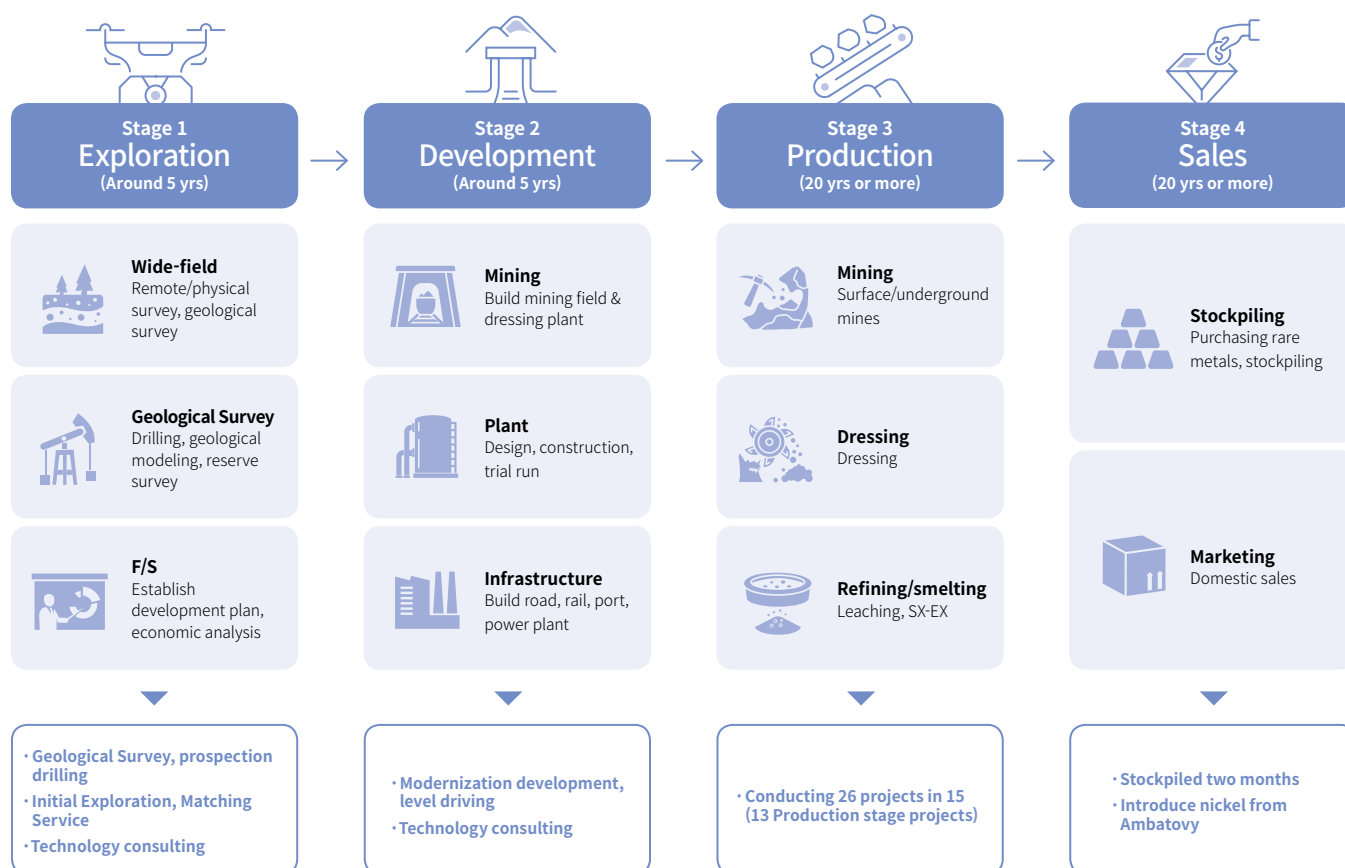


North Korean resources development

In order to prepare for the development of natural resources in North Korea, which has high potential, and to build the East Sea energy/resource belt which is key for the government's "Setting up new Korean economic map & implementing economical unification" project, KORES is creating a cooperative joint road map combining our capital and technology with North Korea's resources/workforce and building a support system for private sector advancement.

Value Creation by Function

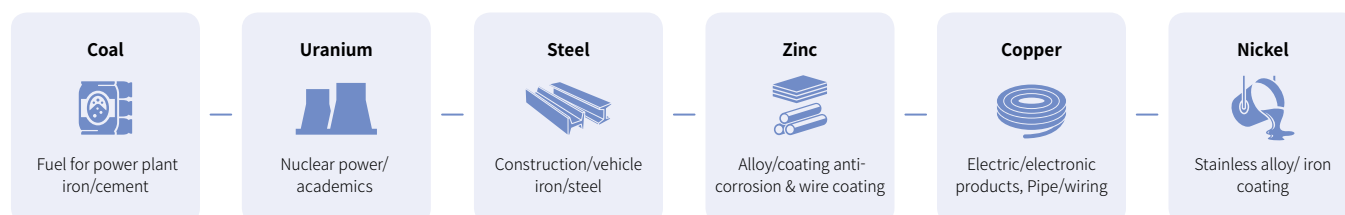
Resource development is a long process from exploration to sales with various activities under each step. KORES has experience in all areas of exploration, development, production and sales and uses this to create outstanding business outcomes at each step.



Material flow & Key Mineral Use



Key Mineral Use and Industries





02 Sustainability Performance

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Stakeholder Engagement



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Materiality Assessment



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Issue 1.
Securing a Stable Supply of Mineral Resources

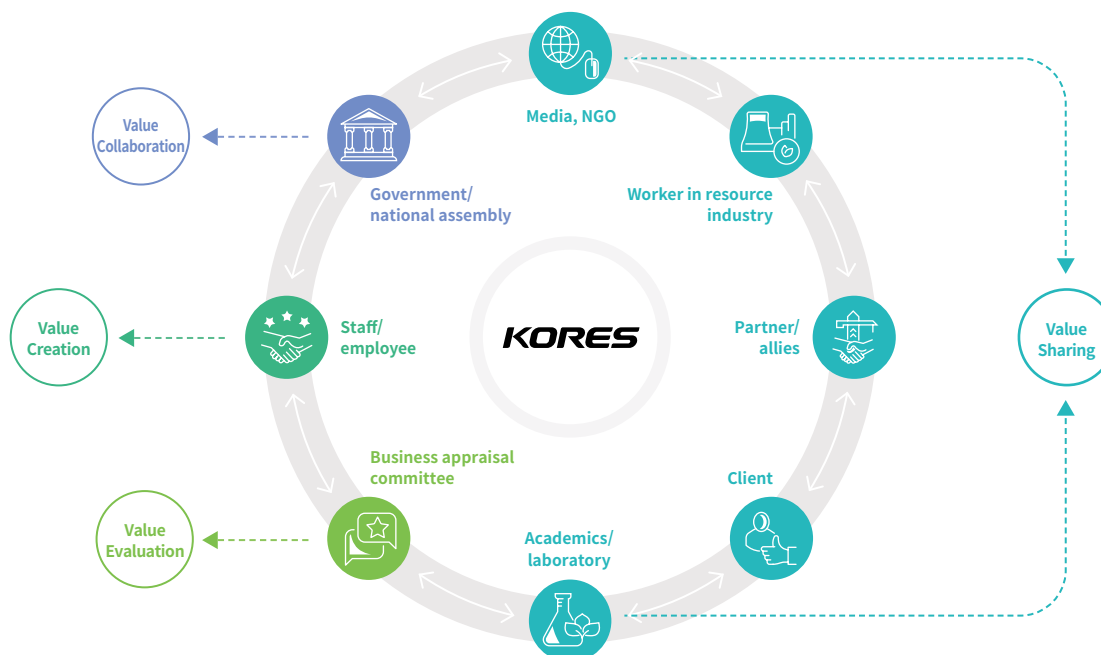
38
Issue 2.
Creating a Safe & Environment-friendly
Mining Ecosystem



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Issue 3.
Preparing for Future Resource
Development

Stakeholder Engagement

Stakeholders of KORES are defined as ‘individuals or groups that are significantly affected by the activities conducted by KORES.’ In order to identify the expectations and interests of the stakeholders, it manages various communication channels, to collect various opinions of stakeholders and reflect them in business operations.



	Value Collaboration	Value Sharing				Value Evaluation	Value Creation
Stakeholder	Government, national assembly	Media, NGO	Worker in resource industry	Partner/allies	Client	Media, NGO, Business appraisal committee	Staff, employee, union
Key Interests	Government policy, achieve establishment goal	Social responsibility, ethical management	Joint investment technology research & support	Mutual partnership, fair trade	Effective execution of government subsidies	Outcome, social responsibility, ethical management	Performance appraisal, competence development
Communication Channel	Monthly meeting, notifications	Meetings, company newsletter	Conference, seminars	Meetings/information session	Integrative customer management system	Business appraisal consulting & meeting, company newsletter	Townhall meeting, survey, unit committee meeting

Survey Results on Views on Sustainability Management

Purpose

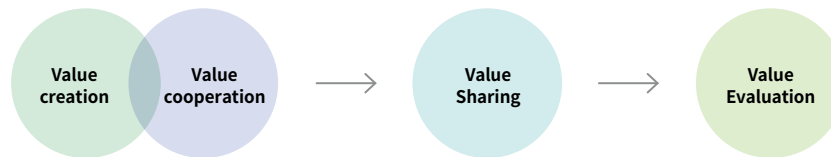
Consolidation of stakeholder's views to publish the sustainability report

Subject: Key internal/external stakeholders

Population: 303 people (63 external, 240 internal)

Q. What is the sustainability issue that KORES should focus on most?





Value Creation



Definition	Subject which creates products & services
Stakeholder	Staff, employees and labor union
Interest	Organization's vision/development, achievement of purpose, work environment
Communication channel	General staff information meeting & survey, labor union meeting, training (job, human rights etc)

◦ Resolve labor union conflict regarding the issue of the merging of the institute

Communicative effort

Conflict

- Large gathering at Sejong Government building
- One-man protest by executive division of labor union

Communication

- Joint declaration to overcome risk
- Labor joint emergency measures committee /workshop

Mutual growth method

- Agree to restructuring
- Establish measure in response to merging of institutes

Value Collaboration



Definition	Partner relationship including policy/legislation for public service
Stakeholder	Government, national assembly
Interest	Carry out purpose, share state affair philosophy, business outcome
Communication channel	Audit, regular meeting, business appraisal consulting

Communicative effort

- **Seek method to implement social value**
→ Seek method to implement social value through business appraisal consulting
- **Discuss method to normalize business & enhance private support**
→ Support establishment of regulation for stable function transfer & step-by-step sales of overseas property

Value Sharing



Definition	Client who is provided of the product & service
Stakeholder	Mining development business, public, partner, affiliate
Interest	Promoting mining, prevention of mining accidents, overseas resource development
Communication channel	Business information meeting, resource development meeting, field visit, survey

Communicative effort

- **Hold information sessions for government subsidies**
 - Improve productivity through supporting modernization (41.2 ton/person → 42.1 ton/person)
 - Forest damage prevention effect (145.5m² → 184.7m²)
- **Create domestic mining committee**
 - Seek domestic development methods for mining industry, support policies, reflect institutional improvement (increase funding budget)

Domestic Mining Committee

Domestic mining CEO committee

Domestic mining practical affairs committee

Value Evaluation



Definition	External institute or organizations that evaluate public enterprises
Stakeholder	Media, civic groups, government
Interest	Achievement of purposes, carry out public enterprise role (provide public benefit)
Communication channel	Government business appraisal, media, survey, website

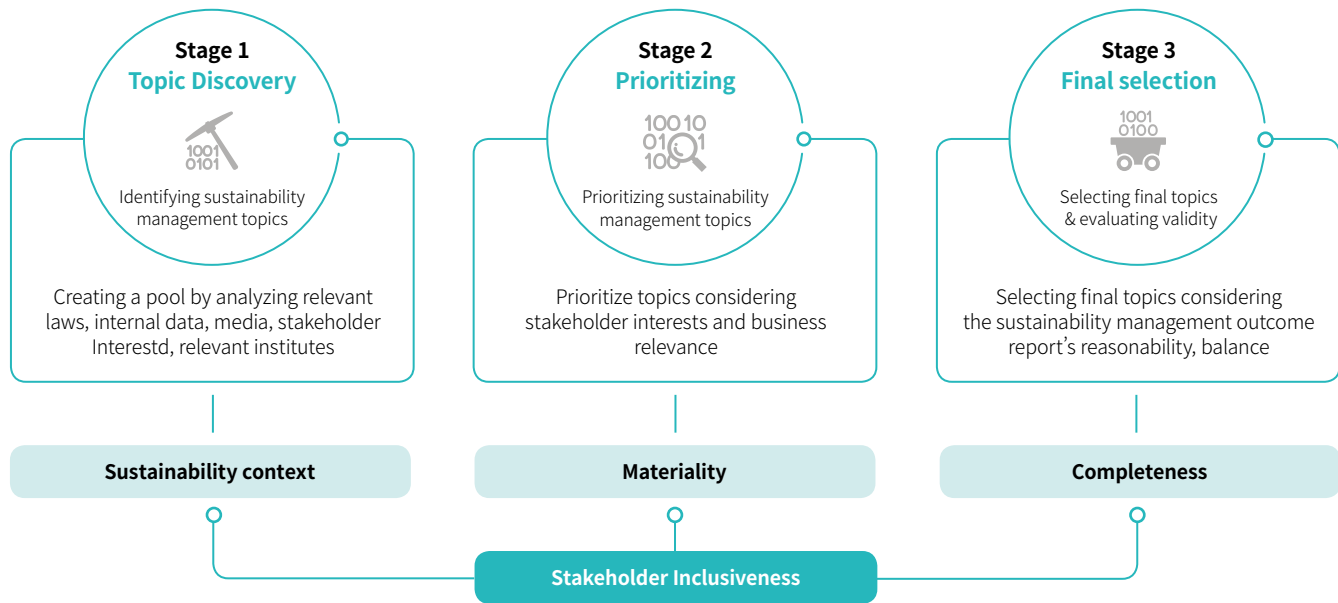
Communicative effort

- **Strive to normalize business through retrenchment**
→ Moved up one grade in the government management evaluation (D → C)
- **Business innovation such as creating joint models, establishing innovative plans for public participation**
→ Reach client satisfactory grade A

Materiality Assessment

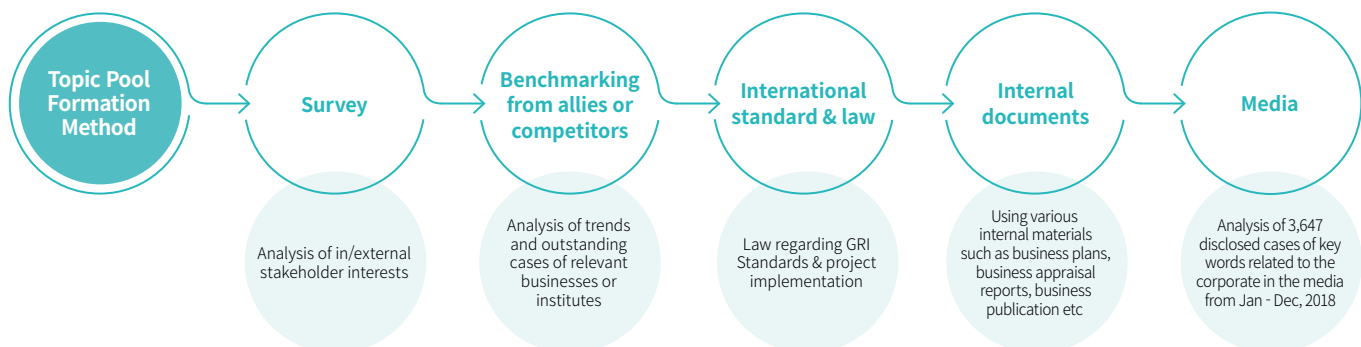
Stakeholder's evaluation of KORES and how it influences decision-making, is analyzed in terms of economic, environmental and social perspectives. Also, much effort is made to conduct sustainable business activities reflecting these.

This report selects relevant issues using a three step process: topic discovery, prioritizing, and selecting the final topic to report the more important issues of KORES to its stakeholders.



Step 1 Topic Pool Formation

This stage is for analyzing a big picture of topics relevant to KORES that are identified through internal/external surveys, benchmarking from similar industries, internal documents and media analysis. As a result, a topic pool has been created of a total of 29 topics; 6 economical, 6 environmental and 17 social topics.



Step 2 Prioritization

The priority of topics has been selected with regards to survey results and project relevance. Surveys were collected from stakeholders, including those from the domestic mining industries and internal staff, between May 9, 2019 and May 17, 2019 and 303 people (63 external, 240 internal) responded. Also, project goal contribution, project relevance, future importance have been considered, and 14 important issues for KORES among 29 topics have been selected.

Results of Selection

Selected Key Topics

- ① Support domestic companies' advancement overseas
- ② Secure resources by overseas resource development
- ③ Expand stockpile project of metal mineral
- ④ Increase domestic mining productivity & efficiency
- ⑤ Discover new projects
- ⑥ Business normalization
- ⑦ Comply with Mining Safety Act
- ⑧ Expand a culture of safety
- ⑨ Secure technology competitiveness
- ⑩ Mutual growth
- ⑪ Build system for disasters
- ⑫ Staff training
- ⑬ Modernization
- ⑭ Sustainability management innovation effort



Step 3 Final Material Issues

Final topics are selected regarding appropriateness and balance of internal reviews and outcome reports.

Material Issues	Stakeholder	GRI Standard		Impact		Page
		Category	Aspect	Internal	External	
①	Client	Economy	Indirect economy	○	●	22-25
②	Staff, Client	Economy	Economical outcome	○	●	20-37
③	Client	Economy	Indirect economy	●	●	32-33
④	Client	Economy	Indirect economy	○	●	34-36
⑤	Staff	Economy	Indirect economy	●	●	32-33, 37,58
⑥	Staff, Government	Economy	Economical outcome	●	○	26-31
⑦	Client	Society	Health, Safety	●	●	41-42
⑧	Client	Society	Health, Safety	●	●	43-45
⑨	Staff	General	Training	●	○	50-54,79
⑩	Client	Society	Indirect economy local communications	○	●	59-64
⑪	Client	Society	Health, Safety	○	●	46
⑫	Staff	General	Training	●	○	50-54, 79
⑬	NGO, Client	Environment	Environment indirect economy	○	●	47
⑭	Staff	General	-	●	○	55-58



ISSUE 1

**Securing a
Stable Supply
of Mineral
Resources**



Sustainability Background

KORES have made efforts to improve supply structure of mineral resources by advancing into various countries with natural resources. As a result, resource development rate in 2018 reached to 26.1%, 7.6% higher compared to 18.5% in 2007. Although KORES overseas resource development contribution reached 21% in 2018, it was accompanied by the financial deterioration.

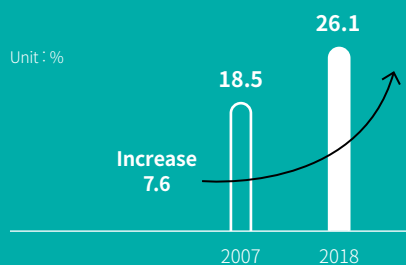
In order to restore financial stability, KORES has been conducting highly intense restructuring since 2016 including normalization and sales of overseas projects. KORES has conducted restructuring projects worth of KRW 473.4 billion as of 2018 through capital sales and budget restriction and is continuing to make efforts for business normalization such as organization reduction, manpower reduction, return of staff wages, and so on.

Moreover, KORES is improving its fundamental business and preparing for the future. KORES has established a consumer-oriented service and system to support overseas resource development through private sectors and is preparing methods for the development of North Korean resources in preparation of future economic unification. KORES is making efforts to prepare for sustainable resource development despite the challenging business environment.

Overseas Resource Development Outcome Comparison (2007 ↔ 2018)

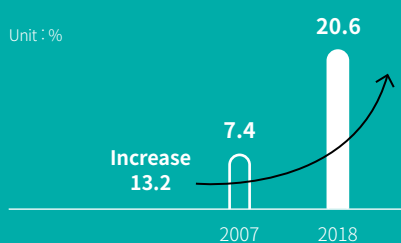
Resource Development

Unit : %



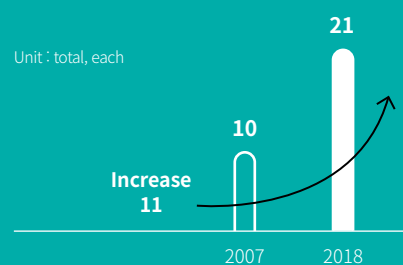
Corporate contribution to resource development

Unit : %



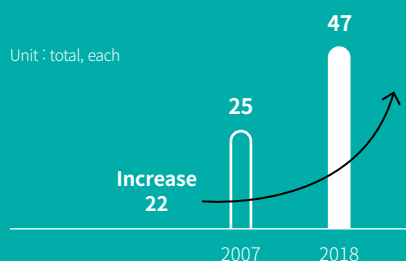
Project country

Unit : total, each



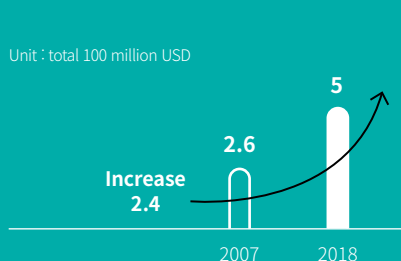
No. of projects

Unit : total, each



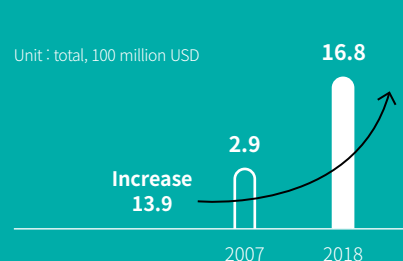
Investment

Unit : total 100 million USD



Resource development

Unit : total, 100 million USD



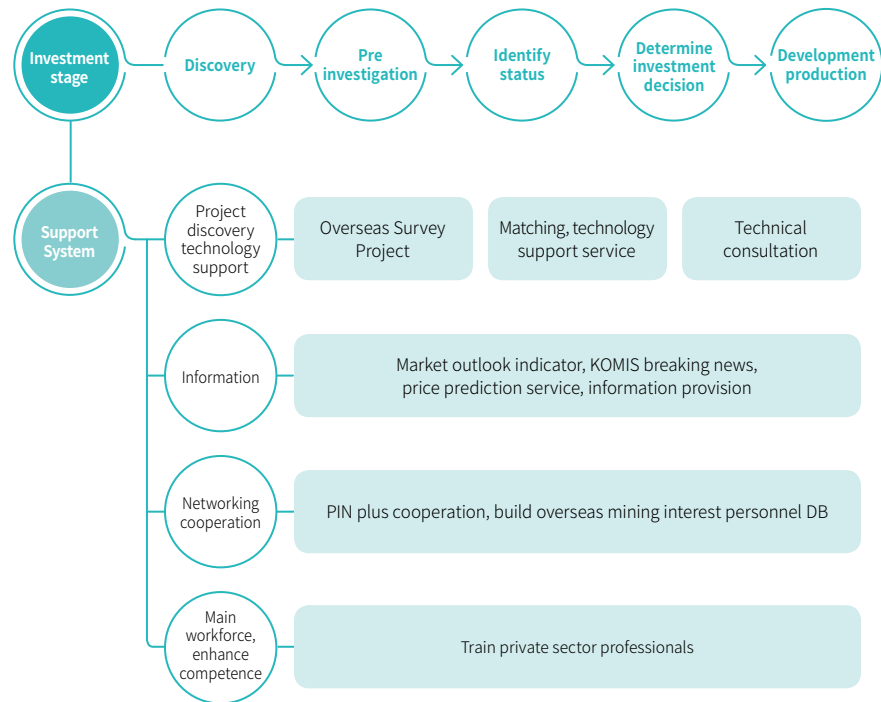
Support for Overseas Resource Development

KORES has re-established its role to promote overseas resource development by private sectors to fulfill improvement requirements of the government's promotional system. It has established its plans to carry out a step-by-step transfer from overseas investment/management to private support, and in 2017, established a support organization to create a basis for this type of support.

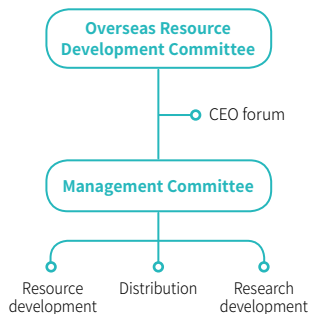
Building a support system for the whole cycle of resource development

In 2017, a technological system across all areas of resource development from the initial discovery stage to the development and production stage has been established. Afterwards, three new projects, including a matching service, were established. And in 2018, 4 areas and 10 support systems of the support scheme were established to compensate for and improve the scheme.

Private Support Scheme by Investment Stage



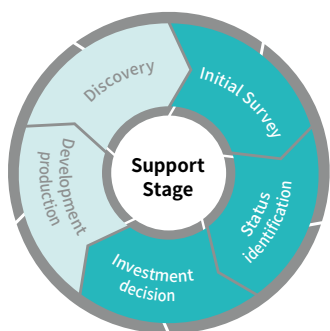
Overseas Resource Development Committee



*Membership (July 2019) : 179 Companies

Overseas resource development committee

KORES has expanded and restructured its practical committee, which used to be the center for overseas resource development of metal and coal, to the overseas resource development committee in order to attract investment from private sectors. The inaugural assembly was held in November 2017, where 3 departments were established. Through this, one regular general meeting, and 6 committee meetings were held in 2018. KORES expects to see active advancement into overseas projects, quality information exchange and utilization of networking with interest in overseas resource development in various sections.



Overseas Project Key Outcome

Unit : case

구분	2016	2017	2018
Investment condition survey	14	14	14
Initial Exploration	19	17	9
Share acquisition feasibility	-	-	1

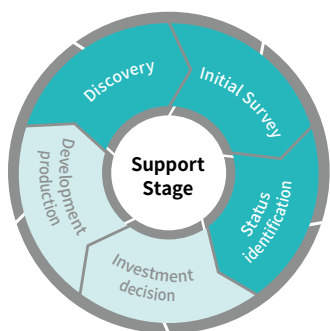
Overseas Survey

Not only does overseas resource development require a great amount of initial investment and take a long time to retrieve the investment funds, the investment success rate is low as well. Therefore, it is not easy for companies to enter it. In order to resolve these company challenges, KORES is promoting private sector overseas resource development investment and making efforts to reduce the risks that follow these business projects.

In 2018, it has supported a total of 24 overseas research projects and attracted 3 investment negotiations and 17 follow-up project discussions.

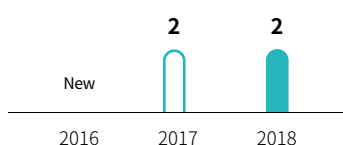
Overseas Survey Project Major Outcome

Category	Type (Region)	Stage	Outcome
Investment connection	Copper (Bolivia)	Development	About KRW 100 billion in overseas investment
	Gold (Zimbabwe)	Development	
Development production	Nickel (Indonesia)	Production	Royalty profits of about US\$90,000 in 2018
Follow up Exploration	Bituminous Coal (Indonesia)	Exploration	Improvement of project value and future development connections expected
	Copper (Mexico)	Exploration	
	Bituminous Coal (Indonesia)	Exploration	



Matching Service Key Outcome

Unit : case

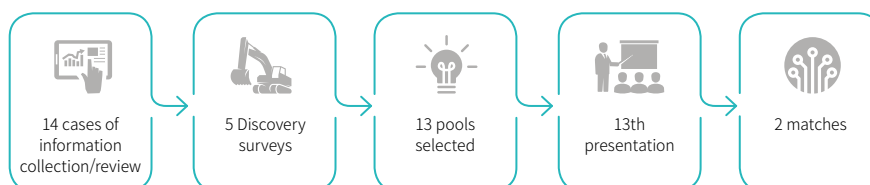


Matching Service

KORES utilizes its internal information & network to contribute to creating profit through the businesses and to increase the success rate of overseas investment by discovering and exploration promising projects.

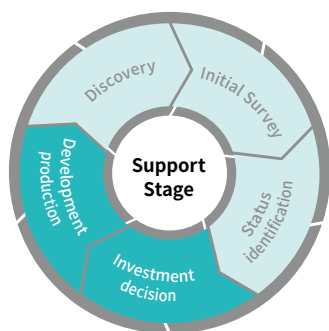
In 2018, it discovered 14 cases of information and created 13 promising project pools and matched 2 of these projects through business information meetings.

Matching Process & Outcome



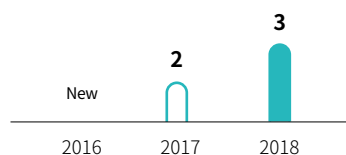
Matching & Technological Support Outcome

Type	Requests	Support Details	Outcome
Bituminous Coal (USA)	Technological review of coal for iron making	Creating/providing legal, exploration, development coal washing review	Diversification of supply of coal for iron making
Anthracite (Russia)	Further Exploration plan for expansion of production	Confirm new layer through drilling plan and exploration management	Secure stable supply of anthracite for power plant



Technology Consultation Key Outcome

Unit : cases



Technology Consulting

KORES is providing consultation services utilizing accumulated experience, technology and labor force for the technological challenges private sectors face when carrying out overseas resource development projects. Technology consultation services are expected to contribute to project promotion and stabilization by providing a method for resolving problems requested by the consumer, and supporting the decision making process for the project.

In 2018, 7 cases of business needs were identified and 3 projects were selected and supported by the committee.

Consulting Details & Outcome

Type	Request	Details	Outcome
Nickel Cobalt (Australia)	• Join dressing inspection • Technology review	• Create/provide dressing technology review	• Reduced dressing risk
Cobalt (Australia)	• Verify reserve • PFS result review	• Analyze primitive data • Create/provide PFS review	• Check technology risk • Support decision making
Bituminous Coal (USA)	• Technology review for due diligence	• Field investigation of geology and mining • Review reserve/amount/quality • Evaluate feasibility of production status/development plan	• Support decision making

Education & Strengthening Competence

KORES is conducting resource development training using its resource development experience and know-how while taking into consideration challenges private sectors face in training personnel in the resource development field. Along with the existing practical package course, a training base has been expanded with new courses customized for the consumers. KORES promises to continue to supply professionals in resource development.



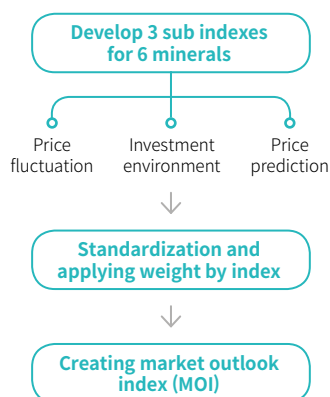
Education Key Outcome

Category	2016	2017	2018
No. of courses		2	8
No. of trainees (persons)		34	90
No. of participating organizations	New	19	12
Training satisfaction(%)		95.7	95.1

Education Programs

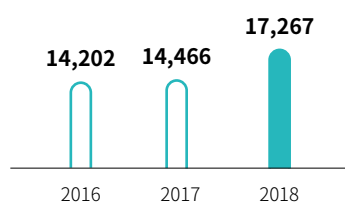
Practical package	Course	10 courses for copper mining investment
	Participation	5 companies, 14 people
Consumer customized	Course	4 courses including bituminous coal project
	Participation	5 companies, 58 people
	Course	2 courses for practical plant management
	Participation	2 companies, 18 people
Overseas investigation project	Course	Overseas survey utilization guide, overseas investment case & precautions
	Participation	31 companies, 60 people

Concluding Market Outlook Index (MOI)

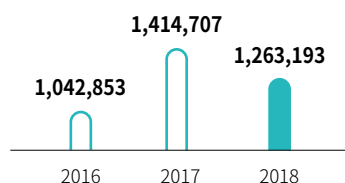


Resource Information Service Key Outcome

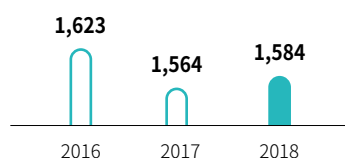
KOMIS visitors (Monthly average)



KOMIS page views (Monthly average)



KOMIS created information (yearly)



Information Service

KORES is managing professional resource information contents (KOMIS-www.kores.net) for users to easily access the information. KOMIS publishes mineral price information, the local status of countries with resources, and policies, and provides valuable information for individuals or companies interested in overseas resource development. Also, to help reduce the risk for those starting overseas resource development projects, it developed a market environment diagnostic tool, market outlook index (MOI) and a rare metal price prediction system.

Additionally, to quickly provide information, KORES developed KOMIS notifications that are categorized into urgent, caution, and warning alerts when it notices abnormal activities in the market, and is notifying stakeholders via the website or mobile message services.

KOMIS Status & Key Contents



Mineral Price

Market Price	Market price of 32 types
Price Prediction	Long term price prediction of 11 types



Global Status

Mineral General index	Resource market fluctuation diagnostic index
Daily resource news	daily status *E-mails to about 15,000 people
Weekly mineral price trend	Weekly status analysis
Resource information FOCUS	Market issue in-depth analysis
KOMIS News	Fast delivery of abnormal market signs
Monthly resource Insight	Monthly status analysis for 6 mineral types
Rare metal the prime	Monthly status analysis for 14 rare minerals
Foreign correspondent	Country status, policy, project introduction



Country, Mineral Type Information

82 countries	Mining status, major mines, mining institute etc.
80 mineral types	characteristic, use, source country, supply/demand etc.



Overseas Investigation Report

Shares corporate's overseas survey project reports

Overseas Resource Development & Business Normalization

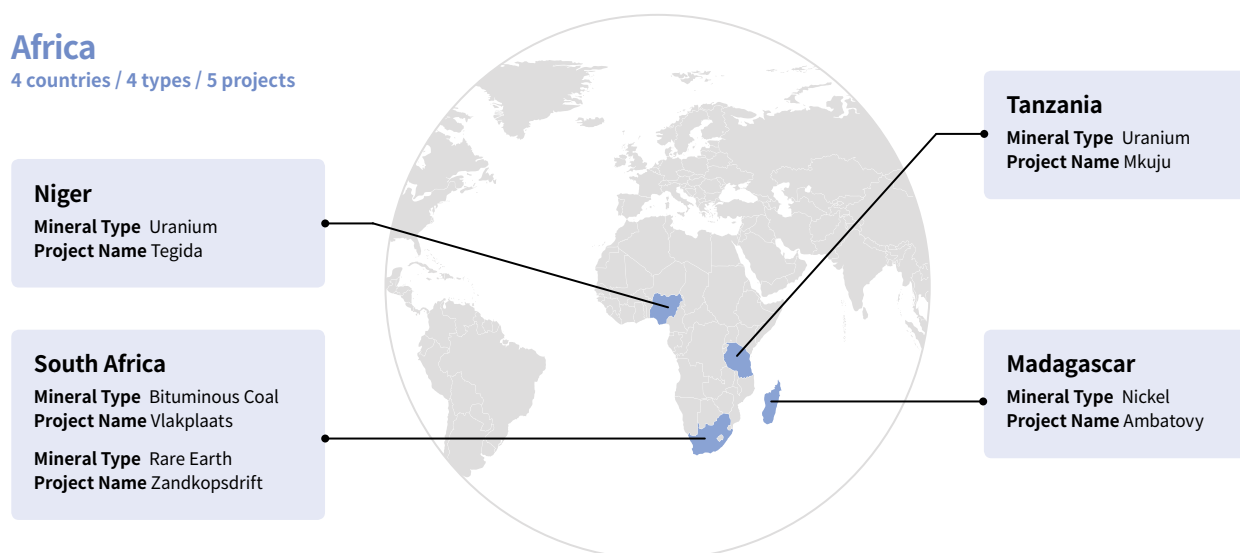
KORES is conducting overseas resource development to build a stable supply basis of industrial materials by securing six strategical mineral types. Following the first advancement overseas in 1990, it has conducted 47 projects in 26 countries, and currently as of the end of 2018, 26 projects in 15 countries are being conducted.

Functional Change Regarding Resource Development



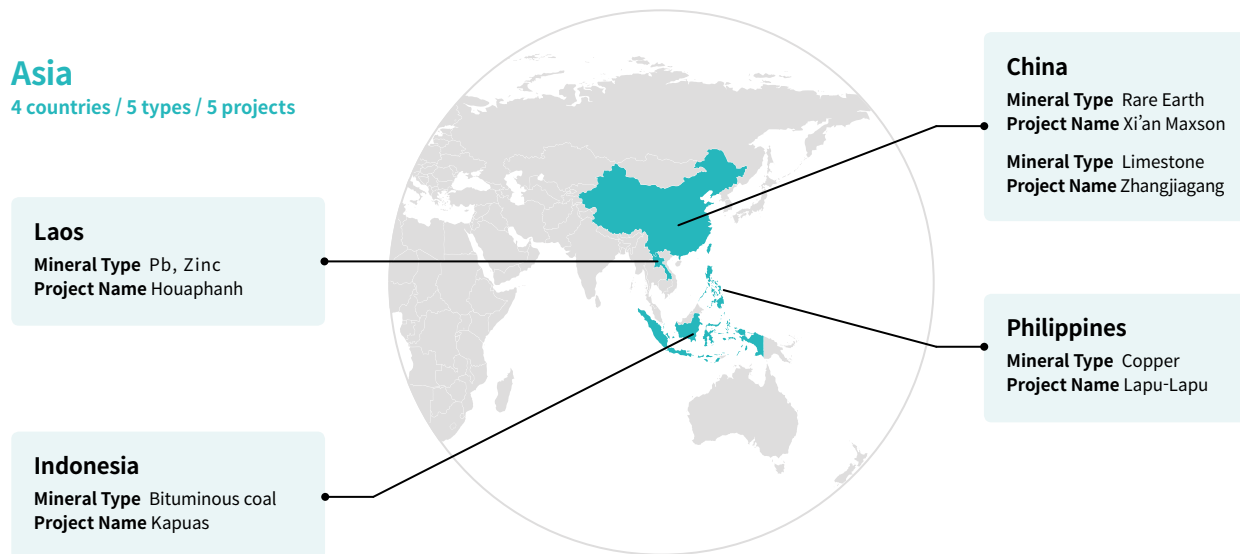
Africa

4 countries / 4 types / 5 projects



Asia

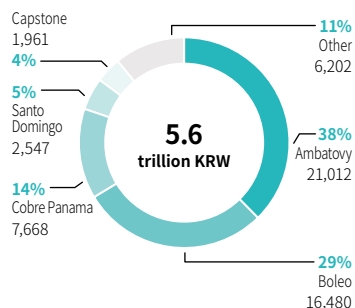
4 countries / 5 types / 5 projects





Investment Size by Project (Dec. 2018)

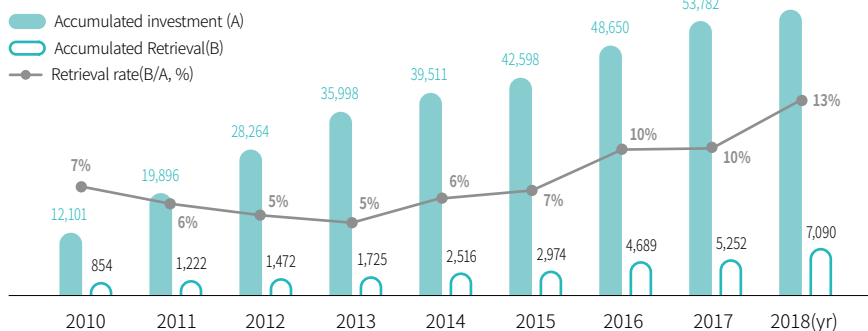
Unit : 100 million KRW



In 2008, KORES changed its name to the Korean Resources Corporation and actively invested in overseas resource development. Investment that was KRW 490 billion in 2008 increased to an accumulated amount of KRW 5.6 trillion in 2018 and as a result, the resource development rate that was only 7.4% increased to 21%, making it a leader of private sectors' overseas resource development.

Retrieval compared to Amount Invested

Unit : 100 billion KRW, %



Oceania

1 country / 1 types / 9 projects



Australia

Mineral Type Coal

Project Name Athena

Cockatoo

Narrabri

Minerva

Togara North

Springvale

Angus

Moolarben

Wyong

America

6 countries / 2 types / 7 projects

Canada

Mineral Type Copper

Project Name Capstone

Mexico

Mineral Type Copper

Project Name Boleo

Chile

Mineral Type Copper

Project Name Santo Domingo

Mineral Type Lithium

Project Name NX Uno

USA

Mineral Type Copper

Project Name Rosemont

Panama

Mineral Type Copper

Project Name Cobre Panama

Argentina

Mineral Type Lithium

Project Name Sal de Vida

Main Project Status



- Apr. 2008 Join project
- Sept. 2010. Start mine construction
- Jul. 2013 Take over 60% of Baja mining project
- Dec. 2014. Construction complete
- Jan. 2015. Electrolytic copper trial production
- Feb., Apr. 2016. zinc sulfate, cobalt pilot production

Boleo Copper Project in Mexico

Location	Santa Rosalia, Baja peninsula Mexico
Participation Period	June 2008
Reserve/period	Reserve/No. of Years: 44.5 million tons (Cu@1.35%)/17 yrs
Production Size	Electrolytic copper 34,500 tons/yr, Cobalt 900 tons/yr
Share	Korea 92.8% Corporate 76.8%, LS-Nikko 8%, Hyundai Steel 3.6%, SKN 3.6%, Iljin 0.8% Canada 7.2% Camrova Resources 7.2%

The Boleo project is the corporate's first metallic mining project and is a mining/plant coherent project using hydrometallurgy to produce electrolytic copper. Following its first sales in 2015 that was at 7,319 tons, an accumulated amount of 58,735 tons of electrolytic copper have been produced as of 2018, and other by-products such as cobalt which is used for electric vehicles have also been produced and are contributing to enhanced sales.

Production Status

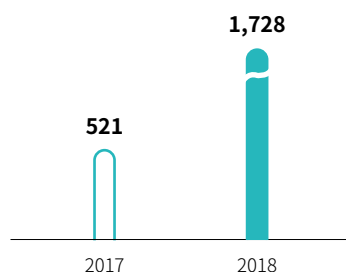
Category	2015	2016	2017	2018	Total
Surface Mining (1000 tons)	448	1,146	1,840	2,215	5,649
Underground Mining (1000 tons)	70	201	338	439	1,048
Electrolytic copper (tons)	7,319	14,005	17,973	19,438	58,735

Business Outcome

The Boleo project had faced challenges such as complex geological structures, weak bedrock causing frequent underground collapses, however, through initial trial and error, after applying a semi-shield method, stable underground mining has become possible. KORES resolved the challenges of underground and surface mining designs using its own software, and through this, obtained key technology required for mine development. Also, it is contributing to training professionals by providing field experience for employees and conducting a circulatory dispatch system.



Boleo Project Key Outcome Unit : 100 million KRW



Improvements of Underground Mining

Semi-shield single walled mine



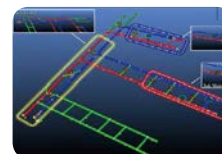
Regions with poor mining conditions (Retaque, High grade regions)

Construction of Korean support



Secured underground stability by introducing Steel support methods

Ventilation improvement



Improved ventilation underground (Ventsim S/W)

Main Project Status



- Oct. 2006. 1Established joint agreement with Korean consortium etc.
- Sept 2012. Management right permitted, production started
- Jan. 2014Reached production (70% of design)
- Sept. 2015.PF financial completion reached and registered nickel LME
- Dec. 2018 Produced 33,216 tons of nickel

Ambatovy Nickel Project in Madagascar

Location	Toamasina (plant), east of Moramanga (mine) center of Madagascar
Participation Period	Nov. 2006
Reserve/No. of Years	190 million tons (Ni@0.85%)/29 yrs
Production Size	Nickel 60,000 tons/yr, Cobalt 5,600 tons/yr
Share	Korea Consortium 27.5%, Sumitomo (Japan) 47.7%, Sherritt (Canada) 12%, Ambatovy Holdings 12.8%

The Ambatovy project is a production project for nickel, a key mineral for stainless steel, and is producing 17,700 tons (Ni) which is 18% of the domestic nickel development amount at 91,800 tons. What is unique about this project is that it is a mine-plant combination project where raw ore of nickel is collected from above ground and sent through a slurry process which is then transported to the plant via a pipeline, to be produced into the final product. At 2015, it reached its maximum production amount, and started to decline due to plant maintenance work, etc., and in 2018, production was at 33,000 tons, which is 78.2% of the planned amount. KORES will not stop here but continue to improve productivity by conducting maintenance work and reducing costs.

Production Status

Unit : tons

Category	2012	2013	2014	2015	2016	2017	2018
Nickel	5,954	25,069	36,992	47,298	42,081	35,462	33,216
Cobalt	503.5	2,141	2,903	3,469	3,252	3,089	2,860

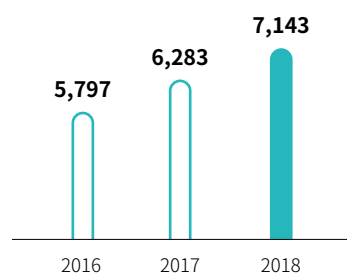
Business Outcome

Ambatovy, Madagascar is one of the worlds top 3 nickel mines and holds 38% of Korea's nickel demand. During the initial stage of the project, Korean companies participated in 10 areas including power plant and plant construction, and KORES secured and acquired sales rights of 50% (yearly maximum of 30,000 tons) of the nickel production amount. Through this, in 2018, the nickel resource development rate has reached 55.2%, and performance is an average of 26.1% higher than the other six mineral types.



Ambatovy Project Key Outcome

Unit : 100 million KRW



Escape of Ambatovy plant, Madagascar



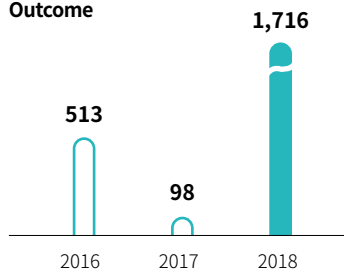
Nightscape of Ambatovy plant, Madagascar

Business Normalization



Business normalization Key Outcome

Unit : 100 million KRW



The government has published functional adjustment measures for the corporation twice in 2016 and 2018 for sustainable development of overseas resources and the restoration of financial health of KORES. Thus, from 2016, KORES has established a restructuring plan, selling overseas assets, to reduce liabilities while creating a support system to conduct overseas resource development centered on private sectors.

Energy Public Enterprise Functional Adjustment Plan



Public institution functional adjustment measures

(June 2016)

- Improve a resource development promotion system
- Restructuring of assets
- Improve system, promote private investment



Mineral corporation functional adjustment measures

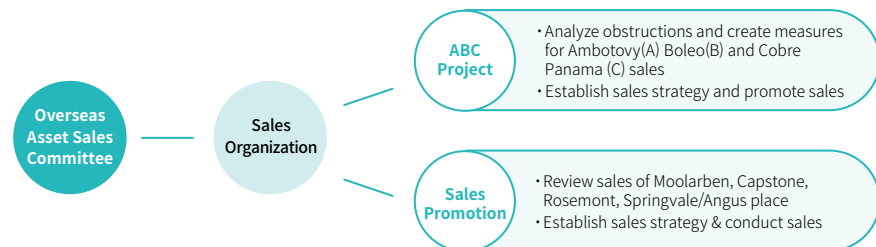
(Mar 2018)

- Merge with related organizations
- End direct overseas investment function
- Step-by-step sales of overseas assets
- Enhance private support

Sales of Overseas Assets

KORES has reorganized its sales process in 2016 for reasonable sales of overseas assets, and created a committee dedicated to sales to promote sales.

In order to prevent assets from being sold at low prices, the sales committee has established a strategy and has conducted sales according to the sales process. As a result, in 2018, a project that is about KRW 171.6 billion was sold.

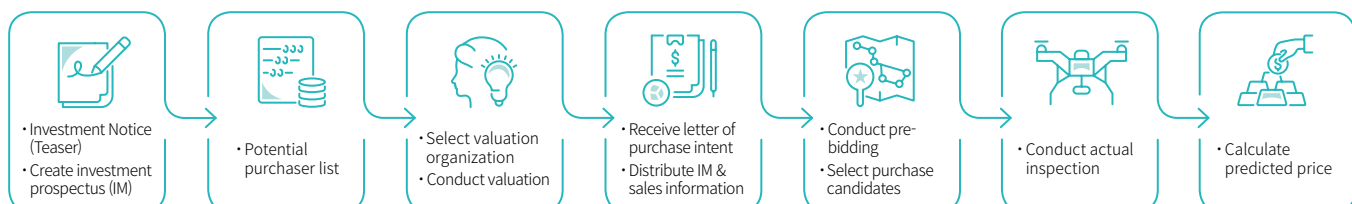


Sales Case (Cobre Panama PMS Sales)

By-products from the Cobre Panama project in its development stage have been sold at U\$178 million via the PMS* method. The Cobre Panama project is a global top ten large scale copper mine invested by a Canadian mining company, First Quantum (FQM) and KORES (share 10%), and is a project to start productions in 2019 from which, 350,000 tons of copper is expected to be produced for 40 years.

***PMS** : PMS is an agreement method where an agreement regarding purchasing by-products (usually gold, silver precious metal) that are produced in the mine is established; part of the amount of predicted sales money is received first, then at the actual point of production, the agreed amount of products is delivered and the balance is paid.

Sales Process



Project Status

Category	Project Name	Country Name (Mineral)	Reported Periodw
Production Stage (13)	Springvale	Australia (Bituminous Coal)	2000
	Lapu-Lapu	the Philippines (Copper)	2002
	Xi'an Maxson	China (Rare Earth)	2003
	Xi'an Maxson	China (Limestone)	2005
	Minerva	Australia (Bituminous Coal)	2006
	Balaraba	Australia (Bituminous Coal)	2006
	Ambatovy	Madagascar (Nickel)	2006
	Angus Place	Australia (Bituminous Coal)	2007
	Moolarben	Australia (Bituminous Coal)	2008
	Boleo	Mexico (Copper)	2008
	Narabhria	Australia (Bituminous Coal)	2009
	Tegida	Niger (Uranium)	2009
	Tegida	Canada (Copper)	2011
Development Stage (6)	Togara North	Australia (Bituminous Coal)	1994
	Wyong	Australia (Bituminous Coal)	1995
	Cobre Panama	Panama (Copper)	2009
	Rosemont	USA (Copper)	2010
	NX Uno	Chile (Lithium)	2010
	Santo Domingo	Chile (Copper, iron)	2011
Exploration Stage (7)	Athena	Australia (Bituminous Coal)	2006
	Vlakplaats	South Africa (Bituminous Coal)	2010
	Sal de Vida	Argentina (Lithium)	2010
	Kapuas	Indonesia (Bituminous coal)	2011
	Zandkopsdrift	South Africa (Rare Earth)	2011
	Mkuju	Tanzania (Uranium)	2012
	Huaphanh	Laos (Pb, Zinc)	2013

(As of the end of December 2018)



Ongoing Projects

15 countries, **26** projects



Total Completed Projects

11 countries, **21** projects

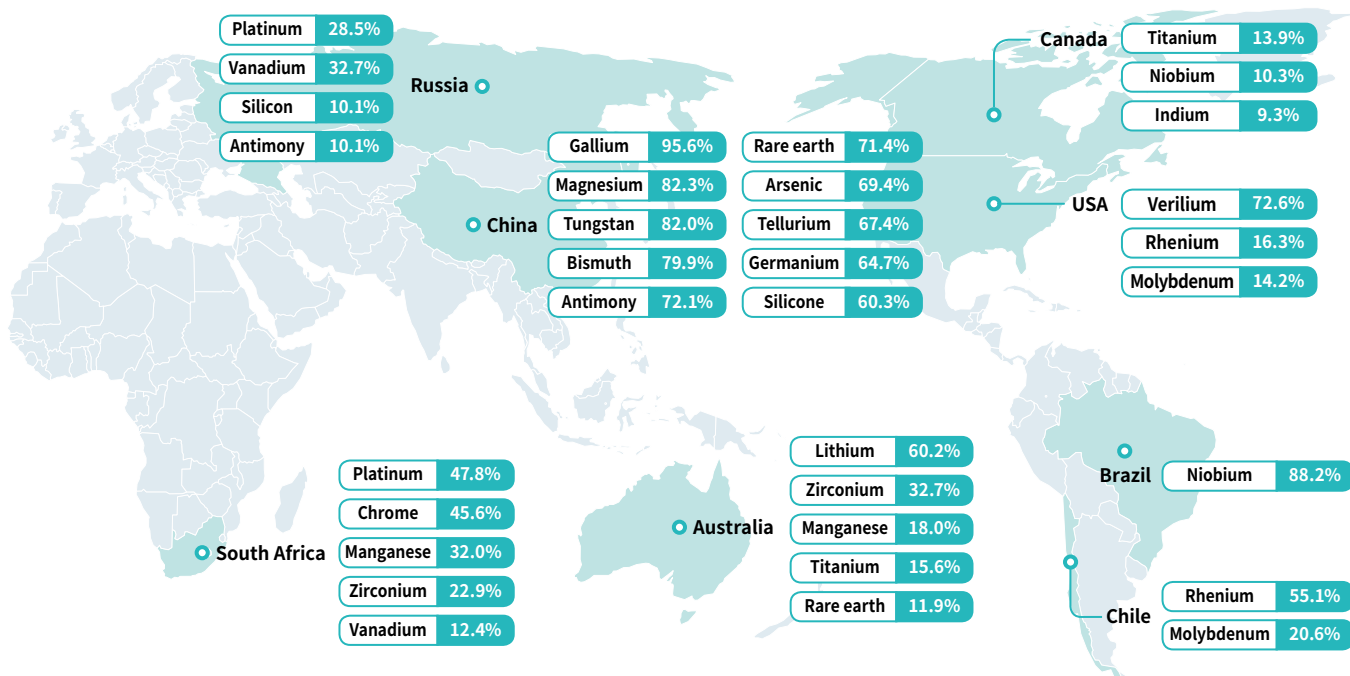


Total Amount Invested for Overseas Resource Development

5.6 trillion KRW

Rare Metal Stockpile

Rare metals are expected to grow in demand as it is key for future industries. However, there is an imbalance between countries with the resources and the manufacturing countries. This can lead to potential dangers such as price increase or supply/demand barriers. In order to prepare for the sudden supply/demand instability of rare metals KORES has been stockpiling rare metals since 2007. As of 2018, it holds 10 types of minerals, and holds from a minimum of 50 to a maximum of 100 days' worth the amount required domestically to protect domestic industries and contribute to market stabilization.



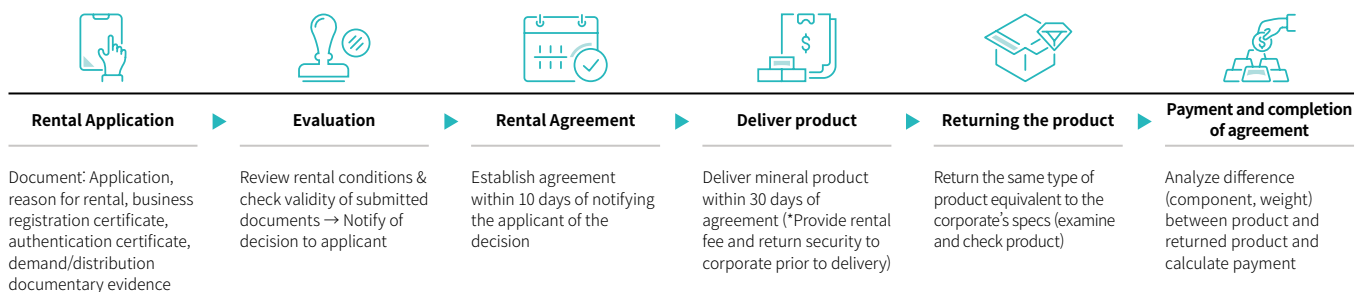
Stockpile Project Key Outcome

Category	2016	2017	2018
Amount (Accumulated, tons)	77,895	77,895	77,895
Hired Amount (tons)	-	290	180
Hiring Company (company)	-	3	3

Rental/release of rare metals

After achieving its stockpiling goal in 2016, for efficient management of the stockpiled assets, a mineral product rental system has been introduced, starting from 2017. This rental system started with a pilot project in 2017 where stockpiled metals were rented out when private industries faced temporary supply shortages due to transportation problems, delayed delivery, etc. As of now, 6 companies have utilized this system and a total of 470 tons have been supplied to private industries to resolve supply problems.

Private Rental Process





Stockpile Plan

Organization	Corporate	Public Procurement Service
Function	Stockpile strategy to supply metal for industrial promotion purposes	End stockpiling of rare metals
Transfer	9 types of rare materials stockpiled in the public procurement service has been transferred to the corporate (stockpile amount in corporate increased 10 types → 19 types)	

Provide Rare Metal Market Information

A report on the market trends regarding mineral types where supply/demand issues occur such as niobium, cobalt is published to provide information on the trends relating to supply of domestic rare metals. This allows private sectors to appropriately respond to market fluctuations. Market information regarding mineral price, industrial trends is also provided online.

Improve operational efficiency

Two different organizations, KORES and the Public Procurement Services, have been stockpiling minerals and therefore, the national assembly and board of audit and inspection has commented on the inefficiency of having two systems for stockpiling minerals. In order to resolve this issue of having 2 metal resource stockpiles, KORES has been selected to be in charge of stockpiling metals for industry promotion purposes. KORES shall create a plan regarding general stockpiling of metallic minerals that is connected to the industrial and mining policies and the transfer of rare metals held by the Public Procurement Services, to promote a systematic stockpile scheme.

Stable stockpile for newly developing industries

Recently, the government has been accelerating the development of next generation industries such as artificial intelligence, Internet of Things, Big data etc. in line with the era of the fourth industrial revolution era.

However, there is concern over weaponization of natural resources as protectionism has expanded due to the USA-China trade disputes. KORES is planning to reinforce its metal stockpile function to deal with the national resource supply crisis.

First, by establishing consistent metal resource stockpile standards, KORES will build a stockpile system linked to industries and supply/demand policies.

Second, KORES will research and provide a forecast of the predicted demand of the stockpiled mineral types and key mineral types for the fourth industrial revolution to flexibly manage the stockpile amount.

Third, KORES will promote rental/releasing of stockpiled assets to resolve supply/demand challenges of the private sector and strengthen responsiveness in any supply/demand emergency situations.

Forth, KORES will strive to raise its standards as an enterprise specializing in providing information on resources by managing private and public consultative groups regarding stockpiled mineral products, and strengthening its market research competence, and its function to provide information to the private sectors.



Metal Mineral Storage

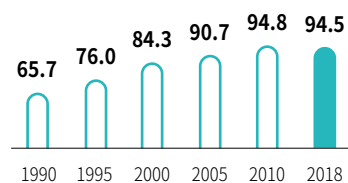


Creating a Mining Ecosystem

Support promotion of domestic mining



Mining Dependency on Import* Unit : %

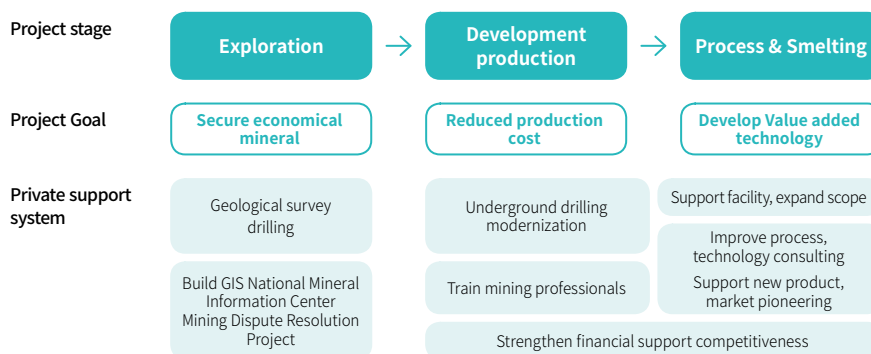


*Reference : Mining Statistical Yearbook, Korea Institute of Geoscience and Mineral Resources

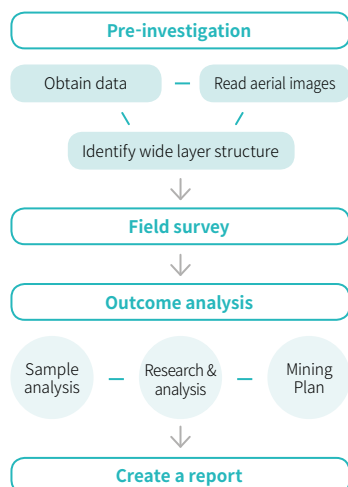
Mining is a key industry for the maintenance of the state's economy and is a major industrial sector where added value creation is unlimited; however, due to a rise in labor costs, and poor profitability, domestic mining competitiveness has weakened. For metallic minerals, 99% is imported and the import dependency is continuously increasing. Moreover, domestic mining industries are small, which makes it hard for them to invest in the future, and most are focusing on low value-added production and concerns about the technology being cut off due to the aging of the manpower.

In order for domestic mining to obtain competitiveness, national support and professional technological support is needed. KORES is supporting domestic mining to promote productivity, and striving to create a sustainable domestic mining ecosystem and to secure industrial material through supporting development to increase domestic competitiveness and supporting investigational surveys to obtain reserves of domestic natural resources.

Domestic Mining Private Support Process



Geological Survey



The Geological survey is a project to identify the status of natural mineral resources in the country by scientifically and systematically surveying regions to secure a long term and stable supply of industrial raw minerals.

KORES has been conducting 30~55 Geological surveys of prospective mining areas since 2000, and as of 2018, completed surveying 848 areas (project goal: 1500 areas) and secured 18.72 billion tons of resources. In 2018, geological surveys conducted in 9 districts and 29 mine areas led to securing 300 million tons of new resources and mine drilling to identify the status of these has been proposed.

Key Outcome

Category	~2013	2014	2015	2016	2017	2018	Total
Mining Region(cases)	611	55	55	52	42	33	848
Resources (100 million tons)	169.4	2.9	3.5	4.9	3.5	3.0	187.2

Mine Drilling



Mine Drilling

Because private companies tend to avoid investing in the initial stages of mining due to uncertain success rates, mine drilling is partially supported by KORES, and through this, KORES identifies the existence of resources, geological structure, and grade. Based on the secured minerals, systematic mining development is carried out.

Along with 33km in 2018, as of now, it has supported a total of 2,698 km worth of drilling construction, and through this, has secured 1.78 billion tons of minerals.

Key Outcome

Category	~2013	2014	2015	2016	2017	2018	Total
Drilling (km)	2,452	60	64	50	39	33	2,698
Resources (million tons)	1,389.5	79.3	98.7	88.8	68.4	58.3	1,783

GIS(Geographic Information System)

KMRGIS History

- 2005**
Introduce GIS system service for internal users
- 2006**
Mar. 2006 KMRGIS* web service introduced
- 2009**
Entered 1899 mining areas in geological mine map oriented GIS database
- 2010~2017**
Built an average of 375km per year of GIS DB for geologic columnar section of the drilling hole.
- 2018**
Built 201km of GIS DB for geologic columnar section of a drilling hole for 6 mining areas with mineral resources.

*Korea Mineral Resources Geographic Information System : KMRGIS (Korea Mineral Resources Geographic Information System)

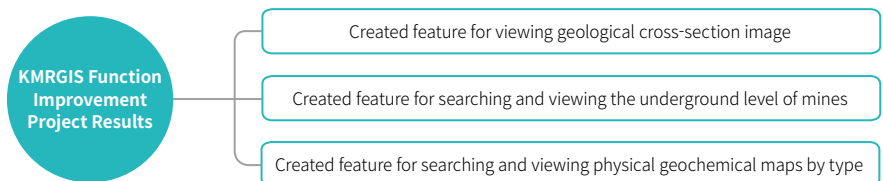


A sectional view of mineral resources

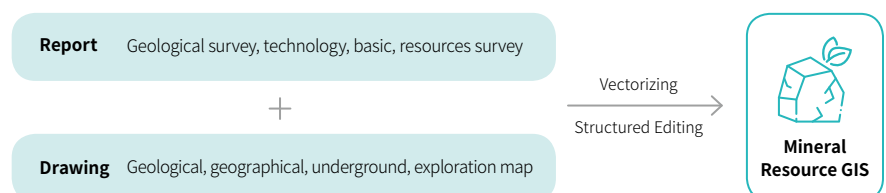
The GIS is conducted by combining GIS technology with a digitalized geologic columnar section of the drilling hole of domestic mines and conducted to obtain a 3D image of the environment and distribution of minerals. KORES applies GIS technology to its geological survey and drilling results, and in 2018, added 3D data to compensate for the limits of a linear-type geological mine data columnar section of drilling holes. This enhanced convenience and utilization for the user.

Key Outcome

Category	~2013	2014	2015	2016	2017	2018	Total
GIS distance (km)	1,631	507	323	311	231	201	3,204
No. of mines	736	208	306	323	276	397	2,246
No. of hole	10,106	1,978	2,319	2,000	2,612	4,383	23,398



Process



Underground Digging



Underground Digging

Underground digging projects are conducted to identify the accurate size and grade of identified minerals and to build a minimum production basis for metals that are heavily dependent on imports. KORES uses such projects to provide highly reliable data required for developing mines and establishing production schemes.

As of 2018, a total of 955 km of mines have been dug, and 370 million tons of minerals have been secured. In 2018, 3D underground modeling of two mines was conducted as a pilot project in connection with the KORES' original project to identify the depth of underground mines.

Key Outcome

Category	~2013	2014	2015	2016	2017	2018	Total
Distance (km)	915.5	9.6	9.1	7.5	7.3	6.4	955.4
Resources (million tons)	316.8	11.3	10.3	10.3	10.2	9.8	368.7

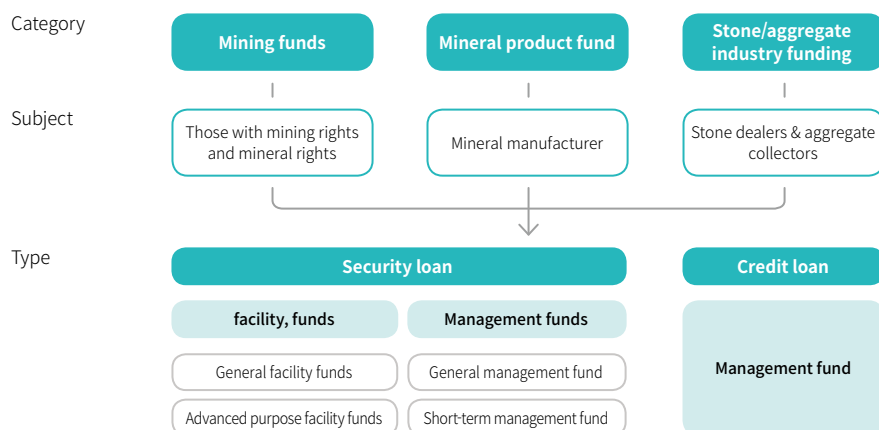
Financial support

Resource projects require high initial investment costs, and the retrieval period is long. This makes mining a high-risk area in the financial world, and therefore it is hard to secure loans based on mining assets. KORES has overcome these challenges through its experience and know-how in the resources industry.

KORES' financial support provide loans for facility and management funds secured based on future development value obtained through mine valuation, and at an interest rate lower than the general financial world.

In 2018, it provided loans of KRW 68 billion for facility and management and as of now, supported KRW 2.68 trillion to promote sustainable growth of domestic mining.

Financial support Type & Subject



Key Outcomes

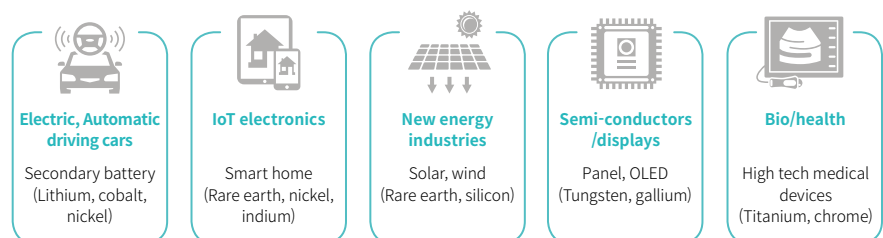
Category	~2013	2014	2015	2016	2017	2018	Total
Financial support (KRW 100 million)	22,900	802	808	808	815	680	26,813

Diversification of Supply Sources

In order to diversify the sources of supply of mineral resources, KORES is promoting domestic urban mining. Urban mining* refers to collection of precious metals or rare metals contained in daily waste, and while the basic market size in 2015 was 20% of the domestic metallic resource demand (about KRW 17 trillion), extraction technology for each mineral type falls behind the developed countries, and therefore, only simple extraction methods are used. Also, with industrial structures centered around small industries, inadequate collection systems, and unfair trade, it is difficult for this type of structure to develop.

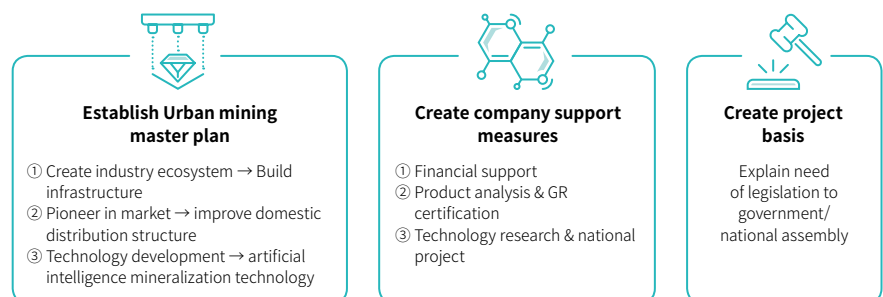
***Concept of Urban Mining :** This type is where daily used products or disposed objects contain metallic minerals that amount to the size of a mine. In general, 5g of gold can be obtained from 1 ton of gold ore, but precious metals such as 150g of gold and 1.5 kg of silver can be obtained from 1 ton of mobile phones.

5 New Industries & Rare Metals

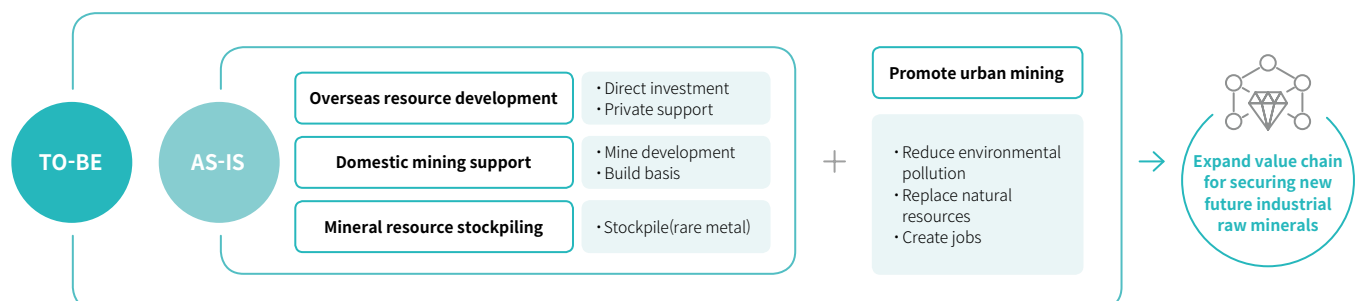


In order to resolve these issues and to build a self-supporting supply system for future strategic metals, KORES has established an “Urban Mining Industry Master Plan.” The master plan includes various measures such as training professionals, managing support systems, building infrastructure to increase recyclability of domestic resources. KORES promises to make efforts to secure future strategic metal resources by building collaboration systems with related organizations and creating a project foundation.

Urban Mining Promotion Strategy



Value Chain for Securing Future Resources





ISSUE 2

**Creating a Safe
& Environment-
friendly Mining
Ecosystem**



Sustainability Background



Accident (Mine collapse in San Jose, Chile)

5th of August 2010, San Jose mine near Kopiapo, Chile, collapsed while 33 miners were collecting copper. The miners survived for 69~70 days underground.

Domestic mining has changed from surface to underground mining due to depletion of natural resources and environment protection, and there is a trend of mining deeper underground. For underground mines, limited work space, dust, and gas threaten the safety of the miners, and when accidents occur it can lead to a disaster. Also, accidents such as the capsizing of the Sewol ferry, Gyeongju and Pohang earthquakes and Uljin limestone mine collapsing, has brought about increased interest in safety and therefore, establishing a culture of safety is required.

KORES has conducted mining disaster prevention activities, field inspection, and has created field improvement recommendations in accordance with the Mining Safety Act since it was founded in 1967, and is leading safe mine development through a stricter Mining Safety Act requiring mandatory safety training, and reinforcing establishment of regulations in 2016. As a result of KORES conducting safety projects for domestic mining and continuously analyzing disaster types and conducting activities to prevent disasters, the disaster ratio that was 7.84 in 1982 has been reduced to 0.55 in 2018, and disaster level in mining industry decreased to the similar level of general industries.

Main Performance



Mining Safety Key Outcome

Category	2016	2017	2018
Disaster index	4.0	4.2	4.3
Disaster ratio	0.55	0.45	0.55
No. of victims	40	32	37
Deaths	6	5	7
Injuries	34	27	30

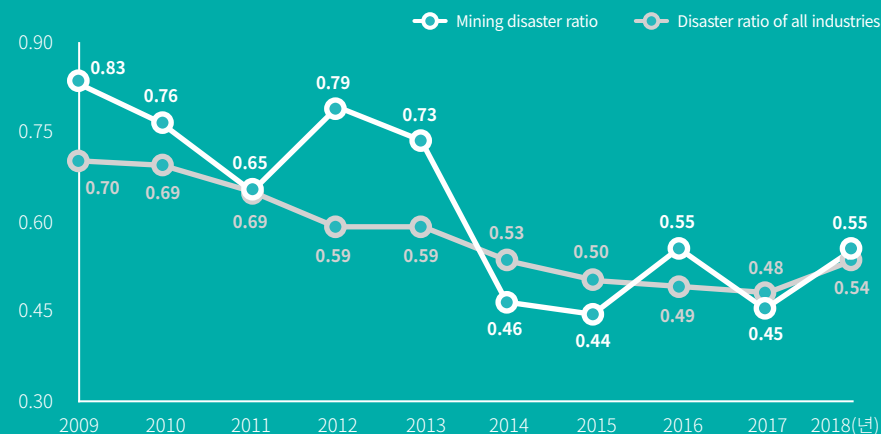
*Disaster index : $\sqrt{\text{frequency rate of injury} \times \text{severity rate}}$

*Disaster ratio : $\text{No of victims/workers} \times 100$



Disaster Ratio Comparison (Mining, Overall)

Unit : %

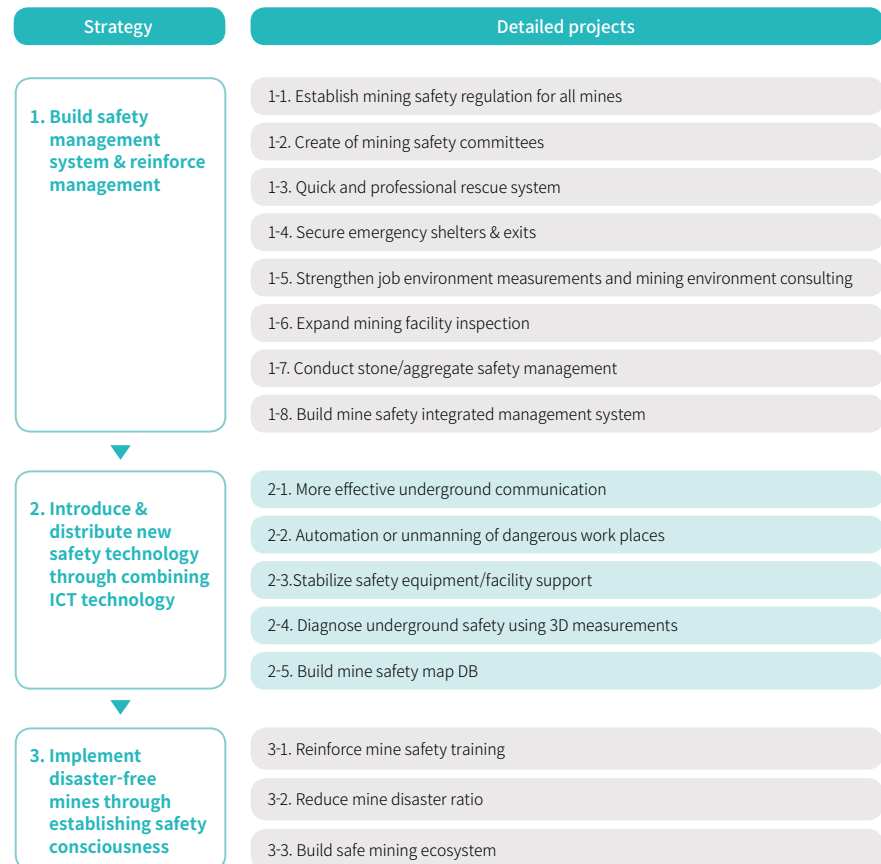
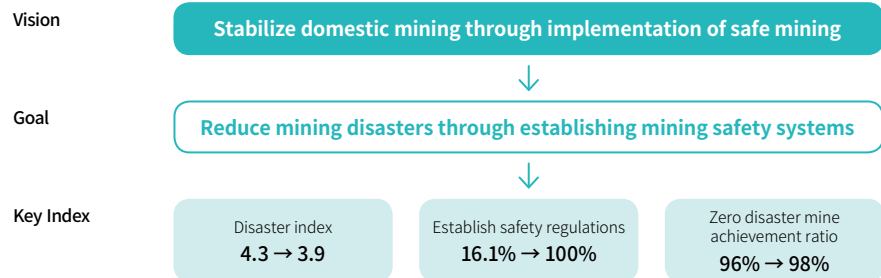


Mining Safety Medium /Long term Plan

There is a high possibility of domestic mines creating severe or major disasters as more mines are going underground and deepening, therefore, prevention is the key.

In 2018, KORES established the “General Measures for Mining Safety Project Management” and set goals for a vision to stabilize domestic mining by implementing safe mines, and to reduce disasters caused by mining through establishing a safety system for mines.

General Measures for Mining Safety Project Management (2019~2021)

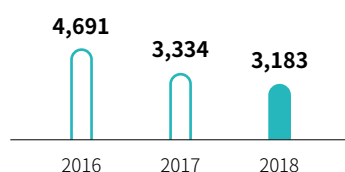


Complying with the Mining Safety Act

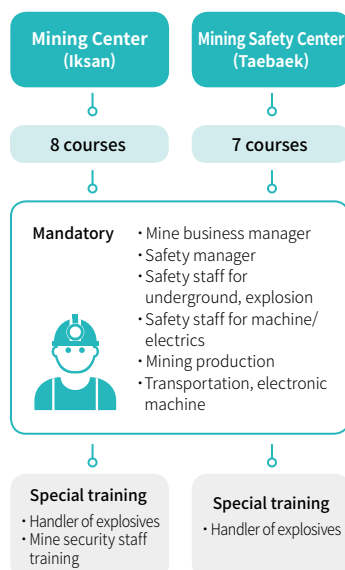


Safety Trainees

Unit : people



Mining Safety Training Facility



Mine Worker Safety Training

Since mining safety training has become mandatory in 2017, KORES has strived to provide quality education and improve learning environment.

In 2018, KORES has created a pool of external professional lecturers, and promoted advancement of the quality of the training by revising its courses based on satisfactory surveys conducted by the trainees.

Also, to enhance the competence of internal lecturers, KORES is introducing 6 types of mining model and underground ventilation model equipment, along as filed training and teaching materials compilation. It will have a great educational effect when dealing with underground ventilation issues rising due to deepening of mines.

2018 Training Program

Category	Subjects	Title	Period	Outcome (times)
Mineral right holder	Mining or mineral right holder	Mining management training	1 day, 8hrs	3
Mining safety manger	Safety manager	Safety manger training	1 day, 8hrs	6
	Safety supervisor			
	Safety staff			
Safety Staff	Underground	Underground explosives/ blasting Safety staff training	1 day, 8hrs	14
	Explosives/blasting			
	Machine	Machine/electricity Safety staff training	1 day, 8hrs	7
	Electric			
	Surface Mine disaster	Surface mine disaster Safety staff training	1 day, 8hrs	-
Mining rescue agency	Mine rescue agent	Mine rescue agent training	2days, 16hrs	11
Mine worker	Underground	Mining/production safety training	1 day, 8hrs	25
	Surface			
	Explosives/blasting			
	Mine disaster	Transport, electric/ mechanical safety training	1 day, 8hrs	25
	Transport			
Whole mine	Electric/mechanical	Training on dealing with explosives	2 days	2
	New Those who deal with explosives			
	Mine worker	Creating manpower for mine security	4 days, 2 days	2
Total training outcome				95



Mining model equipment

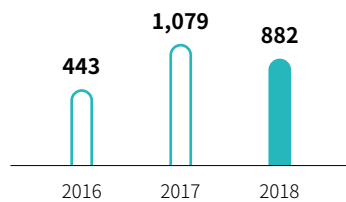


Mine field training



Facility Inspection

Unit : Cases



Mining Facility Inspection

KORES has been delegated by the government in 1981 to conduct periodic inspection on mining equipment and vehicles which need to be managed in order to prevent hazards or where risks are high.

Facilities subject to major inspection include ventilation, blasting, drilling, and transport, and inspection is carried out after installation(Completion test) and after completion test(Performance test).

Each year, KORES establishes a yearly plan of inspection through demand prediction and status surveys of mines, and provides a mining facility safety handbook in order to minimize damages due to disqualification.

Subject & Inspection Period

Facility	Completion	Performance	Performance Test Period
Main fan & side fans	○	○	2 yrs
Crushing facility (150kW or more)	○	○	2 yrs
Hauling gear (person or 150Kw or more)	○	○	1 yrs
Belt conveyor (100Kw or more)	○	×	-
Air compressor (150Kw or more)	○	○	2 yrs
Underground water pump (200Kw or more)	○	×	-
Dressing plant (excluding dry type that does not use motors)	○	×	-
Underground transformation equipment (200KVA or more)	○	×	-
Drilling machine that use motors for oil mining	○	○	2 yrs
Ocean mining equipment	○	○	2 yrs
Oil storage tank over 50kℓ or gas storage tank that holds 500m³ or more	○	○	2 yrs
Pipelines installed on land or sea	○	○	2 yrs
Gasoline plant	○	○	2 yrs
Stabilizer plant	○	○	2 yrs
Vehicle mining machines & mining cars	○	○	2 yrs
New pit mouth on surface	○	×	-
Total	16 types	11 types	



Measuring toxic gas



Vehicle Mining machine



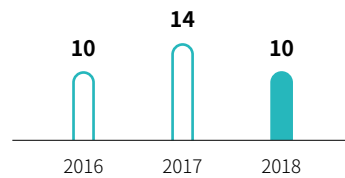
New pit mouth on surface

Spreading of Safety Culture



Technology Guidance

Unit : Cases



KORES is working hard to spread safety culture in mining by conducting various activities such as mining technology training, safety campaigns and creating material for promoting safety.

Mining Technology Training

Mining technology training is conducted by KORES professionals, who visit the fields where safety training has been requested. It is created to deliver safety techniques such as how to use mining safety equipment (oxygen, air respirators etc), measuring noise/vibration, and understanding the results, draining, ventilation, mine disaster prevention, etc., to the workers, and in 2018, KORES conducted 10 technology training sessions, covering mining development, ventilation analysis, etc.

Mining Technology Training Activities

Area	Mine Name	Date
Mining Development	Daenam Mine	Mar. 22-23
	DFC	July 3
Underground Ventilation	Buheung Limestone	July 17
	Sun Cement Gasa-do gold mine	July 18
	EF Yongyeon Mining	Sept. 12
	Shinwon Samyuk Mining	Nov. 13
	BMC Baeksan	Nov. 26
	Kyungdong Sangduck Mining	Dec. 26
Oxygen Respirator	Daesung MDI Donghae office	Nov. 14
Explosives Safety		
Disaster in-depth analysis	All mines	Dec. 18



Improve and analyze ventilation

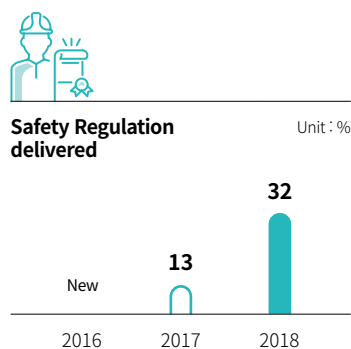
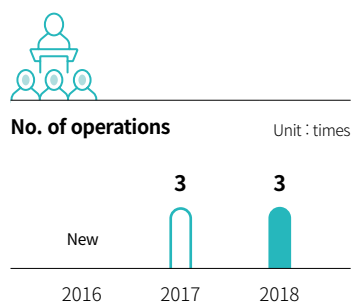
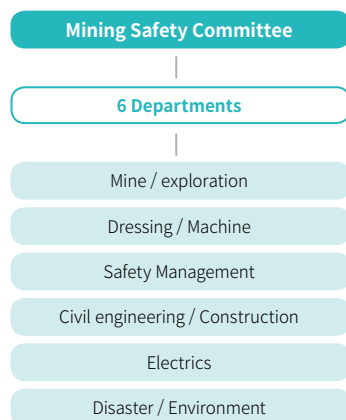


Preparing for mining for redevelopment



Oxygen respirator maintenance/management

Mining Safety Committee Structure



※ Based on all operating properties throughout the country (KORES deals with 70%)

Mining Safety Committee

The mining safety committee has become a mandatory group according to the 2017 revision of the Mining Safety Act and consists of six departments by section for proper management of mining safety technology standards. Safety technology is revised taking into consideration field opinions and problems that arise when applying the safety standards which is consolidated by reviewing the regulations of each area and conducting field surveys.

Establishing Safety Regulations

KORES is in charge of managing organizations which develop statements regarding mining safety regulations*, and establishes safety regulations for domestic operating mines.

*Mining Safety Regulation Opinion Survey Organization : KORES, Korea Coal Corporation, MIRECO, KIGAM

Safety Standard Revision Procedure



In accordance with the enforcement of establishing safety regulations, the number of mines subject to the establishment of mining safety regulations expanded to all operating properties in the country from 2017. Currently, there are 342 mines that are subject to introduce regulations, and 109 mines have established regulations between 2017~2018. This is 32% of the initial goal, and KORES will strive to complete the introduction of safety regulations to all mines by 2021.

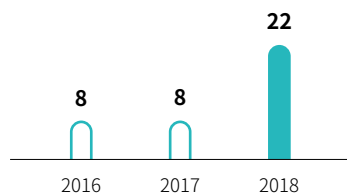
Establishing Safety Regulations

Category	Details
Application & distribution	<ul style="list-style-type: none"> Safety regulation review application Distribute to other organization (prior agreement) *KORES manages 4 organizations specializing in creating safety regulation statements
Document review	<ul style="list-style-type: none"> Review validity of documents and application
Preliminary review of safety regulation draft	<ul style="list-style-type: none"> Preliminary review of whether safety regulations (draft) submitted by the mine meets the Mine Safety Act and mine safety technology standards. Create safety regulation revision draft for each mine and send to the mine
Field inspection	<ul style="list-style-type: none"> Discuss safety regulation revision and safety management field inspection for all procedures Create report including mine safety management status, safety regulation (draft) revised, deleted, added details and results
Review opinion for safety regulations final draft	<ul style="list-style-type: none"> Create safety regulation revision customized for each mine, and create final review opinion
Manage Statements	<ul style="list-style-type: none"> Consolidate and manage safety regulation statements from other organizations Report safety regulation review status



Joint inspection

Unit : cases



Disaster Prevention Activity

KORES is conducting preventative activities at all times and acknowledges that prevention is key to all accidents. During the thawing and winter seasons, when disasters occur the most it conducts preventative activities such as maintaining a support system at all times and distributing safety promotional material. Also, in 2018, the government conducted a joint civil affairs survey regarding 22 mining disaster cases including noise and vibration from explosions during mining development and also diagnosed the safety degree of the operating properties.

Activity Details & Outcome

Category	Details	Outcome
Safety campaign	Safety campaigns such as distributing promotional material and sending informational documents <Safe Mine, Healthy Workers>	All year round
Safety promotional material (Winter, thawing)	Create and distribute safety cards, stickers, posters, safety banners to prevent mine disasters	Twice (20 mines)
Mine disaster prevention during special weather reports	Monitoring damages and sending SMS in advance according to special weather reports	10 times
Maintaining support systems of mine safety equipment	Provide safety equipment such as pumps and hoses kept by the office for mines that lack safety equipment and mines where disasters are anticipated	5 cases

2018 Government Joint Civil Affairs Survey

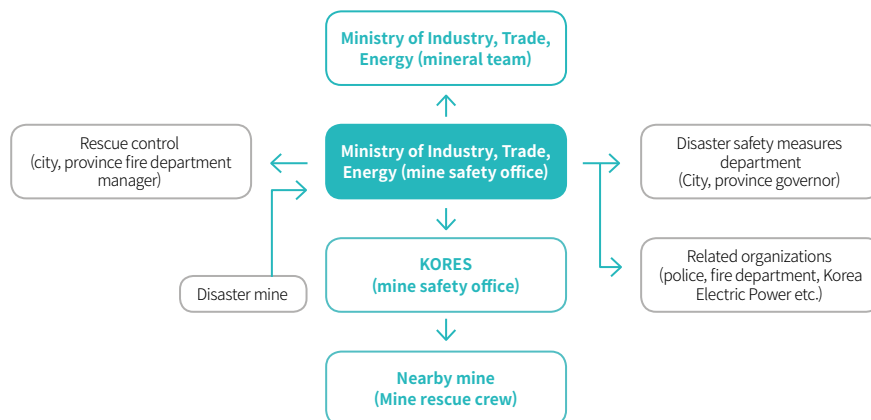
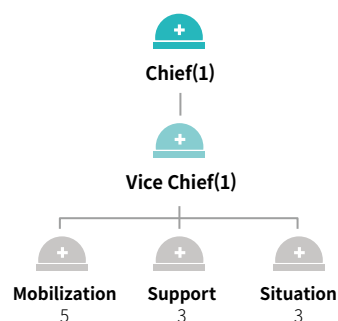
Date	Mine	Subject	Date	Mine	Subject
3. Jan	Taryung		19. June	BMC Byuksan	
	Buheung	Explosion vibration	18. July	BMC Byuksan	
4. Jan	Hanheung Yeunpoong		20. July	Myungjin	
20. Feb	Dongwon	Dust	3. Sept	Sambo	
22~23 Feb	Baekgwang Youngcheon	Ground subsidence	12. Nov	Buheung	
14. Mar	Jungsun		27. Nov	Sungshin Eouigok	Explosion vibration
10. Apr	Buheung		7. Dec	Nammyung Banchon	
17. Apr	Daewoo Remicon	Explosion vibration	12. Dec	Hanwon	
18. Apr	Byukam Cheongsan			Hansol	
26. Apr			18. Dec	Bomyung	
23. May	Gangwon Material		26. Dec	Buheung	

Building a System for Disasters

KORES has built a prompt response system for quick survival recovery and for preventing additional damages when disasters occur. It manages an emergency contact system and its own rescue agency, for systematic rescue and recovery; also the mine rescue agency conducts rescue activities when disasters occur.

Disaster Report & Rescue Activity System

Rescue Agency Organization



Rescue Activity by Mine Rescue Agency in the Last 10 Years

Region	Date	Type	Remarks
Taebaek, Gangwon	2/2012	Gas combustion	2 deaths, 2 injuries
Okgye, Gangneung	8/2012	Collapse of sides	2 deaths, 1 injury
Jungsun, Gangwon	8/2013	Rock falling	1 death
Donghae, Gangwon	3/2014	Fall	1 death
Jungsun, Gangwon	3/2015	Rock falling	1 death
Bonghwa, Gyeongbuk	2/2016	Suffocation	2 minor injuries
Dogye, Samchok	9/2017	Gas explosion	2 deaths, 4 injuries
Jungsun, Gangwon	4/2018	Explosives	3 deaths, 3 injuries
Chungju, Chungbuk	4/2018	Rock falling	1 death



Rescue Status

Category	2016	2017	2018
Rescue cases	1	1	2
Rescue training cases	12	12	12

The mine rescue agency is reinforcing its rescue competency by conducting periodic emergency training on its own or conducting joint training with local fire departments. In 2018, it joined in a private/public joint training session organized by the Department of Trade, Industry, and Energy, 3 times (Jangsung, Dogye, Sangduk mines) and conducted rescue activities at the accident scenes at Handuck and Jungsun Limestone.



Modernization of Mine Development

Pros/Cons of Each Development Method

Surface Mining

Pros Low production cost
Cons Deforestation, dust and environmental issues



Underground Mining

Pros Minimum deforestation
Cons Higher production cost

Modernization of mining is helping to provide the modern facilities and equipment needed for increasing productivity and added value in accordance with the government's eco-friendly policies to prevent development of surface mining and promote underground mining.

KORES has contributed greatly to the modernization of mining and its facilities by providing 573 units of equipment from 1991 to 2018.

Equipment Provided

Category	Major equipment and facilities
Mine modernization equipment	Jumbo Drill, Long Hole Drill, ANFO Charger, LHD(Load, Haul Dump), Wheel Loader, Mine Truck etc.
Underground mining conversion facility	Comminution & Classification Facility, Belt Conveyor, Mineral Processing & Smelting Facility etc.
Value enhancement facility	Ultrafine Mill(Grinding Mill, Pulverizer), Fine Classifier, Photometric Sorting Separator, High gradient Magnetic Separator, XRF etc.

Also, in order to provide equal help and prevent unequal distribution of supplies, it has established a 'one equipment for one mine' support system, and when providing supplies, it takes into consideration the usefulness and appropriateness of the requested machine. In 1991, productivity per person was 5.1 tons/person and this increased over 8 times to 42.1 tons/person in 2018. In addition, the forest area prevented from being damaged from 1991 to 2018 was 7.56 million m² (accumulated) and KRW 231.1 billion of restoration costs have been saved.

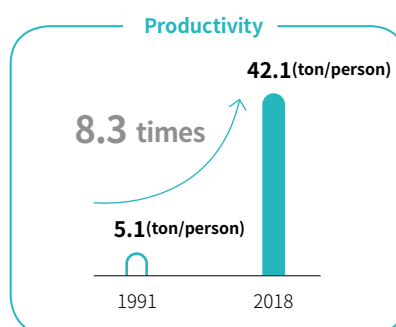
Key Outcomes

Category	~2013	2014	2015	2016	2017	2018	Total
Support Equipment (unit)	425	31	35	32	26	24	573
Productivity per person (ton/person)	-	38.6	39.1	40.1	41.2	42.1	-
Prevented deforestation area (10,000 m ²)	494	52	49	53	54	54	756



Modernization of Mine Development

Enhanced productivity & deforestation prevention



ISSUE 3

**Preparing for
Future Resource
Development**





Sustainability Background

In order to respond the rapidly changing management environment and prepare for the future, KORES suggests “Human-centered & Technology-based Management” “Reinforcing Innovative Management,” and “Mutually Growing Business.”

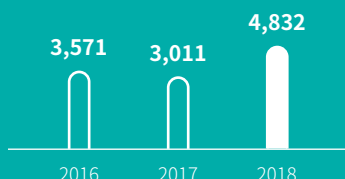
Main Performance



Training hours per person Unit : Hours



Total trained employees Unit : Employees



Training Satisfaction Unit : Points



Human-centered & Technology-based Management

KORES established a human resource development scheme and selected key field techniques of 497 abilities among 9 areas of key management competencies. Also, to build a fair society and increase work satisfaction in the workplace, KORES modified illogical work practices and is making efforts for the balance between work and family life for workers.

Business Innovation

KORES manages various communication channels to share the voice and ideas of stakeholders, as a proactive response to the changing business environment.

Establishment & Activity of KORES Innovative Plan



Mutually Growing Business

In accordance with the government policy and industry situation, KORES has shifted its focus from a large enterprise support system to a support system customized for each development stage, and is managing a mutual growth system to promote mutual growth with domestic SMEs in the mining industry.

Mutual Growth Performance

Category	2016	2017	2018
Mutual growth grade	Good	Avg	Avg
Client satisfaction	A	A	A
Labor Union mutual growth index	8.2	8.4	8.7

Human-centered & Technology-based Management

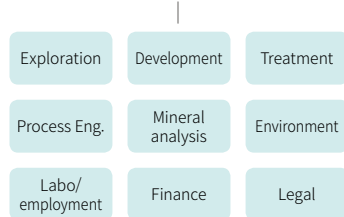


key work competencies by 2026

Secure **100%**

Key Work Competencies

497 competencies in 9 areas



***Key Work Competency :** Competencies required to achieve the vision

Medium and Long Term Talent Cultivation Strategy & Project

1. Establish a competency based training system

- Manage courses for 3 competencies
- Develop NCS ability level courses



2. Secure key competencies

- Secure 497 key work competencies per area



3. Training reflecting the business environment

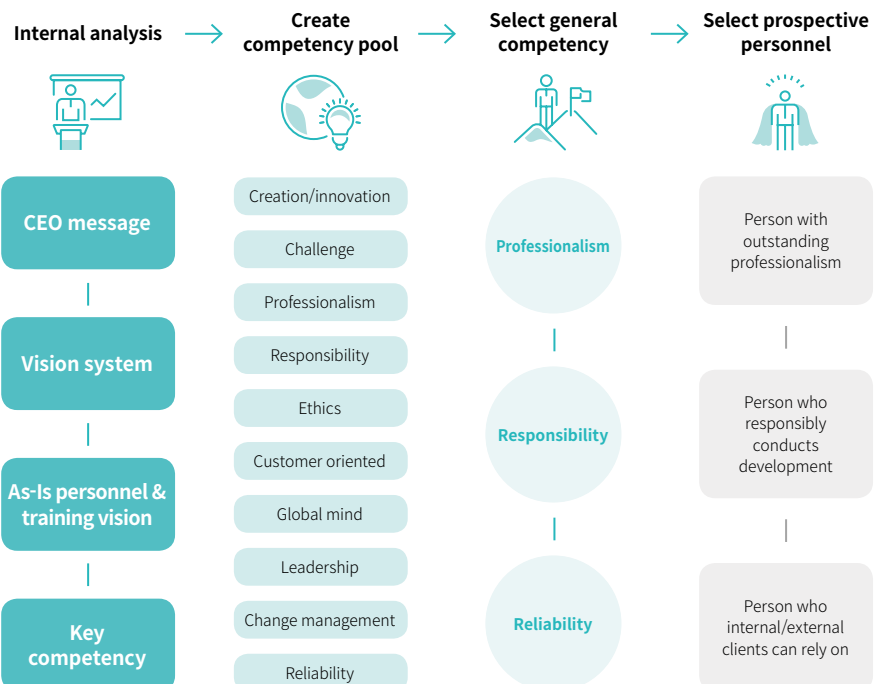
- Flexible training regarding the management environment

In order to overcome the management environment where it is harder to secure human resources due to suspension of new recruitment in accordance with the government's functional adjustment and restructuring policies, KORES is conducting its business centered on cultivating professionals. It has established a medium- and long-term plan for training professionals and has selected key techniques and required competencies, and to secure these, it is working hard to train professionals in the resource development sector according to the plan.

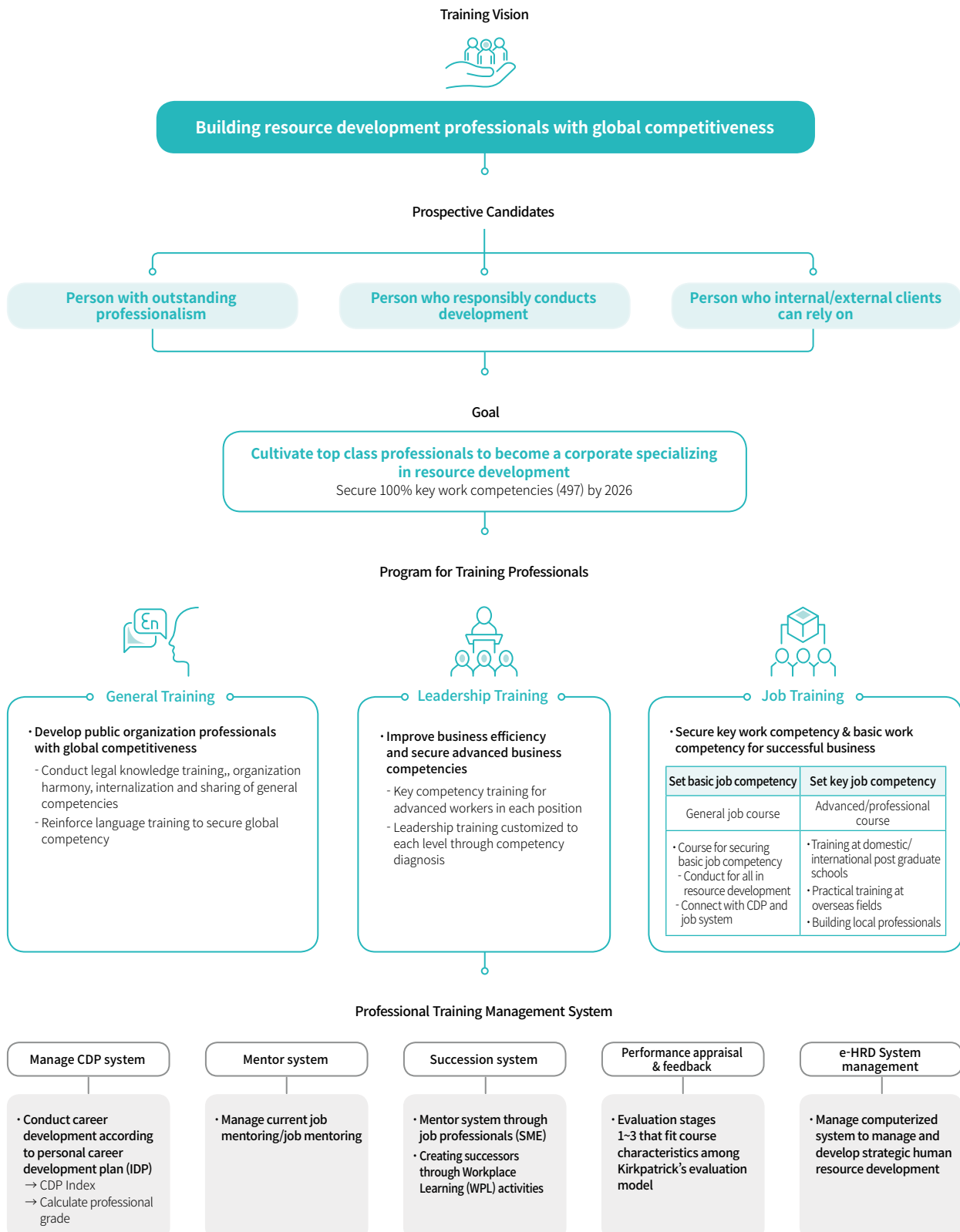
Medium- and Long-Term Road Map for Securing/Cultivating Professionals

Category	Short (2018~2019)	Medium (2020~2022)	Long (2023~2027)
Business strategy	Support	Introduce/improve private investment	Expand private investment
	Investment	Adjust normal production, portfolio	business normalization, create profit
	Future	Project discovery, trial	Commercialization & create profit
Secure personnel	Restructure existing personnel Hold off recruitment	Restart recruitment - Secure personnel for private sector support	Expand recruitment - Advancement of function
Secure required competency	Secure 437 key work competencies	Secure 463 key work competencies	Secure 497 key work competencies

In order to cultivate professionals needed by the organization, KORES analyzed required competencies and selected general competencies including professionalism/responsibility/reliability, to create an image of a prospective candidate for each general competency. With the goal to obtain key work competencies, it created a program for training professionals in the areas of general training, leadership training, and job training, to reinforce competency among staff.



Professional Cultivation System



Social Responsibility

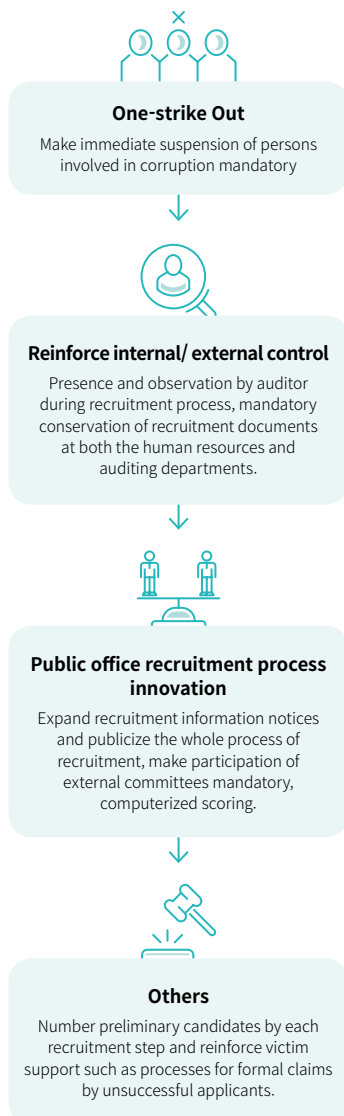
KORES has conducted responsible business as a public enterprise in accordance with the need for a fair and equal society. It is participating in creating a fair society by improving its recruitment system to abolish solicitation or corruption and is leading the change from an unfair society, and improving recruitment safety and welfare by converting part-time workers to full-time employment.

Improvements of the Recruitment System

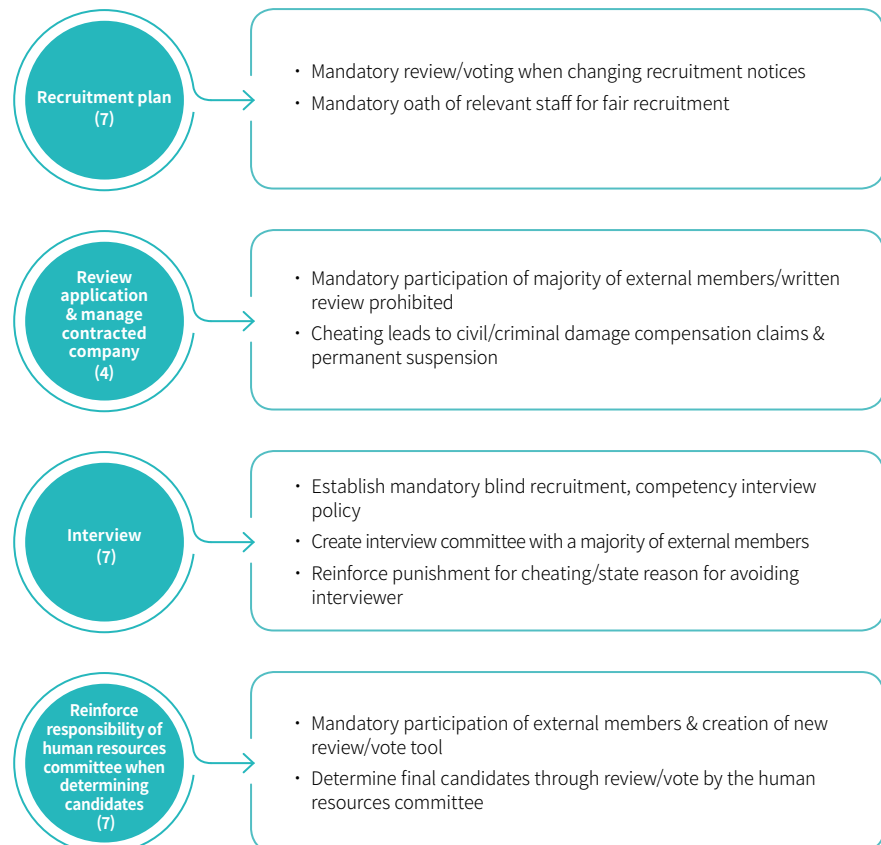
KORES understands that fair recruitment is key to creating a fair social system, and cultivating competent professionals. For a transparent and fair recruitment process, KORES is practicing 21 improvement projects recommended by the government to end recruitment-related corruption, and to secure recruitment transparency.

To stand against recruitment-related corruption, the company has introduced a one-strike-out system, and made suspending those involved in recruitment corruption mandatory. It is also preserving recruitment documents permanently and making sure auditors are present and observing the whole process of recruitment. Also, it has created a system against internal corruption by external solicitation through revising the regulations of each recruitment step and having external members review applications, and conduct interviews.

Main Projects

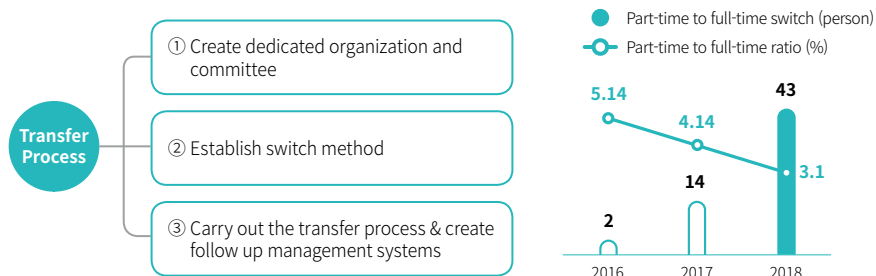


System Improvements by Employment Stage



Switching from Part-time to Full-time Employment

In order to create quality job opportunities promoted by the government and to change the corrupt job environment, KORES has decided to stop recruiting for inefficient youth internships and expand full-time employment positions, and has converted part-time employees to full-time.



2018 Key Outcome

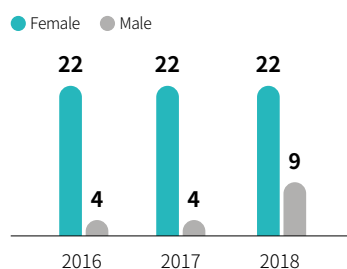
Unit : person

Category	Previous	New
Conversion of part-time employees to full-time workers	29	43
Recruitment of experience type youth internships	30	-



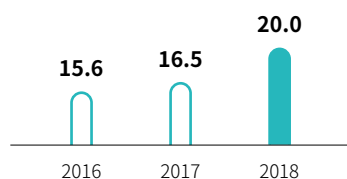
Parental leave

Unit : person



Ratio of using child care leave (person on leave/qualified)

Unit : %



Balance Between Work and Family Life

KORES is making all efforts to improve the work environment for each employee so that they can practice at their maximum competency and have a stable work life. KORES is managing a system to help balance work and family life and to prevent clashes between work and family life that can occur.

Vacation & leave

KORES expanded its paid leave period, including maternity, paternity leave, and child care leave to match the level of civil servants. Also, for balance between work and family life, it reorganized its system so that those with families can use child care leave for not only official events at school and parent-teacher conferences, but also for hospital visits for children.

Flexible working hours system

KORES is making efforts to create a better work environment for pregnant women. Shortened work hours for women during pregnancy and periodic checkups for pregnant women are being provided as well as restrictions from working extra hours during the night or on holidays, and prohibition from performing any harmful work.

Leave system

KORES is managing various support systems for balance between work and life by improving work conditions to protect vulnerable employees and to protect employees from long working long hours, and is providing paternal leave or child care leave without any disadvantages and therefore, was acknowledged as an "Outstanding family-friendly organization" by the Ministry of Gender Equality and Family in November of 2018.

Category	2016	2017	2018
Female workers (Percentage)	139 (26.5%)	136 (26.6%)	155 (28.2%)
Women (Manager level)	4 (5.7%)	5 (6.2%)	6 (7.9%)

Protection of Women & Socially Vulnerable people

For personal motivation and work efficiency, fair performance appraisal and promoting to and assigning to positions according to work ability is essential. According to the OECD glass roof index by The Economist in the UK, Korea is shown to be at the bottom of 29 member countries. KORES is making efforts to resolve discrimination issues and to increase the number of female managers for a fair promotion system.

Ministry of Employment and Labor Employment Improvement Measures Appraisal Results (2018)

Category	Average	Average 70%	Corporate	Results
Ratio of female workers	23.0%	16.1%	26.6%	Appropriate
Ratio of female managers	5.3%	3.7%	4.1%	Appropriate

*Criteria : If the comparison group company average is 70% or more, it is considered "appropriate."

Customized training courses for fostering female professionals

Training for female workers reflecting needs for work/family balance is being provided as social interest in gender equality increases. Top management, middle management leadership courses depending on the position of female managers and employees, as well as work/life balance courses for female employees with children have been created.

Female Professional Training Course

Course	Subject
Top managers Leadership course	Female managers
Middle management leadership course	Female employees above grade 3
work/life coexistence course	Female employees with children born after 2011

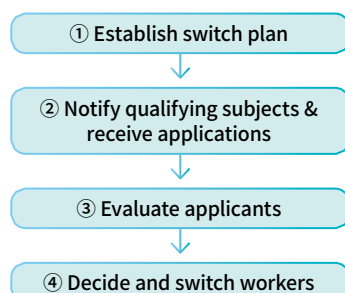
Improving treatment

KORES is continuing to make effort to resolve issues of unfair discrimination of minorities such as high school graduates, and unlimited contract workers in employment.

High school graduates are employed under the condition of working part-time, 4 hours a day, and the existing methods such as being restricted to certain positions and low job continuity has changed. For those who desire to switch to full-time, work ability is evaluated, and the number of qualified subjects increased from 1 in 2017 to 13 in 2018.

Also, KORES is boosting employee motivation and workforce management efficiency by improving labor conditions and providing non-discriminatory welfare to those who switched to indefinite contract work positions.

Switching from part-time to full-time



Female Professional Training Course

Category	Previous	New
Requirement	• Bachelors degree • Work experience 2 years or more	• (Deleted) • Work experience 3 years or more
Criteria	• Higher among those who received a total of 85%	• Higher among those who received a total of 80%

Management Innovation Activities

Creating a KORES Cooperation System

KORES is making efforts to deal with the external environment through managing the organization efficiently, while creating a new breakthrough through management innovation in the rapidly changing management environment of government restructuring and function adjustment policies.

Building a smart work culture centered on collaboration and data

Innovation through spreading of a collaborative and decision-making culture based on science, has been applied to the work. Corporate culture innovation by collaborative work through communication and establishment of a work process based on data, has been applied to build an environment where sustainable value can be created.

In 2018, a collaborative system has been created to make it easier to share information regarding work, and a new sharing system has been created where requests and activity plan performance can be shared. Also, through creating a collaborative map utilizing data mining technology, each department or employee has been able to provide information on the collaboration project. KORES is dealing with the rapidly changing management environment through establishing a scientific decision-making organizational culture centered on collaboration and data, and promises to create an environment where the nation/people can carry out work efficiently.

Improving work efficiency by simplifying the work process

In order to reduce work hours spent creating unnecessary documents and conducting repetitive jobs, KORES created a 'swift job' system to allow for the sharing of electronic documents and prompt sending and receiving of documents. Through this, the coordination sheet for sent documents has reduced 77% in 2018.

Collaboration Points

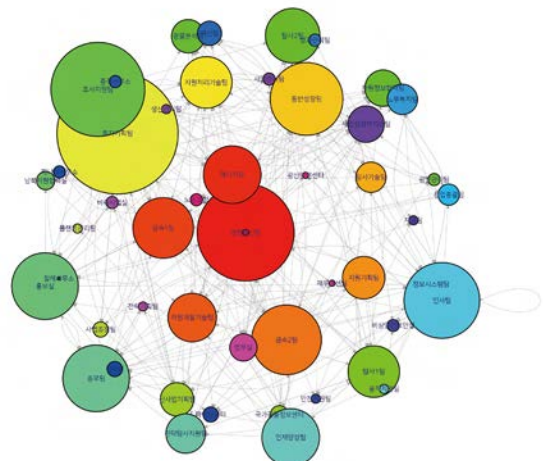
“협업포인트에 마음을 담아
고마운 분에게 선물하세요”

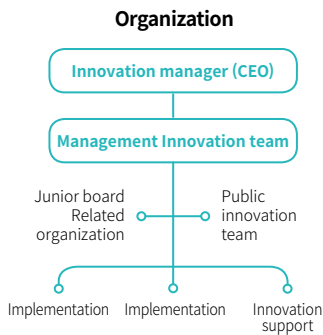


이제 협업포인트를
도움 주신 분에게
쓱- 선물하기

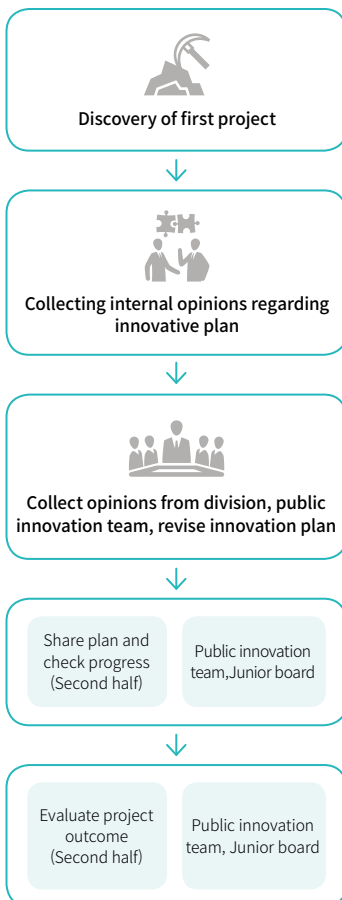
협업포인트 게시판에서 가능합니다
함께 만드는 소통하고 감사하는 문화

Collaboration Map



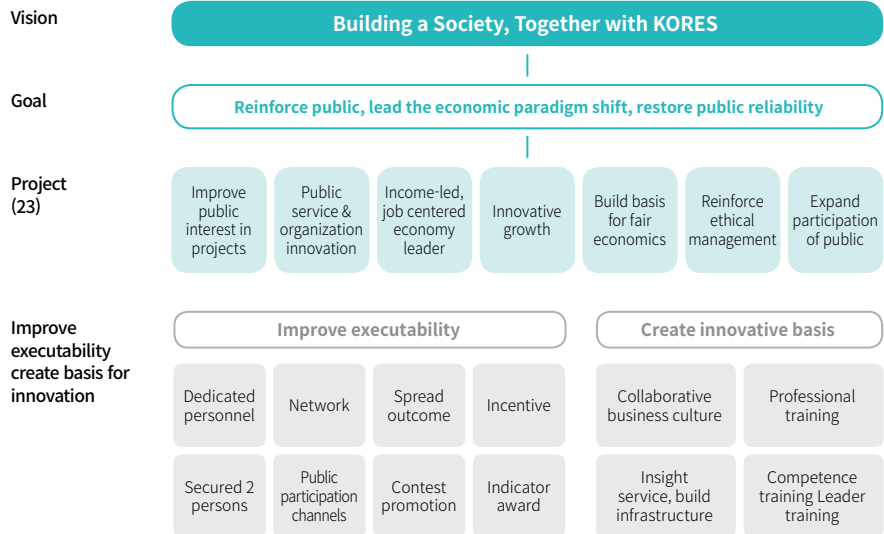


Establishment Procedure



Establishing an Innovative Plan

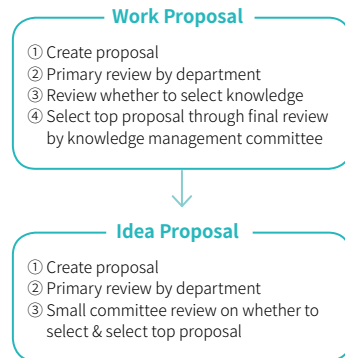
KORES established its innovative vision “Building a Society, together with KORES,” reflecting the meanings, “government by the public” and “innovation with a civil society.” To achieve this, it seeks to achieve innovative goals by establishing 3 goals, reinforcing the public, leading the economic paradigm shift, restoring public reliability, and conducting 23 projects.



In 2018, ‘KORES public team’ made up of 18 people from industries, professionals, locals, university students and the general public, joined the KORES innovation plan establishment process. Also, KORES invited the public to join the innovation project monitoring and evaluation process for the ‘outstanding innovation contest with the public’, and promoted solidarity for innovation by creating a sustainable network. Through this, KORES increased its purchases made through social enterprises, and participated in a joint workshop in Gangwon-do to explore the roles of public facilities in dealing with social issues. KORES promises to lead in implementing public/collaboration-centered administration through active communication with related organizations.

Public Team Project & Outcome





Proposal Ground, Knowledge Sharing System

Unit : case

Category	2016	2017	2018
Job proposal	38	26	21
Idea proposal	35	25	17
Contest proposal	-	90	-
External proposal	-	42	-

Outcome or Top Case



Develop market outlook indicator for 6 strategic types



Improve system for vehicle entering into office building

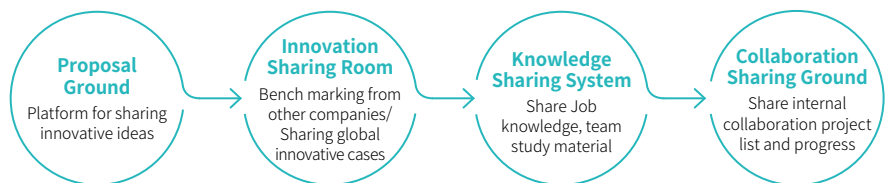
Idea Platform

KORES conducts a proposal system twice a year to improve the work process, enhance job efficiency, create profit, reduce costs and improve the image of the corporation. Proposals or ideas can be carried out within one year, and the proposals which appear to be most effective are selected and reviewed by the knowledge management committee for final selection. Also, the implementation of the selected proposals are reviewed through a progress report.

Proposal and Type of Organization Knowledge

	Category	Details
Proposal	Contest proposal	• Resolve issues of certain agenda
	Job proposal	• Reduce costs, improve processes, create profit
	Idea	• Simplify administrative procedures, improve staff welfare • Improve corporate image
Organization Knowledge	Job manual	• Procedures, standards and methods
	Method	• Experience, personal know-how
	Research/development	• Experience, personal know-how

Along with managing a proposal system, a platform for utilizing and sharing diverse knowledge is being managed. Through this, the ideas of employees are collected and the top ideas are shared. This contributes to improving work methods, thereby increasing job efficiency to achieve management goals.



Manage Communication Channels

KORES manages communication channels to share major issues with stakeholders categorized into key and general stakeholders. By identifying stakeholders' interests and issues with KORES, it is continuously seeking for ways to resolve current issues. In 2018, when establishing an emergency management plan for management normalization, a smooth agreement between labor and management was established.

Communication Channel for Each Stakeholder

	Stakeholder Category	Key Issue	Communication Channel
Key	Government, national assembly	Management normalization reduction of liabilities	General meeting, management notice, consultation
	Labor union, executive and staff	Propose vision, restructuring	Townhall meeting, workshop, proposal, vision publication
	Locals	Contribute to local development	Local meeting, social contribution activity
General	Partner/affiliate	Profit share, fair trade	Integrity inspection, customer satisfaction
	Resource development workers domestic and abroad	Fund technology, joint investment	Resource development meeting, seminar, conference

Technology Innovation

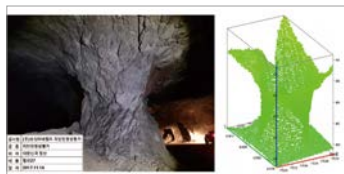
3D Drilling model

Point group data modeling
drone aerial survey technology



Mining stability evaluation

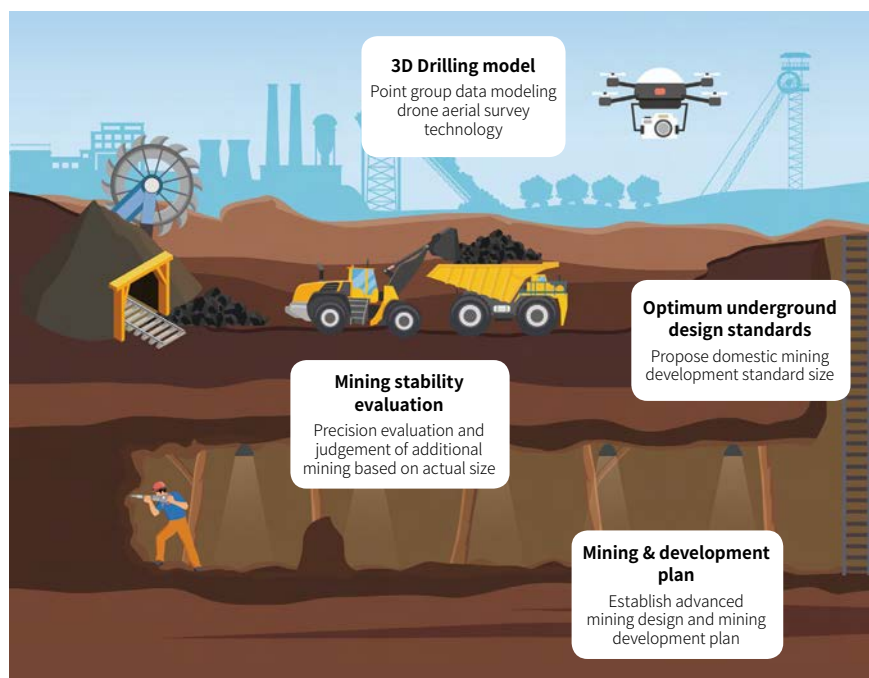
Precision evaluation and judgement of
additional mining based on actual size



Digital mining development utilizing drones and 3D technology

The geological/mining modeling program developed by KORES in 2016 is a software that intuitively displays the geological structure and mines underground by creating a 3D drawing of geological information in database format using a computer. By applying the measurements made by a 3D scanner and drones to the KModStudio*, data measured by drones underground where it is too dangerous for people to go or above the ground where it is hard for people to access can be utilized. This will allow innovative improvements of survey conditions by establishing a mining development plan.

***KModStudio** : This is a geological/mining modeling program developed by the corporate to visualize collected data and load a mine management module of scheduling and mining design based on 3D geological and mining models.



Technology Support History

Category	Mine Name	Applied Technology
Service	Baekgwang (Baekgwang)	Drone, 3D scanning
	Koryo Cement	3D Scanning
	Kumam	3D Modeling
	Yeonhwa Mine 2	3D Scanning
	Koryo Cement	3D Scanning
Support	Kyunggi	3D Scanning
	Baekgwang (Youngchon)	Drone, 3D scanning
	Halla Cement	Drone
	Daesung MDI	Drone, 3D scanning

Leading the Smart mining business

In line with the fourth industrial revolution even in the mining industry, IOT technology is contributing to mine safety. With goals to develop modules for underground mining, transportation and safety management as well as to build integrated management platforms, KORES is conducting national assignments along with industries, schools and etc.

In the future, real-time data collected through wireless internet communication, wearable devices, RFID, and smart sensors in underground mines will become available. Also, through analyzing these, we can expect to see increased efficiency and safety of mining through increased efficiency between mining and transportation, the ability to predict mine rock falls caused by ground deformation, and the ability to measure harmful gases.

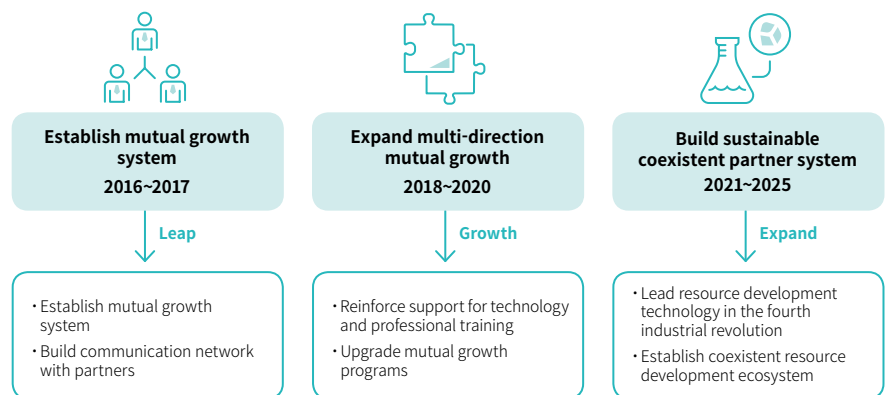
Mutual Growth



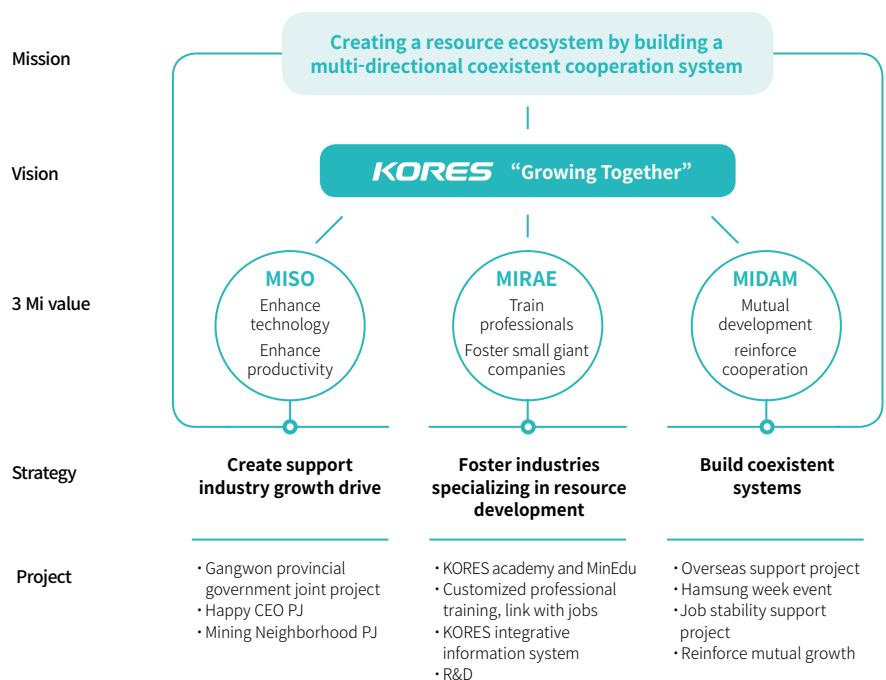
KORES acknowledges small and medium-sized mining companies as key partners to achieve a stable resource supply and promote domestic mining, and understands the importance of mutual growth of the resource industries for the future. In order to achieve this, it is working hard to create a foundation to help partners grow through step-by-step technology, manpower and funding support.

Road Map for Mutual Growth

KORES strives to contribute to domestic mining with a goal to become a leader in resource development technology in the fourth industrial revolution era and establish a coexistent collaborative resource development ecosystem by 2025.



In order to create measures for sustainable growth and to mitigate polarization of the resource industries, we have established a mission called “Creating a resource ecosystem by building a multi-directional coexistent collaborative system.” KORES promises to work hard to implement the three Mi’s (Miso, Mirae, Midam – Smile, Future, Moving Story) under the our vision “Growing with KORES.”



MISO

Mining Support services & Operation



Outcome Sharing Project

An agreement model where the delegating company helps the delegated company achieve mutual goals agreed on between the two companies such as cost reduction, and the outcome is shared by both companies.

Mining Neighborhood PJ

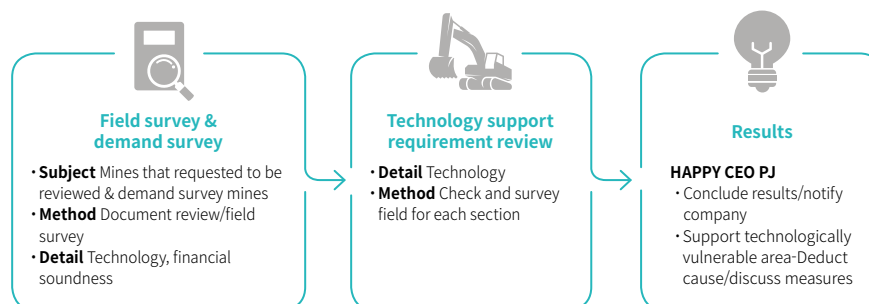
KORES is conducting an outcome share program where funding, and technology is supplied to SME's and the outcomes are shared with the SME's for voluntary innovation of domestic mining. KORES funds and supplies technology for the various challenges that SME's face such as mining, ventilation, and transportation during mining, and contributes to the enhancement of productivity. In 2018, it provided a total of KRW 118 million for 4 projects selected the year before, and was able to save KRW 238 million and share KRW 12 million.

Company	Project Outline	Support Effect
Koryo Jangsung	Review transport efficiency by building routes	Transportation distance reduced by 758m saved 603 KRW/ton
Daesung Danyang	Reduce energy by installing power management system	For yearly power rate KRW 29 million saved
Daesung Jechun	Improve retrieval rate through stable secondary mining	For explosives/oil KRW 678 /ton saved
Samyang Kwanin	Transportation improvement for productivity improvement	For labor/oil KRW 55 million saved

Happy CEO PJ

Based on small and medium mines which lack professional technology, KORES is conducting a talent donation program utilizing its professional technology to improve mining stability and productivity. In 2018, it helped 5 cases by providing technology support, such as improving the ventilation system, building a safe work environment, and energy use rationalization operation (ESCO) by replacing old and inefficient electricity units.

Support Procedure

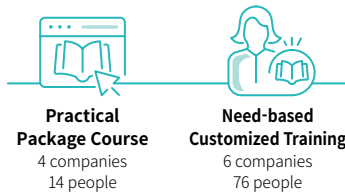


Company	Project Outline	Effect
Jeil	Improve ventilation system to improve work environment	Proposed proper position of new vents, local fans and bottom drilling direction
Kyunggi	Safety evaluation of underground structure for safe mining	Review appropriateness of pit, filler size and propose proper size
Gwangjin	Stability evaluation of weak areas underground	Analyze safety underground and review if support is needed in dangerous regions
Handuk	Energy use rationalization operation (ESCO) III	Electric energy diagnostic results show 403,590kwh/yr 24% can be saved
Kyunggi	Energy use rationalization operation (ESCO) IV	Electric energy diagnostic results show 414,673kwh/yr, 36% can be saved

MIRAE

Mining Resources Ability & Export

Training Outcome



Customized Training Program

KORES Academy

KORES is conducting a field-centered theory and practical training course to cultivate professionals in the mining industry and to increase awareness surrounding domestic mining. In 2018, courses were held 5 times and 118 people completed the course. The results from follow-up satisfaction surveys have been reflected to continue to improve the program.

Program	Subject	Outcome
Future professional training	Middle/High school	Job experience etc. Twice 43 people
SME support training	Workers	3D measurement equipment, mineral analysis; Twice 66 people
Mineral analysis training	Workers	Theory and practical training; Once 9 people

KORES MinEdu

KORES MinEdu is training employees of domestic companies with the purpose to foster professionals for overseas resource development. In 2018, a survey was conducted to identify the need for customized training, and 150 technical professionals in the private sector were trained through home teaching and the development of short-term training programs customized to the company. In addition, to improve the quality of lectures and courses, 19 professional lecturers in the corporate were selected and 16 lesson plans were created to be utilized in the training.

Category	Practical Package course	Practical in-depth course	Customized training
Facility	KORES, Overseas Resource Development Committee	KORES	KORES
Subject	Personnel in field related to resource development		
Details	Collective training centered on practical work for each major technology	In-depth training on technology requested by private sectors	Customized training according to business needs and level
Lecturer	Corporate & external professionals	Domestic/overseas professionals	Corporate professionals

Customized Professional Training & Employment

For domestic resource industries, the workforce structure is aging due to insufficient inflow of a new labor force. KORES is resolving these employment issues by linking to characterization high schools specializing in mining and providing practical training. In 2018, KORES held surveys to identify demand and information sessions for schools that offer a degree in mining and through this, connected 2 mines with 4 students.

Customized Training Program

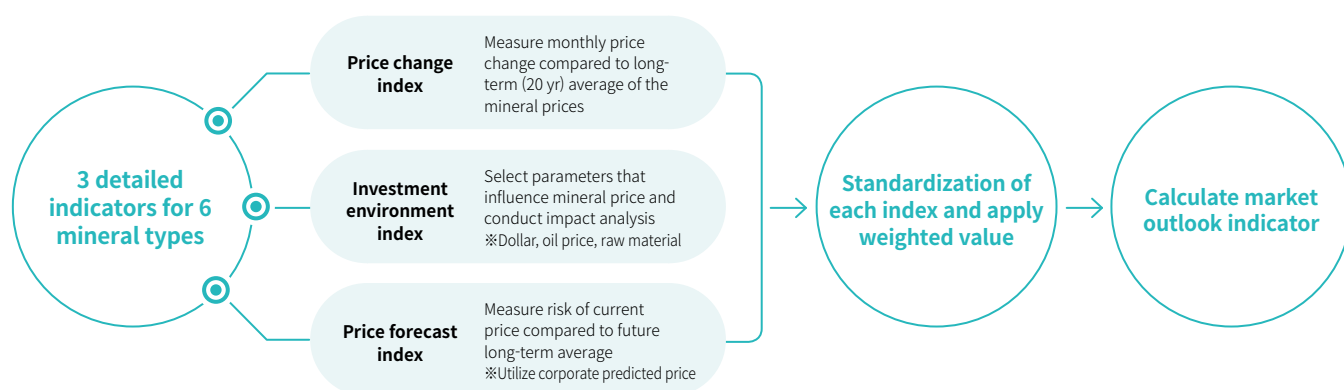
Recruit participating companies and students	Establish agreement and apply to be an industrial worker	Job-focused classes and field training	Work at company & convert to full-time worker
<ul style="list-style-type: none"> • Hold business information session • Visiting domestic mines 	<ul style="list-style-type: none"> • Three way employment agreement • Apply for special cases of military service & industrial worker 	<ul style="list-style-type: none"> • Job-focused class • Mining center training 	<ul style="list-style-type: none"> • Agreement company, employ students • Switch to industrial function worker, and work at mine field

Information Service

KORES is providing support fit for the private sector by creating various resource information contents to promote future resource development. The trend of investor countries, price information and forecast services and information needed for overseas investment are provided.

Market outlook indicator services

Market outlook indicators have been developed to better predict and depict the fluctuation in the resource market. The market outlook indicator service is based on the resource market's long-term cycle and is an indicator for diagnosing the market utilizing formulas developed by KORES and database of the future price forecast, investment environments, and long-term price trend for 6 strategic minerals, to allow private enterprises make a well-informed investment decision when conducting overseas investment projects.



Support Service

Category	Contents	Yearly	Period
Resource trend	Daily resource news	-	Daily
	Weekly resource news	52 times	Weekly
	Monthly trend of strategic minerals insight	12 times	Monthly
	Monthly trend of rare metals the prime	12 times	Monthly
	Resource data FOCUS	Anytime	-
Stats	Mining booklet	Once	October
Price Data	Strategic mineral types	-	Daily/weekly
	Rare & others	-	-
Forecast Data	Forecast	4 times	Quarterly
	Mineral index	-	Daily
	Market outlook indicator	12 times	Monthly
Other		Anytime	-

Mineral price prediction service

Acknowledging the difficulties private enterprises face when having to purchase mineral price prediction data used by overseas industries at a high price, a prediction model has been created and provided regarding six strategic minerals in 2012, and the service has been expanded to include lithium and other rare metals which are expected to be key materials for future industries. This service utilizes medium term (3 year, quarter average), long term (10 year, yearly average) models and are updated every quarter.

MinDex, Mineral Price Index

This is a Korean index created for mineral resources among raw materials and has been published daily since 2017, when it first became an official service. Daily price fluctuations are measured and calculated for mineral types which have a high import amount, which provides easy access to the mineral price fluctuation trend and provides information on how it impacts the domestic industries to help private industries make well-informed decisions regarding when to conduct overseas resource development projects.

MIDAM

Management, Interrelations,
Decision-Making & Activities for
Mining Industry



Hamsung Week Event

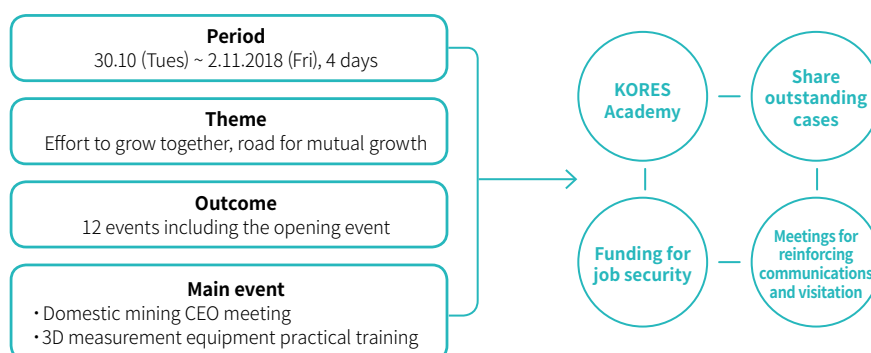


Job Security Support Project

In order to fulfill one of the five national goals, which is 'equal development of the region', various programs which allow communication between the resource industry sector and local community are being conducted.

Hamsung Week Event

A one week event is held every year to reinforce contact between the corporate and companies and spread a culture of mutual growth within the resource industry. During the Hamsung week event, outstanding cases of mutual growth in the mining industry are shared, and various opinions are shared through domestic mining CEO meetings. KORES promises work hard to develop sustainable domestic mining by seeking ways for mutual growth.



Job Security Support Project

The job security support project is to relieve employment challenges in the mining industry. Through the Small and Medium Business Corporation Plan and scholarship programs, it is preventing the loss of professionals in mining and promoting long-term service.

In 2018, a total of 9 people have been provided with KRW 10 million in support through the Small and Medium Business Corporation Plan, and for scholarships, a total of 29 people have been provided KRW 21 million in support.

Job Security Support Project

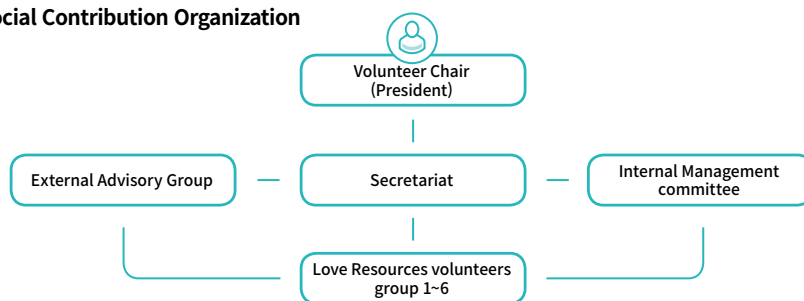
Category	Small Medium Business Corporation Plan	Scholarship System	
		Mining Children of outstanding workers	Customized professional training, job connection
Subject	SME worker	Children of SME worker	High school participant
Criteria	Recommendation by company CEO		-
Support method	Payment	Scholarship	Scholarship
Payment method	Monthly/one time off payment	Immediate payment	Immediate payment
No. of selected	One per mine	15 Mines 25 people	4 people
Details	KRW 100,000/person/month	Mid/high school KRW 500000 University KRW 1 million	High school KRW 500000
Amount	KRW 9.7 million	KRW19 million	KRW 2 million
Remarks	2016 6 people 2017 2 people 2018 1 people	Mid/high school 12 University 13	2018 all qualified people

Social Contribution

Reviving the Local economy

To promote coexistence with SME's in the province, in March 2018, an "Agreement for Purchasing Products Between Public Organizations that Moved to Innovative Cities" has been established with the Gangwon provincial office, and therefore, when making public purchases, products from within the province are given priority. KORES has become an outstanding organization for purchasing SME products within the province, by purchasing KRW 2,121 million (30.5% of the budget) worth of local products, and is leading in reviving the agricultural economy by creating profit through conducting promotional activities and promoting purchases from struggling farms that cannot pioneer into markets.

Social Contribution Organization



Technical & Product Market Support

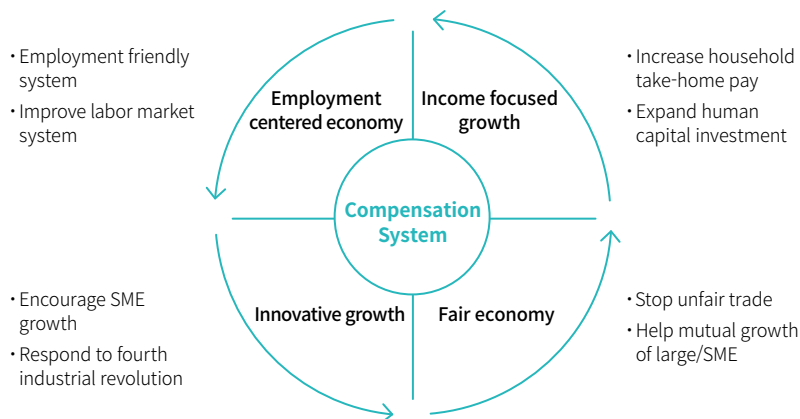
Project outline	Type
Investment condition survey	Technical support
Initial Exploration	
Feasibility survey for acquiring share	
Replace main equipment/ material used at Boleo to domestic products	Market support
Manufacture domestic equipment customized for Boleo	

Technical support and product market support

In order to increase national competitiveness and build a better world together, KORES is collaborating with SME's to promote mutual development. By supporting each step of the process for private sectors advancing overseas, it is helping and encouraging private sectors advance overseas, and to help outstanding domestic SME's pioneer into the overseas market, it is using the overseas projects conducted by KORES to actively purchase SME products.

Introducing a mutual payment system

A mutual payment system is an alternative to a bill and refers to cashing bonds in advance before the bond payment date based on the credit of the purchaser. To promote mutual growth with SMEs, a collaborative profit sharing system is conducted, where SME's contributory portion from the trading profit between large enterprises or public organizations is allotted through a prior agreement.



Labor Union Management

The labor union of KORES, as its partner, pursues survival and prosperity through open management, and is making mutual effort to improve welfare, job security, and develop the company.

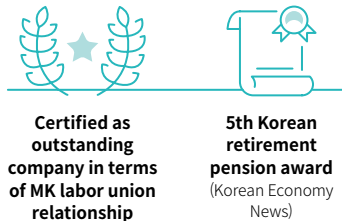
The labor union committee is conducted with the purpose to promote corporate development and enhance the welfare of workers. Every quarter a regular labor union committee meeting is held to discuss current labor union issues, and when needed, a labor union agency is created to resolve the current circumstances.

Overcoming liquidity risk through joint labor union

In December 2017, following the rejection of the Corporate Act revision regarding capital increase, concerns of forced restructuring and disadvantages that may arise from organizations merging, led to anxiety and deepened labor union conflicts; however, this was overcome by a partnership mind set.

The labor union created an emergency measures committee to create a project to overcome the liquidity crisis, and through this, it agreed to faithfully carry out restructuring measures, including returning of wages under mutual cooperation and focused on overcoming the crisis.

Spread Advanced Labor Union Culture Through External Authentication



Labor union cooperation leading to obtaining outstanding corporation regarding labor union culture by Maeil Economy

KORES created a labor union relationship partnership, and to promote advancement of the labor union relationship, obtained a certificate of recognition for being a corporation with outstanding labor union culture through an external certification process that is trusted by the public. This certification process consisted of a preliminary online evaluation followed by a secondary visit inspection. Through this, KORES received positive reviews regarding its outstanding labor union mutual leadership and established cooperative labor union relationship.

Improvement of the retirement pension system and being awarded for outstanding retirement pension program

In March 2018, KORES agreed to change its retirement pension program during a labor union meeting, and has made efforts to improve the management and method of the retirement pension program. As a result, it has been awarded for being an outstanding corporation in the database sector of the Korean retirement pension awards held by Korea Economy News.

Efforts to improve welfare of staff and employees

KORES is focusing on improving work conditions for vulnerable workers through labor union negotiations, and has improved the work conditions of lower-ranking employees and of workers in extreme rural or overseas regions. Grade 5 part-time workers have been converted to full-time, and the number of employees qualified to be promoted among grade 5 and support workers has increased, and for laborers dispatched to rural or overseas regions, additional points have been given to help motivate workers.



03 Sustainability Management



68
Governance



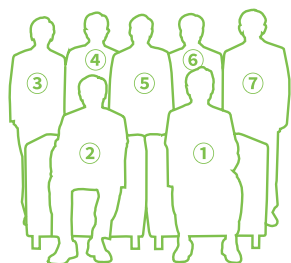
70
Risk Management



72
Ethical Management

74
Human Rights Management

Governance



- ① Nam Yunhwan Executive Director
- ② Kim Chunsun Non-executive Director
- ③ Park Wonkwan Non-executive Director
- ④ Jeong Dongsu Non-executive Director
- ⑤ Yoo Jongnam Executive Director (Standing auditor)
- ⑥ Han Myungkyung Non-executive Director
- ⑦ Choi Byungman Non-executive Director



Members of Board of Directors

Category	Career
	President (vacant)
Executive Director	Yoo Jongnam (Standing auditor) Board of Audit and Inspection Manager
	Nam Yunhwan Strategic Management Div. Executive vice president
	Director(vacant) -
Non-executive Director	Jeong Dongsu Advisor of law firm Yulchon
	Choi Byungman Emergency planning for Board of Audit and inspection tam Leader
	Han Myungkyung CEO of Samnam Inc.
	Park Wonkwan Grand National Party Policy department head
	Kim Chunsun (Chair) Incheon port corporate CEO

KORES was founded on 5 June 1967 in accordance with the National Mining Promotion Corporation Act (now, Korean Resources Corporate Act) established in 30 March 1967. In accordance with the Corporate Act, all capital is to be invested by the government, and for equity structure, 99.86% is held by the Korean government and 0.14% is held by the Korea Development Bank.

Board of Directors

The board of directors is the highest decision-making group, consists of 9 members including CEO, further divided into 4 executive and 5 non-executive directors.

CEO and standing auditors are appointed by the President, and non-executive directors are appointed by the Minister of Economy and Finance.

The chair of the board members is held by the senior non-executive director, thus securing independence of governance. Also, by appointing a standing auditor, management is kept in check.



Managing the Board of Directors

The board of directors established a goal to carry out sustainable management and responsible decision-making, and works hard to review agendas in-depth, proactively participate in management, and create social value.



Board of Directors Performance



Board of Directors Activity

Category	2016	2017	2018
No of board meeting	17	14	12
Voting Agenda	29	35	29
Reports	11	15	18
Participation ratio	92.6%	96.3%	95.7%
Revised votes	0%	5.7%	10.3%

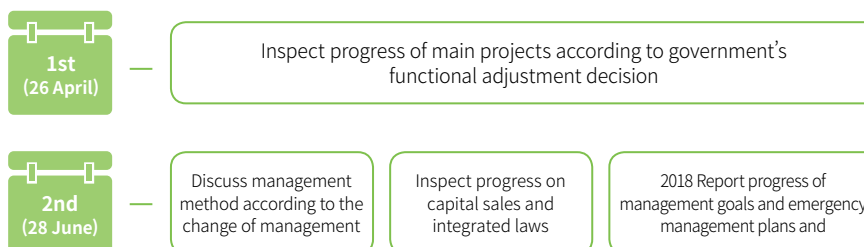
Twelve board meetings have been held in 2018, where a total of 47 agendas, 29 voting agendas and 18 reports were reviewed. Due to the expansion of reportable investment projects, management of the overseas investment capital and the status of sales were inspected and this led to smooth and timely transactions.

Major Agendas Voted on During a Board Meeting

No/Date	Agenda	Details
No. 1130 (30 Jan)	2018 Long-term loan plan	Prevention of overseas projects being sold at a cheap price conduct gradual restructuring
No. 1134 (29 May)	Coal development project in Wyong Australia Procurement of material and change of investment plans	Seeking methods to create investment fund to improve overseas project value
No. 1135 (28 June)	Coal production share sales in Moolarben, Australia	Sales of overseas project

In addition, major issues of KORES have been put forward in meetings for current management issues. Also it is promoting responsible management through actively conducting external activities such as representing the corporate by attending events held by domestic and overseas organizations related to mineral resource development and making a proposal for government policies regarding overseas resource development T/F proposals.

Holding meetings for Current Management Issues



Participating in General Meeting for Overseas Mineral Resource Development Committee

Management through External Activities



Activities

- Non-executive director proposal against government policy of overseas resource development innovation T/F proposal (22 March)
- Attend mining agency 100th anniversary event (May 18)
- Attend overseas mineral resource development committee general meeting (June 22)
- Attend overseas resource development symposium (Dec 6)
 - Present resource development session theme (ex. Cobre Panama investment case)
- Committee activities (sustainable management committee, ethical management committee)

Risk Management

Risks refer to all possible incidents that have a negative influence on management and business activities. Risk management of KORES is conducted to manage risks that can be faced, within allowed limits, and contribute to a stable management through recognition, measurement, control, monitoring and reporting.

Establishment of a Risk management plan

Every year, a risk management plan linked to the strategic management plan is established and managed. The risk management plan is established by submitting it to the risk management committee and includes, selecting key risks of the business environment, response measures, monitoring methods, and priority projects.

Managing the Risk Management Committee

The risk management committee consists of 15 internal members and reviews and makes decisions regarding managing all types of risks that can occur while conducting business activities, including investment projects.

Risk Management Strategy

In order to build a risk management model that reflects the distinct characteristics of the corporation such as internal/external business environment changes, establishment of a new vision and strategic business plans, effective risk management is being carried out to overcome and normalize any financial crises



Selection Process for Top 20 Key Risks

KORES manages a total of 20 key projects and consolidates projects from each department along with general projects with the purpose of prompt gathering of abilities for key projects and businesses that determine its future.



2018 Risk Outcome Check Results

2 Risk Reduced



10 Risk Maintained



8 Risk Increased



Risk Management and Outcome

Top 20 key risks of the company are selected and inspected each quarter in accordance with the risk inspection plan. In 2018, a total of 15 departments controlled 20 risk indexes. A review on the outcome compared to the original plan of each index showed that 2 risks reduced, 10 remained and 8 increased. Also, control of increased risks have been reinforced while continuously being monitored and controlled.

Key Response Outcome

Index Name	Yearly Response Plan	Response Outcome	Possibility
			Reduced risk
Reduced liquidity	① Procure timely funding	① Loan limit increased ② Bond issued	<ul style="list-style-type: none"> Secured funds for next year Need to obtain timely funds
			Reduced risk
Increased interest rate	① Minimize external loan ② Enhance long/short term loan structure and utilize fixed rate ③ Maintain credit rate(Limit additional interest)	① Procure using fixed rate in preparation of increased procurement interest rate ② Maintain credit rate	Base rate increase
			Maintained risk
Delayed Cobre Panama sales	① Select consultant ② Shorten actual investigation time	① Establish sales plan ② Monitor global resource market ③ Select sales consultant	Sales delay due to raw material market drop
			Maintained risk
Suspension of overseas development function leading to functional reduction	① Expand private support & discover new projects ② Alleviate influence by organizational/functional reduction when discussing establishment of integrated law	① Proposal of korean mining corporate law ② Reinforce response through labor-union emergency measures committee	Monitoring and preparation of laws needed

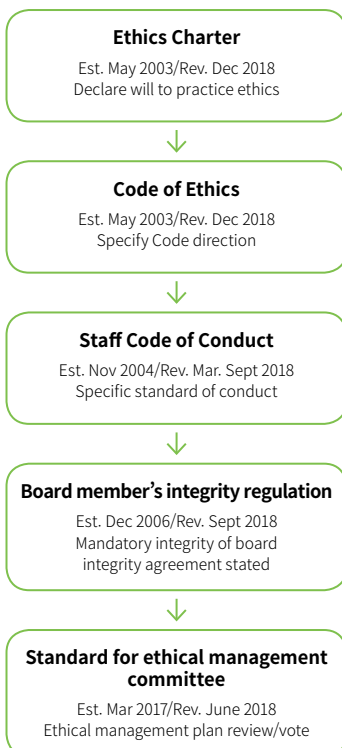
Ethical Management

Ethical Management Committee



*Chair : Director (2017) → CEO (2018)

Ethical Standards (Revised 2018)



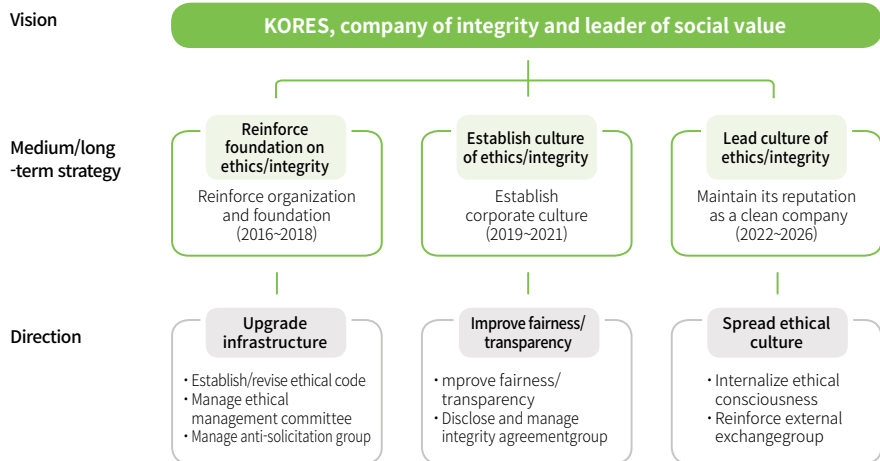
Ethical Management Method

The corporate strives to become a global leader in resource development trusted and loved by the public, and for this, understands that establishment of a transparent, fair and ethical culture is essential. Thus, it has created an 'Ethics Charter,' which is held as the top standard value that must be complied with by all employees.

Building/Managing an Ethical Management System

Ethical management system

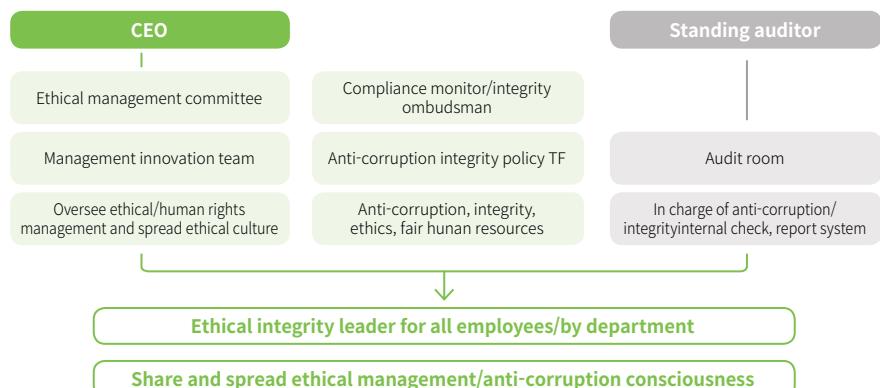
KORES is working hard to conduct an ethical/law-abiding/transparent business to satisfy social expectations and requirements. In 2018, KORES selected three ethical management directions to upgrade its ethical management infrastructure, improve fairness/ transparency of the overall management of the corporation and spread an ethical culture.



Ethical management standards & establishing a dedicated organization

KORES is managing a standards and organization system to promote ethical management. It promoted the chair to become the president of the ethical management committee which is the top decision-making organization for ethical management, and divided the jobs of the ethical management department and anti-corruption integrity department to make it more specialized.

Ethical Management Organization





Ethical Training

Subject	Method	Participants	Completion ratio
Board members & management	Collective	64	91.4%
Staff/employees	Collective	339	76.9%
	Online	401	90.5%



Anti-solicitation Training



Report System

Category	Report center	Violation type
Website	Internal report center	Corruption
	Electronic complaints	Employee offense
	Whistle blowing	Violation of mine security law
Intranet	e-audit system	Violation of code of conduct
Intranet	Integrity report box	Anonymous report

2018 Ethical Management Outcome

'Outstanding organization' for Integrity, overall integrity score rising continuously for 4 years



'Outstanding organization' for anti-corruption policy evaluation rose two grades (Grade 4 → Grade 2)



Effort and Performance for Ethical Management

Internalization of ethical management

KORES is managing an anti-solicitation law training program in accordance with the implementation of laws prohibiting commissions such as illegal solicitation and money or valuables and is conducting internal/external promotion for compliance with the Anti-graft Law and to prevent violation of the law.

In 2018, it revised and reinforced the code of conduct for all employees and established a 'company ethics day (June 2)' to hold a week-long event.

Systematic improvements to prevent corruption

KORES changed its system to proactively eradicate unethical behavior such as recruitment corruption, unfair trade, or overuse of ones power, and is making effort to prevent corruption by reinforcing internal control functions regarding its unique job.

2018 Key Outcome

Human Resources	<ul style="list-style-type: none"> Established fair recruitment standards Reinforced punishment laws for those involved in recruitment corruption
Contract	<ul style="list-style-type: none"> Created new provision 'restriction on recruitment of family' in the staff and employee code of conduct Stated prohibition of providing money/valuables, treats or unfair recruitment in integrity contract implementation memorandum
Power overuse	<ul style="list-style-type: none"> Created claim/support center for behavior of overusing one's power, established methods to abolish all behaviors of overusing one's power
Budget	<ul style="list-style-type: none"> Established job standard for managing funds Conducted shareholder audit of non-operating rights business

Promoting internal/external report system

A report center is being managed for reporting corruption, employee wrongdoing, and 'standards for protecting the reporter and the reporting of a violation of public interest,' and 'standards for protection and compensation of the reporter' has been established and is in effect. In 2018, to promote the report system, improvements have been made and internal/external training and promotional activities have been conducted.

Monitoring & Appraisal

Ethical/integrity activity outcome is being monitored through an internal monitoring system and evaluation by the Anti-corruption and Civil Rights Commission. Also, outcome is analyzed to reflect improvements, and other efforts are also being made.

Integrity & anti corruption outcome

Category	2016	2017	2018
Integrity	Overall integrity	Grade 2	Grade 2
	External integrity	Grade 2	Grade 2
	Internal integrity	Grade 2	Grade 2
Anti-corruption evaluation		Grade 3	Grade 4
Sustainable management index		AAA	AA

Human Rights Management



Charter for human rights management



Human Rights Management Method

KORES respects and upholds the UN Global compact, international standard & regulations, and works hard to protect and enhance the rights of all stakeholders, including staff and employees, partners and international societies.

Basis for Human Rights Management

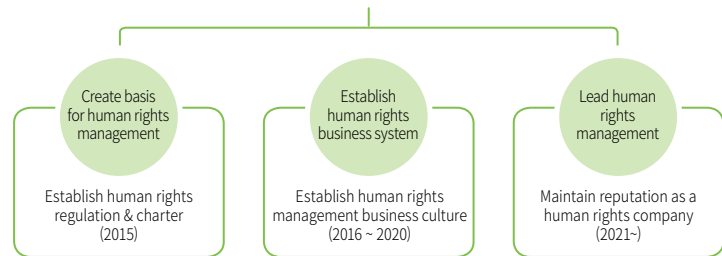
Human rights management system

KORES became a leader in establishing a charter for human rights management and internal regulations regarding human rights in 2015, and created a foundation for human rights management by holding a formal declaration of human rights management involving all employees. In 2018, it applied the 'public organization human rights manual' set by the National Human Rights Commission of Korea, established a KORES human rights management implementation plan, participated in the Gangwon region public organization human rights consultation group, and reinforced exchange and collaboration regarding human rights.

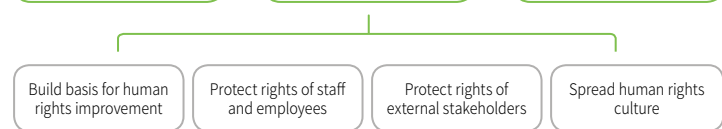
Vision

KORES, building a world for people with resources
KORES protects and respects the rights of all stakeholders and staff and employees.

Medium/long term strategy



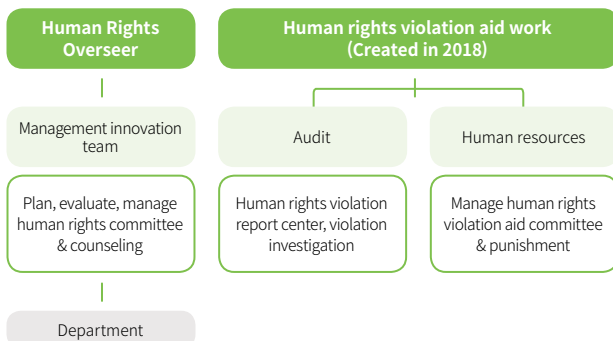
Promotion direction



Human rights influence appraisal

Yearly performance is evaluated, based on 10 areas on the human rights management checklist appointed by the National Human Rights Commission of Korea, and when a negative impact is discovered, improvement measures are created and faithfully carried out.

Human Rights Management Internal Organization



External Collaboration Organization





Human Rights Management Consultative Group Meeting

Spreading Human Rights Culture

Protecting human rights of staff and employees

In order to create a human rights friendly business culture, efforts are being made to improve the work environment. In 2018, it was agreed upon by the labor union to exclude pregnant women from conducting dangerous jobs to protect the health rights of pregnant women, and a system to relieve stress among mine rescue agents when conducting rescue activities at a disaster site has been developed.

Current status of human rights education

Title	Contents	Participant (people)
Special lecture on human rights	Human rights management, disability rights, women rights	245
Increasing awareness of workers with disabilities	Increase understanding and awareness to create a sympathetic view	497
Anti violence training	Prevent 4 types of violence including sexual abuse, harassment	446
Female manager training (3 courses)	Leadership for top, middle management, work/family balance	18

Supporting human rights of external stakeholders and spreading human rights management

Various activities are conducted for the protection of health/safety of mine workers. Improvement of the work environment, health/safety consultation, training and management of a mine rescue agency is established in case of mine disasters. In April 2018, the mine rescue agency was sent to a disaster scene to carry out rescue activities.

Human Rights Violation Prevention and Follow Up

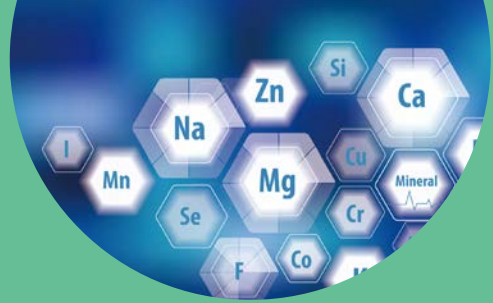
For protecting the human rights of external stakeholders related to the management activities, human rights violation aid procedures are created and provided. In 2018, the 'human rights violation aid procedures manual' was created, and a new human rights report center was established. Through this, 2 human rights consultation cases arose in 2018, showing that the human rights violation aid system is being effectively managed,

In order to abolish sexual harassment/abuse in the workplace in accordance with the social issues such as the 'Me too' movement, counseling offices dedicated to distress circumstances have been increased and further professional counseling personnel has been developed. Every year, violence prevention training is being conducted, and follow up systems and preventative activities such as distributing 'sexual harassment/abuse case manuals' are being conducted.

Human Rights Violation Treatment



*Human rights violation report center : Website (www.kores.or.kr)



04 Appendix

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Third Party Assurance Statement



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Major Awards / Association Memberships

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UN Global Compact 10 Principles

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ICMM 10 Principles



Data Center

Economic Performance

Summary Statements of Financial Position

Unit : KRW

Category	2016	2017	2018
Assets	Current assets	529,880,177,309	465,771,270,378
	Non-current assets	3,835,894,928,537	3,686,063,464,285
	Total	4,365,775,105,846	4,151,834,734,663
Liabilities	Current liabilities	575,688,755,932	879,720,688,138
	Non-current liabilities	4,630,950,554,505	4,554,439,537,113
	Total	5,206,639,310,437	5,434,160,225,251
Equity	Capital	1,958,270,200,000	1,988,270,200,000
	Other	(2,554,927,609,911)	(2,983,502,621,338)
	Equity attributable to equity holders of the parent	(596,657,409,911)	(995,232,421,338)
	Non-controlling interests	(244,206,794,680)	(287,093,069,250)
	Total	(840,864,204,591)	(1,282,325,490,588)

Summary Statement of Comprehensive Income

Unit : KRW

Category	2016	2017	2018
Revenue (Sales)	330,481,001,748	722,869,431,304	638,274,667,050
Cost of sales	607,260,845,096	812,184,781,306	1,008,595,924,250
Selling and administrative expenses	36,809,209,808	89,382,550,420	62,315,353,141
Operating profit(loss)	(313,589,053,156)	(178,697,900,422)	(432,636,610,341)
Other operating income	1,353,776,053	13,990,568,695	21,146,624,570
Other operating expenses	664,317,883,679	145,752,439,926	279,494,390,963
Financial income	19,732,843,932	22,472,776,052	18,215,845,052
Financial costs	7,148,042,756	26,834,276,751	5,437,771,327
Net profit(loss) before tax	(963,968,359,606)	(314,821,272,352)	(678,206,303,009)
Corporate tax	23,448,749,659	95,769,382,305	7,870,869,952
Net profit(loss) for year	(987,417,109,265)	(410,590,654,657)	(686,077,172,961)
Other comprehensive income(loss)	9,466,543,443	(44,653,528,590)	(8,206,828,578)
Total comprehensive income(loss)	(977,950,565,822)	(455,244,183,247)	(694,284,001,539)
Net profit during the term that belongs to equity holders of the parent	(806,518,051,829)	(314,901,481,314)	(562,433,683,085)
Net profit during the term that belongs to non-controlling interests	(180,899,057,436)	(95,689,173,343)	(123,643,489,876)

Social Performance

All Staff & Employees

Unit : Employees

Category	2015	2016	2017	2018
Total current members	556	525	507	538*
New employees	3	5	1	2
Transferees	7	30	11	15

*Include indefinite work contractors

By Type of Employment

Unit : Employees

Category		2015	2016	2017	2018
Full-time	Total	556	525	507	538
	Female	153	139	136	155
	Male	403	386	371	383
Contract	Total	36	27	21	18
	Female	9	9	9	3
	Male	27	18	12	15

By Location of Workplace

Unit : Employees

Category	2015	2016	2017	2018
Domestic	513	476	452	514
Overseas	43	49	55	42

Female Staff and Employee

Unit : Employees

Category	2015	2016	2017	2018
No. of female employees	153	139	136	155
Female managers	7	6	7	7
Percentage of females (%)	27.5	26.5	26.8	28.2
Percentage of female managers (%)	7.7	4.3	7.1	9.2

Social Performance

Social Equal Employment

Unit : Employees

Category	2015	2016	2017	2018
Women	0	0	0	0
Disabled	0	0	0	0
Local talents	0	3	0	0
High school/characterization school	0	1	0	0
Engineering	2	1	0	0

Average Training Hours per Person

Unit : Hours

Category	2015	2016	2017	2018
Training	73	27	25	36

Activity Fee for Social Contribution

Unit : Million KRW

Category	2015	2016	2017	2018
Social contribution	296.0	191.0	110.4	311.2

SME Product Purchase

Unit : Million KRW

Category	2015	2016	2017	2018
Total purchases	36,586	15,261	7,541	6,948
SME product purchase amount	34,297	13,330	5,886	5,457
SME product purchase ratio (%)	93.74	87.35	78.05	78.54

Environmental Performance

Waste & Wastewater discharge

Unit : Ton

Category	2015	2016	2017	2018
Wastewater discharge	98	208.5	54	61.2
Waste discharge	97	11.7	25.79	23.29

Category	Head Office	Mine Safety	Mining	Total
2018 Wastewater discharge	61.2	-	-	61.2
2018 Waste discharge	20.69	1.30	1.30	23.29

Greenhouse Gas Emissions

Unit : tCO₂eq

Category	2015	2016	2017	2018
Direct greenhouse gas emissions	282.9	311.8	290.13	353.31
Indirect greenhouse gas emissions	1,313.90	2,048.10	2,133.31	2,129.55
Greenhouse gas emissions per unit production (tCO ₂ eq/Million KRW)	0.00536	0.00714	0.00335	0.00389

Water Usage*

Unit : m³

Category	2015	2016	2017	2018
Water usage	18,179	14,729	17,960	22,756

*Water supply system covers 100% of water usage

Category	Head Office	Mine Safety	Mining	Total
2018 Water Usage	17,352	2,068	3,336	22,756

Purchase Amount and Ratio of Green Products

Unit : Million KRW, %

Category	2015	2016	2017	2018
Total purchases (million KRW)	3,200	1,149	226	19.5
Purchases (million KRW)	1,858	178	52	8.3
Purchase ratio (%)	58	15.5	23	42.6

Environmental Performance

Energy Use

Unit : toe, MJ

Category	2015	2016	2017	2018
Kerosene (toe)	3.6	-	-	-
Gasoline (toe)	29	28.5	26.02	21.15
City gas (toe)	80.9	98.5	113.97	120.70
Electricity (toe)	666.5	1038.8	1085.40	1139.49

2018 Energy Use

Category	Head Office	Mine Safety	Mining	Total (MJ)	Toe conversion
Kerosene (MJ)	-	-	-	-	-
Gasoline (MJ)	879,564.6	3,270	2,616	885,450.6	21.15
City gas (MJ)	5,055,586.9	-	-	5,055,586.9	120.7
Electricity (MJ)	43,846,982.4	1,608,326.4	2,313,600	47,768,908.8	1,139.49

GRI Content Index

Topic	Disclosure		Page	Assurance	ISO 26000
Organizational profile	102-1	Name of the organization	6	●	6.3.10/ 6.4.1-6.4.2/ 6.4.3/6.4.4/ 6.4.5/6.8.5/7.8
	102-2	Activities, brands, products, and services	6	●	
	102-3	Location of headquarters	6	●	
	102-4	Location of operations	8, 26-27	●	
	102-5	Ownership and legal form	6	●	
	102-6	Markets served	8	●	
	102-7	Scale of the organization	6	●	
	102-8	Information on employees and other workers	6, 79	●	
	102-9	Supply chain	12-13	●	
	102-10	Significant changes to the organization and its supply chain	No significant change	●	
	102-11	Precautionary Principle or approach	70-71	●	
	102-12	External initiatives	87-88	●	
	102-13	Membership of associations	86	●	
Strategy	102-14	Statement from senior decision-maker	2	●	4.7/6.2/7.4.2
Ethics and integrity	102-16	Values, principles, standards, and norms of behavior	72-73	●	4.4/6.6.3
Governance	102-18	Governance structure	68-69	●	6.2/7.4.3/7.7.5
Stakeholder engagement	102-40	List of stakeholder groups	16-17	●	5.3
	102-41	Collective bargaining agreements	Collective agreement application rate: 100%	●	
	102-42	Identifying and selecting stakeholders	16-17	●	
	102-43	Approach to stakeholder engagement	16-17	●	
	102-44	Key topics and concerns raised	18-19	●	
Reporting practice	102-45	Entities included in the consolidated financial statements	78	●	5.2/7.3.2/ 7.3.3/7.3.4
	102-46	Defining report content and topic Boundaries	19	●	
	102-47	List of material topics	19	●	
	102-48	Restatements of information	No significant change	●	
	102-49	Changes in reporting	No significant change	●	
	102-50	Reporting period	About This Report	●	7.5.3/7.6.2
	102-51	Date of most recent report	About This Report	●	
	102-52	Reporting cycle	About This Report	●	
	102-53	Contact point for questions regarding the report	About This Report	●	
	102-54	Claims of reporting in accordance with the GRI Standards	About This Report	●	
	102-55	GRI content index	81-83	●	
	102-56	External assurance	84-85	●	
Management Approach	103-1	Explanation of the material topic and its boundary	18-19	●	
	103-2	The management approach and its components			
	103-3	Evaluation of the management approach			

Economy

Topic	Disclosure		Page	Assurance	ISO 26000
Economic Performance	103	Management Approach(103-1,103-2,103-3)	20-21	●	6.8.1-6.8.2/ 6.8.3/6.8.7/ 6.8.9
	201-1	Direct economic value generated and distributed	22-33	●	
Indirect Economic Impacts	103	Management Approach(103-1,103-2,103-3)	20-21	●	6.3.9/6.6.6/ 6.6.7/6.7.8/ 6.8.1-6.8.2/ 6.8.5/6.8.7/ 6.8.9
	203-2	Significant indirect economic impacts	34-37	●	
Anti-corruption	103	Management Approach(103-1,103-2,103-3)	72-73	●	6.6.1-6.6.2/ 6.6.3
	205-1	Operations assessed for risks related to corruption	Number of anti-corruption violations: 0case	●	
	205-2	Communication and training about anti-corruption policies and procedures	73 (Number of those who completed ethics education: 405people, 90.4%)	●	

Environment

Topic	Disclosure		Page	Assurance	ISO 26000
Energy	103	Management Approach(103-1,103-2,103-3)	10-11	●	6.5.4
	302-1	Energy consumption within the organization	80	●	
	302-4	Reduction of energy consumption	60	●	
Water and Effluents	103	Management Approach(103-1,103-2,103-3)	10-11	●	6.5.4
	303-2	Management of water discharge related impacts	80	●	
	303-5	Water consumption	80	●	
Emissions	103	Management Approach(103-1,103-2,103-3)	10-11	●	6.5.5
	305-1	Direct (Scope 1) GHG emissions	80	●	
	305-2	Energy indirect (Scope 2) GHG emissions	80	●	
	305-4	Other indirect (Scope 3) GHG emissions	80	●	
	305-5	Reduction of GHG emissions	47	●	
Effluents and Waste	103	Management Approach(103-1,103-2,103-3)	10-11	●	6.5.3
	306-2	Waste by type and disposal method	100% contract system (by volume-rate disposal system: 60%(Wonju-si), by contractor: 40%)	●	

Society

Topic		Disclosure	Page	Assurance	ISO 26000
Employment	103	Management Approach(103-1,103-2,103-3)	48-49	●	
	401-1	New employee hires and employee turnover	79	●	6.4.3
	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	50-51, 53	●	6.4.4/6.8.7
	401-3	Parental leave	53	●	6.4.4
Labor/Management Relations	103	Management Approach(103-1,103-2,103-3)	65	●	
	402-1	Minimum notice periods regarding operational changes	Notify at least 30 days before on changes in management	●	6.4.3/6.4.5
Occupational Health and Safety	103	Management Approach(103-1,103-2,103-3)	38-39	●	
	403-3	Occupational health services	46	●	6.4.6/6.8.8
	403-5	Worker training on occupational health and safety	41-45	●	
Training and Education	103	Management Approach(103-1,103-2,103-3)	48-49	●	
	404-1	Average hours of training per year per employee	49	●	6.4.7
	404-2	Programs for upgrading employee skills and transition assistance programs	51	●	6.4.7/6.8.5
Diversity and Equal Opportunity	103	Management Approach(103-1,103-2,103-3)	48-49	●	
	405-1	Diversity of governance bodies and employees	79	●	6.2.3/6.3.7/ 6.3.10/6.4.3
Non-discrimination	103	Management Approach(103-1,103-2,103-3)	48-49	●	
	406-1	Incidents of discrimination and corrective actions taken	52-54	●	6.3.6/6.3.7/ 6.3.10/6.4.3
Human Rights Assessment	103	Management Approach(103-1,103-2,103-3)	48-49	●	
	412-1	Operations that have been subject to human rights reviews or impact assessments	74-75	●	6.3.5
	412-2	Employee training on human rights policies or procedures	75	●	
Local Communities	103	Management Approach(103-1,103-2,103-3)	48-49	●	
	413-1	Operations with local community engagement, impact assessments, and development programs	63	●	6.3.9/ 6.5.1-6.5.2/ 6.5.3/6.8

Third Party Assurance Statement

Presented to the management and stakeholders of Korea Resources Corporation

The CSR (hereafter "the Evaluator") was asked Korea Resources Corporation (KORES) to conduct an independent evaluation of 2018 KORES Sustainability Report. As the evaluator, we now present the management and stakeholders of KORES with the results of its evaluation of the publication process and content of the report.

The Evaluation Criteria

We have focused its review of the sustainability report on whether it complies with the international prevailing AA1000AS(2008) and GRI Standards for sustainability reporting.

- Whether the report applies the principles of the inclusivity, materiality, and responsiveness.
- Whether it satisfies the GRI Standards' principles on reporting content and quality determination.
- Whether it satisfies the Core Option of GRI Standards.

The Evaluation Level

We have kept to the moderate assurance level, focusing on applying the principles of AA1000AS(2008) and adopted the limited level for data sampling. The key activities that it has performed during its evaluation are as follows.

- Checking the reasonableness of the significance evaluation process for selecting issues for the report.
- Checking the agreement with the internal documents and basic data of KORES.
- Checking the sustainability management performance index to make sure that the Core Option of GRI Standards has been met.

Limitations of Evaluation

We have acquired a level of reliability through reviewing a limited scope of literature, which does not mean 100% accuracy.

Independence of Evaluation

We present our opinion based on its ethics and independence as an independent third party evaluation agency.

Our Opinion

After we have gone through a series of procedures to see whether report complies with the evaluation criteria of AA1000AS(2008) and the principles of the international acknowledged guidelines, we present our opinion as below.

Whether the Report Meets the Core Option of GRI Standards

We have reviewed to see whether the report meets the Core Option of GRI Standards, the international guidelines on publishing reports. And we have seen that it satisfies the index reporting requirements on 15 common or special topics. The key reporting aspects and specific indicators as verified through our evaluation are as below.

Category	Topic			
Economy	▪ Economic Performance_201-1	▪ Indirect Economic Impacts_203-2	▪ Anti-corruption_205-1, 205-2	
Environment	▪ Energy_302-1, 302-4	▪ Water and Effluents_303-2, 303-5	▪ Emissions_305-1, 305-2, 305-4, 305-5	▪ Effluents and Waste_306-2
Society	▪ Employment_401-1, 401-2, 401-3	▪ Labor/Management Relations_402-1	▪ Occupational Health and Safety_403-3, 403-5	▪ Training and Education_404-1, 404-2
	▪ Diversity and Equal Opportunity_405-1	▪ Non-discrimination_406-1	▪ Human Rights Assessment_412-1, 412-2	▪ Local Communities_413-1

Whether the Report Applies the Principles of AA1000AS(2008)

We have verified that the report applies the three major principles of AA1000 Assurance Standard.

Inclusivity	Has KORES implemented the participatory activities for the stakeholders?	We have reviewed the stakeholder selection process of KORES, but have not found any major stakeholders deliberately excluded from the processes that different divisions have implemented for the participation of the stakeholders.
Materiality	Does KORES report material issues to the stakeholders?	We have checked KORES' procedure for identifying issues for its report, but our review of the materiality evaluation procedure has not found any problems with its application.
Responsiveness	Does KORES appropriately respond to the needs and expectations of its stakeholders?	We have identified major factors through which KORES influences the stakeholders' performance and verified that the key sustainability issues are adequately described in the report.

Management Improvements Recommended

We hold in high regard the fact that KORES has demonstrated transparency in announcing to its stakeholders through the report its efforts for sustainability management such as the acquisition of a stable supply of mineral resources, the creation of a stable and eco-friendly ecosystem of the mining industry, and local community contribution activities with a view to fulfilling its social responsibility. We advise KORES to continuously manage risks with its financial and non-financial elements and upgrade its preemptive response to changes in the business environment to consolidate the basis for its sustainable growth.

We hope that KORES will continuously increase its social responsibility by upgrading the policies and principles that should be considered in making investments and developing resources overseas, conducting R&D work on eco-friendly technology, and training professionals for the mining industry among others. Furthermore, we advise KORES to contribute more to local and international community through strengthening its links to the UN Sustainable Development Goals(SDGs) and measuring their achievement.

Our Qualifications

Asked by KORES to evaluate its report, The CSR is a global sustainability management agency. We are licensed to review in accordance with AA1000AS(2008) as certified by the UK-based Accountability, and have won the status of Gold Community Member from Global Reporting Initiative(GRI). We have as our partners CSR specialists from the US, the UK, and Germany among others who boast CSR research achievements.

December 2019

Jeong Se-woo

CEO of THE CSR




Major Awards

Year	Awards History	Organization
2014	Familyfriendly Corporate Certificate by the Ministry of Gender Equality and Family	Ministry of Gender Equality and Family
2015	Family-friendly Corporate Certificate by the Ministry of Gender Equality and Family	Ministry of Gender Equality and Family
	Outstanding case for government 3.0 implemented project	Ministry of Economy and Finance
	Family-friendly Corporate Certificate by the Ministry of Gender Equality and Family	Ministry of Gender Equality and Family
2016	'Minster of Land, Infrastructure and Transport' award for contributing to regional development	Minster of Land, Infrastructure and Transport
	Selected as outstanding workplace implementing the social responsibility of a labor-union	Ministry of Employment and Labor
	Outstanding organization for conducting regional development	Wonju-si
2017	Certified as company for outstanding labor-union culture	Maeil Economy
	Family friendly corporate certificate by Ministry of Gender Equality and Family	Ministry of Gender Equality and Family
2018	Awarded national retirement pension award	Korea Economic Daily
	Family friendly corporate certificate by Ministry of Gender Equality and Family	Ministry of Gender Equality and Family

Association Memberships

Gangwon-do transfer of public organizations committee

Korea Society of Economic & Environmental Geology

Republic of Korea National Red Cross

Geological Society of Korea

Deep Seabed Mining Committee

UN Global Compact Korean Chapter

Government-invested institution committee

Institute of Internal Auditors

Korean Mining Association

Korea International Trade Association

Korea Society for Energy Engineering

Korean Resource Economics Association

Korean Society for Geosystem Engineering

Korean Academic Society of Quality Business Administration

Korean Association for Public Administration

Korean Accounting Association

Korean Council on Latin America & the Caribbean

Association of Contaminated Land Investigation

Korean National Tuberculosis Association

Korean Fire Safety Institute

UN Global Compact 10 Principles



UN Global Compact Ten Principles



Human Rights

- Principle 1.** Businesses should support and respect the protection of internationally proclaimed human rights;
- Principle 2.** Make sure that they are not complicit in human rights abuses.



Labour

- Principle 3.** Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
- Principle 4.** the elimination of all forms of forced and compulsory labour;
- Principle 5.** the effective abolition of child labour; and
- Principle 6.** the elimination of discrimination in respect of employment and occupation.



Environment

- Principle 7.** Businesses should support a precautionary approach to environmental challenges;
- Principle 8.** undertake initiatives to promote greater environmental responsibility;
- Principle 9.** encourage the development and diffusion of environmentally friendly technologies.



Anti-corruption

- Principle 10.** Businesses should work against corruption in all its forms, including extortion and bribery.

ICMM 10 Principles



International Council on Mining & Metals

1

Apply ethical business practices and sound systems of corporate governance and transparency to support sustainable development.



2

Integrate sustainable development in corporate strategy and decision-making processes.



3

Respect human rights and the interests, cultures, customs and values of employees and communities affected by our activities.



4

Implement effective risk-management strategies and systems based on sound science and which account for stakeholder perceptions of risks.



5

Pursue continual improvement in health and safety performance with the ultimate goal of zero harm.



6

Pursue continual improvement in environmental performance issues, such as water stewardship, energy use and climate change.



7

Contribute to the conservation of biodiversity and integrated approaches to land-use planning.



8

Facilitate and support the knowledge-base and systems for responsible design, use, re-use, recycling and disposal of products containing metals and minerals.



9

Pursue continual improvement in social performance and contribute to the social, economic and institutional development of host countries and communities.



10

Proactively engage key stakeholders on sustainable development challenges and opportunities in an open and transparent manner. Effectively report and independently verify progress and performance.





KORES SUSTAINABILITY REPORT 2018

Korea Resources Corporation places its utmost efforts toward contributing to Korea's economic development via securing a stable supply of mineral resources for national industry.

KORES, as the leader of resource development,
We promise a higher standard of fulfilling social responsibility.
We will listen more carefully to our stakeholders at close distance.
We also promise to strive for a brighter and better shared future.

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For more detailed information and PDF version, please visit the KORES website.
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