K-water
2020
SUSTAINABILITY
REPORT

Providing a brighter, happier,
and more prosperous future with water

K water   2020 SUSTAINABILITY REPORT

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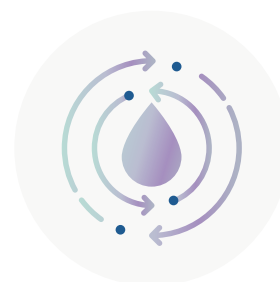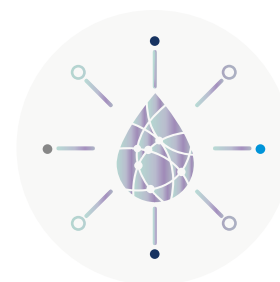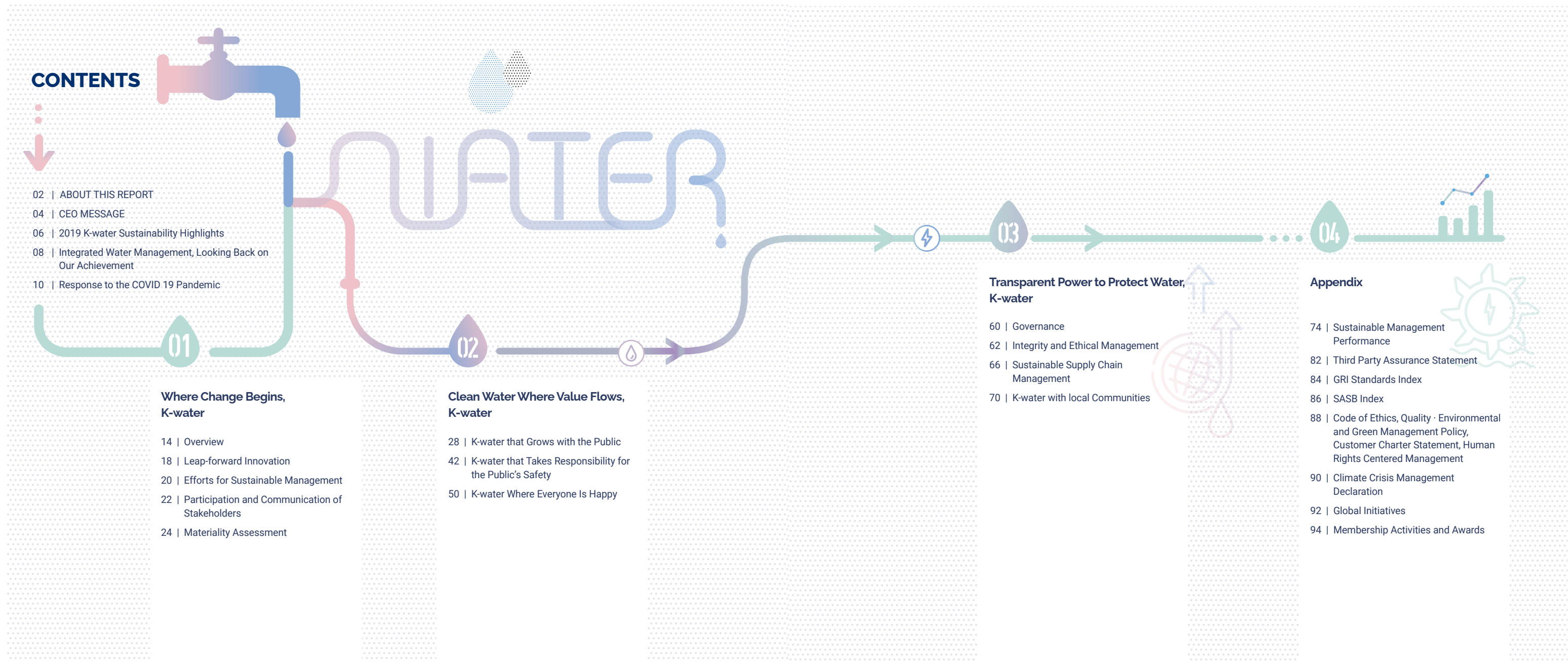
About This Report

K-water has published its Sustainability Report annually since 2005. The 2020 K-water Sustainability Report is the 16th publication and aims to share our sustainable management vision, activities, and achievements with our stakeholders. This report is a result of our unceasing efforts to grow into a sound enterprise that manages the entire water cycle from source to tap, communicating transparently our sustainable activities and achievements in the water industry, and focusing on our mission, "Providing a Brighter, Happier, and More Prosperous Future with Water." The 2020 report features particularly newly adopted core values and management policies as a public corporation.

Reporting Standards

This report has been drafted in line with the core standards of GRI (Global Reporting Initiative) guidelines and ISO 26000, which are the standard international sustainability reporting guidelines. This report presents key issues derived from the materiality assessment in connection with the management strategy of the Corporation and Management Approach (MA) on key issues.

Reporting Period and Scope

This report centers on the sustainable management activities of K-water's headquarters and local business sites from January to December of 2019, and includes some important undertakings performed until in October, 2020. Quantitative performance includes data from the last three years (2017~2019) or more to identify the trend of changes.

As overseas businesses (22 projects in 12 countries as of August 2020) have been carried out on a project basis without official establishment, only their business performance has been included in this report. This report does not present the performance of subsidiaries and affiliates but includes some achievements in training and support for mutual growth in relation with partnering companies within our supply chain. Financial performance has been filed based on K-IFRS-applied consolidated data since 2011.

Report Assurance

For the sake of accuracy and reliability, this report was verified by an independent external agency. This third-party verification agency has certified its compliance with the core options of the GRI Guidelines.

Alterations

There were no material changes in corporate scale, structure, or ownership during the reporting period compared to the previous year.

Some figures amended due to changes in calculation and description methods were noted separately. K-water publicizes its sustainability management and Annual Report through the disclosure of its business management on its website.

The Sustainability Report is issued both in Korean and English, which can be downloaded in PDF format via its website. For more information or inquiries, please contact the following:

CEO MESSAGE

"

Dear valued stakeholders,
Thank you for your interest in K-water.

We have published our 16th
Sustainability Report this year thanks
to communication and cooperation
with all of our stakeholders.

"

Since its founding in 1967, K-water has been contributing to national industry development and improvement of people's lives for the past 52 years as Korea's leading public water company. Through innovation and advanced technologies of the 4th Industrial revolution, K-water is keeping pace with the changes and trends of the times for sustainable development. For a new leap forward in the era of great transformation, we revisit the four core values of inclusion, safety, trust, and challenge. Based on our core values, we make the following four promises to innovate national water management and keep people safe amid major changes in the overall business environment such as climate crisis and digital transformation.

First, we will implement safe integrated water management practices against climate change so that people can rest assured.

K-water has recognized climate change as a crisis and declared climate crisis management that puts our response to the climate crisis first. We will protect the public's safety from water disasters such as drought and floods by completing an integrated water management system from the beginning to the end of the water cycle. In addition, by establishing an eco-friendly water management system in which all areas of quantity, water quality, and aquatic ecology can be maintained, we will achieve a sustainable green transformation to ensure harmonious coexistence between people and nature.

Second, we will strive to supply tap water that everyone can trust.

We will provide high-quality tap water service through smart water management applied with fourth industrial revolution technology. K-water is striving to supply tap water to areas with vulnerable water supply by improving aged facilities and implementing digital-based preventive management through the entire process of water supply from water intake sources to faucets. In addition, we will contribute to the advancement of national waterworks through projects to improve the flow rate of local waterworks and technical support for local governments. Based on this, K-water will realize water welfare equally for all citizens.

Third, we will lead the national water industry and secure global competitiveness.

We will take the lead of ceaseless innovation by using the various values of water as new growth engines. We will strive to respond to climate change, such as reducing greenhouse gases by activating eco-friendly water energy, and lead the national green new deal policy by promoting carbon neutrality. In addition, we will accelerate the innovative growth of the national water industry by creating and revitalizing an open innovation ecosystem, and will strive to solve the global water problem by promoting overseas projects focused on international cooperation.

Fourth, through dynamic innovation and communication, we will become a public company that both creates value and is trusted by the public.

Setting safety and integrity as the top priority values of management, we will realize transparent management focusing on pubic interests. We will cultivate digital convergence workforce throughout water management and lead digital innovation in the water field. In addition, we will internalize social value through communication with the public and establish various communication channels to become a public corporation that stakeholders and the public can relate to.

Dear fellow stakeholders, 2020 is the year of unprecedented national crisis due to a new pandemic, COVID-19. K-water has been making efforts to overcome the crisis by proactively checking the prevention and response system to prevent disruptions in water management and business promotion.
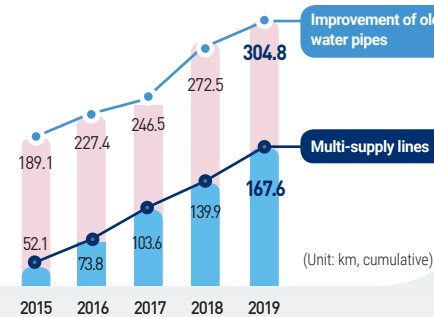
K-water will continue to listen to the opinions of its stakeholders and do its best to become a public company specializing in water management trusted by the public. We look forward to the continued support and interest from all our stakeholders.

November 2020 K-water CEO

2019 K-water Sustainability Highlights

Perfect Safety from Water Disasters

6 CLEAN WATER AND SANITATION
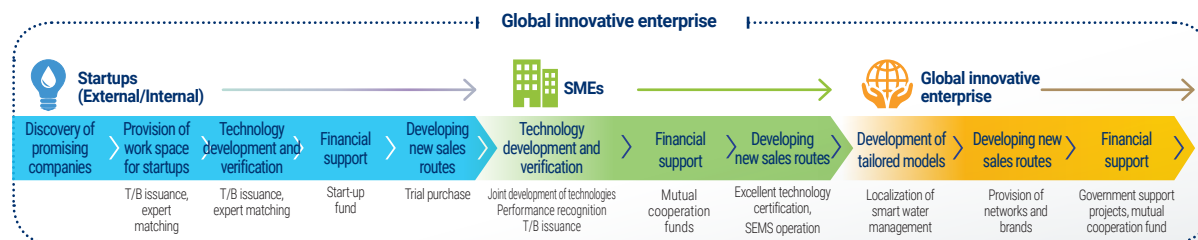11 SUSTAINABLE CITIES AND COMMUNITIES

- No cases of flood damage were reported in 134 municipal areas despite the largest number of typhoons ever recorded thanks to the rainfall forecast system has been more accurate as much as 8 times compared to the previous year and optimal operation of dams.
- The application of the 4th industrial technologies, improvement of old water pipelines, and acquirement of multi-supply lines and other reinforcement measures reduced the risk of waterworks accidents by 11%.

Improvement of old water pipes

304.8
272.5
246.5
227.4
189.1

Multi-supply lines

167.6
139.9
103.6
73.8
52.1

(Unit: km, cumulative)

2015 2016 2017 2018 2019

Innovation Platform Bridging the Growth Ladder

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
17 PARTNERSHIPS FOR THE GOALS

- Awarded the Bronze Tower Order Industrial Service Merit for supporting innovative water industry startups
- Provided regular support for 126 startups; this represents the largest scale of support among public corporations in Korea.

Global innovative enterprise

Startups (External/Internal)

Discovery of promising companies	Provision of work space for startups	Technology development and verification	Financial support	Developing new sales routes
	T/B issuance, expert matching	T/B issuance, expert matching	Start-up fund	Trial purchase

SMEs

Technology development and verification	Financial support	Developing new sales routes
Joint development of technologies Performance recognition T/B issuance	Mutual cooperation funds	Excellent technology certification, SEMS operation

Global innovative enterprise

Development of tailored models	Developing new sales routes	Financial support
Localization of smart water management	Provision of networks and brands	Government support projects, mutual cooperation fund

* Increased the sales of partnership startups by 13 times (4.2 → 54 billion (KRW)) and the number of jobs by 6.4 times (42 → 269 people)

Natural Ecosystem Restoration through Water Environment Improvement

6 CLEAN WATER AND SANITATION
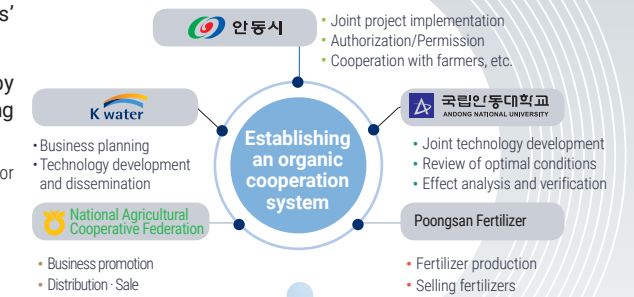14 LIFE BELOW WATER

- Reduced the occurrence of algal blooms by 35% in the Bohyeonsan Dam through proactive basin management.
- Promoted river restoration by opening the estuary bank of Nakdong River after 32-year closure.

Revitalization of Local Economy based on Corporation Capabilities
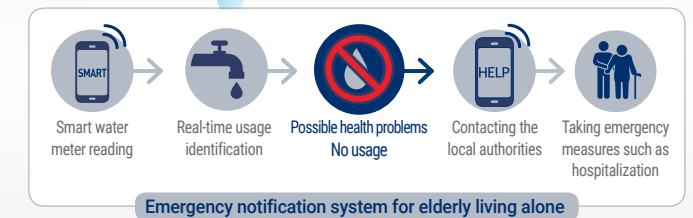
1 NO POVERTY
2 ZERO HUNGER

- Applied for a patent for NPA and trial use by farms around Andong Dam (Phosphorous outflow (P) 50%↓, farms' fertilizer purchase 21%↓)
- Contributed to job stability in areas around dams by establishing welfare foundations for the first time among public corporations.

* Awarded the Grand Prize for Social Contribution in the area of CSV for citizen-friendly water welfare services.

안동시
· Joint project implementation
· Authorization/Permission
· Cooperation with farmers, etc.

K water
· Business planning
· Technology development and dissemination

Establishing an organic cooperation system

국립안동대학교 ANDONG NATIONAL UNIVERSITY
· Joint technology development
· Review of optimal conditions
· Effect analysis and verification

National Agricultural Cooperative Federation
· Business promotion
· Distribution · Sale

Poongsan Fertilizer
· Fertilizer production
· Selling fertilizers

Equal Water Welfare Benefits for Everyone

1 NO POVERTY
3 GOOD HEALTH AND WELL-BEING

- Improved water welfare services for the vulnerable (smart water meter reading, expanding the social safety net for elderly living alone by 7.4 times: 114 households in 3 counties → 840 households in 17 counties)
- Awarded the Grand Prize of 2019 Government Innovation Excellence Case

Smart water meter reading → Real-time usage identification → Possible health problems No usage → Contacting the local authorities → Taking emergency measures such as hospitalization

Emergency notification system for elderly living alone

Tap Water Quality Innovation Recognized by International Standards

6 CLEAN WATER AND SANITATION
15 LIFE ON LAND

- Official approval of international tap water certification project by UNESCO
  * Pilot cities for the tap water certification standardized by K-water at the request of UNESCO (Seoul and Daegu in December, 2019)
- Awarded the Grand Prize at the Big Data Contest held by the Ministry of Environment for water quality prediction algorithm

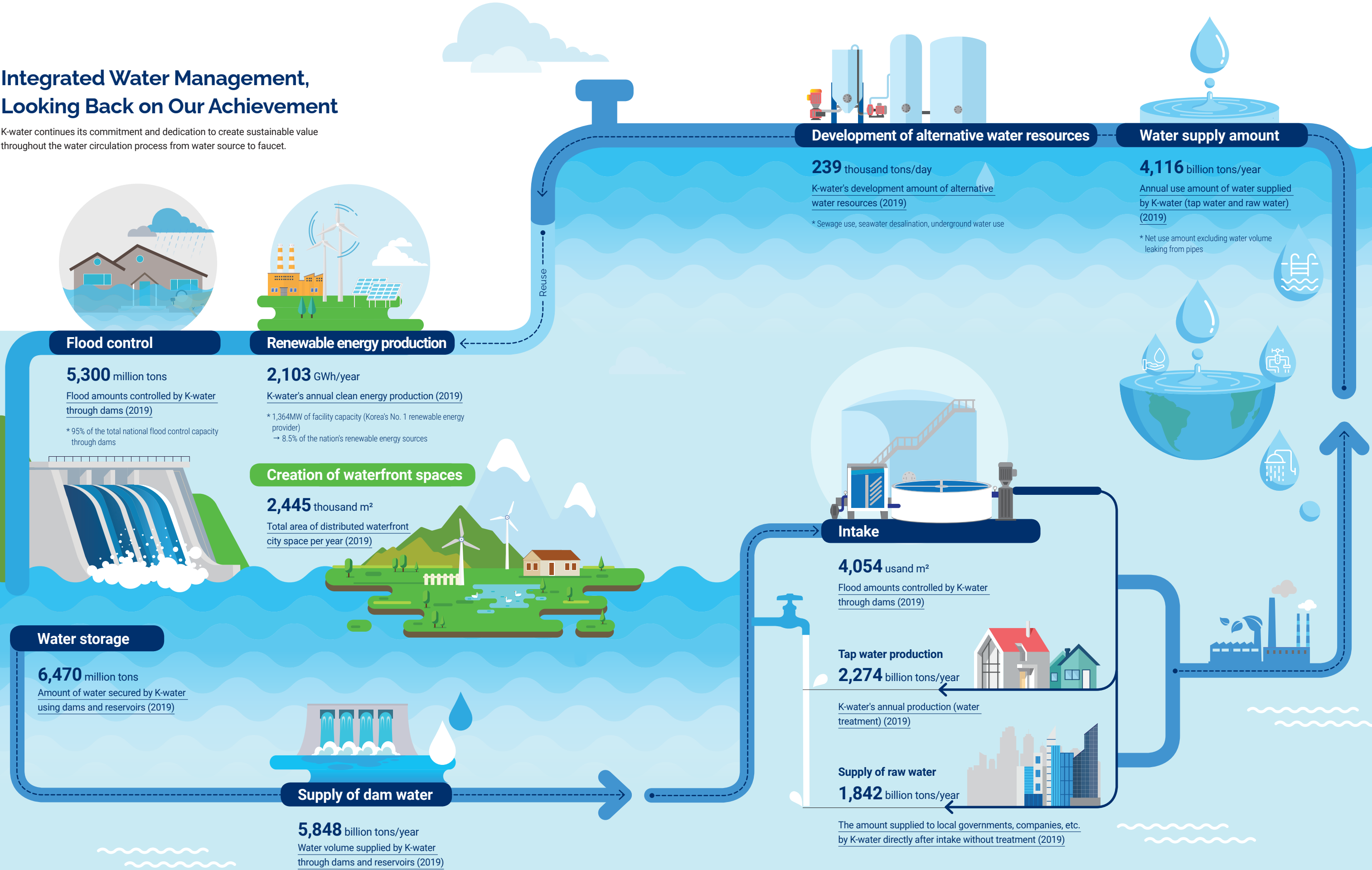## Creating Decent Jobs

3 GOOD HEALTH AND WELL-BEING
8 DECENT WORK AND ECONOMIC GROWTH

- Created 11,391 new sustainable and high-quality jobs linked to the industry (9,254 jobs last year, 23% ↑)
- Awarded the Job of the Year Grand Prize 2019 in the employment expansion sector
- Awarded the Vice Prime Minister's Award at the Fair & Capability-oriented Recruitment Contest

Integrated Water Management, Looking Back on Our Achievement

K-water continues its commitment and dedication to create sustainable value throughout the water circulation process from water source to faucet.

Development of alternative water resources

239 thousand tons/day

K-water's development amount of alternative water resources (2019)

* Sewage use, seawater desalination, underground water use

Water supply amount

4,116 billion tons/year

Annual use amount of water supplied by K-water (tap water and raw water) (2019)

* Net use amount excluding water volume leaking from pipes

Reuse

Flood control

5,300 million tons

Flood amounts controlled by K-water through dams (2019)

* 95% of the total national flood control capacity through dams

Renewable energy production

2,103 GWh/year

K-water's annual clean energy production (2019)

* 1,364MW of facility capacity (Korea's No. 1 renewable energy provider)
→ 8.5% of the nation's renewable energy sources

Creation of waterfront spaces

2,445 thousand m²

Total area of distributed waterfront city space per year (2019)

Intake

4,054 usand m²

Flood amounts controlled by K-water through dams (2019)

Water storage

6,470 million tons

Amount of water secured by K-water using dams and reservoirs (2019)

Tap water production

2,274 billion tons/year

K-water's annual production (water treatment) (2019)

Supply of raw water

1,842 billion tons/year

The amount supplied to local governments, companies, etc. by K-water directly after intake without treatment (2019)

Supply of dam water

5,848 billion tons/year

Water volume supplied by K-water through dams and reservoirs (2019)

# K-water's response to the COVID 19 pandemic

Support to Overcome COVID-19

The World Health Organization has declared a pandemic, which is the highest level of warning, a state in which certain infectious diseases are at their worst prevalence worldwide over the novel coronavirus (hereinafter referred to as COVID-19). K-water is committed to responding to the national emergency and crisis caused by the prolonged COVID-19 outbreak, protecting the safety of employees, SMEs, venture companies, customers, and local communities, and contributing to overcoming the crisis together through various support activities.

Comprehensive Enterprise-wide Support Measures

Increasing the crisis level to Serious to deal with the spread of COVID19, the government is striving to stop the spread of the epidemic and to support the recovery of the stagnant local economy. With the goal of "achieving the early end of the COVID 19 and promoting the normalization of the local economy", K-water is making company-wide efforts in line with the government's comprehensive measures to set the main guidelines and carry out tasks.

Directions and Tasks to Respond to COVID19
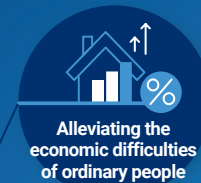
Alleviating the economic difficulties of ordinary people
- Reduction of water price
- Reduction of rent to support small businesses
- Support for the revitalization of the economy of ordinary people such as traditional markets
- Creation of jobs for the elderly and boost income for local residents

Support for domestic economy recovery
- Boost investment through early financial execution
- Encouraging employees' participation to uplift the domestic economy
- Supporting consumer sentiment in the inert culture and arts sectors
- Helping SMEs and ventures to move forward

Public safety and anti-virus activities
- Supporting antiseptic items and relief
- Employees' blood donation campaign
- Anti-virus support for the vulnerable class at customer contact points
- Supporting anti-virus activities of the Corporation's facilities

▲ Company-wide emergency meetings in response to COVID-19

▶ Donation of antiseptic items to help traditional

Helping Marginalized People through the Process of Water Meter Reading

K-water seeks to support the vulnerable such as senior citizens living alone 'outside the welfare system' through its regional waterworks offices. When a staff visits a resident for onsite meter reading, the staff also provides masks and checks their temperature to strengthen virus prevention measures and the safety of the elderly and vulnerable.

'Blood Donation for Love' event ▶

▲ Anti-virus campaign in seven cities across the country

Support for Overcoming the Crisis

Domestic Economy Recovery Activities

K-water strives to support vulnerable sectors, in particular traditional markets and flower farmers, severely suffering from COVID-19 and encourages its employees to actively use local currencies. In particular, as part of efforts to revive traditional markets, we initiated a campaign to donate goods purchased in traditional markets with a social contribution fund of KRW 500 million raised by voluntary donation from our employees, and allocated KRW 120 million out of the employee welfare fund to mandatory spending in traditional markets. Additionally, in order to help flower farmers in need, all departments have participated in flower bucket challenges*.

* The flow bucket challenge is an initative to raise much needed money for flower shop through the purchasing of small potted plants by all members of a K-water department.

The participation of all employees in 'Flower Bucket Challenge' ▲

Employee's Voluntary Blood Donation Campaign

K-water supports efforts to overcome the blood shortage due to the prolonged COVID-19 situation by encouraging its employees to donate blood. So far, a total of 550 people have joined a campaign named 'Company-wide Relay Blood Donation' designed to inspire employees' blood donation. The blood donation campaign is further promoted by updating the number of blood donors to motivate continuous participation.

Support for Anti-virus Activities through Sharing Employees' Salaries

K-water's initiatives to fight the outbreak includes 'Double Donation Campaign', which supports the underprivileged who were suffering most after the government's anti-virus measures using KRW 100 million won raised by sharing the salaries of high-ranking managers (director of headquarters or higher), and the distribution of hand sanitizer to the public in seven stations across the country.

Support for Young Students' Right to Study

K-water donated 750 laptops and desktops for teenagers to continue online learning in this difficult situation. We also donated 250,000 bottled waters and some 5,000 antiseptic products including necklace-type hand sanitizers and masks to local children's centers.

01

Where Change Begins,
K-water

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Where Change **Begins**, K-water
Clean Water Where Value Flows, K-water
Transparent Power to Protect Water, K-water
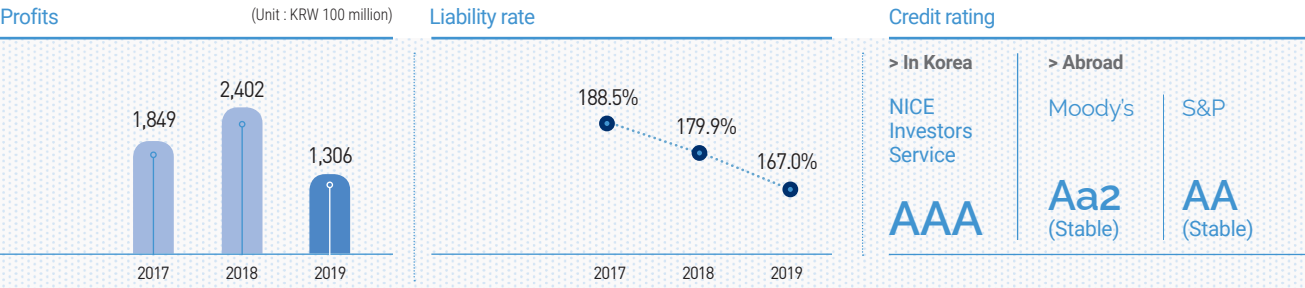Appendix   15

K-water overview

K-water was established in November 1967 for the purpose of developing and managing water resources in a comprehensive way to facilitate water supply and improve water quality, contributing to the improvement of people's lives and public welfare. In the era of a complex New Normal that will lead to radical changes in business environments such as unified water resources management, climate change, and digital transformation, K-water aims to 'provide a brighter, happier, and more prosperous future with water' by achieving water management that allows the coexistence of people and nature in an environment focusing on ecological values and pursuing an inclusive water welfare society.

K-water has secured the basis for implementing integrated water resources management that is responsible for all areas of the water cycle through the amendment to and addition of Article 9 Project of the Korea Water Resources Corporation Act. Establishing an optimal water cycle system encompassing water quantity, quality and aquatic ecology, and strengthening its capability to take the lead in solving global water-related issues caused by climate change and water shortage, K-water is committed to securing public trust and achieving continuous growth as a 'World Leading General Water Platform Enterprise.'

Overview

(As of June, 2020)

Institution name	K-water
No. of Employees	6,329
Organization	[Headquarters] 1 vice president 5 divisions, 5 offices (institutes), 34 departments / [Local business sites] 7 Head Office (institutes), 20 departments (centers), 74 branches (offices)
Foundation date	November 16, 1967
Shareholder composition	Korean Government 93.16% / Korea Development Bank 6.76% / Local governments, etc 0.08%
Purpose of establishment	The Korea Water Resources Corporation Act Article 1 (Law No. 3997, 1987.12.4)
Institution type	Quasi-market-type public corporation
Relevant organization	Ministry of Environment
CEO	Park Jae-Hyeon
Location of headquarters	200, Sintanjin-ro, Daedeokgu, Daejeon

(As of December 31, 2019)

Capital	KRW 8.9010 trillion (as of December 31, 2019)
Total assets	KRW 22.2548 trillion
Sales	KRW 2.9717 trillion
Profits	KRW 130.6 billion
Liability rate	167.0%

Profits
(Unit : KRW 100 million)

2017	2018	2019
1,849	2,402	1,306

Liability rate

2017	2018	2019
188.5%	179.9%	167.0%

Credit rating

> In Korea	> Abroad	
NICE Investors Service	Moody's	S&P
AAA	Aa2 (Stable)	AA (Stable)

Organizational Structure

Board of Directors — CEO — Standing Audit Committee Members — Audit Committee

Secretary's Office / PR Department / Safety Innovation Dept. / Future Strategy Dept.

Vice President

Planning Division / Management Division / Water Resource Division / Water Supply Division / Green Infrastructure Division

Global Business Division / Human Resource Development Institute / Environmental Division / Future Technology Division

K-water Research Institute / Silhwa Business Division

Hangang River Basin Division / Geumgang River Basin Division / Yeong-Seom River Basin Division / Nakdonggang River Basin Division

Subsidiaries
* ( ) : Share ratio

Domestic

Waterway+	(100%)
Korea Construction Management	(18.9%)
K-water Operation and Management	(2.0%)
K-water Operation Management	(100%)
Korea Overseas Infrastructure & Urban Development Corporation	(8.89%)
Water Genesis	(20%)
Pumpcare	(20%)
Sejongtech	(20%)
SURGETEC	(20%)

Abroad

K-water (Thailand) CO.,Ltd	(100%)	Thailand
KDS HYDRO PTE.LTD	(80%)	Pakistan
STAR HYDRO POWER LIMITED	(100%)	Pakistan
ANGAT HYDROPOWER CO.	(40%)	Philippines
KWPP Holdings	(38.5%)	Philippines
JSC Nenskra Hydro	(91.9%)	Georgia
Luzon Clean Water Development Corp.	(2.80%)	Philippines
Tina Hydropower Lim ited.	(80%)	Solomon Islands
Patrind O&M (Private) Limited	(100%)	Pakistan
PT.hasang Operation and Maintenance	(95.0%)	Indonesia

Brief History

Establishment of the Foundation for National Economic Development

1967.11
Foundation of the Korea Water Resources Development Corporation

1973.10
Construction of Soyanggang, multipurpose dam

1992.11
Construction of water supply facilities in Ilsan New Town

Improvement of National Welfare and Livelihood

2006.03
Proclamation of 'K-water' CI

2015.04
Established Asia Water Council (AWC)

Construction of Sustainable Water Circulation System

2018.06
Transferred to the jurisdiction of the Ministry of Environment in accordance with the amendments to the Government Organization Act

2019.11
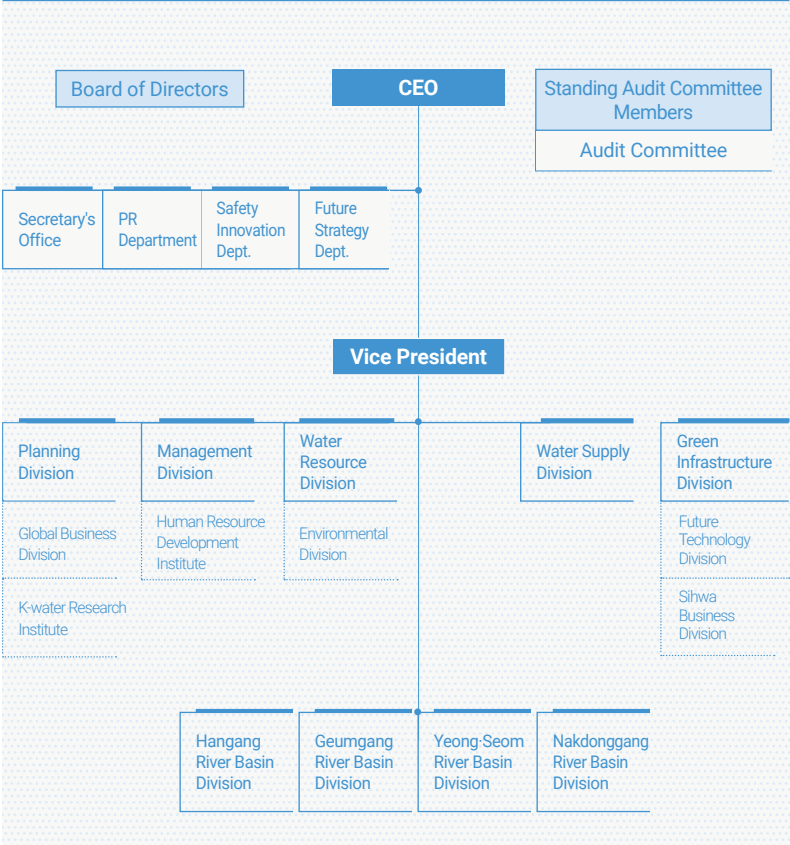Started the construction of Busan Eco Delta Smart City National Test-bed.

2020.11
Declared Climate Crisis Management

Foundation of the Corporation

Construction of Soyanggang, Andong and Daecheong Dams

Construction of multi-region waterworks

Proclamation of 'K-water' CI

Established AWC

Agreement ceremony of Integrated Water Resources Management

Started the construction of Busan EDC

Declared Climate Crisis Management

Integrated Water Resources Management Facilities

In light of the requirement for new water management policies to respond to social and economic changes such as climate and population changes, K-water has laid a foundation for integrated water resources management through unified water management policies and adjustment of the functions of water management agencies. Based on its 50 years of water resources management experience, K-water has adopted the basin headquarters system to lay the groundwork for integrated water resources management tailored to and in consideration of the characteristics and issues of each basin. We have established a rapid decision-making structure centering on basin characteristics as community-based and field-oriented water management becomes possible through basin-level operation. We are endeavoring to realize an optimized water management through the integrated operation of metropolitan and regional waterworks.

- **Construction and operation of 20 multi-purpose dams**
- **Operation of 14 water supply dams**
  - Water supply capacity of 12.5 billion m³/year (60% of national usage)
  - Flood control capacity of 5.3 billion m³ (95% of national capacity)
- **Operation of 17 weirs and the Ara Waterway**
- **Construction of 48 metropolitan area and industrial water supply facilities**
  Facility capacity of 17.56 million tons (48% of the national capacity)
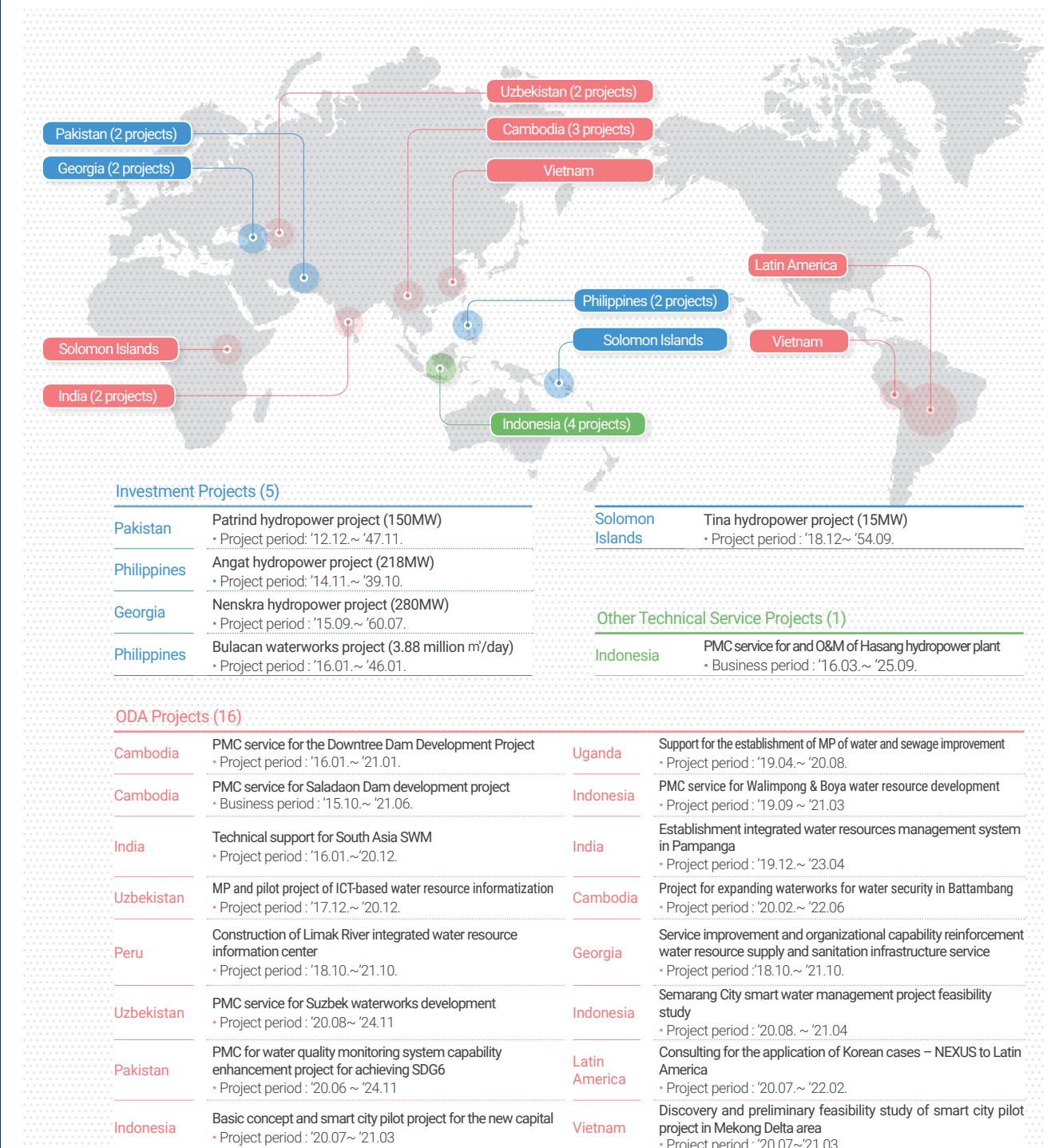 Construction and operation of 28 regional waterworks, 14 municipal sewages and 3 industrial water supply facilities
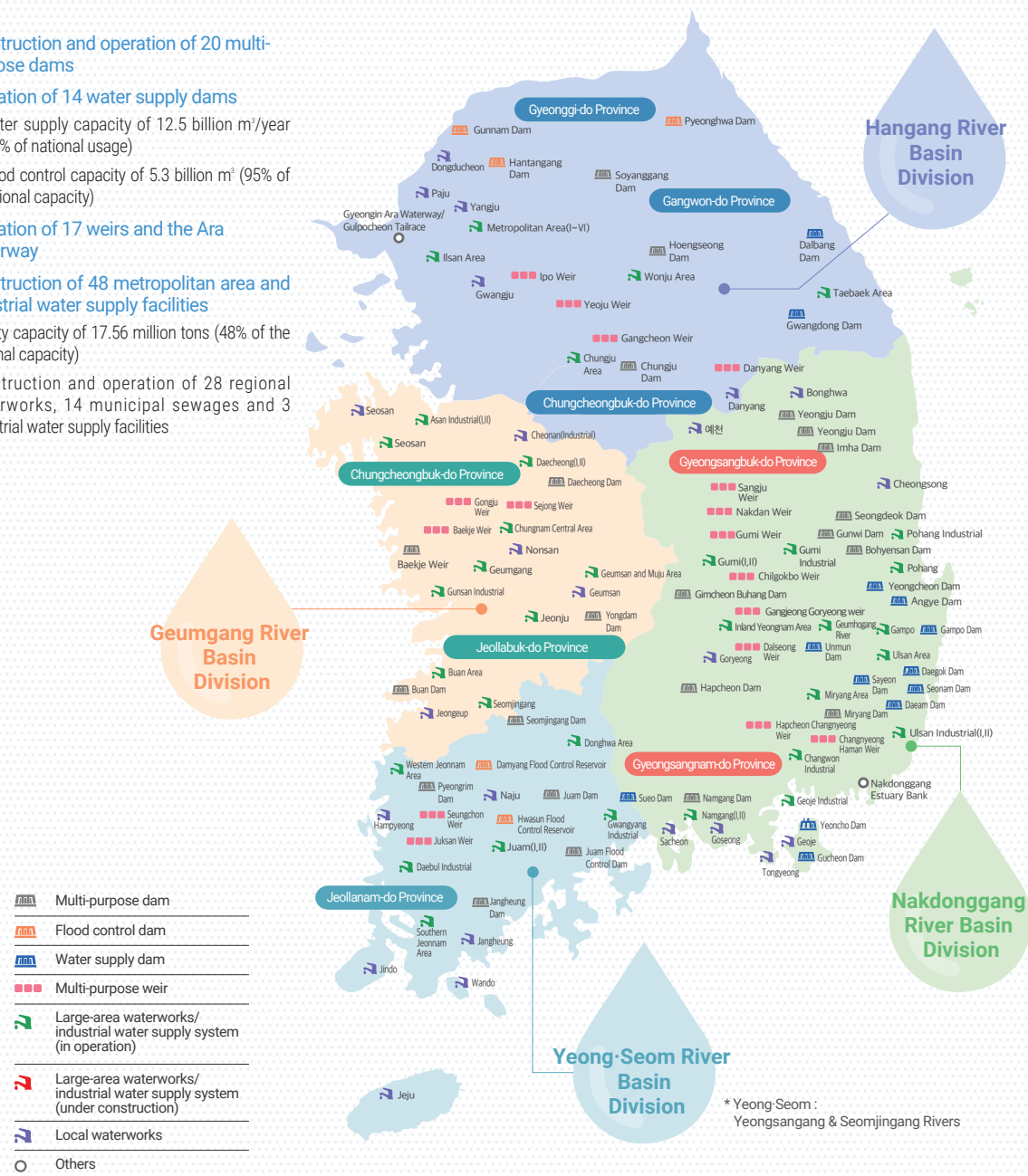
Legend:
- Multi-purpose dam
- Flood control dam
- Water supply dam
- Multi-purpose weir
- Large-area waterworks/ industrial water supply system (in operation)
- Large-area waterworks/ industrial water supply system (under construction)
- Local waterworks
- Others

* Yeong·Seom : Yeongsangang & Seomjingang Rivers

Overseas Projects

Starting with the Shanxi Province Bunha River Basin Research Project in 1994, K-water has been advancing into overseas markets, and has completed 86 projects in 32 countries as of 2019 by seeking to strengthen its business capabilities and diversify its business fields. Currently, we are diversifying our business field by engaging in investment projects including Patrind hydroelectric power plant in Pakistan, Angat hydroelectric power plant in the Philippines, Nenskra hydroelectric power plant in Georgia, and Tina River hydroelectric power plant in the Solomon Islands. As of June 2020, we are currently conducting 12 projects in 12 countries.

Investment Projects (5)

Country	Project
Pakistan	Patrind hydropower project (150MW) · Project period : '12.12.~ '47.11.
Philippines	Angat hydropower project (218MW) · Project period : '14.11.~ '39.10.
Georgia	Nenskra hydropower project (280MW) · Project period : '15.09.~ '60.07.
Philippines	Bulacan waterworks project (3.88 million m³/day) · Project period : '16.01.~ '46.01.
Solomon Islands	Tina hydropower project (15MW) · Project period : '18.12.~ '54.09.

Other Technical Service Projects (1)

Country	Project
Indonesia	PMC service for and O&M of Hasang hydropower plant · Business period : '16.03.~ '25.09.

ODA Projects (16)

Country	Project	Country	Project
Cambodia	PMC service for the Downtree Dam Development Project · Project period : '16.01.~ '21.01.	Uganda	Support for the establishment of MP of water and sewage improvement · Project period : '19.04.~ '20.08.
Cambodia	PMC service for Saladaon Dam development project · Business period : '15.10.~ '21.06.	Indonesia	PMC service for Walimpong & Boya water resource development · Project period : '19.09 ~ '21.03
India	Technical support for South Asia SWM · Project period : '16.01.~'20.12.	India	Establishment integrated water resources management system in Pampanga · Project period : '19.12.~ '23.04
Uzbekistan	MP and pilot project of ICT-based water resource informatization · Project period : '17.12.~ '20.12.	Cambodia	Project for expanding waterworks for water security in Battambang · Project period : '20.02.~ '22.06
Peru	Construction of Limak River integrated water resource information center · Project period : '18.10.~'21.10.	Georgia	Service improvement and organizational capability reinforcement water resource supply and sanitation infrastructure service · Project period :'18.10.~ '21.10.
Uzbekistan	PMC service for Suzbek waterworks development · Project period : '20.08~ '24.11	Indonesia	Semarang City smart water management project feasibility study · Project period : '20.08. ~ '21.04
Pakistan	PMC for water quality monitoring system capability enhancement project for achieving SDG6 · Project period : '20.06 ~ '24.11	Latin America	Consulting for the application of Korean cases – NEXUS to Latin America · Project period : '20.07.~ '22.02.
Indonesia	Basic concept and smart city pilot project for the new capital · Project period : '20.07.~ '21.03	Vietnam	Discovery and preliminary feasibility study of smart city pilot project in Mekong Delta area · Project period : '20.07.~'21.03

Innovation for Leaping Forward

Proclaiming the new vision of 'World Leading General Water Platform Enterprise', K-water is pledged to leap forward to become 'World Leading K-water' that spreads happiness around the world. We intend to implement a new value system for innovation in water management and establish new core values and management policies for the purpose of responding to today's rapidly changing business environment. In addition, we propose seven strategic tasks for innovation in water management that fits a new era, and establish a tailored system to realize social value to improve the quality of people's lives, thereby advancing toward an inclusive public water welfare society.

Mission and Vision

MISSION	Providing a brighter, happier, and more prosperous future with water
VISION	The World's Best Comprehensive Water Platform Provider
Slogan	K-water : Linking Nature and People

New Value System

Core values

Inclusiveness | Safety | Trust | Challenge

Management policy

People-oriented water management | Dynamic and innovation communication | Global technology leader

Seven strategic tasks

01	02	03	04	05	06	07
Preserve our rivers in a way that nature and people can live together	Provide safe and clean water for people to enjoy	Carbon-neutral water management responding to climate crisis	Digitally created, advantageous water management	Future water cycle cities to raise quality of life	Innovative water industry ecosystem to revive the economy	Change and Innovative Management to communicate with people

Strategic Goals (2030)

Target water quality Grade Ⅰb, 100% (2025)	Tap water drinking rate (direct + indirect), 90%	Greenhouse gas reduction 1,192,000 tCO₂-eq	Digital twin (dams and water purification plants), 100%	Smart water cities, increased by 40 cities	Job creation, 250,000 new jobs	Trust index, 85 points ('22)

Strategies for Realizing Social Value

Strategic direction

Basic safety for people's lives	Healthy and clean environment	Enhancing economic vitality	Services that can be experienced by the public	Clean and responsible management

Strategic tasks

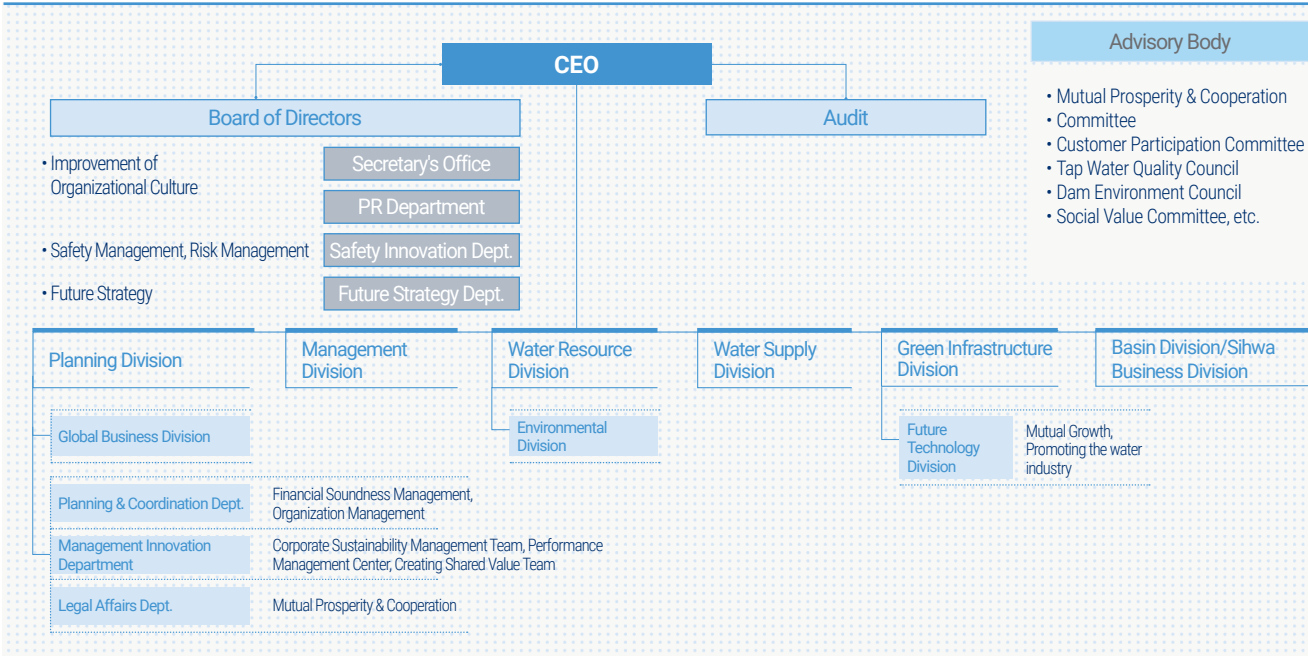| Basic safety for people's lives	Healthy and clean environment	Enhancing economic vitality	Services that can be experienced by the public	Clean and responsible management
01 Establishment of safety management system	04 Recovery of healthy water circulation	08 Creating quality jobs	11 Providing services that meet public needs	14 Realization of fair, honest, and ethical management
02 Water disaster prevention	05 Securing alternative eco-friendly water resources	09 New technology development and investment expansion	12 Regional development and boosting local economy	15 Protection of human rights and respect for labor rights
03 Reinforcing the safety of facilities	06 Efforts to preserve and restore the aquatic ecosystem	10 Reinforcing the priming role of innovative growth	13 Improvement of public communication and participation	
	07 Creating an urban environment that enhances quality of life			

Detailed tasks

Strategic direction	Goals ('24)	Main tasks			
Basic safety of people's lives	- Disaster management evaluation – "Excellent" - Industrial disaster rate- 0.45	Ensuring safe construction sites and workplaces	Improving social safe networks for the vulnerable	Disaster prevention system to protect people's daily lives	Supply of uninterrupted clean and safe water
Healthy and clean environment	- Global water quality achievement rate -100% - Greenhouse gas reduction - 1,405,000 tCO₂-eq	Upstream basic water environment improvement	Development of eco-friendly alternative water resources	Construction of waterfront ecosystem belt	Creating cities specialized in water
Enhancing economic vitality	- To create 93,000 jobs (~'24) - Innovative growth investment KRW 6.5 trillion	Social and economic revitalization	Open innovation R&D	Open platform of water industry	Big data ecosystem of environment business
Services that can be experienced by the public	- Commercialization of citizen's ideas-50 cases ('20) - Customer satisfaction level – Grade A	People-oriented services	Improved water rights of the vulnerable	Vitalization of regional economy	Expansion of people's participation in management
Clean and responsible management	- Integrity evaluation- Class 1 - Trust index-85 points ('22)	Integrity culture proliferation & reinforced internal check	Resolving unfair trade practices	Protection of human rights and respect for labor rights	

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K-water's Efforts for Sustainable Management

K-water's Sustainable Management Implementation System

K-water is a public corporation specialized in water and is pursuing sustainable management, fully recognizing missions given by the public. Headed by the Management Innovation Department, the Head Office and Basin Division are operating Sustainable Management Promotion Organization and promoting innovations in sustainable management. A total of 29 key performance indicators have been set and managed in order to ensure sustainable management and the systematic implementation of SDGs.

K-water Sustainable Management Organizations

CEO

Advisory Body
- Mutual Prosperity & Cooperation Committee
- Customer Participation Committee
- Tap Water Quality Council
- Dam Environment Council
- Social Value Committee, etc.

Board of Directors
- Improvement of Organizational Culture — Secretary's Office, PR Department
- Safety Management, Risk Management — Safety Innovation Dept.
- Future Strategy — Future Strategy Dept.

Audit

Planning Division | Management Division | Water Resource Division | Water Supply Division | Green Infrastructure Division | Basin Division/Sihwa Business Division

Global Business Division
Environmental Division
Future Technology Division — Mutual Growth, Promoting the water industry

Planning & Coordination Dept. — Financial Soundness Management, Organization Management
Management Innovation Department — Corporate Sustainability Management Team, Performance Management Center, Creating Shared Value Team
Legal Affairs Dept. — Mutual Prosperity & Cooperation

K-water SDGs target-linked management

Targets	K-SDGs Detailed indicators	Goals by 2030	K-water 2024 management goals
6 CLEAN WATER AND SANITATION	National water supply rate (%)	Continuous expansion (>96.4)	Water supply to 15,000 people in areas with limited access to water
	Rural water supply rate (%)	Continuous expansion (>>72.8)	
	Utilization of treated sewage water as water resource (%)	9.0	Securing 0.44 billion m³/year of sustainable water (supply of recycled water−57 million m³/year)
	Achievement of water quality (%)	85	Target water quality (Grade I)-98%
	Ratio of 'Good' grade in water quality (%)	85	
	Leakage rate of running water (%)	9.2	Introduction of SWM to 161 municipal areas
	Recovery rate of ecological streams (%)	Continuous expansion (>>70.8)	Health level of ecosystem − Level B (Good)
7 AFFORDABLE AND CLEAN ENERGY	Percentage of power generation with renewable energy (%)	20	Development of 3.9GW of water energy (photovoltaic, hydrothermal, hydro) ('30) (3.2% of the national renewable energy general goal)
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Growth rate of enterprises publishing sustainable management reports	Need to set targets	Publishing the sustainable management report
	Purchase rate of green products in the public sector (local governments)	70	Purchase rate of green product-85%
	Recycle rate of industrial wastes	95.4	Waste recycling rate-100%
13 CLIMATE ACTION	Percentage of generation with renewable energy (%)	20	photovoltaic, hydrothermal, hydro
	Nation's greenhouse gas emissions (MtCO₂)	608~574	Reduction of greenhouse gas by 1,450,000 tCO₂-eq

K-water Key Performance Indicators of Sustainable Management

☺ Good   ☹ Insufficient

Key Performance Indicator (KPI)	Unit	2017 Performance	2018 Performance	2019 Target	2019 Performance	Fulfillment Level[5]
Supplied dam water	100 million m³	58.24	58.80	98.38	58.48	☺
Supplied tap water	100 million m³	39.97	40.75		41.16	☺
Target rate of flood control	%	109	134	Changes in the Indices		☺
Target rate of dam operational advancement[1]	%	-	-	100	138.1	☺
Dam safety grade achievement rate	%	86.2	86.7	90.0	90.0	☺
Dam tide reduction rate[2]	%	40.6	42.2	48.0	46.4	☺
Risk management efforts	points	96.5	97.0	97.0	97.0	☺
Global water quality standard compliance rate	%	99.99	99.98	100.0	99.99	☺
Tap water quality safety rate[2]	%	100	100	100	100	☺
Local waterworks flow rate	%	84.3	84.3	82.0	84.2	☺
Smart water management expansion	cumulative cases	5	9	13	13	☺
Sewage reuse	1 million m³/year	42	42	42	42	☺
Greenhouse gas reduction converted into renewable energy generation	1,000 tCO₂-eq	988	1,569	1,133	983	☹
Distributed waterfront project sales	KRW 100 million	8,084	8,772	9,242	8,430	☺
SMEs that benefited from K-water's mutual overseas market advancement program	no. of companies	33	52	279	53	☺
Newly Selected Enterprises[6]	no. of companies	-	192		293	
Sales of products developed with SME technologies	KRW 100 million	861	1250	330	2,119	☺
Environmental performance index[4]	points	151	158	155	151	☺
Green product purchase rate	%	80.8	84.3	80.0	80.9	☺
Sales	KRW trillion	3.4	3.4	4.6	3.0	☹
Liability rate	%	188.5	179.9	175.4	167.0	☺
Job creation	persons	6,886	9,624	11,706	11,868	☺
Social contribution index	points	93.4	87.0	90.0	89.7	☺
Human resource cultivation index	%	44.3	45.0	45.0	45.3	☺
Customer satisfaction	grade	S	A	A	Very good	☺
Trust-based management index	points	74	74	75	69	☹
Integrity level	grade	Moderate	Unsatisfactory	Moderate	Unsatisfactory	☹
Industrial accident rate	%	0.07	0.23	0.00	0.17	☹
Information and security management level	points	87.12	74.33	75.00	79.71	☺

1) Target rate of dam operational advancement (%) : Reflecting index fomula to minimize flood damage, stable water supply, and response efforts of water quality in terms of water quality and quantity-linked operation
2) Dam tide reduction rate (%) : Target rate of 'Very Good (Ia)' based on top-level target criteria of 2 items (TOC, T-P) for national water quality management goals by K-water management dam
3) Tap water quality safety rate (%): A newly included index calculated by dividing the number of non-detections of five algal toxins by the number of measurements (in 38 large-area water purification plants)
   * Five algal toxins (Microcystin-LR, Microcystin-RR, Microcystin-YR, Anatoxin, Nodularin)
4) Environmental performance index (points) : The indexed value of the degree of environmental performance improvement compared to the base year
5) Fulfillment Level : Good when achieving 90% or more
6) Enterprises newly selected for the support program to foster the Korean water industry

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Participation and Communication of Stakeholders

Communication Strategies Classified By Each Stakeholder

In consideration of environmental changes, K-water defines the public, local communities, suppliers, governments, and employees including labor unions as major stakeholders and seeks seamless communication through customized channels. We are improving the internal stability of the communication systems, such as information sharing and feedback, so that various stakeholders can directly or indirectly participate in management or present their opinions.

Communication Strategies For Stakeholder

Stakeholders	The public, customers	Local communities	Partners, Water industry	Governments, Experts	Employees, Unions
Communication strategies	Information sharing, all-round participation	Leading regional innovation, solving water problems	Fair partnership	Proposal of national water management policies	Expanding bottom-up innovation
Representative communication channels	Danbi Talk Talk (ONLINE), National Forum (OFFLINE)	Innovation platform, Basin governance	Fair culture TFT, Water industry platform	Professional consultative bodies, Openness R&D	Employee Boards ---- VIP* ---- Labor-Management Joint Committee

Social Value Committee, Customer and Integrity Innovation Team

* VIP: It stands for Voluteer In Passion, meaning the promoter of change for organizational culture in current departments

Records of Communication with Stakeholders in 2019

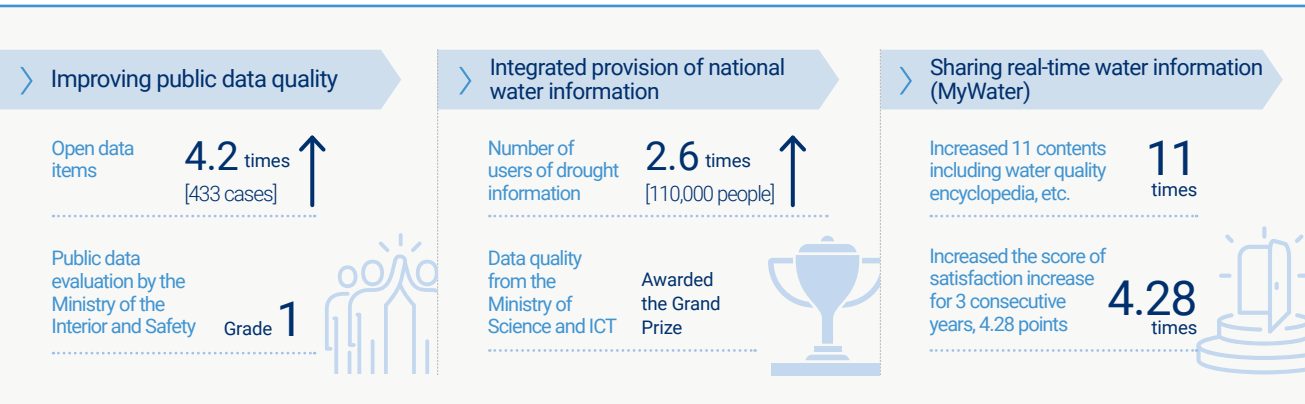|	Stakeholders	Main issues of interest	Communication channels	Communication records
Sponsor type	Employees	· Unified water management · Organization's culture improvement	· CEO message, management meeting, employee board, etc.	· K-water Focus View (Once a month) · Employee Council (Once a month)
	Labor union	· Introducing the labor director scheme	· Labor-Management Council, Joint TFT	· Labor-Management Council (4 times), Labor-joint operation of programs
Cooperative type	Governments (central/local), National Assembly, experts	· Implementation of national tasks	· Policy meetings, interviews, etc.	· Encouraging policy proposals, Leading policy implementation
Relation type	Related organizations, partners	· Improving services for the public · Promoting water industries	· Business meetings, MOU, Meetings, platform centers, etc.	· Joint search for identifying practical cooperation, understanding needs, practical support
	Customers, the public	· Improvement of water services	· Website·SNS, Danbi Talk Talk, supporters, Social Value Committee, public forum, etc.	· Social Value Committee (3 times) · Advance publication of information
	Local governments, local residents	· Local water problems	· Mutual Prosperity Cooperation Committee, interviews, residents' meetings, etc.	· Operation of private advisory groups · Participation in major policy decisions
Persuasion type	Civic groups	· Opening of the weirs of the four major rivers · Ecosystem restoration	· Mutual Prosperity Cooperation Committee, forums, advisory group, etc.	· Operation of private advisory groups · Participation in major policy decisions
	The media	· Water management issues	· Contributions, special reports, press conferences	· Operation of private advisory groups · Participation in major policy decisions

Reflection of Stakeholders' Opinion

Enhancing the level of communication with stakeholders, K-water is using suggestions from stakeholders as a foundation for sustainable growth by having these suggestions reflected in management activities. Since 2018, a total of 4,700 people have joined 'Danbi Talk Talk', which is an online communication channel designed for anyone to submit suggestions and participate in discussions. In 2019, it was upgraded as an online and offline platform allowing its members to engage in discussions and exchange feedback to ensure that feasible suggestions are proposed and discussions are conducted more actively with a goal of commercialization. The scope of in-depth online conferences, which were increased from 2 times to 13 times, was broadened to include programs for sharing information and discussion to ensure talks between our relevant departments and citizens. Fifty one innovation tasks derived from in-depth online and offline talks have been reflected in businesses as a source of business innovation and civil complaint reduction. We are also endeavoring to receive practical suggestions from the public by proactively providing information of interest.

Result of Businesses in 2019

Agenda from employees / Suggestions from the public → Agenda selection → [ONLINE] In-depth discussion / [OFFLINE] Forum & workshop → Participation of innovation and business departments → Reflection in business → [ONLINE] Disclosing the progress, receiving follow-up opinions

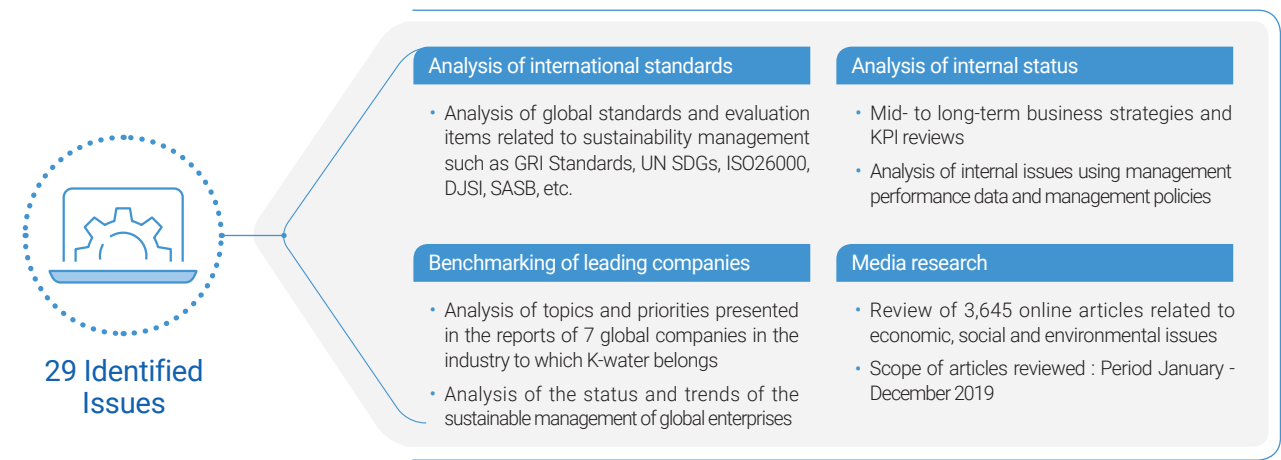|	> Important public opinions	> Reflection in businesses
Water management area	· As concern about the safety of tap water increases due to the incident of tainted tap water in Incheon and other issues, the scope of management needs to expand to households.	· Establishment of basin tap water support centers for technical support · Development of pipe cleaning technology, technical consulting for local governments (21 cases)
Public service	· Lack of experience-based education about water and experience contents · Provision of data that can be used by the general public	· Establishment of education centers (3 locations), introduction of ecotourism (1,300 people) · Increased open data items and the number of uses by 4.2 times and 4.8 times, respectively
Social value	· Suggestion of water-based social contribution such as laundry · Job creation ideas from the public's perspective	· Introduction of sanitation service visits for the vulnerable (218 households) · Creation of new jobs such as pipeline monitoring and tap water certification

Providing Information of Interest for Stakeholders

Improving public data quality

Open data items **4.2** times ↑ [433 cases]

Public data evaluation by the Ministry of the Interior and Safety — Grade **1**

Integrated provision of national water information

Number of users of drought information **2.6** times ↑ [110,000 people]

Data quality from the Ministry of Science and ICT — Awarded the Grand Prize

Sharing real-time water information (MyWater)

Increased 11 contents including water quality encyclopedia, etc. **11** times

Increased the score of satisfaction increase for 3 consecutive years, 4.28 points **4.28** times

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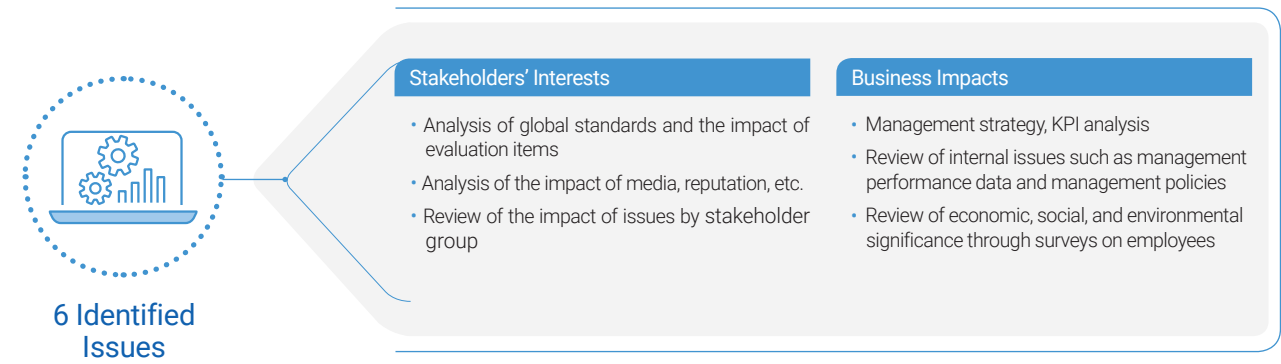
Materiality Assessment

Materiality Assessment Process

K-water conducted a materiality assessment in accordance with the reporting principles of GRI (Global Reporting Initiative) - 'sustainability context', 'materiality', 'stakeholder engagement', and 'completeness' to determine key agenda and contents. Through the analysis of international standards, corporate management policies and internal issues, benchmarking of leading companies, media research, and stakeholder surveys, we have identified a pool of 29 material issues related to K-water's sustainability management activities.

29 Identified Issues

Analysis of international standards
- Analysis of global standards and evaluation items related to sustainability management such as GRI Standards, UN SDGs, ISO26000, DJSI, SASB, etc.

Analysis of internal status
- Mid- to long-term business strategies and KPI reviews
- Analysis of internal issues using management performance data and management policies

Benchmarking of leading companies
- Analysis of topics and priorities presented in the reports of 7 global companies in the industry to which K-water belongs
- Analysis of the status and trends of the sustainable management of global enterprises

Media research
- Review of 3,645 online articles related to economic, social and environmental issues
- Scope of articles reviewed : Period January - December 2019

Validation of Materiality Assessment

For the 29 issues derived from the materiality assessment, K-water has quantified "stakeholders' interests" and "business impacts" of each issue to specify their priority. Stakeholders' interests were evaluated by reviewing the effectiveness of the impact of business costs, profits, and risks of core issues on stakeholders. We also considered the relationship between the financial and non-financial impacts of our business activities and management policies, and have ultimately identified a total of six key issues.

6 Identified Issues

Stakeholders' Interests
- Analysis of global standards and the impact of evaluation items
- Analysis of the impact of media, reputation, etc.
- Review of the impact of issues by stakeholder group

Business Impacts
- Management strategy, KPI analysis
- Review of internal issues such as management performance data and management policies
- Review of economic, social, and environmental significance through surveys on employees

K-water Materiality Assessment Matrix

NO.	Key issues
❶	Increase in the requirements for water management safety
❷	Response to climate change (low carbon emission and fine dust reduction, etc.)
❸	Supply of eco-friendly energy (production of new renewable energy such as hydropower)
❹	Improvement of occupational health and safety
❺	Enhancement of employees' competency and fair performance evaluation
❻	Improvement of human rights and diversity of employees

⑦ Enhancement of stakeholder engagement and communication
⑧ Social contribution activities based on the characteristics of local communities
⑨ Strengthening new growth engines (technology development, patents, etc.)
⑩ Economic performance (creation and distribution of economic value)
⑪ Production of healthy and safe tap water
⑫ Ethical management and compliance
⑬ Integrated risk management (economy, environment, society)
⑭ Improvement of customer satisfaction and service quality

⑮ Securing the soundness and transparency of the governance structure
⑯ Innovation and digitalization
⑰ Sustainable supply chain management
⑱ Efforts to create social value
⑲ Minimizing environmental impacts (emission of wastewater and management of pollutants, etc.)
⑳ Job creation and hiring competent staff members
㉑ Use and reuse of water
㉒ Strengthening labor-management relations and internal communication
㉓ Increased importance of shared growth with partner companies and suppliers

㉔ Customer health and safety
㉕ Realization of water welfare services tailored to customers
㉖ Compliance with laws and regulations in the social sector
㉗ Protection of the environment and biodiversity around workplaces
㉘ Compliance with environmental laws and regulations and response to regulations
㉙ Increase in requirements for fair trade

Selection of Material Topics

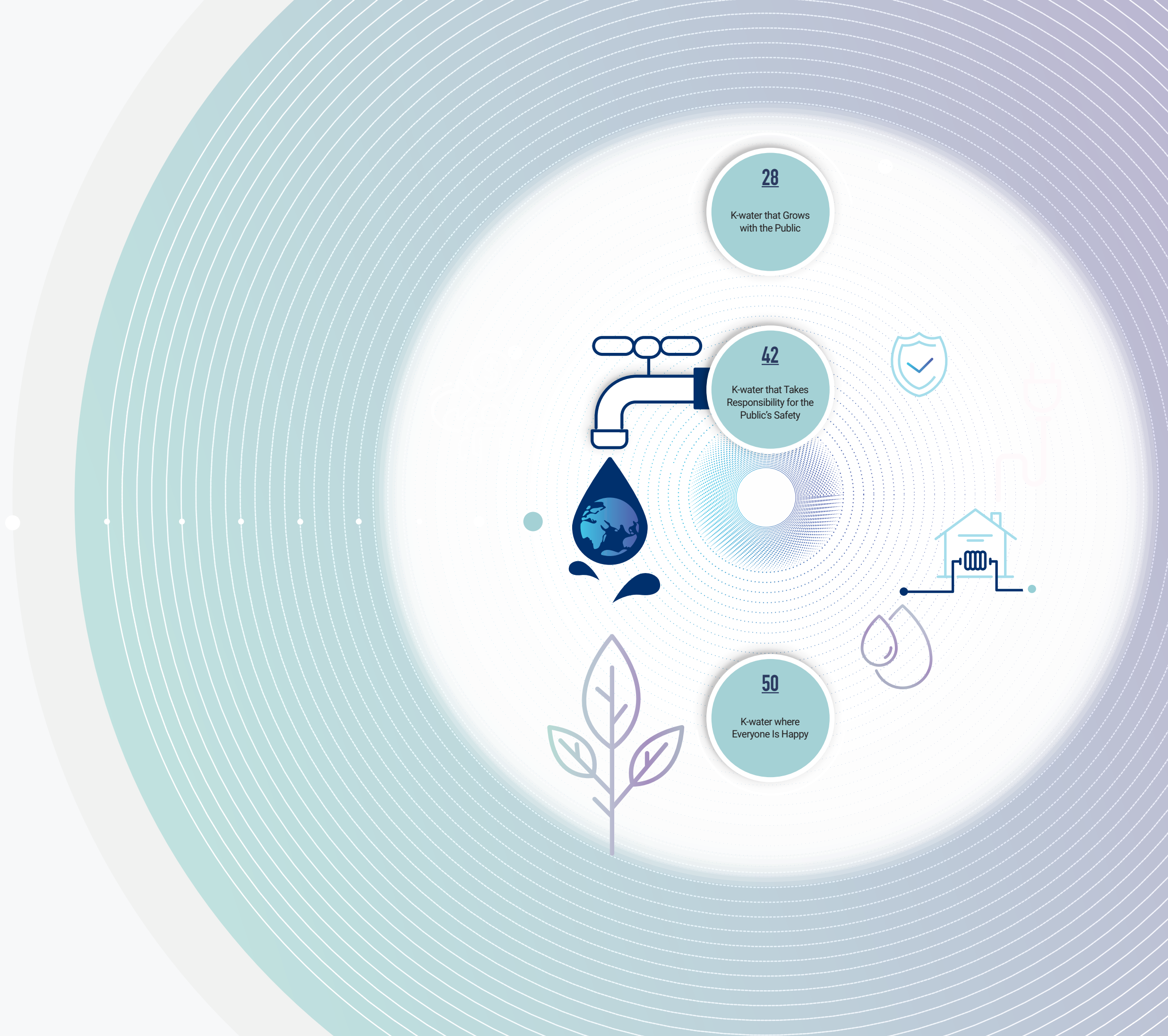| NO.	Key issues	Key reporting topics	Impact of issues*			Reporting boundary	GRI Index
			Cost	Revenue	Risk		
1	Increase in the requirements for water management safety	K-water that grows with the public	○	○	○	Customers (the public), governments, NGOs and local governments	303-1
3	Supply of eco-friendly energy (production of new renewable energy such as hydropower)						302-5
2	Response to climate change (low carbon emission and fine dust reduction, etc.)	K-water that takes responsibility for the public's safety	○		○	NGOs, local governments, suppliers and customers (the public)	201-2
4	Improvement of occupational health and safety						403-1
5	Enhancement of employees' competency and fair performance evaluation	K-water where everyone is happy			○	Employees and customers (people)	404-2
6	Improvement of human rights and diversity of employees						405-1

*Impact of issues
1) Cost: Impact linked to financial losses (policy regulation, environment changes, etc.)
2) Revenue: Impact on business activities/processes creating financial profits
3) Risk: Impact related to potential non-financial risks (media, public opinion, reputation, etc.)

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Clean Water Where Value Flows,

K-water

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K-water that Grows with the Public

42
K-water that Takes Responsibility for the Public's Safety

50
K-water where Everyone Is Happy

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K-water that Grows with the Public

In line with the escalating global interest in dealing with climate change and reduction of carbon dioxide emissions, K-water is expanding and strengthening integrated water resources management in consideration of water quantity, quality, and ecology beyond quantity-oriented water management. In addition, we intend to construct water-related infrastructure that the public can benefit from by supplying safer and cleaner water to the public.

Key Activities >>

- Focusing on a leading role as a public corporation to improve people's quality of life including water welfare in areas with limited access to water, vitalization of the water industry, and job creation
- Establishing the supply system for safe drinking water through advanced water purification systems and the upgrading of old pipes
- Boosting capabilities to accomplish integrated water resources management and early achievement of perceivable outcomes
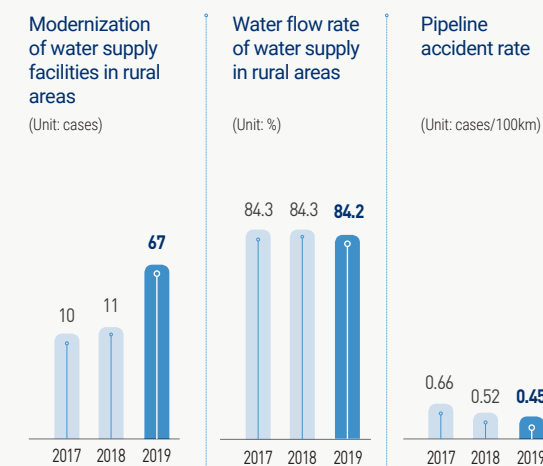
Future Plans >>

- Increasing investment in improving water welfare in areas with limited access to water, and reducing water service gaps such as water quantity, quality, and rates across the country
- Enhancing supply stability and reliability by sequentially improving old pipes
- Securing advanced technologies and knowhow to upgrade the efficiency and effectiveness of seawater desalination for islands and remote areas
- Realization of Net-Zero for metropolitan water purification

Key Achievements >>

Modernization of water supply facilities in rural areas (Unit: cases)				Water flow rate of water supply in rural areas (Unit: %)				Pipeline accident rate (Unit: cases/100km)			
10	11	67		84.3	84.3	84.2		0.66	0.52	0.45	
2017	2018	2019		2017	2018	2019		2017	2018	2019	

Material Issues in Sustainable Management >>

Key issues	Aspect assessment			SDGs-related goals
	Cost	Revenue	Risk	
Increase in the requirements for water management safety			O	6 CLEAN WATER AND SANITATION
Supply of eco-friendly energy (production of new renewable energy such as hydropower)	O	O		7 AFFORDABLE AND CLEAN ENERGY

Achievement Goals >>

Control items	Goals	Period
Realization of carbon neutral (Net-Zero)	Reduction of greenhouse gas in 43 metropolitan water purification plants by 1.67 million tCO$_2$-eq	By 2030
Management of water source quality	Achieving water quality goal of grade I b in all water sources	By 2025

Transition to a Carbon-neutral Society

A variety of K-water's management activities aim to realize carbon-neutral water management in response to climate change. We are planning to greatly expand the development and utilization of water-based energy such as floating solar plants and hydrothermal energy in order to lead the transition to a carbon-neutral society through various water management practices.

Producing Tap Water that Generates No Greenhouse Gas

K-water is committed to realizing a Net-Zero water purification plant and declaring participation in RE100 to engage in the promotion of global carbon reduction. We will expand renewable energy in response to climate change and realize a sustainable low-carbon green society. Net Zero refers to achieving an overall balance between emissions produced and emissions taken out of the atmosphere. Targeting 43 water purification plants nationwide, we are planning to achieve net zero for 11 sites by 2025 and 25 by 2030. We also aim to produce solar and hydrothermal energy to be established in the spare area of the water purification plant for cooling and heating.

K-water Declaration of Net-Zero

- Enhancing the position as the No. 1 renewable energy company in Korea
- Energy saving practices and expansion of renewable energy at intensive energy consuming business sites.

Expansion of Net-Zero Workplace

- Increase of Net-Zero business sites among 43 water purification plants (currently 2 places → 25 in 2030)
  * Net-Zero for all natural-flow water purification plants

Improvement of Energy Independence

- Expansion of renewable energy (solar power, small hydro power, etc.)
- Introduction of hydrothermal energy to cooling and heating
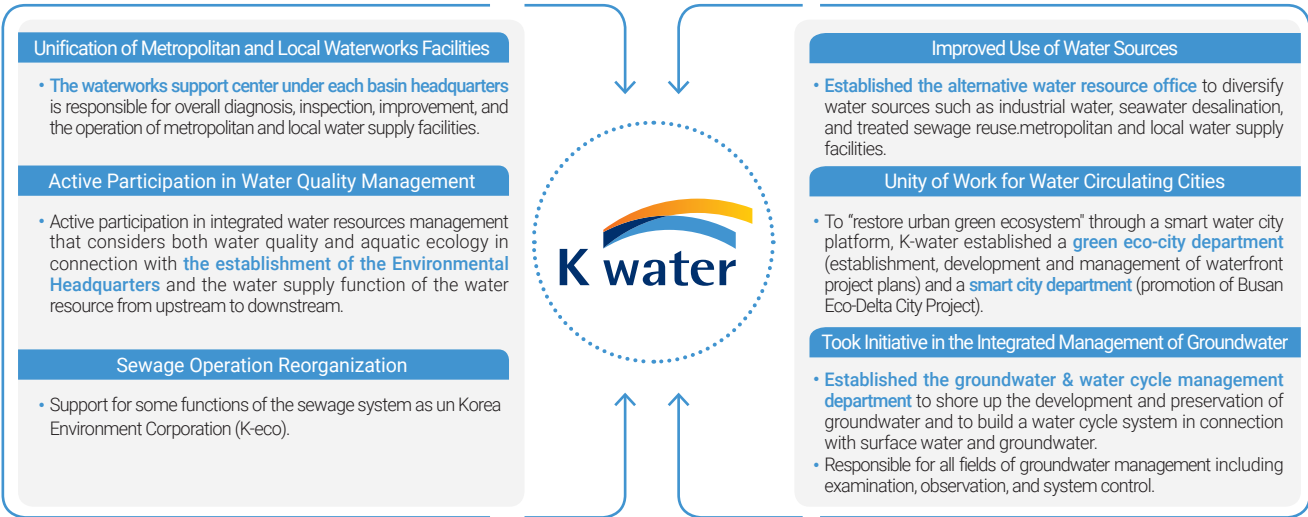- Replacement of low-efficiency and energy intensive equipment (motors, etc)

Energy-Efficient Water Management

K-water focuses on decentralized and nature-based water management, which reduces energy use and improves the stability of water management. We seek to intensify our efforts to control demand and reduce the generation of carbon dioxide at dam facilities. We have been building the decentralized water supply facilities to resupply water in dams as an alternative water source, and construct and operate natural water management systems. Furthermore, we are promoting a number of initiatives for low-energy-consuming water management including strengthening the management of the public water demand through leakage reduction and water rate scheme improvement as well as implementing methods to cut back the production of carbon dioxide in reservoirs.

Expansion of Clean Water Energy Development

K-water is increasing the construction of floating solar power systems, taking into account eco-friendly properties and residents' acceptance, in line with the government's policies on climate change and energy. Our plan includes the construction of 60MW floating solar power systems in Hapcheon Dam and other places, and seeks to expand the capacity to 2.6GW by 2030. In addition, we continue environmental monitoring and shore up the verification of environmental impact to clear up concerns about water pollution. This contributes to regional development and increases residents' income by implementing floating solar plants in which local residents participate.

Resident-participation Hapcheon Floating Solar Power Systems Construction Model
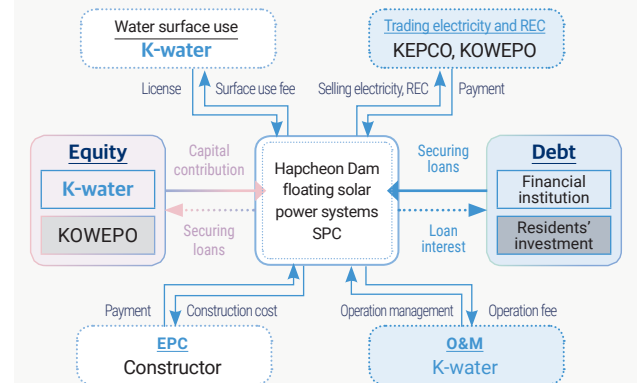
Realization of Eco-friendly Energy Society

K-water aims to achieve an eco-friendly energy society by utilizing hydrothermal energy that uses water as a direct heat source. Implementing a convergence cluster project in Gangwon-do, we are planning to build a data industrial complex, a smart farm complex, and a complex for enterprises specialized in water-related businesses by 2025. Additionally, we will supply 16,500RT of hydrothermal energy using deep water. We will increase the capacity of hydrothermal energy scheme to 127,000RT by 2030 as a part of our efforts to achieve zero energy, targeting demands around water supply pipelines and water streams in metropolitan and local areas.

Renewable Energy Production (Unit : GWh/year)

2017	2018	2019
2,118	2,436	2,103

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Sustainable Integrated Water Resources Management

Laying a Foundation for Implementing Integrated Water Resources Management

K-water is adjusting its business scope through the reorganization of businesses and tasks that have almost completed their purposes or are no longer in operation based on the analysis and prediction of environmental changes. Based on our capabilities across the entire area of water quantity, quality, and ecology, we propose adjustments of our functions to lay a foundation for the implementation of integrated water resources management. We have identified six proposals for adjustment to meet the needs of stakeholders, actively utilizing K-water's capabilities.

Unification of Metropolitan and Local Waterworks Facilities
• **The waterworks support center under each basin headquarters** is responsible for overall diagnosis, inspection, improvement, and the operation of metropolitan and local water supply facilities.

Active Participation in Water Quality Management
• Active participation in integrated water resources management that considers both water quality and aquatic ecology in connection with **the establishment of the Environmental Headquarters** and the water supply function of the water resource from upstream to downstream.

Sewage Operation Reorganization
• Support for some functions of the sewage system as un Korea Environment Corporation (K-eco).

Improved Use of Water Sources
• **Established the alternative water resource office** to diversify water sources such as industrial water, seawater desalination, and treated sewage reuse.metropolitan and local water supply facilities.

Unity of Work for Water Circulating Cities
• To "restore urban green ecosystem" through a smart water city platform, K-water established a **green eco-city department** (establishment, development and management of waterfront project plans) and a **smart city department** (promotion of Busan Eco-Delta City Project).

Took Initiative in the Integrated Management of Groundwater
• **Established the groundwater & water cycle management department** to shore up the development and preservation of groundwater and to build a water cycle system in connection with surface water and groundwater.
• Responsible for all fields of groundwater management including examination, observation, and system control.

Active Operation of Organizations

As the only agency specialized in water resource management, K-water is actively engaged in the national water management scheme. In response to the requirement for the unified and integrated water resources management, we have reorganized our business structure and improved work process competence. Our operation system has been overhauled to reflect changes in policy such as the promotion of post-COVID-19 Korean New Deal and new values and strategic systems. The transformation process includes the reorganization of the functions of planning, construction, management, and operation by facilities such as water resource and water supply. The organization was also reinforced to embrace future growth businesses such as upgraded SWC functions and new renewable energy.

Expanding the Role of IWRM

K-water is striving to innovate sustainable integrated water resource management with a main focus on the watershed, starting with unified water management of integrating both water quality and quantity. In accordance with legalization-internalization-policy, we are reviewing the preemptive revision of water related laws and operating an enterprise-wide Task Force Team in three key areas for future innovation.

Performance in 2019

Legalization

Legislative strategy (Feb. 2019) and proposal for government policy (Sep. 2019)
▶ Completed the Proposal and submission to revised the Korea Water Corporation Act and Act on Construction of Dams and Assistance, etc.

Internalization

Selected as top 10 company in which the public can experience (Jun. 2019)
▶ Proposed Ministry of Environment's strategic discussion and full reflection of work plan

Policy-making

Selected managing institutions of water use (Jun. 2019, Ministry of Environment)
▶ Established the nation's highest plan

Strengthening the Command System of IWRM

Unified water management	Focusing on responding to issues (2018)	
Plan	Basin	Clean water
Planning water resources	Water resource management (Water quality–quantity– ecology)	Tap water management (Integration of metropolitan and local areas)

Integrated water resources management	Focused on operation management (2019)	
Integrated plan	Project	Clean water
Water resource + running water	Construction + project (waterfront, etc.)	Water resource + running water

Project Business unit	Focusing on facility management (2020)	
Water resource	Running water	Green infrastructure

Improvement of Integrated Water Resources Management for Watersheds

K-water is conducting integrated watershed management of the entire water circulation process. Integrated water resources management refers to the unified administration of water quantity, quality, and aquatic ecology-environment, etc., which were individually controlled by considering all matters that may affect water management in the area for optimal management. We are endeavoring to secure and spread integrated water resources management by preemptively establishing an integrated water resources management master plan to create a healthy water environment, to practice a cooperative water culture, and to form governance to resolve water-related conflicts.
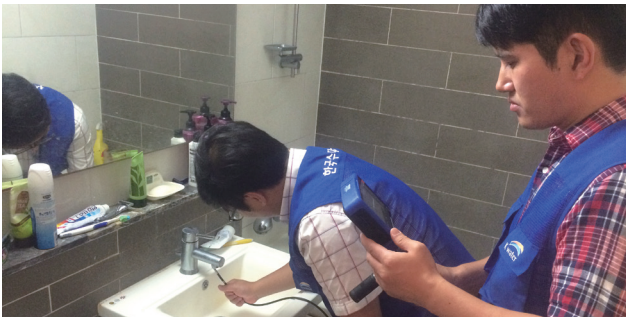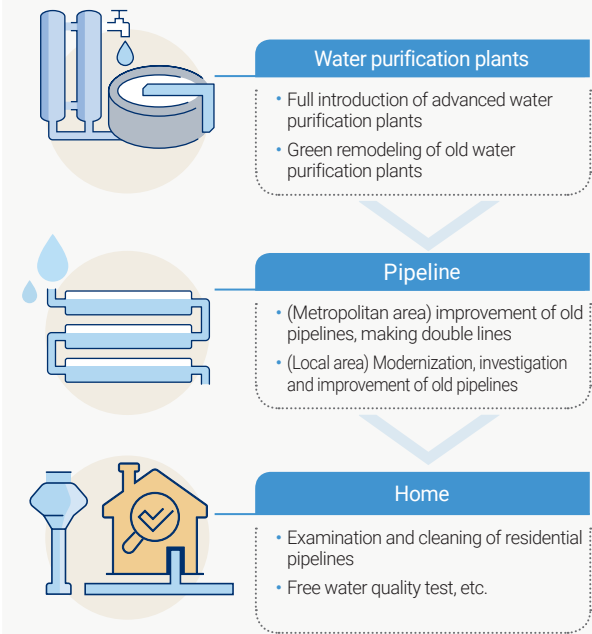
Integrated Water Resources Management System

1 Analysis of water information and investigation management
2 Prediction and operation of water management
3 Maintenance and safety management of water resource facilities
4 Water quality management of basins, rivers, and reservoirs
5 Water quality management of water-intake sources
6 Optimization of water purification systems
7 Intelligent water supply system operation
8 Customized industrial water
9 Efficient sewage treatment operation

Underground water
Water purification plants
Storage reservoirs
Use of industrial water and grey water
Seawater desalination

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Green Infrastructure Considering Nature and the Environment

Improvement of Old Facilities

To be a company trusted by the public, K-water has prioritized the stable quality and quantity management of tap water to ensure its safety by upgrading old pipelines across the entire water supply network from water purification plants to pipelines to households. We have established a national standard model for the inspection of pipelines in order to reduce leakages and strengthen the safety of the pipeline network and build an advanced monitoring system. The accident rate of pipelines decreased by 11% in 2019 compared to 2018 by enhancing regular monitoring activities such as GIS onsite inspections. In addition, we are using state-of-the-art technology to continuously upgrade pipeline management in old facilities. For example, underwater drones and AI-based leakage detection devices are useful for examining pipelines and tunnels without cutting off the water supply or excavating.

Improvement Plan for Old Facilities

Water purification plants
- Full introduction of advanced water purification plants
- Green remodeling of old water purification plants

Pipeline
- (Metropolitan area) improvement of old pipelines, making double lines
- (Local area) Modernization, investigation and improvement of old pipelines

Home
- Examination and cleaning of residential pipelines
- Free water quality test, etc.

Examination and cleaning of residential pipelines

Comprehensive Improvement of Dam Environment

K-water intends to improve the conditions of dams in a comprehensive manner, taking into account safety, ecology, and culture. We have renovated old dams to shore up their safety and are currently performing various activities to restore the ecosystem of dam basins including both the creation of micro-ecological systems, and the installation of fish ways, wetlands, and sediment management in reservoirs and dams.

Establishment of Eco-friendly River Management Systems

K-water strives to restore the natural features of rivers while considering the natural environment. 'Smart Eco River', which incorporates big data, AI, and other technologies of the 4th industrial revolution, has been introduced to improve the water quality management of rivers. Estuary banks were temporarily opened in consultation with 12 relevant agencies. In June, 2020, we planned the third test to open the estuary bank after reviewing various seawater inflow scenarios depending on the degree to which the floodgate was opened.

Watershed management
- Storage facilities, artificial wetlands
- Biodiversity of waterfronts

Connection and conservation of dam basin ecosystem
- Securing vertical and horizontal continuity
- Creation of small ecosystems

Dam renovation

Restoring natural features of river streams

Estuary ecosystem restoration
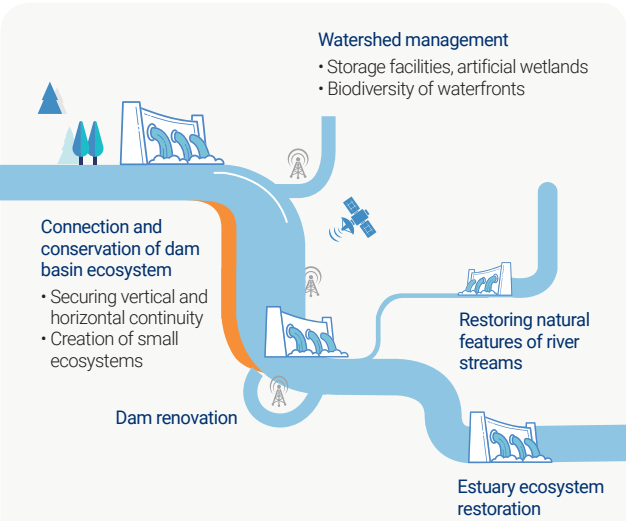
Opening of the Nakdonggang River Estuary Bank

Floodgate operation during regular days

River streams   floodgate   Sea

Seawater inflow   Freshwater discharge
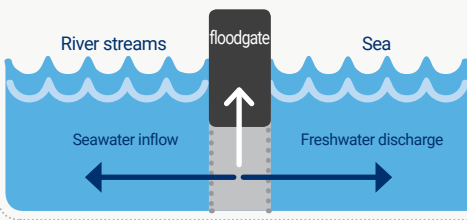
Smart Infrastructure for Preemptive Water Management

Smart Pipeline Management Infrastructure

K-water is building and managing a smart pipeline management infrastructure for real-time water quality and quantity monitoring. We have signed an agreement with Iksan-si to construct smart pipeline management infrastructure. It includes tap water management facilities, such as a precision filtration system, a water quality monitoring system incorporating ICT technology into water supply pipelines, and a monitoring system for the entire tap water supply process.

Concept of Smart Local Water Supply Infrastructure

- Real-time monitoring
- Examination of the inside of pipelines
- Maintaining a proper level of residual chlorine
- Small-scale monitoring of flow rate and water pressure
- Flow meter
- Water pressure gauge
- Smart meter
- Real-time water quality data
- Flushing
- Real-time water quality monitoring
- RF sensors
- Automatic drain facility
- Remote water leak monitoring system
- Drinking fountains

K-water has, by establishing a remote surveillance network and an integrated control system, prepared a control system standardization plan to enable real-time monitoring and pipeline analysis. Furthermore, the control systems located in each basin and the headquarters will be upgraded and linked so that they can serve as a control tower of tap water systems across the country. We have constructed the smart supply systems to provide citizens with a clean and stable tap water supply.

Smart and Integrated System for Aquatic Ecosystem Management

K-water has built an integrated water quality monitoring and predictive response system, ensuring enhanced response to water quality accidents, pollutant management and monitoring, and reservoir water quality prediction. Our real-time water quality prediction system (SURIAN, SUpercom based RIver Analysis Network) linked to meteorological, basin, dam, and river stream models provides high-accuracy water quality prediction data and supports fast decision-making when an accident affecting water quality occurs to minimize the impact on the ecosystem. We are also taking the lead in securing eco-friendly water quality of rivers in cities and creating a healthy water environment by introducing an Eco-Filtering System* that encourages natural purification.

Eco-Filtering

- Water intake
- Filtering site
- Algal mat
- Research and promotion facility
- Retention ponds
- Ecological wetlands
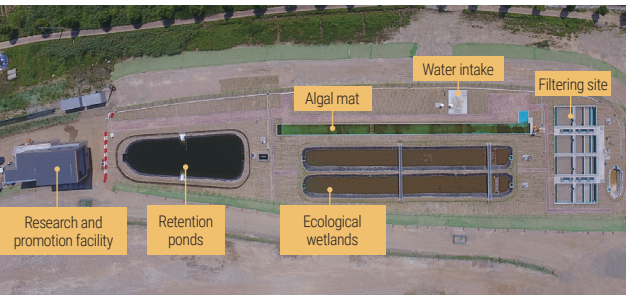
* Eco-Filtering : A chemical-free, low-energy-based eco-friendly water treatment technology based on natural purification methods such as adsorption, precipitation, and the removal of organic matter and nutritive salts by microorganisms.
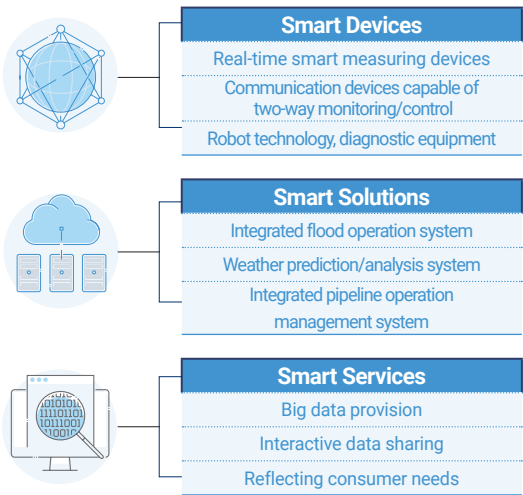
Integrated hydraulic and water quality monitoring & predictive response system

Response to an accident affecting water quality

Responding to and sharing crisis
- Real-time information sharing
- Accident recognition
- Suggestion of best response scenarios

Surveillance and monitoring
- Main pollutant monitoring CCTVs
- Real-time integration of water quality TMS
- Real-time tracking of water quality changes in basins
- Detecting water quality accidents and monitoring trends

Management and monitoring of pollutants

Pollutant management
- GIS-based pollutant records
- On-site inspection and preemptive reduction of pollutant sources

Pollutant management
- Tracking changes in basin land and pollutants
- Retention ponds-river stream water quality analysis (once/day)

Pollutant management
- Evaluation of pollutants in each municipal area (basin)
- Identifying controlled areas and priorities
- Retention ponds-river stream water quality analysis (once/day)

Prediction of reservoir water quality

Project predication and evaluation
- Integrated basin management target
- New development projects and water quality improvement measures
- Effectiveness prediction and pre-evaluation

Hydraulic and water quality prediction
- Optional operation through hydraulic interpretation
- Identifying the optimal method of water intake such as floodgate operation

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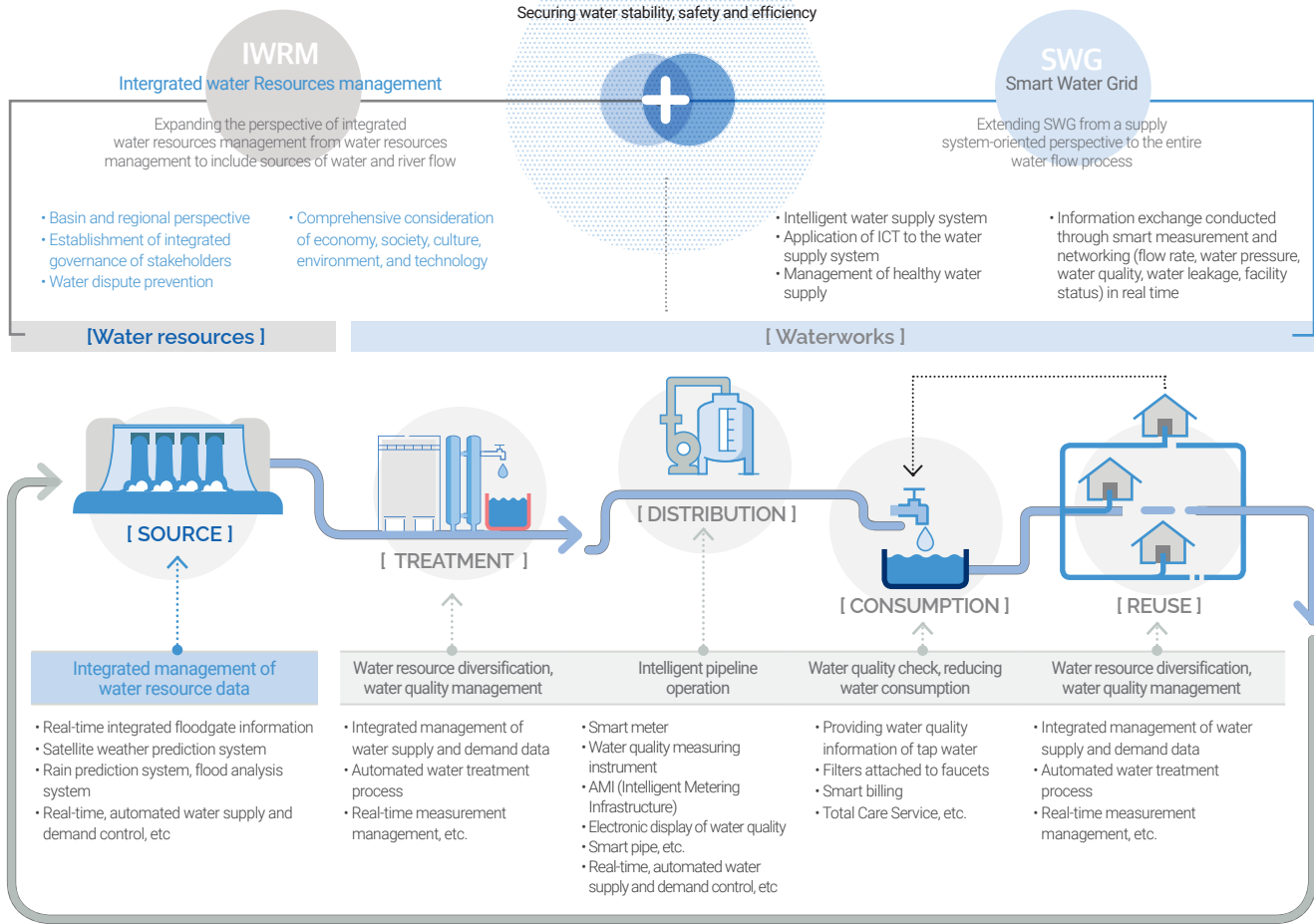# A New World Driven by Digital Transformation

Building a Smart Water Management System

K-water has established Smart Water Management (SWM), a new, innovative paradigm in the water industry from planning to management by integrating information and communication technology (ICT) into the entire water management process. SWM is an integrated water resources management model that secures water stability and efficiency through smart water grid-based design and operation. It is a smart solution that combines intelligent detecting and ICT technology through smart devices. K-water aims to scientifically and systematically manage the entire water management process by integrating consumer-oriented service systems. We also install smart meters at each household to provide continuous usage data and consumer-oriented services for supporting safety, such as the detection and notification of water leaks and the activities of the vulnerable, such as the elderly.

3S-based Smart Water Management

Smart Devices
- Real-time smart measuring devices
- Communication devices capable of two-way monitoring/control
- Robot technology, diagnostic equipment

Smart Solutions
- Integrated flood operation system
- Weather prediction/analysis system
- Integrated pipeline operation management system

Smart Services
- Big data provision
- Interactive data sharing
- Reflecting consumer needs

Concept of Smart Water Management

SWM
Smart Water Management

"Integrated management model for the entire water circulation"
Securing water stability, safety and efficiency

IWRM
Intergrated water Resources management

Expanding the perspective of integrated water resources management from water resources management to include sources of water and river flow

- Basin and regional perspective
- Establishment of integrated governance of stakeholders
- Water dispute prevention
- Comprehensive consideration of economy, society, culture, environment, and technology

SWG
Smart Water Grid

Extending SWG from a supply system-oriented perspective to the entire water flow process

- Intelligent water supply system
- Application of ICT to the water supply system
- Management of healthy water supply
- Information exchange conducted through smart measurement and networking (flow rate, water pressure, water quality, water leakage, facility status) in real time

[Water resources]　　　[Waterworks]

[SOURCE] → [TREATMENT] → [DISTRIBUTION] → [CONSUMPTION] → [REUSE]

Integrated management of water resource data
- Real-time integrated floodgate information
- Satellite weather prediction system
- Rain prediction system, flood analysis system
- Real-time, automated water supply and demand control, etc

Water resource diversification, water quality management
- Integrated management of water supply and demand data
- Automated water treatment process
- Real-time measurement management, etc.

Intelligent pipeline operation
- Smart meter
- Water quality measuring instrument
- AMI (Intelligent Metering Infrastructure)
- Electronic display of water quality
- Smart pipe, etc.
- Real-time, automated water supply and demand control, etc

Water quality check, reducing water consumption
- Providing water quality information of tap water
- Filters attached to faucets
- Smart billing
- Total Care Service, etc.

Water resource diversification, water quality management
- Integrated management of water supply and demand data
- Automated water treatment process
- Real-time measurement management, etc.

Leading the Data-driven Ecosystem

The rapid development of data technologies such as big data and AI has been applied and expanded to the water field, increasing the necessity of improving the data-based competitiveness of the national water industry. K-water is reinforcing its water management quality by opening water environment data based on public demand through the water information portal (MyWater) and public data portals. Additionally, we are establishing a verification system based on quality diagnosis of the open data. Since 2019, we have been reorganizing the water management system and promoting technology development by establishing a platform that collections real-time hydrological, meteorological and environmental data and holding a public contest on big data to reflect suggestions from citizens.

Development of the Water Management Analysis Model

K-water has developed and is operating K-series, a software designed for leading smart water management. K-series is a strategic software package in which our technology and know-how in the water resources, waterworks, and energy fields have been implemented as a software program. With the K-series, we are leading integrated water resources management technology and improving water management systems by developing linkage models and hybrid models (into which physical and chemical models and data models are fused). In addition, we have opened K-series (shared via MyWater) to the public and are actively engaging with technical software communities (an open platform system in which industry, academia, and research institutes participate) to continuously improve the Korean water management industry's technology.

| Business Case

Water Infrastructure Smart Technology Workshop

K-water and the Korea Water Resources Association jointly held the 'Workshop on Smart Technology for Water Infrastructure Facility Management' to introduce and exchange opinions about smart technologies based on the core technologies of the 4th Industrial Revolution, which can be used for water infrastructure management. During the workshop, core technologies in eight fields were presented, including Building Information Model (BIM), which visually reproduces all building information from foundation construction to maintenance after construction is completed, and underwater robots. Experts from relevant agencies and industrial leaders including the Ministry of Environment, K-water, the Korea Rural Community Corporation, and the Electronics and Telecommunications Research Institute participated as panels to discuss the subjects. In the workshop, we introduced core technologies in the field of smart safety management and maintenance. We have sought more effective ways to implement the Green New Deal and Digital New Deal in the water infrastructure field based on the discussions of experts at the workshop.

Water Infrastructure Smart Technology Workshop

K-water's World Class Software

K SERIES

Internalization of the integrated water resources management technologies of water quantity, water quality, and water ecology from ditches to estuaries, strengthening soft power in the water fields.
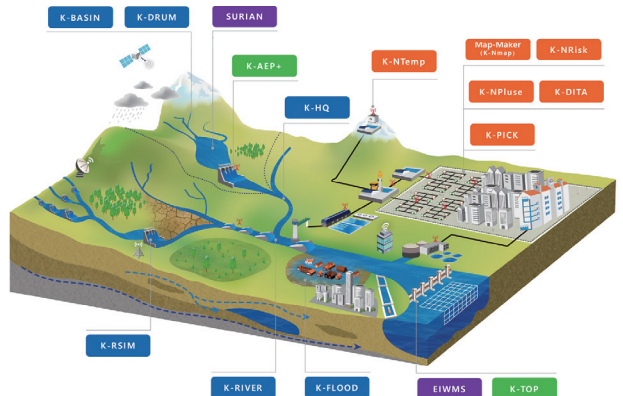
A | Watershed management technology SW
- **K-BASIN** Semi-distributed watershed model
- **K-DRUM** Grid-based distributed watershed model
- **K-RSIM** Reservoir simulation model
- **K-RIVER** One-dimensional stream flow analysis model
- **K-FLOOD** Secondary Flood Analysis Model
- **K-HQ** Rating curve (Stage-discharge curve) calculation SW

B | Technical SW about water quality and quantity
- **Map-Maker (K-Nmap)** MAP-MAKER (K-Nmap) : Water supply network modeling SW
- **K-NRisk** SW for mathematical analysis of abnormal water supply systems
- **K-NTemp** Water pipeline temperature analysis SW
- **K-NPluse** SW for the analysis of unsteady flow of water supply systems
- **K-DITA** SW for Physical model for analyzing flow fluctuations
- **K-PICK** incorrect · missing data correction SW

C | Energy technology SW
- **K-AEP+** SW for calculating optimal generation amount based on dam operation
- **K-TOP** Tidal power generation SW

D | Water management system
- **EIWMS** Integrated management system of Nakdong River Estuary
- **SURIAN** Integrated water quality prediction and response system

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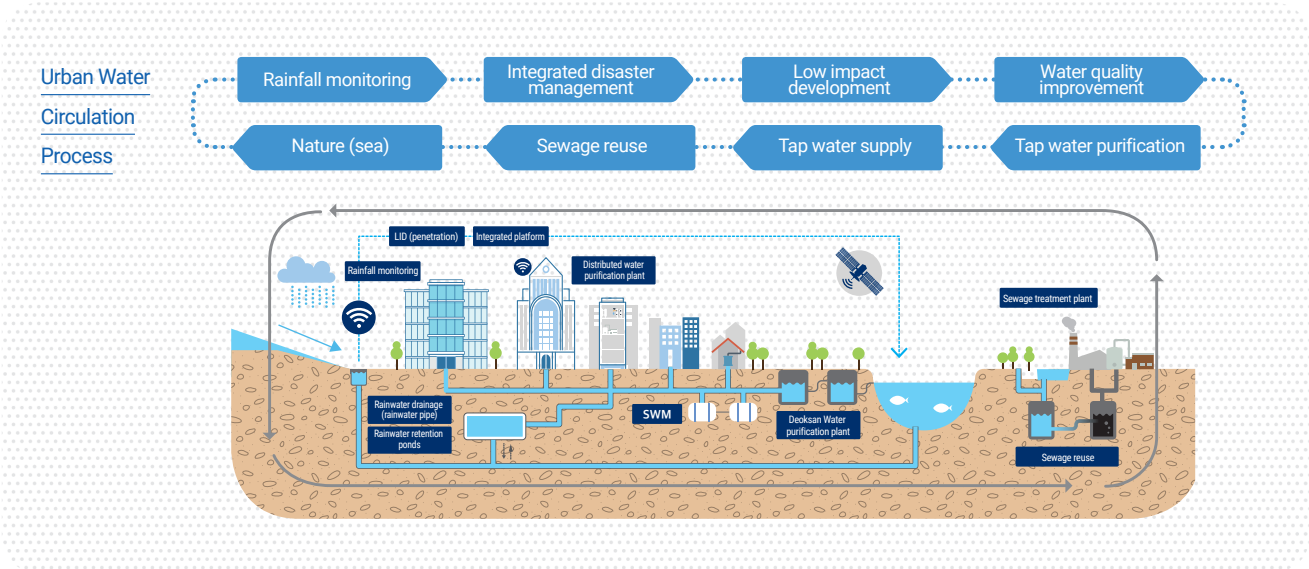Appendix   37

Global Technology Leader

Platform for Smart Water Management (SWM) Standardization

K-water is promoting and expanding the Smart Water City (SWC) Project in order to realize a healthy water supply system that consumers can trust by scientifically managing the quantity and quality of water and providing information on tap water. In 2014, starting from some areas in Paju, the Smart Water City Pilot Project was expanded to all areas of the city in 2016, and through this project, the quality of tap water in the area has improved significantly.

Goal of Establishing Smart Water Platforms and Solution Development
(Unit: cases, cumulative)

	5	10	30
	2022	2025	2030

Current Status of Major Smart Water Cities

Project area (thousand ㎡)	Project area (thousand ㎡)	Project area (thousand ㎡)
11,770	111	105
Budget (KRW 100 million)	Budget (KRW 100 million)	Budget (KRW 100 million)
6,605	24.9	28.7
Busan Eco Delta City	Buyeo Gyuam District	Naju Noan District

Condition diagnosis
- The introduction of smart water management requires permission from local governments due to the nature of consignment projects.

Expansion strategy
- **Targets:** Municipal areas that have achieved the target water flow rate.
- **Method :** No additional financial burden except the consignment project budget.

Result
- Approved by 5 cities and counties
  * Dongducheon-si, Yangju-si, Jeongeup-si, Goryeong-gun and, Naju-si

Expected effects
- Supply of healthy water to 537,000 people.
- Increased drinking rate and trust in tap water.
- Public health and welfare

Ansan New Town Phase 1
Sihwa Phase 1
Sihwa MTV
Songsan Green City
Ansan New Town Phase 2
Gumi High Tech Valley
Gumi Expansion Complex
Gumi Complex 2 and 3
Gumi Complex 4
Onsan National Industrial Complex
Buyeo Gyuam District
Busan Eco Delta City
Yeosu Expansion Complex
Najunoan District
Changwon National Industrial Complex
Yeosu National Industrial Complex

Started construction (March, 2016)
Service population 150,000 (2030)

Design completed (December, 2016)
Service population 75,000 (2022)

Core Technology Development through Smart Water City

As the frequency of droughts and floods has increased significantly due to climate change, water management and risk management has become complex and challenging. To make matters worse, urbanization and emerging pollutants have resulted in the degradation of ecosystems and water quality. K-water is using advanced ICT technologies to monitor and manage the entire process of the water supply systems from source to tap in real-time to restore the natural ecology of rivers and develop smart water cities where humans and nature can coexist in harmony. The integration of these smart water management systems with technologies of the 4th Industrial revolution such as AI and IoT are the foundation of smart water cities.

Urban Water Circulation Process

- Rainfall monitoring → Integrated disaster management → Low impact development → Water quality improvement
- Nature (sea) → Sewage reuse → Tap water supply → Tap water purification

LID (penetration) · Integrated platform
Rainfall monitoring
Distributed water purification plant
Sewage treatment plant
Rainwater drainage (rainwater pipe)
Rainwater retention ponds
SWM
Deoksan Water purification plant
Sewage reuse

Development of Digital-based Water Platform

K-water is striving to develop an ever-evolving and digital-based water platform to address, with participants, complex and diverse urban water problems that cannot be solved by existing technology and service models. Based on our comprehensive water service capabilities, we aim to foster innovative water companies and leap forward as a comprehensive global water platform company by building a digital water platform where the fusion of data and innovative solutions creates value.

Building a digital water platform where the fusion of data and innovative solutions creates value

An innovative platform for solving complex and diverse water problems	A double-sided and multi-faceted platform that grows with participants	A platform that continuously evolves with small platforms
• Providing solutions that can be used practically in the field such as during floods, droughts, water and sewage problems	• An open system in which companies and local governments participate and various services are self-created	• Realization and expansion of a universal platform based on the standardization and practicality of SME technologies and solutions

Implementation of Smart Water Factories

K-water has automated the water treatment process using the 4th industrial technologies, and is promoting the optimal energy management of its facilities by monitoring and controlling the amount of electricity in real time. We run water purification plants automatically with artificial intelligence and big data-based analysis and prediction. We also perform preventive inspections of infrastructure facilities using ICT and big data. Additionally, we measure and diagnose power usage in real time to keep the usage to an optimal level, and strengthen the safety of facilities by incorporating IoT into finding workers' location and managing hazardous environments.

Detailed Implementation of Smart Water Purification Plants

Items	Implementation Plan
ICT predictive maintenance	• Real-time autonomous diagnosis and analysis of critical facilities → development and pilot tests construction of the predictive maintenance system (Hwaseong Water purification plant)
Smart energy management	• Development and pilot tests construction of real-time energy management across all production and supply processes
Intelligent visual network	• Construction of the visual data analysis system → foundation for the prevention and initial response to critical accidents
Smart safety management	• Construction and expansion of the smart safety management systemmanagement across all production and supply processes

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Strengthening International Cooperation by Leading the Water Industry

Global Smart Water City Platform

K-water has promoted smart city water technology in Southeast Asia, where water-related problems are severe, in order to make it the representative smart city urban model in Asia. During the Korea-ASEAN Summit, we ran a center where visitors could watch and experience water-specific technologies and services applied to Busan Eco Delta City, including a smart water purification plant, and held a special presentation for leaders from Indonesia and other Asian countries. We also introduced smart solutions to cities that do not have water treatment plants to about 15,000 people including presidents of 10 countries and 22 buyers. Our project was given the Best Award for Smart City in Asia Pacific, becoming a representative city model in Asia.
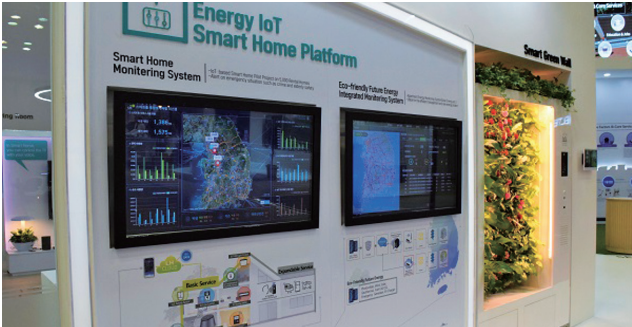
Smart City Fair during the 2019 Korea-ASEAN Special Summit

Reinforcement of Business Expansion to Overseas Markets

K-water signed an "OECD·Ministry of Environment·AWC (Asian Water Committee) Joint Project MOU" to diagnose water status in 10 Asian countries, discover solution projects, and promote the advancement of Korean companies. Through this agreement, we are looking forward to the completion of a K-water-led practical cooperation system among Asian countries for water cooperation, issue selection, solution presentation, policy, legislation, and implementation.
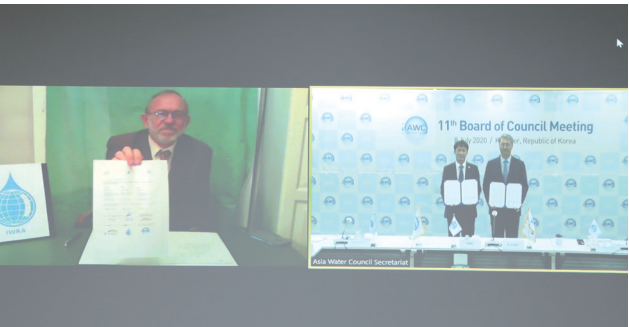
Signed MOU of joint projects

Development of Domestic and International Markets

K-water's smart cities are laying the foundation for new overseas markets and we are working hard to export smart cities' core water-specific technologies to the markets. To this end, we are building a network between countries through, for example, offering training opportunities for high-ranking public officials from Indonesia. We are also opening a joint research center with five countries along the Mekong River and establishing a cooperation system for water management research between Korea and Mekong to disseminate specialized water technologies abroad. In addition, we have applied the technologies of the water cycle city to 5 municipalities, including Andong, and are currently reviewing the feasibility of operating AI, drones, autonomous driving, and smart water purification plants in Songsan Green Smart City.

Investment Plan for Smart City Expansion

(Unit: KRW 100 million)

Total amount	2018	2019	2020
32,280	7,217	3,965	21,098
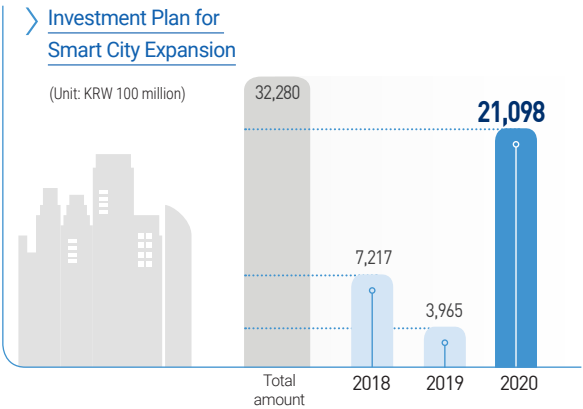
Creation of Subsequent Overseas Projects

In 2019, K-water achieved KRW 18.8 billion in sales by jointly conducting 13 overseas projects of technology services with 12 private companies. We plan to discover new subsequent projects worth KRW 93.7 billion based on the successful completion of the previous projects. In addition, K-water's world class technologies have demonstrated to the international community by jointly participating with private companies in funding projects for international organizations and improving the credibility of private companies.operating AI, drones, autonomous driving, and smart water purification plants in Songsan GC Smart City.

Performed	Namneung River (Laos) water resources management MP	Denpasar (Indonesia) SWM MP
Subsequent projects	Integrated water resources management (KRW 12.1 billion)	Bali (Indonesia) SWM (KRW 4.8 billion)
	Mekong River (Laos) flood (KRW 5.5 billion)	Semarang (Indonesia) SWM (KRW 62 billion)

Performed	Malaysia SWM plan	Old waterworks in Tashkent MP
Subsequent projects	Indonesia's new waterworks investigation	SWM test project (KRW 3 billion)
	Malaysia SWM MP (KRW 3 billion)	West Uzbekistan waterworks (KRW 3.3 billion)

Water Environment Cooperation Between the Two Koreas

K-water requested that the government include the supply of groundwater and the requirement of a prior notice by North Korea before discharging water from a dam in the inter-Korean talks agenda as a plan for inter-Korean cooperation at the Water-Détente. In addition to improving drinking water and sanitation in the North, we will specify areas of mutually beneficial cooperation and prepare measures for flooding and drought by reinforcing dam bodies vulnerable to leakage, damage, and earthquakes to secure the safety of old dams in North Korea. We will carry out academic exc hanges regarding improving the condition of drinking water and sanitation, which are directly related to both the human rights of North Koreans and the water environment technologies of the two Koreas. In addition, we are planning to support North Korea's membership in the Asian Water Commission (AWC) and establish and proceed with various measures for cooperation between the two Koreas in water and environmental fields.

2019 Water-Détente

Inter-Korean Water Resources Cooperation

K-water has laid a foundation for new projects by building a water resources cooperation system between the two Koreas. We have materialized projects that can be included in the agenda of inter-Korean talks, and are supporting the establishment of a permanent communication channel on the water environment between the two Koreas. While maintaining a cooperative relationship with domestic and international institutions related to North Korea, we are identifying inter-Korean tasks by running the Reunification Water Research Group and strengthening the project foundation through DB construction. We are also engaged in consultations with relevant ministries so that the water environment can become an agenda during inter-Korean talks, possible inter-Korean cooperation projects can be found, and leading environmental cooperation can be accomplished through proposals to the government.

Detailed Plan of Inter-Korean Cooperation

Goals	Detailed plan
Laying a foundation	• Improving (permanent) cooperation with the National Assembly, the government, public agencies, and domestic and international private organizations. • Identifying tasks, policy proposals, and promotion through an internal advisory group – Reunification Water Research Group • Operation of and participation in training programs to improve internal competency. • Research, analysis, DB construction and systematic management of water and environment in North Korea
Government support and agenda	• Consultations with relevant departments to include water and environment issues in the agenda of the inter-Korean talks
Cooperation projects	• Materialization of inter-Korean projects related to drinking water, sanitization, energy, and forestry • Preparing detailed plans for cooperation concerning rivers shared by the two Koreas and proposing them to the government. • Establishing effective ways to utilize water resources in North Korea

UNESCO-K-water Joint Education

K-water, together with the UNESCO i-WSSM, conducted a one-month long international training session for international students residing in Korea and public officials from developing countries in October 2020 to build global capacity in the water and energy sector. This training was developed jointly by both organizations to respond to the climate and environmental crisis caused by COVID-19 and to improve the capacity of developing countries in the field of basic health and environment. The educational topics cover three areas: integrated water resource management to improve capacity to respond to climate change, waterworks operation to effectively supply clean and safe water, and development of sustainable eco-friendly new and renewable energy. Smart water management promoted by K-water was especially reflected in the contents of this course in order to actively promote Korea's Green New Deal in water management.

UNESCO-K-water joint global capacity building training.

| Business Case

Water Management Education for 8 Countries in Southeast Asia

The K-water's Human Resources Development Institute provided "Water Resource Development and Management" training for 15 water management officials from eight Southeast Asian countries, including Laos and Myanmar. The training included subjects on practical matters concerning the overall water cycle system such as securing and using water resources, establishing water management policies and systems, stable water and sewage management, and other water management measures tailored to the characteristics of Southeast Asia.

Training in South East Asia's Water Management

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Water Culture Infrastructure with the Public

Aquatic Ecosystems and Waterfront Space

K-water is taking the lead in realizing eco-friendly water management by improving the environmental and cultural functions of dams as well as their irrigation and flood control functions. More specifically, we are constructing waterfront buffer areas as a part of ecological management of basins utilizing the geographical advantage of dam areas connected to the water. We have transformed such areas into healthy waterside buffer areas by creating riparian forests and wetlands in reservoir areas that were needed to recover ecological functions. Waterfront buffer zones will perform various functions including purifying pollutants, providing habitat for living things, controlling the microclimate, and providing eco•experience tourism. In addition, we intend to provide ecological and cultural services to the public through the discovery and operation of programs based on river culture. While providing various water-based services that the public can experience, we will promote water culture by preserving and utilizing natural resources and are planning to boost the local community's economy by securing the sustainability of such water culture.

In particular, Gangcheon Island in the Hangang River basin signed a consignment agreement for environmental management to preserve ecological value and create local jobs. We are making efforts to highlight the island as a leisure ecological space that everyone can enjoy by creating resident-led jobs and improving the ecological and cultural values of the Island.

Signing Agreements for Environmental Management with Local Communities

Supporting the Local Economies of Villages Nearby to Eco-friendly Dams

K-water formed, as a part of realizing social value, 'Public Happiness Design Corps' with local residents to build sustainable ecological village around the dam intended for boosting the local economy by discovering profit-generating models using the ecological and cultural resources of villages near dams. Starting with Ihyeon-dong village near Daecheong Dam as a pilot project, we are trying to expand the creation of sustainable ecological village around the dam along basins based on consensus with local communities, improve infrastructure, and discover programs that reflect the needs of local residents.

Public Happiness Design Corps

Rest Places for Local Residents

K-water has developed state-owned facilities such as water purification plants and booster stations into spaces for relaxation and ecological experiences for local residents. The Gunsan Booster Station has been turned into a water-friendly park with rest areas and facilities based on water themes. Trails and habitats for butterflies were built at the Gumi Water purification plant. These rest spaces and facilities are open to both local residents and visitors. They are also used for eco-concerts and eco-tours for local residents and students.

Eco Tours and Eco Concerts Performed in Gumi Water Purification Plant

Public Benefits through Water Welfare

Stable Water Supply to Areas in Shortage of Water

Due to the geographic characteristics of islands and remote areas, water supply is limited, and in the case of Yokjido, 38% of the supply is leaked due to the deterioration of supply pipelines. K-water is working hard to correct the shortage of drinking water for residents. For example, we are dispatching 46 employees in rotation to Yokjido and establishing strategies tailored to each area to resolve water supply-related issues. In addition, we are conducting a project to provide a direct supply line of metropolitan water to residents in areas where the local water supply system is not easily accessible. In 2019, utilizing the metropolitan area water supply model with no distance restrictions, we provided a direct water supply to 110,000 people in 17 municipal areas including 1,000 people in Haenam County whose main water source had been groundwater.

Multi-region Waterworks Model without Distance Limitation
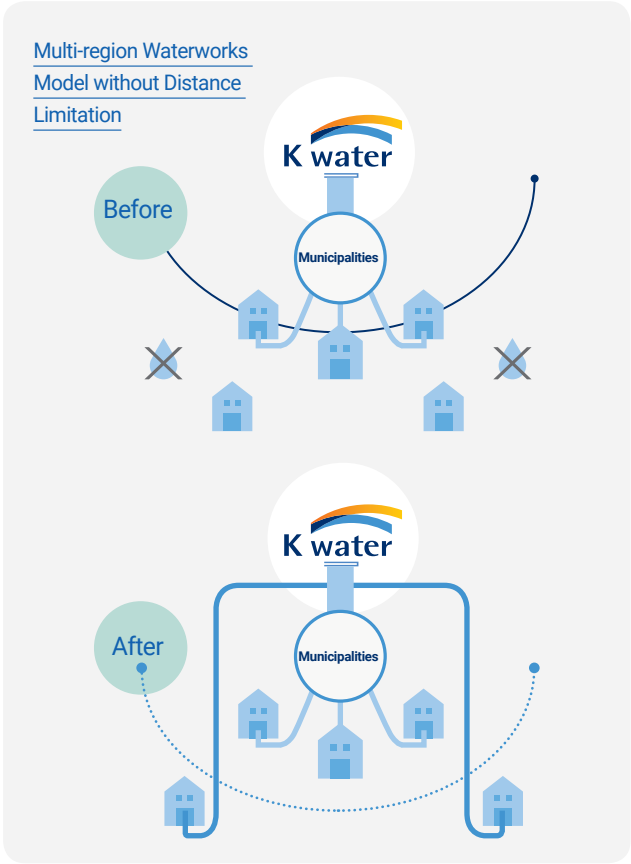
Water Service Gaps between Regions

In order to alleviate water service gaps between regions, K-water is implementing various measures including introducing integrated water supply fees for each basin and reducing water fees. We have also prepared a mid- to long-term roadmap for unifying water fees for municipalities, strengthening water fee support, and increasing the discount rate for using dam water, supporting an additional KRW 383 million annually.

Mid- to Long-term Roadmaps

Success model development (2019-2024)
4~6 sub-regions

Expansion of integrated management (2025-2030)
20~30 sub-regions

Integrated management by basin (after 2030)
100% nationwide
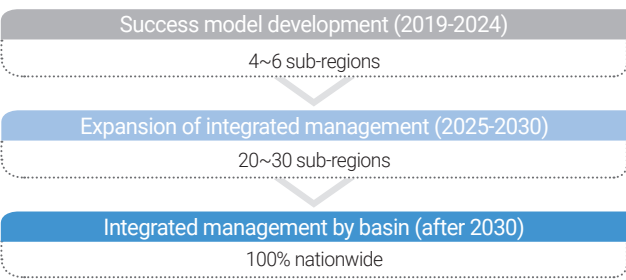
Reducing Residents' Water Fee Burden

K-water is running seawater desalination facilities that supply both high-quality drinking water and water for home or industrial use via the treatment of seawater that otherwise would not be used. Due to accumulated deficits, the agreements of 18 facilities were withdrawn in 2019, but we have extended the operation of island seawater desalination facilities and reduced the water fee by 60% in order to promote island residents' water welfare.

Founding Business Improvement Processes

Replacement & substitution of entire facilities	Replacement & substitution of individual equipment	Maintenance
To be borne by local governments	To be borne by K-water	

Replacement & substitution of facilities	Maintenance
Subsidies from local governments and the central government	To be borne by K-water

Water Welfare Services for the Vulnerable

K-water has developed a "social safety net service" for vulnerable residents, such as elderly living alone. The majority of local waterworks business sites operated by K-water are in rural areas with large elderly populations. As such, using IoT-based smart water meter reading, K-water has established and is managing a service that determines crisis situations by identifying real-time usage and monitoring water usage patterns.

No. of Households Using Our Social Safety Net Service

(Unit: households)

28
1 city districts
2017

114
3 city districts
2018

840
17 city districts
2019
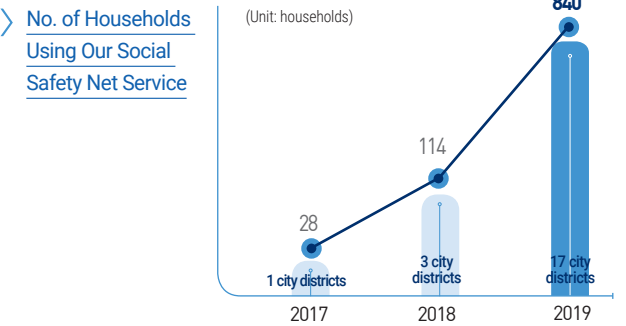
K-water that Takes Responsibility for the Public's Safety

K-water intends to build a preemptive disaster prevention system in areas with limited access to water by upgrading the current disaster management system to secure public safety against water-related disasters such as flood, drought, tainted water, and algal blooms. Furthermore, our safety management system has been reinforcing a culture of safety for the Corporation, business partners, and citizens.

Key Activities >>

- Reinforcement of flood information provision service and upgrading forecast and warning systems to meet the needs of the public
- Responding to civil complaints using K-water's expertise, active support to cope with tainted water incidents, and water fee reduction
- Building a systematic safety management system by enhancing the 'K-water Risk Management (KRM)
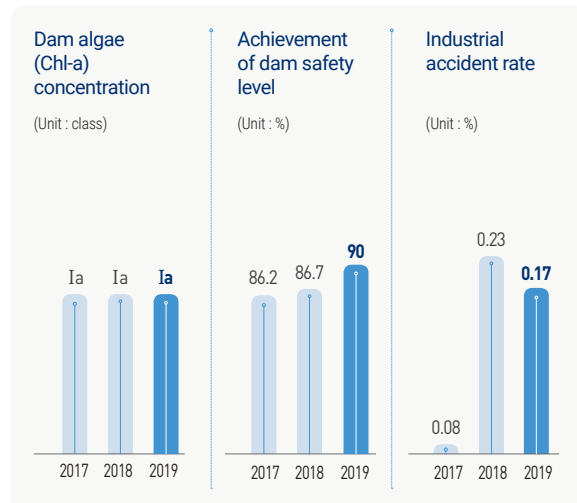
Future Plans >>

- Upgrading dam warning stations and the hydrometric satellite communication network for better flood forecasting and warning
- Establishing an emergency support system, to be run by local governments, named 'Drought 119' (for emergency water supply) to help regions at risk of drought
- Stable implementation of K-water safety management M/P (2020~2024)

Key Achievements >>

Dam algae (Chl-a) concentration	Achievement of dam safety level	Industrial accident rate
(Unit : class)	(Unit : %)	(Unit : %)

Dam algae (Chl-a) concentration:
- 2017: Ia
- 2018: Ia
- 2019: Ia

Achievement of dam safety level:
- 2017: 86.2
- 2018: 86.7
- 2019: 90

Industrial accident rate:
- 2017: 0.08
- 2018: 0.23
- 2019: 0.17

Material Issues in Sustainable Management >>

Key issues	Aspect assessment			SDGs-related goals
	Cost	Revenue	Risk	
Response to climate change (low carbon emission and fine dust reduction, etc.)	○		○	13 CLIMATE ACTION
Improvem ent of occupational health and safety			○	8 DECENT WORK AND ECONOMIC GROWTH

Achievement Goals >>

Control items	Goals	Period
Establishing a system to respond to drought	Local government decision-making system (situation board, emergency water supply) and "Drought 119"	By 2024
Introduction of smart safety technologies	Expansion of safety net for facilities, industry, and construction using smart safety technologies	By 2024

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Systematic Response to Flood

K-water is advancing integrated management using advanced technologies to respond to water disasters such as floods and droughts. We are striving to systematically respond to floods by strengthening the support of integrated flood management and improving dam operation during the flood season.
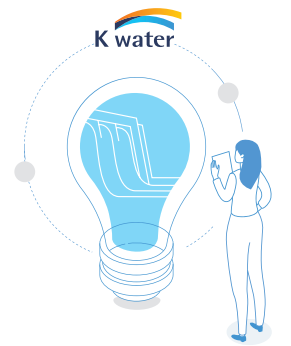
Flood Management Using Advanced Technologies

K-water has established an advanced, preemptive flood response system for predicting rainfall, analyzing floods, and responding to floods using cutting-edge technologies. We are planning to improve the typhoon analysis model using AI technology such as deep learning on typhoon statistics from 2022.

Increasing Support for Integrated Flood Management in Vulnerable Areas

Due to the sudden increase in torrential rains caused by climate change, frequent flood damage occurs in vulnerable areas such as small to medium rivers and downtown areas. K-water has, in consideration of water circulation in the watershed, established a construction plan to develop an integrated river-city connection smart urban inundation management model for integrated management of the entire process of inland and river flood management.

Integrated Flood Management System Construction Process

Laying a Foundation
Establishment of work process and distribution of guidelines for system construction
○ Reorganization and increase of dedicated personnel for flood analysis and system construction

Collaboration System
Establishment of a collaboration system for sharing roles and communication about flooding between agencies
○ Industry-academia-research workshops to standardize local governments' communication systems for information about disasters, etc.

Sharing Information
Linking and integrating flood information possessed by local governments and related agencies
○ Real-time connection and integration of flood-related information from Korea Rural Community Corporation, Meteorological Administration, and flood control centers

Technology Development
Development of methods to link information between agencies and upgrading disaster prevention measures using cutting-edge technology
○ Enhancement of the standard platform software (SmartTM)

System Construction
Establishment of integrated flood management system for local governments and expansion of its application to municipalities
○ Construction-completed of three municipalities (Goryeong-gun, Cheongju-si, Danyang-gun) in 2019 and is constructing four municipalities in 2020

Systematic Preparation for Flooding

K-water analyzed data from hydrological observations at 31 locations and improved observation standards in order to minimize flood damage. As a result of these efforts, the observed density of Yeongju Dam has been improved by 30%, and its analysis accuracy has also been improved by 12% compared to 2018. We have also upgraded the operating standards for dams during the flood season in order to reduce flooding downstream caused by frequent, sudden, and concentrated heavy rainfall. In addition, flood management capabilities have been improved by using natural retention spaces such as wetlands and parks for impounding flood waters in emergency situations.

Improvement of Dam Operation During the Flood Season

Before	After
Planned flooding level / Normal high water level / Low water level — Flood control space, Water supply space	Flood control space, Water supply space, Flood control water level
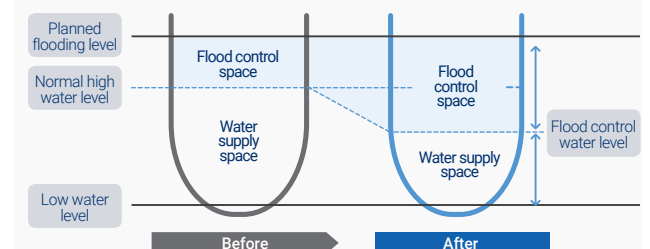
| Business Case

Record Number of Typhoons Landed in Korea

In 2019, seven typhoons hit Korea, and heavy rains fell in and around the southern regions. Consequently, this raised water levels in dams and rivers at the same time. When typhoon "Mitak" landed, K-water moved water in advance through the spillways connecting Andong Dam and Imha Dam, thereby securing 1,400m³ of flood control space to reduce the flood burden of Imha Dam. In addition, we were able to keep 64% of the inflow water in the dams by adjusting the discharge volume of five multi-purpose dams including Gimcheonbuhang, Hapcheon, Namgang, Miryang, and Juam, thereby preventing flood damage to 134 municipalities.

> Flood Control Rate

(Unit: %)
- 2017: 62.1
- 2018: 65.9
- 2019: 73.1

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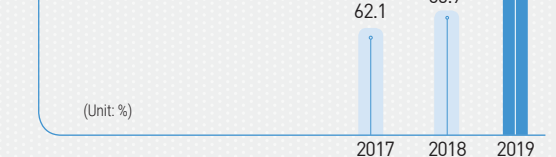
Drought Response with Local Communities and Residents

Since January of 2017, K-water has run a national drought forecast and warning system to proactively respond to natural disasters. Data from the warning system are used to monitor, analyze, and predict the intensity of drought by region across the country (162 cities and counties) in order to minimize damage and suffering. Additionally, we have started to support region and people-oriented drought response services in order to prepare for recently intensifying natural disasters.

Minimizing Drought Damage

K-water is executing preventive drought control measures by using data from real-time monitoring and analysis for forecasting, providing preliminary drought predictions for all dams, and implementing emergency response plans for individual dams. In 2019, rainfall in some dam areas (Soyanggang, Chungju, Boryeong) decreased to 73% compared to the previous year (decreased by 27% compared to the previous year), resulting in water shortages in some regions. However, through effective dam operation and with cooperative efforts with other agencies (including ICHNP, KRCC, and local governments), we have been able to secure up to 122% (9.66 billion m³) of dam storage compared to the previous year. In particular, we prevented water shortages in the metropolitan area (with a population of 25 million) by responding preemptively to drought by utilizing water from the Soyanggang Dam and Chungju dams.

Precipitation in 2019

National precipitation (Unit : mm)
Decreased by 9% compared to average year
1,307 → 1,184
Average Year　2019

Soyanggang Dam Chungju Dam Boryeong Dam (Unit : mm)
| The 4th lowest precipitation since 2000
Soyanggang Chungju　Boryeong
Decreased by 27% compared to a normal year
1,217 → 886　1,372 → 1,022
Average Year　2019　Average Year　2019
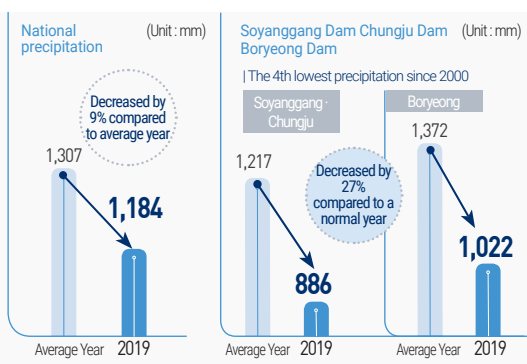
Increased Storage Rate for Preemptive Drought Management
(Unit : %)
59.1　69.9　59.3
2017　2018　2019
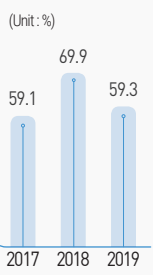
Reinforcement of the Regional Drought Response System

Based on our water management experience and technology, K-water provides customized support to local governments suffering from drought. Since 2019, we have established and run the 'Comprehensive Drought Response Board' to help local government officials monitor water shortage situations in their regions and make decisions in a timely manner. In addition, we are building 'Drought 119', which provides information on user location-based emergency water supply facilities available in case of drought, and are planning to launch it from 2022. We are also trying to strengthen local governments' ability to respond to drought by running a tailored support system named 'Danbi', which includes education, information, countermeasures, etc., to local governments suffering from water shortages.

Comprehensive Drought Situation Board for local governments
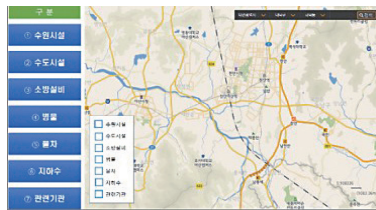
Emergency support for drought measures (Drought 119)

'Danbi' services tailored to customers

Drought Measures Based on Public Participation

K-water has built and is operating "drought education centers" for the first time in Korea to increase people's awareness of water shortages and encourage voluntary participation in water conservation. In addition, we are supporting the government's decision to prevent drought damage by establishing a drought information portal that provides a variety of drought-related information including basic knowledge about drought, tips on how to respond to lack of rain, and drought forecasts and warning data. In particular, 110,000 people visited the portal when data quality was improved and more drought information was added in 2019. In recognition of such quality improvement achievements, K-water was awarded the "Grand Prize" at the Data Quality Awards of the Ministry of Science and ICT.

Drought Education Center

Drought Information Portal

Expansion of in-depth drought information

Responding to Water Quality and Algal Blooms to Ensure Public Safety

A Representative Agency to Water Quality Issues and Algal Blooms

K-water is striving to secure water safety for the public by improving water quality and dealing with algal blooms in line with government measures. In 2019, we were recognized as the representative response agency to deal with tainted water and algal blooms. We also improved the nation's initial response capabilities by securing the ability to rapidly respond to incidents at 51 water sources. Additionally, in support of the government's policies and actions to combat algal blooms, we have developed practical measures to monitor and reduce algal blooms.

Development of Algal Bloom Indicators to Provide Transparency and Build Public Trust

K-water has developed the K-water Visual Index (KVI) to immediately respond to algal blooms. Previously, when an algal bloom occurred, it took almost 4 days from investigation to response, making it difficult to react at an early stage. So, we developed and distributed indicators that can alleviate these problems and can be determine the determine the level of algal blooms in which the natural river environment has changed and the public can recognize. In addition, with a public participation system, we encourage citizens to participate in dealing with algal bloom issues by reporting them to a dam management office upon finding them.

Step 0	Step 1	Step 2	Step 3	Step 4
No outbreak	Possible outbreak	Algal bloom outbreak	Intensified	Scum generation
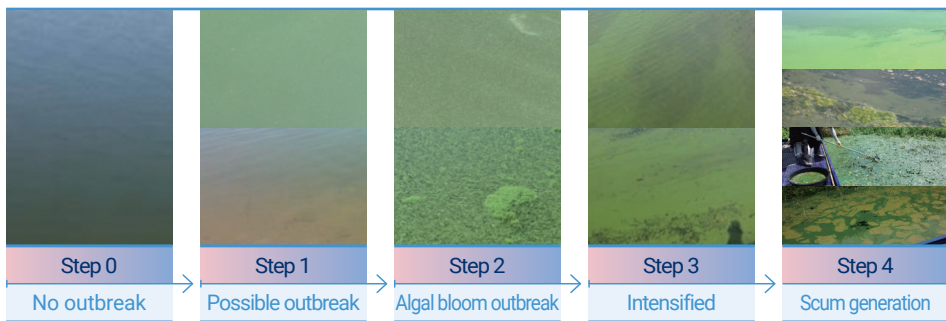
Algal Bloom Indicators

KVI Dashboard Installation at Daecheong Dam

A Full-scale Emergency Response System

K-water takes preemptive measures against any ongoing algal bloom issues or incidents that may affect water quality. We conduct an investigation once a week for areas where algal blooms occur regularly and monitor these areas in real time using CCTV. Through these activities, we inspected 519 cases of water pollution in basins and took preemptive action against 500 cases. In addition, as a part of such measures, algal bloom reduction facilities have been constructed in the reservoirs of several dams, including Yeongju Dam. We are also promoting a pilot project to eliminate algal blooms using a removal.

> Status of Algal Bloom Warning

453 → 13% ↓ → 395
(Unit : days)
2018　2019
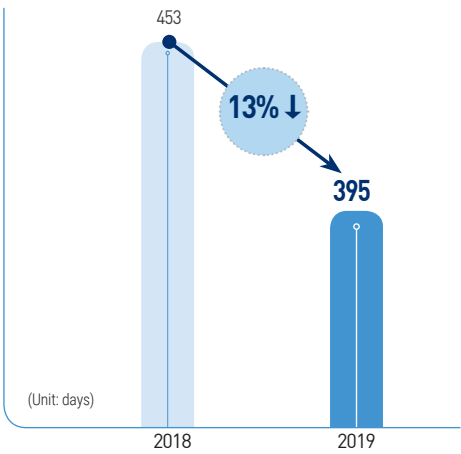
| Business Case

K-water's Efforts to Prevent Tainted Tap Water

In May 2019, as the tainted tap water that occurred in Incheon-si spread to Yeongjong-do and Ganghwa-do, citizens suffered greatly, including interruptions to school meals, skin rashes, and other issues. Although K-water was not the agency responsible for handling the incident, for the sake of public health and safety, we mobilized water experts and technical equipment to resolve the incident as soon as possible and reviewed the initial responses of Incheon-si. In addition, after we examined the status of water supply pipelines at major points and the quality of water at 167 locations, we repeatedly discharged turbid water and cleaned the pipelines to normalize water quality. We also provided citizens with emergency water service including 325 water vehicles and 380,000 bottles of bottled water, and established a citizen-oriented complaint response system to proactively resolve any inconvenience to communities.

01 Efforts to solve tainted tap water
02 Efforts to solve tainted tap water

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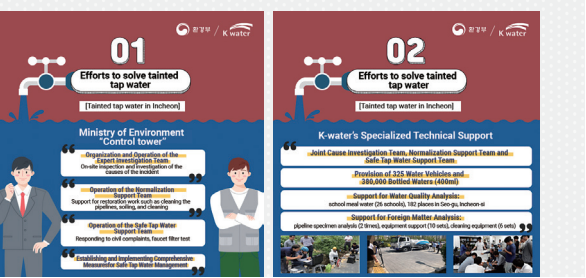
Risk management

Company-wide Safety Management System

K-water aims to practice safety management by building a management system that focuses on the safety of the public and workers. Based on surveys, we diagnosed the company-wide safety level, investigated the working conditions of field workers, and have established company-wide safety management strategies through the dissemination and internalization of safety culture. Dividing the direction of strategy into the management system and safety management practices, we are shifting the management direction from business-oriented to safety-oriented and expanding safety management targets previously limited to our employees to all workers.

Direction of Company-wide Safety Management

Management system	• Establishment of safety management policies and safety MP • Establishment of K-water's basic safety plan (every year) • Organization and operation of the Safety Management Committee • Expanding the scope of advanced information release and management disclosure • Strengthening the safety section of the internal performance management system • Safety personnel 25%↑ & budget 5%↑ compared to the previous year * Safety department (Director of Head Office → Direct control of President)

Safety management	• Development of smart safety technologies and expansion of the scope of their adoption
	• Establishment and operation of labor-management safety work council
	  * Supporting a safe working environment for subcontractors via participation by labor representatives for contractors and subcontractors
	• Enhancing cooperation and technical exchanges with safety organizations
	  * KOSHA and Korean Society of Disaster & Security (2)
	• Company website (safety section) renewal, expanded information provision via SNS
	  * Disaster response education and publicity for the public using various media

Organization of the Dedicated Safety Organization

In January 2020, K-water reorganized the dedicated safety organization, previously managed by the vice manager (vice president), under the direct control of the President. The safety organization is divided into the Disaster Safety Department, Quality Safety Department, and Construction Safety Department. The Disaster Safety Department serves as the control tower for the overall safety management activities including company-wide disaster and facility safety management, risk management, and accident response and support. The Quality Safety Department oversees the technical system and support for improving construction quality and safety including construction system management. The Construction Safety Department is responsible for safety management activities to reduce construction accidents. The vice president who oversees safety-related activities is in charge of general safety management.

Worker-oriented Safety Culture

K-water intends to establish a worker-oriented safety culture by internalizing safety consciousness as well as establishing a safety management system. Tailored training is provided to all personnel from new employees to top managers. Our safety education is tailored to each position and includes online and field training and special lectures on industrial safety for new employees. In addition, we offer specialized training programs, such as lecture programs for hazardous chemicals managers and industrial safety supervisors, for nurturing safety diagnosis and risk assessment personnel. We also try to raise safety consciousness among employees through safety workshops and company-wide disaster management training.

Safety and Health Education

Preparing Measures through Safety Management

K-water has reorganized management systems in the industrial, construction, and facility safety areas to create an environment to prevent accidents in the workplace. We established and distributed safety and health manuals for contracted businesses to prepare safety guidelines for workers based on their business characteristics, and conducted collaborative activities such as workshops and training in which staff from both the head office and field branches participated to secure a safe workplace. This resulted in obtaining a certificate of excellent risk assessment in the workplace. In recognition of these activities, we were selected as 'the best organization for construction safety management' and an 'excellent public institution for disaster management' by the Ministry of Land, Infrastructure, and Transport, achieving the highest level of government evaluation in the safety sector in 2019.

Director of the Organization		Safety Organization
Deputy Director of the Organization (Safety Manager)		
Director of Planning Division	Director of Management Division	Head of Global Business Division	Head of Future Technology Division	Director of K-water R&D Center

Smart Safety Management

K-water is endeavoring to improve the working environment by preventing industrial accidents and performing safety management to protect workers. In order to establish an effective industrial accident prevention system based on workplace characteristics, we have created the quadruple "SAFETY NET" to reduce industrial accidents in the workplace by 25%.

The SAFETY NET Process
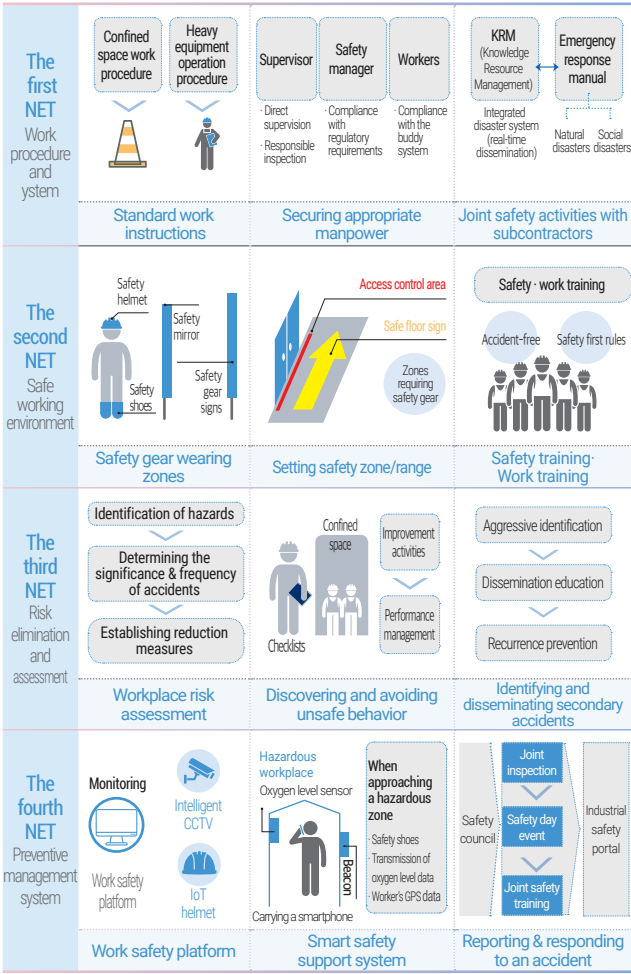
In addition, in response to the growing need for smart safety management and systematic management in hazardous workplaces, we have established an ICT-based "smart safety management system" to perform people-centered safety management. By using workers' GPS data, smartphone, and the safety management system, the system transmits workers' locations and sends an alert to the management system if no movement is detected for a certain period of time when a worker approaches a hazardous zone to prevent industrial accidents. Currently, phased-pilot projects are in operation to verify the effectiveness of this safety management system, and as soon as the verification is complete, we will apply it to 78 business sites nationwide.

Safety Culture to Subcontractors

K-water, as an ordering agency, aims to establish partnership with subcontractors to achieve a culture of fairness and safety. To this end, we have established a system to simplify construction payments by linking system information to the Public Procurement Service. Furthermore, we have secured and are running two-way communication channels including on-site inspection by and on-site meetings with the CSO (Vice President), meetings for construction safety and mutual prosperity, and construction safety competitions to build a culture of safety with subcontractors.
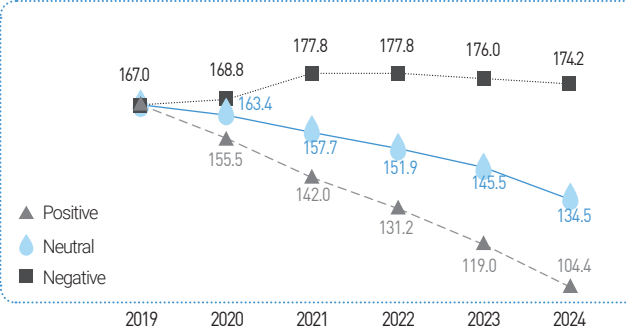

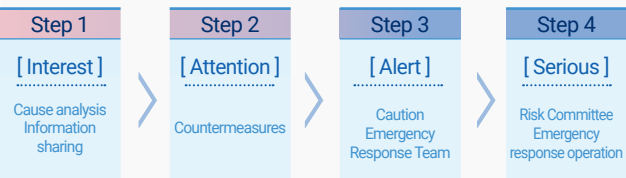Meetings for construction safety and mutual prosperity

Fair and Transparent Financial Solvency

As large-scale floods and droughts continue to occur worldwide due to the impact of climate change, the introduction of efficient water management is urgent. K-water, as a public corporation specialized in water management, has established and is running an eco-friendly management system across our entire business process.
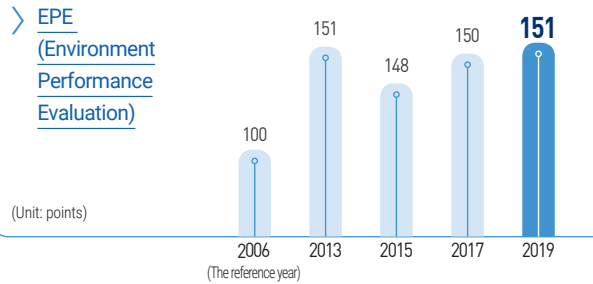
Mid- to Long-term Financial Plan Scenario

	2019	2020	2021	2022	2023	2024
Negative	167.0	168.8	177.8	177.8	176.0	174.2
Neutral	167.0	163.4	157.7	151.9	145.5	134.5
Positive	155.5	142.0	131.2	119.0	104.4	

Financial Risk Management System

Step 1	Step 2	Step 3	Step 4
[Interest]	[Attention]	[Alert]	[Serious]
Cause analysis Information sharing	Countermeasures	Caution Emergency Response Team	Risk Committee Emergency response operation

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Environmental Management

Eco-friendly Management System

As large-scale floods and droughts continue to occur worldwide due to the impact of climate change, the introduction of efficient water management is urgent. K-water, as a public corporation specialized in water management, has established and is running an eco-friendly management system across our entire business process.

> EPE (Environment Performance Evaluation)

(Unit: points)

2006 (The reference year)	2013	2015	2017	2019
100	151	148	150	**151**

Overview of K-water's Environment Management

Implementation system	Environment Performance Evaluation Index	Support basis
Quality, environment management system that meets global standards	**(EPE, Environmental Performance Evaluation)**	**Nurturing internal experts in quality, environment, and green management**
• Obtained IOS certification for quality, environment, and green management. • In October, 2020, certification conversion ISO9001 / ISO14001 [ISO9001(Quality Management) / ISO14001 (Environment Management) / KSI7001(Green Management)] • Every year, external agencies and internal auditors conduct the inspection of all departments for the implementation of quality, environment, and green management (including customer service quality, environment, and safety management), and corrective measures are taken.	• An index that comprehensively and quantitatively measures environmental management performance in all business areas • Indicates the degree of relative improvement in environmental performance compared to the base year (2006) • In use since 2007, we developed and obtained the patent for the first computerized environmental performance evaluation system in Korea. • The environmental performance evaluation (EPE) index in 2019 was 151 points, meaning a 51% improvement compared to the base year (2006).	• Since 2007, we have provided selected employees with opportunities to take training courses to become certified auditors of ISO quality and environmental management. • As of October 2019, a total of 179 certified auditors of ISO quality and environmental management were selected. • Quality and environment management that meets internal standards have been implemented by internal experts across the entire operation of K-water.

Environment Management System Certificate

Environment Management System Process

PLAN
• Environment management policy and code of practice
• Establishment of environmental management goals
• Environmental management implementation plan
• Eco-friendly design

CHECK
• ISO certification audit
• Environment performance evaluation (EPE)
• Government management evaluation and internal audit
• Internal evaluation

ACTION
• Management review
• Sustainability management report
• Improvement and correction of nonconformities
• Stakeholder communication

DO
• Environmental management goals and implementation plans
• Development and management of eco-friendly water resources
• Clean energy production
• Green purchase

Climate Change Adaption and Risk Management

Climate Change Adaption and Risk Management Strategy

K-water is the first public corporation to proclaim "Climate Crisis Management", which prioritizes climate crisis responses in all decision-making processes. In order to protect the public from the climate crisis and become an innovation platform that turns the crisis into an opportunity, K-water has set "adaptation", "mitigation" and "transition" of climate change as core key words. By 2030, we will strive to provide a safe, healthy, and clean water system and prevent flood and drought damage. In addition, going forward, we will both lead the nation's progress toward carbon neutrality and and fulfill our responsibilities for national water safety.

Adaptation	Mitigation	Transition
Living in a healthy and clean water environment Safe free of flood and drought damage	763 million tons of GHG reduction	Creating sustainable cities based on K-water technology with K-water technology
Safe free of flood and drought damage	Achieve 2.8% of the domestic reduction target in 2030	K-water smart water city

K-water's Response to Climate Change

K-water has been designated as a target firm for the national greenhouse gas emission trading system, and is trying to reduce greenhouse gas emissions every year. In 2019, K-water's GHG emissions were 724,800 tCO$_2$-eq and have been in compliance with the allowable GHG emissions set by the Ministry of Environment for eight consecutive years. Most of the GHG emissions emitted by K-water are indirect emissions, mainly due to the electricity used to supply tap water. In addition, we have registered 12 projects in the United Nations (UNFCC) through the Clean Development Mechanism (CDM) project, and earn CERs totaling (equivalent to) 470,000 tons of greenhouse gas reduction potential per year. We also aim to realize carbon profits and to achieve greenhouse gas reduction effects through the production of clean energy.

■ Allowable emissions   ■ Indirect emissions (Scope 2)   ■ Direct emissions (Scope 1)

	2013	2014	2015	2016	2017	2018	2019
Allowable emissions	631,431	624,660	646,559	651,719	720,687	736,676	724,800
Indirect emissions (Scope 2)	627,000	620,499	641,559	647,652	715,870	732,256	720,143
Direct emissions (Scope 1)	4,431	4,161	5,000	4,067	4,817	4,420	4,657
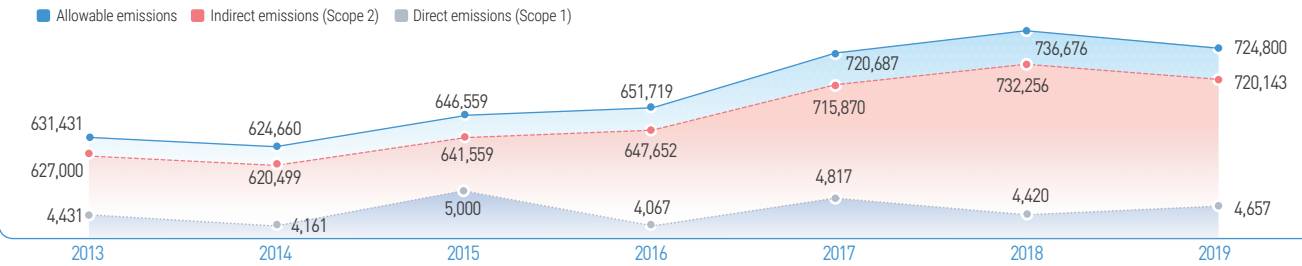
Clean Development Mechanism (CDM) Status

Classification	Target	UNFCC registration date	Annual generation (MWh/y)	CO$_2$ reduction (tCO$_2$-eq/y)
Total	–	-	830,176	466,489
Sihwa tidal power	Sihwa tidal power plant	Jun. 2006	507,629	251,089
Small hydro power 1	Andong, Jangheung, Seongnam 1st plant	Oct. 2006	15,473	8,103
Small hydro power 2	Daecheong, Juam, Dalbang, Seongnam 2nd plant	Feb. 2007	13,944	8,331
Sihwa wind power	Sihwa wind power plant	Nov. 2007	6,293	2,521
Small hydro power 3	Gosan, Pangyo plant	Nov. 2009	5,557	2,987
Small hydro power 4	Seongdeok, Gimcheonbuhang plant	Oct. 2010	4,963	2,759
Small hydro power 5	Angye, Hoengseong 2nd plant	Apr. 2012	4,603	3,100
Water efficiency improvement	Paldang 3rd intake facility	Aug. 2012	-	7,044
Hydro power 6	Ipo, Yeoju, Gangcheon weir	Oct. 2012	76,406	50,772
Hydro power 7	Sejong, Gongju, Baekje, Sangju weir	Sep. 2012	57,541	38,237
Hydro power 8	Nakdan, Gumi, Chilgok, Gangjeong Goryeong weir	Sep. 2012	58,170	38,654
Hydro power 9	Dalseong, Hapcheon-Changnyeong, Changnyeong-Haman, Seungchon, Juksan weir	Sep. 2012	79,597	52,892

Total Capacity of Renewable Energy Generation

Items	As of the end of 2019
Facility capacity (MW)*	1,364
Annual power generation (GWh/year)	2,103
Crude oil substitution effect (1,000 barrels/year)	3,324
CO$_2$ reduction (1,000 tons/year)	1,012

* No. 1 company based on domestic facility capacity

Registered 12 projects in the UN CDM, Carbon Emission Reduction and Profit Realization

466,489 tons

Effects of reduction of greenhouse gas (CO$_2$)

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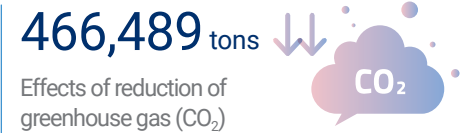
K-water where Everyone Is Happy

K-water wishes to build a workplace for talented human resources through various activities including work environment improvement and continuing education in order to strengthen the competence of its members. We also listen to various opinions and ideas from the public and employees, and establish a platform for participation and communication to spread people-centered social values.

Key Activities >>

- Enhancing communication to innovate the organization's culture by improving the official communication of company-wide issues including the selection and operation of employee board of directors
- Established the 「Rights Protection Portal」 that provides a one-stop service including reporting, consultation, reception and process
- Securing a platform to solve social issues by using the abilities of citizens and local networks
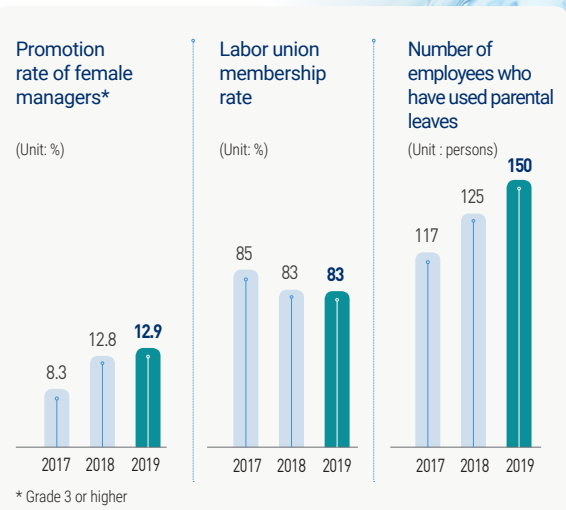
Future Plans >>

- Discovering and stopping bullying and sexual harassment in the workplace through visiting lectures and counseling with experts at least five times
- Resetting five-year mid-to long-term goals to increase the number of female managers and achieve the goal of female executives
- Enhancing public-led and people-participating services, competency internalization and technique advancement

Key Achievements >>

Promotion rate of female managers*
(Unit: %)

- 2017: 8.3
- 2018: 12.8
- 2019: 12.9

* Grade 3 or higher

Labor union membership rate
(Unit: %)

- 2017: 85
- 2018: 83
- 2019: 83

Number of employees who have used parental leaves
(Unit : persons)

- 2017: 117
- 2018: 125
- 2019: 150

Material Issues in Sustainable Management >>

Key issues	Aspect assessment			SDGs-related goals
	Cost	Revenue	Risk	
Improvement of human rights and diversity of employees			○	5 GENDER EQUALITY
Enhancement of employees' competency and fair performance evaluation			○	4 QUALITY EDUCATION

Achievement Goals >>

Control items	Goals	Period
Protection of employees' rights	At least 15 visiting lectures / consultations with experts	By 2024
Increase of female managers	Achieved 24% of the goal for hiring female directors	By 2024

Happy Workplace for Mutual Prosperity

With the goal of achieving a people-centered, happy workplace where all employees work equally, K-water intends to build a dynamic organization through enhancing internal communication and improving internal competencies by training employees and developing human resources.
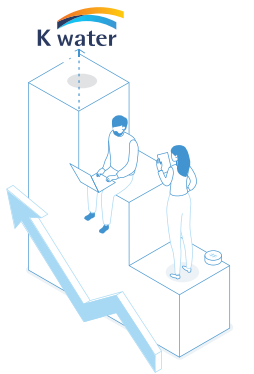
Spreading Positive Culture through Active Communication

A happy workplace can be achieved by improving Work•Life Smart, which contains the voices of its members, and by consolidating company-wide capabilities. We listen to the voices of our members through multiple channels and activities including the selection and operation of the employee board of directors, improving official communication on company issues, establishing the quality of life improvement TF, and conducting focus group workshops. A total of 37 departments participated in tailored communication programs such as the "Why Camp" and "The Work in Dignity Camp" held in 2019. In addition, we are contributing to the spread of a positive corporate culture by operating both the Perception Improvement and Praise bulletin boards.

K-water's Innovation System

TEAM SMART	PEOPLE SMART
Securing organizational competency	Building self-confidence
WORK SMART	**LIFE SMART**
Work efficiency	Respecting individual values

Workplace where Workers are Protected and Respected

Any harassment of co-workers in the workplace will not be tolerated. To this end, K-water puts top priority on protecting victims and makes efforts to prevent secondary damage on the basis of expertise and fairness. Employment rules were revised to stipulate how to prevent and deal with harassment, and a rights protection portal with procedures for reporting and handling such an issue has been established. The rights protection portal provides a consultation service regardless of time and place and includes a system for reporting offenses. It also allows users to check the progress of handling incidents and receive relevant statistical data in real time.

Harassment Reporting System

Ensuring consultation and investigation objectivity	Active protection of victims
· Contract with certified labor attorneys · Operation of Employees' Rights Protection Committee	· Space separation, consultation and feedback · Completed investigation more than 3 months and within at least 30 days
Tolerance NO, Fairness UP	Reduced the processing period by 60 days

Harmonization of Work and Life

K-water is striving to create a place of harmonization of work and life, providing a comfortable working environment. The flextime is implemented to promote employees' work-life balance, and employees are encouraged to leave the office at a designated time to improve work performance and reduce low-value-added work. Furthermore, we have held contests for job improvement ideas to update company rules and systems, thereby eliminating redundant regulations and customary work performance in all areas of management. securing employee pride by operating both the Perception Improvement and Praise bulletin boards.

Classification	Description
Introduction of flexible working hours system	· 160 hours work per month and flexible work hours for one day · Introduction of total working hours management system linked with the optional working hours system (PC is only available during working hours)
Encouraging the use of vacations	· Changed the minimal unit of use to 30 minutes · Allowed to carry over or save unused vacations; can use the saved vacations more freely
Upgrading child care support	· Maternity leave and parental leave notice system (to allow securing replacement staff and budget in advance) · Operation of in-house daycare centers; capacity increase by converting work facilities to daycare facilities · Increase of spousal maternity leave (to 10 days from 5 days) · Expanded the period of first time parental leave career recognition (from 1 year to 3 years, if both parents take 6 months or more time off) · Childcare vacation 2 days per year

Employee use of the Flextime system

(Unit: persons)

- 2018: 595 — 10% of the total
- 2019: 2,156 — 35% of the total

25%p UP

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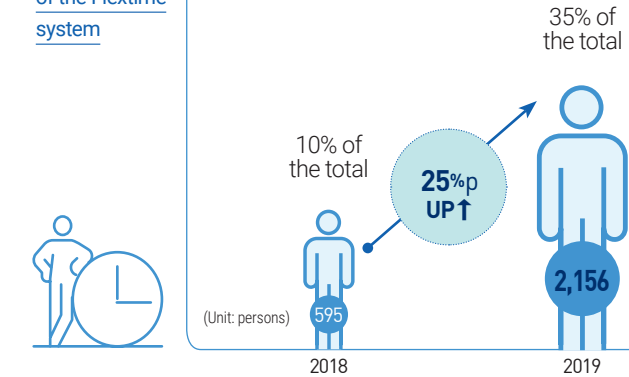
Open Management For Promoting Global Leaders

Building Agile HR strategies

K-water has adopted an agile personnel management system to respond in a timely manner to government policies and new business opportunities. In order to carry out short-term projects such as modernizing local waterworks and overseas projects, we have established an expert pool management system and are recruiting and deploying competitive human resources in advance based on our mid- to long-term forecasting of the demand for specialists. In addition, we are providing employees with opportunities to improve their competencies through company-wide convergent human resource management and various job rotation programs that include inspection and maintenance, shift work in order to redefine future-oriented growth paths.

Talent-oriented Management

K-water has implemented a talent-centered management system that agilely responds to changes across organization, HR, education, and evaluation. We have built project-based role units and offer growth paths that allow various job experiences for employees to provide special promotion opportunities. We are also encouraging employees to acquire environmental adaptation skills through exchanges with other organizations. Furthermore, we ensure employees build competencies through job training that are required for the execution of the strategy, and present a roadmap for each stage of growth to support systematic capacity building.

In-house Training to Enhance Capacity

K-water is striving to strengthen the capacity of employees including both the expansion of new learning techniques such as flip-learning and experience-based training contents, and educational resources that meet the needs of employees' competency development. Flip-learning is not a general training process, but a learning technique based on pre-learning, evaluation, discussion, presentation and team activities, and a training method in which data sharing and feedback sharing steps are applied in a reversed manner. The training consists of a total of 22 courses, and 917 trainees have completed the training in 2019. In addition, we conducted leak detection practices at the water pipe network center, groundwater experience with VR, etc., opened special lectures with the members of the Korea's national team of water treatment for WorldSkills and opportunities to participate in the operation of the actual equipment during the training.

VR education

Skills education (Pipeline Net Training Center)

Upgrading Job Expertise

To reinforce job expertise, K-water is nurturing internal and external experts and enhancing employees' competency. While we are expanding open positions for external experts to strengthen competency based on healthy water supply and unified water management externally, the Job Management Committee selects expert positions internally to screen and evaluate appropriateness and improve expertise in safety and mutual cooperation.

Utilization of Experts based on Job Competency

	Open-transfer evaluation
1	• Expanding the scope of information disclosure such as qualifications and applicants • Disclosure of applicants' qualifications, open matching, etc. to ensure the optimal placement of experts in each position.

	Qualification-based transfer
2	• Priority placement of those with licenses that are legally required*. * Water purification plant operator, electrical engineer, etc.

	Deferred rotational transfer
3	• Positions requiring job continuity* can be exempted from rotational transfer (up to 8 years, subject to be reviewed once a year) * Overseas investment project development, global cooperation, inspection and maintenance, etc.

Improving Gender Equality Company-wide

K-water has operated a comprehensive female employee management plan to increase the number of female employees in managerial positions. We reset the five-year mid-to-long-term goal to secure more female managers, which includes introducing female employee recruitment targets, encouraging more females to apply, reinforcing leadership training of female employees, and increasing their placement in key positions. In addition, we used the results of the recent 5-year multi-faceted evaluations as basic data for promotion evaluation to enhance objectivity and established a promotion system that employees can trust in order to strengthen the performance and competence evaluation system of female managers.

Accumulative Female Manager Ratio
(Unit: persons)

7.3%
115

8.4%
139

2018   2019
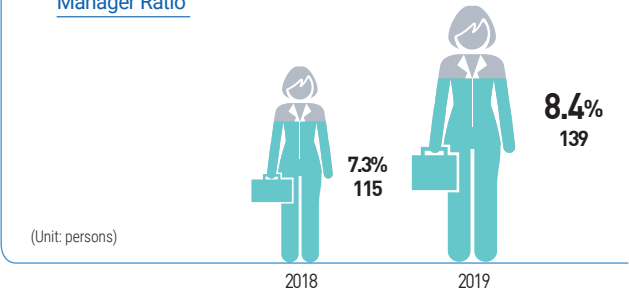
Creative Talent Development

K-water is focusing on managing core competencies and fostering mid- to long-term manpower. In order to nurture experts in the 4th industry to achieve ICT-based integrated water resources management, we have identified key areas of development that reflect future changes and strategic tasks.

The Selection of Core Development Areas

Forecast of future changes	Identification of key strategic tasks
Climate change, the 4th industrial revolution, etc.	Business strategy areas
Changes expected in the future	Main tasks

Selection of key areas to be fostered
Identification of key areas to be fostered *Workshops for gathering opinions, etc.

K-water's Talent Development Index*
(Unit : %)

44.3   45.0   45.3

2017   2018   2019

* Talent Development Index : Performance indicator to evaluate the level of professionals, using the results of profile matchups

K-water develops human resources in key areas through entrusted education to foster experts and employees with master's and doctoral degrees, discovering subjects to learn from a convergence perspective, and providing intensive and in-depth training to help understanding cross cutting fields. We have established a professional human resource DB, which is linked to the development of human resources and HR management including job assignments to improve the use of human resources. In addition, we are strengthening the link between short-term training to secure diversity and entrusted long-term education.

Mid- to Long-term Human Resource Development Plan

Key development areas	Unit	'20	'21	'22	'23	'24
Hydraulic floodgates, river plans, redevelopment of existing dams	Persons	48	49	42	36	38
ICT-based integrated water resources management, upgrading aged water pipelines	Persons	42	44	51	58	58
New renewable energy, eco-friendly waterfront spaces (LID), overseas projects	Persons	21	28	28	21	21
Water polices and water resource economy, management, rates	Persons	33	35	35	43	44

Talent Development for IWRM

K-water has opened degree courses designed to nurture leaders and is running a course to foster convergence experts specialized in financial investment, such as overseas projects and local water supply projects. We signed an agreement with Hannam University in June 2019 to cultivate water experts, through which a total of 7 managers were selected, and plan to foster leaders with global water management capabilities and innovation mindsets for management.

Convergence Financial Experts Course

Period	16 months (Mandatory subjects and attendees' level are considered)
Targets	Trainees are selected based on job concentration and development potential without restriction in job type.
Curriculum	Study guidelines are provided. Attendees can select freely in cyber courses.
Goals	Continuous opportunities to become an expert.

Various Training to Foster Experts

K-water aims to cultivate human resources specialized in various areas to keep pace with the changing times. In order to cultivate communication-oriented professionals, we have established a pool of labor-management experts, selected labor advisory groups, and appointed honorary labor investigators. Upon mutual consent, selected labor-management personnel are given opportunities to become experts in the labor-management field through training courses for the top labor-management relations leaders, achieving the license of certified labor attorney, and workshops for labor management personnel twice a year. In addition, group training is provided to foster experts in field works as well as nurturing manager-oriented personnel focused on the head office and the headquarters. Labor-related laws and labor-management partnership improvement measures are discussed, and the competency of the department is strengthened by benchmarking leading companies through regular forums.
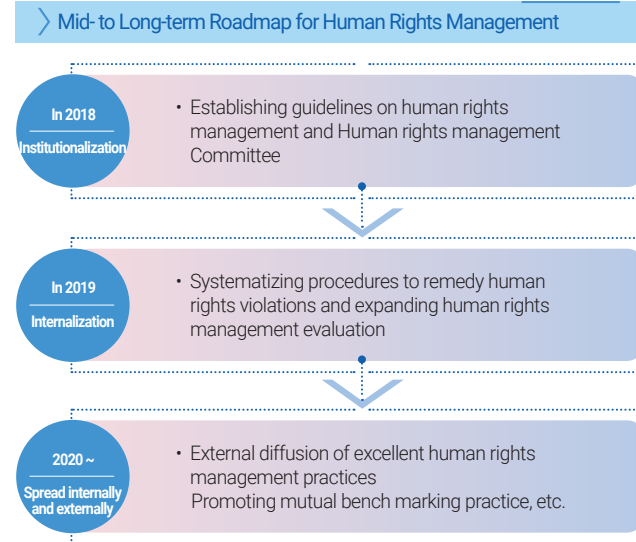

Labor Manager Workshop

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Efforts to Respect Human Rights

Improving the Foundation for Human Rights Management

The Promotion System of Human Rights Management

K-water has established guidelines for human rights management and run the Human Rights Management Committee to protect and promote the human rights of employees and stakeholders. Through the Human Rights Management Committee, we deliberate and make decisions on overall matters related to human rights management policies every year. As problems related to human rights continue to occur in our society, in 2019, we adopted systematic procedures to provide remedies for human rights violations and expanded the assessment of impact on human rights to improve areas with limited access to water and internalize such efforts. In particular, our efforts focus on improving the four key areas of human rights management—abuse of position/power, sexual harassment, safety, and bullying in the workplace.

> **Mid- to Long-term Roadmap for Human Rights Management**

In 2018 Institutionalization	• Establishing guidelines on human rights management and Human rights management Committee
In 2019 Internalization	• Systematizing procedures to remedy human rights violations and expanding human rights management evaluation
2020 ~ Spread internally and externally	• External diffusion of excellent human rights management practices Promoting mutual bench marking practice, etc.

Guidelines for Human Rights Management

In order to practice human rights management in all aspects, K-water established the "Human Rights Management Charter", which is the standard for value judgment and actions that employees must observe, and pledged to support and practice human rights management. The guidelines on human rights management established in 2018 include domestic and international standards and norms related to human rights, and reflect the human rights management guidelines of the National Human Rights Commission of Korea. The guidelines cover various subjects including the prohibition of discrimination and respect for diversity, guarantees of both freedom of association and collective bargaining, the prohibition of forced and child labor, occupational safety and health, and protection of the human rights of stakeholders such as suppliers, local residents, and employees.

Company-wide Expansion of Human Rights Evaluation

In order to preemptively manage human rights risks, K-water has evaluated the impacts on human rights using the standard presented by the National Human Rights Commission. In 2019, we have improved the evaluation capacity of our operation by upgrading 33 items and 158 indicators in 10 areas, reflecting the characteristics of the Corporation. We also selected evaluation areas in connection with company-wide strategies, developed 44 indicators for 12 items in 4 areas, and completed evaluation of major projects' impact on human rights. As such, we expanded the human rights management areas and target departments to 16 departments and 22 units, and improved the human rights culture by expanding human rights impact assessment to the entire operation of the Corporation.

> **No. of Implementations for Institutional Evaluation Indices**

151 (2018) → **156** (2019) **3.3%↑**

> **No. of Departments Subject to Human Rights Management**

11 units in 9 departments (2018) → **16 departments and 22 units** (2019)
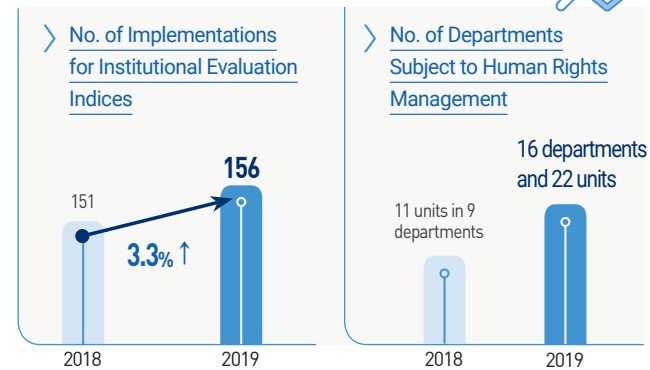
Business Case

Improving Workers' Rights and Interests through "Honorary Labor Inspectors"

In line with the increasing social demand for the protection of labor rights, in November 2019, we appointed three people, including an in-house labor attorney and external experts, as 'honorary labor inspectors' in order to improve the rights and interests of workers through autonomous labor supervision. The responsibilities of the honorary labor inspectors include receiving workers' opinions on compliance with labor-related laws, recommending corrective actions for violations of laws and regulations and monitoring them afterwards, supporting corrective actions to meet improvement requirements from the government's labor audit, training in labor-related laws, and supporting labor management. Based on this, we aim to prevent violations of laws and regulations in advance, protect the rights and interests of workers, reduce business risk factors, and create a safe and fair working environment.

Internalization of Human Rights Management

Internalization of Human Rights Management

Education about Human Rights

In 2018, K-water conducted education about human rights for 1,715 people using the contents of the National Human Rights Commission. From 2019, we have provided intensive training tailored to each of the four areas of human rights, encouraging all employees to internalize human rights awareness.

Record of Education of Human Rights Areas Performed in 2019

Power abuse prevention	**5,969** people
Sexual harassment prevention	**5,890** people
Safety	all construction sites **300** people
Workplace bullying	**5,622** people

Total **17,781** people
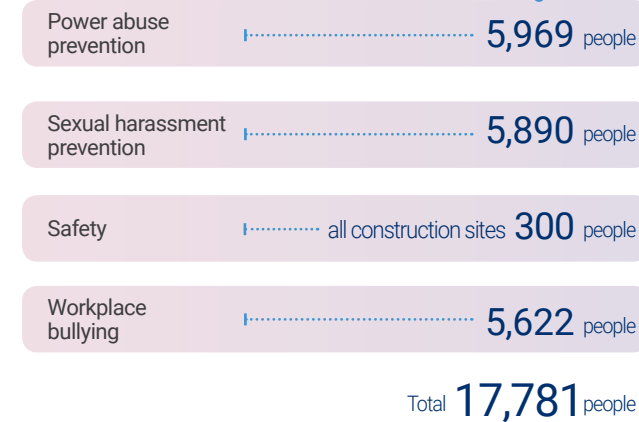
Report Center

In order to increase the report system's accessibility to customers and employees, K-water has diversified the system and secured reporting procedures tailored to each human rights issue. In January 2019, we established the 'Abuse of Power Report Center', and in July, we introduced the 'Workplace Bullying Report Center.' We have added an audit reporting system to the 'Subcontract Help Center' that already existed. In the case of the 'Sexual Harassment Report Center', we have improved the self-reporting and investigation process by outsourcing investigations to secure expertise and reliability. We have also opened a "rights and interest protection hotline" that provides one-click access to the four human rights areas in order to ensure reporting can be done more easily. As a result, citizens can access the reporting center through the website and employees through the one-click reporting banner on the intranet.
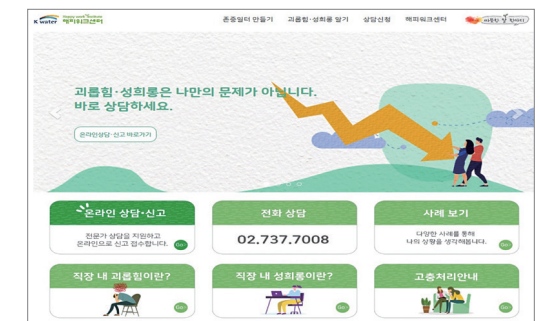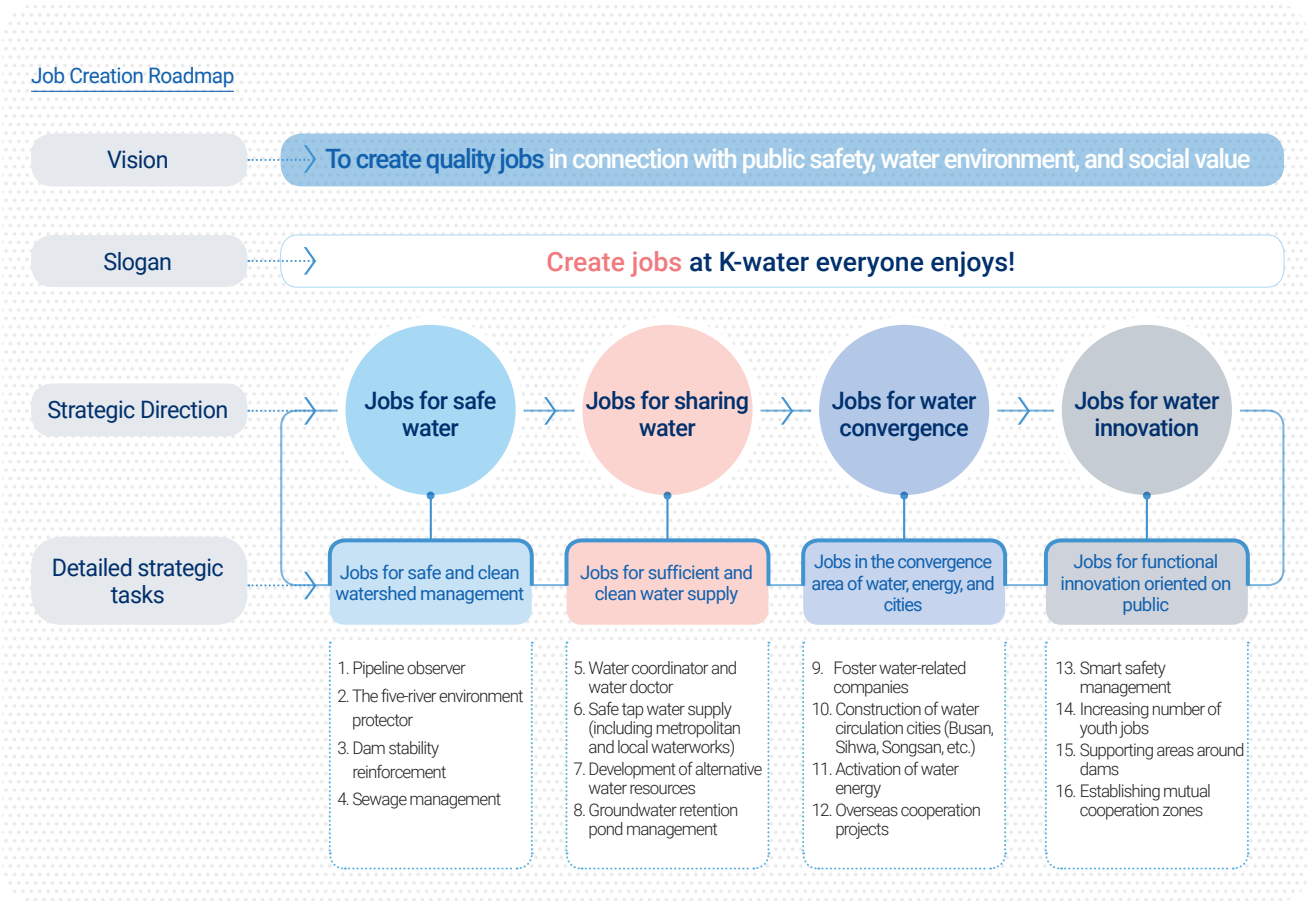
Happy Work Center

Efforts to Respond to Human Rights Issues

	Previous (~2018)	Improved (2019)	Accomplished (2019)
Abuse of Power	• First among public corporations, linked to the Public Procurement System for subcontract payment • Efforts to eradicate abuse of power during employment * Mandatory 50% external committee member ratio	• Mandatory joint contract with the prime contractor * Improved from subcontracts to direct contracts • Added a rule to limit the influence of personal networks	In 2019, no record of corruption in the HR area including abuse of power (2 cases → 0 case)
Sexual harassment	• Operation/processing→performed by the same department • Designated monitoring staff for all departments • Primary protection measures for victims such as separating the perpetrator and victim	• Designated the department in charge separately (under CEO). • Entrusted the jobs of consultation and investigation to an external agency • Introduction of Rights and Interest Protection Committee * Composed of internal and external experts, balancing gender, to deliberate	Added new regulations on fast handling and restrictions to prevent damage
Safety	• Designated a safety manager for each department to strengthen on-site management • Compliance with safety-related laws and amendments to relevant regulations	• Established the Safety Management Committee, which is the highest body to review and deliberate safety and health (14 members) • Safety management tailored to individual types * Development of safety index models, etc	Increased the number of "excellent" rated branch offices in terms of risk assessments (15 offices to 34 offices increased 2.3 times)
Abuse of Power	• Preemptive preventive activities prior to legislation * Established rules of conduct for each position, etc	• Established an exclusive department under the CEO • Full-scale improvement after legislation * Campaign to improve office etiquette and manners, handling guidelines, etc	Selected as an excellent organization to prevent bullying in the workplace

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K-water Leading a Prosperous Future

Creating Quality Jobs in K-water with the Public

K-water is improving its job management system by establishing target-tailored strategies to realize social value through the creation of rewarding jobs. Starting with the first establishment of the 'quality job creation roadmap' linked to the management strategy in 2018, we reset the mid- to long-term goals by reflecting changes in internal and external conditions. And we are also trying to improve both the quality and quantity of jobs by developing job quality indicators and introduction of evaluation since 2019.

Job Creation Roadmap

Vision	To create quality jobs in connection with public safety, water environment, and social value
Slogan	Create jobs at K-water everyone enjoys!

Strategic Direction

- Jobs for safe water
- Jobs for sharing water
- Jobs for water convergence
- Jobs for water innovation

Detailed strategic tasks

- Jobs for safe and clean watershed management
  1. Pipeline observer
  2. The five-river environment protector
  3. Dam stability reinforcement
  4. Sewage management

- Jobs for sufficient and clean water supply
  5. Water coordinator and water doctor
  6. Safe tap water supply (including metropolitan and local waterworks)
  7. Development of alternative water resources
  8. Groundwater retention pond management

- Jobs in the convergence area of water, energy, and cities
  9. Foster water-related companies
  10. Construction of water circulation cities (Busan, Sihwa, Songsan, etc.)
  11. Activation of water energy
  12. Overseas cooperation projects

- Jobs for functional innovation oriented on public
  13. Smart safety management
  14. Increasing number of youth jobs
  15. Supporting areas around dams
  16. Establishing mutual cooperation zones

Creating Jobs for the Youth

In order to increase youth employment and jobs in the public sector, K-water is working hard to increase job opportunities by increasing the number of positions required and alternative employment. We are running a variety of internship programs, such as internship with overseas work, that provide work opportunities at workplaces in other countries and short-term internships that link credits during vacations for college students. These provide young people with opportunities for work experience and enhance connections to future employment.

Entrance Ceremony for New Employees

Business-linked Jobs for Supplying Safe and Clean Water

K-water has been creating business-linked jobs in both public and private sectors for women with career interruptions and middle-aged people in the entire water supply area. In 2019, we created 193 jobs by running a tap water safety check system to improve tap water reliability for the public, created an additional 143 jobs for pipeline observers to minimize pipeline accidents on weekends and holidays, and offered jobs to the elderly from local communities. In addition, we are laying a foundation for creating jobs in the private sector by expanding investment in projects related to reinforcing dam stability and securing safe tap water supply systems.

Innovative Jobs in the Water Industry

K-water has opened its water management know-how, tangible and intangible assets, and global networks accumulated over 50 years to water-related SMEs and ventures, supporting the entire process of start-up, innovative technology development, developing sales routes, and overseas expansion. In 2019, we provided support to 393 SMEs and ventures, which doubled from 2018, thereby expanding corporate sales and creating 1,889 jobs.

The 1st K-water and Startups Networking Day

Innovation Jobs through National Ideas

K-water has created jobs preferred by the public by providing transparent job information and various channels to receive public opinions as part of our continuous efforts for communication. We are constantly collecting job ideas through our public communication platform 'Danbi Talk Talk', holding a job ideathon once a year and promoting test projects to link people's ideas to job creation.

K-water's Job Ideathon

Social Value and Support for Local Economy

K-water is actively fulfilling its social responsibilities as a public corporation through job creation and support. The activities we are undertaking to create jobs include creating jobs for local residents by discovering income sources in areas near dams where economic conditions are poor and the number of elderly residents is a serious issue, and operating K-water Sharing Welfare Foundation to offer work opportunities and welfare for local residents. In addition, we have selected promising social economic companies every year to support with a growth fund of up to KRW 30 million. We are also strengthening corporate competitiveness by offering support via sales techniques and technology development for them to commercially succeed.

| Business Case

New "Untact*" and Digital Jobs to Overcome the COVID-19 Pandemic

K-water is discovering new "untact" and digital jobs to minimize face-to-face contact to overcome the job crisis caused by the COVID-19 pandemic. We have created 43 jobs via various projects including safe dam management projects that aim to enhance the accuracy of dam management and eliminate blind spots by identifying damage to a dam by using pictures taken by drones to construct 3D images. We also created 196 new jobs by implementing projects to create databases for various data and handwritten documents such as state-owned land surveys, compensation documents, dam drawings, etc. to increase their usability.
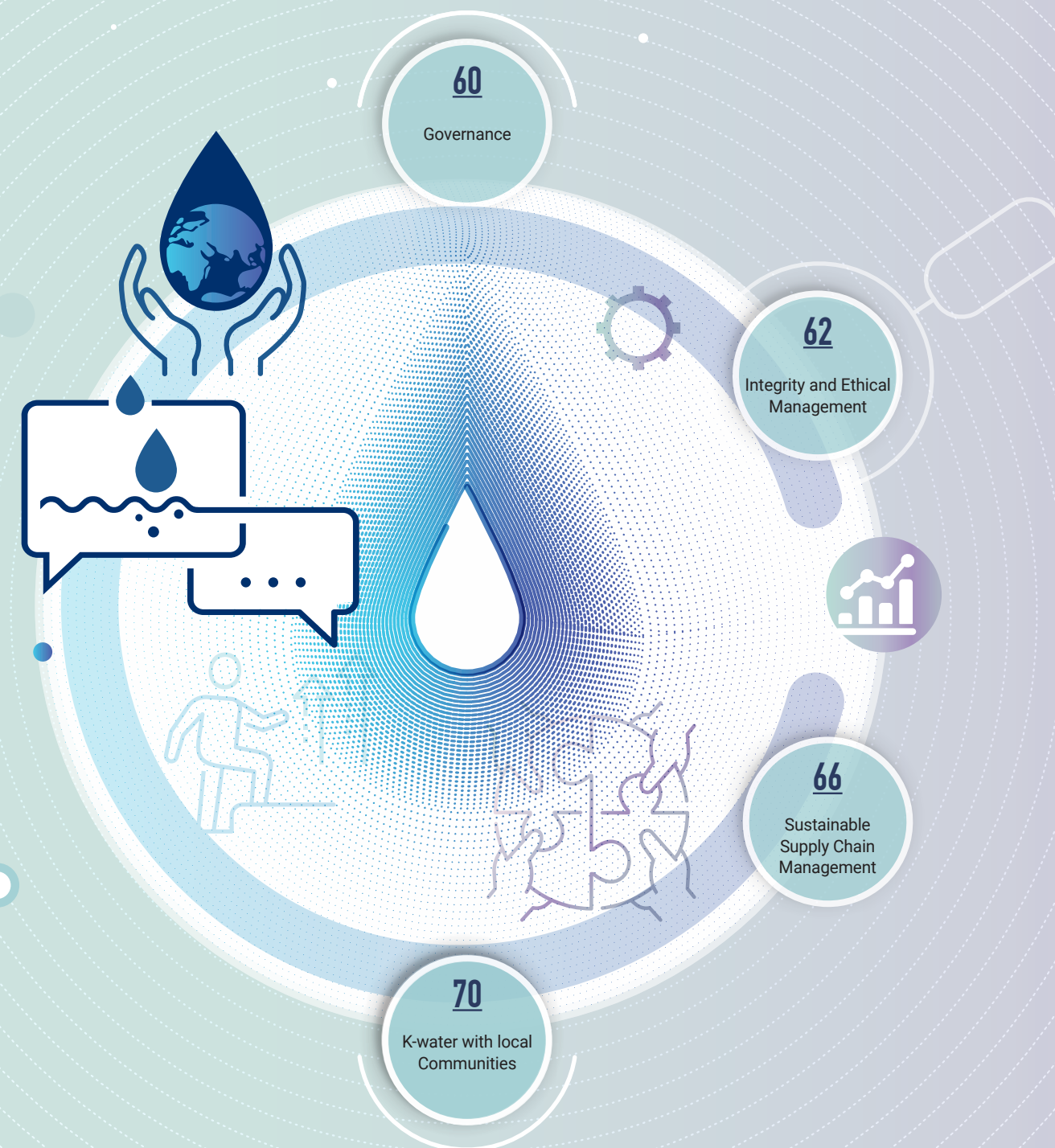
* Non-face-to-face social and economic activities

Status of Untact and Digital Job Creation in 2020

Project	Budget (KRW in millions)	Jobs (No.)
Total	2,880	239
Safety management of dams using drones	1,312	43
State-owned land surveys	544	68
Compensation documents DB	384	48
Dam drawings DB	640	80

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Governance

Composition of the Board of Directors

The Board of Directors is the supreme decision-making body that deliberates and resolves issues related to K-water's management goals and basic policies. As of November 2020, it consists of 14 members, 6 of whom are standing directors and the remaining 8 are non-executive directors. Among the non-executive directors, a senior non-executive director, appointed by the Minister of Strategy and Finance after deliberation and resolution by the Steering Committee, becomes the chairman. We elect non-executive directors through a transparent selection process. Non-executive directors are appointed by the Minister of Strategy and Finance, after deliberation and resolution by the Steering Committee of Public Corporation, from among people with expertise in various fields recommended by the Executive Recommendation Committee. When recruiting, we do not discriminate on the grounds of gender, religion, race, or nationality, and we secure diversity by appointing non-executive directors with sufficient knowledge and experience in various fields. The term of office for non-executive directors is two years and can be extended by one year. The head of the organization is appointed by the President with the recommendation of the Minister of Environment and the term of office is three years.

The board of directors

Special Subcommittees

For the efficient operation of the board of directors, K-water has special subcommittees centered on non-executive directors such as the non-executive directors' preliminary deliberation committee and the audit committee.

Operation of Special Subcommittees

K-water is trying to achieve sustainable integrated water resources management centered on the watershed in an innovative manner, starting with unified water management that integrates both water quality and and quantity. In accordance with legalization-internalization-policy, we preemptively review the amendments of laws and regulations on water management and are running company-wide TFTs in three key areas for future innovation.

	Non-executive director preliminary hearing	Audit Committee	Executive Recommendation Committee
Composition	• All non-executive directors (8)	• Non-executive directors (2), Standing auditor (1)	• Non-executive director (maximum of 8 directors), external committee members (one third or more and less than half of the total committee members)
Roles	• Preliminary deliberation of agenda, management consulting and suggestions	• Work accounting audit	• Deciding how to receive the recommendation and evaluation of applicants
Performance records (19)	• 8 times • Preliminary deliberation of 29 cases • Reflection of 44 cases of management suggestion	• 4 times • Establishing safety management principles and improving safety policy implementation by conducting anti-corruption audits	• 5 times (as of 2019)

Members of the Board of Directors

(As of Nov. 2020)

Name	Gender	Position	Career	Term
Park, Jae Hyeon	M	CEO	Professor, Civil and Urban Engineering, Inje University	Feb. 28, 2020 – Feb. 27, 2023
Kang, Rae Gu	M	Standing Auditor	Member of the Democratic Party's Special Committee on Peace and Cooperation in Northeast Asia Non-standing Director of KHNP	Dec. 16, 2019 - Dec. 15, 2021
Lee, Han Goo	M	Vice President Director of Water Resources	Head of Water Management Planning HQ, K-water	Oct. 16, 2020 - Oct. 15, 2022
Kim, Kab Sik	M	Director of Planning Director of Management	Branch manager of Cheonan Regional Head Office, K-water	Nov. 11, 2020 - Nov. 10, 2022
Oh, Bong Rok	M	Director of Water Supply	Head of IWRM HQ, K-water	Oct. 16, 2020 - Oct. 15, 2022
Lee, Jun Geun	M	Director of Green Infrastructure	Head of Water Cycle HQ, K-water	Oct. 16, 2020 - Oct. 15, 2022
Choi, Dong Jin	M	The chairman of non-executive directors A member of the preliminary deliberation committee of non-executive directors	CEO, Korea Research Institute for Environment & Development President of Institute for Climate Change Action	Mar. 6, 2019 - Mar. 5, 2021
Kim, Joung Soo	M	Non-executive director A member of the preliminary deliberation committee of non-executive directors	Standing Representative, Gwangju Human Rights Peace Foundation Co-representative of Gwangju, Roh Moo Hyun Foundation	Aug. 30, 2018 - Aug. 29, 2020
Yoo, Sun Young	F	Non-executive director A member of the preliminary deliberation committee of non-executive directors	Professor, Journalism and Broadcasting, Sunkonghoe University Chairman of Korean Association for Communication and Information Studies	Aug. 30, 2018 - Aug. 29, 2020
Ji, Hyun Mi	F	Non-executive director A member of the preliminary deliberation committee of non-executive directors A member of the Audit Committee	Associate Professor, School of Accounting and Taxation, Keimyung University Senior Investigator, Financial Supervisory Service	Aug. 30, 2018 - Aug. 29, 2020
Baek, Gyu Seok	M	Non-executive director A member of the preliminary deliberation committee of non-executive directors A member of the Audit Committee	Standing Advisor, Shin & Kim Adjunct Professor, Graduate School of Engineering, Yonsei University	Oct. 6, 2020 - Oct. 5, 2022
Lee, Dae Sik	M	Non-executive director A member of the preliminary deliberation committee of non-executive directors	Professor, College of Economics and International Trade, Pusan National University Non-executive director, Korea Technology Finance Corporation	Oct. 6, 2020 - Oct. 5, 2022
Jeong, Gi Young	M	Non-executive director A member of the preliminary deliberation committee of non-executive directors	Adjunct Assistant Professor, Division of Public Service, Woosuk University Non-executive director, Korea National Railway	Oct. 6, 2020 - Oct. 5, 2022
Jung, Hong Sang	M	Non-executive director A member of the preliminary deliberation committee of non-executive directors	Visiting Professor at KDI School of Public Policy and Management Director, APEC Climate Center	Oct. 6, 2020 - Oct. 5, 2022

Support for Non-executive Directors' Participation in Management

K-water actively supports the activities of the board of directors through the expanded roles of non-executive directors to suggest policies and provide management advice. Since December 2019, we have implemented a number of measures to improve the participation of non-executive directors in management activities including testing monitoring and providing feedback on their activities. We are planning to reinforce and expand such support and feedback tailored to individual directors to ensure more responsible management from 2020. We also support 'preliminary discussions by the employee board' on agendas submitted to the board of directors before the meeting of the board of directors, so that rank-and-file employees can indirectly participate in decision-making.

Support for the Participation of Non-executive Directors

Strengthening the Screening/Review Process of Non-executive Directors
• Expanding the agenda provision period (at least 5 days before the pre-deliberation) and providing information on internal procedures such as regular audit results

Special Report on Pending Issues
• Sharing pending issues in a timely manner through special reports on major issues such as workplace safety management, function coordination, and the response to the tainted tap water incident in Incheon-si to ensure the Board of Directors deals with practical issues.

Operation of the Field-oriented Board of Directors
• Increasing the number of visits to Busan Eco Delta Smart City and Gyeongin Ara Waterway (10 times) to promote understanding of the overall business and provide management information in a regular manner.

Provision of Management Information at All Times
• The operation of regular communication channels to encourage active participation.

Improvement of the Employee-Director Meeting Observation System

K-water operates the "K-water Stakeholder Participatory Decision-making Model" in accordance with the government's policy of "Public Institution Governance Improvement." Since the introduction of this model for the first time among public corporations in December 2018, we have been expanding the basis for employees' participation in management and strengthening its internal management monitoring by reflecting opinions of observers. In 2019, 21 cases suggested by observers were reviewed and 10 cases were reflected in management activities.

Reflecting the Suggestions of Stakeholders in K-water's Management Activities Management Activities

Opinions
• Restructuring the safety management organization
• Fulfilling responsibilities for safety management of primary contract workers and subcontract workers

Reflection in management
• Upgraded the safety management system through the reorganization of the safety department (Jun. 2019, Jan. 2020)
• The labor-management safety work council composed of labor-management representatives primary contract workers and subcontract workers (Since June 2019)
  → Improving consultation on workplace safety for primary contract workers and subcontract workers,
• Establishment and distribution of safety manuals for subcontracted projects (Since October 2019)

Operation of the Board of Directorss

The Board of Directors is convened by the chairman and is held on the fourth Tuesday every month in principle, and special meetings can be convened if necessary. The Board of Directors reviews and resolves important issues, and a decision is made by the approval of a majority of the current directors on major issues such as management goals, budgets, operation plans and mid-to long-term financial management plans. Directors who may have a conflict of interest in the agenda of the Board of Directors cannot participate in the resolution of the agenda, and are not included in the counting of registered directors. The agenda and results of the meetings of the Board of Directors are regularly posted on 'Management Disclosure' on the website and 'ALIO', the management information disclosure system for public corporations.

Operation Status of Board of Directors

Classification		Unit	2017	2018	2019
Number of meetings held		Time	15	16	13
Number of agenda items	Total number of agenda items	Cases	47	53	38
	Decided/reported agenda items	Cases	30/9	32/12	21/8
	Special report agenda items*	Cases	8	9	9
Preliminary deliberation**		%	97.1	100	100
Management proposals by non-executive directors		Cases	68	76	49
Board participation		%	90.2	92.4	89.1
Participation of non-executive directors		%	87.5	90.4	88.5

* The number of special report agenda items has been included in the number of agenda items since the 2019 Sustainability Report.

** Preliminary deliberation: started from the special report agenda from 2018 and does not include agenda items decided through document review.

Performance Evaluation and Remuneration

The remuneration standards for directors are determined by the Board of Directors in accordance with the Articles of Association. Any directors with a conflict of interest cannot participate in the Board of Directors, which determines the remuneration standards for directors. The remuneration standards are determined by executives' evaluation of the management performance of the Corporation and the degree of fulfillment and contract according to the Articles of Association. The type and total amount of remuneration for members of the board of directors is transparently disclosed on the website and ALIO.
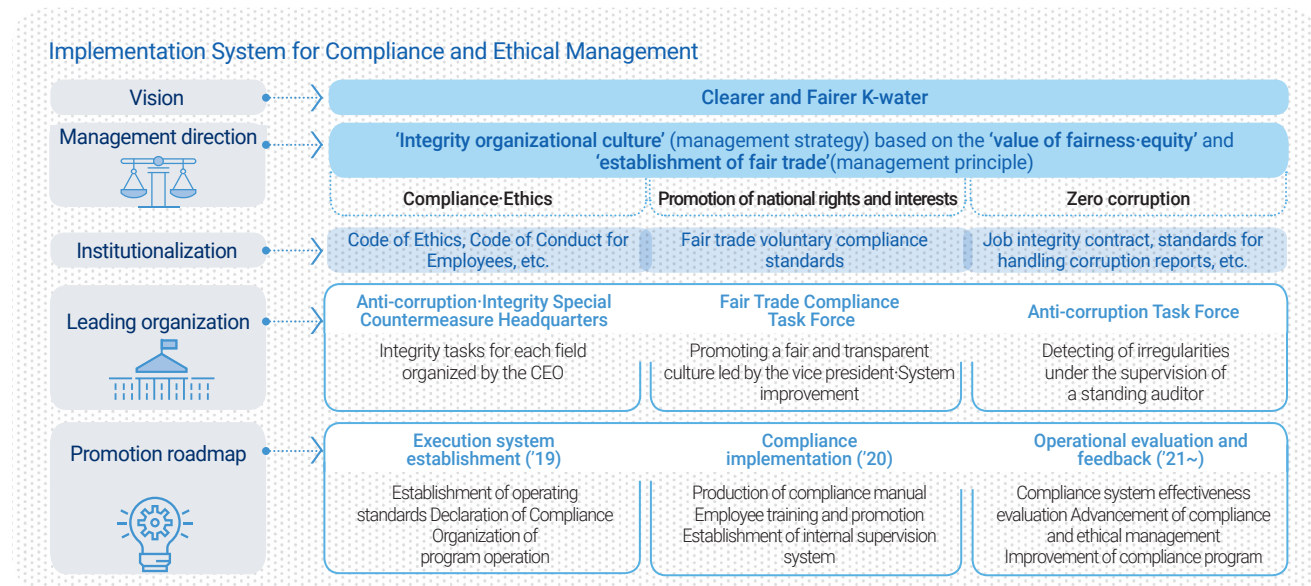
Numeration of Board Members

Classification	Unit	2017	2018	2019
Standing auditor	KRW in millions	153.4	165.3	173.9
Executive director	KRW in millions	147.3	159.1	172.7
Non-executive director	KRW in millions	29.1	29.2	29.7
The highest remuneration (A)	KRW in millions	197.9	214.4	234.7
Average employee wage (B)	KRW in millions	73	76	78.8
Compensation ratio (A/B)	%	2.71	2.82	2.98

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Ethical Management
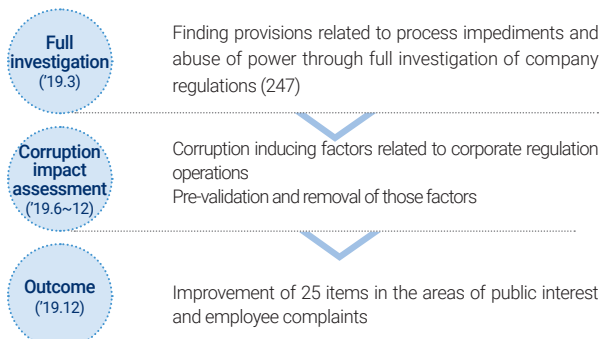
Compliance and Ethical Management System

K-water, as a public company, recognizes sound and ethical management as a mission and a prerequisite for sustainable growth. Under the vision of "Clearer and Fairer K-water", we have been doing our best to establish a sound organizational culture and lead fair trade. Every year, through a dedicated anti-corruption and integrity organization, the level of integrity of the institution is diagnosed, and tasks for improvement are identified and implemented. In particular, we have reinforced the compliance and ethical management system, by introducing an anti-corruption checklist and pledged to comply with relevant laws and regulations as all employees conduct their work with a sense of compliance and ethics in 2019. In addition, we are taking the lead in spreading fair trade and shared growth culture by discovering and improving unfair elements of the trading system such as bidding and contracts, and presenting an exemplary fair trade model through the TFT for Fair Culture.

Implementation System for Compliance and Ethical Management

Vision	Clearer and Fairer K-water
Management direction	'Integrity organizational culture' (management strategy) based on the 'value of fairness·equity' and 'establishment of fair trade'(management principle)

Compliance·Ethics	Promotion of national rights and interests	Zero corruption
Institutionalization — Code of Ethics, Code of Conduct for Employees, etc.	Fair trade voluntary compliance standards	Job integrity contract, standards for handling corruption reports, etc.
Leading organization — Anti-corruption·Integrity Special Countermeasure Headquarters — Integrity tasks for each field organized by the CEO	Fair Trade Compliance Task Force — Promoting a fair and transparent culture led by the vice president·System improvement	Anti-corruption Task Force — Detecting of irregularities under the supervision of a standing auditor
Promotion roadmap — Execution system establishment ('19) — Establishment of operating standards Declaration of Compliance Organization of program operation	Compliance implementation ('20) — Production of compliance manual Employee training and promotion Establishment of internal supervision system	Operational evaluation and feedback ('21~) — Compliance system effectiveness evaluation Advancement of compliance and ethical management Improvement of compliance program

Strengthening the code of ethics

In order to realize ethical management, K-water emphasizes the integrity of its members above all else, and stipulates the code of conduct that should be followed in pursuing business such as the Code of Ethics, the Code of Conduct for Employees, and the Operation Regulations for the Employee Integrity Contract System. In addition, in 2019, all 247 articles were thoroughly investigated to discover and improve the unfair elements in the company regulations, resulting in 25 items being revised.

Practice Improvement

Full investigation ('19.3)	Finding provisions related to process impediments and abuse of power through full investigation of company regulations (247)
Corruption impact assessment ('19.6~12)	Corruption inducing factors related to corporate regulation operations. Pre-validation and removal of those factors
Outcome ('19.12)	Improvement of 25 items in the areas of public interest and employee complaints

Integrity and Ethics Practice Task

K-water has been aiming to improve its level of integrity by preparing highly effective countermeasures for vulnerable areas and improving the integrity promotion system. In 2020, we devised three strategies: "Integrity Promotion System Improvement", "Corruption Prevention Effectiveness Reinforcement", and "Diffusion of Integrity Culture", and selected and carried forward 19 detailed subprojects under seven implementation projects.

Major Tasks to Improve Integrity

Maintenance of integrity promotion system
1. Strengthening anti-corruption management responsibilities and roles by organizational hierarchy (2 tasks)
2. Establishing an autonomous anti-corruption implementation system for employees (2 tasks) and strengthen the effectiveness of corruption prevention

Effectiveness of corruption prevention
3. Eliminating corruption practices such as giving and receiving small-scale treat (2 tasks)
4. Reinforcing self-checking and correction function by enhancing the reliability of the reporting system (3 tasks)
5. Reinforcing corruption monitoring and surveillance (3 tasks)

Maintenance of integrity system for zero corruption
6. Leading the anti-corruption and integrity policy close to the public (4 tasks)
7. Spreading a culture of integrity together with the public (3 tasks)

Internalizing a Culture of Integrity and Ethics

Responsibility of Integrity

K-water is carrying out multifaceted integrity activities to internalize the integrity awareness of its employees. In 2019, the job integrity contract system was expanded and the targets of the integrity contract were expanded from standing members such as the CEO to the head of the division or above. We have exceeded government standards by reinforcing stronger standards of integrity by including the duties of the subsidiary department heads in addition to their own duties in the scope of our responsibility. In addition, we have improved the integrity evaluation items for high-ranking positions to enhance objectivity and strengthened the level of integrity evaluation by expanding the proportion of evaluation results reflected in HR and performance evaluations.

Employee Integrity and Ethics Awareness

In 2019, K-water made a commitment to fair and equitable HR management through an integrity pledge for all HR employees, and innovated HR practices by eradicating negative private meetings. Since 2020, K-water has expanded the use of the integrity pledge from the HR field to six other fields including construction and contracts. All executives and employees make commitments to follow and confirm the pledge through the in-house system at the end of each month.
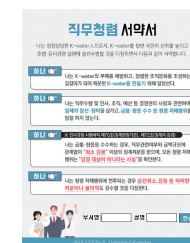
Integrity and Ethics Education and Consulting

K-water is expanding training catering to support all employees to practice integrity and ethics in their daily lives. Integrity education for the various stages of career development, such as education for both new and experienced employees, and leadership training for executives, is mandated and managed. Group training for each department and special education for each task are provided. Since 2020, the Management Innovation Office, the Audit Office, and the Secretary's Office are working together to promote comprehensive consulting such as diagnosing and discussing pending issues, and counseling on corruption and reporting, to raise integrity awareness.

Continuous integrity education as part of career development

Training Specified for Practicing Integrity and Ethics

Group training by department	• Clean Master* integrity communication training by department (5,919 people) • Education for department managers (11,975 people)
Special training for each task	• Specialized Education such as for construction work and compensation (about 1,800 people)
New employee training	• Fostering basic awareness of integrity and ethics and introducing the integrity system (374 people)

* Refer to page 64, 'Visiting Clean Masters'

Sharing the Duty to Practice Integrity with External Customers

K-water aims to completely eradicate corruption by establishing a voluntary culture of practicing integrity so that we can act together and communicate with external customers. Integrity meetings with subcontractors are held to make commitments against giving and receiving money, goods, and entertainment, and promote irregularities reporting systems and investigation of suspected corruption to strengthen anti-corruption management through direct communication. In addition, we have signed a mutual integrity contract with external customers in all business fields, forming a consensus on our commitment to integrity since March 2020.

Mutual Integrity Contracts for all Business Areas

Before • When signing a contract for construction, supply of service, or goods, the 'special terms & conditions for the integrity contract' was requested from the partner company as a separate document

After • When signing contracts with external customers in all six areas of integrity, agreement to comply with integrity is formed by writing an integrity contract which includes the obligation to practice mutual integrity

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Ethical Management

Customer-oriented Audit

K-water intends to build compliance and ethical management through an internal verification system focused on preventing corruption. In 2019, we introduced a pre-consulting system for the first time among public corporations, and reinforced the compliance management system to prevent risks and resolve pending issues by shifting the system from the detection after an incident to precautionary audit. As a result, we were selected as the representative case by the auditor in 2019 in recognition of our performance during the "audit of the consultation on the operation of entrusted regional waterworks projects".

> Evaluation by the Board of Audit
> and Inspection of Korea
> **Achieved the highest grade
> for six consecutive years**

Special Anti-corruption Activities

We have reinforced anti-corruption activities to prevent dishonest dealings through upgraded analysis and monitoring of corruption types and multi-faceted job inspections. In addition, we are endeavoring to eradicate corruption and misconduct by preemptively conducting diagnosis with respect to important social issues such as anti-corruption in the safety-related areas and eradication of illegal employment, and implementing short- and mid-term improvement tasks. We were awarded the "President Citation for Eradication of Safety Corruption" in 2019 for these efforts.

Strengthening surveillance	Planned inspection	Planned inspection including the review of large-scale turnkey projects (2 times), unannounced inspections during the employee transfer period and national holidays (3 times)
	Security inspection	The total inspection of the protection status of the nation's critical facilities (Jan.) and comprehensive security inspection (38 departments)
Improving the system	Internal reporting	Expansion of attorneys to ensure safe reporting (1 male→2 more female attorneys)
	Corporate rules amendment	Amendment to the employees' code of conduct (including the prevention of abuse of power, etc.), code of ethics, and prohibition of private gathering
The sense of integrity	Integrity Golden Bell	Golden Bell (quiz contest) on Enforcement Decree of the Improper Solicitation and Graft Act (40 times, 100,000 participants) and awarded winners (146 people)
	Integrity message	PC screen savers, webtoons, and maxims
Integrity communication	Meetings for communication	'Visiting anti-corruption and integrity meetings' with standing auditors (695 people from 18 departments)
	Customized training	Education about illegal employment cases, internal integrity lecturers' workshop and integrity training by life stage

Visiting Clean Masters

Since 2020, the role of "Clean Masters (25 people)", integrity communication experts who had previously been targeting employees, has been expanded as customer communication experts, actively sharing and communicating integrity issues with customers. Accordingly, each watershed headquarters selects target customers* for in-depth communication, conduct corruption monitoring, introduce the corruption reporting system, and collect customer opinions.

* Customers subject to in-depth communication are selected by comprehensively considering the results of customer and department head's Happy Calls concerning experiences of corruption at watershed headquarters in 2019, and the results of in-house integrity evaluations.

Step 1	2017	• Selected for job support positions • Integrity communication with employees
Step 2	2018~2019	• In-house contest • Integrity communication with employees
Step 3	2020	• In-house contest • Integrity communication with customers

Clean Masters Training

Integrity Happy Call Monitoring

K-water is implementing "Integrity Happy Calls" to respond to customer complaints, investigating any illegal activities in the business process by heads of departments calling customers. In 2019, we made "Integrity Happy Calls" to 617 customers in six business areas including contracts, construction works, and land compensation to strengthen monitoring transparency, accountability, and kindness in performing jobs. In addition, we have improved our services by reflecting customer requests such as simplifying the documents submitted by customers to ask for compensation and disclosing compensation information on our website. In 2020, we have improved individual communication with customers. We aim to eradicate corruption and spread a culture of integrity by promoting K-water's integrity policy and anti-corruption system while strengthening corruption monitoring.

Consultation and Reporting Channels

Operation of Internal Reporting Channels

K-water operates a variety of internal reporting channels introduced to protect the anonymity of reporters and encourage reporting, such as the K-whistle, the special anonymous reporting system, and the safe external attorney service. We have also improved reporting accessibility and convenience by inserting the QR codes of internal reporting lines on employee's business cards. As part of the internal and external publicity of our internal reporting channels, we made leaflets explaining the reporting process, procedures for handling, and the result of operating such a system in 2019. We have distributed these leaflets during contracts, various events, and happy calls.

Integrity Business Cards

Unlimited K-water

K water

Public Relations Department / Manager

K-water Corruption Report

QR code
The identity of the reporter and the content of reporting will be treated in confidence.

K-water, 200, Sintanjin-ro, Daedeok-gu, Daejeon (34350)
Tel 042-629-2114   Fax 042-623-0963
E-mail han@kwater.or.kr

Integrity Leaflets

Internal Reporting Channel

When the type of irregularity is not certain,
just click on the website or reporting link and that's it!!

Report on K-water website
Go to "Integrity Report" then "Report" at the bottom of the homepage or "Customer Center-Customer Plaza-Report"
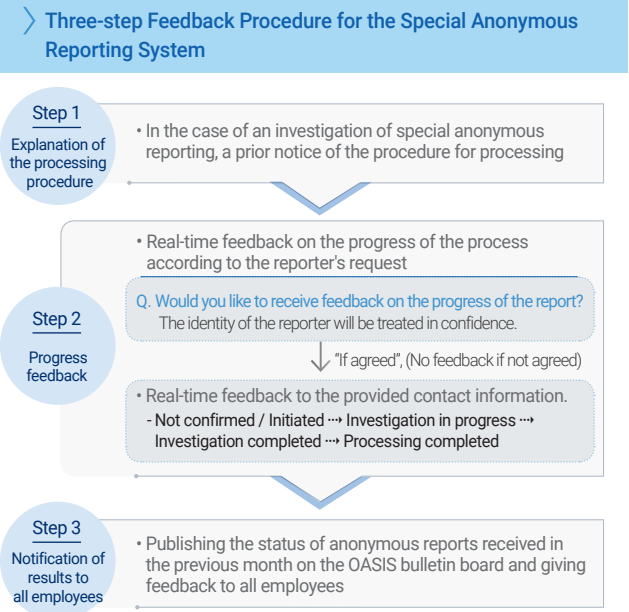
K-whistle (mobile app)
Unable to track a reporter due to server outsourcing Search "K-whistle of K-water" on the Play Store (www.kbelog access-helpline/ anonymous report)

Special Anonymous Reporting System
Report via text message/email provided to employees by external outsourcing organizations every month

Security Report Attorney
An external attorney reporting in an anonymous form on behalf of a reporter
(amie42@hanmail.net)
(nowfirm@daum.net)
(daheedh@naver.com)

Report Center

As part of efforts to ensure the anonymity of reporters and to secure the credibility of the process and results of reporting, K-water introduced the 'Anonymous Reporting System' operated by an external agency from 2019. This system has contributed to reinforcing regular monitoring and self-correcting unlawful behavior. Previously, only the summary of how illegal activities have been handled was disclosed. However, we have changed the policy to transparently publicize the details of cases, investigation process, and the results regulation violations, such as of the Solicitation Prohibition Act, in order to prevent recurrence, enhancing the confidence in the operation of the internal reporting system and punishment from 2020. In the future, we will create an anti-corruption case book and actively use it for comprehensive consulting training, thereby fortifying the internal reporting system and achieving zero corruption.

> Improvements in the Special Anonymous Reporting System

Previous
• Passive discovery of illegal activity focusing on promotion and education
• Reporting by a witness to the relevant department
• Risk of exposing the identity of reporters.
• Reports mainly by employees
• Reports mainly focused on corruption

Improved
• Active identification of illegal activity through survey-based reporting
• Investigation by an external agency
• Protecting the identity of reporters
• Employees + customers + policy customers
• Expanding the scope of reporting to include corruption, abuse of power, sexual harassment, etc.

> Three-step Feedback Procedure for the Special Anonymous Reporting System

Step 1
Explanation of the processing procedure
• In the case of an investigation of special anonymous reporting, a prior notice of the procedure for processing

Step 2
Progress feedback
• Real-time feedback on the progress of the process according to the reporter's request

Q. Would you like to receive feedback on the progress of the report? The identity of the reporter will be treated in confidence.
"If agreed", (No feedback if not agreed)

• Real-time feedback to the provided contact information.
- Not confirmed / Initiated ⋯→ Investigation in progress ⋯→ Investigation completed ⋯→ Processing completed

Step 3
Notification of results to all employees
• Publishing the status of anonymous reports received in the previous month on the OASIS bulletin board and giving feedback to all employees

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Sustainable Supply Chain Management

Support SMEs and Ventures to Grow into Global Innovation Enterprises

Support Platform for Innovative Startups

K-water, a premier state-invested water service enterprise, has established a platform to support the startup of innovative companies and foster promising SMEs in the water industry. Since 2017, we have opened to the public the K-water Water Industry Platform Center (Current Water Industry Innovation Office), an organization dedicated to fostering the water industry as an open platform that actively contributes to job creation and overseas marketing of SMEs and ventures. In addition, in 2019, we discovered 9 in-house ventures and established the "Venture Investment Management Committee" to reduce investment risk and improve operational stability.

Partnership Startups in the Water Industry

K-water is discovering and fostering startups with innovative technologies such as IoT, advanced sensors, and big data in order to respond to digital transformation and other changes in the water industry paradigm. We have selected 92 partnership start-ups from January 2018 through quarterly public contests and recommendations from outside experts, and are planning to support the rapid growth of startups with sufficient growth potential via matching and mentoring by K-water technical personnel, providing test beds, and attracting investment.

Business Case

Support for the Growth of Bitsensing, a Partnership Startup

Bitsensing, a startup that develops and manufactures industrial, automotive, and security radar, was established in 2018 and possesses technologies to measure levels, including water level, with radar. This company was selected during K-water's 5th cooperative start-up selection in 2019 and was provided with various start-up support including test beds, technology consulting, office space, and overseas market development. In 2020, two years after its foundation, this company has grown into one of Korea's top 10 'next-generation unicorns', and has also won the US CES Innovation Award.

Level measurement radar sensors
Intelligent radar sensors that are used to accurately measure water level, wave height, and flow velocity without being affected by weather/environment
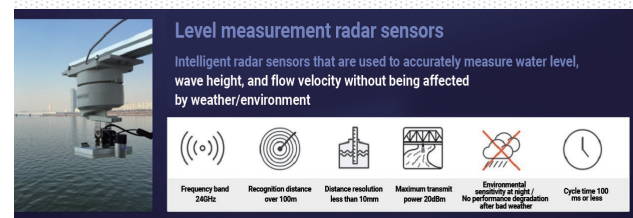
K-water's Water Industry Open Platform
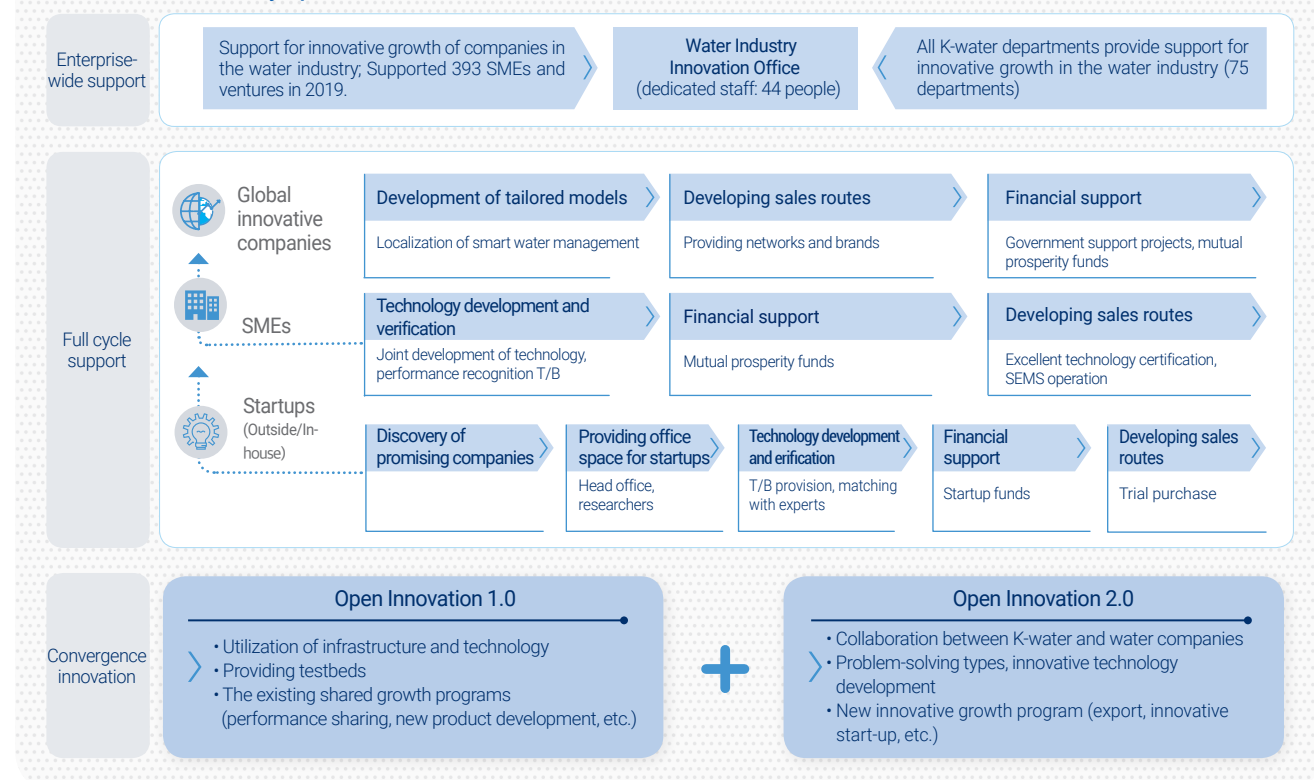
Laying a Foundation for Fair Trade

Domestic and Overseas Expansion of SMEs

K-water is offering a special program to provide tailored support for SMEs to find their initial sales routes, which includes the purchase of products developed by SMEs. In 2019, we purchased products worth KRW 9.3 billion. We also helped startups achieve the first public procurement transaction by purchasing their products on a test basis and supported SMEs to accomplish KRW 143.2 billion in sales. This was increased by 20% year on 2018 using the technology development support system. In particular, due to the expansion of the results of overseas test projects, the sales of SMEs in other countries increased 1.8 times from 2018 to KRW 14.7 billion.

Purchasing Products Developed by SMEs
(Unit: KRW 100 million)

Process of Overseas Pilot Projects

Amount of Exports Overseas Accompanied with SMEs (Unit: KRW 100 million)

Number of SMEs for Joint Advancement of Business Projects (Unit: No.)

Establishment of a Culture of Fair Trade

K-water intends to establish a culture of fair trade by laying a foundation to improve the bidding system. We are working hard to correct low-cost subcontracting practices by requiring signing a contract with an SME as the main contractor, and abolishing excessive warranty with ambiguous legal basis to ease the burden on customers. We have also established and institutionalized a self-inspection checklist to screen out unfair contracts in advance. In addition, we are expanding the use of a standard contract form to ensure fair contracts with subcontractors and to correct the unreasonable cost burden to subcontractors by making the ordering party bear such costs.

Improvement of Unreasonable Practices

Due to large design firms' monopoly of orders, which has intensified in the past two years, low-cost subcontracting practices for SMEs are continuing. K-water is making efforts to expand opportunities for SMEs to participate by introducing, for the first time among public corporations, an upper limit for large companies' participation, restricting joint supply of the top five order-winning companies, easing performance records when evaluating, and reducing the number of evaluation items. As a result, the participation of SMEs has increased by 20%p compared to 2018.

Participation Rate of SMEs (Unit: %)
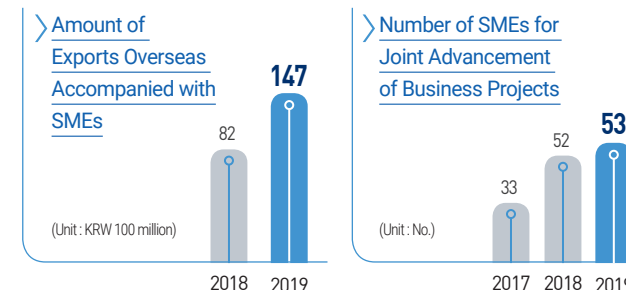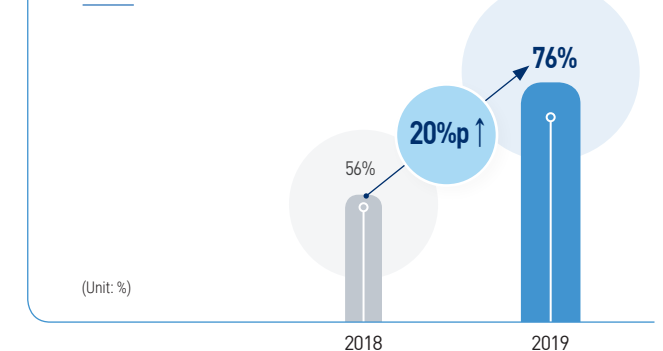

Invigoration of the Private Economy

In order to simplify the contract payment process, K-water is linking the 'Subcontract Keeper' system and sharing necessary data. We mandate the use of the 'Subcontract Keeper' system for contracts exceeding KRW 50 million, and pay contract payments within 3 days. We are constantly improving management by checking the status of the 'Subcontract Keeper' from time to time. We also proposed a significant increase of target advance payment in 2019, achieving the highest fiscal execution rate among public corporations.

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"Open communication!"

A Two-way Talk Platform for Employees and the Public to Share their Opinions

Online 'Danbi Talk Talk'

K-water runs a public communication platform called 'Danbi Talk Talk' to create social value by listening to and communicating with the public. Proposals received through Danbi Talk Talk are reviewed for their feasibility and selected as agenda items every year, and the progress is shared with the public by, for example, reflecting them in our operation and management through specific online/offline processes.
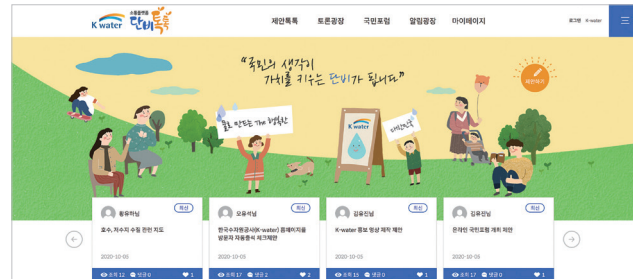
The Main Screen of Danbi Talk Talk – K-water's Communication Platform
(http://www.kwater.or.kr/danbitoktok)

Building a Creative Workspace Culture for Open Minds

K-water has created a space for employees to communicate freely through mobile platform with other employees, and organizes Innovation Day and Innovation Week to develop a free and creative work culture for employees. We have shared and spread the best practices based on collective intelligence, thereby building a culture of creative innovation in the workplace. We have strived to view and listen to the opinions of the public more openly.

Offline Public Forum

In addition to online communication, K-water is discovering ideas by discussing freely with the public in the National Smart Water Management Forum, an offline channel that communicates face-to-face with the public. We listen to public opinions on services, welfare, complaints, etc., and strive to reflect them in service improvement. The National Smart Water Management Forum is a space for public debate from which we can produce practical results. We are also constantly striving to keep pace with rapidly shifting social changes, devising new untact-based communication concepts that connect online and offline.

3rd National Smart Water Management Forum
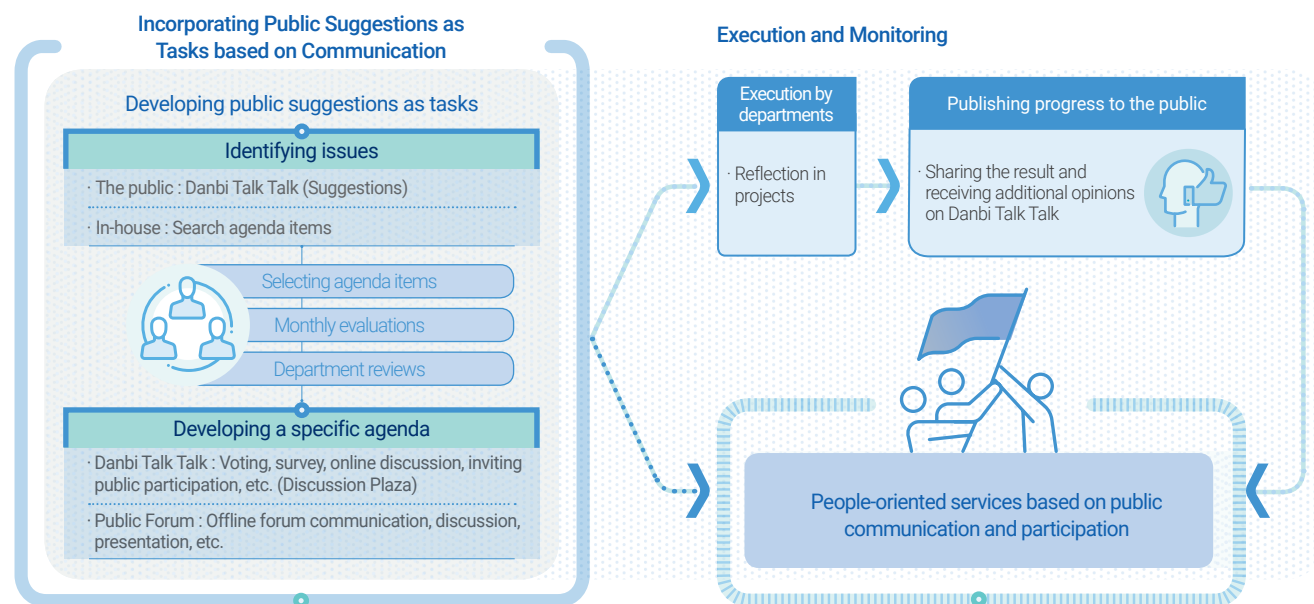
"Participation & Innovation!"

We help people build projects they want to make local communities happy

Creation of Innovation Values

K-water has been carrying out "Public Participation Innovation Projects" that allow ordinary people to participate in the project development process to create public-friendly innovative values. This project is divided into two parts according to participants and innovation techniques: "Happiness Design Team", which utilizes service design techniques, and "Water Experiments by Citizens" via Living Lab. With direct participation of citizens, we are taking a step closer to them as a public corporation through consumer-oriented services and system improvement.

Happiness Design Team   Living Lab

A Platform to Solve Problems in Communities

K-water has established a "platform to solve problems in Daejeon", a public-private collaboration platform that allows citizens to discover local issues and solve them in cooperation with local governments, public institutions, and social groups in the private sector.

In particular, in order to respond more actively to global climate issues, we are promoting, as a part of our continuous efforts to make positive changes, the 'Youth Climate Crisis Response Project.' The project is led by youths who will seize the future with the entire process of Planning → Execution → Spread.

Platform of local problem solution

Open Innovation R&D

K-water aims to realize inclusive technological innovation to obtain technologies, not only through the current practice of in-house R&D, but also through the introduction of creative and innovative technologies from outside and inclusive technology innovation based on citizen-participating R&D. We have expanded the scope of public competition to secure core technologies and participants in the watershed community. The number of public contest projects increased to 30 tasks with KRW 3 billion in 2020 from 12 tasks with KRW 1.1 billion in 2019. It is also our intention to discover creative projects for public contests such as watershed governance and technology policies by separating the competition categories into designated subject, free subject, policy issues, conflict management, and technology policies.
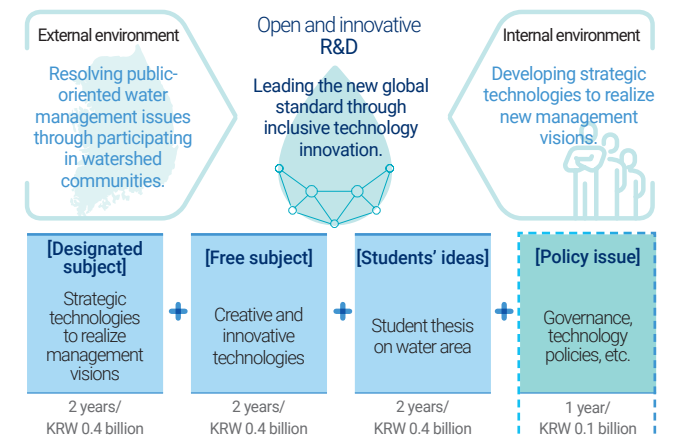
Public Participation in Budgeting

In 2019, K-water, a public corporation specialized in water, laid the foundation for the "public participation budget system", reflecting the will of the public for the first time among public corporations in Korea. In addition, we selected 11 outstanding suggestions across management including water quality, aquatic ecology, and safety with a budget of KRW 7.5 billion. In 2020, we are introducing an issue-solving proposal system centered on people's experience. We are also improving expertise and execution power by strengthening internal and external cooperation to discover and execute projects that can change people's lives.
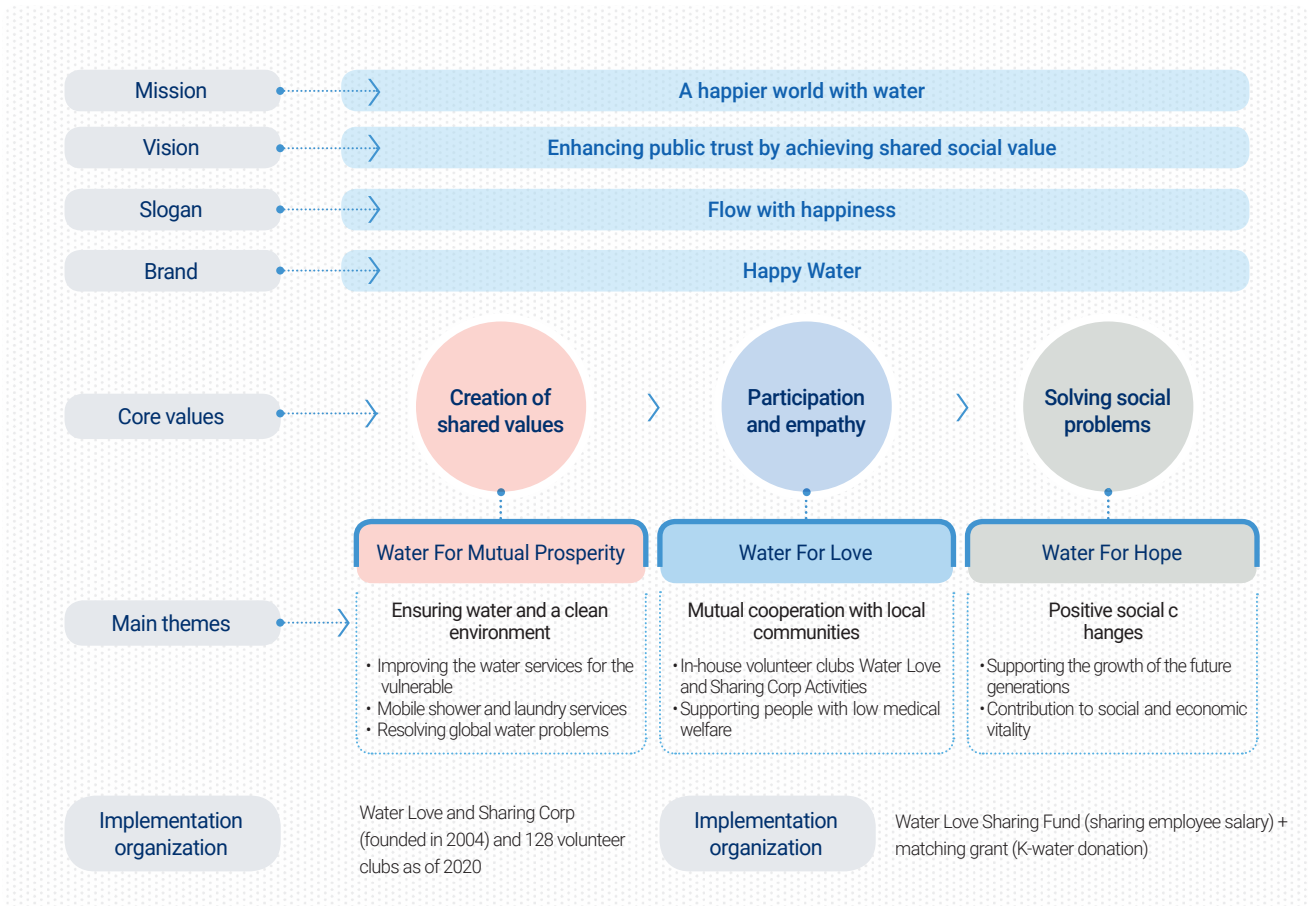
The Public Participating Budget System's Direction in 2020

Goals	Discovering and implementing perceptive projects that change people's lives through public harmony	
Direction	Introduction of issue-solving proposals centered on public experience	Enhancing expertise and execution capacity by improving internal and external cooperation
Tasks	1. Public contests about subjects to resolve preemptively identified water-related issues. 2. Finding new subjects via public contests targeting experts and local communities. 3. Establishing an in-house deliberation body to determine the appropriateness of proposed projects. 4. Cost reduction and synergy improvement through integration with similar public contests.	

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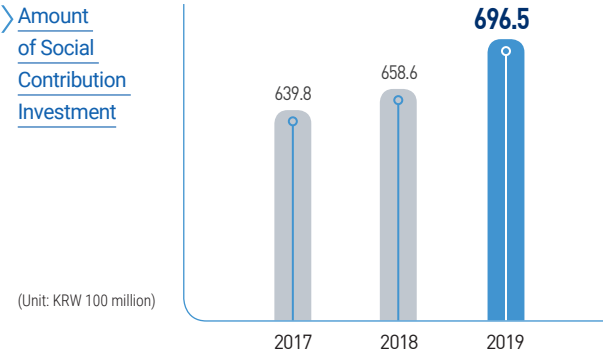Appendix

K-water with Local Communities

K-water's Social Responsibility

K-water has established a vision for social contribution consisting of three core values and implementation directions, and we are performing various social contribution activities based on its business characteristics and resources in order to achieve sustainable development and social responsibility. We have established 'Happy Water', an integrated social contribution brand with the intention to make people happy through water. We also formed a volunteer group of employees, the 'K-water Water Love and Sharing Corps', to continuously carry out various volunteer activities as a part of our efforts to live up to our social responsibility.

Social Contribution System

Mission	A happier world with water
Vision	Enhancing public trust by achieving shared social value
Slogan	Flow with happiness
Brand	Happy Water

Core values	Creation of shared values	Participation and empathy	Solving social problems
	Water For Mutual Prosperity	Water For Love	Water For Hope
Main themes	Ensuring water and a clean environment • Improving the water services for the vulnerable • Mobile shower and laundry services • Resolving global water problems	Mutual cooperation with local communities • In-house volunteer clubs Water Love and Sharing Corp Activities • Supporting people with low medical welfare	Positive social c hanges • Supporting the growth of the future generations • Contribution to social and economic vitality
Implementation organization	Water Love and Sharing Corp (founded in 2004) and 128 volunteer clubs as of 2020	Implementation organization	Water Love Sharing Fund (sharing employee salary) + matching grant (K-water donation)

Water Love and Sharing Corp

> Amount of Social Contribution Investment

696.5

639.8   658.6

(Unit: KRW 100 million)

2017   2018   2019

Conveying the Value of Clean Water

As a corporation specialized in water management, K-water is engaged in various social contribution activities to achieve one of the UN's sustainable development goals of improving the environment of "water and sanitation". We are performing water welfare projects such as the 'Water Project' to improve the water environment of the underprivileged in Korea and provide clean drinking water for elementary and secondary schools in rural areas. We are also making efforts to find drinking water and support the lives of residents in water-poor countries such as Cambodia and Mongolia to convey the value of clean water to those located in the blind spots of water welfare. We are also operating K-water Sarang Spring, actively reflecting the public's innovative ideas. This is a visiting laundry and shower service for residents who live where water for daily use is not available.

K-water's Love Spring

Water For Hope for Solving Social Problems

K-water is involved in activities to solve social problems such as fostering future talent and revitalizing the social economy. Programs designed for helping teenagers include 'Mentoring for Hope', which is a career mentoring program that helps youths in marginalized groups design their future, 'Outdoor Camp' using K-water's waterfront space, and 'Water Dream Camp', which provides opportunities to learn about water. In addition, we are running the "Social Enterprise Support Project" to support commercialization of social economic companies.

Medical Welfare Support in Rural Areas

Water For Love with Local Communities

A volunteer club composed of K-water's employees, "Water Love and Sharing Corp", has discovered and performed social contribution activities tailored to regional development. Programs include support for youths outside schools to obtain IT certification, social safety network services connected to water meter reading, providing water bill vouchers to the vulnerable, and "Love-Sharing Medical Service" to provide medical services to residents living in areas with poor medical and environmental conditions.

Hope Mentoring for Youths' Dreams
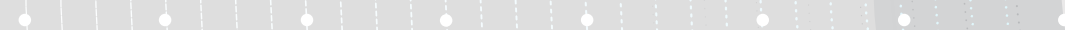
| Business Case

K-water's 13th Supporters Activity Program

College Student Supporters is a K-water representative program to communicate with the public. In 2019, we have launched the 13th Supporters Activity Program, consisting of a total of 132 students. The main activities include public campaigns about monthly themes and participating in improving water use environments including kitchens and water facilities for families belonging to vulnerable social groups with the "Water Loving and Sharing Group".

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Sustainability Highlights

Economic Performance

Economic Performance

	Category	Unit	2017	2018	2019
Assets	Current assets	KRW in millions	7,041,806	8,208,278	8,505,568
	Non-current assets	KRW in millions	13,825,489	13,588,480	13,749,182
	Total	KRW in millions	20,867,295	21,796,758	22,254,750
Liabilities	Current liabilities	KRW in millions	3,056,095	2,901,471	3,202,178
	Non-current liabilities	KRW in millions	10,577,196	11,108,159	10,717,151
	Total	KRW in millions	13,633,291	14,009,630	13,919,329
Capital	Capital	KRW in millions	8,108,974	8,486,338	8,900,966
	Others	KRW in millions	▲908,919	▲740,756	▲614,136
	Equity attributable to owners of the parent company	KRW in millions	7,200,055	7,745,582	8,286,830
	Non-controlling interest	KRW in millions	33,949	41,546	48,591
	Total	KRW in millions	7,234,004	7,787,128	8,335,421

Summary of consolidated statement of income

Category	Unit	2017	2018	2019
Turnover	KRW in millions	3,375,560	3,391,568	2,971,690
Cost of sales	KRW in millions	2,793,724	2,745,361	2,436,367
Selling and maintenance expenses	KRW in millions	154,120	170,185	206,574
Operating profit	KRW in millions	427,716	476,022	328,749
Other income	KRW in millions	68,450	140,705	40,729
Other expenses	KRW in millions	42,887	20,146	75,336
Other gains (loss)	KRW in millions	▲1,889	441	289
Financial income	KRW in millions	125,341	64,617	149,240
Financial costs	KRW in millions	383,290	380,958	333,777
Related profit (loss) of affiliates	KRW in millions	▲1,145	▲7,141	▲6,197
Net profit before corporate tax deduction	KRW in millions	192,296	273,540	103,697
Corporate tax expenses (profits)	KRW in millions	7,362	33,366	▲26,877
Net profit during the term	KRW in millions	184,934	240,174	130,574
Other comprehensive income	KRW in millions	▲27,521	▲31,259	646
Total comprehensive income	KRW in millions	157,413	208,915	131,220
Net profit during the term attributable to owners of the parent company	KRW in millions	179,248	240,449	128,240
Net profit during the term attributable to non-controlling interest	KRW in millions	5,686	▲275	2,334

Turnover by business sector

Sector	Unit	2017	2018	2019
Integrated Water Resources Management (IWRM)	KRW in millions	551,021	715,607	869,312
Tap water production (healthy water)	KRW in millions	1,300,988	1,327,239	1,338,603
Waterfront city development	KRW in millions	544,912	572,864	265,562
Clean energy production	KRW in millions	229,469	270,073	246,942
Overseas projects	KRW in millions	7,284	9,063	7,887

Environmental performances

Renewable Energy Project Performance

Category	Unit	2017	2018	2019
Clean energy production (MWh)	MWh	2,118,326	2,436,746	2,103,507
Power plant fail stop rate (%)	%	0.380	0.848	0.180

Greenhouse Gas Emissions

	Category	Unit	2017	2018	2019
Emissions	Total	tCO_2-eq	720,687	736,676	724,800
	Direct	tCO_2-eq	4,817	4,420	4,657
	Indirect	tCO_2-eq	715,870	732,256	720,143
	Carbon cleanliness	tCO_2-eq/TOE	19.92	20.36	20.03
Reduction	Reduction target	tCO_2-eq	86,524	141,292	129,416
	Estimated emissions	tCO_2-eq	720,687	736,676	724,800
	Emission amount	tCO_2-eq	634,163	595,384	595,384
	Total reduction	tCO_2-eq	4,522	6,434	53,338
	Reduction in the year	tCO_2-eq	4,522	6,434	53,338
	Early reduction-used	tCO_2-eq	0	0	0

Air Pollutant Emissions

Category	Unit	2017	2018	2019
PM	kg	210	204.9	216.7
SOx	kg	1,476	1,442.3	1,525.5
CO	kg	1,031	1,020.3	1,068.1
HC	kg	202	201.1	209.6
NOx	kg	3,275	3,230.9	3,390.2

Energy Consumption and Savings

	Category	Unit	2017	2018	2019
KRW Unit		TJ / KRW 100 million	4.09	4.19	5.02
Consumption	Total	TJ	14,783	15,150	14,905
	Direct	TJ	79	73	77
	Indirect	TJ	14,704	15,077	14,828

Reduction of Waste

	Category	Unit	2017	2018	2019
Water Purification Plant Sludge	Generated amount	tons	121,581	141,441	132,858
	Recycling rate	%	100	100	100
Sewage sludge	Generated amount	tons	60,808	166,554	69,529
	Recycling rate	%	48.7	49	92
Construction Waste	Generated amount[*]	tons	814,987	898,024	263,601
	Recycling rate	%	99.8	100	100

* Reduction of construction waste due to the reduction of construction work (construction completion) in 2019

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Creation of Local Eco-cultural Spaces

	Category	Unit	2017	2018	2019
Total	Alternative habitat	No. of places	53	53	53
	Fish spawning ground	No. of places	13	13	13
	Eco-corridor	No. of places	116	116	116
	Artificial marsh	No. of places	20	20	20
	Fishway	No. of places	5	5	5
Gunwi Dam	Alternative habitat	No. of places	5	5	5
	Dam	No. of places	5	5	5
	Eco-corridor	No. of places	6	6	5
	Artificial marsh	No. of places	6	6	6
	Fishway	No. of places	0	0	0
Gunnam Dam	Alternative habitat	No. of places	8	8	8
	Gunnam	No. of places	0	0	0
	Dam	No. of places	6	6	6
	Artificial marsh	No. of places	1	1	1
	Fishway	No. of places	1	1	1
Hantan Dam	Alternative habitat	No. of places	0	0	0
	Fish spawning ground	No. of places	0	0	0
	Hantan	No. of places	7	7	7
	Dam	No. of places	0	0	0
	Fishway	No. of places	0	0	0
Gimcheon Buhang Dam	Alternative habitat	No. of places	12	12	12
	Fish spawning ground	No. of places	3	3	3
	Eco-corridor	No. of places	46	46	46
	Gimcheon	No. of places	4	4	4
	Buhang	No. of places	3	3	3
Seongdeok Dam	Alternative habitat	No. of places	24	24	24
	Fish spawning ground	No. of places	3	3	3
	Eco-corridor	No. of places	45	45	45
	Artificial marsh	No. of places	2	2	2
	Fishway	No. of places	0	0	0
Yeongju Dam	Alternative habitat	No. of places	0	0	0
	Dam	No. of places	1	1	1
	Eco-corridor	No. of places	1	1	1
	Artificial marsh	No. of places	3	3	3
	Fishway	No. of places	1	1	1
Bohyeonsan Dam	Alternative habitat	No. of places	4	4	4
	Yeongju	No. of places	1	1	1
	Dam	No. of places	5	5	5
	Artificial marsh	No. of places	4	4	4
	Fishway	No. of places	0	0	0

Creation of Local Eco-cultural Spaces

(단위 : 천제곱미터)

Sewage Treatment Facilities		Unit	2017	2018	2019
BOD	- (Average)	mg/L	2.6	2.8	3.4
	5 (1~2 areas)		1.1	1.1	1.3
	10 (3~4 areas)		3.8	4.1	4.6
COD	- (Average)	mg/L	9.4	9.6	10.6
	20 (1~2 areas)		7.4	7.4	7.4
	40 (3~4 areas)		10.9	11.3	12.5
SS	- (Average)	mg/L	3	2.4	2.8
	10 (1~2 areas)		1.9	1.6	1.6
	10 (3~4 areas)		3.9	3	3.4

Major Achievements in Water Quality Improvement

Category		Unit	2017	2018	2019
Water purification plants Quality of effluents	BOD	mg/L	2.2	2.4	2.2
	COD	mg/L	4.3	5	6.3
	SS	mg/L	2.2	2.3	1.8
Sewage disposal plants	BOD	mg/L	5.4	6	5.1
	SS	mg/L	5.3	4.9	5.0

Major Achievements in Water Quality Improvement Activities

Category	Unit	2017	2018	2019
Pollution source	No. of places	360	300	519
Improvement action	No. of places	348	286	500
Action rate	%	96.7	95.3	96.3

Green Purchase Performance

Category	Unit	2017	2018	2019
Total purchase amount	KRW 100 million	509	450	382
Green purchase amount	KRW 100 million	411	381	309
Green purchase ratio	%	80.8	84.7	80.9

Water Rate Discount for Consumers of Reclaimed Water

Category	Unit	2017	2018	2019
Amount of water used at discounted rates	1,000m³	172,756	168,542	161,373
Total discounted rates	KRW in millions	4,232	4,095	3,900

Social Performance

Status of Executives

Category			Unit	2017	2018	2019
All	Total		Persons	5,091	5,293	5055
	Gender	Male	Persons	4,334 (85.1%)	4,472 (84.5%)	4,176 (82.6%)
		Female	Persons	757 (14.9%)	821 (15.5%)	879 (17.4%)
Executives	Total		Persons	7	6	3
	Gender	Male	Persons	7	6	3
		Female	Persons	-	-	-
	Age	Under 30 years	Persons	-	-	-
		Under 30~50 years	Persons	-	-	-
		Over 50 years	Persons	7	6	3
By rank	Standing executives	Total	Persons	7	6	3
		Male	Persons	7	6	3
		Female	Persons	-	-	-
	Grade 1	Total	Persons	53	53	53
		Male	Persons	53	52	53
		Female	Persons	-	1	-
	Grade 2	Total	Persons	331	343	353
		Male	Persons	322	329	335
		Female	Persons	9	14	18
	Grade 3~5	Total	Persons	3,041	3,025	3,231.25
		Male	Persons	2,535	2,511	2,592
		Female	Persons	506	512	639.25
	Grade 6	Total	Persons	320	282	251
		Male	Persons	297	260	229
			Persons	23	22	22
	Others (Including professionals, operational, special servers)	Total	Persons	901	1,093.75	1,164
		Male	Persons	730.5	906.75	963.75
		Female	Persons	170.5	187	200.25
By employment type	Permanent position	General Full time	Persons	4,646	4,794.75	5,052.25
		Infinite Contract	Persons	605.75	829	831.38
	Temporary position	Total	Persons	161.63	221.75	313
		Temporary workers	Persons	153	220	312
		Short-time worker	Persons	8.63	1.75	1

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Employment and Turnover Status

Category		Unit	2017	2018	2019
Newly-hired	Total newly-hired*	Persons	327.5	365.5	477
	Youth	Persons	274.5	312	431
	Female	Persons	92.5	90.5	168
	Disabled	Persons	3	1	4
	Area talent in non-metropolitan	Persons	171.50	197	252
	Employee with a high school diploma	Persons	57	148.5	68
Retirement	Regular retirement	Persons	62	73	106
	voluntary retirement	Persons	10	23	13
Turnover	Turnover / turnover rate	Persons	120 / 2.0	164 / 2.6	332 / 6.7
	Male / turnover rate	Persons / %	103 / 2.0	137 / 2.6	293 / 5.8
	Female / turnover rate	Persons / %	17 / 0.3	27 / 0.5	39 / 0.8

* Total sum has a difference due to overlapping personnel.

Status of Flexible Working

Category		Unit	2017	2018	2019
Time selective job system	Recruitment	Persons	13	9	0
	Conversion	Persons	21	16	32
Flexible work system	Staggered office hours	Persons	1,903	2,427	2,656
	Flexible working hours	Persons	0	595	2,156
	Intensive work	Persons	11	10	7
	Discretionary work schedule	Persons	0	0	0
Remote work system	At-home work	Persons	0	8	15
	Smart work	Persons	0	3	1

Parental Leave Return Rate

Category		Unit	2017	2018	2019
leave of absence	Total	Persons	117	125	150
	Male	Persons	23	21	26
	Female	Persons	94	104	124
Reinstatement rate	Total	%	100	100	100
	Male	%	100	100	100
	Female	%	100	100	100
Maintenance rate*	Total	%	100	100	100
	Male	%	100	100	100
	Female	%	100	100	100

* Maintenance rate: Percentage of workers who have returned from parental leave and worked for more than 12 months

Status of employee education

Category		Unit	2017	2018	2019
Education personnel	Total	Persons	21,060	21,131	21,700
	Executives	Persons	61	55	58
	General	Persons	78	83	85
	Special	Persons	20	39	11
Average hours of education per person		Hours	75	79	80
Average investment costs of education per person		KRW in millions	2.19	1.95	1.53
People who have completed human rights education*		Persons	-	1,715	17,781
Completion rate of human rights education		%	-	32.4	351.7

* Human rights education has been calculated the number of education personnel in each field.

Labor relations

Category		Unit	2017	2018	2019
Membership status of labor union	Admission rate	%	85	83	83
Grievance Settlements	Total number of grievances	Cases	35	73	39
	Number of settled grievances	Cases	33	69	39
	Settlement ratio	%	94.3	94.5	100
Employee Satisfaction	Satisfaction with labor-management relations	%	92.5	93	93.1
	Satisfaction with remuneration and welfare	Points	3.3	3.3	3.5

Occupational Safety

Category		Unit	2017	2018	2019
Industrial accident	Industrial accident rate*	%	0.08	0.23	0.17
	Number of industrial	Persons	6	12	9
Death toll	Employees	Persons	0	0	0
	Direct	Persons	0	0	0
	Subcontract	Persons	0	0	0
	Construction order	Persons	1	3	2
Disease emergence	Disease prevalence	%	11.63	11.10	10.10
	Number of disease	Persons	592	588	621

* The industrial accident rate in 2017 has been different from the last sustainability report as it has recalculated with the standards of the Korea Health and Safety Corporation, excluding employees who got injured but compromised with the company.

Performance of Purchasing Products

	Category	Unit	2017	2018	2019
Total Purchase Amount		KRW in millions	1,398,026	744,371	1,517,079
SME Products	Purchase Amount	KRW in millions	818,203	466,627	949,691
	Percentage	%	58.53	62.69	62.60
Female Enterprises Products	Purchase Amount	KRW in millions	58,076	35,076	64,470
	Percentage	%	4.15	4.71	4.25
Social Enterprises Products	Purchase Amount	KRW in millions	9,876	744,371	21,227
	Percentage	%	0.71	2.01	1.40
Products made by the Severely Disabled	Purchase Amount	KRW in millions	9,771	4,123	9,460
	Percentage	%	0.70	0.55	0.62

R&D Empowerment

	Category	Unit	2017	2018	2019
R&D Investment	R&D costs	KRW 100 million	181	160	120
	% of investment to sales	%	5.36	4.72	4.04
R&D Training of HR	R&D Professionals	Persons	250	250	235
	% of R&D Professionals	%	4.91	4.72	4.65
R&D Performances	Research tasks	Cases	131	140	93
	Number of research presentations	Cases	445	363	300
	Patent Application	Cases	43	27	28
	Patent Registration	Cases	42	23	33

Customer Communication

	Category	Unit	2017	2018	2019
Communication with Customers	Written civil complaints	Cases	310	268	205
	Electronic civil complaints	Cases	1,417	1,721	3,011
	Timely handling rate of civil complaints	%	100	100	99.9
	Information disclosure rate	%	84.1	87.6	75.8
K-water Customer Satisfaction		Points	94.4	91.7	95.0
(Average of the evaluation group)		Points	90.9	88.7	89.6
Customer satisfaction with local waterworks		Points	81.7	81.8	82.2
(Average of the evaluation group)		Points	76.0	75.1	78.0

Management of Ethical Compliance

Category	Unit	2017	2018	2019
General integrity	Points	8.02	7.96	7.59
Evaluation of anti-corruption measures	Points	2	2	3

Social Contributions

	Category	Unit	2017	2018	2019
Social contribution engagement level		Points	93.4	87.0	89.7
Voluntary service	Number of engaged employees	Persons	4,617	3,364	3,358
	Engagement rate of employee volunteer work	%	90.7	63.5	60.2
	Total engagement time	Hours	67,608	33,481	32,248
	Time of engagement per person	Hours	14.6	10.0	9.6
investment amount	Social contribution investment amount	KRW 100 million	639.8	658.6	696.6
	Ratio of investment to sales	%	1.9	1.9	2.3

Membership Activities and Awards

Category	
Expand work flexibility	- Introducing a flexible working system based on individual tasks
Improve sound working practices	- Labor-management agreement to introduce 'total working hours system' in connection with the flextime
	- Eliminating low value-added work procedures to increase work efficiency, simplifying and streamlining the work of company rules, standards, and general works through open communication with all employees
	- Promoting a culture of active use of business systems such as business sharing intranet-portal
Boost childbirth promotion policies	- Maternity leave, parental leave notice system
	- Operation of workplace daycare centers (expanded capacity by converting idle facilities into childcare facilities)
Support work-life balance	- Operation of the 'Quality of Life Improvement TF', such as reorganization of the time selective work system for work-life balance and improvement of the family-friendly welfare system

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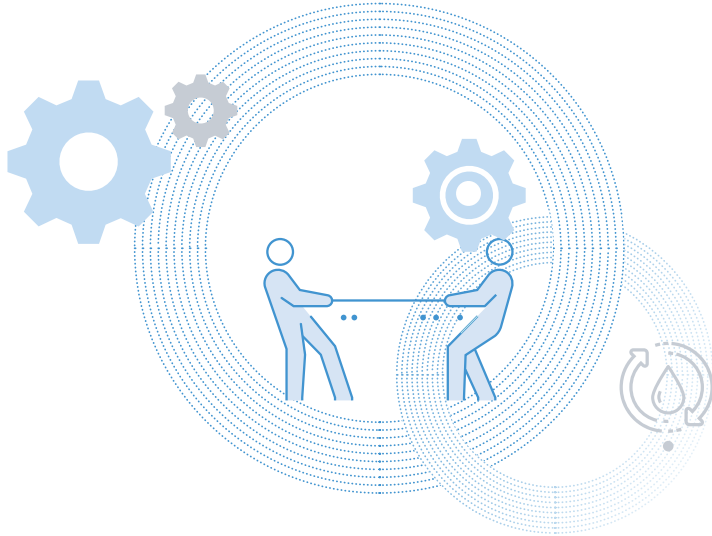
The Third Party Assurance Statement

To the Readers of `K-water 2020 Sustainability Report`

The Sustainable Management Institute (the "Assurer") was asked by K-water on to provide independent assurance of the "K-water 2020 Sustainability Report" (the "Report") and hereby provides the following assurance statement.

Responsibility and Independence

K-water is entirely responsible for all information and opinions presented in this Report. The Assurer is solely responsible for the assurance statement on the content of the Report. As an independent assurance agency, the Assurer was neither involved in the process of preparing this Report nor in any conflicts of interest that may undermine our independence.

Assurance Standards

The Assurer performed assurance in accordance with Type 2 de-fined in AA1000AS 2016) including ISAE 3000 of International Auditing and Assurance Standards Board IAASB). Based on the verification principles, we further confirmed the suitability of possible impacts from the organization's activities and performance. It indicates that the Report was comprehensively reviewed in terms of the effective-ness and reliability of reporting standards in the assurance. The assurance standards are based on the risk reduction with limitations defined in ISAE 3000 and correspond to the moderate level of assurance defined in AA1000AS 2016). In other words, the Assurer confirmed compliance with the importance and understandability principles and evaluated the information and reliability of the GRI indicators listed in the report.

Limitations

The Assurer identified the reliability of performance in the Report based on the above-mentioned assurance scope and standards as follows. The on-site verification was carried out at the headquarters in Daejeon. The financial data were verified through audit reports and public institution management information disclosure systems audited by independent auditors, environmental and social data were also verified through the public institution management information disclosure system, and some data were verified through on-site verification or interviews. The assurer expressly disclaims any liability or co-responsibility for any decision a person or an entity may make based on this Assurance Statement.

Methodology

This assurance was conducted through the following methods;
- Verified if the requirements for Core options of GRI Standards were fulfilled.
- Verified the compliance with the principles of the Report contents and quality based on GRI Standards.
- Verified the selection of material issues covered and the appropriateness of the technical content through media research and benchmarking analysis.
- Verified the suitability of the contents and any errors in expression through comparison analysis with other sources.
- Verified the basis of Comprehensive data and information and the internal process and system through on-site inspection at the headquarters in Daejeon.

Findings and Conclusion

It is the verifier's opinion that the Report reflects K-water's sustainability management activity & performance faithfully and fairly. In addition, through this verification process, this verifier judges that K-water's report meets the GRI Standards requirements for Core Options, and secured the rational level which can be presented by Type 2 assurance level. Universal Standard Disclosures were prepared in full compliance with the requirements for Core Options while Topic-specific Standard Disclosures were reviewed in line disclosures of the material topics identified through the process of determining report content as follows;

- Reporting Principles
- Universal Standards
- Topic Specific Standards
  - Management Approach
  - Water 303-1
  - Energy 302-5
  - Economic Performance 201-2

- Occupational Health and Safety 403-1
- Education and Training 404-2
- Diversity and Equal Opportunity 405-1

- Inclusivity : Stakeholder Engagement

  This verifier confirmed that K-water is promoting communication activity through the communication channel by interested party for conformance to the principles of inclusivity. K-water defines a key stakeholder and establishes a systematic system of participation in consideration of industry characteristics. Stakeholder expectations identified through stakeholder engagement are reviewed in connection with the company's strategic direction and strategic tasks.

- Materiality : Identification and Reporting of Material Issues

  This verifier confirmed that K-water is selecting core issues through the materiality evaluation process. Key issues were selected through the process of analyzing the impact on stakeholder decision-making on various sustainability issues and analyzing the impact on management performance. The selected core issues are reflected in management activities through processes such as participation in materiality evaluation through the circulation of each person in charge, and the activities and performance of K-water on each issue are reported in each report in each promotion area.

- Responsiveness : Organization's Response to Issues

  This verifier also confirmed that K-water is grasping core issues affecting the interested parties' performance, mounting sustainability management activity to respond to the core issues, and giving a proper description of the details thereof in the report. We were able to confirm that we set clear targets on issues presented by stakeholders and transparently disclose their performance.

- Impact : Consideration of the Impact of the Organization

  K-water identifies the social impact of the organization by setting boundaries on the impact of major issues and is making efforts to improve it. In particular, by organizing and managing indexes on social values, we have confirmed that we are managing the social impact of management activities.

Recommendation

The Assurer recognizes the diverse efforts and performance made by the Company and suggests the following for the Company's publication of the Report in the future and the improvement of its sustainability standards.

- We recommend further expanding the category of key issues selected by the materiality assessment. It is necessary to provide the reader with the right information by selecting sufficient key issues as reports for various interests in the Corporation. In particular, the Korea Water Resources Corp. is carrying out a project to run water directly related to the health of customers or the people. Customer safety issues related to water are issues that require special attention in the case of construction, and internal consultation is expected to contribute to the improvement of our profits from a long-term perspective.

Sustainability Lab

November 11th, 2020
Director of the Sustainability Lab
Yang Ho, Lee

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GRI Standards Index

Topic		Disclosure	ISO 26000	Verification Page	Verification Omissions/Comments
Organizational Profile	102-1	Name of the organization	6.3.10/ 6.4.1-6.4.2/ 6.4.3/6.4.4/ 6.4.5/ 6.8.5/7.8	14	v
	102-2	Activities, brands, products, and services		14	v
	102-3	Location of headquarters		14	v
	102-4	Location of operations		16-17	v
	102-5	Ownership and legal form		14	v
	102-6	Markets served		14	v
	102-7	Scale of the organization		14	v
	102-8	Information on employees and other workers		77-78	v
	102-9	Supply chain		66-67	v
	102-10	Significant changes to the organization and its supply chain		66-67	v
	102-11	Precautionary Principle or approach		46-47	v
	102-12	External initiatives		86-87, 92-93	v
	102-13	Membership of associations		92-93	v
Strategy	102-14	Statement from senior decision-maker	4.7/6.2/7.4.2	4-5	v
Ethics and Integrity	102-16	Values, principles, standards, and norms of behavior	4.4/6.6.3	88-89	v
Governance	102-18	Governance structure	6.2/7.4.3/7.7.5	60-61	v
Stakeholder Engagement	102-40	List of stakeholder groups	5.3	22-23	v
	102-41	Collective bargaining agreements		79	v
	102-42	Identifying and selecting stakeholders		22-23	v
	102-43	Approach to stakeholder engagement		22-23	v
	102-44	Key topics and concerns raised		22-23	v
Reporting Practice	102-45	Entities included in the consolidated financial statements	5.2/7.3.2/ 7.3.3/7.3.4	14	v
	102-46	Defining report content and topic Boundaries		24-25	v
	102-47	List of material topics		24-25	v
	102-48	Restatements of information		-	No significant changes
	102-49	Changes in reporting		About This Report	v
	102-50	Reporting period		About This Report	v
	102-51	Date of most recent report		About This Report	v
	102-52	Reporting cycle		About This Report	v
	102-53	Contact point for questions regarding the report		About This Report	v
	102-54	Claims of reporting in accordance with the GRI Standards		About This Report	v
	102-55	GRI content index		84-85	v
	102-56	External assurance		82-83	v
Procurement Practices	103	Management Approach	6.4.3/6.6.6/ 6.8.1-6.8.2/ 6.8.7	24-25	v
	204-1	Proportion of spending on local suppliers		66-67, 80	v
Anti-corruption	103	Management Approach	6.6.1-6.6.2/ 6.6.3	24-25	v
	205-1	Operations assessed for risks related to corruption		62-65	v
	205-2	Communication and training about anti-corruption policies and procedures		62-65	v

Topic		Disclosure	ISO 26000	Verification Page	Verification Omissions/Comments
Anti-competitive Behavior	103	Management Approach	6.6.1-6.6.2/ 6.6.5/6.6.7	24-25	v
	206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices		66-67	v
Energy	103	Management Approach	6.5.4/6.5.5	24-25	v
	302-1	Energy consumption within the organization		75	v
	302-4	Reduction of energy consumption		75	v
	302-5	Reductions in energy requirements of products and services		75	v
Emissions	103	Management Approach	6.5.3/6.5.5.	24-25	v
	305-1	Direct (Scope 1) GHG emissions		49, 75-76	v
	305-2	Energy indirect (Scope 2) GHG emissions		75-76	v
	305-5	Reduction of GHG emissions		75-76	v
	305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions		75	v
Waste	103	Management Approach	6.5.3/6.5.4	24-25	v
	306-2	Management of significant waste-related impacts		75	v
	306-3	Waste generated		75	v
Employment	103	Management Approach	6.4.3	24-25	v
	401-1	New employee hires and employee turnover		78	v
	401-3	Parental leave		78	v
Labor/ Management Relations	103	Management Approach	6.4.3/6.4.4	24-25	v
	402-1	Minimum notice periods regarding operational changes		54-55	v
Occupational Health and Safety	103	Management Approach	6.4.6/6.8.8	24-25	v
	403-2	Hazard identification, risk assessment, and incident investigation		79	v
	403-8	Workers covered by an occupational health and safety management system		79	v
Training and Education	103	Management Approach	6.4.7	24-25	v
	404-1	Average hours of training per year per employee		79	v
	404-2	Programs for upgrading employee skills and transition assistance programs		52-53	v
Diversity and Equal Opportunity	103	Management Approach	6.2.3/6.3.7/ 6.3.10/6.4.3	24-25	v
	405-1	Diversity of governance bodies and employees		60, 79	v
Human Rights Assessment	103	Management Approach	6.3.5/6.3.6	24-25	v
	412-1	Operations that have been subject to human rights reviews or impact assessments		54-55	v
	412-2	Employee training on human rights policies or procedures		54-55	v
Local Communities	103	Management Approach	6.3.9/6.5.1- 6.5.2/6.5.3/6.8	24-25	v
	413-1	Operations with local community engagement, impact assessments, and development programs		70-71	v
Supplier Social Assessment	103	Management Approach	6.4.3/6.6.6/ 6.8.1-6.8.2/6.8.7	24-25	v
	414-1	New suppliers that were screened using social criteria		66-67	v
Customer Health and Safety	103	Management Approach	6.7.1-6.7.2/ 6.7.4/6.7.5/ 6.8.8	24-25	v
	416-1	Assessment of the health and safety impacts of product and service categories		68-69	v
Marketing and Labeling	103	Management Approach	6.7.1-6.7.2/ 6.7.3/6.7.4/ 6.7.5/6.7.9	24-25	v
	417-2	Incidents of non-compliance concerning product and service information and labeling		-	No violations
	417-3	Incidents of non-compliance concerning marketing communications		-	No violations

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SASB Index

Sustainability Disclosure Topics & Accounting Metrics

Category		Metric	Unit	K-water Response
Energy Management	Quantitative	Total energy consumed, percentage grid electricity, percentage renewable	TJ, %	(1) 14,905TJ (2) The ratio of K-water energy generation to the total national generation : 0.4% (K-water generation amount compared to the total amount of renewable energy generation in the country : 5.8%) (3) Renewable energy ratio : 100%
Effluent Quality Management	Quantitative	Number of incidents of non-compliance with water effluent quality permits, standards, and regulations	Cases	Zero case
	Discussion and Analysis	Discussion of strategies to manage effluents of emerging concern	-	It is an ongoing business challenge to manage pollutants and pollutants are today seen as a potential risk factor to be addressed in order to communicate well with customers. K-water is striving to comply with the effluent water quality standards and minimize pollutant emissions in accordance with enhanced water quality standards by establishing and implementing a comprehensive improvement plan for the operation and management of discharged water treatment facilities and preemptively respond to government policy while securing the stability of our operation. In addition, we are contributing to the establishment of a virtuous cycle of resources by recycling 100% of the sludge generated by the water treatment process.
Water Scarcity	Quantitative	Development amount of alternative water resources (seawater desalination, groundwater reservoir, etc.)	Persons, m³	Improved the living conditions of residents by providing stable water supply (1,310㎥/day) to 9,026 residents of three islands
	Quantitative	Amount of Sewage reuse (reproduction of sewage into industrial water)	m³	43 million ㎥
	Discussion and Analysis	Discussion of management of risks associated with the quality and availability of water resources	-	For better quality of water resources and efficient use of customers, K-water is enhancing quality through improvement of water purification plants by automating the operation of the water treatment process using technologies of the fourth industrial revolution. In addition, we aim to secure advanced smart technologies for effective water management, and secure tap water quality and safety by replacing aged pipelines throughout the entire water supply process. In addition, we have been making efforts to establish a sanitary tap water production base and improve tap water reliability by establishing a hygiene and safety management system for the production and supply of tap water, and pursuing a food safety management (ISO 22000) certification to transform the paradigm of water quality management.
Drinking Water Quality	Quantitative	Achievement rate of global water quality standards	%	Achievement rate of global water quality standards: 99.99% * Global water quality standards: the most difficult to achieve among the drinking water quality standards of major WHO, EU, and OECD countries
	Discussion and Analysis	Discussion of strategies to manage drinking water contaminants of emerging concern	-	K-water has established a crisis response system and risk-phase-specific-emergency operation facility for water quality abnormalities and pollution caused by any threats or input of harmful substances into the water supply source, contamination of the water intake source via the introduction of pollutants or by natural phenomena such as floods, abnormal algae, and red green algae. Through this, we are aiming to minimize damage and inconvenience to residents through prompt and accurate response and recovery in accordance with the establishment of a pre-service system in case of pollution outbreak in water supply sources. Although the red water crisis in Incheon in 2019 was not K-water's jurisdiction, we tried to lead the normalization of water quality by mobilizing water experts and intensively investing in technical equipment and materials in consideration of the health and safety of the public.
Fair Pricing & Access	Quantitative	Customer satisfaction (multi-region waterworks, local waterworks)	Grades	Customer satisfaction for Multi-Region Waterworks 94.9 points, customer satisfaction for local waterworks 82.2 points
	Discussion and Analysis	Discussion of how considerations of fair pricing and access are integrated into determinations of rate structures	-	K-water supplies raw water to local governments, tap water to costumers, industrial water and in some cases, ultra-pure water for manufacturing. K-water has set up a rate structure in accordance with the 「Public Utilities Tariff Standard」and 「Guidelines for Tap Water Tariff Calculation」and has been undergoing deliberation by the 'Water Price Deliberation Committee', which includes local government consumers and industry representatives, to determine fair charge. Multi-Region Waterworks has a two-sided fee structure consisting of a basic and a usage fee, and the ratio of the basic to the usage fee is 3:7. K-water recovers investment costs for continuous water supply through basic fee, manages water demand with usage fee, and induces customers to use water fairly.
End-Use Efficiency	Quantitative	Services implementation to improve market confidence	Cases	Tap water safety checking service - 392,000 cases were executed
Distribution Network Efficiency	Quantitative	Water pipe replacement	km	Replacing of Aged pipelines (32.3km, cumulative 304.8km) and installing multiple water supply networks (27.7km, cumulative 167.6km)
	Quantitative	Volume of non-revenue real water losses	%	Multi-Region waterworks pipeline flow rate: 100%, local waterworks pipeline flow rate: 84.2%
Network Resiliency & Impacts of Climate Change	Quantitative	Water treatment capacity located in FEMA Special Flood Hazard Areas or foreign equivalent	Persons	Direct supply of Multi-region waterworks to 110,000 people in unserviced areas where it is difficult to connect to local water supply (17 cities and counties)
	Quantitative	Volume of sanitary sewer overflows (SSO), percentage recovered	-	Not applicable
	Quantitative	(1) Pipeline accident rate, (2) Affected population, (3) Affected time	Cases, persons	(1) Pipeline accident rate 0.45 / 100km (25 cases in total)_No outage (2) Affected population : 0 (3) Affected time : 0
	Discussion and Analysis	Discussion of efforts to identify and manage risks and opportunities related to the impact of climate change on distribution network	-	K-water aims to systematically manage risks by actively responding to disasters caused by climate change such as floods and droughts. We plan to establish and upgrade a flood response system to implement a preemptive flood response system and to build an integrated flood management system for nationwide expansion. In addition, we plan to reinforce prevention-centered drought management through regional-specific measures such as establishing a people-centered drought response system and strategies.

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Code of Ethics ; Quality, Environmental and Green Management Policy ; Customer Charter Statement; and Human Rights Centered Management Statement

Code of Ethics

K-water is a business of the people that contributes to the quality of life of all citizens and the development of the country by developing, managing, and preserving Korea's water resources to be sustainable in environmental, economic, and social aspects and by providing the best products and services. Based on our experience, know-how, and advanced technology, we promise the following to become a global professional water business.

We accomplish our missions through creative thinking and challenges and make efforts to actualize transparent management by processing tasks with an honest and fair attitude. We recognize that the Earth is a precious heritage for our offspring and is a healthy and clean shelter, and as such, we are obligated to practice eco-friendly management.

We provide the best products and services to customers and actualize a consumer-oriented policy through customer satisfaction and management of new value creation.

As a part of the local community, we respect the traditions and cultures of the community and enrich the lives of local residents by contributing to the development of the local community.

We comply with ethical/legal values, respect market order of free competition, and seek realization of fair competition.

We respect the unique personalities of all people without discrimination, and respect personalities and creativity.

We develop partnerships with labor and management based on mutual trust and harmony, promoting our mutual prosperity.

Quality, Environmental and Customer Charter Statement Green Management Policy

We fully understand that it is high time to make all-out efforts for the promotion of sustainable development harmonized with the environment to create and maintain a pleasant and livable environment for all. Therefore, in order to enhance the public values of K-water so that all citizens will lead a happy life thanks to water, and to solve global water problems in the era of climate change, we declare our Quality, Environmental and Green Management Policy as follows, based on the strong will of all the executives and employees to put it into action.

We all take the initiative in preserving clean water and air, and a livable natural environment.

For establishing and implementing plans related to quality, environmental and green management, we enhance the reliability of K-water and the transparency of our business by collecting extensive opinions from the public and disclosing information and data.

We take the lead in pollution prevention, climate change mitigation and adaptation, and biodiversity and ecosystem protection throughout the entire process of our businesses including water resources development and management and water supply.

We faithfully fulfill our obligations required to the practice of quality, environmental and green management and achieve continuous improvements by enhancing our performance.

Implementing this policy, we, all the executives and employees of K-water, will take responsibility for the water welfare of the people through by pursuing mutual prosperity and do our utmost to achieve sustainable growth

Customer Charter Statement

K-water will make its best efforts to put customer's value first, communicate with customers and innovate services together to realize national happiness and become a trusted public corporation,

We will provide the world's best water management services safely and equally.

We will provide a pleasant environment and contribute to the preservation of ecosystems by practicing environmental management.

We will practice ethical management to secure management transparency and contribute to establishing fair competition.

We will expand mutual prosperity & cooperation to foster the water industry and contribute to the vitalization of local communities

Human Rights Centered Management Statement

In order to fulfill our goal of "Opening the Future and Providing Happiness by Sharing Water", we will actively practice human rights centered management emphasizing and protecting human dignity and values in all our business activities and pursue the actualization of social values and the achievement of sustainable development.

For this, we support and resolve to practice human rights centered management in accordance with the following criteria for our actions and value judgment which all the executives and employees should abide by.

We respect and support international standards and norms for the protection and promotion of human rights, including the UN's Universal Declaration of Human Rights.

We do not discriminate against any stakeholder including the executives and employees on the basis of race, religion, disability, sexual orientation, place of birth, educational level, age or political opinion.

We are committed to the protection and promotion of the human rights of the executives and employees and guarantee the freedom of association and collective bargaining.

We do not use any form of forced labor in employment and do not allow child labor.

We guarantee workers' safety and health rights by providing a safe and hygienic working environment.

We respect and protect the human rights of local residents in the areas where we carry out our businesses.

We comply with domestic and international environmental laws and regulations and practice environmental justice to prevent any environmental problems from occurring.

We strive for mutual growth with our partnering companies, support their practice of human rights centered management and cooperate with them in it.

We do our best to provide our customers with the best water services and to protect their human rights.

We take prompt and appropriate actions on any human rights violations that arise from our business activities and actively work to prevent such violations in advance

* The Code of Ethics; Quality, Environmental and Green Management Policy ; Customer Charter Statement; and Human Rights Centered Management Statement of K-water can be found on our website (www.kwater.or.kr).

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Climate Crisis Management Declaration

K water **Climate Crisis Management Declaration**

K-water recognizes that climate change is a crisis that can no longer be ignored and thus will lead by example in overcoming the crisis. We will lead the green transformation in the public sector, starting with small habits in our daily lives, such as using temperature controls and minimizing disposable items.

K-water will intelligently adapt itself to the climate crisis. We will increase our response capabilities to ensure the safety of the public from water disasters such as droughts and floods. In addition, we will create a water system that people can use with confidence through the improvement of both aquatic ecology and water quality.

K-water will work with local communities to overcome the climate crisis. We will become a reliable partner in the green transformation of our society by integrating climate-crisis management activities, such as green remodeling, with social contributions.

K-water will mitigate the climate crisis through carbon-neutral water management and clean water energy. We will establish a low-energy tap water supply system, achieve carbon-neutrality for multi-region water purification plants in 2030, expand eco-friendly water energy such as floating solar power and hydrothermal power, and participate in the RE100 for the first time as a public institution.

K-water, as Korea's leading water management organization, will actively respond to the climate crisis. With the climate crisis as a top priority, we will strive to create climate change response results that can be more practical for and felt by the public.

K-water will turn the climate crisis into a new opportunity. We will establish a water cycle city model that is resilient to the climate crisis and support our water companies' growth with technology to respond to the climate crisis. In addition, we will actively seek overseas expansion of climate crisis solutions based on our global network in connection with the AWC.

K-water will focus its capabilities to protect the public from the climate crisis, facilitate a sustainable water environment, and create new growth engines.

Through this, K-water will lead Korean society's green transformation to national carbon neutrality by 2050. Furthermore, we will become a stepping stone for people all over the world to not only escape the climate crisis, but also to coexist and co-prosper with nature.

Going forward, K-water declares that it actively promotes climate crisis management with the unified mind of its employees.

November 16, 2020

K-water
CEO Park Jae-Hyeon

K-water Labor Union
Chairman Noh Cheol-Min

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Global Initiatives

Support for the UN Global Compact's 10 Principles

COMMUNICATION ON PROGRESS
UN GLOBAL COMPACT

The UN Global Compact's Ten Principles are derived from the following international agreements.

· The Universal Declaration of Human Rights
· The International Labor Organization's Declaration on Fundamental Principles and Rights at Work
· The Rio Declaration on Environment and Development
· The United Nations Convention Against Corruption

The UN Global Compact asks companies to embrace, support and enact, within their sphere of influence, a set of core values in the areas of human rights, labor, the environment and anti-corruption

Human Rights

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

Labour

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

Environment

Principle 7 | Businesses should support a precautionary approach to environmental challenges.
Principle 8 | Undertake initiatives to promote greater environmental responsibility
Principle 9 | Encourage the development and diffusion of environmentally friendly technologies.

Anti-Corruption

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

K-water practices and complies with the ten principles of UN Global Compact.

CEO Statement of Support for the Sustainable Development Goals

SUSTAINABLE DEVELOPMENT GOALS   Global Compact Network Korea

CEO Statement of Support for the Sustainable Development Goals

K-water

[SDG 6 · 7 · 9 · 11 · 13 · 17]

K-water's efforts has laid the foundation for national economic growth and contributed to raising the quality of life for all people trying to protect citizens from natural disasters and supply them with clean and sufficient water. K-water, as Korea's representative public water company, promises to strives to fulfill the UN's Sustainable Development Goals (SDGs) and to meet the demands of the times and live up to the expectations of the people.

First, K-water will provide safe, clean and secure water services with river basin-based integrated water resources management. We will contribute to the successful establishment of river basin-based integrated water resources management systems by concentrating our capacity on the improvement of water environment, safeguarding citizens from water disasters such as floods, droughts and deteriorating water quality, and enhancing the water quality and water ecology health.

Second, K-water will continue with our commitment to ensure the supply of clean and stable water. We will link existing dams and reservoirs and discover alternative water sources to secure the necessary amount of water, while preventing the waste of water through scientific demand management. In addition, we will narrow the gaps in water quantity, quality, and supply rates among different regions and strengthen the safety and cleanness of drinking water so that people can drink tap water anytime, anywhere.

Third, K-water will create new values of water through the convergence of water, energy, and urban technologies. We will actively develop eco-friendly water energy sources such as floating photovoltaic energy and hydrothermal energy. In addition, we will strengthen the competitiveness of the domestic water industry by expanding our support for SMEs (small and medium enterprises). Also, we will also take the lead in resolving water issues globally, centered on the Asia Water Council (AWC).

K-water will provide water services that the public can sympathize with through communication with a wider range of stakeholders and sharing values with them. So, we will be reborn as a public company for all citizens through our innovations to provide greater publicness and make a happier world with water.

March 26th, 2019

Hak - Soo Lee
K-water CEO & President of Asia Water Council

Membership Activities and Awards

Membership Activities

1971	Association of Great Dams
1974	Korean Society of Civil Engineers
1976	Korea Electric Association, International Contractors Association of Korea
1993	Korea Water Resources Association
1995	Korean Society Of Environmental Impact Assessment
1996	Korean Federation of Water Science and Engineering Societies, Korean Institute of Landscape Architecture
1997	Korea Electric Engineers Association
1999	Korea Disaster Prevention Association
2001	Korea New & Renewable Energy Association
2002	Korea Water and Wastewater Works Association
2003	Korean Society on Water Environment
2005	Korea Engineering & Consulting Association
2006	Ethical Management Forum, River Association, Korea Society for Environmental Analysis
2007	Korea Society of Environmental Restoration Technology, American Water Works Association, International Water Association, UN Global Compact
2008	Korean Society of Environmental Engineers, Membrane Society of Korea, Korean Society of Environment and Ecology
2010	Korean National Committee on Irrigation and Drainage, Korean Society for Fluid Machinery
2011	Society of Air-conditioning Refrigerating Engineers of Korea
2012	Korea Environmental Policy and Administration Society
2013	Architectural Institute of Korea
2014	Korea Society of Mechanical Engineers, Korean Society of Climate Change Research, Korea Photovoltaic Industry Association, Korea Society of Quality Management, International Hydropower Association, Korea Association of Conflict Studies
2015	Korean Society of Ecology and Infrastructure, Korea Society of Hazard Mitigation
2016	Asia Water Council, International Water Resources Association
2017	Society of Korea Industrial and Systems Engineering, Korean Society of Public Enterprise
2019	Korean Solar Energy Society, Korean Society of Safety
2020	Korean Society For Quality Management, Korean Association For Public Administration, Korean Society of Civil Engineers, Korean Society Of Soil And Groundwater Environment

Awards

2008. 04	Korea Management Innovation Grand Prize (Awarded by Ministry of Knowledge Economy and Maeil Business Newspaper)
2008. 10	Korea Social Contribution Grand Award (Korea Journalist Forum), Sustainable Management Top Award (Ministry of Knowledge Economy and Korea Chamber of Commerce and Industry), 2008 Korea co-Friendly Company Grand Award (Ministry of Environment), Asian Most Admired Knowledge Enterprise (UK Teleos)
2009. 01	Continuity & Creation Management Award in Environmental Management (Korean Ministry of Knowledge Economy and UN Global Compact)
2009. 10	ELow Carbon Green Growth Commendation (Green Growth Association and Korean Ministry of Environment), New Regeneration Energy Awards Prime Minister Commendation (Ministry of Knowledge
2010. 12	National Green Technology Grand Award (Korean Ministry of Knowledge Economy and Korean Ministry of Education)
2011. 06	Korea Green Management Award (Ministry of Knowledge Economy and Korean Ministry of Environment), Eco-Star Eco- Technology Award in Water Pipeline (Korean Ministry of Environment)
2012. 01	First Korean public company to be awarded the Excellent Smart Work Agency Award (Ministry of Public Administration and Security)
2012. 02	Most Admired Company in Korea (KMAC)
2012. 06	Environmental Impact Management Grand Prize (Korean Ministry of Environment), Excellent Global Social Contribution Agency Commendation (Ministry of Health and Welfare), Selected as an excellent company with outstanding performance in Labor and Management Relations (Korean Ministry of Employment and Labor)
2012. 07	Korea Digital Innovation Award Grand Prize in the Public Sector (Ministry of Knowledge Economy)
2012. 09	Presidential citation for outstanding performance in purchasing goods from SMEs (Small and Medium Business Administration of Korea)
2012. 10	Family-Friendly Enterprise (Korean Ministry of Gender Equality and Family), Selected as one of the 100 Best Companies to Work For (GWP Korea), Asian Most Admired Knowledge Enterprise (UK Teleos)

2012. 11	Sustainability Grand Awards Innovation Management Award (Ministry of Knowledge Economy)
2012. 12	Public Company Management Award Grand Prize (Sisa Journal)
2013. 07	Korean Digital Green Management Award (Ministry of Science, ICT and Future Planning)
2013. 10	Korea Green Architecture Competition Award of Excellence (Presidential Committee on Architecture Policy), Commendation in recognition of contribution to renewable energy supply obligation system (Korean Ministry of Trade, Industry and Energy)
2013. 11	Natural Environment Grand Award (Korean Ministry of Environment), Asian Most Admired Knowledge Enterprise (UK Teleos)
2013. 12	Global Most Admired Knowledge Enterprise (UK Teleos)
2014. 02	Most Admired Company in Korea (KMAC)
2014. 06	Top Prize in Water Business Assessment (Ministry of Environment)
2014. 08	Korean Digital Award (Ministry of Science, ICT and Future Planning), Achieved Carbon Trust Standard (UK Carbon Trust)
2014. 11	Ranked as one of the top 100 Best Korean Companies to Work For (GWP Korea), Outstanding Agency in Anti-Disaster Drilling Assessment (National Emergency Management Agency), Korea Quality Management Enterprise Presidential Citation (Ministry of Trade, Industry & Energy), Advanced Public Enterprise in Shared Growth Prime Minister Award (Ministry of Public Administration and Security)
2014. 12	Sustainable Science Award in Environment (Society of Sustainable Science), Korea Volunteer Work Grand Prize (Ministry of Public Administration and Security), Global Most Admired Knowledge Enterprise (UK Teleos)
2015. 06	National Sustainability Management Award in Social Contribution (Ministry of Health and Welfare)
2015. 11	Most Admired Company in Korea (Ministry of Trade, Industry & Energy)
2015. 12	Minister's Award in recognition of support for youth outside the school system (Ministry of Gender Equality and Family), Educational Donation Grand Prize for Public Enterprises (Ministry of Education), Asian Most Admired Knowledge Enterprise (UK Teleos)
2016. 05	Minister's Commendation in the Selection of Excellent Institutions at the Unification Expo (Ministry of Unification)
2016. 09	Minister's Commendation at the 2016 National Sharing Awards (Ministry of Health and Welfare)
2017. 04	Korea Social Contribution Grand Award in CSV, 2016 Public Agency Innovation Example Contest Grand Award (Ministry of Economy and Finance), 2017 Public Agency Innovation Example Contest Grand Award (Ministry of Economy and Finance), Leading Utilities of the World Trophy (Global Water Summit 2017)
2017 .07	2017 Safety and Health Activity Case Presentation Contest Excellency Prize in Service Sector (Ministry of Employment and Labor)
2017. 10	The 5th Applied Ecologic Technology Contest Excellency Prize for the 5th consecutive year (Korea Society of Ecology and Infrastruc-ture Engineering), Asian MAKE Award and Global MAKE Award for the 10th consecutive year (Hall of Fame, UK Teleos)
2018. 01	Selected as an excellent family-friendly organization for 10 consecutive years (of Gender Equality and Fa), Selected as an excellent organization for evaluation of anti-corruption measures (Anti-Corruption & Civil Rights Commission)
2018. 06	Minister's Commendation in Collaboration Best Practices (Ministry of Public Administration and Security)
2018. 09	Selected as the best agency for public agency disaster management (Ministry of Public Administration and Security)
2018. 11	Minister of Strategy and Finance Award for Social Responsibility (Ministry of Strategy and Finance) 2018 Korea's 100 Best Companies to Work for 6 consecutive years (GPTW Korea) 2018 Data Quality Award Excellence Award (Ministry of Science and Technology Information and Communication) Participation Award for Active Cases of Best Practices (Human Innovation Division)
2019. 05	National "Big Data Platform and Center" organization selected (Ministry of Science and Technology) and the Minister of Environment for the Development of the Water Industry (Ministry of Environment)
2019. 07	Human Resources Innovation Champion (Ministry of Personnel Management) based on Innovation Performance in Personnel Management, and Best Organization for Mutual Cooperation for Small and Medium Enterprises (National Assembly Forum)
2019. 08	Selection of the best post-management site for the 2019 Environmental Impact Assessment (Ministry of Environment)
2019. 11	2019 Public Data Provision and Operation Status Evaluation Minister Award (Ministry of Public Administration and Security), Presidential Award for National Quality Management Competition (Ministry of Trade, Industry and Energy), 2019 Smart City Asia-Ta Awards Best Project (International Data Corporation, IDC), 2019 Minister of Environment Award for Best Practices for Government Innovation (Ministry of Environment), Selection of the best organization for self-audit activities (audit agency), Minister of Public Administration and Security Award (Ministry of Public Administration and Security)
2019.12	2019 Excellent Award for Innovation in Public Service (Korea Society of Public Enterprises), 2019 First Certification of Leisure-Friendly Enterprises and Minister of Culture, Sports and Tourism Award (Ministry of Culture, Sports and Tourism), Deputy Prime Minister of the Fair and Competency Competition (Planning and Finance), Selection of outstanding institutions for safe Korea training (Ministry of Public Administration and Security), Prime Minister Award for National Infrastructure Disaster Management Evaluation (Ministry of Public Administration and Security), Presidential award for eradicating corruption in the safety field (Ministry of Public Administration and Security)
2020. 01	Selection of priority tasks for collaboration, innovation, and public participation in 2020 (Planning and Finance Ministry)