

# 2018-9 MIRECO SUSTAINABILITY REPORT

Co-existence of humans and nature | Harmony between development and conservation



2018-9 MIRECO

SUSTAINABILITY REPORT

ABOUT THIS REPORT

MIRECO, Specialized Institution to lead National Safety and Economic Prosperity in Mine Areas

The Mine Reclamation Corporation or MIRECO safely manages and restores the mine damage areas and contributes to the development of the local community while making a pleasant living environment and promoting the area's economic facilitation and resident welfare. In the 5th MIRECO sustainability report, MIRECO transparently publishes the result of performances that fulfills its social responsibility in economic, social, and environmental aspects. For any inquiries about the report or opinions on MIRECO's sustainable management, please contact the Division of Planning & Coordination (Value Innovation Team).

<b>Reporting Principle</b>	This report is prepared in accordance with the Core Option [100-400] of the GRI (Global Reporting Initiative) Standards.
<b>Reporting Boundaries</b>	The scope of this report includes MIRECO's domestic operations. Information with a different scope is specified separately.
<b>Reporting Period</b>	The report covers MIRECO's Sustainability management activities and performances from January 1 through December 31, 2018, and some of the activities and performances of the first half of 2019 are included. To enable time series analysis, the report includes data from the previous three years.
<b>Reporting Scope</b>	The report focuses on the management performances and outcomes of MIRECO's head office, except for the corporation's CSR activities that include those of its regional offices. MIRECO has prepared and presented K-IFRS consolidated financial statements since 2016 to report its financial performance.
<b>Assurance</b>	To ensure reliability and quality of reporting contents, a third-party assurance provider verifies thereport.
<b>Additional Information</b>	(25456) Division of Planning & Coordination (Social Value & Innovation Team), Mine Reclamation Corp. 2, Segye-ro, Wonju, Gangwon-do T 033-902-6347   E-mail freedom0117@mireco.or.kr www.mireco.or.kr

Contents

<b>Overview</b>	MIRECO Sustainability
02 Letter from CEO	60 Governance Structure
04 Company Profile	62 Ethics Management
06 Vision & Strategy	64 Human Rights Management
08 Materiality Assessment Process	66 Environmental Management
	66 Corporate Culture
<b>Social Value Creation</b>	<b>Appendix</b>
12 MIRECO's Social Value Creation	70 Customer Satisfaction
18 Interview with Stakeholders	72 Social Responsibility Management
20 Social Value Creation Process	Performance
	78 GRI Standard Index
<b>Value Adding Activities</b>	81 UNGC Advanced Level
22 Safe and Clean Land Restoration	82 UNGP Reporting Framework
34 Leading Inclusive Growth in Mining Areas	83 Award & Recognition
42 Growth Engine for Future Innovation	84 Third-Party's Assurance
49 Mutually Growing Community	

# Letter From CEO

Dear distinguished stakeholders,

I would like to express my sincere gratitude to stakeholders who have sent their continued interests and supports to us this year as always. Thanks to your interests and supports, MIRECO could bring about a meaningful achievement and performance last year. First of all, MIRECO has made tangible fruition in the business innovation sector. For example, MIRECO received grade 2 from the Integrity Appraisal of Public Institutions in 2018, up by 2 grades from the previous year and got grade 2 from the Anti-Corruption Policy Appraisal of Public Institutions while acquiring "Excellent" in the Customer Satisfaction Index for 11 consecutive years and "Satisfactory" in assessing promotion of Shared Growth. On top of that, MIRECO was recognized its efforts and achievements in public with being awarded Minister prize from the Ministry of Trade, Industry and Energy in the global business area for its contribution to technology commercialization and awarded Minister prize from the Ministry of Public Administration and Safety for its contribution to disaster management.

Meanwhile, MIRECO re-established the medium to long-term management strategy and advanced the business goals in October 2019 for actively responding to changing business dynamics that include the government's hardening policies toward safety management and eco-friendly energy, changing paradigm tilted to sustainable development, growing social consensus for fair society, and transformation in technology environment such as the Fourth Industrial Revolution. To put it concretely, MIRECO plans to promote sustainability of the mining industry and community in Korea with much-strengthened management goals and four strategic initiatives below.

**First, to implement a safe and clean land restoration project, MIRECO will complete reclamation in 991 mine sites that have mine damages by 2024.**

MIRECO invested about KRW 955.9 billion and finished environment restoration in 706 sites harmed by mining. In 2018, the mine damage prevention project was executed in 221 places, with about KRW 64 billion. By 2024, MIRECO will complete restoration in 991 deteriorated mine sites, which are approximately 26 percent of 3,804 closed mines with confirmed contamination requiring mine reclamation so that the health and environment right for residents in mining areas can be secured.

**Second, as a part of making mine areas self-reliant, MIRECO will attract KRW 300 billion of investment to abandoned mine areas by 2024.**

A conventional piecemeal approach that provides partial culture and energy can never create consistent growth in the local economy anymore. Against this backdrop, MIRECO has transformed its regional economy supporting projects into a comprehensive regional promotion project such as attracting industries, diffusing culture, and building infrastructure. Particularly in 2018, MIRECO's 'ECO JOB CITY TAEBAEK' became the final winning selection for the economy-driven type of the Urban Regeneration New Deal Project Contest hosted by the Ministry of Land, Infrastructure, and Transport. In 2019, 'Deokpoaeitta' was selected as a regional specialty regeneration project, paving the way for mining areas to stand on their own. MIRECO will continue its efforts to enhance the economic value of abandoned mine areas by active business development and supports toward regional economic vitality.



**Third, for the sake of securing future growth engine, MIRECO will advance R&D achievements by 25 percent by 2024.**

MIRECO will continue to boost its R&D performances by securing future leading technology, broadening the technical cooperation, and making new business opportunities based on core capability. For reference, the technologies like Advanced Measuring-Analysis Technology for Underground Mine Cavities as well as MIRECO EYE are developed by MIRECO, and both are being widely applied to various mine sites and road safety in urban areas. Also, the technologies were selected as the best practices of innovation for their high-level technology by the Ministry of Economy and Finance.

**Fourth, for the strengthened foundation for sustainable business, MIRECO will acquire a top grade in social value assessment by 2024.**

There are growing demands and expectations for social value creation toward public institutions. Accordingly, MIRECO will lead in creating social values by promoting job creation, shared growth, and social contribution as the core institution to implement mine reclamation and support growth and self-reliance of abandoned mine areas. In particular, MIRECO will put the utmost efforts to listen to the opinions of interested parties, including business operators in the mining industry and residents in abandoned mine areas, and grow together with them while resolving the problems in hand.

Since the foundation in 2006, MIRECO has faithfully served the role of the public institution that takes responsibility for mine reclamation in Korea. MIRECO's eco-friendly mine damage prevention project keeps people safe, and various regional promotion projects for facilitating the economy in the mining area improve the living conditions of residents in abandoned mine sites. MIRECO will remain committed to improve the sustainability of itself and society as the public institution specialized in mine reclamation.

I look forward to your great interest and encouragement.

Thank you.

# Company Profile

The Mine Reclamation Corporation or MIRECO is the one and only organization specialized for mine reclamation in Korea established in 2006 as the quasi-governmental institution for the efficient mine damage prevention projects. MIRECO has been contributing to make the pleasant living environment in mine areas and support the economic revitalization while minimizing the environmental and social problems caused by mine damage. Its tasks range from the restoration in deteriorated areas deteriorated by active, suspended, or closed mines to the investigation, research and technology development for mind damage prevention.

## Corporate Status

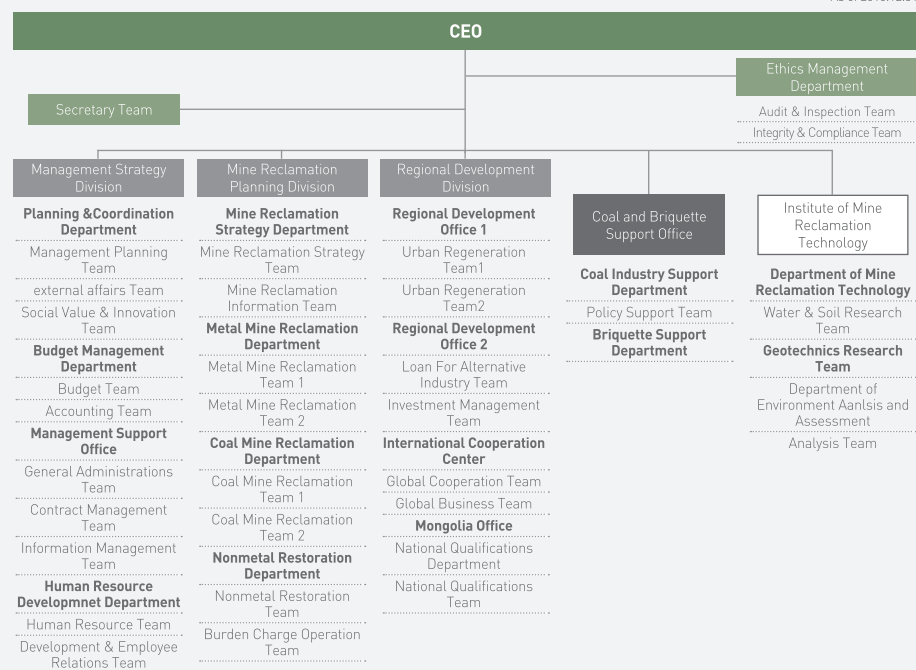
As of 2018.12.31

Name	Mine Reclamation Corp.(MIRECO)
Date of Establishment	June 1, 2006
Type of Business Entity	Quasi-governmental institution
Line of Business	Mine reclamation projects
Competent Authority	Ministry of Trade, Industry and Energy
No. of Employees	232 (Total number of employees)
Turnover	KRW 333.663 billion
Liabilities	KRW 371.5 billion

## Organization Structure

MIRECO has enhanced the safety, environment, energy & welfare part in the structure in order to facilitate the implementation of national projects and expanded the part taking in charge of regional revitalization projects. Furthermore, MIRECO has firmly dedicated to systematic social value, newly organizing Value Innovation Team to control the whole sustainable business to push forward proactive sustainable management.

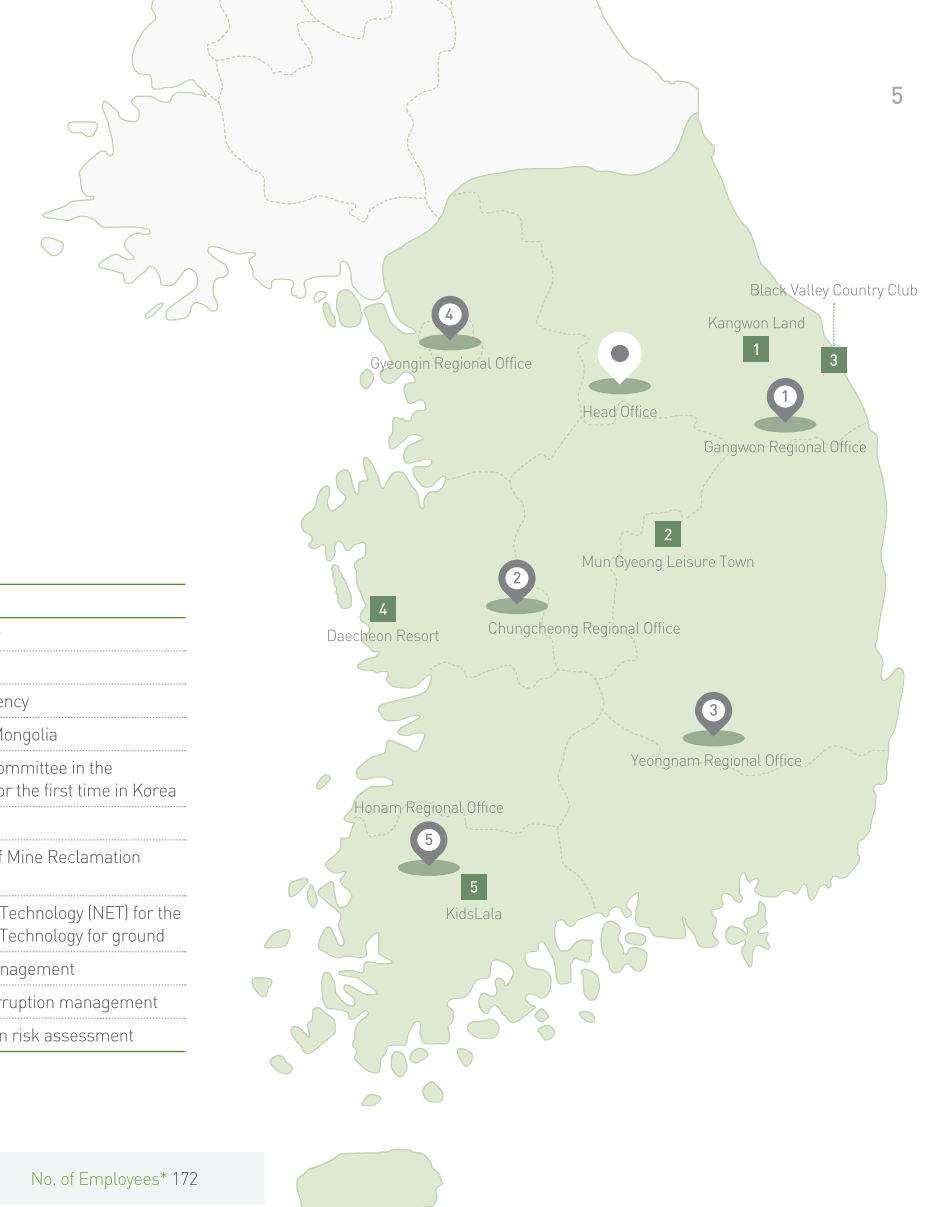
As of 2018.12.31



<b>Gangwon Regional Office</b>
Mine Reclamation Business Team Coal Mining Area Promotion Team Operation Team
<b>Chungcheong Regional Office</b>
Mine Reclamation Project Team Coal Mining Area Promotion Team
<b>Yeongnam Regional Office</b>
Mine Reclamation Project Team Coal Mining Area Promotion Team
<b>Gyeongin Regional Office</b>
Mine Reclamation Management Team
<b>Honam Regional Office</b>
Mine Reclamation Management Team

## Organization History

Date	History
June 2006	Establishment of Mine Reclamation Agency
June 2008	Renamed Mine Reclamation Corp.
Nov. 2008	Designated as a soil-related specialized agency
May 2010	Opened the first overseas branch office in Mongolia
April 2013	Appointment as a secretary of the mining committee in the international standardization organization for the first time in Korea
Oct. 2014	Assessment agency for the risks of soil
Aug. 2015	Relocation of the head office and Institute of Mine Reclamation Technology Center [Wonju]
Dec. 2016	Acquired the Certification of New Excellent Technology (NET) for the self-developed 3D Digitization and Imaging Technology for ground
Dec. 2018	Declaration of MIRECO's Human Rights Management
Sept. 2019	Acquired ISO 37001 certification for anti-corruption management
Nov. 2019	Gangwon branch attained Excellent Grade in risk assessment



## Status of Major Branch & Organization

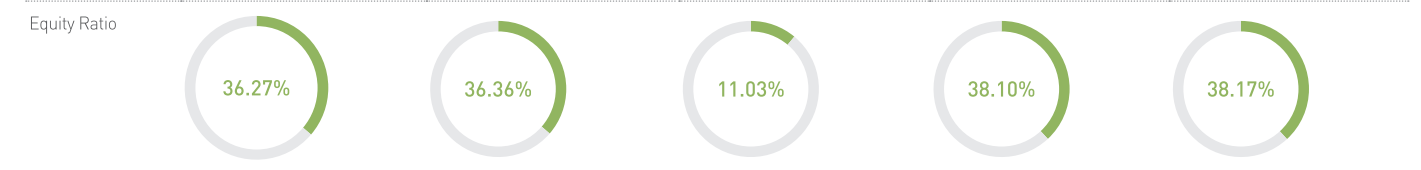
Head Office	Location 2, Segye-ro, Wonju, Gangwon-do	No. of Employees* 172
-------------	---	-----------------------

### Regional office

Name	1 Gangwon Regional Office	2 Chungcheong Regional Office	3 Yeongnam Regional Office	4 Gyeongin Regional Office	5 Honam Regional Office
Location	Taebaek	Daejeon	Daegu	Seoul	Gwangju
No. of Employees	20	14	13	7	6

### Associate Companies

Name	1 Kangwon Land	2 Mun Gyeong Leisure Town	3 Black Valley Country Club	4 Daecheon Resort	5 KidsLala**
Date of Establishment	1998.06.29	2003.02.25	2004.08.13	2007.12.26	2012.01.06
Location	Jeongseon	Mungyeong	Samcheok	Boryeong	Hwasun
Major Lines of Business	Casino, hotel, golf course, ski slope, condo	Golf course, condo	Golf course	Golf course, condo, rail bike	Job experience theme park, accommodation complex, etc. (in preparation)



\*Total number of employees(As of 2018.12.31.)

\*\*VarioHwasun changed its name to KidsLala in 2019

# Vision & Strategy

MIRECO makes great efforts to create a pleasant living environment and revitalize the economy in mining areas while meeting the needs of the times. To do so, MIRECO established new vision and management principles for efficient operation and the realization of its social value. Thus, the goals and tasks of the institution were also re-established accordingly. With a medium to long-term roadmap to bring out social values, MIRECO's vision is to make social integration with communities by achieving its tasks step by step.

In November 2019, the medium to long-term management goals for 2021-2014 have been newly established with 4 strategic directions; 'Safe and Clean Land Restoration', 'Leading Inclusive Growth in Mining Area', 'Securing Growth engine for Future Innovation, and 'Receiving Top Grade in Social Value Appraisal' which followed by 12 strategic tasks, and 32 detailed action plans. MIRECO will make ceaseless efforts to enable systematic and sustainable management and to create social values based on the new management goals.

## MIRECO's Business Strategy

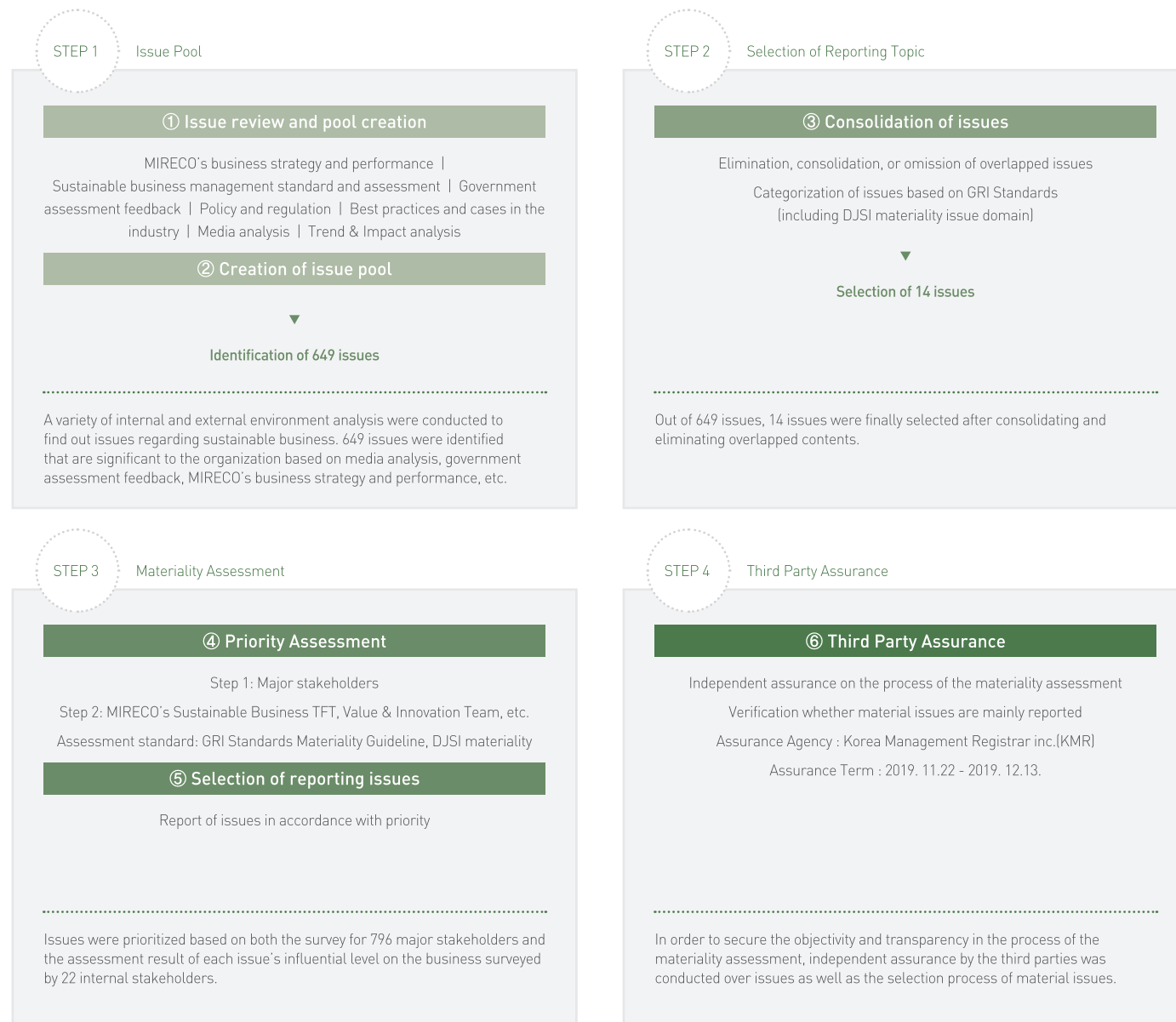


## Sustainability Performance and Goals

Major indexes	Unit	2016	2017	2018	2019 Goal	2024 Goal	
<b>Safe and Clean Land Restoration</b>							
No. of mining sites completed with mine hazard prevention measures	%	-	-	-	100	100	
Paid amount for mine reclamation projects	KRW 100 million	800	815	640	766	800	
Attainment of legal standards in soil restoration	%	-	-	-	90	96	
Expansion of mine hazards-free areas	%	-	-	105.0	110.0	120.0	
Improvement rate in the handling capacity of water purification facility	%	86.6	92.65	89.59	90.50	97.50	
Rate of safety accident in mine subsidence business places	%	0	0	0	≥2.04	≥2.04	
Specialized forestation rate	%	26.6	27.8	32.7	32.7	37.9	
Patent registrations and applications	Case	11	11	11	≥6	≥6	
<b>Leading Inclusive Growth in Mining Areas</b>							
Payment of energy (Briquette) voucher	KRW 1million	14,747	20,001	18,326	25,172	14,865	
Coal quality inspection rate	%	17.3	15.0	19.8	15.0	15.0	
Briquette quality inspection rate	%	100	100	100	100	100	
New & renewable energy in abandoned mine areas	kW	582	157	3,000	1,200	200	
No. of job creation in abandoned mine areas	Person	45	23	99	121	≥113	
Ratio of residents in abandoned mine areas among employees of subsidiaries	%	-	50.0	51.9	52.0	57.0	
Progress rate of Urban Renewal New Deal Project 'ECO JOB CITY Taebaek'	%	-	-	-	2.3	100.0	
<b>Securing Growth Engine for Future Innovation</b>							
No. of industry-academia-research cooperation network building and collaboration cases	case	5	7	9	10	13	
No. of trainees in the industry-university expert cultivation program	Person	235	365	342	280	280	
New business discovery and implementation	-	Consisted Agenda Task Force	Deducted a new project	Deducted a new project Selection and implementation of tasks for the new business	Diversification of the new business development	Diversification of the new business development	
Technology development performance index	Point	2.65×10 <sup>-10</sup>	3.36×10 <sup>-10</sup>	4.86×10 <sup>-10</sup>	7.40×10 <sup>-10</sup>	2.50×10 <sup>-9</sup>	
No. of cases to support the competitiveness of SMEs	Case	-	-	-	≥3	≥5	
No. of members for overseas global cooperation network [Accumulated]	Person	-	569	626	683	968	
No. of overseas contract	Case	-	87	96	99	129	
Global shared growth performance index	point	-	60	65	65	70	
<b>Making Shared Social Value</b>							
Governance	The activity of BOD	Point	98.4	94.2	95.8	≥90	≥90
Ethics Management	The level of integrity	Level	2	4	2	≥2	≥2
Human Rights Management	Establishment of infrastructure and efficient implementation for human rights management	-	-	-	Introduction of human rights management	Establishment of implementation System	Publication of the casebook for human rights infringement prevention
Employees	Internal satisfaction on personnel policies	%	-	-	72.74	74.78	84.98
	Satisfaction with labor relations	Point	84.4	78.3	85.7	79.6	86.3
	The utilization rate of flexible working hour scheme	%	17.7	20.8	51.4	30.0	Average utilization rate over the past 3 years
Customer	Public institution customer satisfaction index (PCSI)	Level	A	A	A	Outstanding	Excellent
	Personal information leakage	Case	0	0	0	0	0
Shared Growth	Evaluation of shared growth performance	level	normal	normal	Satisfactory	Satisfactory	Outstanding

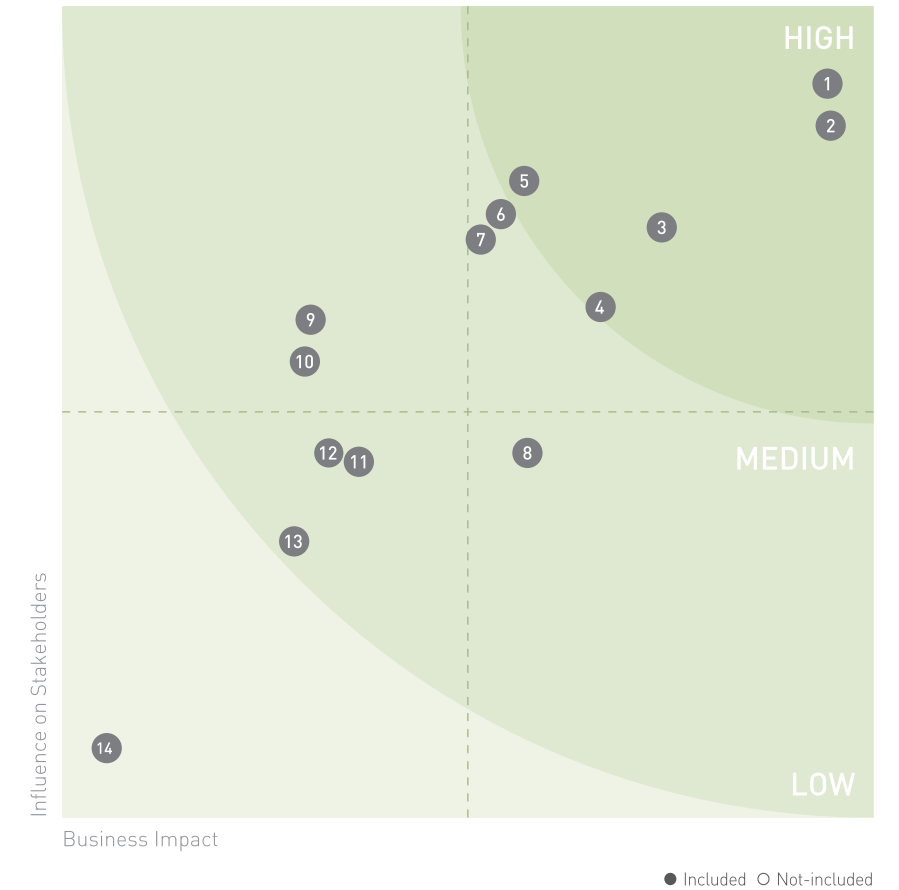
# Materiality Assessment Process

MIRECO has been publishing issues of significance by conducting materiality assessment with an aim to effectively reflect the internal and external environment that affects to sustainable business and various issues that stakeholders are interested in. For the assessment, the pool of 649 issues related to MIRECO's sustainable business is formulated first through reviewing internal issues, media as well as international guidelines including GRI Standards and 10 principles of UNGC. For the materiality assessment, reporting issues were picked out and priority assessment was made to select 14 material issues according to the interest level of stakeholders and influential level on the business. The detailed process of materiality assessment is as below;



## Materiality Test Results

The materiality test found out 14 material issues that are closely linked to MIRECO's distinctive characteristics and social values as a public institution. Those issues include 'Safe and Clean Land Restoration', 'Leading Inclusive Growth in Mining Areas', 'Securing Growth Engine for Future Innovation', 'Job Creation and Talent Training', and 'Integrity and Ethics'. In this report, MIRECO is willing to reveal all these critical issues so that readers can see the relative achievements and efforts we have made.



No.	Materiality Issue	Reporting Boundaries					Reporting Issue	Page
		Residents in Abandoned Mine Areas	Business Partners	General Public	Employees	Government and Related Institutions		
1	Safe and clean land restoration	●	●	●	●	●	Topic 1. Safe and Clean Land Restoration	22-33
2	Leading inclusive growth in mining areas	●	●	○	●	●	Topic 2. Leading Inclusive Growth in Mining Areas	34-41
3	Securing growth engine for future innovation	○	●	○	●	●	Topic 3. Growth Engine for Future Innovation	42-48
4	Job creation and talent training	●	●	○	●	●	Topic 4. Mutually Growing Community	49-57
5	Integrity and ethics	○	●	○	●	●	MIRECO Sustainability	62-64
6	Customer satisfaction	●	●	○	○	○	Appendix	70-71
7	Industrial safety and health	●	●	○	●	○	MIRECO Sustainability	32-33, 66-67
8	Shared growth	●	●	○	○	○	Topic 4. Mutually Growing Community	45, 50-52
9	Risk management	○	○	○	●	○	DMA	22, 34, 42, 49
10	Eco-friendly business	●	●	●	●	●	Topic 1 & Appendix	22-29, 66
11	Human rights management	●	●	○	●	●	MIRECO Sustainability	64-65
12	Contribution to community	●	○	○	●	○	Topic 4. Mutually Growing Community	55-57
13	Participation of stakeholders	●	●	●	●	●	Social Value Creation	16-19
14	Governance of organization	○	○	○	●	●	MIRECO Sustainability	60-61

# Social Value Creation

- 12 — MIRECO's Social Value Creation
- 18 — Interview with Stakeholders
- 20 — Social Value Creation Process

# MIRECO's Social Value Creation

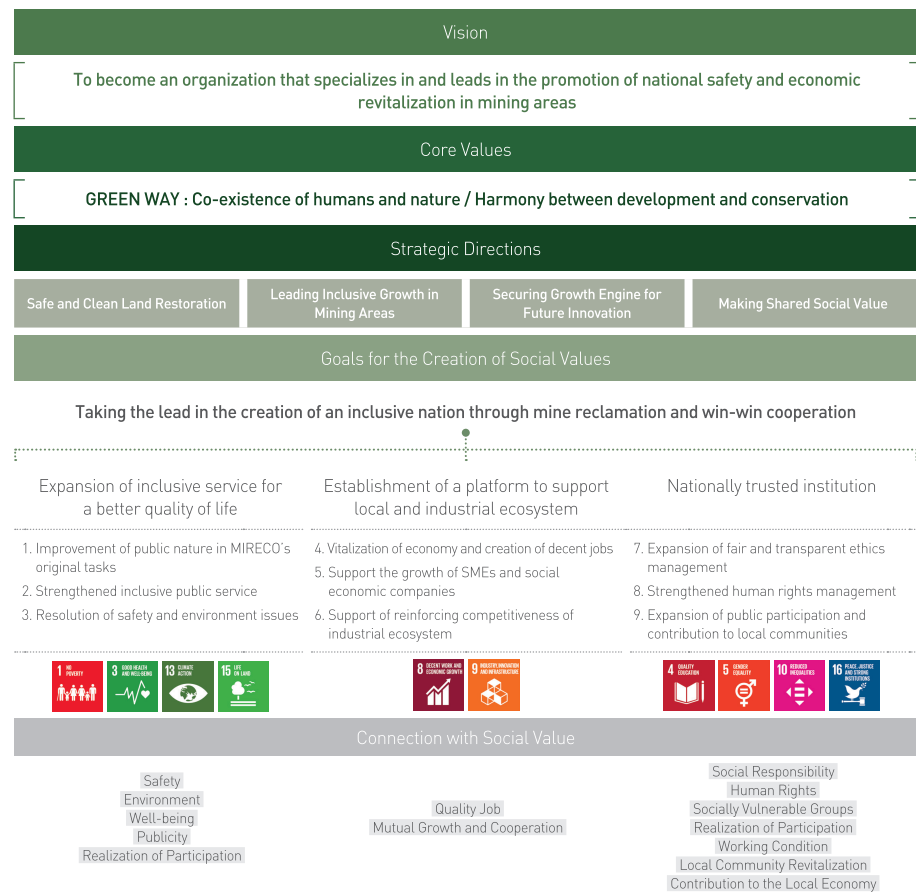
When MIRECO creates social value for the national economy and mine community, the value of itself will be raised accordingly. This is the core engine for sustainable development.

## Social Value Implementation System

The original purpose of MIRECO's projects like environment restoration and local community promotion has been directly linked to the creation of social value. On top of that, MIRECO actively work in line with the direction of the government that brings about social value by making decent jobs and responding to safety and human rights. Accordingly, in September 2018, MIRECO formed an implementation plan for creating social value that contains not only goals but also the definition of key focused areas of social value and advanced in July 2019.

## Strategy System for Social Value

MIRECO has established Vision Strategy System for Social Value to create tangible performances through the ties with its business strategy system. With the goal to realize social value through mine reclamation and regional win-win cooperation, MIRECO has set 3 strategies, 9 strategic tasks, and 23 action plans. Its direction and projects are annually established in accordance with the changes in the business environment.



2018-19 Progress in the Internalization and Spread of Social Values

2018	6	<ul style="list-style-type: none"> <li>Lectures on social values and the role of public institutions</li> <li>Attendance in public conferences related to social values and innovation</li> </ul>
	7	<ul style="list-style-type: none"> <li>7 best practices rewarded through the idea contests for social values</li> </ul>
	8	<ul style="list-style-type: none"> <li>Participation in seminars on innovative measures for realizing social values</li> <li>Design and distribution of promotional images depicting MIRECO realizing social values</li> </ul>
	9	<ul style="list-style-type: none"> <li>Educational programs on social values for under-graded departments in the assessment of 2017</li> </ul>
	10	<ul style="list-style-type: none"> <li>Educational programs scheduled to be on social value for all employees</li> <li>Support for other educational programs and seminars regarding social value issues</li> </ul>
	11	<ul style="list-style-type: none"> <li>Contests of best practices for social value implementation</li> <li>Internalization and sharing of best practices through company-wide workshops</li> </ul>
2019	2	<ul style="list-style-type: none"> <li>Spread through the publication and distribution of casebooks for best practices</li> </ul>
	4	<ul style="list-style-type: none"> <li>Attendance in 2019 conferences related to innovative management of public institutions</li> </ul>
	5	<ul style="list-style-type: none"> <li>Discovery of best ideas for innovation and mutual growth in 2019 (6 cases regarding innovations, 3 cases in mutual growth)</li> </ul>
	7	<ul style="list-style-type: none"> <li>Introduction of innovation junior board &amp; mileage system on innovative management</li> <li>Establishment of 2019 MIRECO's promotion plan for innovation</li> </ul>
	9	<ul style="list-style-type: none"> <li>Performance Management Competency Training Center</li> </ul>
	11	<ul style="list-style-type: none"> <li>Attendance in the 1st best practice contest for innovation cities in Gangwon-do province</li> <li>Discovery of best practices for innovation and mutual growth in 2019 (6 cases regarding innovations, 6 cases in mutual growth, and 6 cases in working procedures improvement)</li> </ul>

## Definition of Social Value and Key Focus Areas

Countries and corporates in the world have been reinforcing the activities regarding the fulfillment of social responsibility while expanding the transparency in operations as well as assessment and legislation in order to reduce the social risks, including labor, environment, and human rights. Amid this global trend, the Korean Government has presented social value creation as the core value of the national administration and set it as the government institutions' basic principle of operation.

The social value of MIRECO has two aspects; the identity as a public institution that contributes to the community's development and the specialized institution for mine reclamation business. These two approaches have induced public nature and win-win cooperation as the direction of the institution to take. Accordingly, the social value of MIRECO is defined as the strengthened inclusive service through the expansion of public nature in its original work and the support of local community industrial ecosystem. In addition, in line with the central government's policy on social value, MIRECO selected 5 key focus areas; 'job creation', 'fair opportunity and social integration', 'safety and environment', 'win-win cooperation and regional development', and 'ethics management'.

## Social Value Promotion Organization

In order to raise the execution capability toward social value, MIRECO operates Social Value Committee for deliberation and decision, Value Innovation Team dedicated to social value matters, and Social Value Section, Junior Board as the working level organization in the structure. Also, Public Participatory Group was formed to reflect the opinions of the interested parties actively.

## Committee for Social Value & Innovation Promotion

MIRECO had established the Social Value Committee in 2018 with the CEO as its head to set a direction for the promotion of social value and the decision making, and it was expanded into Committee for Social Value & Innovation Promotion in 2019. The major responsibility of the committee is to deliberate and resolve key issues, including setting comprehensive promotion directions for social value and innovation. The separate advisory group is also operated for consultations on major policy decisions.

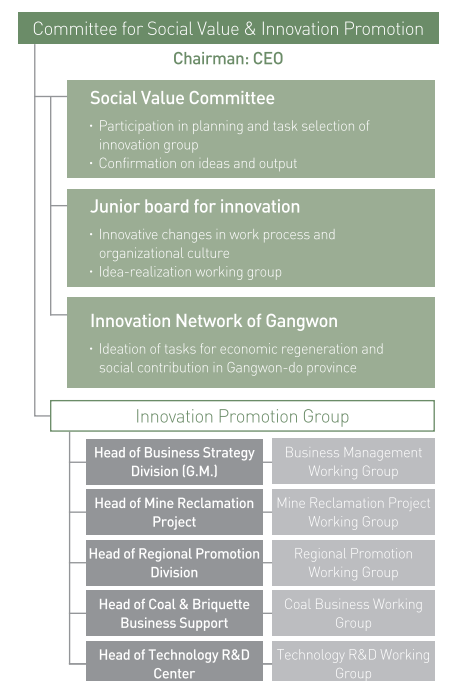
## Dedicated Organization

For the reinforced operation for social value creation, Value Innovation Team was formed under the Division of Planning & Coordination. The team takes charge of the comprehensive work of MIRECO's sustainable business including the publication of sustainability report and the tasks related to shared growth.

## Execution Organization

There are 5 sections for social value sections under the committee; job creation, social integration, safety and environment, win-win cooperation, and ethics management. Leaders of 5 teams are responsible for each section, and they share the current situation of its promotion tasks while discussing major issues to improve the execution capabilities. On top of that, the Junior Board is comprised of working-level staff with different levels from 2 to 5, taking in charge of ideation and execution.

Organization Chart of Social Value Promotion





### Social Value Management System

MIRECO manages 9 strategic tasks and 23 detailed action plans derived from 3 strategic directions in accordance with the social value strategy system. MIRECO makes great efforts to listen and reflect various stakeholders' opinions.

#### Expansion of Inclusive Service for the Better Quality of Life

Strategic Tasks	Detailed Action Plan	KPI	Unit	2018-19 Goal and Performance
Improvement of public nature in the institution's original work	Enhancing the safety in tailing field using IoT technology	Establishment of a control system in a storage facility to detect an abnormality	Case	Goal: 1 Performance: 3
	Making safe national parks in cooperation with other institutions	Setting priority in the mine hazard prevention projects for the abandoned mines located in national parks	Case	Goal: 1 Performance: 1
	Conduction Field investigation using MIRECO Easy Map	Accident rate in field investigation	%	Goal: 100 Performance: 100
	Resolving social issues using new mine reclamation technologies	Establishment of cooperative relationships and the provision of technical support	Case	Goal: 2 Performance: 2
Reinforcement of inclusive public service	Alleviating water shortage in mountainous areas using discharged water after treatment	Utilization of discharged water		<input checked="" type="checkbox"/> Working group / Pilot test <input checked="" type="checkbox"/> Establishment of a working group / Completion of the pilot test
	Visiting service for patients suffering pneumoconiosis to protect their rights and interests	Support rate for direct application	%	Goal: 7.0 Performance: 28.6
	Improving welfare for the energy-deprived class using QR code	No. of the household loss briquet voucher	Case	Goal: ≥24 Performance: 24
Settlement of safety and environment issues	Establishing and operating a disaster management system	No. of industrial accidents	Case	Goal: 0 Performance: 0 (In progress)
	Securing safety and reducing CO <sub>2</sub> through forest restoration projects in mine hazard areas	Carbon absorption volume	tCO <sub>2</sub> eq	2018: 2,144 2019: 4,081
	Operating safe laboratories through systematic safety management	Reduction of risks in the test analysis laboratory		Over 90% of elimination in high-risk groups 100% of elimination in high-risk groups
	Establishing and operating the system to protect personal information and information security management	Reinforcement of cyber security system		<input checked="" type="checkbox"/> Reinforcement of information security system <input checked="" type="checkbox"/> Improvement of CPO control management performance and information security system

#### Establishment of a Platform to Support the Growth of the Regional and Industrial Ecosystem

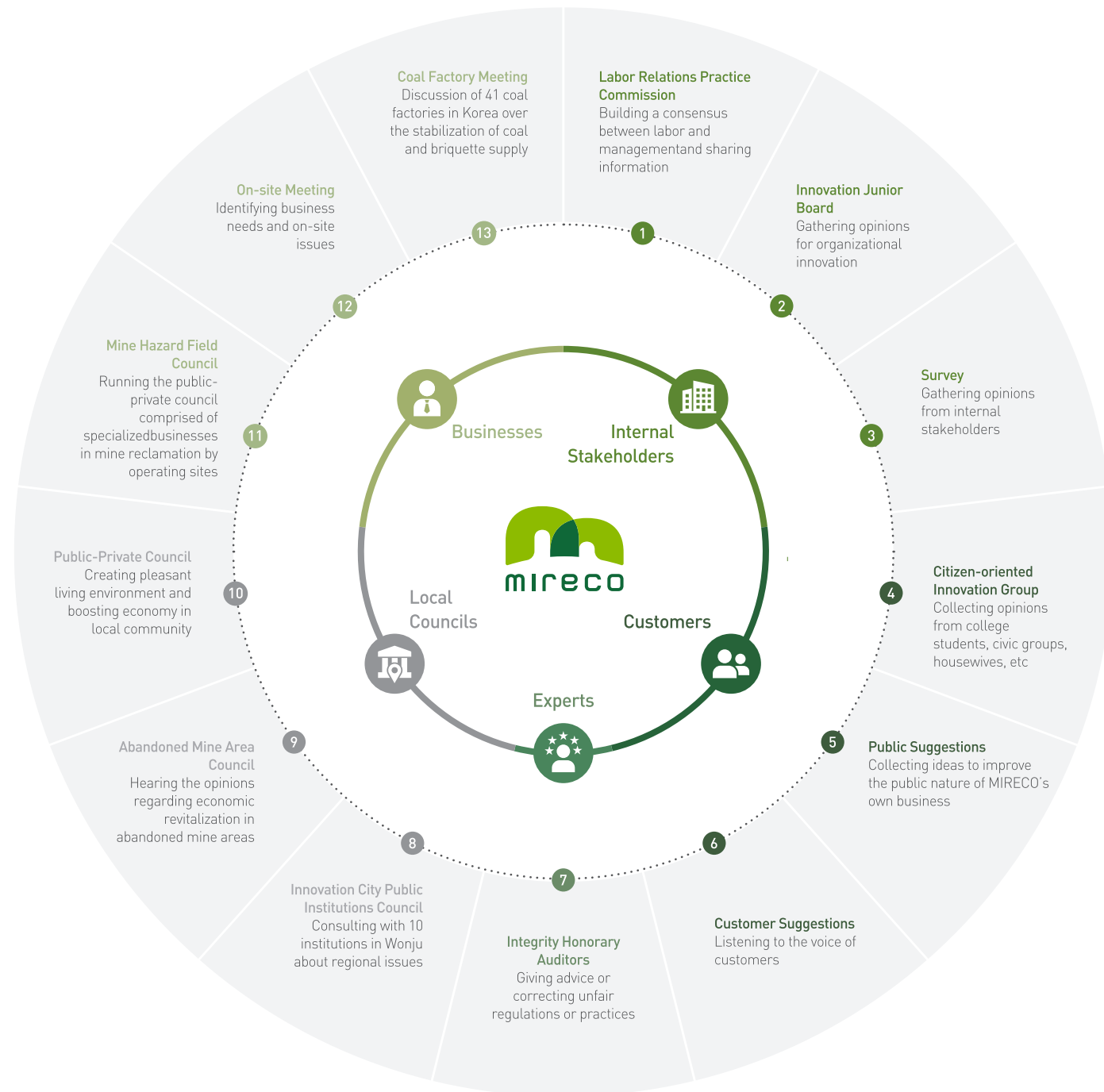
Strategic Tasks	Detailed Action Plan	KPI	Unit	2018-19 Goal and Performance
Revitalization of economy and creation of quality jobs	Facilitating the urban regeneration New Deal project	No. of new jobs	Person	Goal: 17 Performance: 4 (In progress)
	Supporting companies for more job creations	No. of supported companies	Case	Goal: 32 Performance: 34
	Supporting SMEs and startups through sharing coal residue recycling technology	No. of support cases	Case	Goal: 1 Performance: 2
Support for the growth of SMEs and social-economic companies	Introducing internal venture business and promoting its growth using MIRECO's resources	No. of workshops and consulting	Case	Goal: 4 Performance: 4
	Establishing an online promotion channel and supporting disadvantaged companies in making inroads into markets	No. of companies registered	Case	Goal: 100 Performance: 78 (In progress)
Support for the industrial competitiveness	Making zero cases of payment in arrears in mine projects	Achievement rate of making zero in delayed payment' goal	%	Goal: 100 Performance: 100
	Safety design of mine reclamation projects and fairness in cost estimation	The advancement of integration standards	Case	Goal: 2 Performance: 3

#### Trustworthy Institution for People

Strategic Tasks	Detailed Action Plan	KPI	Unit	2018-19 Goal and Performance
Expansion of fair and transparent ethics management	Acquiring ISO37001 certification for anti-corruption management	Confirmation of certification		<input checked="" type="checkbox"/> Acquiring ISO 37001 certification <input checked="" type="checkbox"/> Completed
	Preventing from corruption through operating "Allbaro" Center	No. of educational programs conducted	Case	Goal: 4 Performance: 5
	Operating "Insamansa" HRM reporting center	Confirmation of introduction		<input checked="" type="checkbox"/> Introduction of HRM reporting center <input checked="" type="checkbox"/> Completed
Fortifying human rights management	Creating culture centered around human rights for internal and external stakeholders	Implementation of human rights impact assessment on the institutional operation and major businesses	Case	Goal: 2 Performance: 2
Encouragement of public participation and contribution to local communities	Public Contest inviting local residents to discover new ideas	No. of applications for the contest of urban regeneration idea	Case	Goal: 62 Performance: 199

### Opinion-Gathering from Stakeholders regarding Social Value

MIRECO operates multiple channels, including Citizen-oriented Innovation Group, Integrity Honorary Auditors, Mine Hazard Field Council, and Abandoned Mine Area Council to gather opinions which will be delivered to related teams and actively reflected to the implementation.



Channel for Stakeholders	Opinion-Gathering(2018-2019)	Reflection to Business
1 Labor Relations Practice Commission 2 Innovation Junior Board 3 Survey	Building common understandings in labor relations and requiring current information	Streamlining into a single negotiation channel and making an agreement for not having labor disputes Promoting activities together with labor and management
	Round-table meetings to promote institutional innovation and internalization within MIRECO	Ideation and implementation of tasks for innovation in 2019
	Requiring capacity building training tailored to the needs of each staff and teams	Operating education courses by key tasks reflecting the needs of the organization and individuals
4 Citizen-oriented Innovation Group 5 Public Suggestions 6 Customer Suggestions	Examination on the current value system to devise plans for the improvement	Interconnection and consistency among the purpose of inception, core value, vision, and strategic direction of MIRECO
	Requirement to implement inclusive administration and fulfill public nature through innovations in public institutions and the development of ideas on social value with people's point of view	Enhancement of innovation and social value promotion with expanded connectivity
	Need to identify needs paying attention to the voice of customers (VOC) and to establish systematic communication policy	Building communication channels customized to stakeholders and strengthening the monitoring and sharing
7 Integrity Honorary Auditors	Suggesting the revision of regulations for expanding the subject of contract screening	Expanding the screening subjects for contracts through the revision of the Regulation of Contract Screening
	Auditing participated by Integrity Honorary Auditors for eradicating the misuse of power	Integrity Honorary Auditors' Inspection on the misuse of power and corruptions
8 Innovation City Public Institutions Council 9 Abandoned Mine Area Council 10 Public-Private Council	Serving a role of public institution and support local SMEs	Hosting briefings to induce purchase for the products of social economic companies and disabled enterprises in Wonju Establishing online promotion channel, "Kanghyukine" for local businesses
	Restricting business activities in mine hazard restoration sites even if it is private land to prevent the leakage of contaminations from illegal destroying activities	Releasing location information on mine hazard prevention facilities
	Strengthening the role of public institution for the revival in abandoned mine areas	Implementing Urban Regeneration New Deal project in abandoned mine areas in Taebaek Developing the advanced profit model for Solar Power on Mine Site project participated by residents
11 Mine Hazard Field Council 12 On-site Meeting 13 Coal Factory Meeting	Resolving problems of unfair activities, particularly the misuse of power regarding construction payments between contractors and subcontractors	Implementing payment notification service
	Applying appropriate production cost in mine reclamation projects for win-win cooperation with SMEs	Developing new cost estimation system for soil restoration project considering on-site conditions
	Asking specialized private businesses to share the performance of technology development	Introducing Profit-sharing Plan
Coal Factory Meeting	Establishing system for the sustainability of coal industry	Suggesting revision and deregulation of related laws through governmental consultations (on-going)

## Interview with Stakeholders

MIRECO conducted interviews with experts in various fields to review sustainable management and devise future directions and ways to create social values. MIRECO will continue to listen to the voice of stakeholders through various communication channels to reflect them in the management.

### Institutions need to sincerely care about the performance of sustainable management as the means of achieving long-term goals.

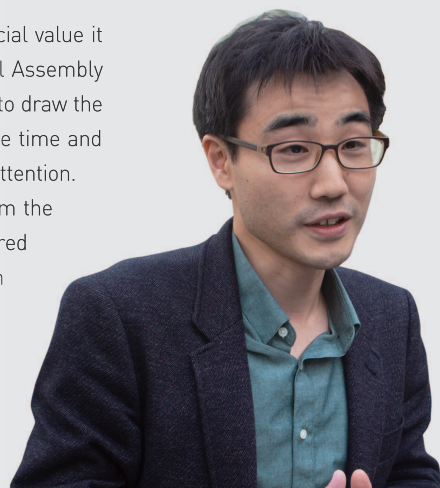


It looks bright that MIRECO is making multiple efforts to attain sustainable management. However, in the current sustainable management ecosystem of Korea, reporting the deficiency can be regarded as poor management, and that is why many organizations only emphasized their strength. The bottom line is that sustainability cannot be measured by fragmentary figures, but by continuous management and efforts of institutions to achieve their goals with sincerity. Even small achievements should be disclosed and managed by means of the publication of sustainability reports, the management of numerical values, and links with the UN SDGs as the measures to achieve the institution's long-term goals, rather than to show off and promote the institution's achievements.

Prof. Jae-hyuk Lee (Korea University)

### The creation of greater social values requires the attention of the people.

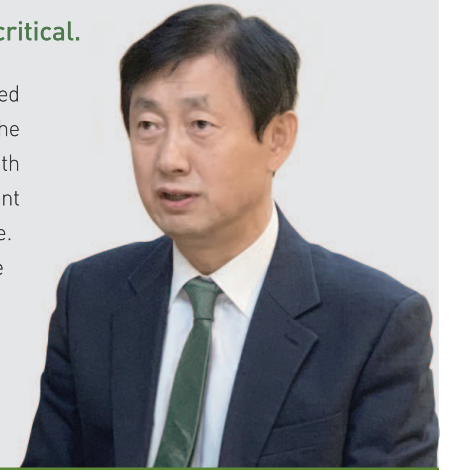
For the public institution that creates social value, the bigger of its scale, the greater the social value it creates. However, the projects on a larger scale inevitably need supports from the National Assembly and government agencies, which requires the public attention. In other words, it is necessary to draw the public interests in mine management for the greater social value creation. Unfortunately, the time and space gap between mineral producers and mineral users makes it hard to attract the public attention. Now, MIRECO needs to actively promote and publicize the fact that we all have benefited from the minerals in the past, and that we are all responsible for the management of damages incurred in the production process. It is because the public interest is the key for MIRECO to gain momentum for the projects along with the greater social value.



Senior Researcher, Tae-han Kim (Korea Social Responsible Investment Forum)

### On top of the greater concern for safety, the engagement of stakeholders is critical.

Safety is the most significant value. The core framework for the safety issues has been prepared as the issues are a big part of the government's national agenda and have been incorporated in the management strategy of MIRECO. However, to leap forward in safety-related matters, experts with excellent job competency need to carry out detailed tasks. In addition to responding to the current trends in safety, MIRECO should be prepared for the global and social requirements to come. Furthermore, it is anticipated that the various suggestions from stakeholders with the expertise to be comprehensively reflected in all stages from strategy establishment to post management through the systematic process of collecting external opinions.



Byung-nam Choi (MIRECO Citizen-oriented Innovation Group)

### The ultimate goals for social values and their management system are indispensable.

So far, the MIRECO has been striving for the establishment of a sustainable management system. From now on, it is time to manage the outcomes and impacts of its projects. What is important is that setting the ultimate goals for the creation of social values by each business and steady management of the following changes are the key point, going beyond mere reporting on business performance. Looking forward, I hope that MIRECO plays a leading role in the sustainable management of mine reclamation and in supporting mining areas by presenting a new report format that provides multiple analysis and evaluation on the activities and achievements of sustainable management.



Prof. Seung-kyoon Kim (Social Innovation Center, Catholic University)

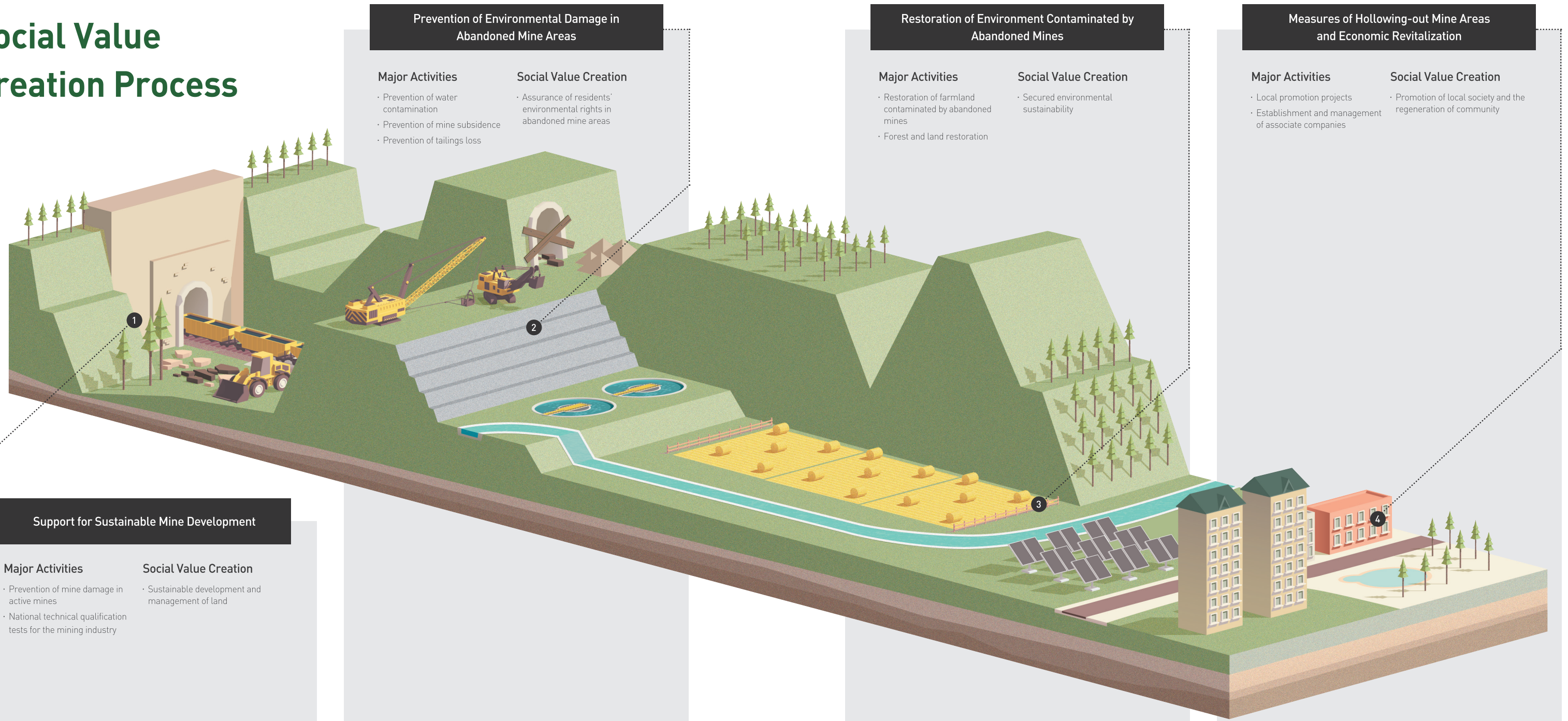
### We must take the lead in creating jobs and providing educational and cultural benefits.

The priority of the social value lies in the social integration through job creation and educational and cultural benefits. In abandoned mine areas, the coal industry, which was the economic pillar of the region, has declined, making the regional economy deteriorated. Consequently, the region is confronting the threat of extinction such as the shrinking population and broken community. As the collapse of the coal industry led to the scarce jobs, conflicts in the region are being sparked, and the inferior educational and cultural benefits stirred the sense of loss in the local community. Pledging to solve these problems, MIRECO is carrying out various promotion projects, including Urban Regeneration New Deal Projects and educational and cultural support projects tailored to the context of abandoned mine areas in the perspective of social creativity, a new paradigm in regional development.



Director, Doh-in Ko (MIRECO Regional Development Office 1)

# Social Value Creation Process



## Prevention of Environmental Damage in Abandoned Mine Areas

- |   |   |
|---|---|
| <b>Major Activities</b> <ul style="list-style-type: none"> <li>Prevention of water contamination</li> <li>Prevention of mine subsidence</li> <li>Prevention of tailings loss</li> </ul> | <b>Social Value Creation</b> <ul style="list-style-type: none"> <li>Assurance of residents' environmental rights in abandoned mine areas</li> </ul> |
|---|---|

## Restoration of Environment Contaminated by Abandoned Mines

- |  |   |
|--|---|
| <b>Major Activities</b> <ul style="list-style-type: none"> <li>Restoration of farmland contaminated by abandoned mines</li> <li>Forest and land restoration</li> </ul> | <b>Social Value Creation</b> <ul style="list-style-type: none"> <li>Secured environmental sustainability</li> </ul> |
|--|---|

## Measures of Hollowing-out Mine Areas and Economic Revitalization

- |   |   |
|---|---|
| <b>Major Activities</b> <ul style="list-style-type: none"> <li>Local promotion projects</li> <li>Establishment and management of associate companies</li> </ul> | <b>Social Value Creation</b> <ul style="list-style-type: none"> <li>Promotion of local society and the regeneration of community</li> </ul> |
|---|---|

## Support for Sustainable Mine Development

- |   |   |
|---|---|
| <b>Major Activities</b> <ul style="list-style-type: none"> <li>Prevention of mine damage in active mines</li> <li>National technical qualification tests for the mining industry</li> </ul> | <b>Social Value Creation</b> <ul style="list-style-type: none"> <li>Sustainable development and management of land</li> </ul> |
|---|---|

<p>Paid amount for mine reclamation projects KRW 64 billion</p>	
<p>Accumulated no. of patent 50</p>	
<p>No. of trainees in the industry-university expert cultivation program 342 person</p>	

<p>Improvement of treatment capacity for wastewater treatment facilities 89.59%</p>	
<p>Compliance with global soil standards 97.6%</p>	
<p>The rate of ground subsidence in mining areas 0%</p>	

<p>Net absorption amount of CO<sub>2</sub> after forest restoration projects 2,144tC</p>	
<p>New &amp; renewable energy in abandoned mine areas 3,000kW</p>	

<p>Amounts provided through coal price stabilization subsidy KRW 170.1 billion</p>	
<p>Amount of support for alternative industry loan assistance KRW 17.4 billion</p>	
<p>Job creation in abandoned mine areas 99 person</p>	

Value Adding Activities 01

# Safe and Clean Land Restoration

The 'mine hazard' generated in the course of mine development process poses a threat to the natural environment and the public lives. MIRECO has been actively dedicating to the systematic management and the post-management by each field to reduce the mine damage jeopardizing nature and residents and to restore the land in a safe way.

## Why is this topic important?

'Mine hazard' indicates the damages including mine subsidence, waste rock, the spread of dust generated in the course of mine development. These mine hazards threaten environment and safety and even sparks serious social problems in the mine industrial regions. Mine hazard can directly contaminate the natural environment, resulting in destroying the ecosystem; for instance, mine drainage containing sulfide minerals causes water contamination. Also, various secondary damages can occur from the mine hazard as crops produced in a polluted environment may be delivered to the table of the people. The scale and lasting period of the mine hazard can be greatly expansive by the level of its contamination, continuity, diffusion, and accumulation, making active responses indispensable. The best optimal measures to ensure the safe living environment of the people is to take professional actions through an eco-friendly mine hazard management plan as well as the consistent monitoring of damage situations.

## What are the approaches of MIRECO?

As the one and only professional institution of mine reclamation in Korea, MIRECO has been fortifying its expertise in mine reclamation projects through in-depth research and active technology development. MIRECO establishes the Basic Plan for Mine Reclamation every 5 years for the systematic management and approaches by conducting comprehensive research on the mine hazard location, type, and situation toward all closed, suspended, and active mines. Also, MIRECO focuses on mine damage prevention and reclamation projects with eco-friendly and semi-permanent approaches, while preventing secondary damages with using systematic post-management method even after the termination of projects. Furthermore, a cooperative system with various related institutions is established to secure financial stability and advance the mine hazard restoration technology. On top of that, active communication with residents is inducing the participation and interests of multiple stakeholders so as to prevent the mine damages.



2018 Highlight

**Paid Amount for Mine Reclamation Projects**

Paid amount for the optimal restoration of the natural environment and the improvement of public living environment

**KRW 64 billion**

---

**Compliance Rate with Global Soil Standards**

Compliance rate of domestic standards compared to the global soil contaminated standards

**97.6%**

---

**Treatment Capacity of Waste Water**

MIRECO's total water treatment capacity compared to the total influx of contaminated mine drainage

**69.1%**

## Restoration to Make Healthy and Pleasant Environment

MIRECO makes its efforts to reduce the negative environmental impact, including water, forest, and air pollutions caused by mine hazard and prevent possible damages to residents and the ecosystem. To this end, MIRECO has been reinforcing the mine reclamation expertise and developing technologies to implement the semi-permanent and eco-friendly restoration projects.



## Mine Drainage Treatment Projects

The goaves and tailings contain sulfide minerals when it exposed to oxygen or water can causes mine drainage contaminated with heavy metal content which affects harmful influence on the water ecosystem. With an aim to protect water environment and nearby areas from leachate, MIRECO has been actively implementing water treatment projects, including the purification of the mine drainage containing heavy metal content. On top of that, MIRECO focuses more on the establishment of a profound system and constant improvement of the business process for the much improved and effective water treatment.

**Improvement of Purifying Efficiency in Water Treatment Facilities** The conventional water treatment facilities using a natural purification method is not effective in improving water quality and purifies only limited heavy metal content. For the purpose of overcoming the shortcomings of the conventional type water treatment facilities, MIRECO has strived to switch it to the physical chemistry method using illuviation and precipitation to raise the efficiency of the treatment. With this transformation, 42,000m<sup>3</sup> of mine drainage has been treated a year, making MIRECO secured safe water sources for the public.

**Water Quality Improvement Project System by Regions** MIRECO has set the mine clustered areas or contaminated leachate areas in the same water system to the subject of projects to improve the effectiveness within the limited budgets. The organization's integrated water treatment system enabled the simultaneous implementation of water treatment projects targeting the origin of contamination after grasping the current contamination levels of drainage in 5 large influence areas, 82 standard basins, and 102 streams.

**Improvement of Mine Drainage Treatment Process** Consistent improvement of the work process is required to raise the business effectiveness. For the better process of water quality improvement projects, MIRECO has broken down the tasks into detailed investigations and working design and prevented the delay of the project by introducing the pilot-test to shorten the time for land purchase and an earlier approval for the construction. In addition, MIRECO conducts



### Achievements of Mine Drainage Treatment Projects (2018)

36 sites  
KRW 16.375 billion  
42,000m<sup>3</sup> purified



### Investigation on the Current Contamination Level

5 large influence areas  
82 standard basins  
102 streams

preliminary feasibility studies on large-scale projects with more than KRW 30 billion budget.

**Establishment of Roadmap to Build the ICT-based Integrated Control System for Mine Hazard Prevention Facilities** MIRECO has established the roadmap to build the ICT-based integrated control system on mine reclamation facilities, aiming at promoting more efficient water quality improvement projects.

In addition, the existing monitoring control systems operated in 13 active water treatment facilities are spatially and functionally integrated, with a supervising control system newly installed to enable the real-time remote control and measurement. Based on this, MIRECO has ultimately set the foundation to minimize the mine damage and its diffusion resulted from accidents and disasters by detecting errors in mine hazard prevention facilities at the earliest stages.

**Research on Water Quality Improvement** When the sediment is deposited in the course of water quality treatment, the purification capabilities are degraded and mine drainage can be discharged to streams. Against this backdrop, MIRECO developed a sludge removing equipment mobile dehydrator tailored to the situation considering the characteristics of mine drainage and small scale of sites. Its sludge removing function is much upgraded with the module-type dehydrator suitable to semi-active water treatment facilities.

**Soil Improvement & Restoration Projects**

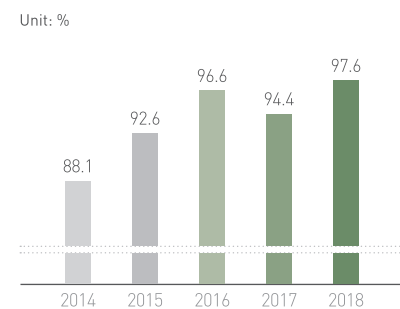
MIRECO has strived to create a safe farming environment by restoring soils in mining areas and areas nearby the suspended or abandoned mines to ultimately ensure safe food for the public. Therefore, with an aim to meet the global soil standards, MIRECO has invested about KRW 342.2 billion into soil improvement and restoration projects in abandoned mine areas by 2018, thereby completing restoration on approximately 1,120ha of land. MIRECO will make its utmost efforts for higher satisfaction through the advancement of soil improvement and restoration projects.

**Creating Environment for Safe Agricultural Products** In delivering safe farming products to the public, a safe production environment should be created first. To this end, MIRECO has set the three steps to block contaminated crops from the stage of production and distribution along with the creation of the environment for safe production. With this step by step efforts, contaminated farm products were prevented 100 percent from producing and distributing and the soil improvement and restoration projects were implemented 104.5 percent compared to those of the previous year. MIRECO will continue to reinforce the standards of soil and introduce the verification process through public participation and experiences so that safeguarded soil environment can be created.

**Fallow Land Compensation System** MIRECO operates a fallow land compensation system to compensate for the loss of farms while promoting safe soil restoration. The National Agricultural Products Quality Management Service is responsible for safety tests on the crops produced nearby the abandoned mine areas and finds out the farmland that exceeds the standard of heavy metal content in the agricultural projects. On the unsuitable land, MIRECO recommends to leave the unfit land fallow and provides financial compensations to them so that it can make up for the losses and guarantee the living stability of farmers.

**Improvement of Polluted Soil in Army Bases** As the multilateral cooperation is required to address the problem of soil pollution in army bases due to the security issues, MIRECO has

**Global Soil Standards Compliance Rate in the Recent 5 Years**



**2018 Fallow Land Compensations Granted**

- No. of Mines**: 59
- Regions**: 40 cities and towns in nationwide
- No. of Farmland**: All 359, Fallow Land 298
- Area**: All 64.5ha, Fallow Land 56.8ha
- Amount**: KRW 589.3 million

been implemented the environmental risk assessment projects using the MIRECO's specialized infrastructure. To do so, MIRECO has found the way to systematically recover the soil based on the results of health risk assessment and secured the objectivity by the independent assurance by which different contractors verifies the quality of the restoration. MIRECO's mine hazard prevention technologies have been applied to the polluted land in army bases, bringing about the enhanced capability of environment management in the military bases and a safe living environment for the people. These efforts came to the meaningful fruition with a 50 percent reduction in restoration cost in 2018.

**Expansion of Soil Restoration Projects** Having collaborated efforts with related organizations, MIRECO expanded the scope of the soil restoration project that had been previously limited to 2 kilometers from the origin of the contamination. Accordingly, exceptional measures can be implemented if the pollutions are found to be continued. Based on this, 11 mines in 84.6ha, where projects were completed are currently set as the subject of the investigation and design. MIRECO is striving to eliminate any blind spot of the soil restoration project through complementary projects and re-examination.

**Reforestation Projects**

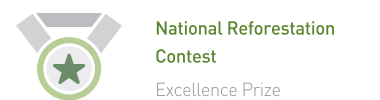
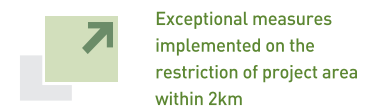
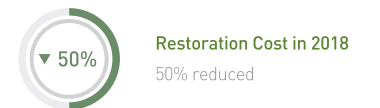
MIRECO does not spare any effort for the reforestation to address various issues that can be caused by the forest damages in the process of mining activities. MIRECO not only monitors and investigates the destructed forest harmed by the mine development but also selects the land and implements reforestation projects every year according to the voice of residents and local governments. As the concerted efforts of the world are required to tackle the climate change derived from global warming, MIRECO has been implementing the carbon offset projects in the forest and the specialized forestation projects.

**Carbon Offset Project** Coping with climate change, MIRECO is giving strength to the role of forest as the source of absorbing carbon. MIRECO has been implementing the social-contribution-type carbon offset project by selecting the pilot land located in Taebaek City, Gangwon Province to confirm the idea and made an agreement with the Eastern Regional Office of Forest Service in June 2018 about carbon offset project to boost the effectiveness of the project. The result of the pilot project is expected to absorb around 1,386 tons of CO<sub>2</sub> which is the same effect of oxygen generation that 179 people can breathe for a year.

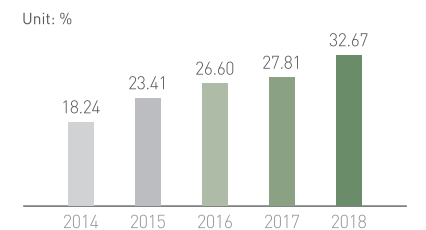
**Expansion of Eco-Friendly Specialized Forestation** MIRECO is actively promoting the reforestation project in the way that forest can recover its original state with improving the conventional method, which only aimed at recovering mine hazard and conducting fast plantation. To this end, MIRECO has expanded the specialized forestation land and developed various specialized plants considering the characteristics of the land and climate environment so that eventually, the public contribution of forest can be greatly increased.

**Expansion of Specialized Forestation Project**

Project/Year	2014	2015	2016	2017	2018
Project areas(m <sup>2</sup> )	34,187	29,964	46,808	84,652	7,682
Specialized forestation land(m <sup>2</sup> )	6,235	7,017	12,454	23,546	2,510
Ratio(%)	18.24	23.41	26.60	27.81	32.67



**Ratio of Specialized Forestation Land**



### Waste Rock Loss Prevention Projects

Waste rocks generated during the mining activities are piled in the nearby areas where no safety structure or ground reinforcement is equipped. Although most waste rock yards are located on steep slopes, there are no appropriate drainage systems for stormwater, raising the risk for the waste rock loses. Furthermore, even if there is a structure for that purpose, it has become old and neglected since the closure of the mines. Therefore, MIRECO is planning and implementing the waste rock loss prevention projects considering the various facts of the site conditions.

**Waste Rock Loss Prevention Projects for Active Mines** The waste rock loss in the course of mine development can be the source of contamination in nearby water and soil, leading to diverse damages. Particularly in the case of active mines with the higher possibility of large-scale waste rock loss, more active prevention efforts are needed so that the secondary damages like dust diffusion or heavy metal pollution can be prevented. Accordingly, MIRECO pursues the landfill type or stabilizing type of projects to increase the safety of both the old and new waste rock yard. With these types of prevention projects, risk elements are eliminated in advance while the mineral development and the use of minefield are expanded.

### Abandoned Facility Removal Projects

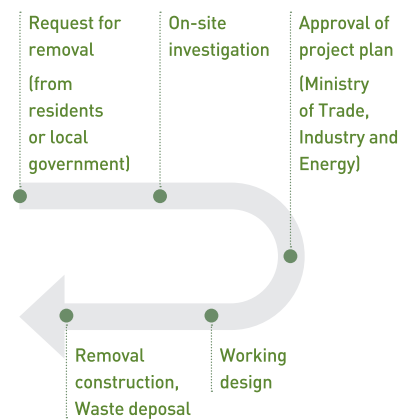
Mines in Korea were actively developed during the Japanese colonial era and before the 1960s under the national economic development policy, but the economic and social changes made most of them closed since the 1980s. As many mines were closed in a short period of time, the management was not appropriately done, and still, there are many abandoned facilities posing a threat to the nearby environment. In order to address this problem, MIRECO has been actively implementing the abandoned facility removal projects.

**Accident Prevention** The broken window theory explains that one broken window neglected becomes a hotbed of crime. Similarly, neglecting abandoned facilities will not only disturb the tourism industry in the mining area by spoiling the beauty of the environment but also make nearby areas crime-ridden districts where illegal trash is thrown away and juvenile delinquent gather. Therefore, MIRECO established a comprehensive plan for abandoned facility removal projects and ensured the safe residential environment by demolishing two mining structures of abandoned facilities in Taebaek, Gangwon Province in 2018.

**Improvement of Residential Environment and Land Use** Neglecting abandoned facilities make the quality of the living environment dropped, causing different types of accidents. Thus, MIRECO removes the abandoned facilities in private land and raises the efficiency of land use so that the living quality of residents can be much increased.

**Investigation-Design-Review-Establishment Regarding Abandoned Facilities** In order to remove abandoned facilities that were neglected for a long time safely and accurately, it is required to set a concrete plan considering the conditions of the facilities. MIRECO conducts on-site investigations to acquire the information on the current condition, structure, purpose, size, and material of the facilities. Based on the information, design specifications of the abandoned facilities including measurement and drawings are made. Then, MIRECO reviews the regulations regarding waste disposal and finally establish and implement the plan on waste removal and disposal.

#### Procedure of Facility Removal Project



#### Abandoned Facility Removal Projects Conducted in 2018

Mine	Tae-an-hanbo
Location	Taebaek, Gangwon
Quantity	2 structures
Budget	KRW 8 million
Remarks	Completed

### Tailings Loss Prevention Projects

Rocks and low-level minerals leftover in taking the valuable minerals are classified as tailings. The tailings tend to be small size particles, have a high heavy metal content level and remain toxic reagents. Therefore, when tailings come into contact with water, heavy metal content can be eluted, posing a threat of pollution to soil and water in nearby areas. Thus, MIRECO has been striving to remove or block tailings, preventing damages to humans or the ecosystem.

**Promotion Directions of Tailings Loss Prevention Projects** For preventing tailings loss, MIRECO investigates the current situations of mines where tailings are piled up. Then, MIRECO prevents the tailings loss through water blockage, soil covering, and planting while removing heavy metal contents in the tailings. The prevention of environmental damage is the priority of all procedures, and all process is conducted in an eco-friendly way.

**Procedures of Tailings Loss Prevention Projects** Before conducting the tailings loss prevention projects, MIRECO investigates the volume of tailings, contamination level, and see if there is any leachate to find out the places requiring urgent stabilization. The subject of projects is selected in accordance with the priority of results. After that, a detailed examination is conducted including the resistivity survey, drilling investigation, and test pit to measure the scale and volume of the piled tailings. In addition, an on-site test is conducted to calculate the design parameter and examination of the tailings' component and contamination level. Then, the basic direction of the project such as method and budget can be discussed in the working design stage after deliberation. After that, the project is ordered and executed. Even after completing the project, MIRECO strives to make no additional harm to storage facilities by preventing damages and deterioration through semi-permanent post-maintenance.

**Current Situations and Plans** MIRECO invested KRW 2,505 million in tailings loss prevention projects in 20 sites in 2018 and conducted regular monitoring twice a year so that no secondary damage will occur due to the tailings storage facilities. Also, MIRECO has selected 14 prioritized sites out of 60 tailings storages since 2016 to assess stability with completing the assessment on 4 sites in 2018. As the pollution in the upper reaches of the Andong Dam had become problematic, MIRECO completed the working design of the tailings loss disposal project for both sides of the upper reaches (109km) in the Andong Dam. MIRECO plans to deal with this issue step by step for 3 years, anticipating this project can serve as the platform for the organization to expand its scope of business to cope with environmental changes.

#### Major Mine Reclamation Methods

<b>Blocking &amp; Landfilling Method</b> <p>Building retaining walls with impermeable layers and liner systems in the tailings storage areas and separate tailings physically and chemically from outside to put them inside the retaining walls and cover the areas with soil</p>	<b>Solidification &amp; Stabilization Method</b> <p>Adding chemicals to tailings to produce a physical and chemical reaction that minimizes the risk of their movement and leakage</p>	<b>Recycling Method</b> <p>Recycling appropriately in order to use tailings under certain contamination level as the industrial raw material</p>	<b>Soil Covering Method</b> <p>Covering the top of tailings storage yards with an impermeable material, bring in quality soil from elsewhere, and creating a new layer of soil on top of the tailings and contaminated soil in order to prevent tailings from mixing with rainwater or stream water or contaminate the surface and groundwater</p>
---	---	---	---

Tailings Loss Prevention Projects in Yun-Hwa Mine (Before)



Tailings Loss Prevention Projects in Yun-Hwa Mine (After)



#### 2018 Tailings Loss Prevention Projects

20 sites  
KRW 2,505 billion

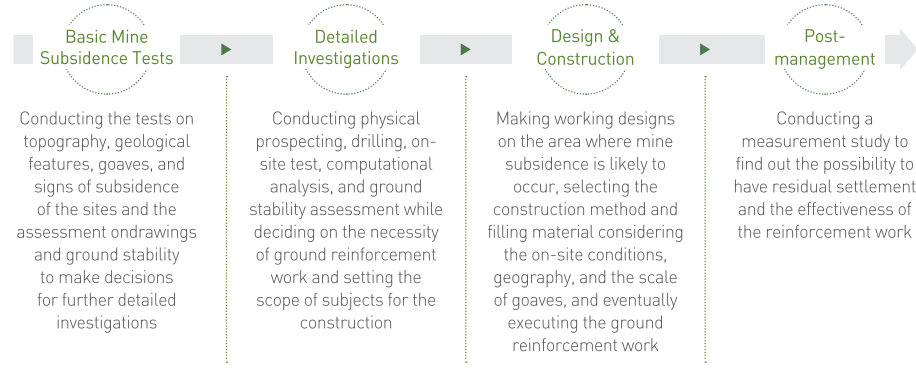


#### Information on 60 tailings storage facilities in nationwide releasing online in 2018

### Mine Subsidence Prevention Projects

Mine subsidence is the sinking or cracking of the ground surface caused by the collapse of the cavity roof. It occurs when the underground cavern in the closed mines are abandoned without any safety measures. There are 2,154 closed mines projected to have underground cavities due to the mining. As the collapse of underground pit or goaf can lead to large-scale accidents in railways, roads, or residential areas, through measures and management is highly required. Accordingly, MIRECO is implementing mine subsidence prevention projects toward abandoned coal and metal mines.

#### Procedures of the Projects



**Current Situations and Plans** MIRECO completed the mine subsidence prevention projects in 18 sites with KRW 2,614 million in 2018, and the projects are underway in 8 sites as of the first half of 2019. As the geography and ground environment changes due to the urban area expansion and development projects, MIRECO has strengthened the safety management in abandoned mine areas and improved the report center operation system so that the immediate reporting can be made in case of mine subsidence. Furthermore, technical supports on active mine subsidence in Hwasun Coal Mines of Korea Coal Corporation and local government of Jangseong-gun contributed greatly to the improvement of the national living environment.

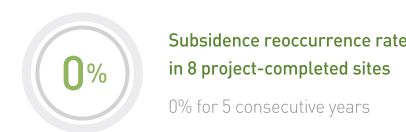
### Noise, Vibration and Dust Prevention Projects

Noise, vibration and dust generated during the mining and mine development processes are the major mine hazard that negatively affects to the nearby environment and mine sites, resulting in the hearing impairment of humans and animals, etc. Dust collectors are installed and operated in the active mines to prevent the mine hazard, but meeting the standard set by the related regulations is not likely to happen when the facility is old and not appropriately managed. To address these problems, MIRECO has been actively pushing forward the noise, vibration and dust prevention projects so that the public safety and health are secured.

**Noise Prevention Projects** Most mines are located far away from the residential areas and equipment is put inside of the building, so the noise from the mine equipment operation and machinery does not exceed the permitted level. However, the noise of the blasting operations in open areas tends to lower the quality of life in nearby residential areas. Therefore, MIRECO installed soundproofing walls to reduce blast noise and block the sound waves while looking for ways to shut off or reduce the sound waves of blasts even at the mine sites.

#### 2018 Mine Subsidence Prevention Projects Performance

		Completed with mine hazard prevention measures	Budget (KRW 1 million)
Active mine	Working design	1	9
	Reinforcement work	1	330
Abandoned metal mine	Basic minesubsidence tests	7	575
	Detailed investigations	11	614
	Working design	1	40
	Reinforcement work	2	84
Abandoned mine	Safety diagnosis	1	65
	Reinforcement work	1	261
Abandoned non-metal mines	Reinforcement work	1	636
<b>Total</b>		<b>18</b>	<b>2,614</b>



**Vibration Prevention Projects** Vibration often generated from the unintended blasting, smashed minerals, and air compressor operation. Particularly the vibration from blasting is considered as the most serious damage as it affects the nearby housings, structures, and precision machinery and leads to psychological problems like anxiety. Although there is no perfect canceling technology as an explosion inevitably accompanies noise and vibration, MIRECO strives to minimize the noise and vibration through crater test technology while researching on the ways to fully use explosive energy toward rock smashing with appropriate boring, the right amount of gunpowder and large size of the free face.

**Flying Dust Prevention Projects** MIRECO has made great efforts to prevent flying dust, complying with the related dust regulations set by the Mine Safety Act. Under the regulation, flying dust should be measured at mining sites more than once every 6 months. If the volume of dust exceeds the standard, wet type or collecting type measures should be taken using devices like a sprinkling system to prevent the spread of dust. In the case of active mines, dust collectors are installed to prevent external diffusion of dust generated in the course of the mineral sorting process. Also, wheel washing systems and sprinklers are installed at mine entrances to remove dust caused by the heavy equipment in transporting the minerals.



### Winning the Excellence Prize in the National Reforestation Contest

MIRECO has been conducting eco-friendly forestation projects to recover the forests damaged by mining for the conservation of ecosystem and to raise the quality of life in abandoned mine areas. The size of specialized forestation projects continues to be expanded and specialized forests became about 32.67% of all project areas in 2018. MIRECO plans to keep expanding the projects in the future.

In 2009, the closed Maro Mining Site in Boeun, Chungbuk Province was likely to have secondary risks caused by the accidents or the loss of coal tailings. Against this backdrop, MIRECO designated the area as the site for the forest restoration project. First, 17 abandoned facilities were removed in 2010. Then, reforestation project was conducted on 5ha area with KRW1.9 billion between 2011 to 2013. As a result, pine trees and oriental oak trees has grown well in the area and biodiversity could be secured. Recognizing these efforts, the Korea Forest Conservation Association awarded this case as the best practice in the 13th National Reforestation Contest. MIRECO will continue to implement eco-friendly reforestation projects so that more forests are recovered and residential environment around abandoned mine areas is improved.

Before Reforestation



After Reforestation





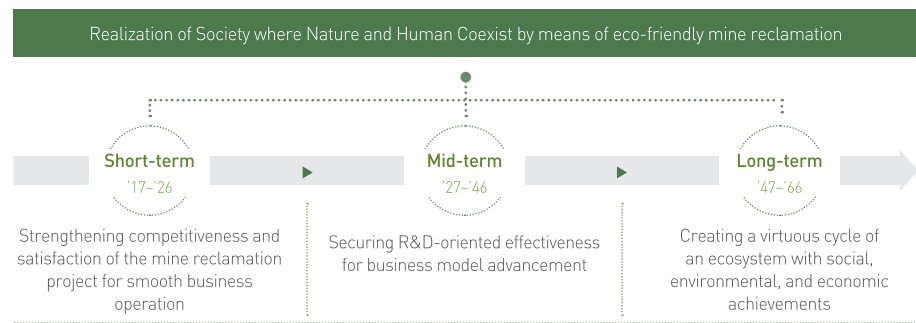
## Advancement of Mine Reclamation Project Management System

MIRECO has developed the mine reclamation project management system for enhanced efficiency and effectiveness. Recognized as specialized institutions, MIRECO improved the credibility of its analysis service on soil, water quality, and coal and disclosed the big data accumulated in conducting various mine reclamation projects for everyone to use it easily.

## Systematic Mine Reclamation Management

Setting a clear direction where to mine reclamation project proceed is indispensable to maximize the continuous effectiveness, going beyond a brief achievement. Thus, MIRECO reorganized the medium to long-term roadmap for mine reclamation, setting respective objectives according to the short, medium, and long-term phases; strengthening competitiveness and satisfaction, securing R&D-oriented effectiveness, and creating a virtuous cycle ecosystem with social, environmental and economic results. ICT-based facilities have upgraded the quality of management and meetings are conducted regularly to check the project execution rates and achievements according to the plans. As a result, MIRECO recorded completion at 93.5% to the mine reclamation projects planned in 2018 for the first time. In addition, the introduction of the contract review system in 2016 has saved KRW 10.4 billion in budget.

### Medium to Long-term Roadmap for Mine Reclamation



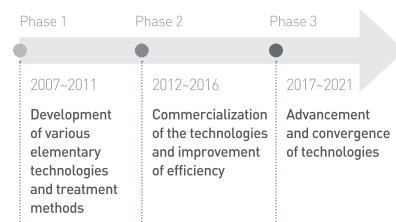
## Technology-based Quality Improvement

**Foundation of Systematic Technology Development** Since 2007 when MIRECO established the first medium to long-term technology development strategy, it has been renewed every 5 years to ensure systematic technology development. Based on Phase 1 of the strategies from 2007 to 2011, MIRECO undertook the development of various technologies and treatment methods on water quality, soil, mineral residue, and mine subsidence, while conducting research on the commercialization of the technology and the improvement of efficiency on Phase 2 from 2012 to 2016. In 2018, MIRECO is on Phase 3, focusing on technological advancement and convergence technology which will be continued to 2021.

**Gathering Opinions on Technology Development** MIRECO has been holding technical support meetings to listen to the customer's needs in business departments and branch offices to gather opinions on technology development. With sharing ideas among centers, departments, and branches, MIRECO pursues the proactive support and the development of customized technologies to address issues in each site. In addition, MIRECO offers technical consultation and education to SMEs in resource development and mine reclamation sectors to facilitate efficient



### Medium to Long-term Technology Development Strategy



mine damage prevention technologies on the ICT-converged platform. Taking advantage of the technology commercialization model in mine damage prevention and mine safety, MIRECO is solidifying the foundation of technology marketing and creating consumer-oriented technology services in partnership with related research institutes.

<p><b>Case 1: Seoul Metropolitan Government</b></p> <p>Technical support for the post-management of the new technology (NET), 'Imaging Technology for Underground Caverns' to explore urban road sinkholes that has emerged as a social issue</p>	<p><b>Case 2: Korea Institute of Construction Technology</b></p> <p>Evaluation of reinforcement level of FOS-embedded carbon fiber sheet based on the demonstration of a small and medium-sized bridge, utilizing fiber optic sensor measurement technology developed by MIRECO</p>	<p><b>Case 3: National Institute of Environmental Research</b></p> <p>Increased demand for waste recycling such as sludge coming from water purification process (Yeongdong Coal Mine), coal pumice (Jangseong, Gyeongdong), regarding mine reclamation projects in the future</p>
---	---	--

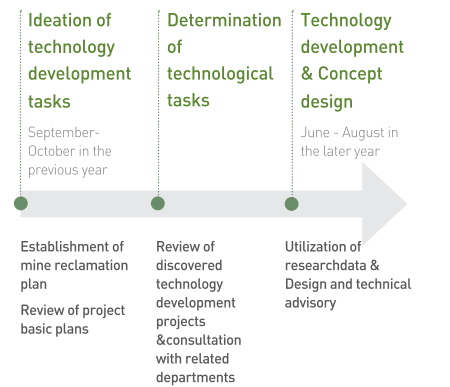
**Specialized Agency in Analysis** The analysis-specialized agency operated by MIRECO provides testing results analysis services on heavy metals and asbestos-contaminated soil, mine drainage, coal, and coal processing products. Also, MIRECO has developed standardized verification materials in search of the enhanced verification of analysis quality to earn the credibility of the contaminated soil restoration project ranging from its detailed investigation stage to the actual implantation. In 2007, the analysis evaluation institute had been recognized its qualification as a specialized soil-related organization by the Ministry of Environment and was designated in 2010 as an internationally certified testing institute for soil, water quality, and coal by the National Institute of Technology and Standards. Furthermore, in 2012, it was designated as an asbestos environment center by the Ministry of Environment, building up a trust at home and abroad in the field of testing and analysis services for mine management.

## Infrastructure for Big Data on Mine Reclamation

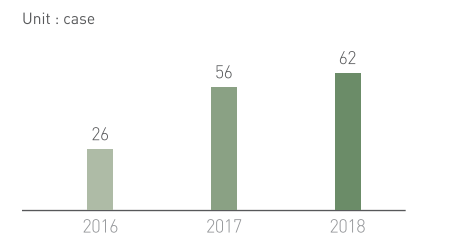
**Database for Standardized Information on Mine Reclamation** As the significance of public information-based innovation is coming to the fore, MIRECO has established the Integrated Mine Reclamation Information System where users effortlessly utilize needed information thanks to the electronically integrated data on mine and mine damages, on top of the newly added features. Provided data on the system includes the inspection results on national mine hazard such as ground, water quality, soil, tailings, forests, waste-rock, and waste facilities and the scanning files and image files on mine drawings as well as the achievements of mine hazard prevention projects and water and soil quality monitoring data. As such, MIRECO's rapid data uploading has greatly improved the efficiency of administrative works.

**Active Use of Information on Mine Reclamation** MIRECO has set the vision and strategic goals to ensure that various stakeholders can easily access to the high-quality information regarding mine reclamation. To this end, The Integrated Mine Reclamation Information System and the Mine Hazard Prevention Project Database are being updated on a regular basis and the standardized formatting style enabled the convergence of similar databases. Also, the scope of mine information disclosure has been expanded depending on the classification of consumers after the legal review. As for the sharing platform, various efforts have been made to facilitate the active use of information on mine reclamation, including the improvement of the searching features in the Integrated Mine Reclamation Information System, the establishment of interactive sharing system with the Ministry of Land, Infrastructure and Transport, and the introduction of non-computerized information sharing channels.

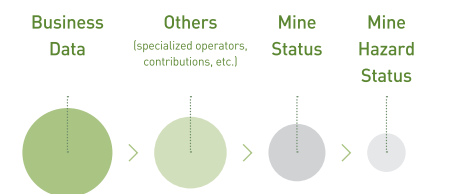
### Task Ideation Process Based on Life-Cycle Concept Design



### Number of Information on Mine Reclamation requests by year (excluding requirements from the National Assembly)



### Requested data for the external use for the last 5 years:



### Prevention-centered Disaster Control Management

Safety is the most fundamental value for a better quality of human life. MIRECO has been promoting the safety management system to create a safe environment for people and employees. To this end, prevention-centered measures have been enhanced while the autonomous on-site inspection empowers safety management. At the same time, mine hazard prevention technologies such as mine subsidence prevention technology are being practically utilized at the private level, safeguarding people's life.



### MIRECO Safety Management System

**Disaster Control System** MIRECO has established a disaster control system to safeguard employees and the public from the disaster and accidents. Based on 3 strategies, "healthy food for the people," "ICT-based eradication of the blind spots for safety," and "human-centered safe workplace," action plans have been set up to overcome the risks of each strategy. Considering the fact that real-time monitoring and golden time are the keys to overcome the limitations of the current system, the ICT-based integrated control system has been established for mine hazard prevention facilities on sites that have enabled real-time precision measurement, remote control, the big data information collection. Moreover, an automatic alarm system linked with intelligent surveillance cameras and smartphones successfully addressed the blind spots issues.

Management Goal		
Creation of a safe environment for people and workers through proactive safety management		
Strategies		
Healthy food for the people	ICT-based eradication of the blind spots for safety	Human-centered safe workplace
Risks & Tasks		
Production and distribution of contaminated agricultural products Contamination of drinking water sources due to mine hazards	Absence of integrated control tower for facilities and sites for appropriate safety management	Normalization of disaster caused by extreme weather Heavily relying on autonomous management of industrial sites
The groundwork for producing safe agricultural products Securing clean water sources in mining areas	Integrated control of mine reclamation facilities PMIS-based safety management at all stages	Professional response to the disaster Industrial accident prevention organizations



**Nov. 2018**  
Distinguished contribution to the disaster management

Awarded by the Ministry of Public Administration and Security



**Nov. 2019**  
Recognition for safe workplace (Gangwon branch)

Korea Occupational Safety and Health Agency

**Human-centered Safe Workplace** MIRECO has committed to creating an environment where workers can work safely. As most mine reclamation sites are located in mountainous areas and exposed to threats of natural disasters, MIRECO strives to reinforce customized safety management for each disaster situation such as mine subsidence in the thawing season and fine dust. Also, the safety cluster among civil, government, military, industrial, academic, and research was established to conduct simulation training and to carry out joint national safety assessments of which results were thoroughly reflected in mine reclamation projects. In 2018, MIRECO had established the specialized organization in mining safety and completed consulting on the enactment of safety regulations for 12 small mines. Safety inspections and educational programs have helped safety officers improve their expertise, while safety education observation programs, STOP was introduced to empower preventive safety management.

### Expansion of Mine Subsidence Prevention

The mine subsidence prevention project has been gained its significance in securing the safety of people's lives along with the safe management of mine-related workplaces. Therefore, Information on subsidence risk areas has been disclosed to the public, and local governments with safety management for the area reinforced. Furthermore, newly introduced ground investigation techniques such as MIRECO EYE, drones, and tomography are being practically utilized to get rid of any risk of subsidence. Looking forward, MIRECO expands the scope of detailed investigations and discloses relevant information on mine subsidence and the list of mines that safety actions were already taken on the Integrated Mine Reclamation Information System.

### Active Autonomous On-site Safety Management

The creation of a safe workplace requires active autonomous safety management on sites. For this purpose, MIRECO regularly conducts a close examination of facilities, including mineral residue storages and water purification facilities. In particular, the post-management team conducts safety inspections twice a year on the mineral residue storage facilities in that the harmful heavy metal content can lead to enormous environmental and property damages. The short-term, medium to long-term tasks are identified and proactive measures are taken based on the inspection results in order to completely prevent accidents. Furthermore, for mine hazard prevention operators and briquette manufacturers, joint meetings are held on a regular basis to serve as a venue where education on workplace safety and disaster prevention are offered and information is shared.



Acquired related data among 106 locations in Seoul City  
Completed prompt reinforcement measures on 41 underground caverns



Achievement of ZERO Industrial accident for 2 consecutive years and ZERO mine subsidence accident for 7 consecutive years

Value Adding Activities 02

# Leading Inclusive Growth in Mining Areas

The rapid changes in the national economy paradigm have brought the issue of imbalance in the supply of coal and briquettes. As the non-economic mines were abandoned and surrounding areas have experienced the economic decline, MIRECO is laying the foundation for self-reliance in the closed mine area.

### Why is this topic important?

In the late 1980s, the domestic anthracite coal supply reached a peak at around 24,295 thousand tons as of 1988, whereas radical changes in the economic paradigm and the growing preference for the clean fuels have reduced the demands for coal, leading to a disparity in supply and demand. Against this backdrop, the government introduced the coal rationalization policy in 1989 to restructure the coal industry which abandoned non-economic mines and eventually resulted in the economic decline in mining areas and consequently pointed out as a serious social issue. In fact, the population of abandoned mine areas in Gangwon-do (Taebaek, Jeongseon, Yeongwol, Samcheok, etc.) which amounted to about 440,000 in 1988, has dropped to 190,000 in late 2017, less than the half compared to that of the 1980s. However, the government's support policies have been insufficient to address the regional crisis. Meanwhile, with the expiration of the Special Act on the Development of Abandoned Mining Areas is around the corner in 2025, the establishment of the foundation for self-reliance in the closed mine areas has emerged as an urgent social issue.

### What are the approaches of MIRECO?

MIRECO, as a supportive organization for regional development, is making unwavering efforts to improve the living conditions in geographically and economically underprivileged mining areas. First of all, MIRECO is developing and fostering alternative industries suitable for abandoned mine areas and actively attracting companies in related industries to help the region stand on their own. Moreover, MIRECO is contributing to new jobs and income improvement by means of attracting new projects in line with government policies, such as the Urban Regeneration New Deal Project and the Solar Power on Mining Site Project. Looking forward, MIRECO will actively develop and foster new growth engines to replace the coal industry and will eventually create the self-reliance environment and the sustainable virtuous cycle of job creation, growth, and distribution based on communication with residents.



**2018 Highlight**

**Amounts Provided through Alternative Industrial Loan Assistance**

The amounts of investment and loan support to revitalize the abandoned mine area and improve settlement conditions

**KRW 17.4 billion**

---

**Amounts Provided through Coal Price Stabilization Subsidy**

The amounts of subsidies for the stable supply of briquettes for the vulnerable and the support for coal mines and workers

**KRW 170.1 billion**

---

**Renewable Energy Supply in Abandoned Mine Areas**

The amounts of energy supply through the renewable energy supply through solar power on mine site project

**3,000 kW**

## Nurturing Alternative Industries in Closed Mine Areas

Following the government's adoption of the coal industry rationalization policy, the abandoned mine areas were experiencing a host of social problems, with a hollowing-out phenomenon due to the shrinking local economy and the rapid decline in population. Against this backdrop, the government enacted the Special Act on the Assistance to the Development of Abandoned Mine Areas, in 1995 and designated the cities like Taebaek, Jeongseon, Samcheok and Yeongwol in Gangwon-do province, Mungyeong in Gyeongsangbuk-do province, Boryeong in Chungcheongnam-do province, and Hwasun, Cheollanam-do province as the beneficiary zones for the local economic revitalization projects. Since 1996, MIRECO Alternative Industry Loan Assistance has financed manufacturing and tourism and leisure start-up businesses, anticipating that they can energize the local economy in abandoned mine areas. Accordingly, the loan assistance has concentered its position as a representative service of a regional economic development project.



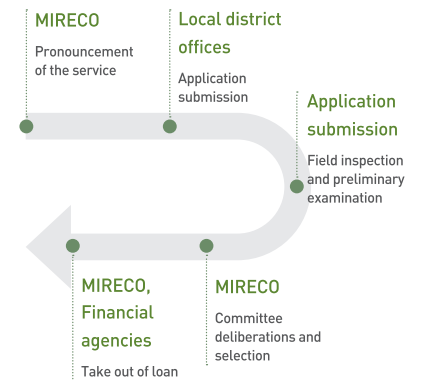
### Loan Assistance for Alternative Industries

MIRECO has provided loans to foster alternative industries for 22 years. On top of that, additional KRW 15 billion have been annually invested using MIRECO's own resources to foster substitute industries. MIRECO is making multiple efforts to create an environment where enterprises can develop with financial supports and consulting on productivity. Moreover, the consumer-centered system such as "prior notice for the loan" enabled timely support of funds depending on beneficiary companies' situation and the "visiting orientation" encouraged business operators to facilitate available services for them. Thanks to the enhanced customer's accessibility to the services, MIRECO acquired the top grade in the 2018 Ministry of Strategy and Finance Customer Satisfaction Survey.

#### The Lending Conditions of Alternative Industry Loan Assistance

Purpose	Duration (Deferment / Repayment)	Limit	Loan Ratio	Interest rate (%) (Rental/Loan)
Facilities	5 years / 5 years	KRW 3 billion	Below 80% of required funds	Annually 0.25/1.75 (Quarterly Variable Rate)
Operations	2 years / 3 years	KRW 500 million	Below 100% of required funds	

#### The Process of Alternative Industry Loan Assistance



### Achievements of Alternative Industry Loan Assistance

From 1996 to 2018, MIRECO paid out the total of KRW 335.6 billion to 402 companies through Alternative Industry Loan Assistance and MIRECO eventually saw 20.7% increase in average sales and 13.8% of growth in job creation compared to the previous status based on the study on MIRECO's invested companies for the last decade when MIRECO spearheaded its own loan services. In addition, its great economic performance to investment is notably shown in 4.11% increase in GRDP (Gross Regional Domestic Product) and 4.08% increase in employment, playing a locomotive role in local economy revitalization projects. Also, MIRECO provided KRW 17.5 billion to 29 companies in 2018 alone, which resulted in 99 new jobs. Looking forward, as a part of the proactive administration, a virtuous cycle for regional jobs will be created where local talents and local SMEs meet their needs with the help of related organizations.



Average Sales Comparison before the Loan

KRW 61.9 billion → After the loan: KRW 74.7 billion (KRW 12.8 billion increased)



Average No. of Employees Comparison before the Loan

22.5 → After the loan: 25.6 (3.1 increased)

\*Reference: An Analysis of Alternative Industry Loan Project Achievements and Activation Plan (Apr. 2019)

**Support and Management of Associate Companies** On the basis of the Special Act on the Assistance to the Development of Abandoned Mine Areas (Dec. 1995) and the Stage 2 Investment Plan for Abandoned Mine Area (Nov, 2002, the Ministry of Trade, Industry and Energy), MIRECO has established and supported associate companies to help revive the local economy as below.

#### Current Status of Associate Companies

Corporate name	Date of establishment	Major business	No. of employees (person)	Sales (KRW 100 million)
Kangwon Land	June 29, 1988	Casino, hotel, golf course, ski slope, condo	3,673	14,360
Mun Gyeong Leisure Town	Feb. 25, 2003	Golf course, condo	44	108
Black Valley Country Club	Aug. 13, 2004	Golf course	58	45
Daecheon Resort	Dec. 26, 2007	Golf course, condo, rail bike	24	59
KidLala	Jan. 01, 2012	Job experience theme park, accommodation complex, etc. (in preparation)	21	-

MIRECO has been creating high-quality jobs and the mutual growth in the region by ensuring operational stability through stable sales and the surplus structure of associate companies. In 2018, the business diversification had 124 irregular jobs converted to regular jobs and MIRECO has strived for win-win development with the local community which has been proven in the purchase of local goods worth of KRW 83.8 billion.

### Hansung Food benefitted from MIRECO's Loan Assistance

Hansung Food specialized in Kimchi with 100% Korean agricultural product has worked in partnership with local cabbage farmers in Gangwon-do province for 20 years. In 2018, Hansung Food built Korea's fourth-largest plant in Yemi Agricultural Industrial Complex, thanks to the financial supports by MIRECO's Loan Service. Reduced delivery distance allowed the fresh ingredients and about 100 personnel were employed in the plant, contributing to the local job creation. The plant with diverse features could produce 47 tons of Kimchi per day and 14,100 tons per year and is willing to provide traditional Kimchi to consumers through home shopping and other marketing channels in the region. In line with the policy direction of MIRECO that cherishes social value creation along with the pursuit of profits, the company's CEO Kim Soon-ja promised to provide and Kimchi charity events as well as educations and opportunities to make Kimchi for the high school students, senior citizens, multicultural families, and foreigners in local communities.

### Abandoned Mine Area Development Projects

MIRECO is the public institution enforcing policies at the closest point for residents in abandoned mine areas. For a nimble response to the social and environmental changes and better living conditions and quality of life for residents, MIRECO has promoted various regional development projects.



### Urban Regeneration New Deal Project to Eliminate Regional Imbalances

Jangseong District in Taebaek City has been marked as the top priority area to implement the Taebaek City Regeneration Strategic Plan. Since the area has shown sharp declines in almost all indicators, including 287.4% in the aging index and 71.9% in the aging residential ratio. Intensive supports pumped into the area to foster alternative industries spurred by the enactment of special laws were insufficient to resolve severe local economic crisis due to the failure of appropriate local industries' development. In the face of a local extinction crisis, the Urban Regeneration New Deal Project, 'ECO JOB CITY Taebaek' was invented with forming the governance among private, government and public institutions. With a view to ensuring sustainability in local communities,

#### Outlook of Urban Regeneration New Deal Project, ECO JOB CITY Taebaek



- 1.1 Renovation of aged apartments into smart farms and education centers
- 1.2 Smart greenhouse made of glass
- 1.3 Place for agricultural products sales and hands-on experience
- 2.1 Forest renewable energy park
- 2.2 Collection center for unused forest resources
- 2.3 Education center for forest resource utilization
- 3.1 Small-scale grid for district heating
- 3.2 Higher efficiency for industrial energy
- 3.3 Higher efficiency for housing energy
- 4.1 Designation of shaft tower in Jangseong mining station as a modern industrial heritage
- 4.2 Vertical shaft experience facility
- 4.3 Mine park
- 5.1 Coal mine museum, exhibition hall
- 5.2 Mine art incubation center
- 5.3 Establishment of cultural cluster
- 6.1 Cultivation of smart farm experts
- 6.2 Cultivation of forest resource experts
- 6.3 Cultivation of local culture experts
- 6.4 Support for the operation of the village corporation

MIRECO worked for hand in hand with Korea District Heating Corporation, Korea Coal Corporation and Taebaek City to construct a new renewable and cultural power plant near Jangseong Mining Station. ECO JOB CITY Taebaek is the economic-based urban regeneration project that invests KRW 2,155 billion, including KRW 25 billion from the national budget, KRW 16.7 billion from the local budget and KRW 173.8 billion from public and private investment toward a total area of 460.862 m<sup>2</sup> from 2019 to 2024.

**Major Content of the Projects by Area**



The Urban Renewal New Deal Project, ECO JOB CITY Taebaek is expected to create 285 direct and 2,407 indirect employments, a total of 2,692 jobs.

Since the ECO JOB CITY Taebaek was recognized as the representative case of 2018 Urban Renewal New Deal project, it was awarded by the Ministry of Land, Infrastructure, and Transport as well as by the Gangwon Provincial Governor, cementing its position as the exemplary model of business that drive innovative growth.

**Deokpoeitta** The Yeongwol-gun Urban Renewal New Deal Project was promoted in 2019 to expand a great influence of urban regeneration to other abandoned mine areas. This project aims to regenerate marsh snail-specialized commercial areas nearby Yeongwol Station (115,700m<sup>2</sup>) which was the center of coal-fired power plants and logistics in the past and to renew abandoned communities and housing welfare. In the pursuit of successful implementation, the project will inject a total of KRW 33.3 billion for 4 years from 2020 to 2023 and MIRECO will cooperate with Gangwon Land and CJ Hello Youngseo Broadcasting, harnessing expertise in each field. In terms of achievements, the corresponding effect of 52 direct employments is expected to be generated in the business area, and MIRECO concreted its position as an urban regeneration specialized institution since it has been selected for the Urban Renewal New Deal Project for 2 consecutive years.



**Merit Award of Government Innovation**



**The representative case of 2018 Urban Renewal New Deal project selected by the Ministry of Land, Infrastructure, and Transport**



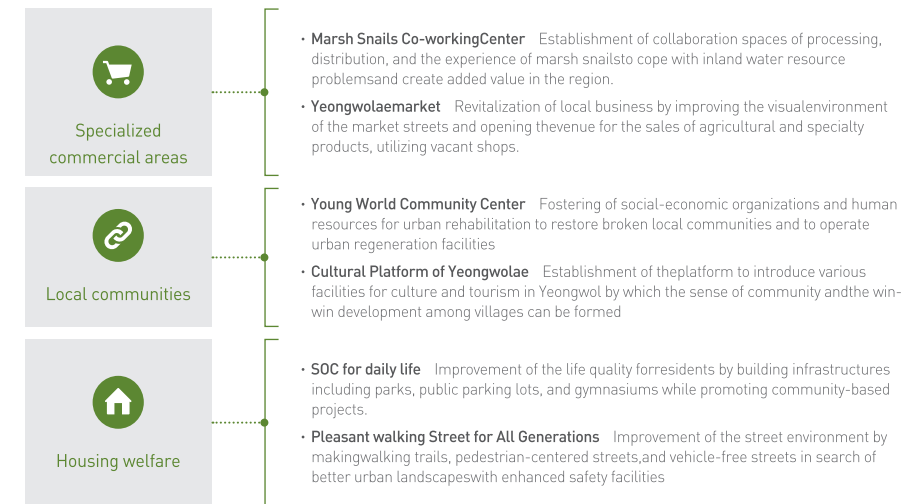
**The corresponding effect of generating direct employments through Eco Job City Taebaek**

2,692 jobs



**Acknowledged as the representative business for 2 consecutive years**

**Major content of the projects by area**



**Renewable Energy Business**

MIRECO is carrying out the 'Solar Energy from the Mine Site Project' that generates revenue returning to the region with solar power on the abandoned mine sites. Solar energy from the mine site project, the representative example of the renewable energy project in the abandoned mine areas aims not only to actively respond to climate change but also to create jobs for local communities as a driving force for regional development. After Korea Coal Corporation provides the land for 20 years and the Korea District Heating Corporation invests in solar energy from the mine site pilot project, the excess profits excluding the investment capital will be returned to the region. Setting aside this project, MIRECO is building "MIRECO Zero Energy Town" where two or more new renewable energy sources like solar power generation facilities, solar hot water facilities, geothermal heating facilities are installed in houses and public facilities. These community-based local development projects are practically reducing the burdens of energy cost in closed mine areas.

**MIRECO Zero Energy Town Performances**

Area	Location	Duration	Project Cost (KRW million)				Total
			Government	MIRECO	Local government	Residents	
Taebaek	Samsu-dong, Taebaek-si, Gangwon	'13.8-'14.4	260	286	-	-	546
Mungyeong	Maseong-myeon, Mungyeong-si, Gyeongbuk	'14.8-'15.7	230	297	-	-	527
Yeongwol	Hanbando-myeon, Yeongwol-gun, Gangwon	'14.12-'15.12	354	274	79	86	793
Hwasun	Dongbok-myeon, Hwasun-gun, Jeonnam	'15.5-'16.5	410	298	72	50	830
Boryeong	Seongju-myeon, Boryeong-si, Chungnam	'15.5-'16.5	411	299	100	75	885
Jeongseon	Sindong-eup, Jeongseon-gun, Gangwon	'15.10-'16.10	682	300	310	86	1,378
Samcheok	Dogy-eup, Samcheok-si, Gangwon	'17.1-'17.12	358	260	100	-	718



**Effect of generating direct employments through 'Deokpoeitta'**

52 persons

**Solar Power on Samcheok Mine Site**



### Welfare Improvement of the Vulnerable and Mine Workers

MIRECO is promoting various coals and briquettes support projects by conducting policies to stabilize coal prices and briquette-sharing programs for low-income families for better energy welfare.



#### Support for Those Left in The Blind Spot of Energy

**Briquette Support Program for Low-income families** Since 2007, MIRECO and the Ministry of Trade, Industry and Energy have implemented the program to provide the vulnerable with coupons that can offset the differences in increased briquette prices. The beneficiaries of this project are those in need still using briquettes, including the recipients, lower income families, and the underprivileged in the winter season from October to late April. As of 2018, a total of 63,634 households were received briquette coupons worth KRW 406,000. Moreover, MIRECO is planning to impose a QR code system for briquette coupons to avoid delays in administrative procedures and risks associated with fraud and abuse stemmed from the use of paper coupons. The introduction of the QR code will prevent fraud and abuse while individual guidance boosts the effectiveness of the program by encouraging people eligible for the benefits to make practical use of energy vouchers.

#### Support Stabilization of Coal Industry

**Coal Price Stabilization Measures** In compliance with the Coal Industry Law, MIRECO has set the price cap on coals and briquettes and covered the price differentials to the coal industry for the purpose of protecting people's livelihood, stabilizing prices, and maintaining coal industry. MIRECO has provided a total of KRW 982 billion as coal and briquette stabilization support funds, mine drilling support funds, and production reduction support funds to coal mining business operators, briquette manufacturers, and briquette transportation businesses for the last 5 years. In 2018 alone, KRW 151.7 billion was supported for the purpose. The ultimate goal of these measures is to accelerate the stable operations of the coal and briquette industry and stabilize the supply and demand of anthracite coal. Coal mining business operators, briquette manufacturers, and briquette transportation businesses will be supported by those measures as below.

#### Targets and Content of the Support

Target	Type	Content
	Coal price stabilization support	Industrial accident insurance and children's tuition fee support for miners and support for coal price differential for coal mining companies
<b>Coal mine operators</b>	Production reduction support	Support for coal mining companies that have reduced their annual coal production by over 5%
	Mine drilling cost support	Support of 70% of mine drilling costs (within budgetary limits)
<b>Briquette manufacturers</b>	Briquette manufacturing costs	Support of briquette manufacturing costs
	Anthracite vehicle transportation costs	Support of vehicle transportation costs of anthracite used to manufacture briquette
<b>Briquette Transportation Businesses</b>	Briquette transportation costs	Subsidy paid to logistics companies transporting briquettes from briquette factories to consumers

**Supportive Measures for Closed Mine Sites** In accordance with the coal industry rationalization policy introduced due to a steady decline in coal demand, MIRECO provides financial support to the miners and mine operators of the closed mines or those required to reduce their production quantities, pursuing a successful policy implementation. By doing so, MIRECO strives to stabilize the livelihood of workers when switching their jobs with the various types of support such as severance pay, unemployment compensation benefit, accident compensation benefit and tuition fees. MIRECO has contributed KRW 158.5 billion in total for the last 5 years as a subsidy and KRW 28.5 billion in 2018 for mine closures, seeking a stable coal production system and the robust local economy in the region.

#### Targets and Content of the Support

Target	Type	Content
	Worker subsidy	Financial support for severance pay, wage and unemployment compensation benefit, job transfer preparation, special compensation benefit, accident compensation benefit, tuition fees
<b>To-be-closed Mines</b>	Mine operator subsidy	Support for relocation and disposal of mining facilities
<b>Mines required to reduce production</b>	Worker subsidy	Financial support for job transfer preparation, special compensation benefit, and tuition fees

**Quality Inspection on Coal and Coal Products** MIRECO has been conducting quality inspections on coal and coal products to guide fair trade and ensure a stable supply of coal and briquettes to consumers. As for the coal, 5 active mines or 15% of the transport volume is the objective of the inspection, including 42 briquette plants and 5 other processed coal plants nationwide. Inspections are carried out on calorific value and volatile matter for the coal, on calorific value and specific size for the briquette, and on calorific value, sulfur content, and coal dust for other processed coals. In 2018, MIRECO implemented quality inspection on 201,707 tons of coal in 5 active mines in Korea out of 1,018,268 tons or 19.81% annual coal transport, exceeding 4.81% of the scheduled amount of 152,740 tons. Also, MIRECO conducted 603 briquette quality inspections and 48 other improved charcoal quality inspections, contributing to the delivery of quality coal and briquettes to consumers.



#### Coal Price Stabilization Measures

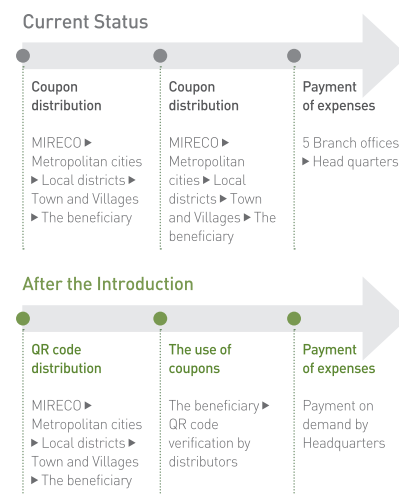
A total of KRW 982 billion was provided for the last 5 years



#### Supportive Measures for Closed Mine Sites

A total of KRW 158.5 billion supported for the last 5 years

#### The improved process through the introduction of the QR code system



# Securing Growth Engine for Future Innovation

Keeping up with the times, MIRECO is laying a sustainable foundation for mine reclamation by developing innovative technologies that will lead to future trends. On top of that, MIRECO devotes itself to create a win-win ecosystem through strengthening both national and international networks to secure growth engine for future innovatoin.

### Why is this topic important?

The Fourth Industrial Revolution has brought changes in society faster than ever. Various technologies such as artificial intelligence (AI) and the Internet of Things (IoT) have already deeply penetrated into our daily lives, shifting current life style. Considering the fact that the existence of companies depends on the driving force which will help the company to keep up with social and economic changes, sustainability in achieving mining policies has become indispensable. Advancement of mine-breaking innovation technology will enable timely mine management projects and improve the completion of projects from mine development to abandoned mines. Furthermore, by utilizing it as a solution to various social problems, it enables the public institutions to realize their social values. In addition, by reinforcing the global cooperation network, we can create high-quality jobs by building an infrastructure to enter the overseas market, and we can expand follow-up cooperation and create national interests through the performance of supporting projects.

### What are the approaches of MIRECO?

MIRECO has actively researched both in the field and academics to proactively develop innovative and technologies and secure competitiveness in the global mine reclamation market. Beyond the advanced technologies for highly efficient mine hazard prevention, MIRECO is seeking to make practical use of innovative technologies in the field. MIRECO EYE, the 3D Digitization and Imaging Technology for Underground Caverns utilized in preventing sinkholes to safeguard urban road condition is the representative case that shows MIRECO's efforts to realize social values. Also, since 2010 MIRECO has been managing national technical qualifications in the mining field, through which cultivate high-quality mine prevention experts to solidify its position as a specialized institution in environmental resources development. Furthermore, MIRECO is promoting national interests by promoting global cooperation projects including international exchanges and official development assistance (ODA) with various countries such as Mongolia, Peru and Indonesia.



2018 Highlight

**Technology Development Performance Index**

Mine reclamation technology research, dissemination and sharing performance index to R&D investment for 3 years

4.86×10<sup>-10</sup>

---

**Cultivation of Mine Damage Prevention Expert**

Achievement of Training Program for Professionals of the 4th Industrial Revolution-based Mine Reclamation

62 persons

---

**Mutual Expansion to Overseas Market with SMEs**

Overseas expansion through Joint Projects Development and Consortiums Hosted by SMEs

20 companies

## Future-oriented and Innovative Technologies

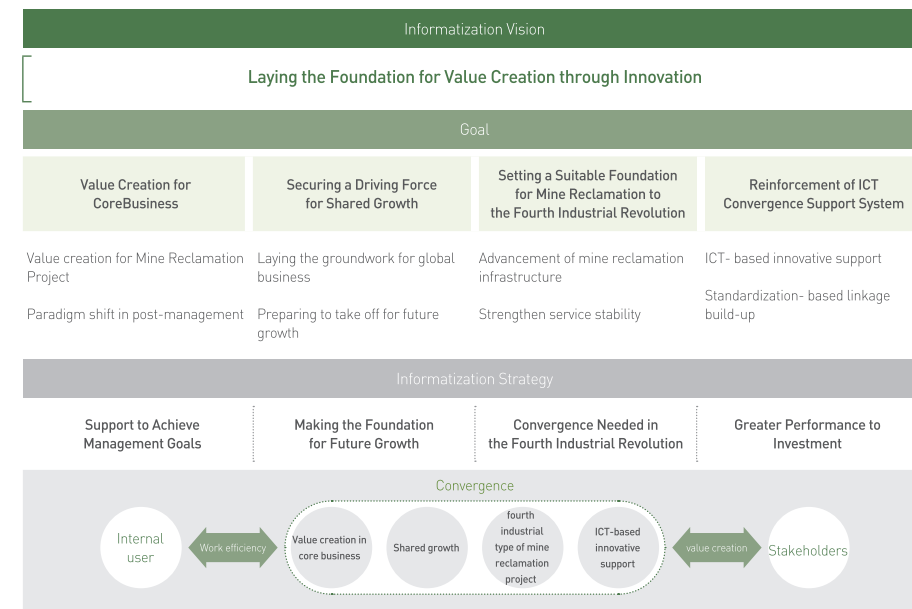
In response to the new paradigm change of the Fourth Industrial Revolution, MIRECO has established a medium to long-term informatization strategies and is focusing on securing first-class technologies that lead the future market by developing and utilizing future-oriented and innovative technologies.



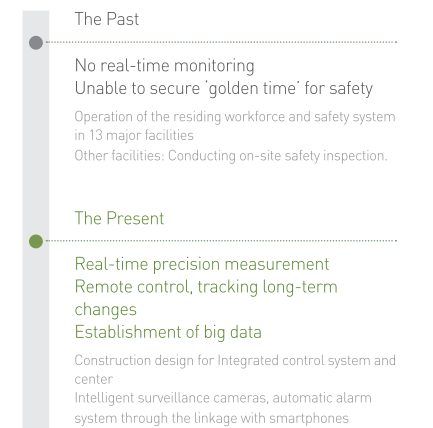
## Utilizing Information & Communication Technology (ICT)

Since January 2018 when a medium to long-term informatization strategy was set up, MIRECO has been taking a proactive response to the era of the Fourth Industrial Revolution and creating new changes with leading innovations. IoT, artificial intelligence, big data, cloud, and other information and communication technologies (ICT) are practically integrated in the mine management in line with the government's core tasks, while MIRECO strives to secure the emerging technology to take the lead in the future market by composing external advisory groups and setting indicators related to ROI.

### MIRECO's medium to long-term informatization strategy map



### ICT-based Integrated Control System on Mine Reclamation Facility



### Efforts to Secure Leading Technology

**MIRECO EYE** In the mining sector, underground cavities formed during the mining of minerals would collapse over time, resulting in mine subsidence. Therefore, MIRECO, the only one mine reclamation specialized organization in Korea, developed MIRECO EYE on our own, the 3D Digitization and Imaging Technology for Underground Caverns, for ground stability investigation to detect sinkholes in the mining area. The 3D Digitization and Imaging Technology for Underground Caverns (MIRECO EYE) enables a device to be put into a borehole to measure the scope of underground caverns to obtain precise digital information and images of underground caverns, which makes it possible for any institutions or corporations to use this new technology to identify potential risks of mine subsidence. As a model example, MIRECO EYE was applied to guarantee road safety in Seoul, thereby providing data for road underground caverns in 12 districts and 106 locations in Seoul and helped to secure road safety in urban areas by reinforcing 41 sites immediately. Moreover, MIRECO breaks down the current model into four different models to promote the utilization of MIRECO EYE in various fields and conditions. Looking forward, MIRECO will establish a cooperative network with related organizations to manage underground safety based on MIRECO EYE so that it can ensure security in various fields such as mine, disaster control, military and civil engineering. Meanwhile, MIRECO EYE has been recognized for its excellence in technology both in internal and external evaluations, obtaining the National New Technology Certification in 2016 (NET No. 1040) and awarded by the Minister of Trade, Industry and Energy in 2017.

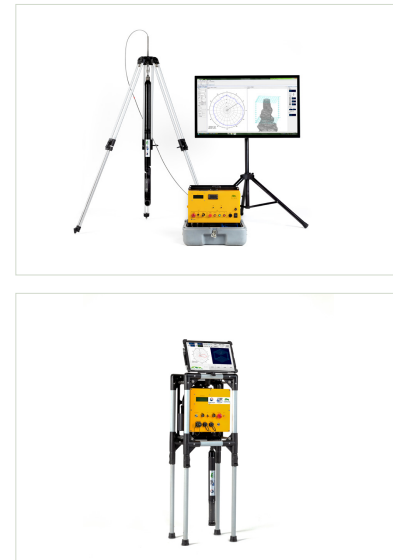
**MIRECO TUBE** MIRECO TUBE was designed to commercialize sludge dewatering technology that can be applied to natural purification facilities where equipment is difficult to enter. MIRECO TUBE reduces the time and cost required for sludge treatment of water purification facilities using natural purification and semi-active treatment. In fact, when dehydration technology was applied to two semi-active treatment water purification facilities and three natural water purification facilities, it showed a higher water content reduction rate and higher solid-liquid separation rate, resulting in the high dehydration efficiency in natural purification treatment.

**Efficient Mine Management using Drones** Mining areas which mainly located in inaccessible mountainous areas with mining drainage, mineral residue, waste-rock over a wide range of areas cause the restraint of time and safety issues in investigation. Against this backdrop, MIRECO is making good use of drones in wide-area surveys to predict mine damages and identify the location of major facilities. Therefore, safety issues, as well as work efficiency in field investigation, have been solved. Also, in conducting mine reclamation projects for various developing countries, MIRECO has promoted the nation's advanced mine management technology and upgraded the nation's status on the global stage by applying the investigation techniques based on the fourth industrial technologies.

#### Performance of Drone-utilized Projects

<p><b>Planning a wide-area survey and visualizing drawings</b></p> <ul style="list-style-type: none"> <li>• Aerial photography with drones and spectrum analysis</li> <li>• Intuitive visualization of complicated drawings</li> </ul>	<p><b>Scientific calculations of forest-covered rates in rehabilitation areas</b></p> <ul style="list-style-type: none"> <li>• Aerial photography on forest rehabilitation areas using drones</li> <li>• Calculating forest coverage rate using standard color analysis program by sections</li> </ul>	<p><b>Aerial surveys and searching for areas with mine subsidence</b></p> <ul style="list-style-type: none"> <li>• Regular aerial shots on areas having the possibility of minesubsidence</li> <li>• Finding sinking areas and conducting an on-site survey</li> </ul>	<p><b>Reasonable estimation of mining waste stockpiles</b></p> <ul style="list-style-type: none"> <li>• Aerial photography on large-scale mining waste storage</li> <li>• Calculating the number of piles utilizing 3D Modeling</li> </ul>
--	--	--	--

MIRECO EYE for Mining and Special Purposes (A, L)



### Win-Win Ecosystem in the Mine Reclamation Industry

MIRECO is establishing a win-win ecosystem in the mine reclamation industry by providing technical support and training and nurturing qualified human resources for SMEs. In addition, MIRECO has enhanced the domestic and overseas private cooperation networks as the growth engine for future innovation.



### SME Support Training

The active sharing of the latest technologies and trends serves as a platform for cooperation. Therefore, MIRECO organizes annual SME support training programs with Korea Mineral Resources Corporation and Korea Institute of Geoscience and Mineral Resources for win-win cooperation among MIRECO, mine reclamation operators and mining workers. MIRECO believes that sharing technology application cases and the latest issues cultivates professional knowledge and improves the safety of mines, and eventually turning into quality mine reclamation.

### Nationally Qualified Human Resources

Qualified human resources in mine reclamation and mining resources sector enhance the industry's competitiveness and ensure the quality of win-win networks. To this end, MIRECO runs national technical qualification tests in a way that keeps the balance among work, education, and qualification, reflecting on-site conditions. Centering around specialized mine hazard prevention operators and mining industries and those in the mining resources sector, MIRECO offers capacity-building and safety training programs to strengthen expertise. In addition, for the purpose of nurturing experts with national qualifications, MIRECO takes the lead in the post-management training to enhance their job competency.

### Strengthened Home and Abroad Cooperation Network in Private Sector

MIRECO has strengthened the cooperation network through business agreements with domestic companies in order to plan, discover, and promote international cooperation projects in the area of mine reclamation, energy, resource, and environment. MIRECO has spared no effort to help

**Professional qualifications courses for analysts, technicians, etc.**  
 for 25 students, 71h ▶  
 1 engineer, 1 analyst nurtured

**MIRECO signed Global Win-win Network Agreement**



companies looking forward to making inroads into the overseas market by harnessing MIRECO's international network and infrastructure. Private enterprises are encouraged to participate in international exchanges and cooperation such as invitational training programs and local seminars. The solar power generation project on the damaged site in the Erdenet Mine managed by Mongolia's Ministry of Energy shows how local material and human resources can be utilized in mining projects.

### New Driving Force for MIRECO

Since an organization for overseas business was set up in 2011 to strengthen global competitiveness and explore the overseas markets, MIRECO has carried out diverse international mine reclamation projects encompassing international exchanges, multinational cooperation and ODA.



### International Exchange and Cooperation Projects

A wide range of international exchange projects from invitational training, joint workshops to seminars have been conducted targeting countries that MIRECO plans to advance into. Such international exchanges are intended to form a major network with overseas organizations that serve as a platform where MIRECO is promoting the nation's mine reclamation technology and know-how to the global stage while upgrading the national status. Follow-up projects, the advantage of these international exchange projects, stem from such global networks. Those benefits are clearly shown in 52 mine reclamation agreements signed with 19 countries since 2009 which have laid the groundwork for its global market expansion. Another example can be found in 2018 business agreement with Peru, signed after the long-term international exchange project to improve the mine environment, strengthen the environmental supervision capacity of the mine areas, and establish the physical stability monitoring system for the mine reclamation facilities in cooperation with Peru's three governmental institutions in mining and environmental sectors.

Those international exchange and cooperation projects are being developed and given the branding name of 'MIRECO Fellowship Program', encompassing invitational training and local seminars for government officials in developing countries.



Join in CTCN (Climate Technology Center & Network, International Organization) for the first time as a public institution in the mining-related sector

### Implementation Performance Table



### Development Assistance Project (project-type ODA)

Development assistance project (project-type ODA) aims to provide 3 to 5 years of intensive assistance and support for developing countries on mine reclamation policies and technologies, through which MIRECO discovers potential market demand in receiving countries. In 2018, a total of three project-type ODA were implemented jointly with 10 private companies, including 1 in Mongolia, 1 in Indonesia and 1 in Peru, adding up to KRW 1,206.2 billion.

No	Title	Client	Duration	Cost(KRW 100 million)
1	Capacity building and establishment of the master plan on mine hazard management in Mongolia	KOICA	'14.12-'20.12	63.95
2	Mine damage Fact-finding Survey and Recovery Demonstration Project in Indonesia	KOICA	'14.12-'18.01	30.98
3	Mine reclamation management information strategy planning project for eco-friendly mineral resources development in Peru	KOICA	'15.12-18.12	25.68

### Capacity Building and Establishment of Master Plan on Mine Hazard Management in Mongolia

Since 2014, MIRECO has carried out project-type ODA, The Capacity Building and Establishment of Master Plan on Mine Hazard Management in Mongolia, to improve the sustainability of Mongolia's

key industry and economic pillar, the mining industry. This project was the third one of follow-up projects after KOICA ODA, The Project to Reduce Air Pollution by Improving Heating Culture in Ulaanbaatar, Mongolia, conducted between 2008 and 2009. As a part of Mongolia's master plan for mine management policy and system, MIRECO has supported the legislation to include fundraising, organization structure, and the execution method of mine management.

**Mine Damage Fact-finding Survey and Recovery Demonstration Project in Indonesia** Indonesia is a major producer of coal and copper and the mining makes up about 33% of the government's revenue. However, the shortage of manpower and budget prevents the nation from managing the mining systematically and responding positively to the mine hazard. Thus, with a view to raising awareness of mine hazard and laying the foundation for mine management, MIRECO has implemented KOICA ODA project Mine Damage Fact-finding Survey and Recovery Demonstration Project in Indonesia from 2014 to 2018. In order to ensure systematic mine management, MIRECO surveyed the environmental pollution status of mining areas and developed a mine management manual based on the survey to suggest the significance of legal regulations on soil pollution management.

**Mine Reclamation Management Information Strategy Planning Project for Eco-friendly Mineral Resources Development in Peru** Peru has six times larger land area than the Korean peninsula with abundant mineral resources such as copper, gold, and zinc. That is why mining plays a locomotive role in national economic development, accounting for 9.4% of GDP per capita as of 2018. However, the Peruvian government is struggling with effective mine management due to the lack of a system for abandoned mine management, field survey equipment, qualified manpower, and related experience and skills in the field. Against this backdrop, MIRECO successfully completed The Mine Reclamation Management Information Strategy Planning Project for Eco-Friendly Mineral Resources Development in Peru from 2015 to 2018 with the support of KOICA ODA.

**The Tailored Projects to The Needs in Mongolia**

In 2010, MIRECO established a local office in Mongolia to facilitate the ODA project, on which currently promoting international development assistance projects customized to local needs. In addition, the local office in Mongolia has worked as a venue where MIRECO conducts mine hazard management consulting on Korean mining companies in Mongolia while discovering and developing new projects to solve the current issues in Mongolia, desertification and air pollution in cooperation with Mongolia. Amid continuous exchanges with local governments such as the Ministry of Mining, Specialist Supervisory Service, MIRECO has provided mining hazard prevention technology and global network as a stepping stone for SMEs to make inroads into overseas market. On top of that, various projects are being carried out to reduce environmental damages like desertification in Mongolia.

**Directions of Major Global Cooperation Projects**

While implementing the global cooperation projects, MIRECO has been building infrastructure by which public-private partnerships enter the overseas market with excellent global competitiveness, and creating high-quality jobs and nurturing human resources through the Development Assistance Project (ODA). Furthermore, MIRECO will continue to make efforts to address high-demand issues on the global stage based on our experience and technology, thereby contributing to the national interests and the embodiment of social values.



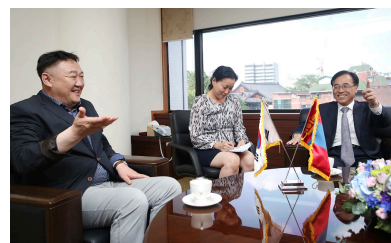
Ulaanbaatar Urban Forest (40ha) in Mongolia

Mine damage fact-finding survey and recovery demonstration project in Indonesia



Joint ideation and planning of climate change ODA in Peru

Discussion with the chairman of the GASI (General Agency for Specialized Inspection) of Mongolia on mine reclamation and mine health



Value Adding Activities 04

# Mutually Growing Community

As a public institution, MIRECO has been seeking the ways to fulfill the responsibility of realizing social values. MIRECO endeavors to create a community that grows together in various aspects including job creation, shared growth, and social contribution.

**Why is this topic important?**

Public institutions work for all members of society. The faithful implementation of the institute's own business leads to the creation of industry-related social value as well as additional social value, such as quality jobs and win-win cooperation. Therefore, the institution should listen to the opinions of various stakeholders through multiple communication channels and swiftly reflect them in the operation to form the community where everyone grows together. As the government calls for public institutions to realize social value beyond that of public interest, the feasibility of social value realization in the process of the projects is gaining its significance on top of the impact the project results would have on society. Moreover, as a member of the social community, a public institution should be renewed as a trustworthy organization, making unwavering efforts to fulfill its social responsibility.

**What are the approaches of MIRECO?**

For the sake of a sustainable foundation of win-win cooperation, MIRECO has established a system to encourage shared growth and perform 9 strategic tasks. Also, MIRECO strives to provide our partners with practical assistance, going beyond simple support, to make sure our suppliers' powerful capacity building based on vigorous communication which can be found in the workshops on shared growth and visits to enterprises financed by Alternative Industry Loan Assistance. In addition, MIRECO devotes all our efforts to create quality jobs by setting our strategic directions for a job-creating system, public and private sector jobs, and expanding the job infrastructure. As a part of its efforts to fulfill social responsibilities, the headquarter and branch offices are carrying out various social contributions tailored to beneficiaries including material support, talent donation, and scholarships. As such, MIRECO will not spare any efforts to grow together with various stakeholders.



**2018 Highlight**

**Shared Growth Performance Evaluation**

Evaluation of the shared growth committee on the support of public institutions for shared growth

**Satisfactory**

**Job Creation in Private Sector**

Achievement in private job creation through business investment and support for business partners

**699 persons**

**Budget for Social Contribution**

Budget assigned for social contribution to assist self-reliance of local Community

**KRW 396 million**

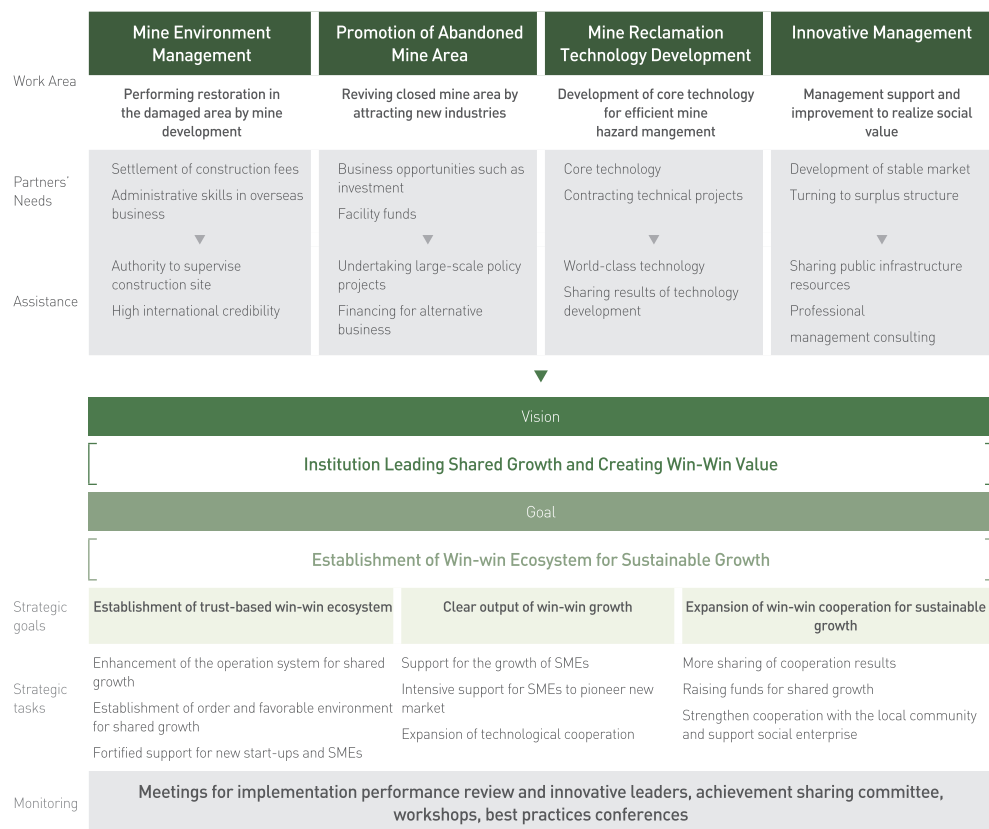
### Shared Growth

MIRECO, in partnership with SMEs in the coal and briquette industry located in the abandoned mine areas, is creating a sustainable win-win foundation based on communication and trust.



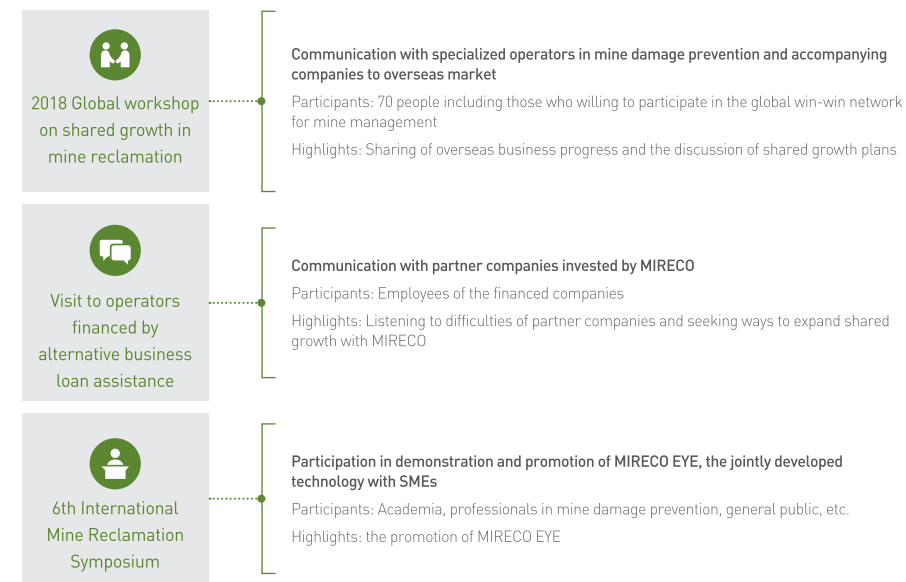
### Shared Growth System

Under the vision of 'Institution Leading Shared Growth and Creating Win-Win Values,' MIRECO has established and faithfully implemented 3 strategic goals and 9 strategic tasks. In addition, the MIRECO Win-Win Cooperation Committee was formed in December 2018 where all executives were appointed as win-win cooperation executives including the CEO for this purpose.



### Creating Favorable Culture for Shared Growth

**Favorable Culture for Communication and Fair Trade** MIRECO is listening to voices from partner companies on their situation and current issues to pursue substantial shared growth. The 2018 Global workshop on shared growth was the venue for specialized operators and enterprises exploring the overseas markets to communicate and learn from each other. Also, MIRECO is well-informed of difficulties our partner companies suffer from by visiting those who got a loan for alternative business. Moreover, MIRECO has made endless efforts to gain a foothold for SMEs to make market expansion. For this purpose, MIRECO promoted and demonstrated MIRECO EYE in the International Mine Reclamation Symposium.



**Win-win cooperation among SMEs and major companies in 2019**  
Presidential Merit Award

**Globalization of technology commercialization**  
Awarded by the Minister of Industry and Technology

**Shared Growth Performance Evaluation in 2018**  
'Satisfactory' (1 grade up compared to the previous year)

In addition, MIRECO strengthened its win-win growth network at home and abroad by signing business agreements of the Preferential Purchasing Agreement on Products of SMEs in Gangwon-do Province (Mar 2018), and Peru Mining and Environment Business Agreement (Nov 2018).

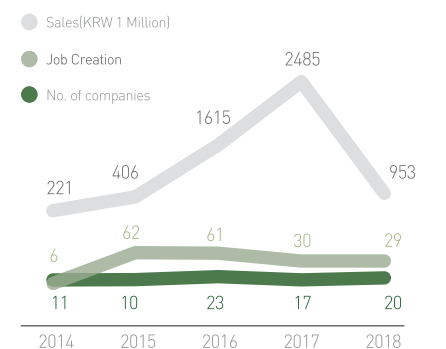
**Establishment of Fair Trade Order** MIRECO is working hard to establish a fair trade order to minimize the damages on secondary suppliers and prevent payment delays of original contractors with close examination on illegal subcontracting. In particular, subcontractors are carefully safeguarded at all stages from bidding to contracting as MIRECO has set clear standards for subcontracting management and performance certificate issuance. MIRECO expanded payment monitoring actions to sub-secondary suppliers and inspection cycle from once per project to once a month to prevent overdue wages. As a result, MIRECO has made visible achievements by seeing "Zero" illegal subcontracts as of 2018. In the future, MIRECO will more closely examine the subcontract payments with electronic payment management.

### Competitiveness Support for Partner Companies

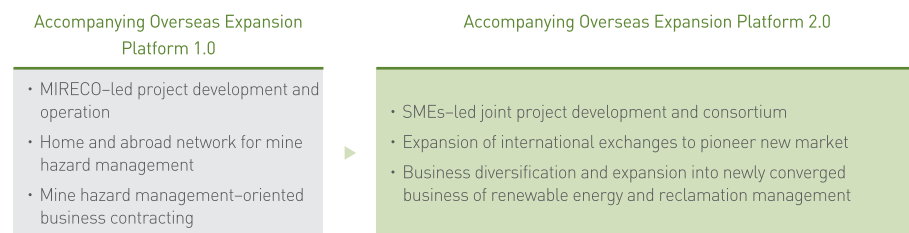
**Global Competitiveness Support** MIRECO has made efforts to expand the mine management market by localizing Korea's mine management technology and system. In order to reinforce cooperation with private companies, the shared growth council was established through the active

**Unfair trade for 4 consecutive years**  
ZERO

### Overseas expansion of partner companies of MIRECO



supports from MIRECO on their overseas expansion. In 2018, MIRECO achieved sales at KRW 953 million and 29 new jobs by facilitating 20 companies' advancement into overseas markets. For the sake of global competitiveness of SMEs, MIRECO has established the "Accompanying Expansion Platform 2.0", a system transformed from the existing MIRECO-led type to the private-led type platform, on which MIRECO has achieved 18% of increase in the number of companies that have made accompanying expansion and 83% of increase in new business contracts compared to that of last year. Recognizing its achievements in making accompanying overseas expansion with private companies, the Minister of Trade, Industry and Energy gave this platform an award in the Technology Commercialization Global Business sector in December 2018.



MIRECO also helps SMEs with the provision of technology, administrative support, information, and network in overseas markets. In 2018, MIRECO provided consulting on gold mining development to SMEs which had difficulties obtaining licenses in Mongolia, while supporting SMEs struggling with getting approvals in environmental impact assessments in Peru. As such, MIRECO has been working to strengthen the global competitiveness of SMEs.

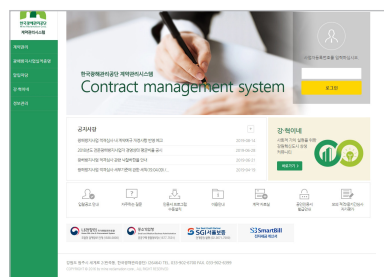
**Capacity Building Support for SMEs** MIRECO provides SMEs with customized training programs to enhance their job competency. With an intention to make the program effective and practical that can be directly applied in the field, in-depth surveys and interviews were conducted, on which MIRECO is developing training programs from the perspective of working-level employees in SMEs. As a result, participants scored 88.8 points for the overall satisfaction level of the programs in 2018. MIRECO will continue to design and provide curriculums reflecting the actual demand based on thorough surveys.

**Community Support**

**Support Sales Opportunists for SMEs** SMEs in rural areas are facing difficulties due to the lack of promotional channels and opportunities compared to those in metropolitan areas where infrastructure and support services are diverse. On the other hand, MIRECO and other public institutions moved into innovative cities are also struggling to find the right companies at the right time due to scarce information. In order to resolve the difficulties of local SMEs and public institutions, MIRECO established an online interactive channel, 'Ganghyukine' in October 2018 for the first time of its kind. This online channel serves as a venue where companies find opportunities to promote themselves while public institutions find information on local companies, leading to the creation of win-win value. Besides, MIRECO makes efforts to support social economic companies at the corporation level by selecting priority items to induce the purchase of those products made by social economic enterprises.



Main Page of 'Ganghyukine'



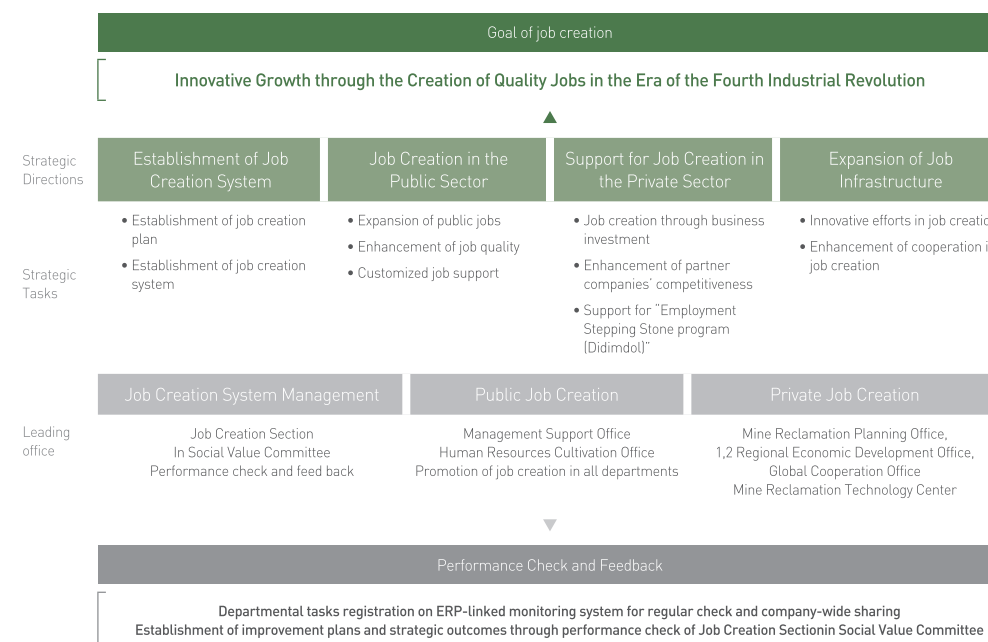
**Job Creation**

The creation of quality jobs is a social issue that governments, institutions, and companies have to address together. Against this backdrop, MIRECO has established a strategy system for job creation and has actively worked on both public and private sectors to create sustainable and better jobs.

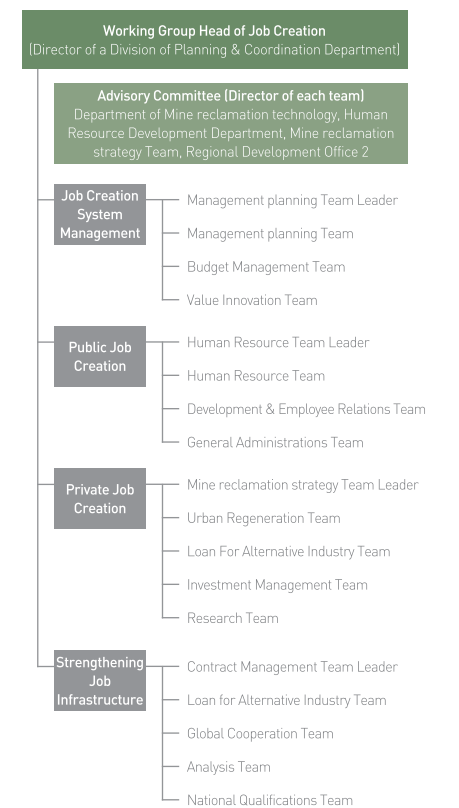


**Job Creation System**

MIRECO has reorganized the job creation system with a focus on generating clear output that local residents and the general public can actually have benefitted. To do so, MIRECO has promoted 10 tasks in 4 areas, including the reinforcement of the job creation system, public jobs, private jobs, and the expansion of the job infrastructure. Moreover, MIRECO is concentrating on creating high-quality jobs by strengthening performance management. To this end, departmental tasks are registered on an ERP-linked monitoring system for a regular check, which will extend to proactive and systematic job creation.



**Organization Chart of Job Creation Promotion**



\* Member can be changed according to job creation implementation

### Efforts to Create New Jobs

**New Jobs in MIRECO** MIRECO is making various efforts to diversify work patterns and introduce new systems to create new jobs in the corporation. First, MIRECO accurately predicted the vacancy rate of 2018 to hire new employees, achieving the highest ratio of employment to the capacity (97.29% of the capacity) since 2015. In addition, 6 new regular employees were hired thanks to the flexible manpower management through the peak wage system, and 11 replacement jobs were hired as well with the introduction of parental leave and interim part-time schemes. Meanwhile, in order to systematically realize the responsible employment through the transition of irregular and indirect employment to regular workers, MIRECO established a roadmap for the transition to regular workers and formed an organization to push forward it. To this end, in July 2018, MIRECO has worked hard for rational employment management by introducing the "Guidelines for Service Contracts Converting to Regular Workers" and the "Preliminary Examination of Irregular Employment Plans". Even after completing the transition of irregular and indirect employment to regular workers, MIRECO will establish a culture of mutual respect and win-win cooperation between existing regular workers and converted workers and will continue to pursue the equal pay for equal labor system.

**Project-based Private Job Creation** MIRECO is promoting various job creation projects with the goal of creating a total of 4,218 private jobs by 2022. First of all, MIRECO supports businesses in the industry and encourages the creation of related jobs, in conducting the mine reclamation and technology development projects, while contributing to the creation of new jobs through laying the foundation for self-reliance in mining areas such as with Alternative Industry Loan Assistance. In addition, MIRECO strives to improve the work environment in the abandoned mine areas by establishing a local job matching platform based on MIRECO's own infrastructure and information and providing career experience education for youth in the region.

In 2018, MIRECO launched the ECO JOB CITY Taebaek, a large-scale Urban Regeneration New Deal project to create 2,744 new jobs in the closed mine area.

Employment Area	Business	No. of Employees	Employment Area	Business	No. of Employees
Renewal project	Urban renewal on-site support center	5	Employment derived from the construction phase	Forest renewable energy park	51
	Employment derived from the construction phase	Construction		2,169	Horizontal tunnel experience facility
Civil engineering		106		Mining park	1
Business support service		132		Mine art incubating center	4
Employment derived from the construction phase	Renovation of old apartments into smart farm	27		Coal mine museum, exhibition hall	5
	Smart glass greenhouse	1		Industrial energy efficiencies	4
	Smart agricultural education center	7		Marsh snails co-working center	14
	Smart Farm Innovation Valley	151		Yeongwolae market	12
	Forest resource utilization	5		Yeongwol world community center	9
	Education center	16		Cultural platform of Yeongwolae	17
	Unused forest resource collection center				
	<b>Total</b>		<b>2,744</b>		

### Roadmap for the Transition to Regular Jobs



Title	Annual Goal for Private Job Creation			
	Achievements of 2018	2019	2022	Total
Indirect Mine reclamation project	586	734	780	3,614
Technology development project	14	14	15	57
Direct Project for inclusive growth in mining areas	99	104	120	547
<b>Total</b>	<b>699</b>	<b>852</b>	<b>915</b>	<b>4,218</b>

A total of 699 new jobs were created in 2018, making 105% achievements to its annual goal.



### Corporate Social Contributions

MIRECO is a public organization that helps the independence and growth of local communities. Going beyond mere charitable donations, MIRECO actively implements strategic social contribution activities to create social values for the local communities by harnessing its capabilities and business characteristics.

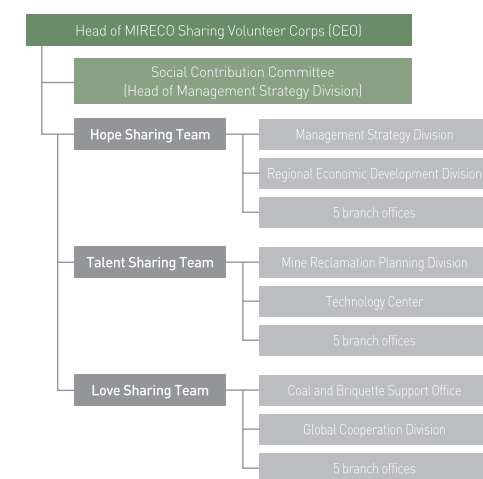
### Social Contribution System

MIRECO is carrying out various social contribution activities with sincere concerns about social contribution. With a view to promoting effective and strategic social contribution activities, MIRECO has selected three themes, Hope, Talent, and Love Sharing which serve as a foundation for the headquarters and local branches to actively carry out sharing activities. In addition, MIRECO constantly communicates with residents to identify and improve community issues for the development of customized social contribution activities to their specific needs.



**Organization to Boost Social Contribution** MIRECO also runs "MIRECO Sharing Volunteer Corps" launched in 2011, which consists of Love Sharing Team, Talent Sharing Team and Hope Sharing Team. The head of the Management Strategy Division was appointed as a chairman of the Social Contribution Committee in 2019 to boost social contribution activities.

### Organization chart of Social Contribution activity promotion



**01 Hope Sharing by Supporting Community**

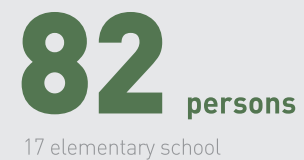
Hope Sharing is a social contribution activity that enhances the competitiveness of local youth and talented people while helping local communities to stand on their own with scholarship programs, employment programs, and cultural promotion projects.

**MIRECO Scholarship Program (Flagship Program of Hope Sharing)** MIRECO Scholarship has been offered to excellent high school students in the region since 2015 when MIRECO's head office was relocated to Wonju. In 2018, each scholarship student from 14 schools was selected and provided with KRW 1 million per person. Recently, MIRECO has expanded the beneficiaries from high school students to university students to nurture talents in the community.

**MIRECO Hope Didimdol Stepping Stone Program** MIRECO Hope Didimdol Stepping Stone is a program that helps job seekers in closed mine areas and Wonju where MIRECO is located. Through its Hope Didimdol program, MIRECO provides colorful supports to the high school students in the local community such as a vocational program, job camp, and financial supports for job fair participation with the purpose of helping job seekers to stand on their own. In addition, MIRECO runs vocational capacity building programs for people with disabilities who are relatively highly dependent on assistance in order to make sure no one is left behind in economic independence.



Mireco Science Camp Participants



**02 Talent Sharing linked with MIRECO's Expertise**

Talent Sharing is a social contribution activity that MIRECO contributes to helping the neighbors' needs or the clean-up of the local environment by utilizing the expertise of our employees.

**MIRECO Science Camp (Flagship Program for Talent Sharing)** MIRECO Science Camp is a science education support project that provides scientific exploration activities, hands-on trainings, and mentoring programs for 4-5 grade elementary school students in 7 regional economy development districts (Gangwon, Taebaek, Samcheok, Yeongwol, Jeongseon, Gyeongbuk, Mungyeong, Boryeong, and Hwasun) designated by the Special Act on Development of Closed Mine areas. MIRECO has developed this project based on the fact that the biggest interests of residents in closed mine areas are their children's education. In 2018, MIRECO science camp was held with 82 students from 17 elementary schools for them to have visions and dreams through science.

**MIRECO Green Mine Tour** MIRECO Green Mine Tour is the environmental education support project that invites children to mines in order to deepen their understandings of mines and provide a wide range of educational opportunities. This project was developed to remind elementary school students in the region of the gravity of environmental pollution and the importance of nature as they will become the leaders of our future generation. A total of 6 times of MIRECO Green Mine Tour were conducted in 2018.

**03 Love Sharing with Community**

Love Sharing is a social contribution activity that supports vulnerable people in the community and shares warm hearts with neighbors through continuous exchanges. With various volunteer activities, MIRECO communicates and shares difficulties with neighbors.

**MIRECO Briquette Sharing Program (Flagship program of Love Sharing)** MIRECO Briquette Sharing Program is the representative love sharing program, which is being carried out every year in connection with the coal and briquette industry support projects in our main business areas. Since the inception of MIRECO, the program has been carried out, delivering 82,594 briquettes to 381 households in 2018.

**Warm-hearted MIRECO** Warm-hearted MIRECO Project sponsors daily goods in winter season such as heating supplies to the households in the list submitted by 5 local governments including Wonju, Samcheok, Taebaek, Yeongwol-gun, and Jeongseon-gun, the educational support offices, and social welfare institutions. MIRECO provides heating supplies to more than 50 households every year through the Warm-hearted MIRECO Program. In 2018, 55 households were selected through close collaboration with related institutions and provided with heating devices suitable for their living environment.

Besides, MIRECO is supporting the growth of abandoned mine areas and loving community with various social contributions and sharing activities such as meal services in local communities, sponsoring welfare centers, and purchasing special products for sisterhood villages.



MIRECO Briquette Sharing Program



# MIRECO Sustainability

- 60 Governance Structure
- 62 Ethics Management
- 64 Human Rights Management
- 66 Environmental Management
- 66 Corporate Culture

# Governance Structure

## Composition of Board of Directors

MIRECO's BOD is composed of 4 executive directors (ED), including CEO, 1 ex officio non-executive director, 5 appointed non-executive directors (NED), and 1 non-executive auditor (NEA). According to the Act on the Operation of Public Institutions, CEO of MIRECO takes charge of the Chairman of BOD concurrently, and CEO is appointed by the Minister of Trade, Industry and Energy through the recommendation of the Executive Recommendation Committee. Executive directors are appointed by the chairman. Non-executive directors and non-executive auditors are appointed by the Minister of Trade, Industry and Energy and the Minister of Strategy and Finance respectively.

Board of Directors				
Classification	Name	Gender	Latest Major Position	Tenure
CEO	Lee Cheong Ryong	M	Vice President of Deloitte Consulting CEO of Gangwondo Development Corporation	2018.5.11 ~ 2021.5.10
ED	Kwon Soon Rock	M	Director of the Personal Information Protection Committee secretariat of the Ministry of Government Administration and Home Affairs Director of Administrative Assistance office at the Local Administrative Training Institute of the Ministry of Government Administration and Home Affairs	2017.3.29 ~ 2020.3.28
	Baik Seung Gwon	M	Head of MIRECO Youngnam Branch Head of MIRECO Global Cooperation Office	2017.3.13 ~ 2020.3.12
	Park Chul Rang	M	Head of MIRECO Gangwon Branch Head of MIRECO Chungcheong Branch	2019.5.2 ~ 2021.5.1
NED	Kim Jae Eun	M	Director of Coal and Mineral Industries, Ministry of Trade, Industry and Energy (present)	2018.11.30 ~ Ex Officio
Appointed NED	Hwang Young Sik	M	Invited professor of Human Resources Development Institute at Dankook University (present) Editorial Advisor of the Hankook Ilbo	2019.1.17 ~ 2021.1.16
	Son Yil Youb	M	Director of international cooperation office at the Gangwon Forum (present) CEO of Gangwon Special Agricultural Products Distribution (present)	2018.3.16 ~ 2020.3.15
	Lee Yeoung Hyeong	M	Director of the Institute for International Peace, an international headquarters of the Bright Society Club (incumbent) Research fellow at Kyungnam University's Institute for Far Eastern Studies.	2018.3.16 ~ 2020.3.15
	Park Seoung Sook	F	Research professor at Hanyang University's associate research institute for resources development (present) Member of IBK Corporate Bank Advisory Committee on IBK Technology Evaluation	2019.1.17 ~ 2021.1.16
	Lee Dong Ki	M	Member of Presidential Council for National Equilibrium (present) Chairman of National Reconciliation and Cooperation Council Member of National Peace and Unification Advisory Committee	2019.5.3 ~ 2021.5.2
Appointed NED	Choi Kyeng Soon	F	Women's chairman of National Peace and Unification Advisory Committee in Gangwon Province (present) Member of Inter-Korean Exchange and Cooperation Committee in Gangwon Province.	2019.7.24 ~ 2021.7.23

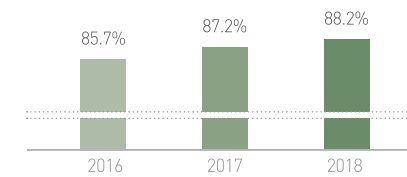
## Enhancement of The Effectiveness in BOD Operation

As the highest decision-making body, MIRECO's board of directors reviews and decides the significant management issues in operating the organization. To enhance effectiveness, MIRECO has established pre and post examination system on the BOD operation and activated the participation of non-executive directors in management to reinforce the BOD's supporting and checking functions.

### Preliminary and Post Examination System

MIRECO reinforces the effectiveness in BOD's operation by procedural checking on whether the BOD's recommendations have been implemented before reporting to the BOD. MIRECO has expanded the opportunities for non-executive directors to participate in management through the enhanced preliminary deliberations. Accordingly, MIRECO achieved 88.2% of implementation records in 2018, producing meaningful results every year.

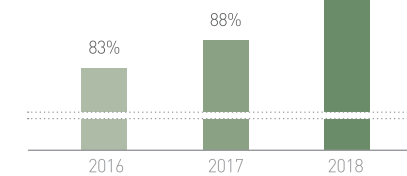
Completion Rate of Proposals



### Effective Management System

MIRECO has established and operated various direct and indirect channels for the successful operation of MIRECO with vitalizing the BOD. Indirect channels include bulletin boards on the web page, company magazines, newsletters, white papers, and statistical annual reports while direct channels include monthly business reports and field inspections to major business sites, etc. The successful operation system increased the proportion of non-executive directors' speech to 73.5%, and the attendance rate of the BOD to 96% in 2018, 8% higher than that of last year.

Directors' Attendance Rate



## Independence and Representation

The BOD of MIRECO is the premier decision-making body that reviews and resolves gravity matters in the operation of the organization. Thus, Independence and representativeness of the BOD are essential to be renewed as a trustworthy governance structure. To this end, MIRECO forms the BOD considering expertise, diversity, and gender equality.

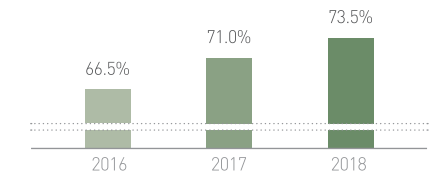
### Securing Expertise by Sector

MIRECO ensures the independent determination of BOD on the method of recruiting and screening candidates and appoints members with expertise in each field such as safety, management, international cooperation, and environment for the representativeness. For gender equality, MIRECO appointed a female member for the Executive Recommendation Committee and enhanced transparency by utilizing the human resources listed in the National Talent Database of HR Innovation Office.

### Expanding Participation of Non-executive Directors in Management

The lively participation of non-executive directors in management and wise suggestions from their expertise spurs MIRECO on to the achievement of its management goals. In November 2018, MIRECO conducted on-site inspections on major business sites and improved business performances by positively reflecting management suggestions based on expertise in each field. The BOD of MIRECO will present the direction where MIRECO should take for the purpose of realizing sustainable management.

The Proportion of Non-executive Directors' Speech





# Ethics Management

## Establishment of Ethics Management System

Public institutions responsible for public obligations require endless efforts to ensure the integrity and ethics management. MIRECO has built an ethics management system and formed an organization to carry out various institutional efforts that arouse integrity in the cause of becoming a trustworthy institution.

### Ethics Management System

For the transparent operation of the institution and to spread the culture of integrity, MIRECO needs the firm goals and strategies for ethics management. MIRECO has established an ethics management system with the goal of "Take off to the Excellent Institution with Integrity and Ethical Culture." As a result, MIRECO has made meaningful records, achieving the second grade of 2018 Integrity and Anti-Corruption Appraisal.

#### Ethics Management System

Ethics Management Goal of 2018		
Take off to the Excellent Institution with Integrity and Ethical Culture		
Strategic Direction		
Enhancement of ethics management system for the actual implementation	Elimination of the root cause of corruption	Solidification of the culture of integrity

### Ethics Management Promotion Organization

Grounded the significance of ethics management, MIRECO formed ethics management promotion organizations such as Ethics Management Committee and assigned departments in charge of ethics management so that they can devote themselves to deciding and pushing ahead principle matters regarding the issue. As for the Internal organizations, Ethics Management Committee, Audit Review Committee, Integrity Practice Leader, and Corruption Impact Assessment Committee conducted two integrity campaigns and deliberations and revised company regulations based on the pre-examination over the possible cause of corruption. Meanwhile, external organization, Honorary Auditors, Integrity Clusters, and Anti-Corruption Volunteer Councils in operation are laying the foundation for the ethics management of MIRECO through regular meetings, Integrity Hanmadang Festival, and system improvement recommendations.

## Operation of Integrity Mileage System

MIRECO is making various institutional efforts to share the values of the organization with employees regarding the culture of integrity and ethics management. To this end, the integrity mileages are taken into departmental assessment, thereby inspiring motivation and voluntary participation in creating a workplace culture with integrity. As part of our efforts to solidify the culture of integrity, the weight of integrity mileage increased from 3 in 2017 to 4 in 2018. In addition, 6 outstanding departments and case studies were rewarded, while No.1 integrity leader awarded by the CEO, to stabilize the integrity mileage system and improved the integrity of employees.

## Ethics Management Practice

Ethics management can be advanced only when the institutional basis is founded and ethics management is applied within the actual work process. Accordingly, MIRECO plans and conducts various programs such as round-table conferences and integrity consulting in order to create a fair MIRECO without corruption.

## Eradication of Corruption in Employment

MIRECO endeavors to ensure fair employment of talented people and to prevent fraud and abuse in the process of recruitment. In May 2018, marking the 12th anniversary of its foundation, MIRECO pledged to fair and transparent recruitment and all employees have made the commitment to upright recruitment. In addition, MIRECO has completed 100% of the 21 tasks followed by special inspections on recruitment corruption such as setting up blind recruitment models, recruitment fraud online reporting centers, and manuals for fraudulent solicitation. The NCS-based transparent recruitment process enabled job-competency-centered recruitment by applying a customized evaluation and scoring system for each job. With such sustained efforts, surveys on recruitment fraud showed "Zero" in both administrative measures and recruitment fraud.

Recorded "Zero" in Recruitment Fraud

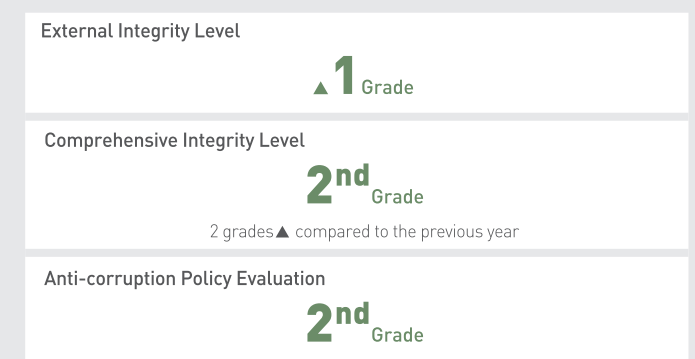
# ZERO

## External Stakeholder Meetings for Anti-Corruption

MIRECO communicate with various stakeholders to ensure a better life for the people. As the head of the organization has emphasized a strong commitment to anti-corruption and integrity, MIRECO strives to share the value of ethical culture with external stakeholders while contemplating ethics management at the internal level. The employees of MIRECO visit partner companies to spread the value of ethics management and to prevent any form of fraud and confirm their commitment by the written pledge of integrity. Furthermore, MIRECO clearly presents its determination to the culture of integrity by sending SMS regarding how to report on corruption and the letter of integrity, thereby raising awareness of people to corruption in the time of a holiday seasons.

## Integrity Consulting

Integrity Consulting is a program that the National Human Rights Commission selects organizations every year to figure out the status of integrity and supports improvement measures with the purpose of promoting ethical awareness of public institutions. MIRECO has set the Health Insurance Review & Assessment Service as a mentee and Korea Tourism Organization with high integrity as a mentor to conduct autonomous integrity consulting between public institutions while implementing consultations with the Anti-Corruption & Civil Rights Commission as well. In the consulting, related institutions explore the reasons for the low integrity, share the know-how to gain excellent integrity and have vibrant discussions to establish suitable plans to each institution's circumstances on top of the survey to assess anti-corruption capabilities. As a result, MIRECO attained the second grade in the comprehensive integrity level and in the anti-corruption policy evaluation with 1 grade going up in the external integrity level.



## Best Practice in Anti-Corruption Efforts and Failure Cases Competition

Recognizing the importance of sharing failure cases beyond best practices, MIRECO convened the competition of failure cases to analyze and improve the cases, eventually to improve work efficiency. First,

exemplary cases were selected based on the evaluation of internal judges and survey results of all employees. With the presentation review of the cases, 5 cases were finally awarded in that those were superior in 4 categories of evaluation; failure factor analysis, efforts, effectiveness, and correlation to corruption. More importantly, MIRECO developed the first mobile dehydrator by seeking the solution from the failure case that the natural drying method of the mine drainage sludge was not able to be applied in the field. In addition, MIRECO also held the Competition for Best Practice in Anti-Corruption Efforts to find out any possible corruption and unreasonable system and practices. The first round was a written review by internal employees. In the second round, judges assessed on four items of Institutionalization, Sustainability, Excellence and Effectiveness to select final 6 cases to be given the prizes and the integrity mileage scores reflected in the department evaluation. By doing so, MIRECO shared its determination to settle the integrity culture with all.

#### Awarded Cases in the Competition of Failure Cases

Classification	Department	Title
Grand Prize	Technology Research Center	Waste (sludge) recycling project in water purification facilities
Excellence Prize	Business Planning Department	Failure and overcoming in the application of natural drying method for mine drainage sludge in the field
Consolation Prize	Technology Research Center	Commercialization of basic technology for coal ash recycling (filling the shaft)
	Yeongnam Branch Office	Failure of quality control in soil improvement and restoration project
	Management Support Department	Sale of public stake in the alternative industrial corporation

#### Awarded Cases in the Competition for the Best Practice in Anti-corruption Efforts

Classification	Department	Title
Grand Prize	Contract management department	Standardization of bidding notices to eliminate a possible cause of corruption
Excellence Prize	Chungcheong branch office	Reinforcement of soil import management to prevent corruption in soil improvement and restoration project
Consolation Prize	Planning and coordination department	ISTM operation to secure transparency of IT services and prevent corruption
	Business planning department	Improvement of work procedures to improve transparency in the contribution system for mine hazard prevention
	Coal and briquette support department	Improvement of the briquette plant inventory operation system
	Management support department	Promotion of transparent and fair recruitment culture by eradicating corruption

### Integrity Hanmadang Festival

MIRECO is a member of Gangwon Integrity Cluster, the organization established in 2016 comprised of 16 institutions in Gangwon-do province promising to establish a clean public society. Co-hosted by the members of Gangwon Integrity Cluster, the 3rd Clean Gangwon Integrity Hanmadang Festival was held from September 17 to 21, 2018. The festival was held at the public institutions in Wonju Innovation City and Chuncheon with various programs to think about integrity in cultural experiences such as making soaps and sand art. Also, "Anti-Corruption and Integrity Day with Citizens of Chuncheon" was held, providing hands-on activities and special lectures. MIRECO will continue to collaborate with residents and other organizations to solidify our position as a reliable public institution.

### Integrity Training for Employees

MIRECO has been conducting tailored integrity training for employees in consideration of the diversity of internal customers. As the significance of fair recruitment, power abuse issues of public institutions, and the prevention of sexual harassment have come to the fore, each issue is broken down to be integrated with to the educational programs and particular groups of employees are selected for each program to learn the institution's values on integrity.

#### Integrity Training for Employees

Title	Target	Main content
Basic course of integrity instructor training	Person in charge of integrity management	Group training on integrity at a training institute
Anti-graft Law	All employees	Anti-graft Law
Leader education on integrity practice	Person in charge of integrity management in each department	Anti-graft law, Code of Conduct for employees
E-learning on integrity	All employees	E-learning on Anti-graft Law
Executive education on integrity	Executives	Anti-graft Law, Power abuse issues
Special lecture on integrity	All employees	Power abuse issues, whistleblowers protection system
New employees education on integrity	New employees	Anti-Corruption and Integrity of public officials
Integrity education for promotion	Promoted employees	Anti-graft Law, Public service ethics, Power abuse issues

# Human Rights Management

## Realization of Human Rights Management

Amidst growing concerns around the world in the impact of business on our society, the demand for human rights management is gaining its significance as well. Against this backdrop, MIRECO considers the influence that public institutions have on the region, nation and the global community, seeking the best way to respect the human rights of employees and build a strong trust in various stakeholders.

### Human Rights Management system

As the CEO of MIRECO expresses the strong commitment to human rights management, MIRECO has set the 3 strategies for human rights management linked with nation-wide participation and the medium to long-term management goals by which respect the human rights of internal employees and external stakeholders and fulfill its social responsibilities.

#### The 3 strategies for Human Rights Management

Strategy		
Establishment of foundation Establishment and enhancement of foundation for human rights management	Internalization Actual implementation of human rights management by business	Communication and sharing Social diffusion of MIRECO's human rights management
Strategic Tasks		
Establishment of basic plan and grounds (regulations) for promotion	Ensuring environmental safety rights with mine rehabilitation	Internal and external expression of firm determination
Organization of Management and Relief Committee	Realization of energy welfare for the vulnerable class	Expanding education on the sense of human rights
Introduction of tools for sustainable management	Strengthening co-prosperity and sharing management in abandoned mine areas	Local network composition and expansion
Management Philosophy		
<b>Transparent management / Value management / Open management / Safety management</b>		

### Management of Major Human Rights Issues

MIRECO has formed a Human Rights Management Committee to deliberate and promote overall human rights management. Furthermore, external experts participate in the committee with the purpose of transparent and efficient human rights management. In addition, MIRECO conducts regular assessments on institutional

operations and major projects targeting stakeholders throughout the value chain to identify potential human rights risks and to check the current status of human right management. The institutional human rights assessments aim to find out the level of human rights management in overall operation of MIRECO, while the assessments on major projects aim to check important human rights issues in process of the projects against the employee, consumer, residents, as well as industrial safety, supply chain management issues, etc. Based on the assessment results, MIRECO is striving to implement systematic human rights management by seeking ways to address the deficiencies in each business.

### Enactment of MIRECO's Human Rights Management Declaration

Celebrating the World Human Rights Day on December 10, 2018, MIRECO held the proclamation ceremony for MIRECO's Human Rights Management Declaration with which MIRECO has made a commitment to realizing human rights management at an international level and shared its firm determination to the 120 various stakeholders in the proclamation ceremony. Looking forward, MIRECO will continue to pay attention to human rights management.

#### Full script of MIRECO's Human Rights Management Declaration

Declaration of MIRECO's Human Rights Management
We respect and support the international standards and norms of human rights such as Universal Declaration of human rights (UN)
We do not discriminate based on race, religion, disability, gender, education background, age, physical ability, place of birth, and political opinion.
We guarantee the freedom of association and collective bargaining.
We do not permit any form of forced labor and child labor in employment
We create safe and sound working conditions and enhance industrial safety and health.
We seek mutual development with our business partners and support them in executing human rights management.
We comply with domestic and overseas environment-related laws and regulations and strive to protect the environment and prevent pollution.
We respect the human rights of residents in local communities.
We keep our business transparent and guarantee public access to our business information.
We strive to provide prompt and appropriate measures against infringement of human rights and prevent the infringement in advance



### Relief of Human Rights Violation

The creation of the environment where human rights are respected is the most important, but in the event of human rights violations, swift action and remedies are needed to minimize the damage. Accordingly, MIRECO introduced a human rights violation relief procedure by which victims report a case through either visit or online platform for written or interview investigations on the infringement case. Depending on the matter, the findings and follow-up measures are reviewed by the Human Rights Management Committee for the necessary measures to terminate the violation.

### Spread of Human Rights Management Culture

MIRECO strives to consolidate human rights in the institution and further spread the value of respect for human rights through its stakeholders by educating and holding a contest for them as part of realizing public values.

### Employee Education on Human Rights

MIRECO educates employees on the topics of human rights infringement prevention and implementation procedures so that they can internalize the norms and guidelines. In addition, human rights education is offered to internal and external stakeholders and customized education is also provided to certain groups in consideration of their various circumstances for intensive training.

### Promotion of human rights management

MIRECO designated 2018 as its first year of human rights management with various efforts to stabilize and promote human rights management. Moreover, MIRECO meets various stakeholders through various channels such as media reports, social media, and websites to inform the public about the importance of human rights as well as various news from MIRECO. For the purpose of becoming a trustworthy public institution at home and abroad, MIRECO is sharing the current status and direction of human rights management on the new page on our website where human rights management progress will be shared in days to come.

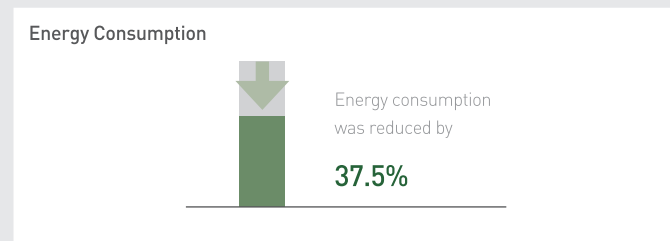
# Environmental Management

## Eco-friendly Management

The development of various technologies has made human life much easier, but the price of reckless development that does not respect nature is posing a threat to our lives. In search of the answer to these social problems, the whole world is pulling wisdom to conduct eco-friendly management with social responsibility. MIRECO also considers how to coexist with humans and nature and how to preserve the environment for the next generation.

### Reduction of Energy Consumption

MIRECO is challenging the reduction of energy consumption as part of its eco-friendly management. Based on the analysis results of regular energy usage in MIRECO, the fluorescent lamps in offices were replaced with energy-saving LEDs, leading to 210,240W savings annually. MIRECO will constantly seek ways to reduce energy consumption to keep the environment sustainable.



### Waste Reduction

The sustainable environment requires multiple efforts to prevent environmental pollution. MIRECO has established a waste management plan, trying to use recyclable products. For example, umbrella vinyl covers were replaced with rainwater removers, reducing plastic covers by approximately 50%. MIRECO also recommends tumblers and the campaign has achieved a 45% reduction in the use of paper cups compared to the previous year.

# Corporate Culture

## Better Welfare for Employees

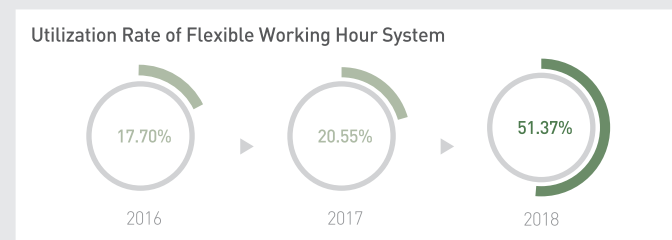
A healthy mind and body of employees are closely related to high work efficiency and satisfaction. MIRECO has been creating a corporate culture where employees strike the balance between work and family and while enjoying the various welfare programs.

### Supports for Work-Family Balance

MIRECO seeks to create a family-friendly working environment and positively support the balance between work and family. MIRECO runs flexible work time options and "family day" to improve the commuting environment of employees. In 2018, 125 employees, or 51.37% of all employees, took advantage of flexible work time options, making meaningful achievements. In addition, MIRECO operates long-term vacation and annual day-off saving systems, supporting tailored working options to each employee to make sure no one is left behind in welfare blind spots. With this effort, the number of male applicants for parental leave has been increased, and welfare satisfaction level rose to 8.66 points. Furthermore, MIRECO introduced the "Top 10 Work Innovation System" to strike a balance between work and life for which problems were detected, plans were established, and test operation was conducted in 2018 to promote and solidify the system. Recognized by the Ministry of Gender Equality and Family, MIRECO has been certified as a family-friendly company since 2016.

### System to Boost Flexible Work Time Options

Type	Contents	Outcome
Interim part-time scheme	<ul style="list-style-type: none"> <li>No application required</li> <li>Subsidy by working hours (up to KRW 400,000 per month)</li> </ul>	6 briefings at the corporation level
Family day	<ul style="list-style-type: none"> <li>Leave 2 hours early on the last Friday of every month</li> <li>Autonomous participation</li> <li>Additional work for 30 minutes from Monday to Thursday to maintain 40 hours of work per week</li> </ul>	71 people used in 2018
Flexible time options for commuting	<ul style="list-style-type: none"> <li>Adjust daily commuting time within 40 hours of work in 5 days a week</li> </ul>	54 people used in 2018



### Family-friendly working options tailored to each employee

Classification	Content
Male staff	<ul style="list-style-type: none"> <li>Parental leave expanded to 2 years per child as part of the support for gender equality</li> <li>Spousal maternity leave expanded from 5 days to 10 days</li> </ul>
Infertile staff	<ul style="list-style-type: none"> <li>Provided when applying for leave for infertility treatment</li> </ul>
Childcare staff	<ul style="list-style-type: none"> <li>Childcare leave provided for 2 days per year or 3 days if there are 3 or more children</li> <li>Free childcare support with daycare center at workplace</li> </ul>

### Promotion of 10 Work Innovations

Classification	Content
Work efficiency	<ul style="list-style-type: none"> <li>Introduction of the intensive working hour system (Test operation in the management department)</li> <li>Establishment of smart work center (1 in Headquarter, 1 in Branch)</li> <li>Departmental autonomous seating system (Test operation in the management department)</li> <li>Flexible time options for commuting, Early leave, Family day (A total of 51.37% of an employee is utilizing the options)</li> </ul>
Way of working	<ul style="list-style-type: none"> <li>Smart meetings (Test operation of sandglass meetings)</li> <li>Innovative ways of business reporting and work assignment (Through education of department director and revision of approval entrustment etc.)</li> </ul>
Culture at the workplace	<ul style="list-style-type: none"> <li>Manager taking the lead (in the use of flexible working hour options, and long-term vacation)</li> <li>Ease use of annual leave (reflecting the utilization rate in the department evaluation)</li> <li>Improvement of team dining culture (dining together at lunchtime etc.)</li> </ul>
Productivity	<ul style="list-style-type: none"> <li>Performance and result-oriented evaluation ('18 evaluation manual)</li> </ul>

### Support for Vulnerable Workers

MIRECO support vulnerable workers to work without any difficulties by revising institutions. For example, pregnant employees can take a vacation and parental leave depending on the stages of pregnancy and do not need to worry about the career break thanks to the improved working condition in MIRECO and female employees can also be benefited by women-only resting room and a parking area (in headquarters only). Furthermore, in November 2018, all employees were educated to create a working environment where people with disabilities can work safe, and parking spaces for the disabled were installed for their convenience.

### Supports depending on the stages of pregnancy and parenting

Stage	Support	Details
Pregnancy	Day-off	<ul style="list-style-type: none"> <li>Day-off for prenatal check-ups and in the event of a miscarriage</li> </ul>
	Interim part-time scheme	<ul style="list-style-type: none"> <li>Conversion to an interim part-time scheme in the period of Pregnancy</li> </ul>
Childbirth	Subsidy for childbirth	<ul style="list-style-type: none"> <li>Congratulatory payment given KRW 500,000 for the first child → KRW 1.5 million for the third child</li> </ul>
	Maternity leave	<ul style="list-style-type: none"> <li>Spousal maternity leave expansion from 5 days to 10 days</li> <li>90-day vacation before and after childbirth</li> </ul>
Parenting	Parental leave	<ul style="list-style-type: none"> <li>2 years of parental leave per a child available (Split use available for twice for each)</li> </ul>
	Childcare leave	<ul style="list-style-type: none"> <li>2 days available in a year, 3 days available for 3 children</li> </ul>
	Career breaks prevention and recruitment	<ul style="list-style-type: none"> <li>Flexible options for the part-time scheme</li> <li>Expanding opportunities by giving additional points for women who have a career break due to pregnancy and childcare in recruitment</li> </ul>

## Strengthening Safety of Employees

MIRECO conducts a risk assessment to eradicate risk factors and upgrade the safety management system, thereby reducing workers' injuries and illnesses and creating safer working environment with raised safety awareness of employees.

### Safe Workplace

MIRECO conducts risk assessments takes corrective measures for thorough management of hazardous and risk factors. For the purpose of proactive respond, safety management manuals in Test Analysis Lab were advanced and safety signals and monitoring systems enabled real-time accident recognition and visual recognition on hazards. In order to raise employees' safety awareness, safety education and training have expanded to 5 times, and repeated training strengthened employees' ability to respond.



### Strengthening Communication with Employees

MIRECO seeks to create a favorable working environment based on communication between labor and management. MIRECO makes multiple efforts to strengthen communication for better labor-management cooperation and to improve working conditions.

### Strengthening Labor-Management Communication

MIRECO has established an interactive communication channel in consideration of the previous achievements and government policies to share the vision and build consensus among labor and management. By dividing into upward, downward, horizontal, and collective channels, MIRECO actively communicates on the issues of each channel, consolidating trust between labor and management to resolve conflicts. As a result, we have made meaningful achievements in all six labor relations indices, such as labor-management vision, strategy and culture.

#### Labor Relations Indices

Classification	Labor Relations Indices						Average
	Vision and strategy	Culture	Communication	Organization and capability	process	Achievements	
2017	8.01	7.89	7.78	7.74	7.74	7.79	7.83
2018	8.54	8.61	8.51	8.51	8.60	8.64	8.57
Variation	+0.53	+0.72	+0.73	+0.77	+0.86	+0.85	+0.74

### Improvement of Labor-Management Working Conditions

MIRECO strives to improve working conditions for both labor and management and to create an environment where employees can be satisfied. With collective agreements and labor-management councils, MIRECO works on striking balances between work and family, eliminating discrimination against the underprivileged, safe working conditions, improving the quality of life as well as bridging the wage gap against vulnerable workers. In addition, MIRECO introduced new protection programs for the socially disadvantaged including women, persons with disabilities, infinite contract workers, etc., and promotes the transition into regular workers in the cause of realizing social value. MIRECO will spare no efforts to improve the working environment for both labor and management and protect the disadvantaged workers.

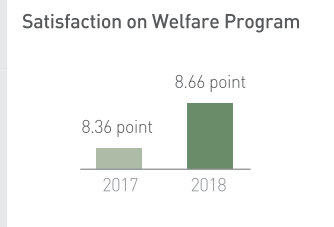
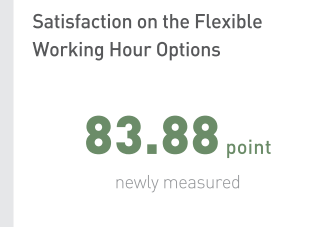
#### Protection programs for the socially disadvantaged workers including women, the disabled, infinite- contract workers, etc.

Classification	Title	Achievements	Note
collective agreements	Sexual harassment survey in the workplace	A confidential survey conducted at least once a year	Newly introduced
labor-management councils	Complaint Handling Committee	Under the 「Act on Labor Participation and Cooperation Promotion」, one from both labor and management was appointed as a member of Complaint Handling Committee	1 case in 2018 0 case in 2017
Company regulations	Complaint Review Committee	Handling sexual harassment or violence and office bullying in the workplace	Newly introduced
	Complaint Handling Member	Sexual harassment or violence and office bullying in the workplace (Selected among HR and labor-management council member)	Newly introduced

#### Fixed Term Contractor



#### Subcontract Worker



# Appendix

# Customer Satisfaction

## Compliance with Customer Service Charter

MIRECO has established its customer service charter and set the core service standards that contain the contents and methods of the service, and implementation standards with details in a bid to offer its customers the best service possible and to gain public credibility.

### Customer Service Charter

MIRECO has enacted the customer service charter and met the core service standards to share MIRECO's mission with customers to promote economic regeneration and national happiness through eco-friendly mine reclamation and sustainable regional development. Since MIRECO has specified the standards and content of the customer service and shared the methods, customer-oriented services have become available. In 2018, in line with the changes in government policies, customer service charter and core service standards have been revised with the promise to expand public participation and to further emphasize social value. MIRECO will constantly strive for better services and better customer satisfaction.

#### MIRECO's Customer Service Charter

**The Best Service**

Through our customer service charter, we will ensure the following  
All executives and employees of MIRECO are committed to providing the best service to our customers with regarding the contribution to economic regeneration and people's happiness through eco-friendly mine reclamation and sustainable regional development as the greatest mission and rewards.  
Through our customer service charter, we will ensure the following.

---

01 We have clear standards and guidelines for the prevention of mine damage and economic revitalization of the mining community to realize customer satisfaction

---

02 We carry out practical, efficient, rational, transparent and open management with actively reflecting customer needs in our operation.

---

03 We do our best for all services related to our customers and ensure the fast, accurate, and kind performance as possible.

---

04 We facilitate communication with customers by disclosing and sharing data and expanding customer participation.

---

05 We provide high-quality public services while realizing social values based on innovation.

---

06 We always listen to our customers to reflect their opinions on management as much as possible.

## Inspection of Compliance with Customer Service Charter

MIRECO conducts the inspection of compliance with the customer service charter to check whether services were properly provided with the core service implementation standards and to identify deficiencies to be fixed, anticipating the better quality of customer service. And the results are shared on the website. The 2018 customer service charter inspection results are as follows.

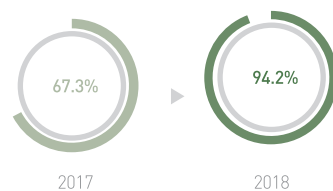
#### The inspection results on the compliance with core service standards in 2018

Description	Major Standard Contents
Soil and Forest Improvements	Get the soil pollution level to drop below the "concern level." Monitor the status of promised fallow land Implement more than 10 cm of soil covering in abandoned mines
Water Quality & Ground Improvements	Implement mine subsidence prevention work
Maintenance of Mine Reclamation Projects	Prevent the occurrence of secondary pollution Improve the quality of water inside abandoned mines beyond the requirement by the Ministry of Environment
Financial Support Service	Execute monthly coal price stabilization payment following on-site inspections Select loan beneficiaries transparently and provide loans on time
Quality Inspection for Coal and Briquettes	Carry out a quality inspection on more than 15% of the total coal transport quantity Implement quality inspection for each briquette factory at least 9 times a year
Registration Service for Operators of Mine Damage Prevention Projects	Issue registration certificate within 30 days of application
Debt Repayment Guarantee Service	Issue a guarantee letter within 3 days of the payment of debt repayment fees
Technical Qualification Testing Service	Issue certificates within 10 days of application

#### Achieved grade A in customer satisfaction level for 10 consecutive years

A

#### Opinion of the Customer



## Activities to Improve Customer Satisfaction

For better customer satisfaction, MIRECO listens to the voices of various stakeholders, including mine workers and qualification test takers. Encompassing from forming a consensus on the stronger protection of valuable personal information of our customers to visiting customers for safety training and briefings, MIRECO strives to think from the customer's standpoint.

### Expansion of Open and Shared Public Data

MIRECO opens various public data to be quickly and easily used by various stakeholders. Furthermore, MIRECO is making efforts to disclose more public data and ensure public access while improving its quality. The CSV file format has been added to enhance the interoperability and processibility of public data in that public data files were uploaded only in the format of Korean(.hwp) and Excel(.xls). In addition, to enhance availability, MIRECO has opened more diverse public data such as anthracite consumption, mine hazard prevention technology development patents and papers. As for usability, MIRECO improved the quality of disclosed public data by correction of link error and data structure change. Furthermore, MIRECO provides sample questions from previous tests for those who are preparing to obtain national technical qualifications and information about the location of mineral residue storage facilities to satisfy people's right to know and create a safe living environment. Based on these efforts, MIRECO has earned an 'Excellent' rating in the information disclosure claim processing category of the information disclosure status appraisal conducted by the Ministry of Public Administration and Security.

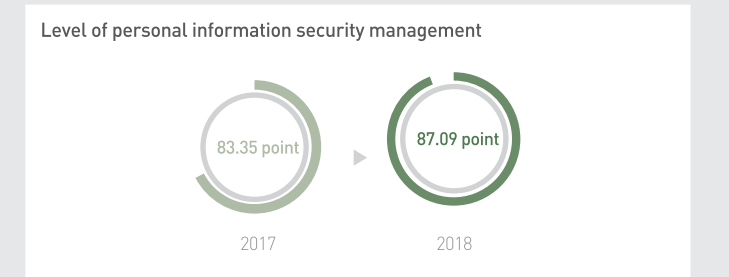
#### MIRECO's public data pen website

## Protection of Personal Information

MIRECO strives to protect the personal information of various stakeholders and customers by projecting and preventing advanced and sophisticated cyber threats.

### Information Security Management Activities

As cyber threats are becoming more advanced, MIRECO endeavors to protect the privacy of various stakeholders and customers by anticipating and preventing the risks. Information security and personal information protection jobs were converted to dedicated tasks, and in consequence of new network security equipment and the encryption of approximately 410,000 social security numbers in the personal information processing system, information security quality has been improved. Furthermore, MIRECO has removed more than 1,200 risk factors such as harmful IPs, URLs, and hacked emails, and successfully prevented 68 malicious code intrusion including zero-day attack. According to the investigation on the entrustment of personal information processing, improper use and the provision to the third parties, 5 checked results were improved as well. Along with that, personal information processing policy has been shared on the website as part of ceaseless efforts to comply with the Personal Information Protection Act. In addition, to raise awareness of personal information protection, leaflets have designed and distributed to all employees and stakeholders. Based on these efforts, MIRECO scored 87.09 points, which is 6.44 points higher than the average score in the level of personal information security management conducted by the Ministry of Public Administration and Security, and 67.32 points 6.44 points higher than the average score in the information security management appraisal conducted by the National Intelligence Service and achieved 'zero' personal information leakage and cyber-hacking incidents.



Information disclosure claim processing category of the information disclosure status appraisal conducted by the Ministry of Public Administration and Security.

'Excellent' rating

# Social Responsibility Management Performance

## Financial Performance

Consolidated statement of financial position	Unit(KRW)		
	2016	2017	2018
<b>Asset</b>			
1. Current assets	109,166,516,697	70,682,597,929	41,436,465,618
(1) Cash and/or cashable assets	49,175,169,461	34,004,934,687	5,733,097,138
(2) Liquid financial assets	58,951,191,554	31,720,265,024	34,259,833,943
(3) Trade receivables and other bonds	527,522,121	719,824,246	574,899,236
(4) Short-term taxable assets	81,683,240	3,757,187,722	77,187,740
(5) Liquid non-financial assets	430,950,321	480,386,250	791,447,561
2. Non-current assets	1,413,334,772,956	1,529,625,421,084	1,572,722,623,345
(1) Non-liquid financial assets	75,923,902,317	83,778,730,880	85,661,735,869
(2) Long-term account receivable and other bonds	2,097,352,000	1,762,136,000	1,879,226,000
(3) Tangible assets	65,423,842,557	85,159,372,416	99,591,483,679
(4) Investment property	6,938,436,963	6,678,056,399	6,283,885,514
(5) Intangible assets	7,248,326,589	6,635,191,812	5,083,506,652
(6) Investment in associates	1,246,808,898,159	1,336,830,564,527	1,365,837,142,624
(7) Non-current non-financial assets	8,894,014,371	8,781,369,050	8,385,643,007
<b>Total asset</b>	<b>1,522,501,289,653</b>	<b>1,600,308,019,013</b>	<b>1,614,159,088,963</b>
<b>Liabilities</b>			
1. Current liabilities	15,639,110,965	7,820,456,030	6,257,510,101
(1) Purchase debt and others	3,249,175,059	3,395,490,425	3,326,887,513
(2) Current short-term tax liabilities	8,238,292,868	7,341,625	159,107,713
(3) Current non-financial liabilities	2,083,243,578	2,239,719,910	931,979,015
(4) Current provision	2,068,399,460	2,177,904,070	1,839,535,860
2. Non-current liabilities	292,242,489,376	316,727,683,946	365,207,169,789
(1) Long-term trade payable and other liability	250,000,000	318,279,000	308,279,000
(2) Non-current financial liabilities	9,378	-	1,747,286
(3) Employee salary debt	1,142,409,012	1,140,654,962	996,194,968
(4) Current provisions	275,262,871,378	297,067,315,220	345,618,465,372
(5) Non-current provisions	15,587,199,608	18,201,434,764	18,282,483,163
<b>Total liabilities</b>	<b>307,881,600,341</b>	<b>324,548,139,976</b>	<b>371,464,679,890</b>

Consolidated statement of financial position	Unit(KRW)		
	2016	2017	2018
<b>Equity</b>			
1. Contributed capital	49,916,708,895	49,916,708,895	49,916,708,895
2. Accumulated profit	1,167,455,884,494	1,228,788,340,456	1,195,816,073,997
(1) Voluntary reserve	44,521,206,801	22,658,759,376	21,523,821,409
(2) Unappropriated earned surplus	1,122,934,677,693	1,206,129,581,080	1,174,292,252,588
3. Other assets	-2,752,904,077	-2,945,170,314	-3,038,373,819
(1) Accumulated other comprehensive income	-2,752,904,077	-2,945,170,314	-3,038,373,819
<b>Total equity</b>	<b>1,214,619,689,312</b>	<b>1,275,759,879,037</b>	<b>1,242,694,409,073</b>
<b>Total equity and liabilities</b>	<b>1,522,501,289,653</b>	<b>1,600,308,019,013</b>	<b>1,614,159,088,963</b>

## Environmental Performance

Consolidated statement of financial position	Unit			
	2016	2017	2018	
<b>Energy Consumption(General)</b>				
Fuel Consumption	6.40	5.93	5.25	
Electricity Consumption	80.04	76.84	87.06	
Steam Consumption	0.00	0.00	0.00	
Total	86.44	82.77	92.31	
<b>Energy Consumption(by Fuel)</b>				
Electricity	80.04	76.84	87.06	
Gasoline	0.77	0.93	0.45	
Kerosene	3.00	2.67	2.88	
LPG	0.02	0.04	0.05	
LNG	2.61	2.29	0.00	
Total	86.44	82.77	90.44	
<b>Water Consumption</b>				
Water	ton	9,623	11,093	11,074

	Unit	2016	2017	2018
<b>GHG Emissions</b>				
Direct emissions [Scope 1]		397	369	<b>331</b>
Indirect emissions [Scope 2]	tCO <sub>2</sub> eq	4,146	3,982	<b>4,228</b>
Total		4,543	4,351	<b>4,559</b>
<b>GHG Emissions (by Organization)</b>				
Headquarters		1,131	1,158	<b>1,192</b>
Gangwon Reginal Office		3,190	3,031	<b>3,216</b>
Chungcheong Regional Office		36	31	<b>23</b>
Yeongnam Regional Office		57	53	<b>53</b>
Gyeongin Regional Office	tCO <sub>2</sub> eq	46	20	<b>21</b>
Honam Regional Office		47	47	<b>45</b>
R&D Institute		37	12	<b>8</b>
Total		4,543	4,351	<b>4,559</b>
<b>Mine Reclamation Project amount Collection</b>				
Collected amount	KRW 1 million	5,768	5,323	<b>5,496</b>
Collection rate	%	65.1	60.1	<b>64.0</b>
<b>Water Pollution</b>				
Water pollution index	PI*	0.590	0.504	<b>0.309</b>
Water treatment volume**	%	41.0	49.6	<b>69.1</b>
<b>Soil Restoration</b>				
Global soil standards compliance rate	%	96.6	94.4	<b>97.6</b>
<b>Reforestation</b>				
Specialized forestation rate	%	26.6	27.8	<b>32.7</b>
Carbon absorption volume	ton	-	-	<b>2,144</b>

\*Pollution Index, contaminantcontent ratio compared to baseline

\*\*Total water treatment capacity compared to the total influx of contaminated mine drainage

## Social Performance

	Unit	2016	2017	2018
<b>Governance</b>				
No. of BOD meetings	ea	9	8	<b>7</b>
BOD attendance rate	%	83	88	<b>96</b>
Non-executive director attendance rate	%	79.63	85.42	<b>89.05</b>
No. of resolutions	ea	18	18	<b>16</b>
No. of reported cases	ea	7	13	<b>11</b>
Proportion of non-executive directors' comments	%	66.5	71	<b>73.5</b>
Completion rate of proposals	%	85.7	87.2	<b>88.2</b>
<b>Ethics Management</b>				
Manager corruptability diagnosis	Organizational environment	6.11	6.52	<b>6.79</b>
	Work environment	6.09	6.02	<b>6.68</b>
	Individual working conditions	9.52	9.70	<b>9.81</b>
Evaluation results of anti-corruption policies	Level	2	exemption	<b>2</b>
Evaluation results of public institution integrity	Level	2	4	<b>2</b>
Participants in sexual harassment prevention education	Person	238	247	<b>255</b>
<b>Employee Status</b>				
No. of employees present	No. of executives	3	3	<b>3</b>
	No. of employees	221.5	227.5	<b>230.5</b>
	Total	224.5	230.5	<b>233.5</b>
Gender	Male	176.0	180.5	<b>179.5</b>
	Female	57.5	57.0	<b>64.0</b>
Employment Type	Regular workers (incl. executives and extra T/O personnel)	224.5	230.5	<b>233.5</b>
	Indefinite-term contract workers	9	7	<b>10</b>
	Contract workers	1	4	<b>2</b>
	Intern	6	10	<b>8</b>
	Length of employment	Average continuous service year	10.7	11.1
Employee turnover	No. of employee turnovers	1	1	<b>3</b>
	Turnover rate	%	0.4	0.4

		Unit	2016	2017	2018
<b>Recruitment</b>					
Recruitment	Male		4.0	8.5	7.0
	Female		3.5	4.5	2.0
	Local personnel (Non-capital area)		3.5	11.0	4.0
	Local personnel (Relocated area)		0.5	4.5	3.0
	Youth		6.5	11.0	8.0
	High school graduates	Person	0.5	4.5	3.0
	Total		7.5	13.0	9.0
Irregular workers	Contract workers		1.0	0.0	1.0
	Intern		17.0	13.0	19.0
Local personnel	Gangwon		0.5	4.5	3.0
	Chungcheong		1.0	1.0	0.0
	Jeolla		0.0	0.0	0.0
	Gyeongsang		2.0	5.5	1.0
<b>Employees who left MIRECO</b>					
Gender	Male		10.0	4.0	6.0
	Female		0.5	0.0	3.0
Age	Below 30	Person	1.0	0.0	1.0
	30-50		4.5	2.0	4.0
	Above 50		6.0	2.0	3.0
<b>Employee education</b>					
Employee education	Education budget	KRW 1 million	429	429	310
	Education satisfaction	Point	87.69	87.69	89.08
	Education hours per person	Hour/Person	62.7	62.0	78.0
<b>Scheme for work-family balance</b>					
Childcare leave	Total		10	11	11
	Male		2	0	1
	Female		8	11	10
	Reinstated employees	person	4	3	4
Flexitime	Flexible time options for commuting		41	49	54
	Flexible time options for working-hour		-	-	71

		Unit	2016	2017	2018
<b>Shared Growth</b>					
Purchase from social enterprises, etc	SME products		83,057	81,898	61,976
	Products from women-owned companies		4,847	5,678	4,594
	Social enterprise products		967	432	1,063
	Products from self-reliant veteran villages	KRW 1 million	3	6	6
	Newly developed products		1,396	1,023	2,690
	Products made by severely disabled People		336	156	196
Substitute industry financing support	Annual turnover of beneficiary companies		109,981	158,775	276,544
	No. of new employees hired by a beneficiary companies	Person	45	23	99
<b>Customers</b>					
Customer satisfaction	Point(Grade)		A	A	A
No. of data breaches	Case		0	0	0
Satisfaction with qualification test service	Point		82.9	78.3	81.7
<b>CCI</b>					
CCI expenditure	KRW 1 million (goal/performance)		580/556	475/456	470/396
Briquette sharing	Piece		208,910	161,574	110,594



# GRI Standard Index

## Universal Standards

Topic	Disclosure	page
<b>GRI 102: General Disclosure</b>		
Organizational Profile	102-1	Name of the organization About this report, 4
	102-2	Activities, brands, products, and services 7, 14, 15
	102-3	Location of headquarters About this report
	102-4	Location of operations About this report, 5
	102-5	Ownership and legal form 4, 5
	102-6	Markets served About this report, 4
	102-7	Scale of the organization 4
	102-8	Information on employees and other workers 75, 76
	102-9	Supply chain 20, 21
	102-10	Significant changes to the organization and its supply chain About this report
	102-11	Precautionary principle or approach 20, 21
	102-12	External initiatives 81, 82
	102-13	Membership of associations 86
Strategy	102-14	Statement from senior decision-maker 2, 3
	102-15	Key impacts, risks, and opportunities 18, 19
Ethics and Integrity	102-16	Values, principles, standards, and norms of behavior 62-64
	102-17	Mechanisms for advice and concerns about ethics 63
Governance	102-18	Governance structure 60
	102-20	Executive-level responsibility for economic, environmental, and social topics 60, 61
	102-22	Composition of the highest governance body and its committees 60
	102-23	Chair of the highest governance body 60
	102-24	Nominating and selecting the highest governance body 60
102-31	Review of economic, environmental, and social topics 61	
Stakeholder Engagement	102-40	List of stakeholder groups 16, 17
	102-41	Collective bargaining agreements 68
	102-42	Identifying and selecting stakeholders 16, 17
	102-43	Approach to stakeholder engagement 17-19
102-44	Key topics and concerns raised 9	

Topic	Disclosure	page
<b>GRI 102: (General Disclosure)</b>		
Reporting Practice	102-45	Entities included in the consolidated financial statements About this report
	102-46	Defining report content and topic boundaries 8, 9
	102-47	List of material topics 8, 9
	102-48	Restatements of information About this report
	102-49	Changes in reporting About this report
	102-50	Reporting period About this report
	102-51	Date of the 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 78, 79
	102-56	External assurance 84, 85

## Topic-specific Standards

Topic	Disclosure	page
<b>GRI 200: Economic</b>		
Indirect Economic Impacts	203-1	Infrastructure investments and services supported 52,56,57
	203-2	Significant indirect economic impacts 37-39
Anti-corruption	205-1	Operations assessed for risks related to corruption 62-64
	205-2	Communication and training about anti-corruption policies and procedures 62-64

Topic-specific Standards

Topic	Disclosure	page
<b>GRI 300: Environmental</b>		
Energy	302-1 Materials used by weight or volume	73, 74
Biodiversity	304-2 Significant impacts of activities, products, and services on biodiversity	25
Emissions	305-1 Direct (Scope 1) GHG emissions	74
	305-2 Energy indirect (Scope 2) GHG emissions	74
Effluents and Waste	306-1 Discharging wastewater by water quality and discharge sites	20, 74
<b>GRI 400: Social</b>		
Employment	401-1 New employee hires and employee turnover	76
	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	66, 67
	401-3 Parental leave	67, 76
Occupational Health and Safety	403-3 Workers with high incidence or high risk of diseases related to their occupation	32, 33, 67
Training and Education	404-1 Average hours of training per year per employee	76
Diversity and Equal Opportunity	405-1 Diversity of governance bodies and employees	60, 61
Rights of Indigenous Peoples	411-1 Incidents of violations involving rights of indigenous peoples	24
Human Rights Assessment	412-2 Employee training on human rights policies or procedures	75
Local Communities	103-1 Explanation of the material topic and its boundary	55
	103-2 The management approach and its components	55
	103-3 Evaluation of the management approach	55
	413-1 Operations with local community engagement, impact assessments, and development programs	56, 57
Customer Health and Safety	416-1 Assessment of the health and safety impacts of product and service categories	70
Customer Privacy	418-1 Substantiated complaints concerning breaches of customer privacy and losses of customer data	71

# UNGC Advanced Level

Topic	Principle	page	
1 Strategy, Governance and Engagement	This report describes mainstreaming into corporate functions and business units	6,12,13	
	This report describes value chain implementation	20, 21	
3 Human Rights	This report describes robust commitments, strategies or policies in the area of human rights	64, 65	
	This report describes effective management systems to integrate the human rights principles	62-64	
	This report describes effective monitoring and evaluation mechanisms of human rights integration	62-64	
	This report describes robust commitments, strategies or policies in the area of labour	68	
	This report describes effective management systems to integrate the labour principles	68	
8	This report describes effective monitoring and evaluation mechanisms of labour principles integration	68	
	9 Environment	This report describes robust commitments, strategies or policies in the area of environmental stewardship	22
		This report describes effective management systems to integrate the environmental principles	23-29
11	This report describes effective monitoring and evaluation mechanisms for environmental stewardship	22, 31, 66	
12 Anti-Corruption	This report describes robust commitments, strategies or policies in the area of anti-corruption	62	
	This report describes effective management systems to integrate the anticorruption principle	62-64	
	This report describes effective monitoring and evaluation mechanisms for the integration of anti-corruption	62-64	
15 UN Goals and Issues	This report describes core business contributions to UN goals and issues	22, 34, 42, 49, 81, 82	
	This report describes strategic social investments and philanthropy	55-57	
17	This report describes advocacy and public policy engagement	34-41	
18	This report describes partnerships and collective action	86	
19 Governance	This report describes CEO commitment and leadership	2,3	
	This report describes Board adoption and oversight	60	
	This report describes stakeholder engagement	8, 9, 16-19	

# UNGP Reporting Framework

## UN Guiding Principles Reporting Framework Index

UN Guiding Principles Reporting Framework is an international guideline for the human rights report of enterprises. MIRECO's 2018-2019 Sustainability Report includes a variety of activities to protect and promote the human rights of stakeholders in accordance with the UN Guiding Principles Reporting Framework. MIRECO is dedicated to seeking out the areas where improvement is needed and incorporates them in operation to realize human rights management with the transparent disclosure of relevant information.

Criterion	Reporting Principle	Description	Page
Governance of Respect for Human Rights	A1 Policy Commitment	What does the company say publicly about its commitment to respect human rights?	65
	A2 Embedding Respect for Human Rights	How does the company demonstrate the importance it attaches to the implementation of its human rights commitment?	65
Defining the Focus of Reporting	B1 Statement of Salient Issues	State the salient human rights issues associated with the company's activities and business relationships during the reporting period.	64
	B2 Determination of Salient Issues	Describe how the salient human rights issues were determined, including any input from stakeholders.	64, 65
	B3 Choice of Focal Geographies	If reporting on the salient human rights issues focuses on particular geographies, explain how that choice was made.	64, 65
	B4 Additional Severe Impacts	Identify any severe impacts on human rights that occurred or were still being addressed during the reporting period, but which fall outside of the salient human rights issues, and explain how they have been addressed.	64, 65
Management of Salient Human Rights Issues	C1 Specific Policies	Does the company have any specific policies that address its salient human rights issues and, if so, what are they?	64, 65
	C2 Stakeholder Engagement	What is the company's approach to engagement with stakeholders in relation to each salient human rights issue?	64, 65
	C3 Assessing Impacts	How does the company identify any changes in the nature of each salient human rights issue over time?	64, 65
	C4 Integrating Findings and Taking Action	How does the company integrate its findings of each salient human rights issue into its decision-making processes and actions?	64, 65
	C5 Tracking Performance	How does the company know if its efforts to address each salient human rights issue are effective in practice?	63
	C6 Remediation	How does the company enable effective remedy if people are harmed by its actions or decisions in relation to a salient human rights issue?	63

# Award & Recognition

Description	Contributions	Host Organization	Award Date
Presidential Merit Award for Win-win cooperation	Voluntary win-win cooperation section	Ministry of SMEs and Startups	2019.11.06
Awarded by the Gangwon Provincial Governor	Excellent institution for active public purchase of SMEs products	Gangwon-do Province, Gangwon-do Provincial Economic Development Institute	2019.03.06
Awarded by the Minister of Trade, Industry and Energy	Acknowledged its distinguished performance in technology commercialization and global business sector	Ministry of Trade, Industry and Energy	2018.12.05
External Organizations Group Prize	Grand prize in Korea Business Communication Awards	Korea Business Communicators Association	2018.12.03
Awarded by the Minister of Public Administration and Security	Recognized its excellence in disaster situation management	Ministry of Public Administration and Security	2018.11.02
Excellent Prize by the Korea Forest Service	Contest for national forest rehabilitation technology hosted by the Korea Forest Service	Korea Forest Conservation Association	2018.09.12
The Minister of Trade, Industry and Energy Award at the NET Commercialization Promotion Fair	Excellence in NET commercialization	Korea Agency for Technology and Standards	2017.11.16
Grand Prize at Environmental Information Disclosure Awards	Excellence in the registration and disclosure of environmental information	The Ministry of Environment	2017.05.30
Grand Prize at Web Award Korea	Excellence in the web information system in the public sector	Korea Internet Professional Association	2016.12.15
The Prime Minister's Award	Contributions to the development of local industries	The Ministry of Trade, Industry and Energy	2015.09.09
The Minister of Trade, Industry and Energy Award	Contributions to the enhancement of national competitiveness through national standardization	Korea Agency for Technology and Standards	2014.10.14

# Association Memberships

Association Name	Purpose	Year of Entry
The Association of Soil Contamination Investigation Institutes	To exchange information about soil and establish measures to develop relevant tasks	2016
UN Global Compact Network Korea	Incorporating the 10 principles of human rights, labor, environment and anti-corruption into the management strategies to achieve sustainable development goals	2013
The Korea Mine Reclamation Association	To support collaboration for activating mine reclamation	2010
The Energy & Mineral Resources Development Association of Korea	To cooperate on mining reclamation business for sustainable resource development	2010
The Korea Public Institution Auditor Association	To exchange audit information	2010
Korea National Committee of World Energy Council (WEC)	To exchange information and build networks in the energy industry	2007
The Korea Mining Industry Association	To share information and strengthen the relationship with members of the mining development	2007
The Council of the MOTIE, the MSIT and Heads of Related Agencies	To realize mutual exchange and cooperation	2007

# Third-Party's Assurance

## To the Readers of 2018-9 MIRECO Sustainability Report:

Foreword	<p>Korea Management Registrar Inc. (hereinafter "KMR") has been requested by of Mine Reclamation Corp. (hereinafter "MIRECO") to verify the contents of its 2018-9 MIRECO Sustainability Report (hereinafter "the Report"). MIRECO is responsible for the collection and presentation of information included in the Report. KMR's responsibility is to carry out assurance engagement on specific data and information in the assurance scope stipulated below.</p>		
Scope and standard	<p>MIRECO describes its efforts and achievements of the corporate social responsibility activities in the Report. The verification has been conducted as limited assurance based on SRV1000 from KMR Global Sustainability Committee and International Standard on Assurance Engagements 3000 (ISAE3000) of IAASB as assurance standards. KMR's assurance team (hereinafter "the team") evaluated the adherence to Principle of reliability of the data and information on the GRI indicators as below, where professional judgment of the team was exercised as materiality criteria.</p> <p>The team checked whether the Report has been prepared in accordance with the 'Core Option' of GRI Standards which covers the followings.</p> <ul style="list-style-type: none"> <li>▶ GRI Standards Reporting Principles</li> <li>▶ Universal Standards</li> <li>▶ Topic Specific Standards</li> </ul> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li>- Management approach of Topic Specific Standards</li> <li>- Indirect Economic Impacts: 203-1, 203-2</li> <li>- Anti-Corruption: 205-1, 205-2</li> <li>- Energy: 302-1</li> <li>- Biodiversity: 304-2</li> <li>- Emissions: 305-1, 305-2</li> <li>- Effluents and Waste: 306-1</li> <li>- Employment: 401-1, 401-2, 401-3</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li>- Occupational Health and Safety: 403-3</li> <li>- Training and Education: 404-1</li> <li>- Diversity and Equal Opportunity: 405-1</li> <li>- Rights of Indigenous Peoples: 411-1</li> <li>- Human Rights Assessment: 412-2</li> <li>- Local Communities: 413-1</li> <li>- Customer Health and Safety: 416-1</li> <li>- Customer Privacy: 418-1</li> </ul> </td> </tr> </table> <p>This Report excludes data and information of joint corporate, contractor etc. which is outside of the organization, i.e. MIRECO, among report boundaries.</p>	<ul style="list-style-type: none"> <li>- Management approach of Topic Specific Standards</li> <li>- Indirect Economic Impacts: 203-1, 203-2</li> <li>- Anti-Corruption: 205-1, 205-2</li> <li>- Energy: 302-1</li> <li>- Biodiversity: 304-2</li> <li>- Emissions: 305-1, 305-2</li> <li>- Effluents and Waste: 306-1</li> <li>- Employment: 401-1, 401-2, 401-3</li> </ul>	<ul style="list-style-type: none"> <li>- Occupational Health and Safety: 403-3</li> <li>- Training and Education: 404-1</li> <li>- Diversity and Equal Opportunity: 405-1</li> <li>- Rights of Indigenous Peoples: 411-1</li> <li>- Human Rights Assessment: 412-2</li> <li>- Local Communities: 413-1</li> <li>- Customer Health and Safety: 416-1</li> <li>- Customer Privacy: 418-1</li> </ul>
<ul style="list-style-type: none"> <li>- Management approach of Topic Specific Standards</li> <li>- Indirect Economic Impacts: 203-1, 203-2</li> <li>- Anti-Corruption: 205-1, 205-2</li> <li>- Energy: 302-1</li> <li>- Biodiversity: 304-2</li> <li>- Emissions: 305-1, 305-2</li> <li>- Effluents and Waste: 306-1</li> <li>- Employment: 401-1, 401-2, 401-3</li> </ul>	<ul style="list-style-type: none"> <li>- Occupational Health and Safety: 403-3</li> <li>- Training and Education: 404-1</li> <li>- Diversity and Equal Opportunity: 405-1</li> <li>- Rights of Indigenous Peoples: 411-1</li> <li>- Human Rights Assessment: 412-2</li> <li>- Local Communities: 413-1</li> <li>- Customer Health and Safety: 416-1</li> <li>- Customer Privacy: 418-1</li> </ul>		
Our approach	<p>In order to verify the contents of the Report within an agreed scope of assurance in accordance with the assurance standard, the team has carried out an assurance engagement as follows:</p> <ul style="list-style-type: none"> <li>▶ Reviewed overall report</li> <li>▶ Reviewed materiality test process and methodology</li> <li>▶ Reviewed sustainability management strategies and targets</li> <li>▶ Reviewed stakeholder engagement activities</li> <li>▶ Interviewed people in charge of preparing the Report</li> </ul>		

Our conclusion	<p>Based on the results we have obtained from material reviews and interviews, we had several discussions with MIRECO on the revision of the Report. We reviewed the Report's final version in order to confirm that our recommendations for improvement and our revisions have been reflected. When reviewing the results of the assurance, the assurance team could not find any inappropriate contents in the Report to the compliance with the principles stipulated below. Nothing has come to our attention that causes us to believe that the data included in the verification scope are not presented appropriately.</p> <ul style="list-style-type: none"> <li>▶ <b>Materiality</b> The Report includes all important reporting boundaries under MIRECO operation and presents specific and long-term CSR strategy and targets. MIRECO is determining the materiality of issues found out through stakeholder communication channels through its own materiality evaluation process, and the assurance team could not find any critical issues nor any critical stakeholder group left out in this process.</li> <li>▶ <b>Understandability</b> Being prepared in sustainability context, the Report specifies the targets on sustainability issues which are identified through the materiality evaluation process, and presents the backgrounds of selection of the critical issues and the management approach. And the Report explains the performance indicators in more detail and comparable way.</li> <li>▶ <b>Reliability</b> The assurance team identified errors in some data and information, and MIRECO completed the modification before finishing the final version of the Report. We judge the data and information in the Report to be correct and reliable, and the assurance team could not find any evidence that MIRECO counter measures to critical stakeholder issues were inappropriately recorded in the Report.</li> </ul> <p>We could not find any evidence the Report was not prepared in accordance with the 'Core Option' of GRI standards.</p>
Recommendation for improvement	<p>We hope the Report is actively used as a communication tool with stakeholders and we recommend the following for continuous improvements.</p> <ul style="list-style-type: none"> <li>▶ MIRECO included sustainability performance for the last three years, long-term and short-term goals and Management Approaches (Mas) in the introduction of the report to express its strong will to pursue sustainability. Also, the report showed the organization's effort to reflect latest issues related to the organization, for example, with the detailed description of its human rights management system, current status and expansion plan. In order to enhance the quality of the report, it is advised to improve consistency and continuity in terms of metrics calculation, visualization and selection of important KPIs.</li> </ul>
Our independence	<p>With the exception of providing third party assurance services, KMR is not involved in any other MIRECO's business operations that are aimed at making profit in order to avoid any conflicts of interest and to maintain independence.</p>

December, 12th, 2019

*E. J. Hwang*





To minimize environmental impact and use of natural resources, spot color and coating are avoided, and soybean oil is used for printing process.