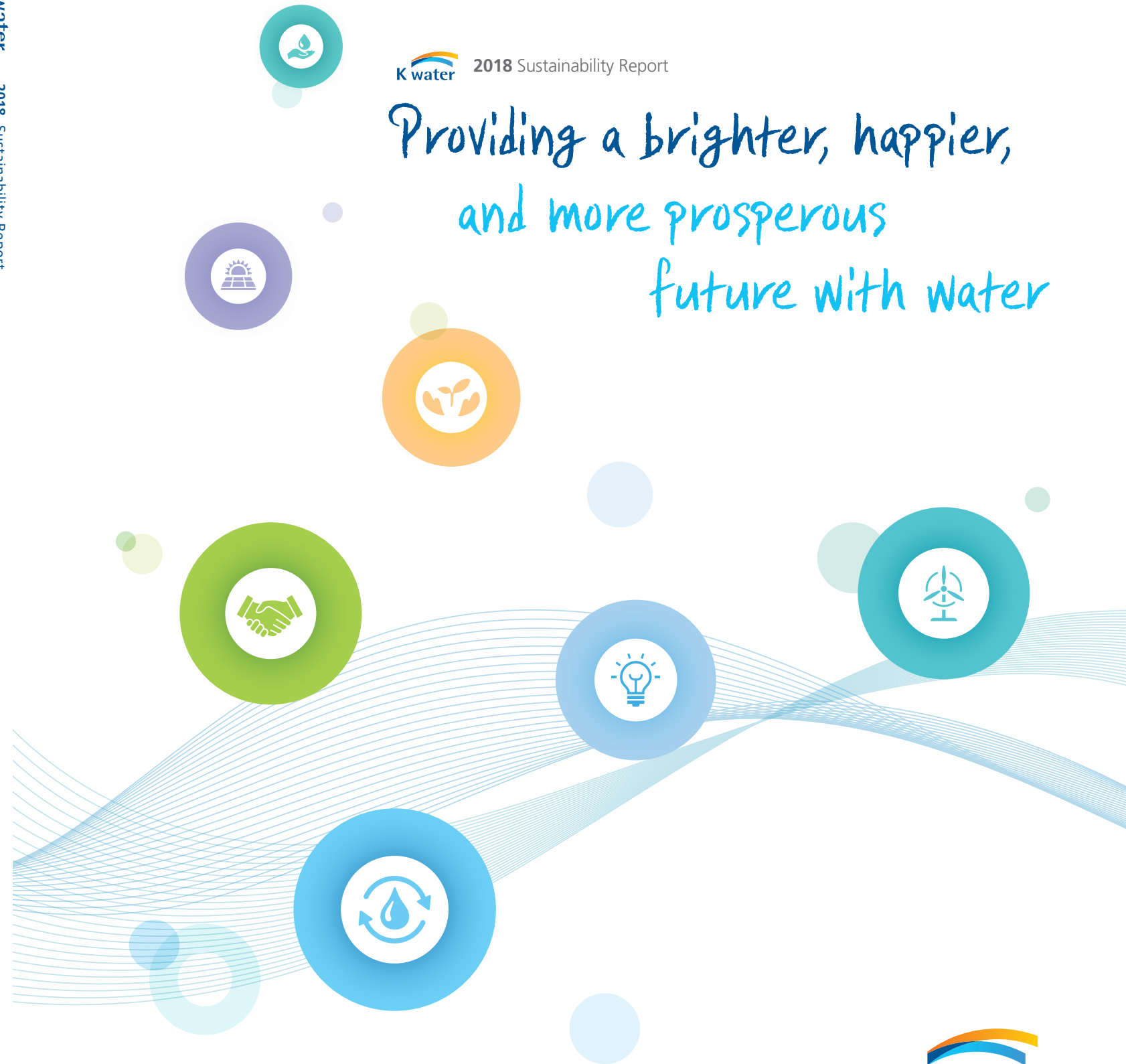


K water 2018 Sustainability Report

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



K-water will be the source of flowing that
embraces both humanity and nature



About This Report

K-water has published its Sustainability Report annually since 2005 and this year, it presents its 14th Sustainability Report. The report introduces K-water's sustainable management activities aimed at the fulfillment of its mission "Providing a brighter, happier, and more prosperous future with water" and the achievements of these activities, along with the company's unceasing efforts to be a global leader in the water industry by providing safe and clear water for all. The contents of this 2018 report were curated with a focus on the three strategies and the social values that K-water has pursued.

Reporting Standards

This report has been drafted in line with the GRI (Global Reporting Initiative) Standards and ISO 26000, which are the international sustainability reporting guidelines and it complies with the core of the GRI Standards. This report features key issues derived from materiality tests and management approaches (MA) on key issues.

Reporting Period, Scope and Boundaries

The quantitative performances presented in this report are as of 2017. As for additional achievements, this report centers on the sustainable management activities of the K-water Headquarters [1 division, 5 head offices, 27 departments (including departments, institutes, centers, and offices)] and local business sites [3 divisions, 5 head offices (including institutes), 12 departments, 62 branches]. As overseas businesses are carried out on a project basis, only their management performances have been included in this report. The achievements of subsidiaries and affiliates are not covered in this report as well as performances related to the company's training and supporting systems, while those related to partner companies within the corporate supply chain are presented in this report. Financial performances have been filed based on consolidated data (K-IFRS) since 2011.

Report Assurance

For the enhancement of accuracy and reliability, the report has been verified by the Korea Management Registrar, an independent external agency. This third-party verification agency has certified that this report complies with the core of the GRI Standards.

Alterations

During the reporting period, the competent authority of K-water changed to the Ministry of Environment (June 8, 2018), which has brought no alterations related to the sizes, structure, basic year or ownership structure presented in this report. However, some of the data from the previous year's report have been altered after re-calculation to reflect the changes in the calculation and application standards. 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. It can be downloaded in PDF format via its website. For more information or inquiries, please find below our contact information.

Address Business Management Department Sustainable Management Team, K-water, 200, Sintanjin-ro, Daedeok-gu, Daejeon (34350)

Tel 82-42-629-2442~4 **E-mail** sustainability@kwater.or.kr **Website** www.kwater.or.kr



2018 Sustainability Report

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



CEO's Message

Dear stakeholders who have always been interested in and supportive of K-water,

I am delighted to introduce our 14th Sustainability Report to you.

For over half a century, K-water has grown into Korea's representative public water management company in parallel with the development of the national water management technology. Our efforts to protect citizens from droughts and floods and supply them with clean and sufficient water have laid the foundation for national economic growth and contributed to raising the national quality of life.

However, changes in water management conditions have been evident in recent years. The unification of water management in Korea has brought about innovative changes in the national water management system. Now, we need a shift from quantity-oriented water management that only concerns humans to a sustainable water management that considers quality and water ecology as well. Another challenge is narrowing the gaps in water quantity, quality, and rates among different regions. The public has showed increasingly high interest in new environmental and economic values that can be created by using water, such as environment-friendly cities where green energy is produced using water and a healthy water circulation takes place; job creation through the fostering of small and medium enterprises and venture businesses in the water industry; and growth through innovations.

K-water, as Korea's representative public water company, has sought changes to meet the demands of the times and live up to the expectations of the people. Our 14th Sustainability Report that introduces these efforts centers on our four promises with citizens and all stakeholders.

First, we will provide safe, clean and secure water services with river basin-based integrated water management.

We will contribute to the successful establishment of river basin-based integrated water 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 that have been relatively neglected so far.

Second, we will continue with our commitment to provide water sharing services to ensure the supply of clean and sufficient water.

Instead of focusing on the construction of large dams, 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 rates among different regions and strengthen the safety of drinking water so that people can drink tap water free from harmful chemicals without worries.

Third, we 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 take the initiative in innovative growth, by solving urban water problems through the enhancement of water ecology services including the restoration of streams and the successful completion of the national smart city test operation in Busan Eco-Delta City using the Fourth Industrial Revolution based smart technology. As well, we will increase the competitiveness of the domestic water industry and create more jobs by expanding our support for SMEs and venture businesses.

Finally, we will be reborn as a public company for all citizens through our innovations to provide greater publicness and make a happier Korea with water.

We will continue to innovate our business practices and management process to provide services that people need by place our top priority on public values. We will also do our best to become a public company trusted by citizens, providing water services that the public can sympathize with through communication with a wider range of people and stakeholders and sharing values with them.

Please continue to support K-water as we strive to fulfill the UN's Sustainable Development Goals (SDGs) and practice sustainable management with the aim of "Providing a brighter, happier, and more prosperous future with water."

Thank you.

Dear stakeholders who have always been interested in and supportive of K-water, I am delighted to introduce our 14th Sustainability Report to you.

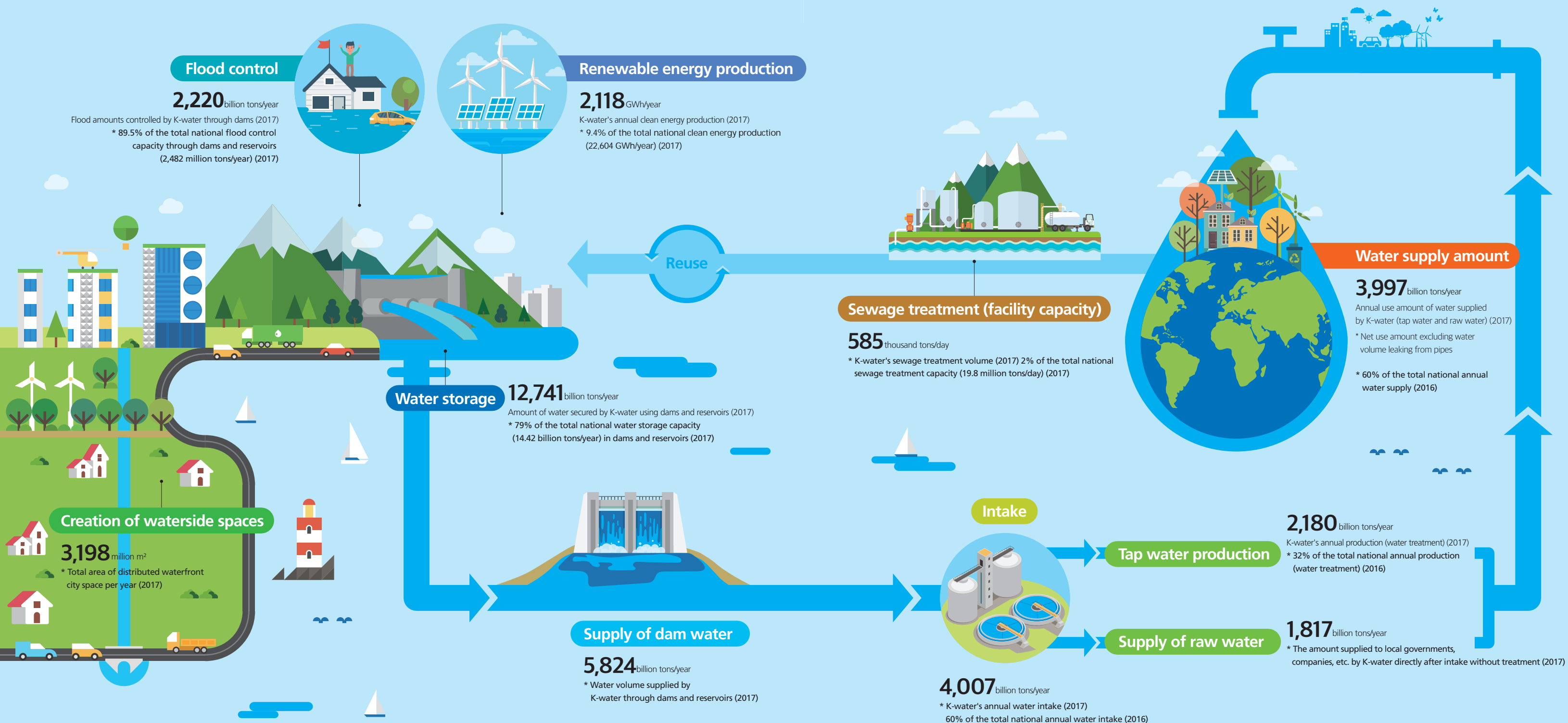
December,
2018

Lee Hak-soo



K-water, Today and Tomorrow

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



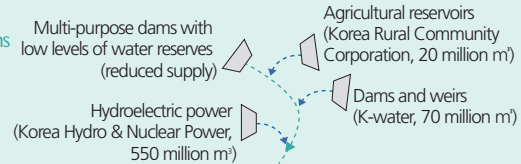
※ Sources: The national statistics presented in this chart are based on the Statistics of Waterworks (2016) and the Statistics of Sewerage (2016) of the Ministry of Environment, and the Electric Power Statistics Information System Data (2017) in consideration of the publication date of this report.

K-water, Sustainability Highlights 2017

Overcoming the national drought crisis through cooperation with other institutions

- The stable supply of 640 million m³ of water through cooperation with water management related institutions
- The prevention of limited water supply to 1.39 million people in 16 cities and counties through emergency water supply

The stable supply of water through cooperation with related institutions



<The ceremony for the completion of the emergency connection between Pyeongnim Dam-Suyangje Reservoir>

Establishing a country free from water disasters and safety accidents

- Won three awards in the field of integrated disaster management as part of the government's disaster and safety contests
Won the Prime Minister Citation at the Safety Culture Awards and the National Disaster Response & Safety Drill; and was awarded the Runner-up Prize at the Best Safety and Public Health Policy Contest held by the Ministry of Employment and Labor
- The average algal concentration (Chlorophyll a) in dams and weirs was reduced by 3.5% than the previous year



<Won the Prime Minister Citation at 2017 the Safety Culture Awards>

Protection of water rights for all to benefit from water supply services

- Universal water services by solving the problem of limited water supply in Tongyeong (which occurred over the past 50 years)
- Approx. 725,000 people benefiting from Smart Water Management (SWM) services

Increase in the quality of jobs through improved quality of employment and work

- Early transition of irregular jobs to regular jobs following democratic procedures without conflicts between labor and management, and the creation of the largest number of youth jobs (334) since the company's foundation

Creation of jobs for all, jobs with values

- A total of 6,552 private jobs (18% increase from the previous year) (991↑)
- Discovery of 5 venture companies and support for their advancement into overseas markets

Expansion of social support for the socially vulnerable and safeguard for equal opportunities

- Strengthening of social responsibility as a public enterprise by actively participating in the Public Workers Solidarity Foundation
- Awarded three prizes in personnel innovation including the Prime Minister's Award at the Personnel Innovation Competition



<Labor and management meeting for mutual prosperity and solidarity>

Fulfillment of mutual prosperity and cooperation with SMEs and the strengthening of a fair competition base

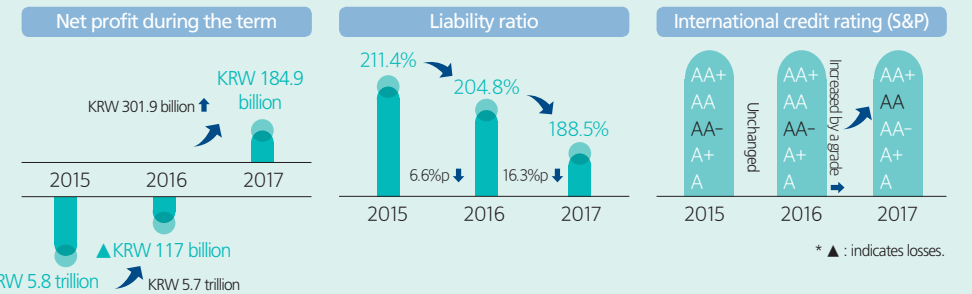
- Revitalization of the local and social economy through the return of profits, a 57% reduction in the amount of postponed payments to construction subcontractors (From KRW 5.5 billion to 2.35 billion)

Support for national water management innovation to restore healthy water circulation

- Agreement between the ruling and opposition parties on the amendments to the Government Organization Act including water management unification in the first half of 2018 (December)
- Water management innovation tasks included in the 100 major government tasks in its "Five-Year National Management Plan"

Acceleration of internal innovation to expand people-centered services

- The first turn to profit since losses related to the four Major River Project (net losses ▲ KRW 117 billion → net profit KRW 184.9 billion)
- Ranked as one of the top 100 Best Korean Companies to Work For list for the 5th consecutive year (implies #1)



Strengthened a substantial and responsible management base through the stabilization of overseas businesses

- Annual income of KRW 20 billion for the next 30 years secured with the commencement of commercial power generation at the Patrind Hydropower Plant (Pakistan)
- The first achievement of net profit (KRW 700 million) and turn to profit since the commencement of the commercial power generation at Angat Dam and (the Philippines)



<Patrind Hydropower Plant>

Innovation of waterfront value and the popularization of eco-friendly energy sources

- Leading the way in waterfront paradigm changes through national smart city test-bed projects
- Securing energy sources that can replace the capacity of a nuclear reactor (1GW) with the development of alternative water energy sources (5GW)

100 Years as the Leading
National Water Company

K-water

**K-water, 100 Years as the Leading National
Water Company**

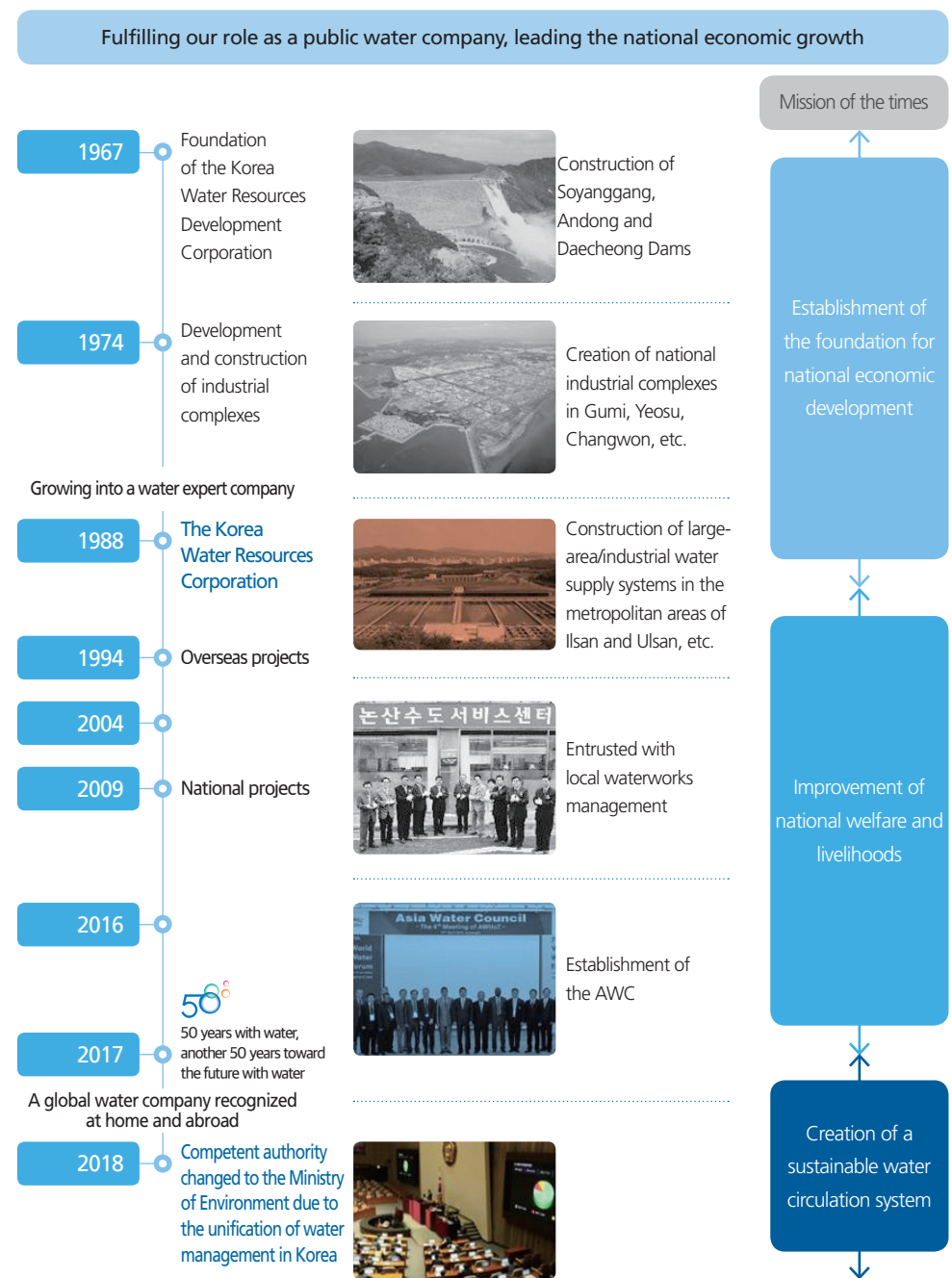
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Corporate Overview

K-water, as Korea's representative public company, will continue to strive for innovative water management in order to complete a sustainable water circulation system through balanced and integrated river basin-based water management. We will provide universal and equal high-quality water services to all citizens for the fulfillment of the national welfare and the aim of "Providing a brighter, happier, and more prosperous future with water."

Brief History of K-water



Overview

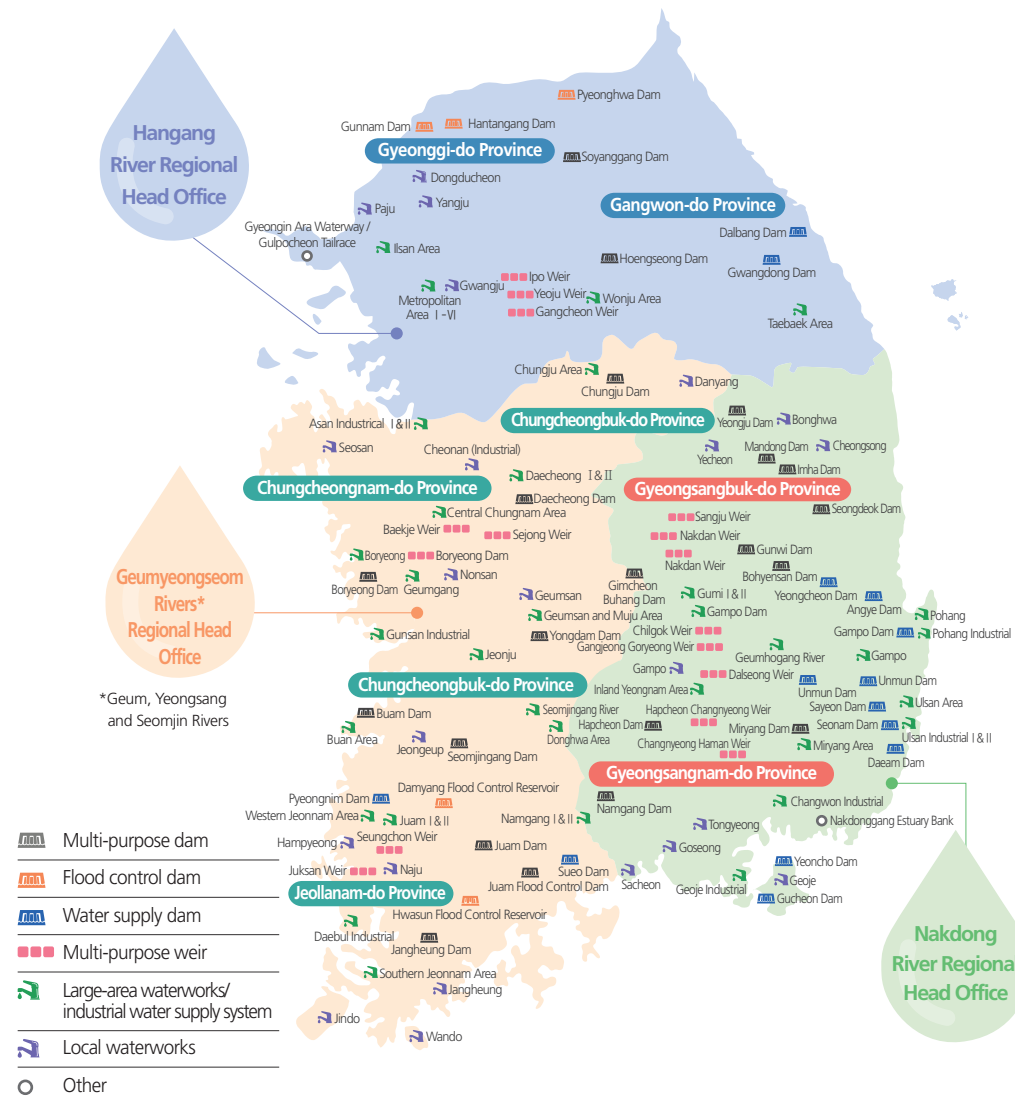
Company name	Foundation date	Purpose of establishment	Institution type
 The Korea Water Resources Corporation (K-water)	November 16, 1967	To contribute to the enhancement of citizens' livelihoods and public welfare by ensuring the smooth supply of water and improving water quality through the comprehensive development and management of water resources. (The Korea Water Resources Corporation Act Article 1)	Quasi-market-type public corporation
Headquarters	No. of Employees	Organization	Assets
200, Sintanjin-ro, Daedeok-gu, Daejeon (34350)	4,847 (7 executives, 3,904 in general services, 195 in professional services, 575 in operations, 166 in special services)	(Headquarters) 1 vice president, 1 division, 5 head offices, 27 departments (including departments, institutes, centers, and offices) (Local business sites) 3 divisions, 5 head offices (including institutes), 12 departments, 62 branches (offices) (Overseas business sites) 9 countries, 11 projects	KRW 20.8673 trillion
Sales	Liabilities	Credit rating	Shareholder composition
KRW 3.3755 trillion	KRW 13.6333 trillion	In Korea: AAA Abroad: Moody's Aa3 (stable) S & P AA (stable)	The Korean Government 92.5% The Korea Development Bank 7.4% Local governments 0.1%
Subsidiaries			
<ul style="list-style-type: none"> Waterway+ (share ratio: 100%) Korea Construction Management (share ratio: 18.9%) P-Waters (share ratio: 2%) Korea Overseas Infrastructure & Urban Development Corporation (share ratio: 11.01%) K-water Operation and Management (share ratio: 100%) 		<p>At home</p> <ul style="list-style-type: none"> K-water Thailand Co. Ltd. (share ratio: 99.9%, Thailand) KDS Hydro PTE Ltd. (share ratio: 80%, Pakistan) Star Hydro Power Ltd. (share ratio: 100%, Pakistan) Angat Hydropower Co. (share ratio: 40%, the Philippines) KWPP Holdings Co. (share ratio: 38.5%, the Philippines) JSC Nenskra Hydro (share ratio: 100%, Georgia) Luzon Clean Water Development Co. (share ratio: 2.81%, the Philippines) 	

* As of December 2018

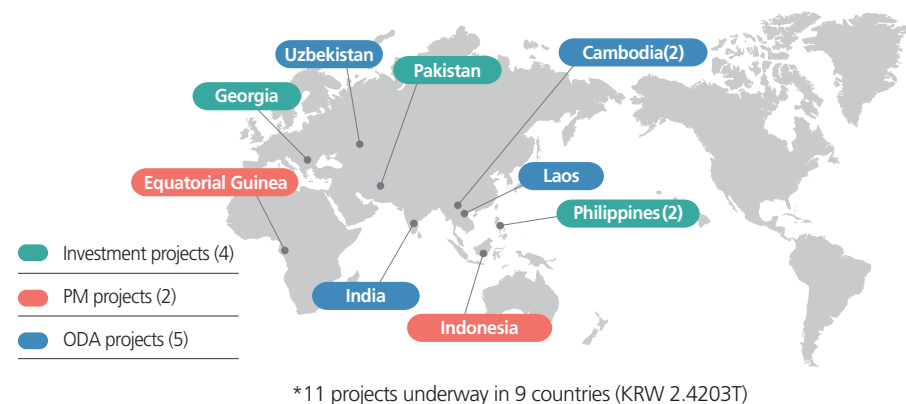
Major businesses

Water safety services	<ul style="list-style-type: none"> Water supply using dams: 13.3 billion m³/year (64% of the total national water supply) - Operation and management of 53 water facilities (dams, weirs, and the Gyeongin Ara Waterway) Flood control amount through multi-purpose dams: 5.3 billion m³ (95% of the total national capacity) - Construction of 2 new dams and the implementation of projects to increase existing dams' capacity and safety
Water sharing services	<ul style="list-style-type: none"> Tap water sales: KRW 1.3 trillion - Operation and management of 48 large-area and industrial waterworks, construction of 21 waterworks facilities in progress * Facility capacity: 17.6 million m³/day (46.4% of the total national capacity) - Entrusted with the operation of 23 local waterworks and 14 sewerage Entrusted with the operation of 23 local waterworks and 14 sewerage
Water convergence services	<ul style="list-style-type: none"> Total area of distributed waterfront city space: 3.198 million m² Renewable energy facility capacity: 1,356 MW - 2,118 GWh/year from hydro, tidal, solar, wind power generation, etc. (2017) 5 GW/year from the development of alternative water energy sources such as floating photovoltaic and hydrothermal energies such as water status, water heat, etc. (including the planned amount) - Increased supply of renewable energy (5GW) that can replace the capacity of a nuclear reactor (1GW) - Reduction of CO2 emissions through the introduction of hydrothermal energy systems such as the Lotte World 2 and the Soyanggang River Hydrothermal Cluster No. of completed projects: 76 in 30 countries No. of projects in progress: 11 in 9 countries (total project cost KRW 2.4T)

Domestic integrated water management facilities



Overseas projects



Vision and Strategy

Mission and Vision

K-water has been committed to the comprehensive development and management of Korea's water resources for the past 50 years and has recently declared new mid- and long-term strategies to reflect the public's opinions in order to be reborn as a water management institution for the people (November 2018). K-water has established 29 strategic tasks and 102 detailed indicators under 14 strategic objectives to promote water disaster safety, water environment improvement, and water welfare enhancement through national and citizen-centered sustainable water management. With this, the company seeks to gain recognition as a global water expert by building the optimal water circulation system and strengthening its capacity to take the initiative in solving global water problems related to climate change and water shortages.

Mission	Providing a brighter, happier, and more prosperous future with water			
Vision	A Partner for providing healthy water circulation service for all			
Shared values			Substantial Management Principles 1. We prioritize the public's interest and pursue efficiency improvement strategies. 2. We provide equitable water services that are accessible to all. 3. We guarantee security from water related threats. 4. We will suspended unnecessary development and pursue environmental justice through sustainable integrated water management. 5. We create and share new values with people.	
	Strategic directions Safe and clean river basin management Clean water Shared without Shortage Water-Energy-Cities convergence services Functional innovation for public interest			
Strategic Business Units	 Water Safety Services	 Water sharing services	 Water convergence services	 Water innovation services
Strategic goals (tentative)	Reduction of flood damages by 60% Securing 420M m ³ of sustainable water per year Creation of 5 water circulation cities Reduction of the population affected in drought prone areas by 70%	Achievement of a water safety rate of 100% Reduction of 1,569 million tons of greenhouse gas (CO ₂) Fulfillment of water quality goals (a) by 86% Water supply to 14,000 residents in areas with limited access to water	Creation of 70,000 private jobs Achievement of ecosystem health grade B (good) Establishment of a basis for the fulfillment of water rate fairness	Accomplishment of overseas sales of KRW 332.2B Accomplishment of the highest grades (S) in customer satisfaction and contribution to social values Liability ratio improved to 153.3%
	Strategic goals (29) 7 including making a flood-safe country 6 including high-quality tap water service 7 including creating eco-friendly water circulation cities 9 including transparent management and citizen participation activation			
Detailed goals (102)	26 including the implementation of comprehensive measures to reduce pollutants in river basins 27 including the establishment of a river basin based comprehensive waterworks plan 23 including the establishment of an ecosystem service value evaluation system 26 including management that pursues communication with the public			

K-water's Sustainable Management

Highest KoBEX SM grade for the 6th consecutive year
Sustainable management survey for major companies

The Institute for Industrial Policy Studies
Top grade in the 2017 KoBEX SM survey

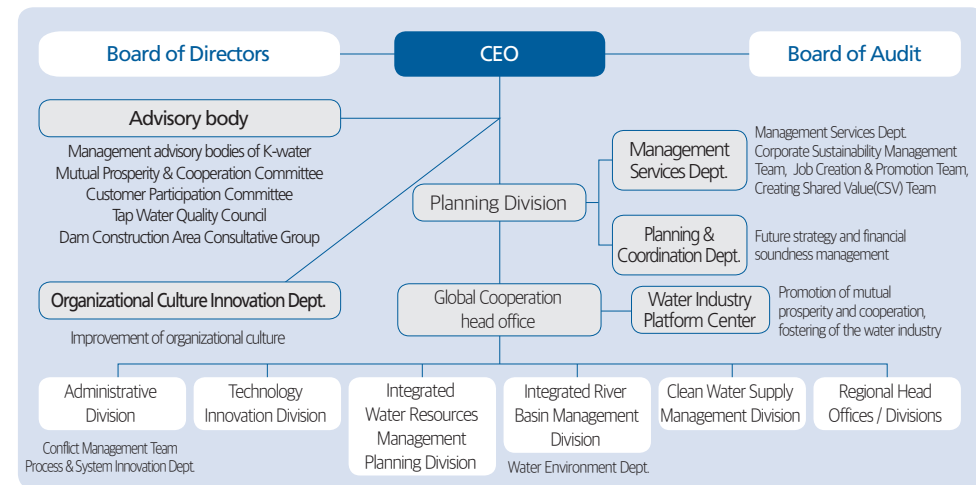
Superior UN SDGBI grade group in 2017



Sustainable management promotion system

K-water has set 29 core achievement indices for the systematic implementation of sustainable management and the UN's SDGs, and has evaluated its accomplishments using the indices. With these efforts, the sustainable management of K-water has gained recognition for its excellency, acquiring the highest grade in the KoBEX SM (Korea Business Index-Sustainability Management) survey conducted by the Korean government for the 6th consecutive year. K-water has also been included in the list of companies with superior UN SDGBI (Sustainable Development Goals Business Index) grade which was announced by the Korean Association for Supporting the UN's SDGs in November 2017. Sustainable management has been promoted as a corporate-wide mission. Led by the Business Management Department under the vice-president, each division of the headquarters and regional head offices have carried out their businesses in an economically, socially, and environmentally organic way.

Organizations promoting sustainable management



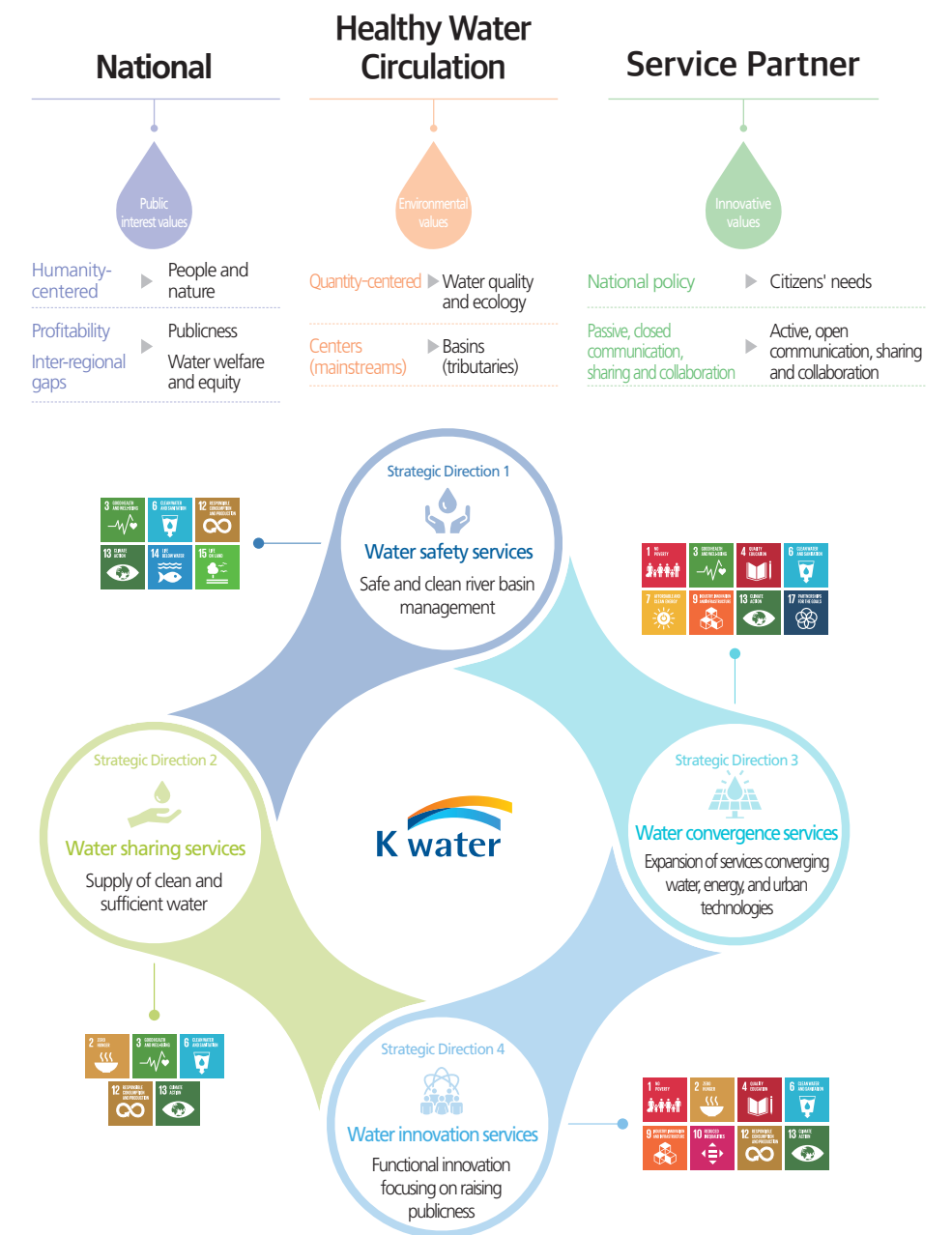
Organizational innovation for sustainable management

K-water has strengthened the main functions of the departments that promote sustainable management in light of changes in its management structure every year. In addition to working with these internal departments dedicated to sustainable management, it has listened to diverse opinions of stakeholders and operated advisory committees and councils to cooperate with them and pursue the accomplishment of sustainable management.

	2013	2014	2015	2016	2017	2018	
Necessity	<ul style="list-style-type: none"> Mutual growth with partnering companies Improvement of the company's financial structure 	<ul style="list-style-type: none"> Strategies for sustainable growth including smart water management Strengthening of disaster safety management 	<ul style="list-style-type: none"> Establishment of Center dedicated responding to climate abnormalities based on scientific data management 	<ul style="list-style-type: none"> Innovation into a voluntary, positive, and developmental organizational culture Process innovation in consideration of the entire cycle of businesses Organization for performing integrated water management linking all businesses 	<ul style="list-style-type: none"> Algae control Mutual growth by fostering the water industry Creating quality jobs and raising social values 	<ul style="list-style-type: none"> Increase in environmental values Meeting the demands of the public by practicing social values 	
Organizational Innovation	<ul style="list-style-type: none"> Mutual Growth Diagnosis Dept. Financial Structure Improvement Dept. 	<ul style="list-style-type: none"> Future Strategy Dept. Disaster Safety Dept. 	<ul style="list-style-type: none"> National Drought Information Analysis Center 	<ul style="list-style-type: none"> Organizational Culture Innovation Dept. Reorganization of the entire corporation (Creation of regional head offices) ERP Promotion Office 	<ul style="list-style-type: none"> Algae Technology Center Water Industry Platform Center Job Creation Bureau 	<ul style="list-style-type: none"> Water Environment Dept. Social Value Creation Dept. 	

K-water's new management direction and fulfillment of the UN's SDGs

To celebrate its 51st anniversary, K-water has declared its new management vision to reflect the opinions of various stakeholders and citizens in order to become a public corporation that provides services for the people with top priorities placed on environmental, public interest, and innovative values. It has also established strategies to faithfully implement the UN's Sustainable Development Goals (SDGs), which are the promises shared by countries. K-water will achieve water welfare that benefits both nature and humanity, both for the present and future generations, and for every citizen regardless of the regions where they live; build a water circulation system that encompasses water quantity, quality, and ecosystem; and create new water values with the people. Based on these efforts, K-water will achieve the UN's SDGs and be reborn as "a partner for healthy water circulation that benefits all."



Key Performance Indicators of Sustainable management.

K-water's promises	Key Performance Indicator	2016's performances	2017's			2018's goals	2019's goals	
			Goals	Performances	Fulfillment rate (%)			
K-water's efforts to achieve national water welfare	Water safety services	Supplied dam water (100 million m ³)	57.2	59.07	58.24	98.59	57.89	98.38
		Supplied tap water (100 million m ³)	38.85	39.17	39.97	102.04	39.56	
		Water innovation services	147	105	109	103.81	112	116
		Dam safety grade achievement rate (%)	84.2	86.2	86.2	100.00	86.7	90.0
		Dam/ river water quality management goal achievement rate (%) ¹⁾	54.6	42.6	42.6	100.0	47.9	56.9
			83.5	86.5	87.7	101.39		
		54.6	-	42.6		47.9	56.9	
		Risk management efforts (points)	96.48	95	96.5	101.58	97.0	Planned changes in the Indices
	Water sharing services	Global water quality standard compliance rate (%)	99.9	100.0	99.99	99.99	100.0	100.0
		Tap water quality safety rate (%) ²⁾	-	100	100	100	100	100
		Local waterworks flow rate (%)	83.9	83.9	84.3	100.48	81.7	82.0
		Smart water management expansion (cumulative cases)	-	4	5	125.0	8	13
		Sewage reuse (1 million m ³ /year)	-	44	42	95.45	42	42
	Water convergence services	Greenhouse gas reduction converted into renewable energy generation (1,000 t CO ₂ eq.)	1,012	1,031	988	95.83	938	1,133
		Distributed waterfront project value	9,831	8,825	8,084	91.60	8,487	9,242
		SMEs that benefited from K-water's mutual overseas market advancement program (no. of companies)	2	20	33	165.00		
		Enterprises newly selected for support program to foster water industry					123	279
		Sales of products developed with SME technologies (KRW 100 million)	514	300	586	195.3	320	330
Overseas business sales (KRW 100 million)		1769	727	1205	165.75	360	368	
물로 만드는 The 행복한 대한민국	Water innovation services	Environmental performance index (points) ³⁾	153	150	151	100.7	150	155
		Green product purchase rate (%)	81.3	80.0	80.8	101.0	80.0	80.0
		Green product purchase rate (%)	3.6	3.5	3.4	97.1	3.8	4.6
		Liability rate (%)	204.8	203.3	188.5	107	181.2	175.4
		Job creation (persons)	32,062	6,688	6,886	103	9,091	11,790
		Social contribution index (points)	92.6	90	92.6	102.89		
		Human resource cultivation index (%)	43.6	44	44.3	100.68	45	45
		Customer satisfaction (grade)	Grade S	Grade A	Grade S	Fulfilled	Grade A	Grade A
		Trust-based management index (points)	77	76	74	97.37	78	8
		Integrity level (grade)	Unsatisfactory	Very good	Very good	Good	Very good	Very good
		Information and security management level (points)	80.22	85.22	87.12	102		
		Construction accident rate (%)	0.46	0.26	0.79	32.91	0.24	0.22

1) Dam/river water quality management goal achievement rate (%): The 2016-2017 rates were calculated as the achievement rates of dam water chlorophyll a control goals (Ia). Since 2018, the rate refers to the fulfillment rate of dam (TOC, TP) and river (BOD, TP) water quality management goals (Ia).
 2) Tap water quality safety rate (%): A newly included index calculated by dividing the number of five algal toxins by the number of measurements (in 38 large-area water purification plants)
 * The five algal toxins are: Microcystin-LR, Microcystin-RR, Microcystin-YR, Anatoxin, and Nodularin
 3) Environmental performance index (points): The indexed value of the degree of environmental performance improvement compared to the base year

Governing Structure

The Korea Water Resources Corporation Act stipulates that the capital of K-water shall be invested by the State, local governments, or the Korea Development Bank and at least 50/100 of it shall be invested by the State. As of December 31, 2017, the investment ratios of the State, the Korea Development Bank and local governments are 92.5%, 7.4%, and 0.1%, respectively. In addition, the K-water Board of Directors is composed of experts in each field and a sound governing structure with a fair decision-making system has been established.

Operation of the Board of Directors

The K-water Board of Directors is the supreme decision-making body that deliberates and resolves important management issues including management objectives, in consideration of public interests, economic efficiency, and social and environmental impacts. The Board also performs the functions of supporting and keeping the management in check. The K-water Board of Directors consists of 15 members, 7 of which are standing directors and the other 8 are non-standing directors, and the role of chairman is served by a non-standing senior director. The Board contributes to the improvement of the governing structure of K-water as a public corporation and to the rational check on its management. In addition, in order to safeguard the independence and strengthen the role of checking of non-standing directors, more than half of the members of the Board of Directors, the Executive Recommendation Committee, and the Audit Committee are non-standing directors.

Composition of the Board of Directors

(As of October, 2018)

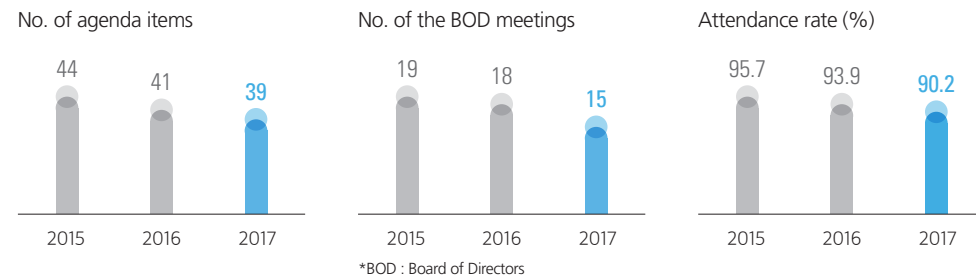
Standing directors			Non-standing directors		
Name	Position	Career	Name	Position	Career
Lee Hak-soo	CEO	• Vice-President, K-water • Head of Urban Environmental Business HQ, K-water • Head of Audit Dept., K-water	Lim Seong-ho	Director of the Hangang River Regional Headoffice	• Head of Gyeongin Ara Waterway HQ, K-water • Head of Songsan Construction Office, K-water • Head of Ara Waterway Business Dept., K-water
Park Jeong-hyeon	Standing Audit Committee member	• Chief of Public Affairs, Office of the Prime Minister • Editor-in-Chief, the Seoul Shinmun (newspaper) • Head of Management Planning Dept., the Seoul Shinmun (newspaper)	Park Byeong-don	Director of the Geumyeongseom Rivers Regional Headoffice	• Head of Pohang Office, K-water • Head of Boryeong Dam Waterpipe Construction Office, K-water • Head of Chungcheong Office, K-water
Kim Bong-jae	Director of General Business Management	• Head of Dam Area Management Dept., K-water • Head of Waterfront Business Dept., K-water • Head of Bohyeonsan Dam Construction Office, K-water	Gwak Su-dong	Director of the Nakdonggang River Regional Headoffice	• Head of Planning & Coordination Dept., K-water • Chief Secretary, K-water • Head of National Assembly Budget Team, K-water
Cho Hong-sik	Senior non-standing director (Chairman)	• Director of Environment & Energy Center, Seoul National Univ. Law Research Institute • Dean, Seoul National Univ. School of Law	Park Gwan-min	Non-standing director	• President, Korea Drone Association • Former Director of Green City, Korea Land & Housing Corporation
Kim Jeong-su	Non-standing director	• Chairman, Noori Culture Foundation Management Committee • Standing Representative, Gwangju Human Rights Peace Foundation	Lim Hae-jong	Non-standing director	• Chairman, Democratic Party of Korea Jeungpyeong, Jincheon, Goesan & Eumseong Committee • Former Auditor, Korea Development Bank
Yu Seon-yeong	Non-standing director	• Prof. of Journalism & Broadcasting, Sungkonghoe Univ. • Former President, Korean Association For Communication And Information Studies	Jeong Nam-sun	Non-standing director	• Vice Director, Environment Law Center
Ji Hyeon-mi	Non-standing director	• Associate Prof. of Accounting and Tax Affairs, Keimyung Univ. • Former Senior Investigator, Financial Supervisory Service	Jeong Sang-su	Non-standing director	• CEO, Geumnan Welfare Foundation • Director, Daejeon YMCA

* The position of vice-president of K-water is vacant as of October, 2018.

Performances

In 2017, a total of 15 regular Board of Directors meetings were held, and the average attendance rate of the members was 90.2%. A total of 39 agenda items were reviewed and 74 management suggestions were made at the meetings. The suggestions presented to the Board were fully reflected in the management, contributing to the improvement of K-water's management.

BOD operation status



The Board of Directors has strengthened the management activities closely related to business sites, by making a total of seven site visits of non-standing directors to settle conflicts over local issues and to better understand and analyze management issues such as drought response and water management unification. Before each regular meeting, K-water provided the board members with clear explanation on the agenda items and carried out individual visits to business sites and offered consultations on a regular basis, to promote thorough deliberation on the agenda based on the expertise of the non-standing directors and responsible decision making. This greatly contributed to the strengthening of a responsible management system.

Major Resolutions Made by the BOD

Resolution No.	Date	Agenda	Details
329th	June 27, 2017	Sponsorship of the 2018 PyeongChang Winter Olympic Games	Active support for the success of the 2018 PyeongChang Winter Olympic and Paralympic Games to fulfill its social responsibility as a public institution
333rd	September 26, 2017	Operation plan on an autonomous water saving demand adjustment system for large-area waterworks	Establishment of a preemptive drought response system by inducing autonomous water saving efforts from local governments to cope with constant and repeated droughts
335th	November 13, 2017	Emergency water supply facility construction for the Geumho River system's large-area waterworks	Response to water outages due to harsh droughts in the Unmun Dam area and the overcoming of a national disaster situation through emergency water supply facility installation using the Geumho River as a water source

Committee in the BOD

Name	Members	Authority and responsibility	No. of previous meetings
Audit Committee	• 1 standing committee member • 2 non-standing committee members	• Auditing accounts and businesses of the corporation and reporting the results to the BOD • Requesting management activity reports, investigating the corporation's businesses and asset status, etc.	총 5회

K-water's Communication with Stakeholders

Composition of Stakeholders and Measures for Communication

In order to effectively communicate with stakeholders, K-water has classified and analyzed stakeholders according to their roles such as value production and operated channels of communication suited to each stakeholder group by selecting issues of interest for them. This enabled K-water to establish a foundation for the implementation of water management unification through the participation of all employees in discussions on integrated water management and to prevent water outages that could have affected 1.39 million people through the communication and cooperation among local governments, related institutions and the residents. K-water has also solved local water problems by inviting NGOs and other diverse stakeholders to participate in the decision-making process.

Goal	Enhancement of National water welfare through the implementation of integrated water management			
Strategic direction	Strategic direction	Water sharing services	Water convergence services	Water innovation services
Provided values	<ul style="list-style-type: none"> Achieving integrated water management Ensuring water safety 	<ul style="list-style-type: none"> Intelligent, efficient water services 	<ul style="list-style-type: none"> Pollution-free water energy Recovering urban water circulation 	<ul style="list-style-type: none"> Fostering the water industry and creating jobs
Classification	Internal	External		
	Value creation	Value cooperation	Value sharing	Value evaluation
Value evaluation	<ul style="list-style-type: none"> Employees The Labor Union 	<ul style="list-style-type: none"> Government and the National Assembly, experts Relevant institutions, partner companies 	<ul style="list-style-type: none"> Customers, citizens Local government and communities 	<ul style="list-style-type: none"> Civic groups The press
Expectations	<ul style="list-style-type: none"> Sustainable development of the organization Improving welfare and working conditions 	<ul style="list-style-type: none"> Matching with national policies Technology improvement and mutual growth 	<ul style="list-style-type: none"> Water Welfare, public interest value Benefiting local communities 	<ul style="list-style-type: none"> Environmental and ecological restoration Social issues

Classification	Main interests	Communication performances	Communication channels
Value creation	Employees	<ul style="list-style-type: none"> Water management unification Organizational culture improvement 	<ul style="list-style-type: none"> Quick sharing of information Operation of a dedicated organization
	The labor union	<ul style="list-style-type: none"> Introduction of worker director system Organizational culture improvement 	<ul style="list-style-type: none"> Labor-management council meetings (4 times) and joint program operation
Value cooperation	Government and the National Assembly, experts	<ul style="list-style-type: none"> Implementation of government projects 	<ul style="list-style-type: none"> Labor-management council meetings (4 times) and joint program operation
	Relevant institutions, partner companies	<ul style="list-style-type: none"> National service enhancement Fostering of the water industry 	<ul style="list-style-type: none"> Seeking substantial cooperation Need for identification, practical support
Value sharing	Customers, citizens	<ul style="list-style-type: none"> Water service improvement 	<ul style="list-style-type: none"> Meetings with customers (3 times) Information pre-release (301 items)
	Local government and communities	<ul style="list-style-type: none"> Local water issues 	<ul style="list-style-type: none"> Direct communication and joint decision making on key policies
Value evaluation	Civic groups	<ul style="list-style-type: none"> Opening of the weirs of the four major rivers Ecosystem restoration 	<ul style="list-style-type: none"> Operation of private advisory groups Participation in key policy decisions
	The press	<ul style="list-style-type: none"> Water management issues 	<ul style="list-style-type: none"> Providing accurate information

Creation of management performances through communication channels suited to each stakeholder group

[Value creation] Establishing a foundation for the implementation of water management unification through the participation and discussion of all employees on implementation integrated water management.

Issue	<ul style="list-style-type: none"> Projects and organizational innovation for integrated water management underway, but delays have occurred in implementing them and achieving visible performances - Need for enhancing the understanding and consensus of all employees (Only 32% of them responded that they understand the relevant projects.)
Efforts for communication	<ul style="list-style-type: none"> Diversification of communication and participation channels to enhance the understanding and consensus of all employees <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Communication</p> <ul style="list-style-type: none"> Education <ul style="list-style-type: none"> Promotion of integrated water management training for each level of positions (12 times) and the materialization of the implementation system Conferences <ul style="list-style-type: none"> Organizational innovation conferences for the establishment of a region-based integrated water management system (4 times) Identification of the rights to further transfer from the headquarters to the regional head offices and ways to establish responsible management system in each region Contest <ul style="list-style-type: none"> Contest to collect future project ideas that could lead to the development of new integrated water management implementation measures (264 applications) </div> <div style="width: 45%;"> <p>Participation</p> <ul style="list-style-type: none"> Corporate-wide TFT <ul style="list-style-type: none"> Preemptive identification of tasks to implement water management unification through the Next-Generation Water Management TFT (February, 2017) and the CEO-led Water Management Innovation Committee (June, 2017) </div> </div>
Results	<ul style="list-style-type: none"> Promotion of internal innovation for integrated water management, including the assignment of standing directors to all regions and the transfer of authority of the head office Active presentations of water management innovation related proposals to the National Advisory Council to reflect them in the new government's national projects ➔ Establishment of a base for integrated water management and preemptive preparation for integrated water management unification

[Value Cooperation and Sharing] Prevention of water outages affecting 1.39 million through cooperation and communication among local governments, related institutions and residents

Issue	<ul style="list-style-type: none"> Limited water supply predicted (in 16 cities and counties) at Unmun and Pyeongnim Dams due to prolonged and severe droughts over a period of four years
Efforts for communication	<ul style="list-style-type: none"> Sharing information with the public and communicating with local residents through joint cooperation and response with local governments and relevant institutions <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Local governments</p> <ul style="list-style-type: none"> (Unmun Dam) Construction of an emergency water supply facility using the Geumhogang River in cooperation with the cities of Daegu and Gyeongsan (February, 2018) * Daegu: Co-funding, support for construction approval/Gyeongsan: site provision, support for construction approval </div> <div style="width: 45%;"> <p>Relevant institutions</p> <ul style="list-style-type: none"> (Pyeongnim Dam) Establishment of an alternative water supply pipeline connecting K-water's Pyeongnim Dam and the Korea Rural Community Corporation's Jangseong Dam and Suyangje Reservoir through a joint TFT </div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Local residents</p> <ul style="list-style-type: none"> (Information sharing) Launching of a drought information portal (September 2017) to provide real-time drought information to the public (Water saving campaign) Promotion of direct communication with local residents such as water saving campaigns </div> </div>
Results	<ul style="list-style-type: none"> Prevention of water shortages that would affect 1.39 million people with continuous water supply even during extreme droughts

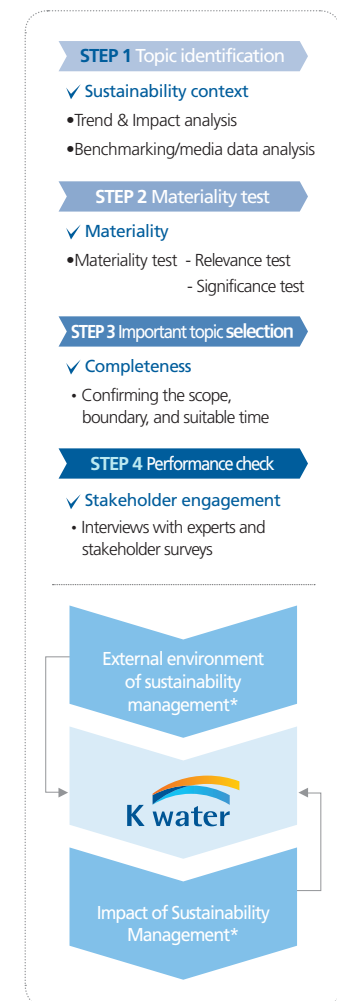
[Value evaluation] Resolving local water problems through the participation of various stakeholders and NGOs in the decision making process

Issue	<ul style="list-style-type: none"> Increase in dam discharge needed according to the growing demand for ecosystem restoration due to the drying of the Seomjingang River downstream
Efforts for communication	<ul style="list-style-type: none"> The Geumyeongseom Regional Mutual Prosperity and Cooperation Committee, consisting of NGOs, academia, media, and K-water ➔ Consensus formed on the need to increase the volume of discharge from Seomjingang Dam
Results	<ul style="list-style-type: none"> Participated in the Yeongsangang River Water System Dam and Weir Linkage Committee based on the consensus formed at the cooperation committee ➔ Induced the decision for additional discharge from Seomjingang Dam (260,000 m³/day)

Major Topics of K-water's Sustainable Management

Major Topics of K-water's Sustainable

K-water pursues sustainable development by reflecting economic, social, and environmental issues in the entire operation process. K-water has selected major sustainable management topics based on the materiality assessment criteria recommended by the GRI Standards and ISO 26000 (Social Responsibility) in order to identify issues more important to K-water itself and its stakeholders, track and report the related businesses, and set up strategies for establishing its own sustainable management system.



Materiality test process

In order to derive key sustainability management topics, K-water has conducted internal and external environmental analyses and materiality tests based on the sustainability context, principles for materiality and completeness, and stakeholder engagement criteria provided by the GRI Standards, which are international sustainability reporting guidelines.

Step 1 Identification of sustainability management topics through internal and external environment analyses

K-water has selected 41 issues related to its sustainable management by analyzing mid- to long-term management strategies, business process improvement and competitiveness analysis reports, press reports, and topics raised by leading domestic and global companies in the same industry.

- *External environment of sustainability management: The external economic, social, and environmental changes that affect K-water
- *Impact of Sustainability Management: The economic, social, and environmental changes that K-water provides to the outside

Step 2 Relevance and significance tests through stakeholder surveys

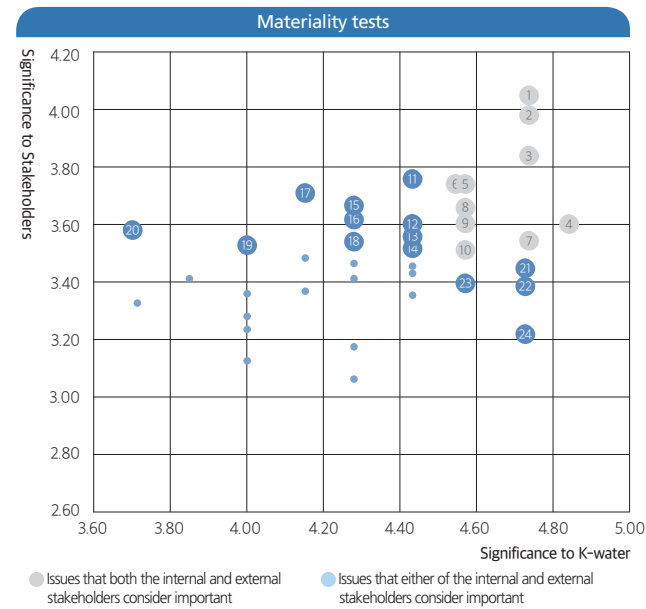
Based on ISO26000, an international standard offering guidance on social responsibility, and the GRI standards, the international sustainable management reporting guidelines of GRI (Global Reporting Initiative), the 41 initially selected topics were tested for their relevance and materiality and prioritized. Through the relevance test, topics with low relevance were excluded, and based on the results of surveys for internal and external stakeholders on their social concerns and K-water's performances, topics with wider gaps between the concern and performance levels were tested for materiality.

Step 3 Selection of major topics

The present report has focused on 24 topics that showed wide gaps between the stakeholders' concern levels and K-water's performance levels, and thus were considered relatively more important by both the internal and external stakeholders.

K-water's Efforts for Sustainable Management

This report contains important topics derived from the materiality tests and specific activities, results, and future plans related to these topics.



Key topics	
1 Emphasis on publicness as a public institution and social value creation	13 Impact products and services have on the environment
2 Establishment and implementation of an ethical management system (ethics and integrity)	14 Reduction of energy use (production of renewable energy such as hydropower)
3 Establishment and operation of a transparent decision-making structure (governance)	15 Discharge of wastewater and waste
4 Customers' satisfaction with products and services	16 Ensuring biodiversity
5 Protection of customers' privacy	17 Participation by stakeholders (strengthening communication with customers, local communities, etc.)
6 Compliance with environmental laws and regulations	18 Management of air pollutants
7 Health and safety in the workplace (industrial safety and health)	19 Environmental expenditure and investment
8 Compliance with laws on products and services	20 Water use
9 Compliance with social sector laws	21 Guaranteeing diversity, equal opportunity, and compensation for employees
10 System to deal with human rights complaints (sexual harassment, etc.)	22 Prohibition of discrimination (eradication of human rights violations)
11 Clients' health and safety	23 Training and education
12 Indirect economic effects (investment in infrastructure)	24 Communication with customers (compliance with marketing-related rules)

Key topics	Stakeholder group	International sustainable management indices (GRI Standards)		Major impact		Page
		Classification	Sub-area	Internal	External	
Establishment and operation of a transparent decision-making structure (governance)	Employees	General	Governance	●		19-22
Water use	NGO, local governments	Environment	Water	●		40-46, 95
Reduction of energy use (production of renewable energy such as hydropower)	Government, NGO	Environment	Energy	●		47-49, 95
Discharge of wastewater and waste	NGO, local governments	Environment	Wastewater and waste	●		95, 96
Ensuring biodiversity	NGO	Environment	Biodiversity	●		96, 97
Management of air emissions	NGO, local governments	Environment	Air emissions	●		95, 96
Compliance with laws on products and services	Government, NGO	Society	Marketing and labeling		●	95
Compliance with environmental laws and regulations	Government, NGO	Environment	Compliance with environmental laws		●	41, 68-70
Compliance with social sector laws	Government, NGO	Society	Compliance with social and economic laws		●	52-53
Guaranteeing diversity, equal opportunity and compensation for employees	Employees	Society	Diversity and equal opportunity	●		62-63, 72-79, 90-91
Training and education	Employees	Society	Diversity and equal opportunity	●		79, 86
Customers' satisfaction with products and services	Customers (citizens)	Society	Training and education		●	42-44, 47
Environmental impact of products and services	Government, NGO	Environment	Marketing and labeling		●	64
Indirect economic effects (investment in infrastructure)	Customers (citizens)	Economy	Local communities		●	52-54
Environmental expenditure and investment	NGO	Environment	Indirect economic effects	●		85
Health and safety in the workplace (industrial safety and health)	Employees	Society	Environmental investments	●		35-36
Communication with customers (compliance with marketing-related rules)	Customers (citizens)	Society	Marketing and labeling		●	21-22
Customers' health and safety	Customers (citizens)	Society	Customers' health and safety		●	41-46
Protection of customers' privacy	Customers (citizens)	Society	Protection of customers' privacy		●	39
Emphasis on publicness as a public institution and social value creation	Customers (citizens)	General	-	●		64-67, 88-89
Emphasis on publicness as a public institution and social value creation	Employees	General	Ethics and integrity	●		72-73
Prohibition of discrimination (eradication of human rights violations)	Employees	Society	Stakeholders' participation	●		74-75
Participation by stakeholders (strengthening communication with customers, local communities, etc.)	Customers (citizens)	General	Stakeholders' participation		●	21-22
System to deal with human rights complaints (sexual harassment, etc.)	Employees	Society	Human rights level assessment	●		73, 79

Interviews with stakeholders for K-water's sustainable management

Government/Ministry of Environment
Deputy Director Lee Gang-uk



K-water actively cooperates with government organizations based on its excellent expertise and carries out various tasks with the Ministry of Environment. I hope that K-water will achieve organizational management and decision-making process transparency, the improvement of revenue management, and an innovative shift from development-oriented businesses such as dam construction to the maintenance and management of infrastructures. I also hope that it will actively promote various businesses that it performs for the people and establish itself as a public corporation that communicates well with the people.

K-water and its highly qualified staff are actively responding to recent water shortage crises through unified water management and technical cooperation with private companies. I hope that the compensation and incentive system related to the restriction of property rights of residents caused by the use of local water resources will be smoothly implemented in the future. I also hope that K-water will contribute to the practice of social values by creating quality jobs, taking into consideration the serious issue of youth unemployment, and coping with future water shortages by working with local residents based on its expertise in the field of water use.

Local government/Asan City Hall
Team Leader Choi Gyeong-man



Employee/ K-water
Senior Deputy Chairman of the Labor Union Han Myeong-jin



Recently, we have discussed various issues such as the unification of water management and the re-prioritization of existing businesses in accordance with the launching of a new labor union, and the shortening of working hours. I hope that in the process of determining business priorities, a transparent decision-making structure will be established and various working conditions within the vast organization will be taken into consideration to create a caring and understanding atmosphere. Korea has excellent water facilities nationwide, but the management of aging facilities has remained at an insufficient level. To solve this problem, keen interest from the people and cooperation

with relevant institutions are needed. In addition, K-water should actively seek ways to support the improvement of inadequate water facilities in North Korea in preparation for future changes in inter-Korean relations in line with the recent peace efforts on the Korean peninsula.

K-water is a corporation that pursues the creation of social values with sincerity and authenticity. It has recently faced various issues such as water infrastructure development in North Korea due to the recent reconciliation efforts on the Korean Peninsula, reflecting social values in the organization, and the unification of water management for effective water management at the same time. I expect K-water to become an organization that internalizes social values through its Board of Directors which is composed of internal and external experts and enhances its resiliency to climate change. Furthermore, I hope that K-water will continue its international social value creation activities by preemptively implementing infrastructure projects that are urgently needed in developing countries through SDGs-based strategies.

NGO/ UN Global Compact
Manager Lee Eun-gyeong



Partner company/ THE.WAVE.TALK
CEO Kim Yeong-deok



K-water is an organization whose hands-on staff is committed to identifying the needs of partner companies and internally leading its organization to meet the needs of the Korean public. The corporation has gained a new growth engine with the stable establishment of an effective water management system through the unification of water management and increasing opportunities for technological innovations that this change has brought. I hope that K-water will contribute to overcoming water shortages by actively utilizing the corporate network and developing efficient water management technologies. In addition,

I am keenly interested in K-water's efforts for discovering and supporting startups that will lead to the activation of a virtuous cycle of social value activities where the technologies developed through the partnership of K-water and SMEs are utilized for infrastructure development in developing countries and exported to advanced countries.

Water Safety Services

Making a happier Korea with a healthier water circulation system	29
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Water Sharing Services

High-Quality Tap Water Services	41
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Rights for All, Water Rights	46

Water Convergence Services

K-water's New Paradigm, Clean Energy	48
Happier lives for all citizens through the development of eco-friendly waterfront cities	50
Leading the National Water Industry by Creating the Industry Platform	52
K-water's Future Convergence Technology	55
K-water as a Global Water Corporation	56

K-water's Efforts to Enhance National Water Welfare



Water Safety Services

Safe and Clean River Basin Management

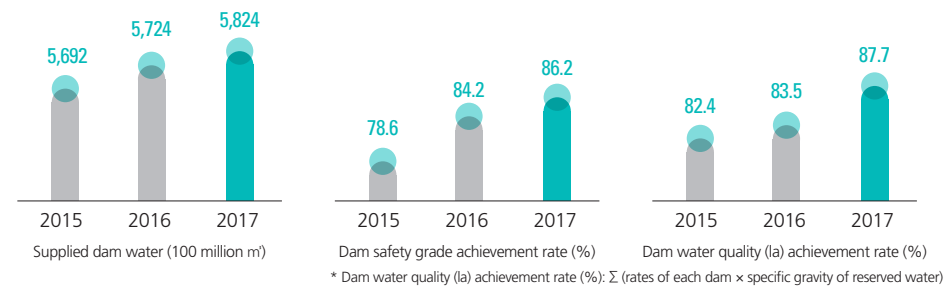
K-water has contributed to enhancing Korea's resiliency to disasters by strengthening its capacity to respond to water disasters and improving the stability of water facilities in response to climate change. In addition, it has tried to improve water management efficiency and its disaster response capacity by linking diversified functions related to water quantity, quality, and ecology and disaster responses in an organic and integrated way. K-water strives to achieve changes in the water environment that can directly benefit citizens through sustainable water management.

K-water's key activities for sustainable management

- Active implementation of water quantity and quality policies such as the opening of six weirs in the four major rivers at necessary times and the use of algal reduction facilities through the establishment of an organization dedicated to water environment; advancement of water quality technology through scientific water quality forecasting
- Advanced technologies are applied to the operation of the National Drought Information Center and the Integrated Water Management Center to build a disaster-resistant water management system
 - Active response to water disasters such as droughts and floods by linking dams (including hydropower dams), weirs and other water facilities
- Develop systematic strategies to respond to climate change and drastically reduce national water disasters by strengthening support for drought and flood prevention, etc.
- Strengthen responsibilities and roles in the water environment sector, providing a model for upstream water quality improvement, investing in river basin pollution response projects, etc.
- Discontinuation of state-led dam development and focus investments on the enhancement of facility safety to respond to the deterioration of aging and existing dams, earthquakes, etc.
- Strengthen the roles and participation in the sewerage sector (water quality, urban floods, etc.) by linking rivers and sewerage systems in terms of water circulation management

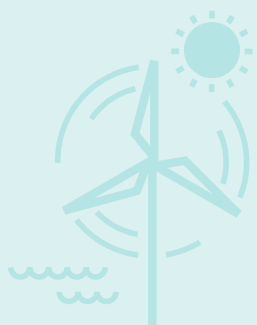
K-water's future plans for sustainable management

Water safety service performances



K-water seeks to establish an optimal water circulation system for sustainable water use. It plans to achieve a shift from large-area to local centered water supply and sewerage systems and to integrate diversified water management on the regional level. In this regard, K-water has selected major sustainable management topics in relation to water safety services, which is one of its main strategic tasks. By systematically managing the activities related to these topics, it has contributed to the fulfillment of the UN's Sustainable Development Goals (SDGs).

Customers' safety and health	Compliance with environmental laws and regulations	Water	Discharge of wastewater and wastes
Increased demand for the stability of products and services (water quality) Increase in diverse and advanced customer demands	Strengthened environmental regulations Compliance with environmental laws and regulations	Water use	Climate change and environmental (air, water, soil pollution) pollution prevention
SDGs			



K-water's major sustainable management topics and contributions to the SDGs

Healthy Water Circulation , Happy Korea

K-water's sustainable integrated water resources management (IWRM)

Integrated water resources management refers to managing water quantity, quality, ecology, and environment, which were previously managed individually, in an integrated and intelligent way by taking into account of all the factors affecting water management in a region.

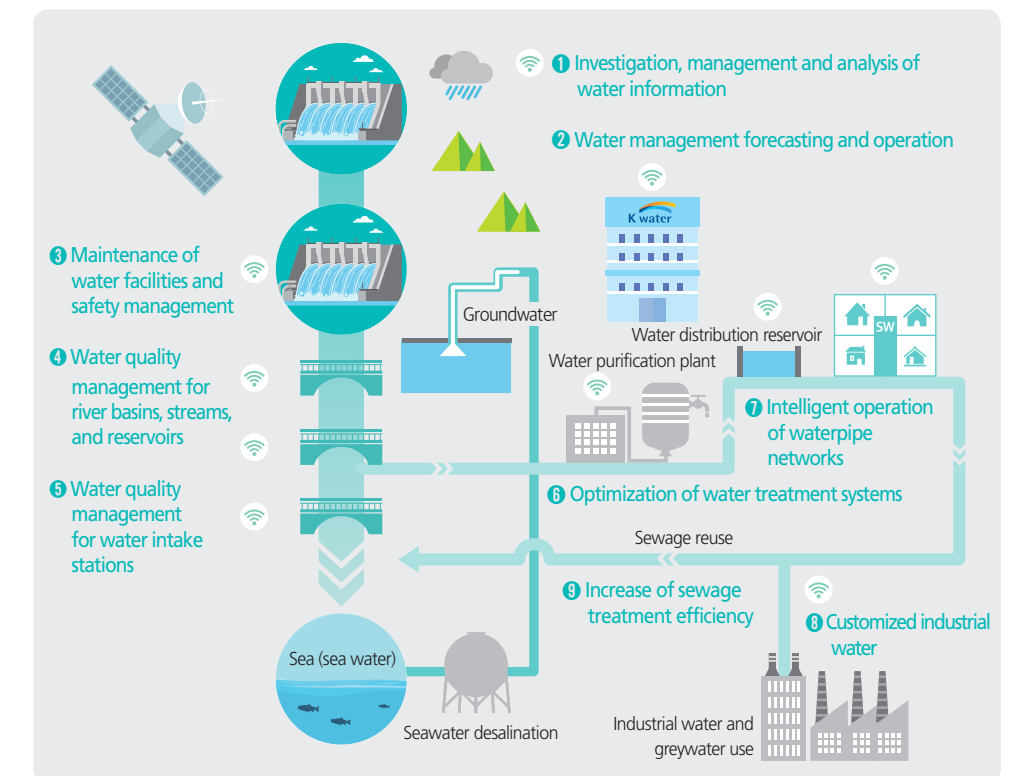
To create a healthy water environment and a cooperative water culture in Korea, K-water preemptively established a masterplan for integrated water resources management in 2014 and contributed to its inclusion in national policies. It also has been committed to the settlement and spread of integrated water resources management system through the formation of governance to eliminate conflicts over water issues between regions and river basin areas.

Integrated water resources management performance indices

	Stabilization of water supply				Prevention of water disasters			
	Supplied dam water (100 million m ³)	Supplied tap water (100 million m ³)	Local waterworks flow rate (%)	Global water quality standard compliance rate (%)	Dam safety grade achievement rate (%)	Dam operation rate in response to droughts (%)	Dam water quality (Ia) achievement rate (%)	Future technology securing rate (%)
2016	57.2	38.9	83.9	99.95	84.2	93	83.5	71
2017	58.2	40.0	84.3	99.99	86.2	104	87.7	74

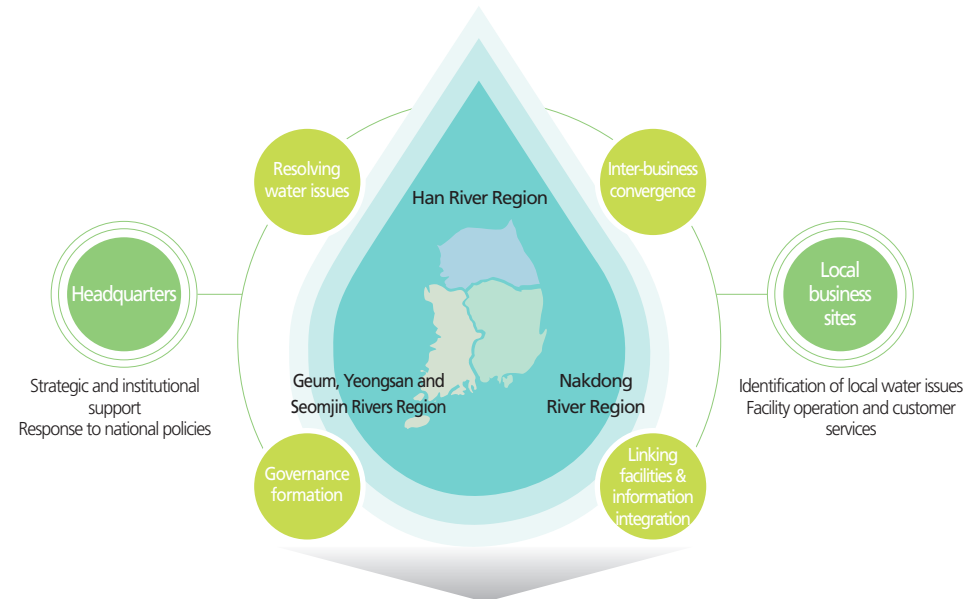
* Future technology securing rate (%): Rate against the goal of securing 1,449 technologies by 2025 (mid- to long-term management goal)

Integrated water resources management system



Water Management Unification, a Massive Shift in Korean Water Management

Region-based integrated water resources management

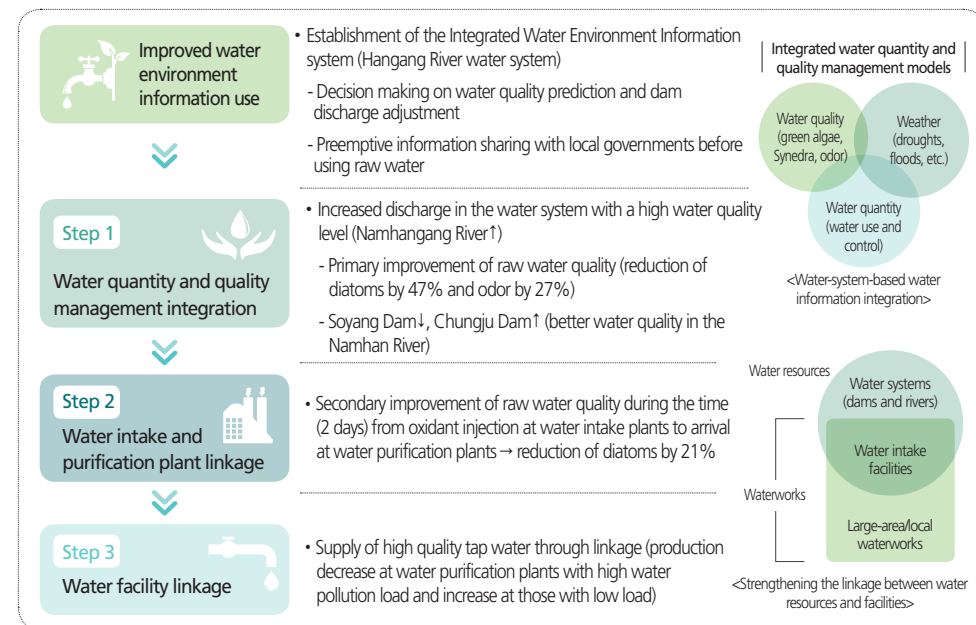


What is region-based integrated water resources management?

Managing water quantity, quality, ecology, and environment, which were previously managed individually, in an integrated and intelligent way by taking into account all factors affecting water management in a region

Based on its 50 years of water management experience, K-water has actively supported the water management unification policy, suggesting ways to achieve national water management innovation and leading the creation of a consensus among stakeholders, and has established a foundation for the implementation of water management unification.

K-water has also created a foundation for integrated water management tailored to each river by taking their unique characteristics into account and establishing a rapid decision-making structure centered on each river region (business site), to achieve optimal water management through response systems suited to and implemented by each region. In addition, a three-stage integrated water quality management system was established to promptly respond to changes in the environmental conditions of water sources, such as sudden changes in water quality.



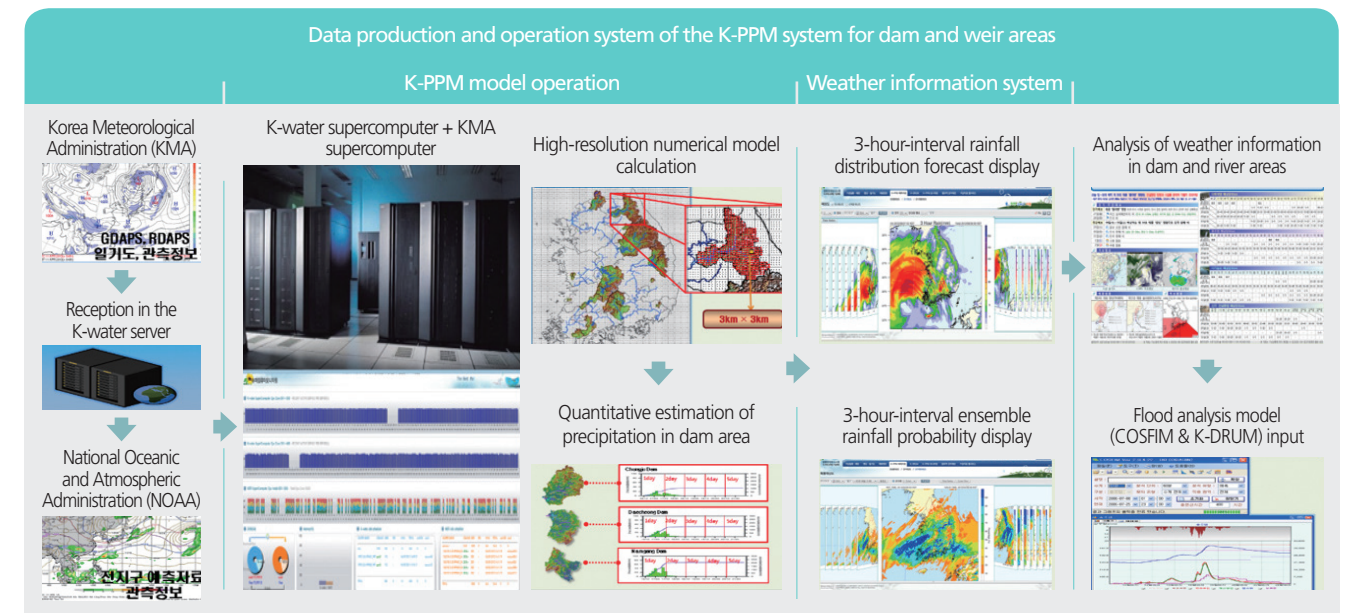
Protection of the People through the Prevention of Water Disasters

Safe water resource management system

Preemptive water management with a precipitation forecasting system

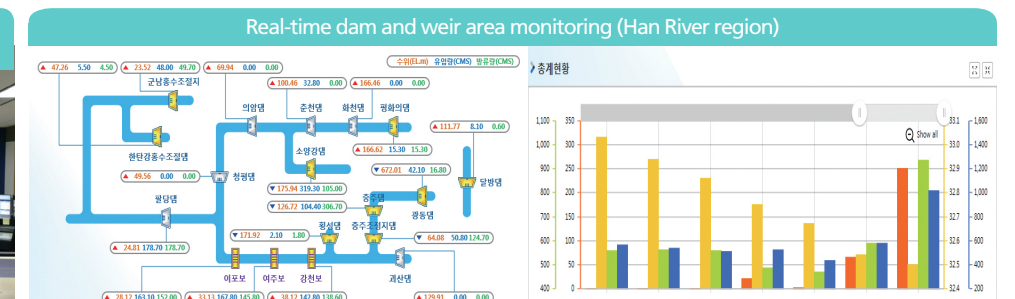
To more actively cope with abnormal weather conditions due to climate change and to reflect the weather characteristics of dam and weir areas with complex geographical features, K-water has built its own supercomputer-based precipitation forecasting system (PFS) and uses it to apply advanced water management.

K-water's Precipitation Prediction Model (K-PPM) has been constructed as a 3x3 km high resolution grid system to take account of the detailed geographical characteristics of dam and weir areas. Data is collected hourly over a period of 5 days and is uploaded to the IWRM system 4 times a day, which is used for K-water's preemptive water management to prevent water disasters.



Water disaster management using a real-time monitoring system

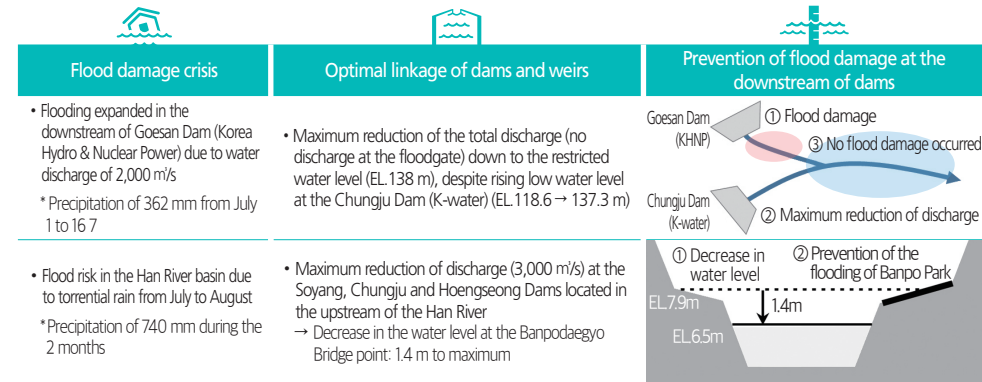
In order to preemptively respond to water disasters, K-water collects the water level data of multi-purpose dams, water supply dams, multi-function weirs and flood control reservoirs from all over the country as well as precipitation data from its monitoring stations in 1-minute intervals. To improve the reliability of the collected water level and precipitation data, K-water operates a real-time hydrological data quality management system. In particular, since 2017, it has performed water management optimized for each river basin using its newly constructed region-based water management system, monitoring water management in real-time at regional IWRM Centers, and carrying out integrated water quantity and quality information analyses.



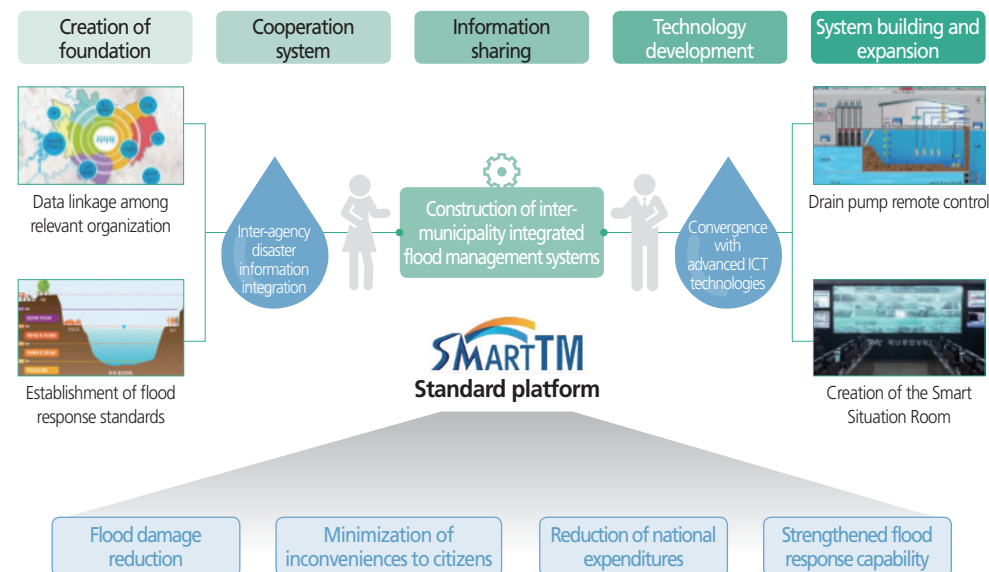
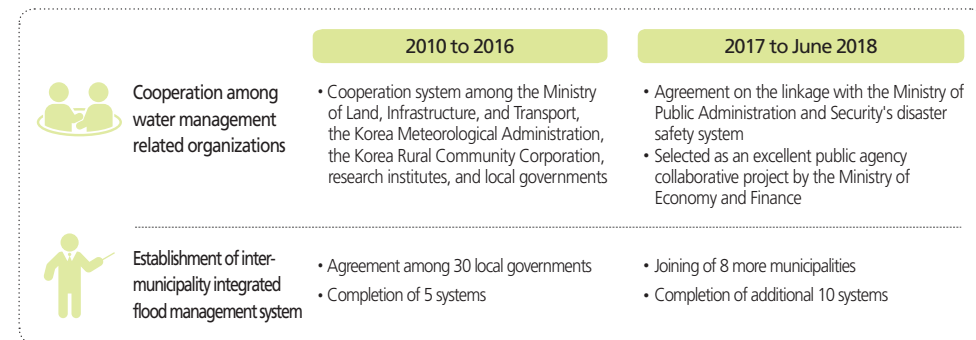
Protection of People through the Prevention of Water Disasters

Flood response through optimal dam-weir linkage and system construction

K-water has made its best efforts to prevent flood damages through the scientific linkage of dams and weirs based on its water management technology accumulated for over 50 years. Despite the record heavy rainfall in the Seoul capital area in 2017, it successfully prevented flood damage in the downstream dam areas and the Han River terrace through the optimized dam and weir linkage system.

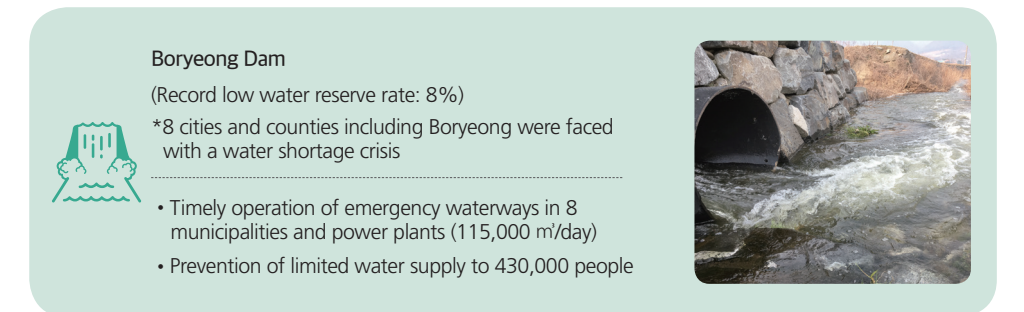
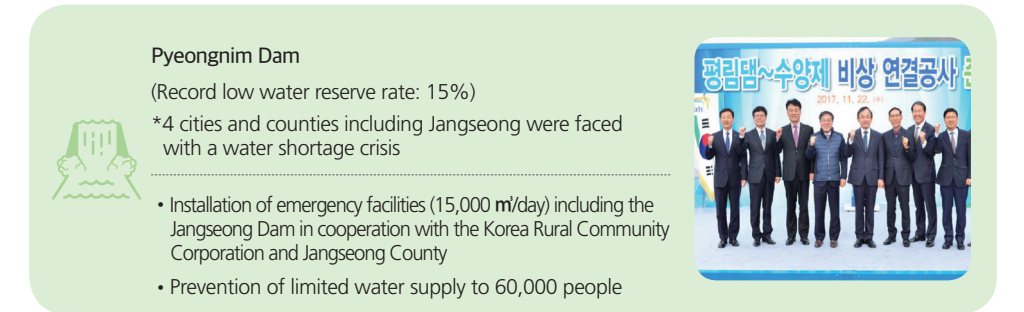
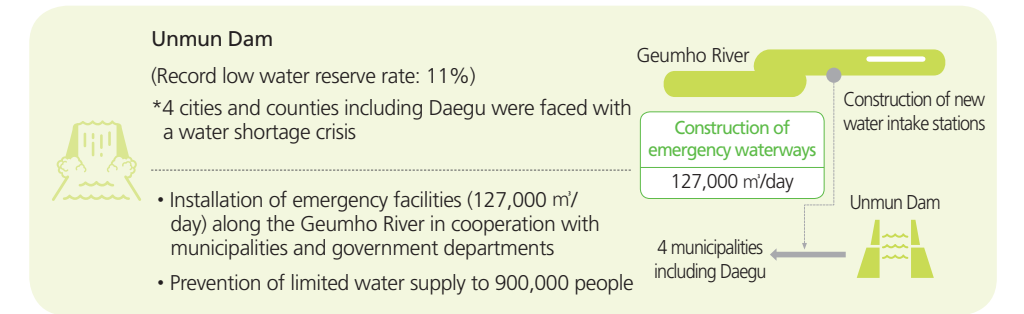
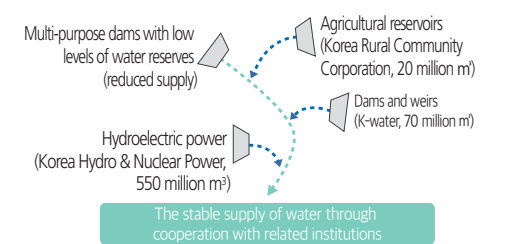


During the last decade, 89% of damages due to typhoons and torrential rain occurred in small and medium river basins, which means that those areas are vulnerable to floods. Therefore, since 2010, K-water has been working on strengthening the flood response capabilities of the areas by establishing an integrated flood management system in cooperation with relevant water management institutions and municipalities.



Damage minimized by preemptive disaster management despite a 4-year drought

In 2017, Korea was faced with a water shortage crisis due to a prolonged drought that lasted for four years. K-water, in close cooperation with related organizations such as the Korea Hydro & Nuclear Power Corporation, Korea Rural Community Corporation and municipalities, supplied about 640 million cubic meters of water, which is an amount that can be used by 10 million people for 227 days, by efficiently linking water facilities or replacing a water source with another. It also helped to prevent the limited water supply, which could have adversely affected about 1.39 million people, by rapidly installing emergency waterways in collaboration with the central and local governments and operating them on a timely basis. In addition, with 42 local governments, it reduced water use in drought affected areas by 2.2% through the provision of drought forecasts and alarms and relevant information to the residents. K-water also supplied large amounts of emergency water that can be used by 100,000 people for 155 days to 93 municipalities suffering water shortages free of charge.

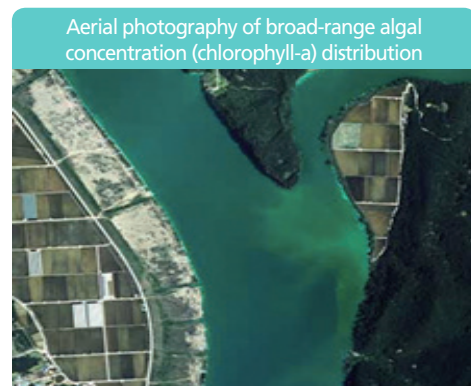


Reduction activities of Harmful algal Blooms(HAB)

K-water is committed to creating a clean water environment that everyone can enjoy through its preemptive and active green algae management.

Efforts to respond to Harmful Algal blooms (HAB)

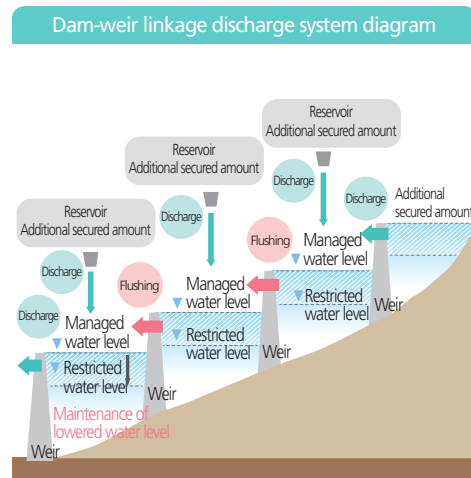
K-water is leading the joint response of related agencies to forecast the occurrence of green algal blooms and to block the factors that can affect it. By using water quality forecasting system (SURIAN), it predicts the occurrence of HABs on weekly and monthly basis and provides information to related organizations and residents, while taking countermeasures such as the installation of barriers to prevent livestock manure from flowing into the rivers during precipitation events. In addition, for more accurate forecasts, K-water has promoted the linkage of water quality data among competent authorities including the Ministry of Environment and advanced the forecasting system. K-water has also continuously developed green algae monitoring and reduction technologies. It has promoted the practical application of related technologies so that it can monitor green algae levels in a wide range of areas at a glance by utilizing drones. Since 2014, K-water has opened the areas with HABS to use as test beds to support the on-site tests of companies owning green algae reduction technologies. Until 2017, a total of 70 technologies have been tested, of which 31 have been verified and 3 have been introduced to HAB sites to reduce green algae levels. K-water has carried out water discharge to respond to HABs through the linkage of dams and weirs as part of its water environment management that considers both water quantity and quality for integrated water resources management. It has also set up a pilot model for the improvement of upstream water environments by comprehensively taking account of water quantity, quality, and ecology and disaster safety.



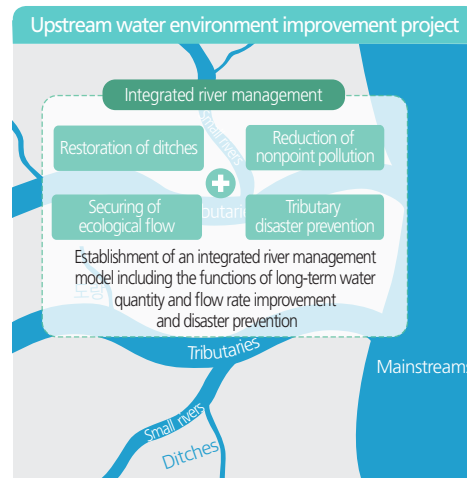
Aerial photography of broad-range algal concentration (chlorophyll-a) distribution



Algal reduction technology field test



Dam-weir linkage discharge system diagram



Upstream water environment improvement project

Sustainable Safety Environment

K-water safety management system

Establishment of a safety management system led by the CEO and supported by expert agencies

Among the 37 dams and 57 water facilities managed by K-water, 54 (34 dams and 20 large-area water purification plants) have been designated and managed as national infrastructures¹⁾, taking up 19% of the total (273 national infrastructures). In addition, K-water plays a major role in the national economy, managing and supervising public construction projects worth about KRW 1 trillion every year; thus, its safety management capability is more important than ever.

To meet citizens' growing interest in safety and their expectations of its role, K-water created an internal department dedicated to safety management in 2015 and has made effort to the settlement and advancement of the safety management system. Particularly, it has built a management foundation that puts top priority on safety, declaring that safety management is one of the core activities set by the CEO since the introduction of the Safety and Health Management System Certification standards in 2000. In addition, K-water has continuously enhanced its safety capacity by diagnosing the safety levels of the headquarters and the local business sites and strengthening its technological capabilities through joint inspections with safety expert agencies such as the Korea Occupational Safety and Health Agency and the Korea Industrial Safety Association.

Creation of safe workplaces through the elimination of safety blind spots

K-water has launched the SAFE K-water project to help workers work without worrying about safety. To ensure the safety of citizens who visit K-water facilities, it has checked the safety of all facilities that are frequently used by the public (e.g. elevators and safety rails) and intensively examined the safety blind spots of industrial sites with relatively high safety accident rates in cooperation with the employees under the wage peak system who have rich experiences and know-hows, as a part of its efforts to create workplaces where the people are safely protected.



In addition to public relations using easy-to-access media contents such as videos on safety, K-water has provided various types of education suited to different groups of people, operating safety experience centers and developing professional training programs for workers, builders, and clients, to spread the construction culture that places emphasis on safety to the entire organization.

¹⁾ National Infrastructures: All facilities related to energy, transportation, drinking water, etc., that need to be continuously managed for the protection of materials and human resources and functional systems as the paralysis of their functions may have a significant impact on the lives and properties of the people, national economy, and the maintenance of the governmental functions.



Deaths during construction work
4 in 2016 ▶ 1 in 2017

Industrial accident victims
11 in 2016 ▶ 5 in 2017

Safety Removal of risk factors

- Inspection of safety railings to eliminate the risk of falls
- Collaboration with the Korea Occupational Safety and Health Agency to carry out safety checks on construction sites with high-risk processes

Action Participatory safety culture campaign

- Promotion of safety awareness using media contents closely related to daily life of workers
* PC screensavers, safety calendars, etc.
- Provision of experiential education presenting concrete cases of safety accidents such as gas leaks and fires

Field Field-centered safety promotional activities

- Accident-free campaign and risk assessments
*54 sites in 2016 → 106 sites in 2017
- Identification of 148 vulnerabilities through disaster prevention technology training at sewage treatment plants

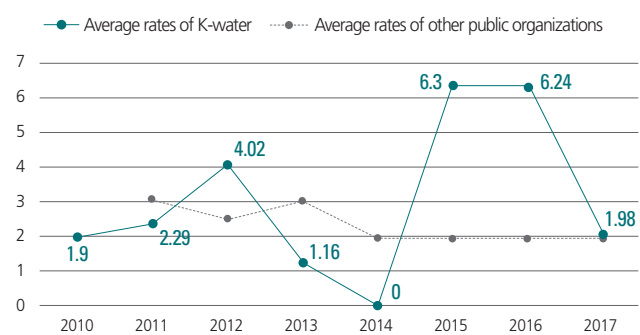
E-learning Online safety education

- The first public corporation to introduce online safety education
*Produced 3,387 trainees (increased effectiveness through the introduction of an evaluation program)
- Strengthening of safety management capabilities of leaders through online safety education suited to all levels of management positions

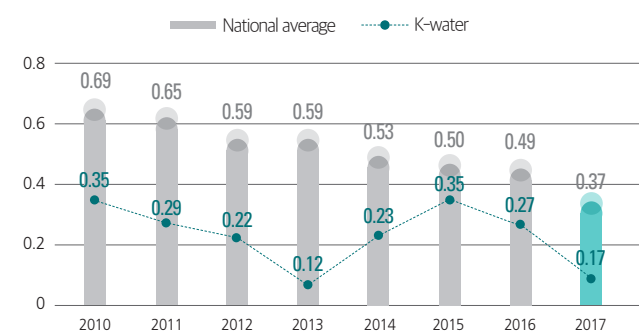
Enhancement of K-water's status as a safety management expert

K-water, led by the CEO, focused its efforts on safety prevention activities for its facilities and construction sites, which led to a significant decrease in accidents occurring at its business sites in 2017 compared to the previous year. At its construction sites, the death rate per 10,000 workers was reduced by about 70% compared to the national average rate announced by the Ministry of Employment and Labor, and the accident rate was reduced by 50% or more against the previous year at its industrial sites where the facilities are managed. Based on these achievements, in 2017, K-water won the Prime Minister Citations at the Safety Culture Awards and the National Disaster Response & Safety Drill; and the Runner-up Prize at the Best Safety and Public Health Policy Contest held by the Ministry of Employment and Labor. K-water will continue to strengthen the safety culture at its industrial sites so that top priority will be placed on people's lives and safety and will further its efforts to create a workplace with an accident occurrence rate of 0 percent.

Construction site fatality accident rates per 10,000 workers for the past 8 years



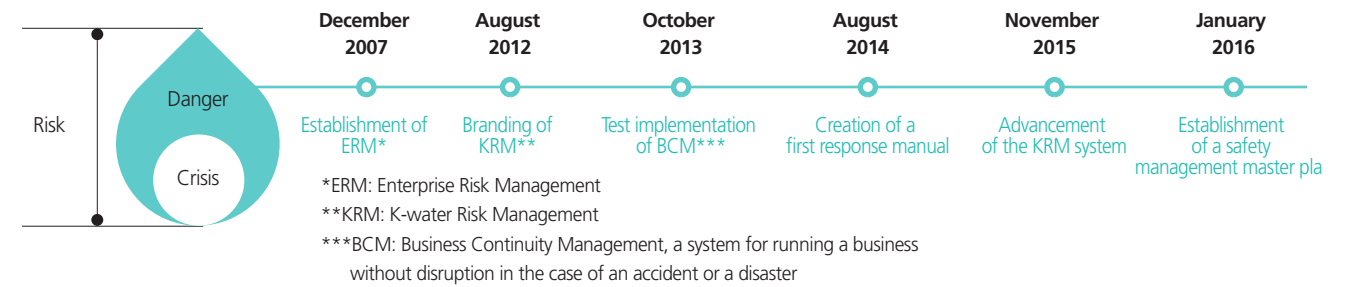
Construction site industrial accident rates for the past 8 years



Risk Management

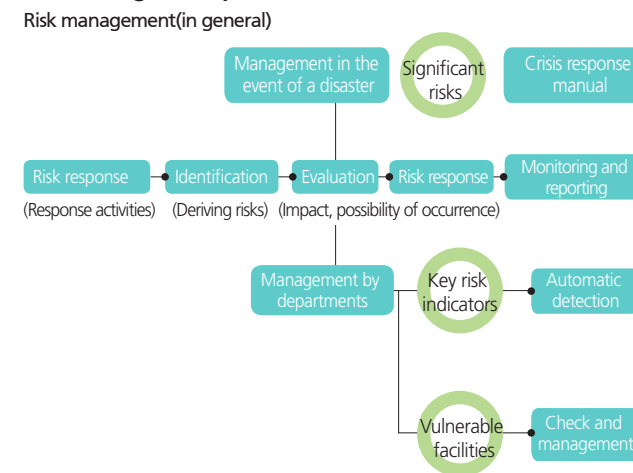
Risk management system

As the complexity and size of disasters grow, greater emphasis has been placed on K-water's role of continuously providing safe and healthy water. K-water has introduced and implemented a corporate-wide risk management system led by the Disaster Safety Department of which every department participated, to efficiently respond to risks, gain competitiveness in the international market through the strengthening of crisis response capabilities, and to successfully fulfill its own management goals along with the government's disaster management policies.

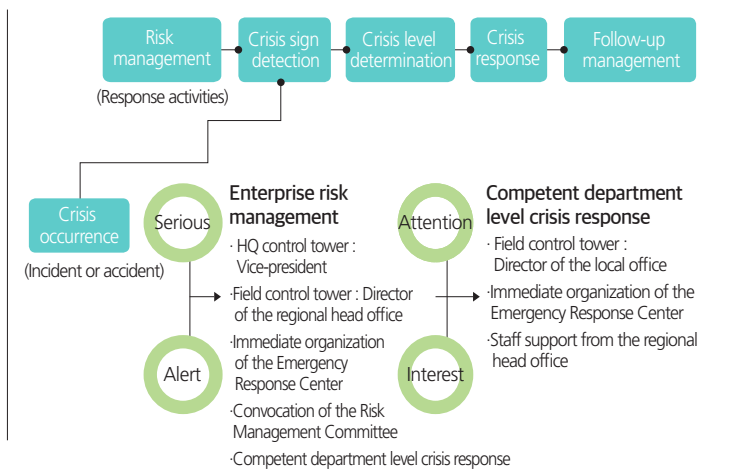


K-water has established an emergency response system and risk management process that works immediately under any circumstances. In order to secure the business continuity management (BCM) system and to maintain the essential function of stable water supply in the event of a disaster, K-water has standardized manuals for each type of disasters and each department and established an emergency water supply support system among water service providers (K-water and 91 local governments).

Risk management process



Crisis management (in the event of an accident)



Serious-Alert (Regional head office level crisis response)

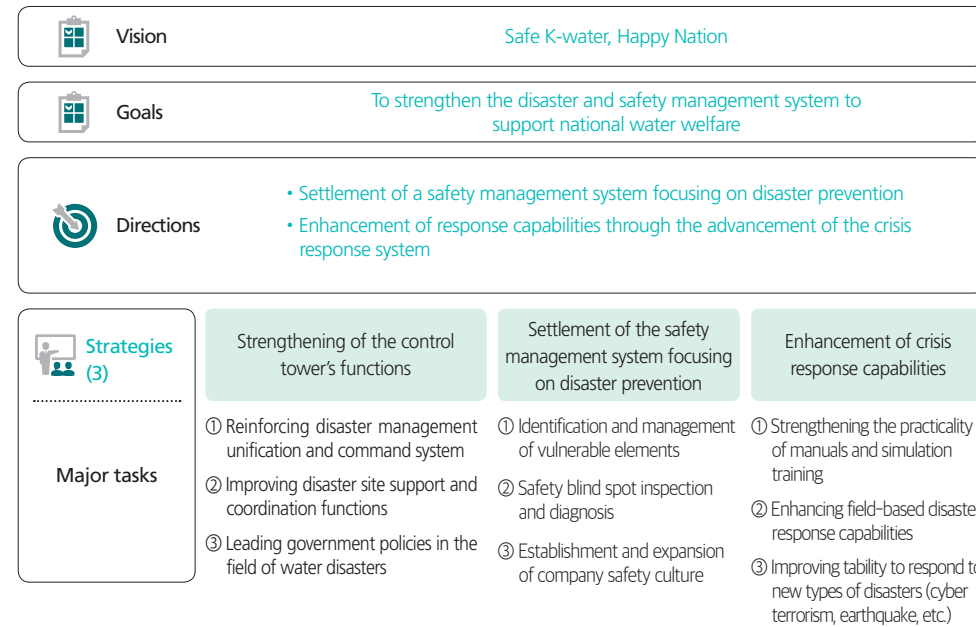
- Immediate organization of the Emergency Response Team and Emergency Response Center
- Emergency Response Center control tower: Director of the regional head office
- Emergency Response Team control tower: Director of the local office (branch)

Attention-Interest (Competent department level crisis response)

- Immediate organization of the Emergency Response Team/Center
- Emergency Response Team control tower: Director of the local office (branch)
- Staff and equipment support from the regional head office

Enterprise risk management strategies

In order to strengthen the disaster and safety management system to support national water welfare, K-water has developed eight strategic tasks following the three strategic directions of the settlement of prevention-oriented risk management, the improvement of crisis response efficiency, and the enhancement of crisis management capacity based on feedback, in order to construct a corporate-wide risk management system.



Risk management performances

Ensuring the safety of all people in cases of severe water-related disasters

K-water has striven to guarantee the safety of all people with prompt and resilient responses even in the most severe natural water-related disasters.

Flood	• Joint training with 103 municipalities (112 times), strengthening the flood response system based on complete survey on dam and reservoir facilities
Drought	• Overcoming of the crisis of limited water supply to 980,000 people (in Daegu, Gyeongsan, Jangseong, etc.) - Linkage of large-area and local water sources, construction and operation of emergency supply facilities, utilization of water sources managed by the Korea Rural Community Corporation including the Jangseong Dam
Earthquake	• Implementation and reinforcement of seismic performance evaluation for multi-purpose dams, water supply dams, water intake towers, etc. (338 facilities)
Green tides	• Prevention of HABs spreading through three-dimensional monitoring using aerial photography and real-time automatic water quality measurements

Preemptive prevention and response system using advanced technologies

K-water is building a disaster response system that utilizes advanced technologies such as drones and AI in preparation for mitigating the effects of massive disasters.

Drone	<ul style="list-style-type: none"> Real-time monitoring and facility inspections using drones in the event of dam and waterworks accidents Removal of concerns over national safety by sharing videos on disasters such as droughts, HABs, and water pollution
IoT	<ul style="list-style-type: none"> Introduction of IoT helmets at construction sites to eliminate safety blind spots that threatening workers Establishment of an IoT-based safety management platform (fingerprint recognition, gas leak detection, etc.) and entrusted research implementation
AI	• Establishment of AI development strategies for preemptive water disaster management and response

Major risk management performances in 2017

K-water has actively responded to 281 Key Risk Indicators (KRIs) and discovered 253 vulnerable facilities to prevent potential risks in advance. In addition, the K-water Risk Management (KRM) system was used in 2017 for response activities such as the rapid communication in the event of a total of 300 accidents mainly composed of disasters. The rate of appropriate reporting within an hour after the occurrence of an accident reached 92 points and the response completion rate was 95 points, proving the effectiveness of K-water's crisis response system.

		Management	Conflict	Disaster	PR	Total
Risk	KRI	7	16	249	9	281
prevention	Vulnerable facilities	-	-	253	-	253
	Crisis management	-	5	294	1	300

	Classification	Evaluation criteria	Achievement rate (no. of evaluations)
Risk management	KRI optimal management rate (%)	Optimal management cases/total cases	98%(275/281)
	Vulnerable facility optimal management rate (%)	Optimal management cases/total cases	99%(250/253)
Crisis management	Optimal reporting rate (%)	Reporting cases within an hour/total cases	92%(276/300)
	Response completion rate (%)	Completed cases/total cases	95%(284/300)

Recognized as Korea's representative disaster response expert

K-water has promoted safety from disasters as one of the CEO's core management activities and is practicing safety-oriented management. K-water was recognized for its effort and was a recipient of three national awards in safety management, safety training and safety activities.

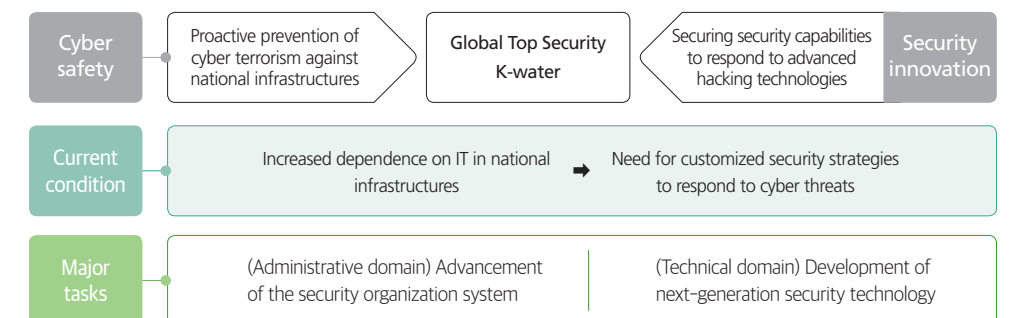
* In 2017, it was awarded the Prime Minister's Citation at the Safety Culture Awards and the National Disaster Response & Safety Drill, and the Runner-up Prize at the Best Safety and Public Health Policy Contest held by the Ministry of Employment and Labor.

Cyber security enhancement

K-water's commitment to ensuring cyber security

K-water has established the K-water Security Management system to implement a safe water management framework and has striven to achieve cyber safety and security innovation to protect citizens' lives and property. To this end, it increased the number of the staff for its internal security team, expanding it from the Security Management Department to the Information and Security Center, which led to a dramatic decrease in the number of threat detection cases by the Cyber Security Center of the Ministry of Land, Infrastructure, and Transport (27 in 2016 to 2 in 2017). K-water has achieved the "Outstanding" rating in the information system vulnerability assessment for two consecutive years and continuously fulfilled the goal of "zero cyber infringement accident" since its foundation by establishing a security threat response system for the Fourth Industrial Revolution era.

In collaboration with the National Security Research Institute on new security technologies, K-water has been committed to creating a "zero-risk" environment for the infrastructures through the construction of packet monitoring system, a media conversion system, etc. As a result, in the 2017 National Intelligence Service's information security management assessment, it gained 87.12 points, which greatly increased against the previous year. K-water was also awarded the citations of the Minister of Science and ICT and the Minister of Land, Infrastructure, and Transport in recognition of its contribution to national information security enhancement.



Water Sharing Services

Supply of clean and sufficient water

K-water intends to promote the healthy water paradigm nationwide based on the achievements of smart water management in Paju and to enhance the equality of water supply by providing clean and safe water to the areas with limited access to water through a more efficient operation of large-area and local waterworks.

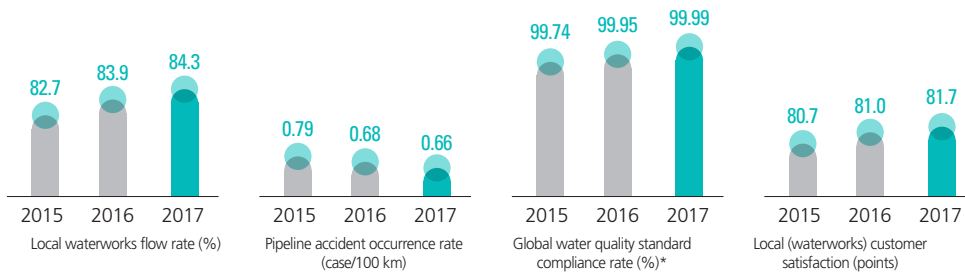
K-water's key activities for sustainable management

- Development of a Smart Water Management (SWM) model as a fundamental measure to eliminate distrust in the water transfer process and the achievement of tap water awareness improvement through the completion of the leading project in Paju
- Improvement of tap water quality by introducing a global-level Water Safety Plan (WSP), operating a world-class water quality inspection institute, and conducting an advanced water treatment process
- Expansion of welfare benefits for rural areas through large-area waterworks and the reduction of water leakage in local waterworks, to narrow gaps in water services between rural and urban areas

K-water's future plan for sustainable management

- Improving demand forecasting and management, securing water supply stability by linking existing facilities (dams, reservoirs, etc.) and developing alternative water resources
- Enhancing the safety and efficiency of water supply by constructing basin-based supply systems and integrating large-area and local waterworks (plans, facilities, organizations, etc.)
- Enhancing the safety and efficiency of water supply by constructing basin-based supply systems and integrating large-area and local waterworks (plans, facilities, organizations, etc.)
- Enhancing tap water safety services through advanced treatment to improve tap water quality, SWM introduction, and indoor pipe management

Water sharing services performances



* Global water quality standard compliance rate (%): number of times of being fulfilled/number of evaluations

K-water plans to promote public trust by introducing smart water management by stages starting from municipalities that entrusted water management to K-water and enhancing tap water quality and values. Furthermore, it has made efforts to expand water welfare to rural areas and raise the efficiency of local waterworks operation. In this regard, it has selected material sustainable management topics in relation to water sharing services, which is one of its main strategic tasks. By systematically managing the activities related to these topics, it has contributed to the fulfillment of the UN's Sustainable Development Goals (SDGs).

Customers' safety and health	Compliance with environmental laws and regulations	Water	Discharge of wastewater and wastes
Increased demand of the stability of products and services (water quality) Increase in diverse and advanced customer demands	Strengthened environmental regulations Compliance with environmental laws and regulations	Water use	Climate change and environmental (air, water, soil pollution) pollution prevention
SDGs			



High-quality tap water services

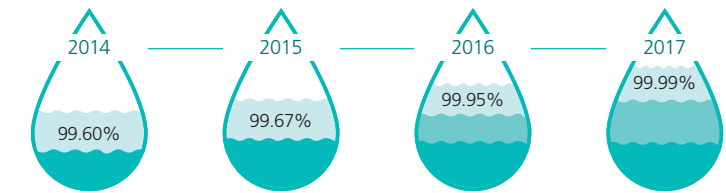
Advanced water quality management

High-quality tap water production by introducing global water quality standards

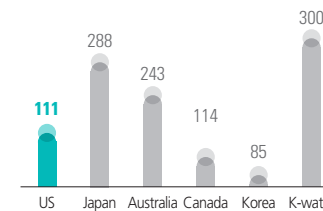
K-water has implemented a global water quality standard system since 2012 to ensure the global competitiveness of tap water. The global water quality standards are K-water's own standards based on the strictest drinking water quality standards of WHO and five representative OECD countries including Korea. Analyses of tap water produced in major water treatment plants abroad (US and UK) revealed that nine substances including aluminum exceeded K-water's global water quality standards and the average compliance rate was 85%, which is lower than that of the tap water produced by K-water.

K-water is working to improve the standard compliance rate by evaluating the operation performances of the water treatment plants that it is managing (large-area, local and entrusted) and receiving feedback from the assessment every year. Optimizing its water treatment process and improving poor water treatment facilities, K-water achieved a standard compliance rate of 99.99 % in 2017, which means it is producing the best quality water in the world.

Global water quality standard compliance rate



Comparison of major developed countries' tap water quality assessment items (As of 2017)



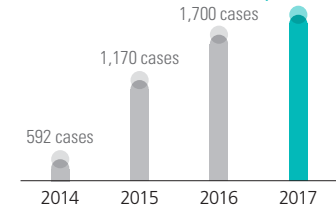
World's top-level water quality testing system

To systematically verify the accomplishment of the global water quality standards, K-water has constructed the world's top-level water quality testing system and added more items other than legally required ones, including those about various harmful substances, to thoroughly examine water safety. Every year, K-water performs tests using 300 items including drinking water quality standards on raw water of water sources and tap water, and it plans to establish a system for analyzing up to 500 candidate substances to be managed in consideration of recent water quality issues and risks through the implementation of the K-WISH 500 system by 2020. With these efforts, it will continue to strive to improve tap water safety.

K-WISH 500: Creation of a management pool with 500 test items

Year	~ 2015	2016	2017	2018 ~ 2020
No. of items	250	51	51	50 items or more per year
Cumulative total	250	301	352	500

Harmful factor improvement cases (cumulative total)



* WSP: A system recommended by WHO to identify and improve harmful factors in the process of producing and supplying tap water

** CWS (Contamination Warning System): A system that monitors water contamination by analyzing basic water quality measurement values (turbidity, pH, etc.)

Preemptive management of unexpected water quality risks

K-water strives to preemptively manage unexpected contamination in the process of tap water supply (e.g. the case of pesticide found in a water supply reservoir in 2012). Implementing a regular WSP (Water Safety Plan)*, it has performed risk tests using 160 items on tap water of all the 37 purification plants that it manages and achieved improvements for 127 kinds of risks. In addition, in 2017, K-water constructed the CSW** system that can monitor the inflow of contaminants in the case of drastic changes in water quality during the supply process and tested it in Goyang Purification Plant. As a result of these efforts, the Water Safety Index (WSI), which was independently developed by K-water, improved from 0.884 in 2016 to 0.901 in 2017.

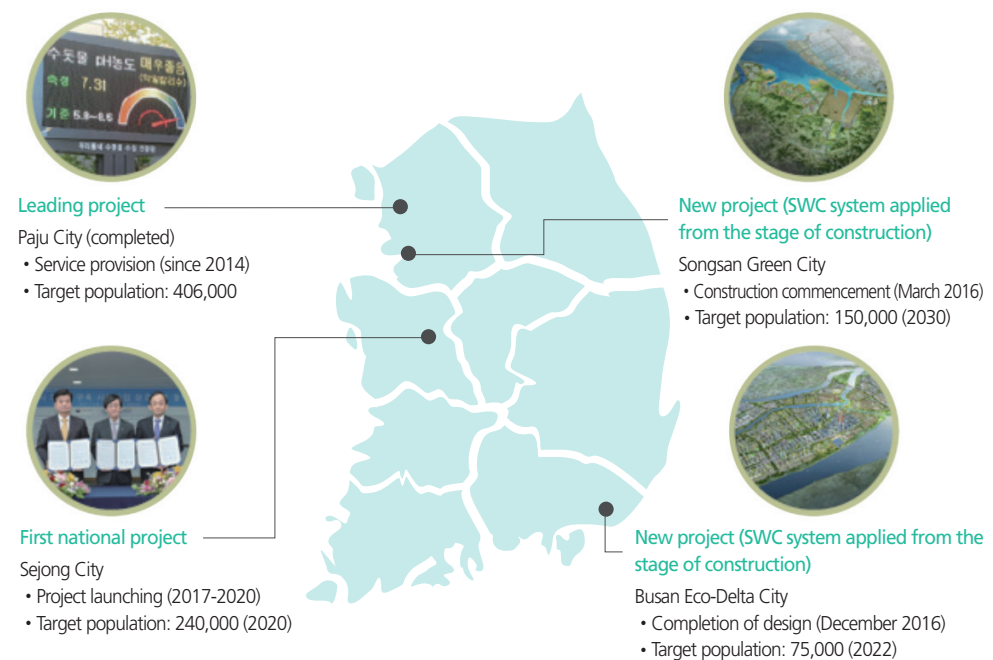
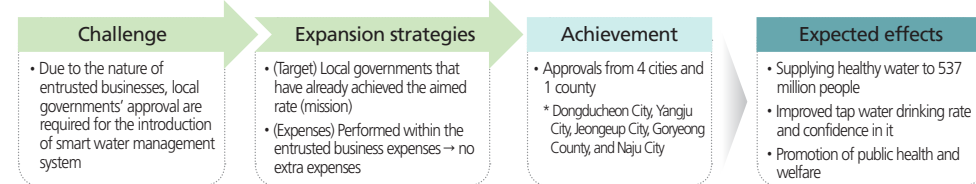
Innovation of Water Management, Smart Water Management

Expansion of Smart Water Management (SWM)

Overview and current status of the Smart Water City projects

SWC (Smart Water City) is a city where a healthy water supply system is implemented, with ICT technologies applied to the entire water supply process from water sources to faucets, the scientific management of the quantity and quality of water, and the provision of tap water information to citizens so that they can trust its quality and drink without worries. It utilizes excellent technologies for water safety services, such as residual chlorine equalization, automatic drainage, real-time water quality measurement and quality information provision, pipeline cleaning, advanced pipeline inspection requiring no water supply discontinuation, smart metering, and a remote water leak monitoring system.

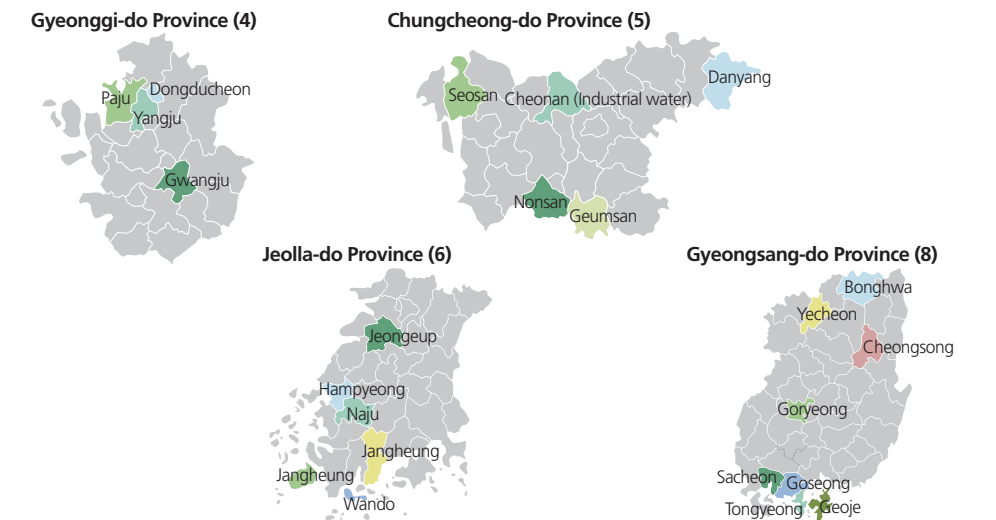
The Smart Water City pilot project, which was first carried out in some areas of Paju in 2014, gradually expanded to the entire city in 2016 as it drew increasingly positive reactions from citizens. This project greatly improved the local tap water quality and the city's direct tap water drinking rate also increased from 1% to 36.3%. The citizens' satisfaction with tap water also increased from 80.7% to 93.8%. Overall, the project has been evaluated as successful and these achievements have laid the foundation for the expansion of the Smart Water City projects to the entire country. Songsan Green City and Busan Eco-Delta City, which are currently under construction, were designed as Smart Water Cities from the beginning, and in 2017, the first national Smart Water City project was launched in Sejong. K-water has also been given approval to introduce the system in Dongducheon City, Yangju City, Jeongeup City, Goryeong County and Naju City in 2017. Thus, it plans to gradually expand smart water management to 21 local governments that have already entrusted water management to K-water by 2021.



Enhancement of local waterworks operation efficiency

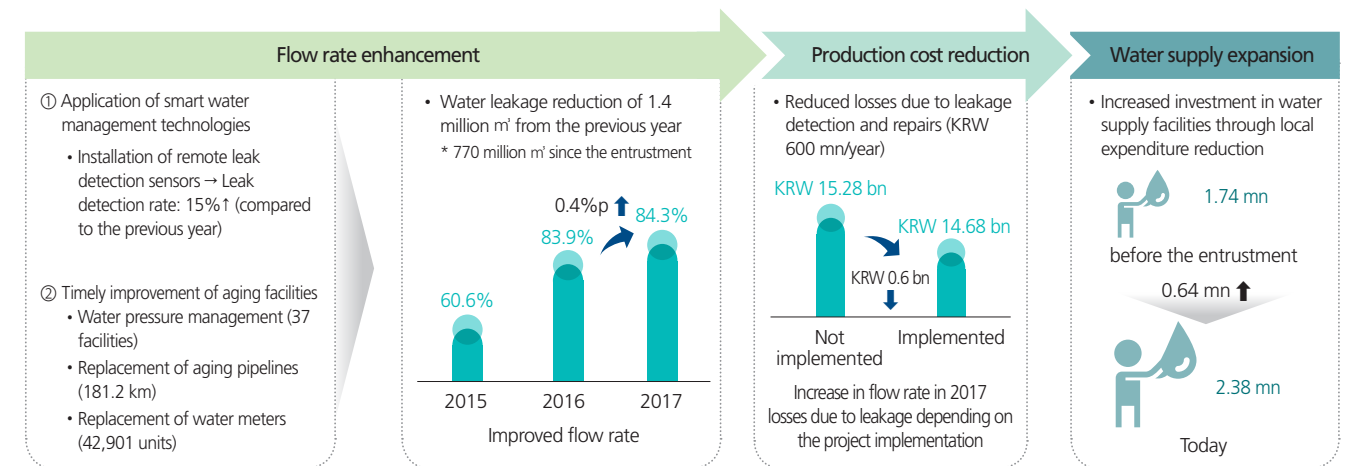
About 31% (58,000 km) of water pipelines in Korea are more than 20 years old and this has led to annual water losses totalling 690 million m³, which is an amount equivalent to national water supply amount for 48 days, and results in an annual loss of KRW 605.9 billion. To prevent such losses and to utilize water resources more efficiently, K-water has established a pipeline management system by carrying out local waterworks operation entrusted by 23 municipalities since 2004. It has also focused on the improvement of aging facilities. This led to an increase in the scientific operation rating of the waterworks from 68.4 points before the entrustment to 93.0 points today. The flow rate was also enhanced by 23.7%, from 60.6% to 84.3%. As a result, the current population supplied with water amounts to 2.38 million, an increase of 0.64 million in comparison with before the entrustment. Customer satisfaction was also improved up to 81.71 points, increasing by 15.42 points.

Local governments' waterworks Current entrusted operations



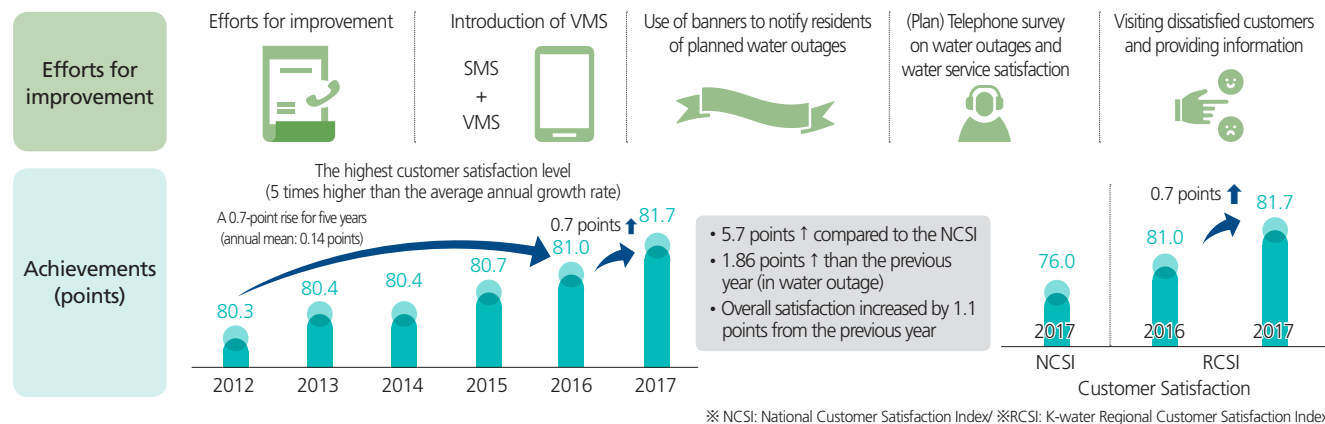
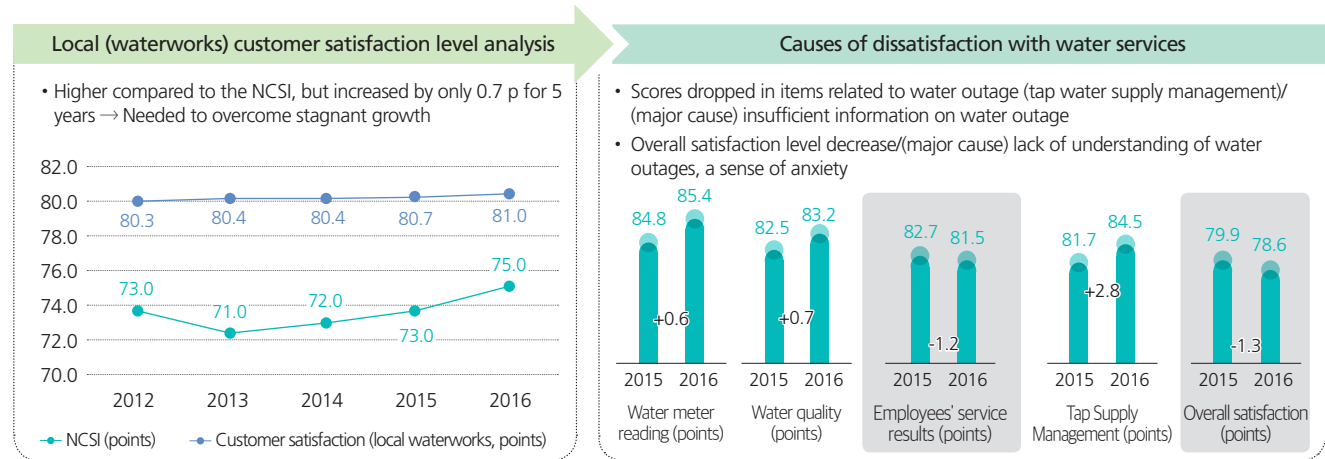
- Replacement of aging facilities**
Pipeline, water treatment facilities
- ICT-based integrated operation**
Real-time sharing and control of pipeline, reservoir, and water intake & purification station data
- Modernization of water supply facilities**
Automatic operation of facilities (real-time water quantity and quality monitoring, crisis notification, automatic chemical injection, etc.)
- Flow rate improvement**
Leakage detection, pipeline maintenance
- Block system construction**
Systematic adjustment of water supply areas
- One-stop service**
Integrated information system (water rate, customer and facility management) 24-hour customer service center, tap water safety check system, etc.

Performances and Effects



Enhancement of customer satisfaction

K-water achieved the highest customer satisfaction by identifying and improving service dissatisfaction factors and provide services that can impress customers. In addition, it has reinforced the implementation of the Tap Water Safety Check System that inspects the quality of tap water of each household, provides analysis results, and solves problems immediately after detection. The system, combined with the household water supply piping cleaning services, has contributed to the improvement of the water quality of 311 households. This led to the increase in customers' satisfaction with tap water quality from 83.2 points in 2016 to 85.2 points in 2017.



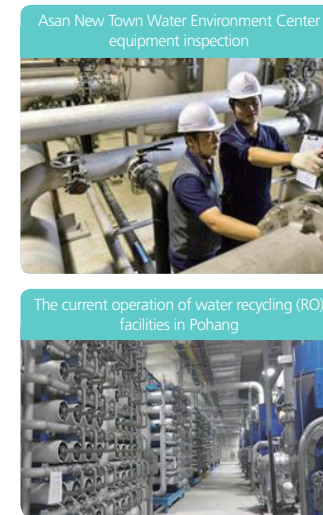
Local waterworks modernization projects

K-water has participated in the national local waterworks modernization project and successfully contributed to the successful implementation of the project by improving the efficiency of the operation of 23 local waterworks and reducing water leakage in the western part of Chungcheongnam-do Province. The local water service modernization project intends to provide national subsidies to local governments to repair aging water facilities including water pipelines and water purification plants and enhance the operation of local waterworks businesses for 12 years from 2017 following the policy of the Ministry of Environment. K-water has participated in 18 out of 46 projects (total project costs: KRW 478.1 billion) until 2018.

Since the launching of the national project, K-water has carried out 1077 cases of water leak detection and restoration by offering a comprehensive service that combines designing, emergency maintenance, and leak detection. As a result of these efforts, K-water increased the flow rate of local waterworks from 57.8% to 62.8% % in the first year of the project and contributed to stabilizing water supply to drought-prone areas in Sinan County.

Classification	Gangwon-do	Chungcheong buk-do	Chungcheong nam-do	Jeolla buk-do	Jeolla nam-do	Gyeongsan gbuk-do	Gyeongsang nam-do
2017	Hoengseong	Danyang(waterworks)	Buyeo, Taean, Seocheon	Jangsu	Sinan	Uiseong	Hamyang
2018	-	Yeongdong, Okcheon	Hongseong, Yesan	Jinan, Gochang	Gangjin	Yeongdeok	Namhae

Sewerage operation



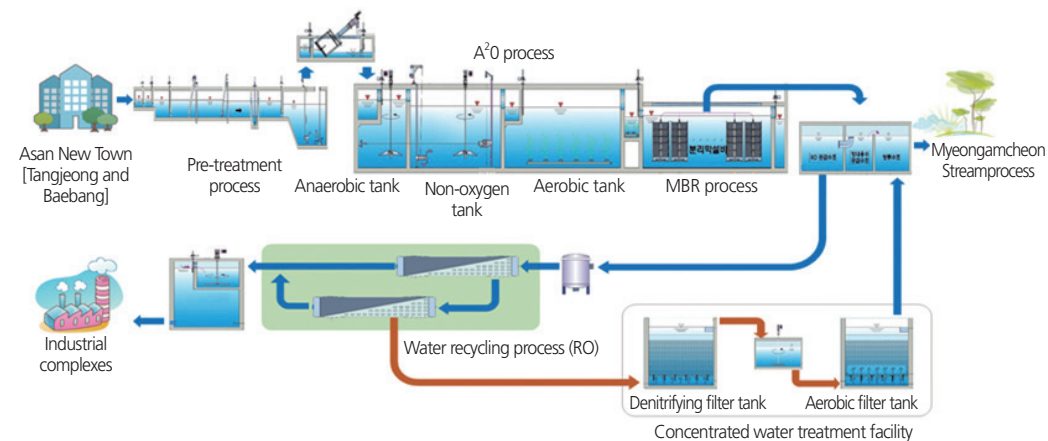
With the creation of a national industrial complex (1996), K-water established the Sihwa Sewage Treatment Plant (phase 1) in 1988 and operation commenced in 1996. Currently, K-water is operating facilities with a total daily treatment capacity of 1.25 million m³ for 10 local government bodies. Based on private-funded BTO (build-transfer-operate) businesses, K-water is operating water recycling facilities in Pohang City (100,000 m³/day), Asan New Town (27,000 m³/day) and Chilgok County (10,000 m³/day). It is also actively responding to the government's water management policy through the revitalization of reclaimed water supply to areas in need of industrial water.

According to the Statistics of Sewerage (2016) of the Ministry of Environment, 62 million m³ of 112 million m³ of water recycled in the nationwide sewage treatment plants every year is supplied as industrial water. About 75% (47 million m³) of the total reclaimed water used for industrial purposes is supplied by K-water. In 2016, releasing its Smart Water Industry Development Strategy, the government announced that it would increase the sewage reuse rate to 34% by 2030 and secure about 2.45 billion m³ of reclaimed water every year. Therefore, K-water plans to supply reclaimed water when the demand for industrial water increases due to the expansion of the existing industrial complexes including Yeosu Industrial Complex and the construction of new large industrial complexes. In addition, K-water has been conducting a survey on the national demand for reclaimed water in connection with the Basic Waterworks Maintenance Plan (2018-2021) from October 2018. It will push forward with the shift towards reclaimed water supply through the existing industrial water supply facilities (dams and waterworks) through the consultation on the use of K-water's water pipeline network for these facilities.

Sewerage Facilities operated by K-water

Classification	Facility name	No. of facilities	Capacity (m ³ /day)	Entrustment period	Remarks
	Total	47	1,249,675	-	-
Upstream dam area projects	Cheongsong Imha Dam	11	8,410	20 years (May 2013 to Apr. 2033)	-
	Hoengseong Chungju	18	11,125	11 years (Jan. 2008 to Dec. 2018)	-
Construction related projects	Seocheon	1	4,000	20 years (Jan. 2011 to Dec. 2030)	-
	Sejong	1	3,400	20 years (Mar. 2014 to Feb. 2034)	-
Private sector investment projects	Asan Sewerage	1	45,000	20 years (Aug. 2016 to Aug. 2036)	-
	Asan Recycling	1	27,000		-
	Chilgok Sewerage	3	67,100	20 years (May 2006 to Apr. 2026)	-
	Chilgok Recycling	1	10,000		Operation rate: 51%
	Busan	1	135,000	15 years (Oct. 2006 to Oct. 2021)	Operation rate: 51%
	Pohang Sewerage	1	15,000	20 years (Jan. 2011 to Dec. 2030)	-
Pohang Recycling	1	100,000	20 years (Jul 2014 to Jul 2034)	Operation rate: 50%	
Relevant projects	Siheung Sihwa	3	286,160	20 years (Jun 2017 to May 2037)	Operation rate: 51%
	Siheung Sihwa	4	537,480	3 years (Apr. 2017 to Mar. 2020)	Operation rate: 10%

<Asan New Town Water Environment Center operation process>

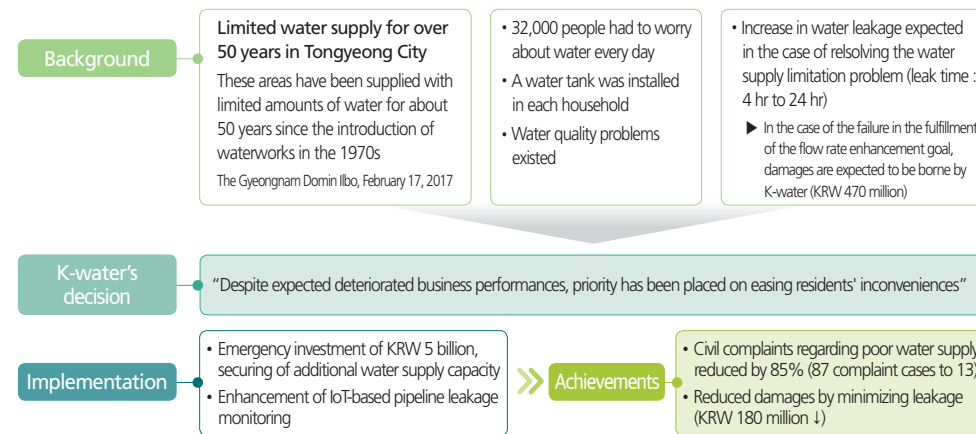


Rights for All, Water Rights

Removal of water supply blind spots for the enhancement of national water rights

Addressing local water problems to resolve water supply limitations

By strengthening IoT-based pipeline monitoring, K-water has reduced 85% of civil complaints regarding water supply deficiencies and secured additional supply capacity, thereby completely resolving the water supply limitation problems (4 hr/day) in Tongyeong City that had lasted for 50 years. This benefited 23% of the local population, or 32,000 people.

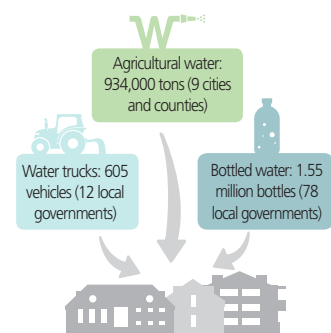


Direct supply of large-area waterworks to water-scarce areas suffering from water pollution

Korea has a national water supply rate of 96.4%, but only 72.7% of farming and fishing villages are supplied with waterworks services, which means that many rural villages do not receive the benefits from the water supply services. These areas which are not equipped with waterworks use their own water sources such as groundwater and valley water, which can only provide a limited amount of water. Thus, the residents have difficulties in reaching stable water supply due to the drying of these water sources during droughts or water pollution incidents caused by unprofessional management. Therefore, K-water is developing a government-municipality collaborative model, moving away from the existing dualized water supply system of large-area and local waterworks. Since 2014, it has promoted and implemented a project to directly supply water to the areas that have no waterworks facilities and are suited to direct water supply through large-area waterworks rather than through local waterworks. Up to date, K-water has concluded and implemented agreements on direct water supply with 16 municipalities. Under the agreements, it plans to supply clean and safe tap water to a population of 11,000 who have had no access to waterworks. It has already supplied water through large-waterworks to the residents of Mugunghwa Apartment in Sejong City, whom were using contaminated groundwater with an excessive amount of limestone.

Improved water rights for island residents through groundwater retention and seawater desalination

K-water has improved the water rights of island residents by creating groundwater reservoirs and providing subsidies for the construction of high cost seawater desalination facilities on islands that suffered from water shortages. It has supplied 77,000 tons of water every year to 477 residents and 33,000 tourists in Daejakdo and Anmado Islands using these groundwater reservoirs and entrusted with the operation of 39 seawater desalination facilities by 8 municipalities, to reduce the average water rates by 70%, from KRW 23,000 to KRW 7,000. In addition, using K-water facilities such as large-area waterworks, water trucks, and bottled water, it has provided emergency water support to areas severely hit by droughts during the farming season. Also, through the temporary opening of drainage pipelines of large-area waterworks near agricultural waterways, it has supplied 934,000 tons of agricultural water to 9 cities and counties including Pohang. To the remote areas not suited for accessing K-water facilities, it has sent water trucks (605 vehicles to 12 municipalities) and bottled water (1.55 million bottles to 78 municipalities) free of charge



K-water's Efforts 3

Water Convergence Services

Expansion of service converging water, energy and urban technologies

K-water is committed to meeting the public's needs for ecological and cultural values and the wise use of water and maintaining healthy and sustainable waterfront values. As demand for renewable energy has increased, it has also taken part in the global efforts to reduce greenhouse gas emissions and mitigate climate change. In addition, K-water has striven to fulfill its social responsibilities as a public enterprise by boosting local economies and promoting balanced growth through the fostering small and medium enterprises (SME) in the water industry and helping them to enter overseas markets through partnerships.

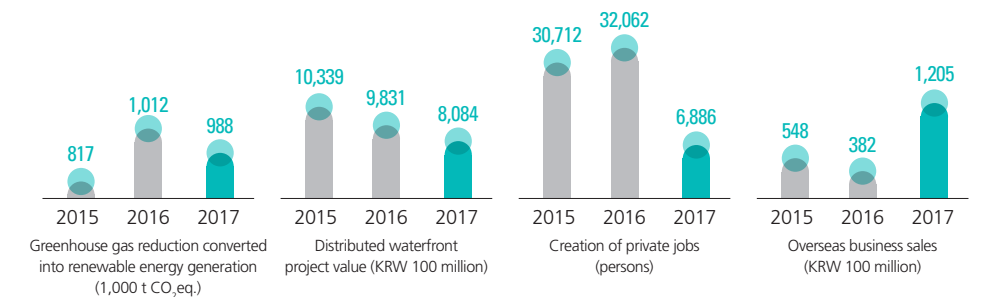
K-water's key activities for sustainable management

- Playing the role of a national distributed energy hub as Korea's top new and renewable energy company (dam and weir hydropower generation, the world's largest tidal power plant at Sihwa, floating photovoltaic power generation, etc.)
- Constructing global-level cutting-edge waterfront cities such as MTV and Songsan Green City and promoting the creation of waterfront space to prevent improper development near the Shihwaho Lake Promotion of zone development
- Opening K-water's technological assets (infrastructures, technologies, etc.) to the private sector and fostering small and medium enterprises (SME) in the water industry by establishing an integrated platform
- Achieving visible performances from overseas investment projects (commercial power generation in Patind from November 2017) and leading international cooperation on water issues through AWC and iWSSM

K-water's future plans for sustainable management

- Promotion of ecosystem health recovery with restoring river ecology and creating new waterfront values
- Waterside projects to create eco-friendly cities taking account of ecology and water circulation
- Active development of water energy (floating photovoltaic and hydrothermal) by strengthening eco-friendliness and civic participation and reforming related systems
- Fostering water-related technologies and the water industry to secure the competitiveness of SMEs and create jobs
- Strengthening the stability of overseas businesses through thorough risk management

Water convergence services



Leading a shift in the eco-friendly energy paradigm including nuclear power phase-out through the expansion of new and renewable energy development that fuses energy and water with infinite potential values and providing healthy welfare space, K-water is striving to enhance national water welfare, strengthen SMEs and venture business support system, and reinforce the global competitiveness of the Korean water industry. Moreover, by systematically managing the activities related to these topics, it has contributed to the fulfillment of the UN's Sustainable Development Goals (SDGs).

Customers' safety and health	Energy	Biodiversity	Anti-competitive practices	Supplier social assessment
Increasing number of consumers who value health, eco-friendliness and social-friendliness	Reduction of energy use (production of renewable energy such as hydropower)	Increased importance of mutual growth with partnering companies	Compliance with social sector laws (fair trade, technology development, patents, advancement into overseas markets, etc.)	Increased importance of mutual growth with partners
SDGs				

K-water's new paradigm, clean energy

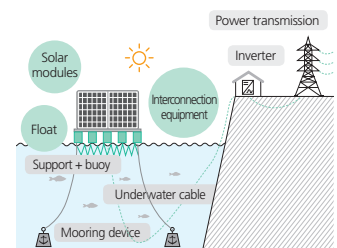
Clean energy as a next-generation new growth engine

New clean energy business model for local communities

K-water is concentrating its efforts on sustainable clean energy by participating in local development projects led by public interests. The Hapcheon Dam Floating Photovoltaic Power Generation project is expected to serve as a major catalyst for the revitalization of the local economy by allowing the residents to join the SPC invested by K-water as debt investors and earn stable profits. Also, the Yongdam Dam Floating Photovoltaic Power Generation project is a development project customized to the local area where the residents share the revenues from power generation with K-water by jointly investing in the project through their cooperative association. In this way, K-water is enhancing the social values of public corporations with a new business model that seeks coexistence with local communities, expanding sustainable eco-friendly energy businesses.






Floating photovoltaic power generation
It is an eco-friendly method for generating electric power that combines marine technology (shipbuilding + mooring) and renewable energy technology. It uses a fusion solar photovoltaic facility composed of solar modules installed on the surfaces of dam and reservoir water.



Floating photovoltaic power generation led by K-water


K-water began testing the possibility of floating photovoltaic power generation development by installing a 2.4-KW pilot model in 2009 on the surface of Juam Dam reservoir. Following the installation of a 100-KW demonstration model in 2011, K-water constructed a 500-KW facility at the dam in 2012, which enabled the world's first commercial floating photovoltaic power generation using the surface of a dam reservoir. Since then, K-water has been laying the foundation for the widespread use of the power generating method by promoting it through environmental verification and the reduction of equipment production costs. In 2016, K-water constructed a 2-MW power generation facility at Boryeong Dam in 2016, followed by a 3-MW facility at Chungju Dam in 2017, for commercial power generation. Especially, through environmental monitoring which has been carried out since the completion of the floating photovoltaic facility at the Hapcheon Dam in 2013, K-water has continuously tracked its impact on water quality and ecology. In addition, K-water has taken the lead in disseminating and expanding clean energy projects that are harmless to the natural environment by using eco-friendly equipment compliant with the Korean tap water hygiene and safety standard (KC).



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Large-scale development by securing the publicness of dams and residents' acceptance
 - As of 2018, the Hapcheon Dam (40 MW) and Yongdam Dam (20 MW) projects are being pushed forward to provide the locals with the opportunity to participate in the projects and to contribute to local development and increase their income through the establishment of an SPC and the application of a joint investment model.
- 
Development of 550 MW capacity power generation projects for non-water supply dams until 2022
 - In conjunction with the government's energy policy (Renewable 3020), project development is being promoted primarily with local governments currently operating floating photovoltaic power generation facilities or in favor of it, and specific development plans will be established based on the investigation of floating photovoltaic resources.
- 
※ Floating photovoltaic resource investigation
 - Target: 40 facilities including dams (multi-purpose, water supply and water control dams), flood control reservoirs or water detention ponds
 - Period: February 2018 to February 2019
 - Contents: Floating photovoltaic capacity of each facility in consideration of development conditions including water system linkage, water level, etc.

Hydrothermal energy diffusion

K-water endeavors to create new industries that utilize the added value of water leading a shift in thinking about energy. As a pilot project based on the properties of water (4°C), it has introduced a cooling and heating system that uses hydrothermal energy to the Lotte World 2, which led to the reduction of annual energy costs by 28% and 348 tons of carbon emissions. Furthermore, K-water is focused on the development and dissemination of a standard model for urban distributed hydrothermal energy projects and the improvement of relevant systems by promoting legislative work to include hydrothermal energy in new and renewable energy sources.

- 
Heating and cooling (3,000 RT) using raw water (50,000 m³/day) from the Phase 1 Seoul Capital Area Waterworks
 * Total maximum heating and cooling load: 30,000 RT (hydrothermal, ice thermal storage, geothermal, turbo chiller, boiler)
- Reduction of total energy consumption by 73% and CO₂ emissions by 38% (compared to the absorption chiller and heater with the same capacity)**

Classification	Absorption chiller and heater	Water source heat pump	Reduced amount	Reduction rate	Remarks
Total consumed energy (TOE)	2,612	697	1,915	73.3%	
CO ₂ emissions(tCO ₂ -eq)	6,065	3,776	2,289	37.7%	

Efforts to expand projects

- World's first development of a standard urban distributed hydrothermal project model using large-area waterworks (January 2017)
- Joint development of hydrothermal clusters using deep water from Soyang River
*Signing of MOUs with Gangwon-do Province and Chuncheon City (July 2017)
- Introduction of hydrothermal energy to buildings in Seoul (relevant ordinance to be announced)

Proposal & discussion → **Partnership establishment** → **Inclusion in laws**
 Consensus through over 50 meetings | • MOU • Joint forums | Utilization of hydrothermal energy reflected in eco-friendly energy ordinances

Achievements

- Introduction of hydrothermal energy system to the Yeongdong-daero Complex Transfer Center and the Samseong-dong Hyundai Motor Company building in Seoul
*Reduction of CO₂ emissions (30,000 tons), mitigation of heat island phenomenon
- Development of hydrothermal clusters in Gangwon-do Province
*7.5 times bigger than the Lotte World Tower
- Designated as an energy subject to mandatory use; utilization expanded to newly built buildings

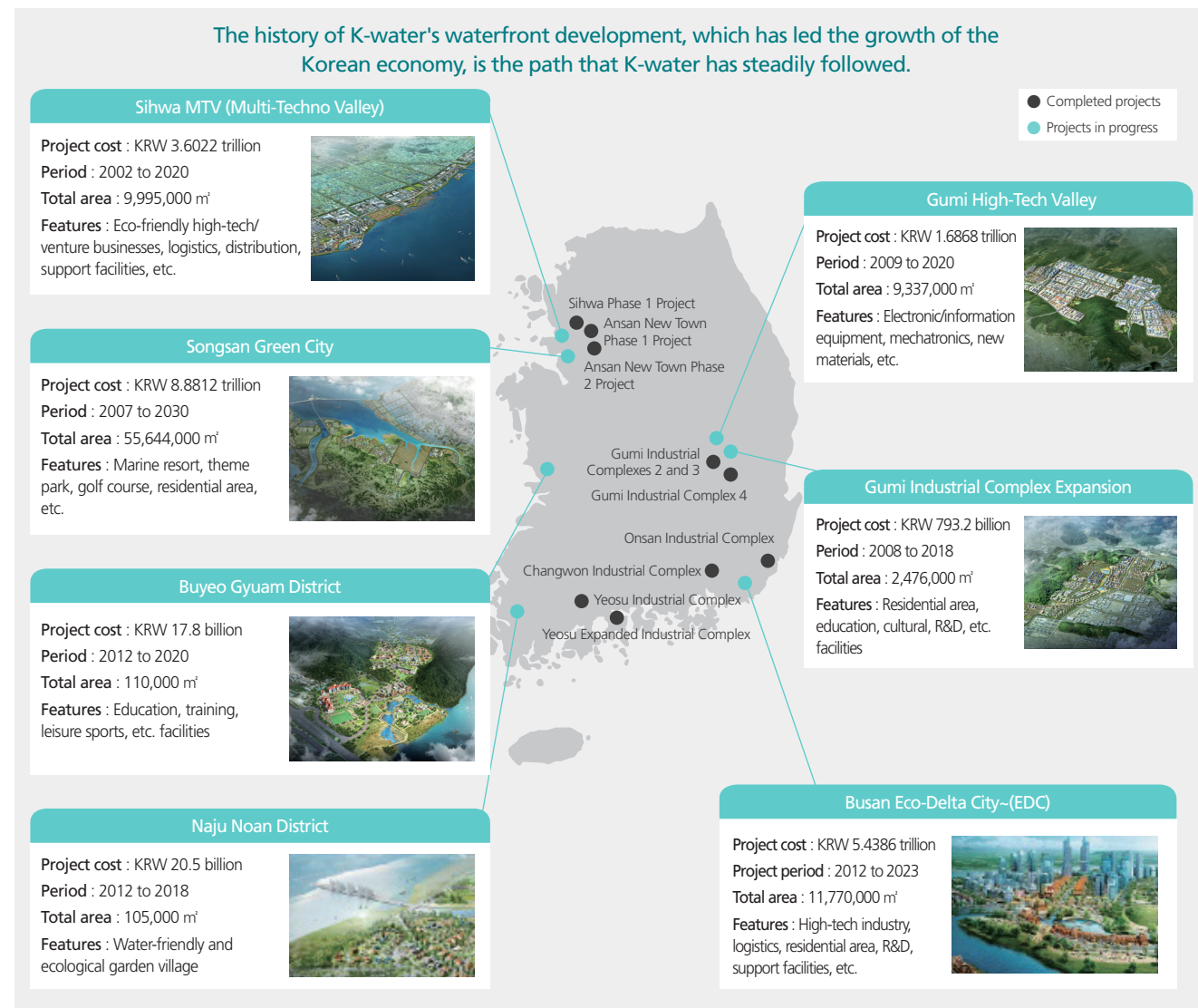
- Creation of 1,751 private jobs in the hydrothermal energy sector (by 2022)
- Dissemination of urban hydrothermal energy supply standard models including Busan EDC(Eco-Delta City)
- Laying the foundation for a down to up system and the enhancement of new project development competencies through the expansion of existing projects

Space for citizens to live life to the fullest, eco-friendly waterfront cities

Creation of waterfront space to improve the national quality of life and public values

Recently, there has been a growing demand for the utilization of waterside space linked with the quality of life due to de-urbanization, the advancement of industrial structures, and the improvement of income levels. In addition, there is a growing need for sustainable city development projects as a means of enhancing urban vitality and identity. Therefore, K-water, moving away from complex development projects focusing on the supply of industrial and residential space, pursues the improvement of the national quality of life and public values using water, based on its experiences in all fields related to water circulation including future-oriented culture, amenity, safety from disasters, smart water city (SWC), and low-impact development (LID) along with the application of Fourth Industrial Revolution technologies.

Creating global innovative growth cities where nature, people, and technology meet and accelerates the arrival of the future

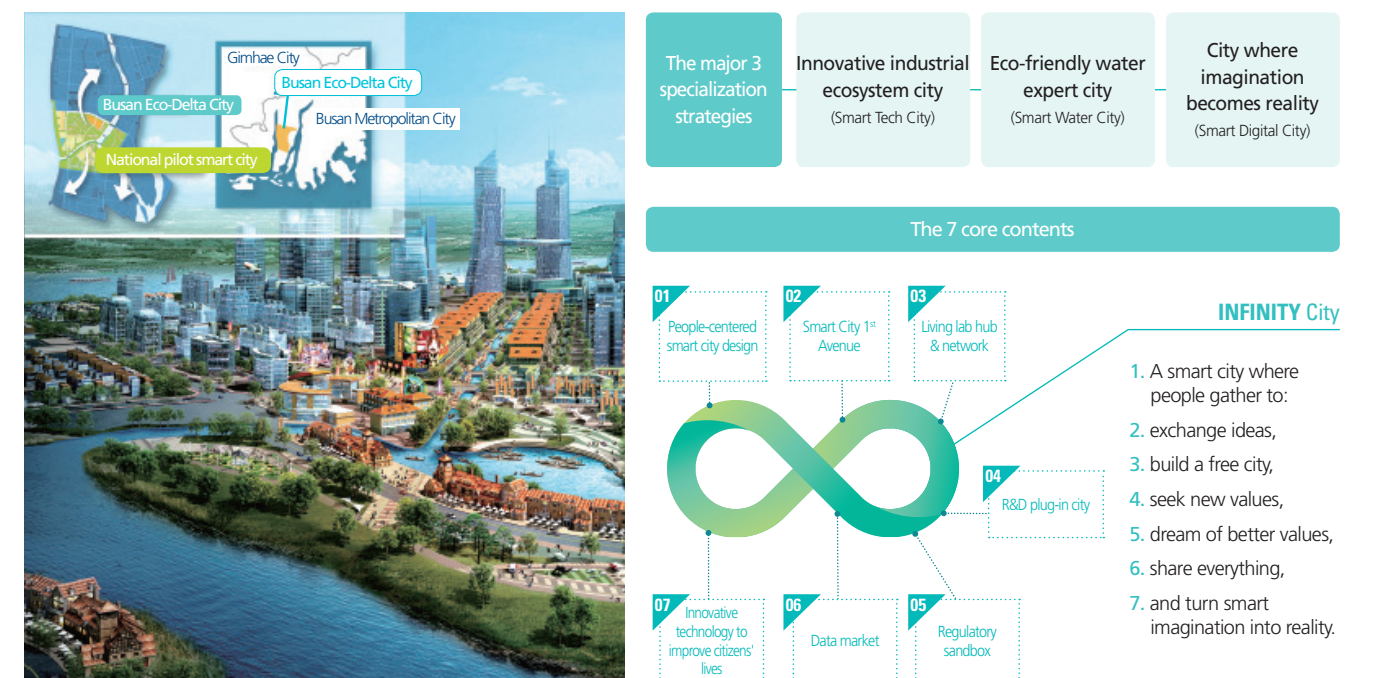


Creation of economically, environmentally and socially sustainable waterside spaces

K-water has supported the creation of water circulation leading cities in cooperation with local governments based on its expertise in water management, entrusted with the project of water circulation city development by Andong City (June 2018). It has also pushed forward with the creation of water-friendly zones along national rivers (Busan EDC, Buyeo Gyuam, Naju Noan) to prevent inappropriate development and the construction of a national smart city test-bed (Busan EDC). In addition, K-water is transforming Sihwa MTV and Songsan Green City into eco-friendly complex and waterfront city, and Gumi Expanded Industrial Complex and Gumi High-Tech Valley into knowledge-based complexes for new industries such as carbon fiber production. Through this process, K-water is doing its best to create sustainable waterfront values in line with the rapidly changing business environment.

Waterfront city revitalization	<p>Management environment : Increasing demand for job creation and regional economic revitalization</p> <p>Efforts for improvement : Initiate a complex project on Bandalseom Island, in which 4 have been rejected over the past 4 years; development of consumer-centered strategies to reflect their opinions in the land development plan and the strengthening of cooperation with local governments</p> <p>Achievements : Attraction of anchor tenants (KRW 270.9 billion, 34% of the total distributed waterfront projects in 2017)</p>
Enhancement of waterfront projects' publicness	<p>Management environment : Severe pollution due to excessive emission of odor and fine dust from companies in industrial complexes</p> <p>Efforts for improvement : Joint operation of the Environmental Energy Center through the establishment of an SPC with local governments</p> <p>* Waste activated carbon collection → recycling → re-supply (total project expenses: KRW 298.4 billion, commenced in 2019)</p> <p>Achievements : Improvement of waterfront city values by reducing pollution and mutual growth with local SMEs</p>
Ensuring the sustainability of waterfront projects	<p>Management environment : Changes including the Fourth Industrial Revolution, the expansion of Gimhae International Airport</p> <p>Efforts for improvement : Promotion of new convergence businesses and systematic risk management</p> <p>Achievements : Leading the national strategic projects by creating smart cities through ICT and SWC convergence and the first sale of a profitable land (KRW 211.4 billion) through multilateral response to the expansion of the Gimhae International Airport</p>

Particularly, Busan Eco-Delta City (EDC) is being developed as a national pilot smart city differentiated by K-water's water management and innovative technology. K-water has selected 3 specialization strategies and 7 core contents aiming at making "global innovative growth cities where nature, people, and technology meet and the arrival of the future is accelerated," solving the existing problems of the city, and transforming it into a new futuristic city.



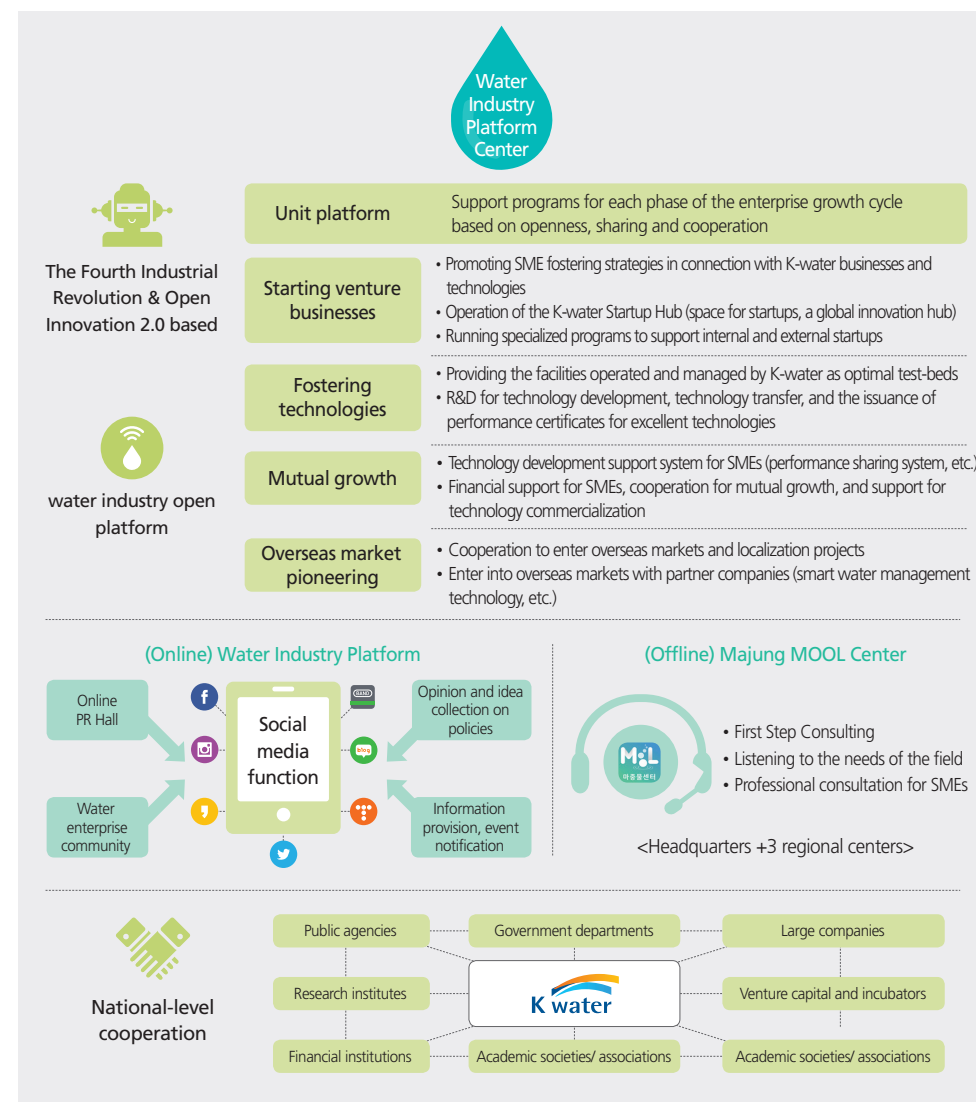
Leading the national water industry by establishing the Water Industry Platform Center

Establishment of a water industry open platform

As a public water company, K-water has established an SME (small and medium enterprises) and venture company fostering system through its Water Industry Platform Center to create a virtuous cycle ecosystem in the domestic water industry and enhance its global competitiveness.

In particular, the Center is focusing the entire organization's competencies on supporting the growth and development of water-related companies based on its accumulated experiences of fostering the water industry in line with the recent water management unification. The Center has strengthened the existing SME technology development support system and is providing support needed at each stage of the company growth process from founding to export. In addition, K-water has shared its knowledge, technologies, and infrastructures with its partner companies and completed its own water industry upbringing program that reflects the needs of these companies.

Water industry fostering system and current programs



Creation of an ecosystem for innovative entrepreneurship

In January 2018, K-water Startup Hub, a startup support space, was opened in the K-water Convergence Institute located in Daedeok Innopolis in Daejeon to promote the active start up and growth of new businesses in the water industry. Also, K-water has regularly held the Water Industry Startup Forum and provided a scale-up program under cooperative agreements with 40 companies. It has offered the companies with space for starting their businesses, mentoring from K-water engineers, and provide support for overseas expansion.

K-water's 2018 Partner and Startups Challenge

No. of participating companies	Partner Startups	Global track	Challenge Startups
40	27	1	12

K-water's Support for Partner and Startups Challenge 2018

No. of companies	Partner Startups	Global Track
Partner Startups (2 years)	Space for starting up businesses	• Using K-water Startup Hub, etc. (events, meetings, residence program, etc.)
	Test bed, technology performance verification	• Using K-water's nationwide business sites and research facilities to allow partnering companies to participate in the demonstration and verification of their technologies
	Consultation on commercialization	• Providing K-water research personnel and consultation with professional technicians
Challenge Startups (1 year)	Exhibitions at home and abroad	• Offering opportunities to exhibit in domestic and overseas expositions, participate in buyer meetings and promotional activities
	Accelerating program	• Participation in the water industry specialization accelerating program (6 months) • Mentoring from K-water experts on a business plan (2 times) • Creation and management of a partner startup pool (information sharing, etc.)

Startups need to attract investment for growth. However, it is difficult for investors to understand water industry technologies and predict their growth potential, which is why private investment in the water industry has not been very active. To solve this problem, K-water plans to take the lead and invest in water industry startups by creating a venture business investment fund, laying the foundation for the innovation and growth of startups.

Starting from 2018, it will discover and foster 100 promising startups by 2021 to create an ecosystem for the water industry and innovative entrepreneurship and contribute to the creation of high-tech jobs.

K-water's in-house venture operation status

K-water launched the first phase of (group of) K-water venture teams to create a growth engine for the water industry and pursue an innovative culture. The first group of K-water venture teams include Sejong Precipitation (mixed precipitation measurement system), Water Eyes (water management using the sensor and IoT), Water-Friend (ultrasonic and plasma tumbler washer), Water-Tech (pipeline pressure relief simulation diagnostic equipment), Career Chain (unplugged remote pipeline monitoring equipment), Pump Care (large pump energy saving device), and Surgetech (lightning protection system diagnostic equipment). Each team consists of two or three employees, and the technologies they have developed are based on the ideas they got while conducting water management tasks in K-water. These teams receive subsidies for starting up their businesses from K-water and the Ministry of SMEs and Startups that totals KRW 200 million (KRW 100 million from K-water and the Ministry each). They are also allowed to focus on preparation for the establishment of their businesses and are provided with a separate space.

Promotion of mutual growth with SMEs

K-water has expanded and reinforced its support program for mutual growth with SMEs in the water industry to meet their needs and has supported them in technology development and market expansion for their products, contributing to raising the national competitiveness. With various support systems including the conditional purchasing system (domestic customers, private and public joint investment) and performance sharing system, K-water will encourage SMEs to develop new advanced technologies. Also, it has implemented a technology prediction system to prevent the participating companies from experiencing trials and errors in the development process and help them complete their development goals in a short time. The SMEs that benefited from the systems achieved sales of KRW 58.6 billion in 2017, and the total sales since 2015 amount to KRW 148.1 billion.

Professional coordinators | Establishment and operation of the K-water Majung MOOL Center

- 8 consultants selected among employees under the peak wage system from HQ and three regional divisions
- Use of rich experiences and know-how of veteran employees
- Small and Medium Enterprise Support Center for providing counseling to SMEs

Certification system | Diversification of K-water certification brands

- Utilization of technologies verified to have excellent performance (K-ACE, 31 companies)
- Establishment of an excellent technology utilization certification system
- Helping promote products using the reputation of K-water

Support for market pioneering | Lowering entry barriers and strengthening fairness

- Relaxing evaluation criteria for new companies (E to C grades)
- Dualization of platform operation (competent department) and project selection (Technology Planning Department)

Financial support | Support for overcoming financial challenges

- Expansion of areas where Water+Loan is available (Chungcheong region to nationwide)
- Mutual Prosperity and Cooperation Fund (KRW 10 billion, loan interest rate reduction by 1%)

Achievement of sales of KRW 58.6 billion of SMEs technologies and products in 2017 (increased by KRW 7.2 billion from 2016)

Fostering of water industry technologies

A total of 111 dams and water business sites operated and managed by K-water have been provided to Korean water companies as test-beds for the demonstration and verification of the technologies that they have developed to enhance their technological competitiveness and self-sufficiency in the global water market, which is expected to continue to grow. Since the launching of the first test-bed project contest in 2018, 49 tasks have been launched in all areas of the water industry including water treatment, pipe networking, and energy as of November, 2018. In addition, K-water has issued certificates for the technologies that had been utilized by K-water for a certain period of time (2 to 5 year) and have been proven to have excellent performance as a means of supporting SMEs in market pioneering.

Overseas market advancement with SMEs

K-water have participated in overseas water industry expositions together with its partner SMEs and venture companies under the theme of "smart water management technology" and supported the companies in opening up markets by arranging meetings with major local buyers. This led to the creation of 106 new jobs and export performances of KRW 10.5 billion by the partnering companies in 2018.

Furthermore, as part of its efforts to develop marketing strategies differentiated from those of other countries and businesses that can meet the needs of developing countries, K-water has made "Smart Water Management" a brand, connecting its experiences with the technology of SMEs. In addition, through the establishment of partnership relationships with the water agencies of various countries, it has promoted the localization test projects for the demonstration and verification of SME technologies in the countries, contributing to the increase in the sales of SMEs and venture companies and creation of jobs by laying the foundation for the expansion of the basis for the projects.

<p>Market pioneering group activities (4 countries, 6 times)</p> <ul style="list-style-type: none"> • Vietnam: VIWW 2018-VIET WATER 2018 • Indonesia: INDO WATER 2018 • The Philippines: ADB FORUM-other business conferences • Singapore: SIWW 2018 	<p>Localization test projects (3 countries, 5 projects)</p> <ul style="list-style-type: none"> • Test projects in Vietnam (groundwater monitoring, water purification plant modernization, and water supply to rural areas) • Test projects relate to groundwater in the Philippines and Jordan 	<p>Overseas expansion together with K-water (1 service project)</p> <ul style="list-style-type: none"> • Entrusted with smart water management technology introduction plan and strategy establishment service in Vietnam
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※ Performance: Support for 33 SMEs in pioneering overseas markets (Vietnam, the Philippines, etc.)

<p>VIWW 2018 (Vietnam)</p>	<p>INDO WATER 2018 (Indonesia)</p>	<p>Signing of MOUs on localization pilot projects</p>	<p>Promotion of localization pilot projects</p>
			



BEST-tech

(K-water verified Best Technology)

Excellent technology (product) that has been applied to K-water facilities for more than 5 years (including performance verification period on the open platform)



NEW-tech

(K-water verified New Technology)

Excellent technology (product) that has been applied to K-water facilities for more than 2 years (including performance verification period on the open platform)


K-water's future convergence technologies

No. of staff

A total of 274 research personnel



Budget



R&D investment scale

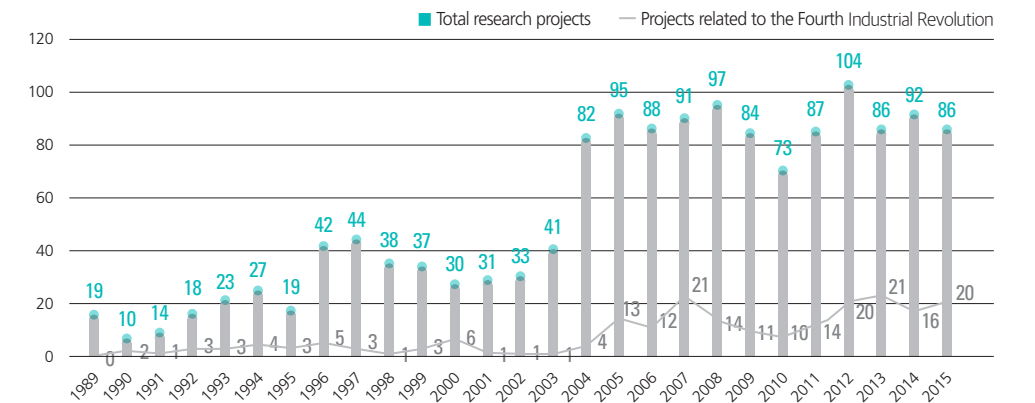
30 public organizations in 2017
The 6th largest R&D investment scale in Korean public companies (KRW 42.3 billion)

* Presented with the Excellent Public Organization Award in the R&D investment category in 2015

R&D efforts and investment in response to the Fourth Industrial Revolution

To respond to the Fourth Industrial Revolution by integrating individual R&D systems required for the management of waterworks and sewerage, water resources, water quality, dam safety, water facilities, etc., K-water has established the K-water Convergence Institute through the restructuring of its internal organizations. It also formed an R&D group that conducts convergence research on future water industry topics such as the recovery of healthy water circulation, infrastructure safety, water energy, and so on. K-water continues with its commitment to innovation, organizing a research team for intensive R&D projects to strengthen its support for eco-friendly city construction and HAB reduction.

Since the 2000s, K-water has carried out water management research using ICT and has secured IT-based water resource research and analysis technologies and optimal and efficient water management system. Since 2017, it has focused on convergence research to integrate IoT, AI and satellite technology. In addition, K-water has developed and operates an ICT and IoT based smart water pipeline management system, water disaster information system using state-of-the-art land observation sensors, AI-based decision making system for waterworks facilities, and waterfront facility damage analysis system using UAV (Unmanned Aerial Vehicle), to lead the innovation and growth of the national water industry and secure the technologies that can enhance the lives of citizens.

Projects related to the Fourth Industrial Revolution

K-water is developing technologies that combine big data and AI to prevent floods and improve water supply and water quality. These technologies are expected to intelligently detect the patterns of multi-purpose and water supply dams used for various purposes and situations (normal and emergency times), predict the future demands and present alternatives. K-water is also promoting the development of manuals for both normal and emergency times to efficiently incorporate new technologies into the existing water management system and is creating a big data platform to integrate them.

K-water as a global water company

Strengthening of leadership and competencies to solve global water problems



Asia Water Council (AWC : Asia Water Council)

An international consultative body for discussing Asian water issues and seeking solutions for them, with 26 countries including Indonesia and China and 130 organizations have officially registered as members

Efforts for solving water problems in Asia led by AWC

Since the successful hosting of the 7th World Water Forum (WWF), the Asia Water Council (AWC), established under the leadership of K-water and the Korean government, has grown into a platform for solving water issues in Asia. The chairman's role (K-water CEO) and the secretariat are led by K-water, holding regular board meetings (twice a year) and participating in international conferences with member organizations to continue human and technological exchanges. In this way, K-water is playing a pivotal role in solving water problems in Asia.

The 8th World Water Forum

The 8th World Water Forum was held in Brazil on March 18, 2018, with the theme of "Sharing Water." During this forum, K-water promoted its core technologies such as smart water management and integrated water resources management and its major overseas projects in the global water market. It also invited domestic SMEs to participate in the forum to seek opportunities to enter overseas markets. Moreover, the AWC Secretariat shared the achievements of the first Asia International Water Week (AIWW) that was successfully held in 2017 with water experts from around the world and sought a variety of ways to solve water issues in Asia by holding AWC special sessions.

<p>2018 AWC special sessions</p>	<p>Meetings with participating agencies</p>
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Participation in the 2018 Singapore International Water Week

K-water participated in the 2018 Singapore International Water Week (SIWW) together with the Ministry of Environment to promote Korea's water management policies and K-water's major projects. The 2nd SIWW kick-off meeting was held in conjunction with the event in which more than 200 people attended including AWC member organization leaders and domestic and international experts on water issues. The meeting, which laid the foundation for the success of the 2nd AIWW, consisted of a publication ceremony for the AIWW white paper, the signing of an MOA between the host country (Indonesia) and the AWC, and a special committee meeting. Through the participation in SIWW, K-water solidified its reputation as a leader in the Asian water industry, while also contributing to the enhancement of the status of Korea in the global water market.

<p>The 2nd AIWW kick-off meeting</p>	<p>Conclusion of an MOA between Indonesia and AWC</p>	<p>Singaporean Market Pioneering Team for Smart Water Management Technology</p>
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Strengthening of the foundation for substantial and responsible management through the stabilization of overseas businesses

Strengthening the foundation for the responsible management of overseas businesses

K-water has completed 76 projects in 30 countries, starting with the Fen River basin survey in 1994 in China. It is currently conducting 11 projects in nine countries including Pakistan, the Philippines, and Georgia, including four in the water and waterworks sectors. To cope with rapidly changing environmental conditions, K-water has established the "Overseas Business 2027 Practice Roadmap" and pursues businesses that harmonize substantiality and growth. In addition, it has strengthened responsible management changing the organizational structure into a large team system for the flexible operation of the organization and human resources and introduction of a project-level performance evaluation system.

* Strengthening substantiality (establishment of risk management guidelines for each business sector) → Business diversification → Practice of responsible management

New overseas business strategies (2018-2027)

- Enhancing substantiality by selectively pushing forward with new projects by taking account of K-water's financial conditions and competencies
 - Carrying out 8 projects (Karian, Tina, etc.) over the next 10 years
- Portfolio improvement by adding new business areas
 - Specifying the plan (adding smart water management, seawater desalination, industrial water supply, etc. to the existing hydropower generation)
- Reinvesting dividends from the existing businesses in newly developed projects
- Complementing and strengthening of the key existing functional strategies
 - Enhancing project pre-review functions and overseas SPC cost management, setting work standards for each project, etc.
- Linking global network activities and overseas businesses



Restrictions

- Mechanical and restricted operation due to limitations on the daily usage of water for power generation set by the Philippine government

Countermeasure

- Utilizing long-term rainfall forecasts and autonomy in dam operation for intensive power generation during the period when large amounts of electricity can be produced and sold at high prices

Overseas business performance

The Patrind Hydropower Plant (150MW) construction, operation, and management project is K-water's first overseas investment project. The hydropower plant commenced commercial power generation in November of 2017 after six years of construction. Based on its technologies accumulated for over 50 years, K-water reduced the construction period by preventing river sand inflow in an environment-friendly way with the use of a water blocking dam and providing technical support for the installation of power lines. With the project, K-water has secured revenues of KRW 600 billion for over 30 years and strengthened its ability to win orders from overseas countries as it has acquired experiences of the entire process of overseas hydroelectric power generation from project development to construction and operation (O & M).

In addition, K-water acquired extended autonomy in power generation for the hydropower generation project at the Angat Dam in the Philippines (since November 2014) through M & A, by overcoming low electricity prices and limitations on water usage. This led to the increase in the revenues from the project by 55% from KRW 30.1 billion in 2016 to KRW 46.8 billion in 2017.

Further, carrying out the Nenskra Hydropower Plant construction and operation project in Georgia, K-water has made efforts to efficiently respond to environmental and social issues as well as the concerns of local residents over the impact of the dam construction, the negative opinions of local NGOs, and the increasing expectations of the local development. As a result, it has acquired major shareholders' approval of an investment of KRW 530 billion, which accounts for 70% of the total targeted loans, securing the sustainability of the project.

Fulfillment of its social responsibility by expanding overseas technical assistance

Pursuing technical innovation based on smart water management technology in cooperation with SMEs, K-water has expanded its overseas technical assistance (T/A) business.

<p>Small-scale, distributed water supply system</p> <ul style="list-style-type: none"> Joint development of small-scale vertical/distributed type systems that can be used for local water sources such as groundwater with SMEs <ul style="list-style-type: none"> Daily supply capacity of 20,000 m³ or less Signing of an agreement on the establishment of water purification plants in Cambodia and Indonesia with SMEs (August 2017) 	<p>IoT-based smart water pipeline management technology</p> <ul style="list-style-type: none"> Development of an IoT convergence water pipeline management technology with 5 SMEs <ul style="list-style-type: none"> Application to the Changwon Industrial Complex: Verified effectiveness in water outage prevention and operation cost reduction (KRW 350 million/year) Technology export to 6 South Asian countries (4 in 2016) <ul style="list-style-type: none"> 9 countries in 2016 (\$ 1.35 million) → 6 (\$ 2.7 million) Follow-up projects are being developed in Bangladesh and India
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Making a Happier
Korea with Water



Making a Happier Korea with Water

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Jobs for All, Jobs with Values

Increasing good jobs by improving the quality of employment and work

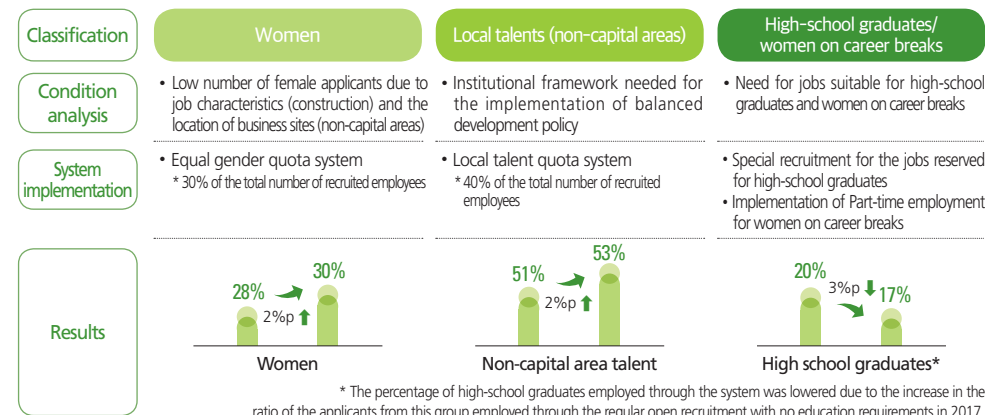


"Public corporations are required to fulfill greater responsibility and create higher values, and the biggest emphasis is on creating new jobs."

- CEO's Message (May 2017) -

The Korean government has spurred its efforts to create jobs as the most important national task, and K-water, the only public water management corporation in Korea, has concentrated the competencies of the entire organization on creating good jobs and putting social values into action in accordance with the government's policies. Under the leadership of the CEO, K-water became the first among the 1st group public corporations to set up Good Job Creation Strategies and form the Job Creation TF (May 2017), which was later made permanent as the Job Creation Bureau (July 2017). It aims to create 62,000 public and private jobs over five years from 2018 to 2022 based on the Job Creation Roadmap (September 2017). In 2017, 6,886 jobs were created and in 2018, it is working on the creation of 9,091 jobs, which is increased by 32% from the previous year. K-water created the biggest number of jobs for young people (334 people) by implementing a preliminary employee system and increasing nonscheduled recruitments to minimize the gap between the fixed and current numbers of employees (2.6 → 2.3%, the lowest among the public corporations), expanding the employment of the socially underprivileged such as women and local talents (249 → 277 people, 11%↑), and operating a job sharing system (time selective job system, etc.).

Won the 2018 Korean Social Contribution Award in the category of job creation (April 24, 2018)

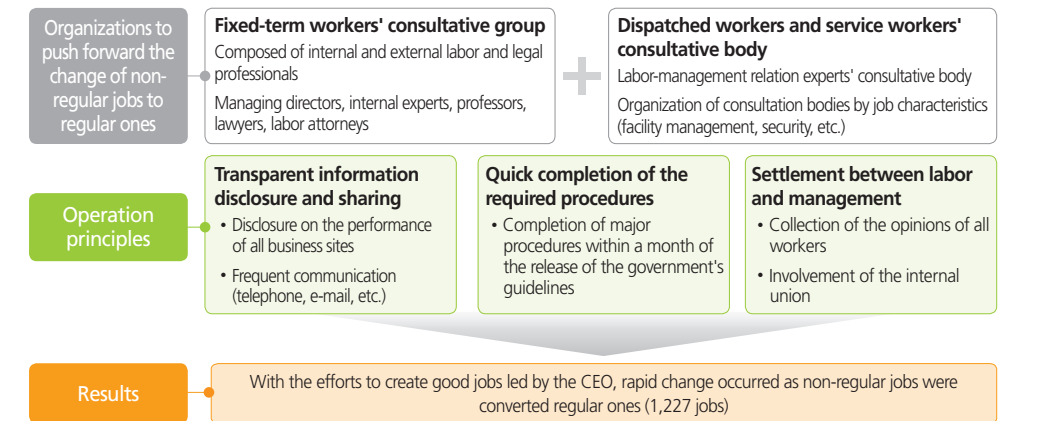


K-water is also striving to create jobs for socially vulnerable groups and small and medium-sized businesses, by increasing the number of jobs related to national tap water services (employment of 104 water coordinators, water doctors, etc.). After the release of the government's guidelines on communication between labor and management (July, 2017), K-water took the initiative among 1st group public enterprises in changing non-regular jobs to regular ones without conflicts between

A water coordinator is providing the results of a household water quality check to the customer



the labor and management, by quickly establishing an organization to push forward with the change and survey and reflect the characteristics of jobs and the opinions of workers. It has become the first public corporation to convert 1,227 non-regular jobs into regular ones (September 2018), and will continue to strive to achieve 0% non-regular workers for regular and continuous jobs by prohibiting the recruitment of non-regular workers for these positions.



Jobs for All, Jobs with Values

K-water has established a roadmap for quality, valuable jobs for all and reflected it in the four core management goals (62,000 jobs) and strategic directions (creation of social values). It has also been committed to creating good jobs with the organizations that perform the enterprise-wide job creation management (Job Creation Bureau), support the fulfillment of the goals (Social Value Creation Department, Strategic Planning Office), and put the plans and strategies into action (Water Industry Platform Center, each competent department, etc.).

With a goal of creating 60,000 private jobs by 2022, K-water offered jobs to 6,552 people in 2017, expanding its support for the water industry, developing new projects, and sharing jobs with the socially vulnerable living in dam areas. It has also contributed to the creation of 921 jobs by supporting the advancement of small and medium sized enterprises in the Vietnamese and Mexican markets through the Smart Water Management Market Pioneering Group as part of its efforts to foster the water industry with the building of the four major water industry platforms. Also, 1,129 jobs were created through the expansion of investments in new businesses, such as floating photovoltaic power generation and local waterworks modernization, while 4,502 more jobs were offered to the elderly and young or middle-aged unemployed residents living in dam areas through K-water's job sharing project for the enhancement of welfare for the socially vulnerable.

Classification	Total	Expansion of investments in new businesses	Water industry upbringing	Support for residents living in dam areas
Goal by 2022 (cumulative total)	60,151 persons	22,880 persons	11,991 persons	25,280 persons
Achievements of 2017	6,552 persons	1,129 persons	921 persons	4,502 persons

Modular type flexible working system

K-water operates a modular type flexible working system that enables employees to autonomously design their working days and hours according to their needs. Deviating from standardized 29 flexible working types, they are free to choose their working hours and days. Optimized for the individual needs and duties of each employees, this system is utilized by 42% of all the employees, which is the highest rate among 1st group public corporations.

Classification	Current no. of employees	2016	2017	Compared with other 1 st group public corporations
Total	4,653 persons	1,892 persons	1,948 persons	42% (K-water) vs 36% (Average no. in 1 st group public corporations)
Part-time jobs		44 persons	34 persons	
Flexible working hour jobs		1,828 persons	1,903 persons	
Intensive and at-home jobs		20 persons	11 persons	

* Current no. of employees: As of December 31, 2017

Mutual Growth with the People

Local communities Cooperation for mutual prosperity

Supporting projects for dam area residents for 29 consecutive years

Since 1990, K-water has carried out support projects to raise the income of dam area residents and promote welfare in areas that have been geographically isolated due to dam construction. These projects are divided into local support projects, resident support projects, and others. Contributing to the increase in incomes from farming, forestry, fisheries and cattle farming, improvement of living conditions, education and local PR, K-water endeavors to enhance the quality of life of the residents.

Dam area support funds over the past 5 years



Local support projects to raise residents' income and enhance their self-reliance

Citizens residing in dam areas are exposed to poor economic conditions where it is hard for them to gain financial self-reliance (only 25% of the national average) and the local economy has remained stagnant for long periods of time. Thus, K-water has developed and promoted projects for entire local communities together with the local social economic organizations such as residents' associations and village businesses. By supporting local small farmers to open new sales channels by holding farmers' markets at dam spaces such as squares, K-water has helped them to generate more income.

Andong Lake Green Barley Field Festival



Namgang Dam Farmers' Market



Daechong Dam Agricultural Product Auction Show



Various projects for the local youth

K-water has systematically operated various educational programs such as English education with native English teachers as well as arts and physical education for the youth living in dam areas whom are provided less educational opportunities than those residing in urban areas. K-water has also made efforts to expand support for the children of multicultural families as well.

English Competency Contest



Youth Orchestra



Youth Science Class



Proving happiness through K-water's Social Contributions

Various projects for the enhancement of local welfare

Taking into consideration the characteristics of dam areas where there is a relatively large elderly population, K-water has continued to carry out welfare projects for senior citizens, operating welfare centers for the elderly and assigning helpers through which K-water has promoted the positive awareness of dams among the locals.

Free meals



Art play program



Eco-tour to Daechong Lake



K-water is striving to make a happier society by creating social values based on its water management expertise and its Sharing Love with Neighbors program.

Efforts to create K-water's own specialized activities to enhance social values

K-water is committed to enhancing social values and improving the quality of people's lives through its own specialized social contribution activities to solve social issues linked to water.



Vision	Raising public confidence by practicing social shared values		
Slogan	Flow into Happiness		
Brand	Happy Water		
Core values	Creation of shared values	Participation and empathy	Solving Social Problems
Key themes	Water for mutual prosperity Social contribution in water-related sectors Improvement of the poor water environment of the socially vulnerable Water-based welfare services Global social contribution	Sharing love Support for local community Local resident care services Love sharing medical services Elderly care services	Water for delivering hope for tomorrow Actualization of hope for the future Happy Water Hope Mentoring Free water educational, etc. Support for future generations' growth
Financial resources	Water and Love Sharing Fund (1% of each employee's salary) + Matching Grants (K-water)		
Execution organization	Water and Love Sharing Club (K-water volunteer team composed of 120 employees)		

Presented with a citation from the Minister of the Interior and Safety at the 2017 Korea Volunteer Work Awards



Water and Love Sharing Group practicing sharing in the local community

The Water and Love Sharing Group is a volunteer group of K-water employees, established in July 2004, and consists of each department's volunteer clubs. Through their volunteer work including support for the underprivileged in local communities and disaster relief activities, they have shared their kindness with neighbors in need. Using the Water and Love Sharing Fund, which was formed by the campaign "Donate 1% of Your Salary" (the first ever in a public corporation) and the Matching Grants financed by the company, 67,608 hours of volunteer work have been carried out by the 4,617 employees belonging to 120 volunteer clubs around the country in 2017. Their volunteer activities included building a social safety net for the elderly using K-water's remote meter reading system, supporting the youth outside school education, providing legal counseling, and talent donations. K-water's Water and Love Sharing Group was awarded a citation from the Minister of the Interior and Safety at the 2017 Korea Volunteer Work Awards in recognition of its contribution to the promotion of volunteer work in the local community.

- Support for the underprivileged** (Icon: Home)

Various activities such as providing food to elderly people living alone, the disabled, child breadwinners, etc.
- Contribution to the local community** (Icon: Hand holding plant)

Technical service in rural areas, drinking water quality inspection, support for residents' events, etc.
- Disaster relief activities** (Icon: First aid kit)

Support for damage restoration in domestic and overseas areas hit by disasters such as floods and droughts, provision of relief supplies, etc.
- Environmental conservation** (Icon: Leaf)

Environmental conservation activities including environmental campaigns and river and stream purification projects

Water for mutual prosperity

Since 2013 K-water has carried out the "Water for Happy Life Project" to support the improvement of indoor aging water facilities and living spaces where water is used such as kitchens and bathrooms for the socially vulnerable people who lack access to clean water, which is essential for a healthy and happy life. K-water has also improved water supply facilities by installing membrane filtration facilities at elementary and middle schools in the areas that have no waterworks. In addition to this, it has carried out projects specialized in its business area, water management, such as providing emergency water in disaster affected areas. K-water's social contributions have been made in overseas countries as well. It has supported the development of drinking water sources and the construction of public facilities in water shortage areas of developing countries. With these activities, K-water helps local communities achieve self-reliance and sustainable development.

- Han River Mulnareumi** (Image: People at a water source)
- Overseas volunteer work (Happy Water School Drinking Fountain Project)** (Image: Water fountain in a school)
- Environment purification campaigns** (Image: People cleaning a stream)
- Water for Happy Life Project** (Image: Workers installing a water filter)
- Overseas volunteer work** (Image: Children with a water filter)
- Support for the restoration of flooded farms** (Image: Workers in a field)



Water for global social contribution and sharing love

K-water has conducted a variety of social contribution activities tailored to the conditions of its business areas. Led by the 120 volunteer clubs nationwide, various projects such as elderly welfare center operation, crisis monitoring services for senior citizens living alone, creation of eco-friendly agricultural complexes and market pioneering assistance to enhance local development, and water rate support for the vulnerable (water voucher system). K-water has also provided medical services and home nursing services to the areas with poor medical conditions in cooperation with professional medical institutions, operated child welfare centers, and contributed to the creation of sustainable income and jobs for local residents by constructing solar power plants.

- Kimchi sharing** (Image: People making kimchi)
- Delivering briquettes** (Image: People with briquettes)
- Volunteer work for local communities** (Image: People at a community event)
- Medical services** (Image: People at a medical service)
- Hapcheon Elderly Welfare Center** (Image: People at a welfare center)



Delivering hope for tomorrow through water

K-water has supported various activities for the youth, who are the hope of the future, so that they can grow to be healthy and happy. K-water also helps the teens in vulnerable areas to design their future and fulfill their dreams through the Happy Water Hope Mentoring program with K-water employees and local college students. Also, through the Water Dream Camp, which is a science education program related to water, K-water employees have donated their talents to provide the local youth with creative and interesting educational experiences. Lastly, K-water has also supported various educational services by operating differentiated education programs for schools in dam areas to narrow the educational gap between rural and urban areas and offering educational equipment.

- Moving English Class** (Image: Children in an English class)
- Happy Water Hope Mentoring Program** (Image: Large group of children)
- Hope Mentoring Program** (Image: People in a mentoring session)
- Water Dream Camp** (Image: Children in a science camp)



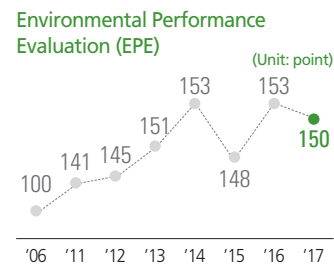
K-water's Environmental Management System for a Healthier Country

Environment-friendly management system

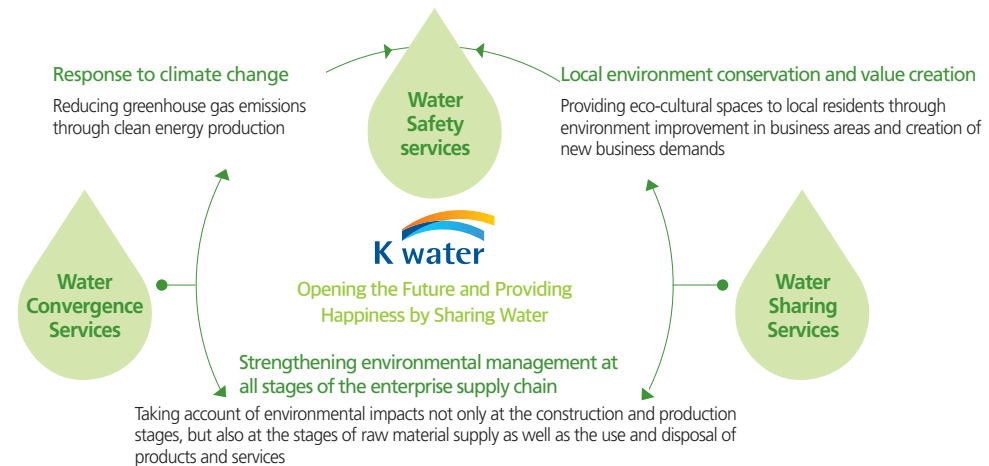
The effects of climate change, such as massive floods and droughts, are spreading throughout the world, and water management has become a key factor in the preparation for the future as it accounts for 90% of responses to climate change. K-water conducts its management activities in consideration of not only the environmental impacts caused by climate change but also the influences it has on the entire supply chain and the environment. As Korea's sole public water management corporation, it has striven to implement environmental management throughout the entire business process. K-water is encouraging all employees to adopt an environmentally friendly lifestyle. It is also actively participating in the reduction of disposable products used in public organizations, promoting the use of multi-use products and paperless conferences to create a workplace where a green lifestyle is put into action and a better environment will be handed down to generations to come.

Overview of K-water's environmental management

<p>Practice system Quality, Environmental and Green Management complying with global standards</p>	<ul style="list-style-type: none"> Acquisition of international standardization certification (ISO) for Quality, Environmental and Green Management Changes to ISO9001/ISO14001 certification in July 2018 [ISO9001 (Quality Management) / ISO14001 (Environmental Management) / KSI7001 (Green Management)] Every year, improvements are made in every department based on the assessment by internal and external experts on the performance in quality, environmental, and safety management (customer service quality, environmental and safety management, etc.)
<p>Environmental Performance Evaluation (EPE)</p>	<ul style="list-style-type: none"> Comprehensive and quantitative measurement of the performance in environmental management across all management sectors The EPE indicates a relative improvement in environmental performance in comparison with the base year (2006). The evaluation has been conducted since 2007 and K-water has constructed Korea's first computerized environmental performance evaluation system and acquired a patent for the system. The EPE score for 2017 was 150 which indicates that the environmental performance has enhanced by 50% from the base year (2006).
<p>Support base Fostering internal experts in quality, environmental and green management</p>	<ul style="list-style-type: none"> Training in ISO quality and environmental management certification auditing has been provided to selected internal employees since 2007. A total of 169 ISO quality and environmental management certification auditors have been produced as of October 2017. The internal experts have provided a practical understanding of quality and environmental management in accordance with international standards in every K-water business site.



Strategies for implementing environmental management



K-water's supply chain and environmental management

	Environmental management	Environmental performance
Supply	<ul style="list-style-type: none"> Purchase of green products (see Graph 1) Water quality management of all water sources 	<ul style="list-style-type: none"> Promoting resource recycling product production (see Graph 1) Encouraging suppliers to practice environment-friendly production Improving the environment of water sources
Business development and planning	<ul style="list-style-type: none"> Environmentally friendly construction 	
Construction	<ul style="list-style-type: none"> Construction waste reduction and recycling Environmental education for partnering companies 	<ul style="list-style-type: none"> Reduced energy and resource costs (see Graph 2) Reduced greenhouse gas emissions (see Graph 3)
Production and facility operation	<ul style="list-style-type: none"> Minimization of energy, resources and labor input through facility and process improvements Minimization and recycling of residual sedimentation (sludge) from water and sewage treatment 	<ul style="list-style-type: none"> Reduced sludge, construction waste, and other processing costs (see Graph 7) Preservation and improvement of the local environment including water discharge areas (see Graph 6)
Use	<ul style="list-style-type: none"> Discharging water and wastewater after purification/ sewage treatment in accordance with standards higher than legally required 	
Disposal and reuse	<ul style="list-style-type: none"> Healthy tap water safe for the human body Lightweight packaging materials Rate discount for consumers of reclaimed water to promote the use of water (see Graph 4) Collection and disposal of waste that flows into dams, reservoirs and rivers during precipitation events (see Graph 2) Reduction of daily waste by practicing an eco-friendly lifestyle 	<ul style="list-style-type: none"> Expanded the use of tap water to prevent contamination of groundwater Reduced social costs for waste disposal Local environment conservation



<p>01 Green purchase performance in 2017 (Unit: KRW 100 mn)</p> <p>509 Total purchase 411 Green product purchase</p>	<p>02 Energy use and reduction in 2017</p> <p>14,783 TJ Energy usage amount 6,100 MWh Saved energy amount</p>	<p>03 Greenhouse gas emissions in 2017 (unit: t CO₂eq.)</p> <p>720,687 Emission amount 4,522 Reduced amount</p>																	
<p>04 Water rate discount for consumers of reclaimed water in 2017</p> <p>172,756 m³ Amount of water used at discounted rates 4,232 백만원 Total discounted rates</p>	<p>05 Disposal of waste that flows into dams, reservoirs and rivers in 2017 (unit: m)</p> <p>24,668 Dams and reservoirs 12,901 Rivers and weirs 37,569 Total</p>																		
<p>06 Quality of effluents in 2017 (Unit: mg/L)</p> <table border="1"> <tr> <th>From water purification plants</th> <td>BOD 2.2</td> <td>COD 4.3</td> <td>SS 2.2</td> </tr> <tr> <th>From sewage treatment plants</th> <td>BOD 2.6</td> <td>COD 9.4</td> <td>SS 3.0</td> </tr> <tr> <th>From sewage disposal plants</th> <td>BOD 5.3</td> <td>SS 5.4</td> <td></td> </tr> </table>	From water purification plants	BOD 2.2	COD 4.3	SS 2.2	From sewage treatment plants	BOD 2.6	COD 9.4	SS 3.0	From sewage disposal plants	BOD 5.3	SS 5.4		<p>07 Total amounts and recycling rates of water purification sludge, sewage sludge and construction waste in 2017</p> <table border="1"> <tr> <th>Water purification sludge</th> <td>Total amounts (tons) 121,581</td> <td>Recycling rates (%) 100</td> </tr> <tr> <th>Construction waste</th> <td>Total amounts (tons) 138</td> <td>Recycling rates (%) 100</td> </tr> </table>	Water purification sludge	Total amounts (tons) 121,581	Recycling rates (%) 100	Construction waste	Total amounts (tons) 138	Recycling rates (%) 100
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Response to climate change

K-water's response to climate change

K-water, designated as a business subject to the national greenhouse gas emissions trading system, has made efforts to reduce greenhouse gas emissions and complied with the government's emission limitations. In 2017, K-water's greenhouse gas emissions amounted to 720,687 tCO₂-eq, abiding by the Ministry of Environment's greenhouse gas emission regulations for the sixth consecutive year. Most of the greenhouse gases were indirectly emitted, mainly caused by the use of electricity to supply tap water. In May 2005, K-water launched its Clean Development Mechanism (CDM) Projects, registering 12 projects to the United Nations Framework Convention on Climate Change (UNFCCC) and securing a total of 530,000 tons of potential greenhouse gas reduction per year.

Greenhouse gas emission amount (tCO₂-eq)



Current status of CDM Projects

Classification	Target	UNFCCC registration date	Annual energy production (MWh/y)	Expected emission reduction (tCO ₂ -eq/y)
Total	-	-	827,722	530,840
Sihwa Tidal Power Plant	Sihwa Tidal Power Plant	Jun 2006	507,629	315,440
Small Hydro Power Plants 1	Andong, Jangheung, Seongnam 1	Oct 2006	15,473	8,103
Small Hydro Power Plants 2	Daecheong, Juam, Dalbang, Seongnam 2	Feb 2007	13,944	8,331
Sihwa Wind Power Plant	Sihwa Wind Power Plant	Nov 2007	3,839	2,521
Small Hydro Power Plants 3	Gosan, Pangyo	Nov 2009	5,557	2,987
Small Hydro Power Plants 4	Seongdeok, Gimcheon Buhang	Oct 2010	4,963	2,759
Small Hydro Power Plants 5	Seongdeok, Gimcheon Buhang	Apr 2012	4,603	3,100
Waterworks Efficiency Improvement	Seongdeok, Gimcheon Buhang	Aug 2012	-	7,044
Hydro Power Plants 6	Ipo, Yeosu, Gangcheon	Oct 2012	76,406	50,772
Hydro Power Plants 7	Sejong, Gongju, Baekje, Sangju	Sep 2012	57,541	38,237
Hydro Power Plants 8	Nakdan, Gumi, Chilgok, Gangjeong Goryeong	Sep 2012	58,170	38,654
Hydro Power Plants 9	Dalseong, Hapcheon Changnyeong, Changnyeong Hama, Seungchon, Juksan	Sep 2012	79,597	52,892

Management system to create social values

Strengthening of ethical management and transparency

Restructured and expanded Integrity Ethics Committee



K-water strives to spread the culture of integrity and ethics in the private sector in order to realize a transparent and clean society reminiscent of water.

Improvement of the integrity and ethics promotion system

In order to promote integrity and ethics in its organization, K-water has strengthened both internal and external frameworks, supplementing the internal promotion system and consolidating the inter-agency cooperation network. In particular, K-water has restructured the Integrity and Ethics Committee, which is the highest decision-making body on integrity and ethics issues, and by expanding the operation of the Citizen Integrity Auditor System in which citizens participate in audits, K-water has paid careful attention to the public's opinions to supplement its weaknesses. In addition, K-water has encouraged voluntary integrity promotion activities in each regional division by appointing integrity and ethics management personnel for each department and holding regional integrity forums. Also, with the appointment of auditors who perform audits and consulting for each regional division, it has strengthened the internal checking system. Lastly, in order to actively respond to social issues that citizens take interest in and put social values into action by increasing the participation of the people, environmental experts have also been invited as citizen integrity auditors. With these changes, K-water has further enhanced the Citizen Integrity Auditor System, obliging to a one to one audit system, regularizing system implementation council meetings, and holding joint meetings with partnering agencies.

Pledge for Fair Play and Anti-Corruption Practices (March 7)



Meeting of Citizen Integrity Auditors (September 5)



Joint campaign of the Daejeon area's integrity council (April 15)



Joint campaign of the Ministry of Environment and affiliated institutions' integrity council (July 6)



Integrity and ethics promotion system



Highlights of the executives' pledge of integrity in performing their duties



Compliance with integrity-related obligations (no grafting, no acceptance of improper solicitation, no bribery, no abuse of authority, etc.); violence of these duties leading to limitations on performance-based bonuses



International Anti-Corruption Academy

※ IACA

- An international organization responsible for the effective implementation of international conventions against corruption, including the United Nations Convention against Corruption and for research, education and training in areas of anti-corruption
- Holds regular conferences and international anti-corruption council meetings and supports international cooperation.
- *Anti-Corruption & Civil Rights Commission, an integrity expert agency, provides IACA training to the staff of agencies with excellent integrity practice performances every year.

Various efforts to spread the culture of integrity and ethics

K-water requires executives to take a pledge of integrity and conducts integrity assessments for employees in high-ranking positions (general manager or higher) to encourage them to take the initiative to practice integrity, while operating Clean Master communication training by touring each and every business site and inviting all employees to take the same pledge, all in the quest to create an organizational culture of integrity. Also, K-water provides outstanding employees with the opportunity to participate in International Anti-Corruption Academy (IACA) training, fostering global integrity experts. In this way, K-water has created a virtuous cycle for spreading the culture of integrity and ethics.

* Clean Master: K-water's internal integrity and communication skills training specialists (8 people in 2017 → 24 in 2018)

Spreading the culture of integrity and ethics to the general public

K-water is willing to listen to the opinions of customers at all times, holding meetings with customers and operating an online communications channel. It is taking the lead in creating a society of integrity by requesting customers to take a pledge of integrity when signing a contract with them. In addition, K-water produces contents that can be easily accessed by customers, such as leaflets, slogans, and UCCs, to promote its whistleblowing and anti-corruption reporting system. K-water operates a variety of reporting channels both on-line and off-line to create a clean organization without corruption.

Clean Master communication training touring all business sites	Completion of International Anti-Corruption Academy (IACA) training
Integrity slogan	Integrity UCC

K-water whistleblowing system

K-whistle (Online reporting)	<ul style="list-style-type: none"> • Website K-water website - Customer Center - Customer Square - Corruption Reporting • Mobile App Google Play ▶ Type "K-water K-whistle" in the search box ▶ Install the app.
Corruption Reporting Box (Offline reporting)	<ul style="list-style-type: none"> • Corruption Reporting Box (stamped addressed envelope without sender information) Using the Corruption Reporting Box installed at each department - complete your reporting letter and send it via mail (nearby mailbox)
<p>🔒 All reporting is kept confidential and the privacy of the identity of the person reporting is strongly protected (Tel. 82-42-629-2292 to 3).</p>	

Actualization of human rights centered management for all people

K-water has made its best efforts to establish a corporate culture based on respect for human rights, set up a roadmap for promoting human rights centered management to protect the human rights of internal and external stakeholders, and take the lead in implementing human rights centered management.

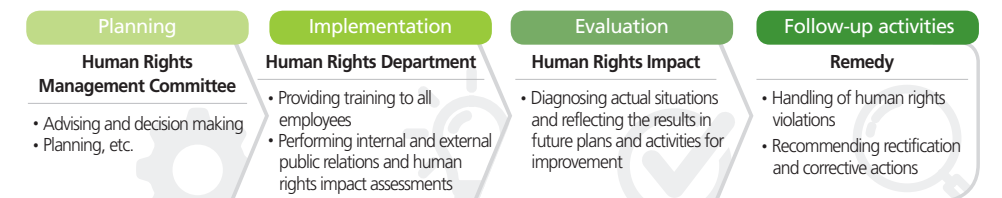
K-water's roadmap for human rights centered management



Systematization of human rights centered management

K-water has constructed a system for the actualization of human rights centered management, establishing basic guidelines for human rights centered management and organizing a committee where outside experts participate to protect and promote the human rights of its stakeholders including executives and employees. K-water has also sought to identify and analyze actual and potential risks to human rights centered management and reflected the results in its efforts for improvement, to achieve sustainable human rights centered management

K-water human rights centered management implementation system



Internalization and spread of human rights centered management

K-water has declared its commitment to promoting human rights centered management by enacting its human rights centered management charter and requiring all employees to take a pledge to abide by it. It has also provided regular training to all employees on human rights and contributed to the internalization and spread of a human rights culture. K-water has also actively participated in the Human Rights Forum of the National Human Rights Commission, taking part in building an inter-agency collaborative network and benchmarking other organizations.

Pledge of integrity by all employees and the organization of a human rights centered management committee.



Driving force for sustainable growth, talent-centered management

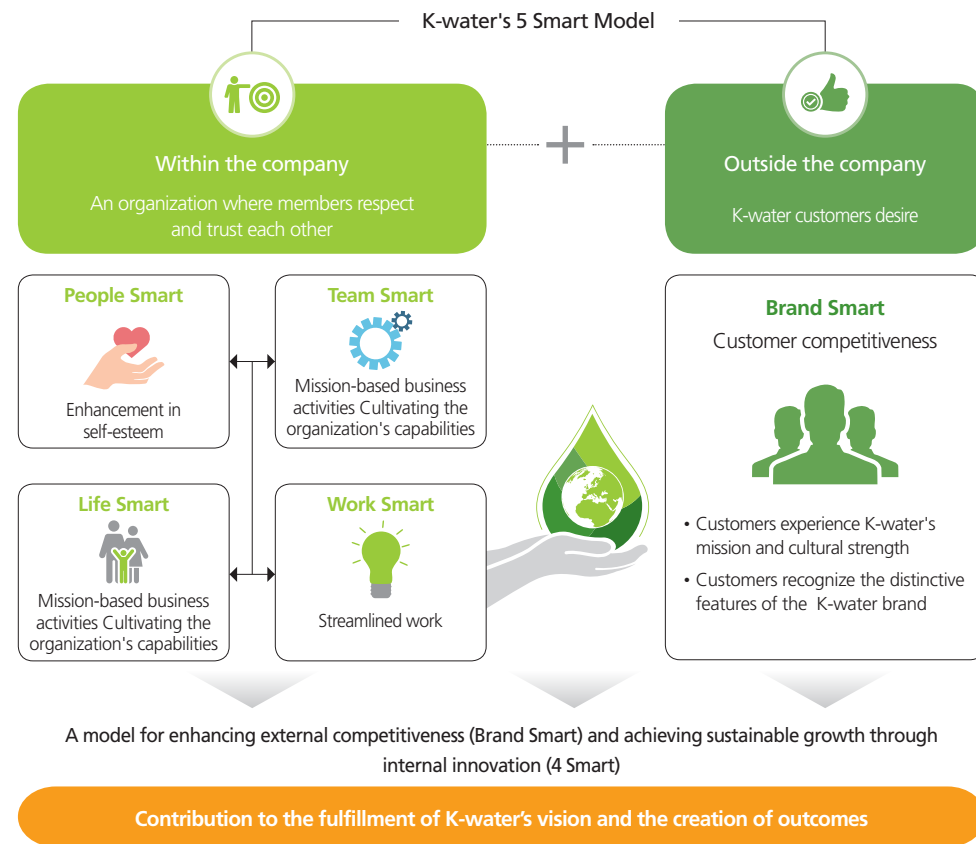
K-water's sustainable management is about people. With this belief, K-water strives to secure, cultivate and maintain excellent human resources whom are the key to sustainable growth.

K-water, where people work in harmony and are happy together

K-water recognizes that its members' creativity, flexibility, and satisfaction with their organization, which are attained through the balance of work and life, are the driving forces behind its sustainable growth. Therefore, K-water has striven to achieve an effective work & life balance by introducing a system that constantly identifies ineffective business practices and improves them while ensuring the autonomy of employees through the implementation of a flexible work system. In addition, since 2016, K-water has created and promoted an organizational culture innovation model (5 Smart), carrying out its systematic innovation activities based on them.



In particular, in 2018, K-water made efforts to create a "K-water where people work together in harmony and are happy together" through effective task sharing and the flexible work system. K-water has been selected as one of the best Asian companies to work for the second consecutive year and has topped the list of the 100 best Korean companies to work for the sixth consecutive year (as of November, 2018).



A differentiated, advanced approach to make a better workplace

- Operation of an organizational culture department directly under the CEO to fully carry out organizational culture innovation activities
 - * Reorganized into the Organizational Culture Innovation Center under the Human Resources Development Institute in 2018 to strengthen organizational culture innovation activities in connection with human resources development
- Establishment of K-water's own organizational culture innovation model (5 Smart) in 2016 for systematic innovation
- Setting of the "Work Performance Standards for the Balance of Work and Family Life" (first in the public corporation sector)
- Creation of do's and don'ts related to the organization's values in 2018 and provision of behavioral standards for leaders and employees to promote considerate attitudes toward each other

Promoting genuine smart work by improving working practices

- Construction and operation of a business sharing portal for efficient reporting and collaboration
- Preventing unnecessary data generation through the operation of a report submission system and ensuring the reliability of data
- Streamlining meetings through a conference management system and systematic monitoring
- Diagnosing organizational culture and using feedback for employee education, campaigns and performance improvement

A variety of family-friendly systems aimed at achieving a substantial balance of work and life

- Expansion of "Family Day" to all weekdays (Monday to Friday) through the implementation of the 9 to 6 system and the PC shutdown system
- Introduction of selective working hour system: the highest degree of flexible working system use compared to other public enterprises
 - * A system allowing employees to freely adjust their commuting time, working hours and days within 40 hours a week, not constraint by the conventional "8 hours a day" system
- Creation of a family-friendly environment through shortened working hours for pregnant women and the linkage of maternity leave and parental leave
 - * Preventing career breaks by assigning employees returning from leave their desired jobs
- Encouraging the use of vacation hours by managing the use rate as an internal evaluation indicator

Promoting employees' self-esteem and sense of belonging by providing accessible and desirable role model

- Selection of K-water Veterans among senior employees who have worked with sincerity and honesty
- Rewarding departments and leaders that have set an example for other members in terms of organizational culture

An effective communication system based on mutual respect and care

- Developing the Why Campaign to share the significance and purpose of work between leaders and members
 - * Organizational culture improvement activities to promote communication and sharing among members particularly focusing on the significance and purpose of work
- Employee campaign based on questionnaire survey results
 - * Conducting surveys on major issues such as etiquette at the workplace, staff dinners, etc. and then carrying out campaigns for improvements based on the results
- Employees of various positions and generations participating in two-way communication between employees and management.
 - * Assistant manager/ manager level staff (junior board); vice general manager/ general manager level staff (middle board); and executive level leaders (senior board)
- Holding K-PuB meetings between CEO and staff for open discussion on key issues



Fair performance evaluation and reward system

K-water has established and operated a fair and reasonable performance evaluation and reward system that takes into consideration the performance of the headquarters, each department and teams so that executives, employees and departments can continuously demonstrate their full potential.

Construction of fair and reasonable evaluation system

K-water has established an optimized evaluation system for all employees of its domestic and overseas business sites in accordance with the characteristics of each internal departments. Based on the principle of priority on performance, it has strengthened the discrimination of evaluation and introduced an organization-specific evaluation system for indiscriminate rewards based on performance.

In addition, K-BEST, K-water's own system, has been established to minimize the complexity and difficulty of evaluations so that general members can easily access evaluation systems and information. The system has been continuously improved to reflect the changes in the business environment.



Organizational development through the organic linkage of organizational and individual evaluations

Through evaluations, K-water clearly informs its members of the weaknesses to be supplemented in common competencies that departments and individuals should improve upon through joint efforts, so that employees' long-term self-development and personal capacity enhancement can be linked to the performance enhancement of the organization. In particular, for the person in charge of each departments, his/ her achievement and leadership have been included in the management contract with the CEO. These systems contribute to the creation of a sound and strong organization.

Linking performance evaluation results with rewards

Evaluation of the performance of regular employees are performed by using various indices including cooperation in their departments or specific tasks, integrity and labor-management relationship as well as indexes related to the performance of their jobs. In the case of the evaluation of executives, their leadership is evaluated not only in relation to their performance in their jobs but also in terms of integrity, organizational culture (nighttime work rate, vacation use rate), and human resource development efforts (participation in education). The results of the evaluation using these performance indicators serve as the basis for individualized rewards for each employee.

K-water motivates its employees to work enthusiastically by offering individualized rewards, including bonuses and awards, to employees who have shown excellent performance based on the results of the evaluation for the year, allowing for no gap in salary between men and women. Consulting and refresher training are provided to employees who have shown relatively low-level performance. These systems enable the entire organization to continuously achieve good performance.

Efforts to enhance labor-management communication and advance labor-management culture

K-water has established legitimate labor-management relations and carried out various activities for advanced labor-management culture. K-water's labor and management have successfully held various joint events, made joint efforts to fulfill national policies and improve the national quality of life and the productivity of the organization

Joint efforts for communication and government policy enforcement for strengthening partnerships

Various partnership strengthening activities have been promoted in order to resolve accumulated labor conflicts in the process of boosting the morale of employees and implementing government policies. K-water's labor and management have made a variety of joint efforts for mutual growth by performing activities in relation to the government's "regularization of non-regular jobs" policy together.

Special training on labor-management culture co-hosted by labor and management	Training on K-water's core values to promote communication and considerate attitudes toward each other * 39 sessions, 3,540 trainees
Understanding Korea's river systems	Raising a sense of ownership in K-water employees by improving their understanding of the characteristics and values of Korean rivers * 11 sessions, 455 trainees
Achievement contest	Increased mutual understanding among employees through the sharing of productivity improvement examples and achievements * 4 sessions, participation of all employees
Change of non-regular jobs to regular ones	Operation of a TF for employee treatment improvement and the Job Creation Bureau * Practicing the values of sharing and mutual prosperity through improvements in 9 areas including rewards * Providing good jobs by converting 1,199 non-regular jobs into regular jobs

Leading they way by resolving social problems through communication based on mutual trust

Conflicts of labor and management continued due to various accusations and lawsuits related to the introduction of the new performance-related annual pay system. The representatives of K-water labor and management released the "Joint Declaration of Cooperation for Achieving the Future Vision" (January 17, 2017) and reached an agreement on the return to the former pay system and the return of the paid bonuses during the early implementation of the new system. (June 28, 2017) This led to the withdrawal of related complaints and lawsuits (July 7, 2017), which ended labor-management conflicts including legal disputes. K-water labor and management discussed the period, procedures, and methods of the paid bonus return and decided to donate KRW 3.5 billion of bonuses to the "Public Mutual Solidarity Fund," which was the largest of all donations made by any public corporation. The decisions made through the negotiations between K-water labor and management will play a leading role in actualizing public values such as the improvement of the treatment of temporary workers in the future

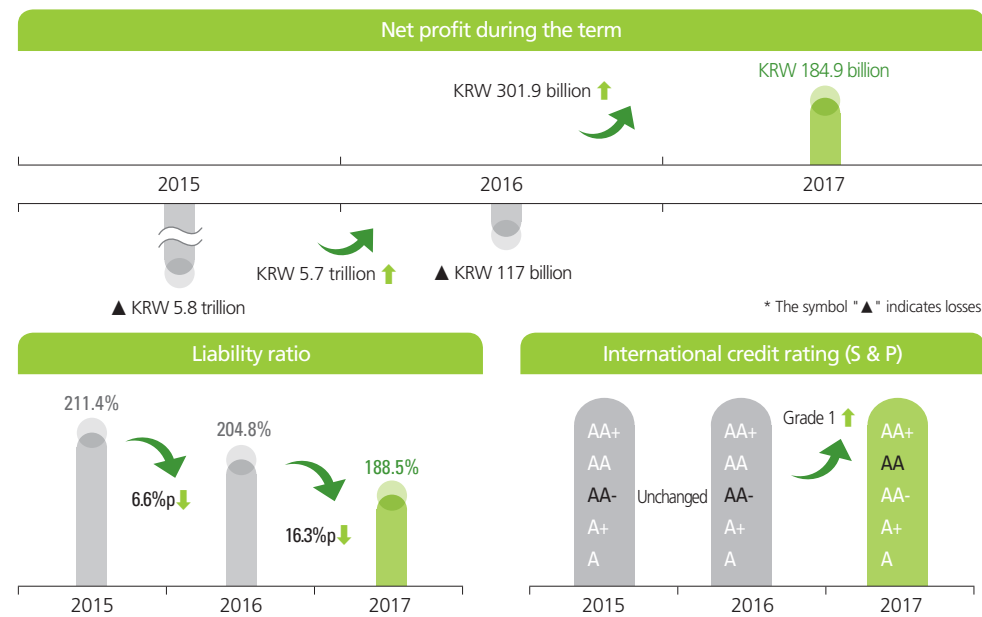


Acceleration of internal innovation to expand people-centered services

K-water, judging that it is imperative to secure financial responsibility for the achievement of the national welfare, has promoted company-wide innovation to enhance performances through the linkage of work systems.

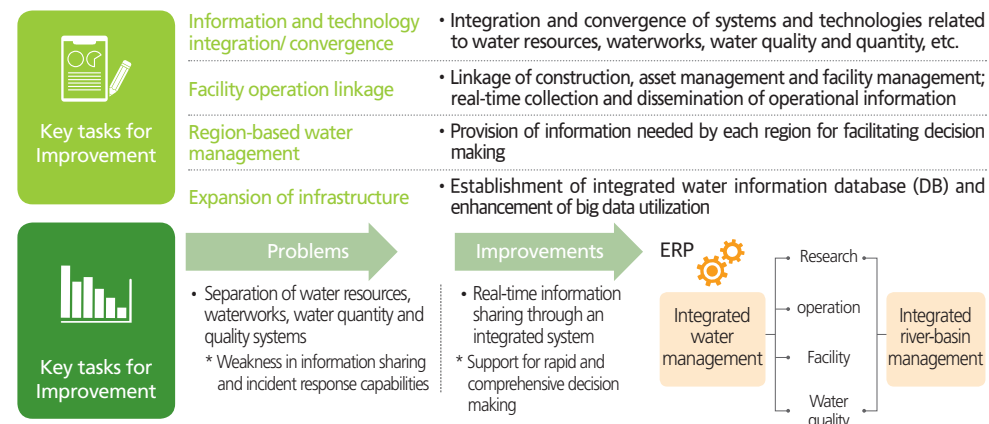
Accomplishment of company-wide financial innovation: Change to a profit structure for the first time since losses due to the Four Major Rivers Project (2015)

The operating profit growth rate was improved by 2.6% compared to the previous year, mainly due to the improvement in profitability through efforts to increase sales and reduce costs in major businesses such as large-area waterworks, dam water supply, and power generation. In addition, KRW 1.6 trillion of debt was reduced, which is much larger than the estimated debt reduction amount (KRW 1 trillion). K-water's liability ratio dropped by 16.3% from the previous year to 188.5%, and finally decreased below 200%. Gaining the recognition of its ability to repay at home and abroad, K-water has achieved AA rating (S & P), which is commonly given to the national government.



Established a standardized process-based work system

K-water analyzed the entire work process to improve organizational productivity, and then drew 41 tasks for improvement including the introduction of a global financial system. It first introduced a new financial system and personnel management system by building a company-wide ERP system, and then constructed and started to operate an integrated Ministry of Justice information system and integrated water quality system.



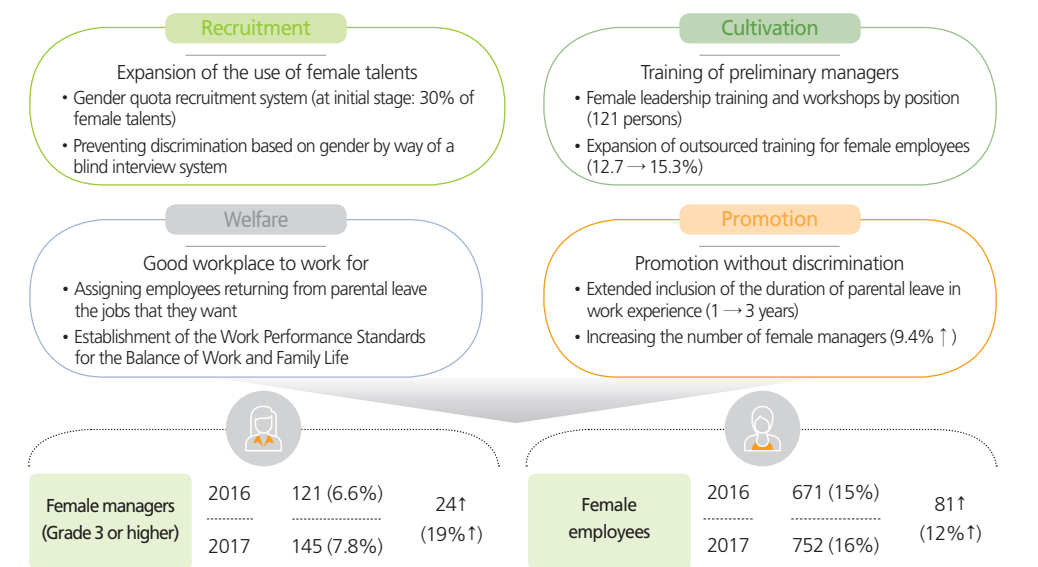
Establishment of medium- and long-term human resources development system for sustainable growth

K-water has established a personnel management process to strengthen the implementation of new management strategies. In addition, it has constructed a convergence education system to actively cope with future changes, and established a water specialist training program to create a training system for cultivating well-rounded talents. As the need for management and technical convergence experts to cope with technological innovation and unification of water management has increased, K-water has set up a Global Water Management Policy Course in collaboration with the Korea Development Institute (KDI). With these efforts, K-water is building a foundation for fostering convergence water experts, developing customized curriculums in various fields such as integrated water resources management, and conducting convergence research.

Vision	Partner for Healthy Water Circulation that Benefits All			
HRD direction	To strengthen organizational and individual competitiveness by cultivating professional well-rounded human resources			
External conditions	Intelligence and information based on the 4th Industrial Revolution	Changing the learning environment and increasing demand for creative talents	Strengthening of integrated water resources management with the unification of water management	HRD paradigm shift with a focus on performance
Needs	Fostering well-rounded talents	Self-directed career development	Training specialists in core business areas	Leadership and organizational development in conjunction with strategies
Strategies	Establishment of curricula for policy and technology convergence experts	Self-learning system based on current jobs	Water expert cultivation and development of problem-solving training	Leadership education innovation and organizational culture education for all employees

Promoting the increase of female managers through personnel management tailored to K-water

K-water has established personnel management policies for each field, such as expansion of the use of female talents and the promotion system without discrimination, in order to increase the ratio of female managers, which is currently 8.5% to 9.4%. In addition, with the adoption of the maternity leave system, K-water has expanded the implementation of the parental leave system and reduced maternity and childcare burdens by providing paid shortened work. In addition, through the operation of the "Shelter," an anonymous and confidential counseling channel, it has reduced sexual harassment in the workplace, to create a healthier workplace.



Appendix

Appendix

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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	Korea Water Resources Association
1996	Korean Association of Academic 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	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

Awards

Apr. 2008	Korea Management Innovation Grand Prize (Awarded by Ministry of Knowledge Economy and Maeil Business Newspaper)
Oct. 2008	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 Eco-Friendly Company Grand Award (Ministry of Environment), Asian Most Admired Knowledge Enterprise (UK Teleos)
Jan. 2009	Continuity & Creation Management Award in Environmental Management (Korean Ministry of Knowledge Economy and UN Global Compact)
Oct. 2009	Low Carbon Green Growth Commendation (Green Growth Association and Korean Ministry of Environment), New Regeneration Energy Awards Prime Minister Commendation (Ministry of Knowledge Economy), Asian Most Admired Knowledge Enterprise (UK Teleos)
Dec. 2010	National Green Technology Grand Award (Korean Ministry of Knowledge Economy and Korean Ministry of Education)
June 2011	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)
Jan. 2012	First Korean public company to be awarded the Excellent Smart Work Agency Award (Ministry of Public Administration and Security)
Feb. 2012	Most Admired Company in Korea (KMAC)

June 2012	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)
July 2012	Korea Digital Innovation Award Grand Prize in the Public Sector (Ministry of Knowledge Economy)
Sep. 2012	Presidential citation for outstanding performance in purchasing goods from SMEs (Small and Medium Business Administration of Korea)
Oct. 2012	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)
Nov. 2012	Sustainability Grand Awards Innovation Management Award (Ministry of Knowledge Economy)
Dec. 2012	Public Company Management Award Grand Prize (Sisa Journal)
July 2013	Korean Digital Green Management Award (Ministry of Science, ICT and Future Planning)
Oct. 2013	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)
Nov. 2013	Natural Environment Grand Award (Korean Ministry of Environment), Asian Most Admired Knowledge Enterprise (UK Teleos)
Dec. 2013	Global Most Admired Knowledge Enterprise (UK Teleos)
Feb. 2014	Most Admired Company in Korea (KMAC)
June 2014	Top Prize in Water Business Assessment (Ministry of Environment)
Aug. 2014	Korean Digital Award (Ministry of Science, ICT and Future Planning), Achieved Carbon Trust Standard (UK Carbon Trust)
Sep. 2014	International Water Association Global Project Innovation Award
Oct. 2014	Asian Most Admired Knowledge Enterprise (UK Teleos)
Nov. 2014	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)
Dec. 2014	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)
June 2015	National Sustainability Management Award in Social Contribution (Ministry of Health and Welfare)
Nov. 2015	Most Admired Company in Korea (Ministry of Trade, Industry & Energy)
Dec. 2015	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)
May 2016	Minister's Commendation in the Selection of Excellent Institutions at the Unification Expo (Ministry of Unification)
Sep. 2016	Minister's Commendation at the 2016 National Sharing Awards (Ministry of Health and Welfare)
Oct. 2016	Minister's Commendation in recognition of contribution to the development of mensuration and measurement (Ministry of Trade, Industry & Energy)
Nov. 2016	Double awards in the Web Awards Korea (Ministry of Science, ICT and Future Planning), the 2016 Asian-Pacific Stevie Award (in Local Community PR and Public Service and Communication Innovation)
Dec. 2016	Asian Most Admired Knowledge Enterprise (UK Teleos)
Apr. 2017	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)
June 2017	Asia-Pacific Stevie Award Silver Prize in Corporate Communication
July 2017	2017 Safety and Health Activity Case Presentation Contest Excellency Prize in Service Sector (Ministry of Employment and Labor)
Sep. 2017	Korea Employment-Friendly Management Grand Award
Oct. 2017	The 5th Applied Ecologic Technology Contest Excellency Prize for the 5th consecutive year (Korea Society of Ecology and Infrastructure Engineering), Asian MAKE Award and Global MAKE Award for the 10th consecutive year (Hall of Fame, UK Teleos)
Nov. 2017	Selected as an Excellent Ordering Agency in SW Business and Minister's Award (Ministry of Science and ICT), Prime Minister's Citation at the 2017 Safety Culture Awards (Ministry of the Interior and Safety), Korea Social Media Grand Award in the Public Sector (Award of the Minister of Science and ICT), Korea Data Quality Awards Excellency Prize (Ministry of Science and ICT) 2017 Ranked as one of the top 100 Best Korean Companies to Work For list for the 5th consecutive year
Dec. 2017	Minister's citation at the 2017 Korea Volunteer Work Awards (Ministry of the Interior and Safety), Korea Social Contribution Grand Award in Overseas Volunteer Work, Educational Donation Grand Prize for Public Enterprises (Ministry of Education), Prime Minister's Award for Outstanding Personnel Innovation Performance (Office of the Prime Minister), Prime Minister's Citation at the 2017 Safety Culture Awards (Ministry of the Interior and Safety)

Sustainability Highlights

Economic | Financial Performance

Condensed all-inclusive income statement

(Unit: KRW in millions)

Category	2013	2014	2015	2016	2017
Assets					
Current assets	5,785,518	5,631,464	6,006,540	6,422,010	7,041,806
Non-current assets	19,818,389	19,807,635	13,544,099	13,877,420	13,825,489
Total	25,603,907	25,439,099	19,550,639	20,299,565	20,867,295
Liabilities					
Current liabilities	3,358,548	2,161,443	2,795,626	3,154,565	3,056,095
Non-current liabilities	10,639,904	11,299,992	10,477,544	10,484,290	10,577,196
Total	13,998,452	13,461,435	13,273,170	13,638,855	13,633,291
Capital					
Capital	6,898,731	7,016,965	7,196,145	7,692,548	8,108,974
Others	4,697,176	4,945,222	-942,043	-1,064,523	-908,919
Equity attributable to owners of the parent company	11,595,907	11,962,187	6,254,102	6,628,025	7,200,055
Non-controlling interest	9,548	15,477	23,367	32,550	33,949
Total	11,605,455	11,977,664	6,277,469	6,660,575	7,234,004

*Consolidation criteria applied in accordance with the Korean International Financial Reporting Standards (K-IFRS) since 2011

Condensed all-inclusive income statement

(Unit: KRW in millions)/ Refer to the information disclosed in the ALIO system on K-water's website.

Category	2013	2014	2015	2016	2017
Revenue (turnover)	3,645,387	3,698,372	3,777,345	3,618,084	3,375,560
Cost of sales	2,989,350	3,178,494	3,288,664	3,105,646	2,793,724
Selling and maintenance expenses	123,920	129,419	139,064	148,369	154,120
Operating profit	532,117	390,459	349,617	364,099	427,716
Other income	315,516	323,280	349,076	20,053	68,450
Other expenses	43,087	6,826	7,437	120,128	42,887
Other gains	2,078	-13,221	-6,295,565	-143,011	-1,889
Financial income	97,870	91,264	85,503	46,182	125,341
Financial costs	449,185	400,656	370,962	329,105	383,290
Profit from investments in associates subject to equity method	1,565	33,248	-8,058	-3,309	-1,145
Net profit before corporate tax deduction	456,874	417,548	-5,897,826	-165,219	192,296
Corporate tax expenses	108,756	118,222	-102,188	-48,254	7,362
Net profit during the term	348,118	299,326	-5,795,638	-116,965	184,934
Other comprehensive income	-9,901	18,874	-8,023	2,844	-27,521
Total comprehensive income	338,217	318,200	-5,803,661	-114,121	157,413
Net profit during the term attributable to owners of the parent company	346,443	298,554	-5,799,067	-120,913	179,248
Net profit during the term attributable to non-controlling interest	1,675	772	3,429	3,948	5,686

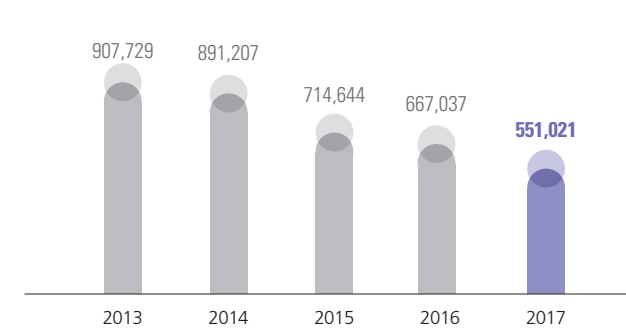
*Consolidation criteria applied in accordance with the Korean International Financial Reporting Standards (K-IFRS) since 2011

Sustainable growth through innovation

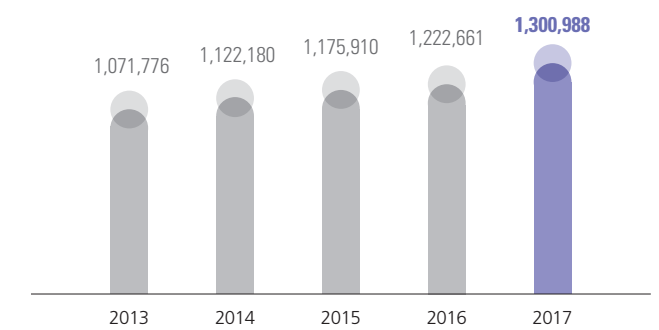


Turnover by business (unit: KRW in millions)

IWRM (Integrated Water Resources Management)

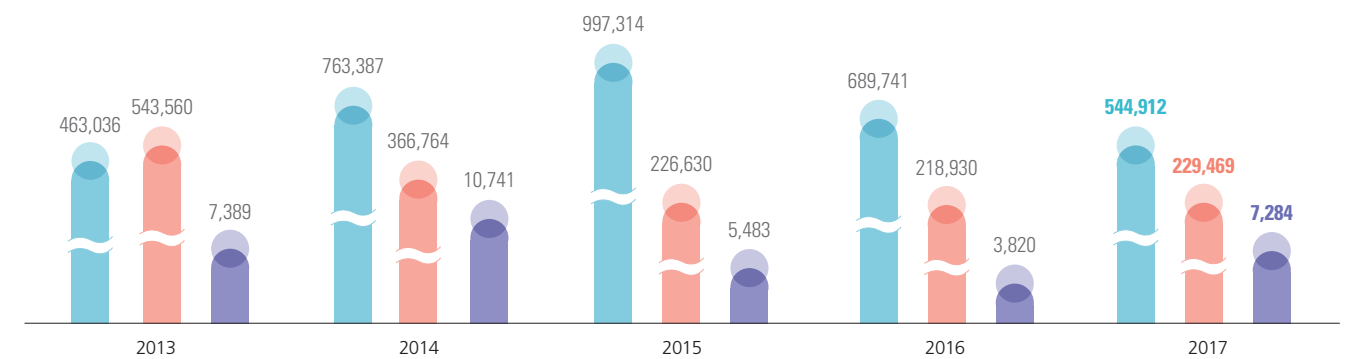


Healthy water supply business



Relevant businesses

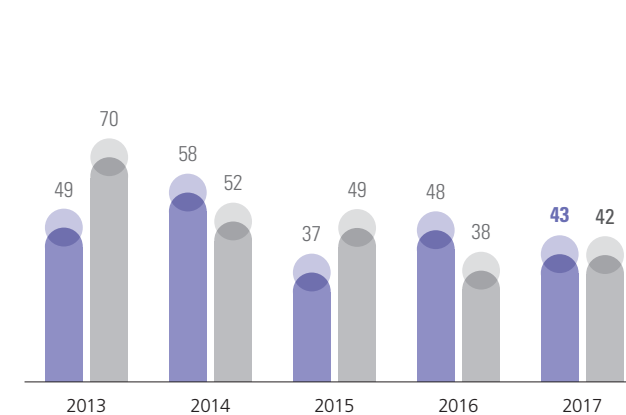
Waterfront business Clean energy Overseas business



Patents and research performances

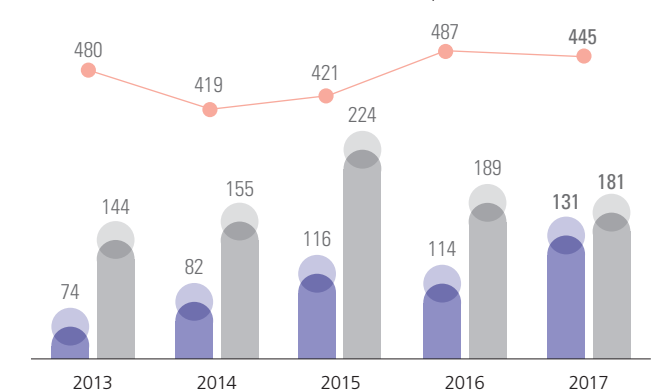
Patents

Application (items) Registration (items)

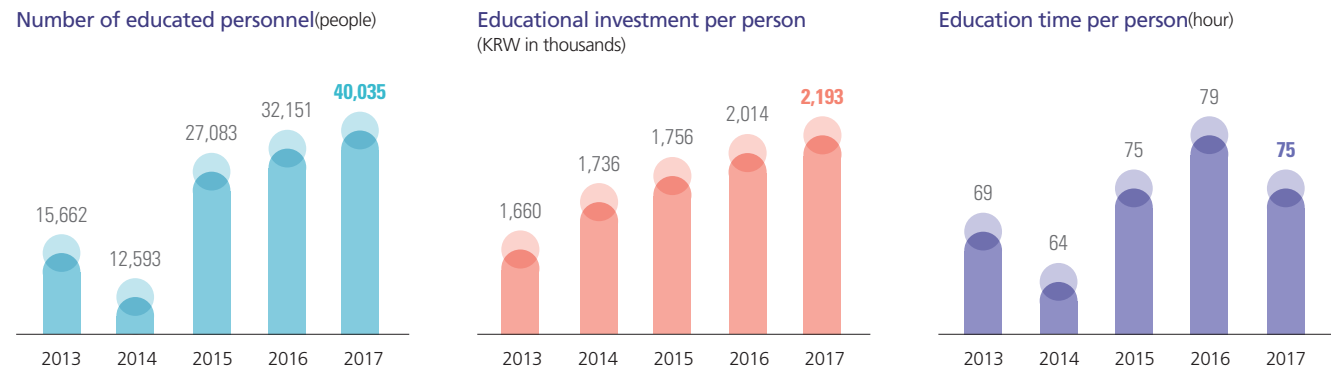


Research

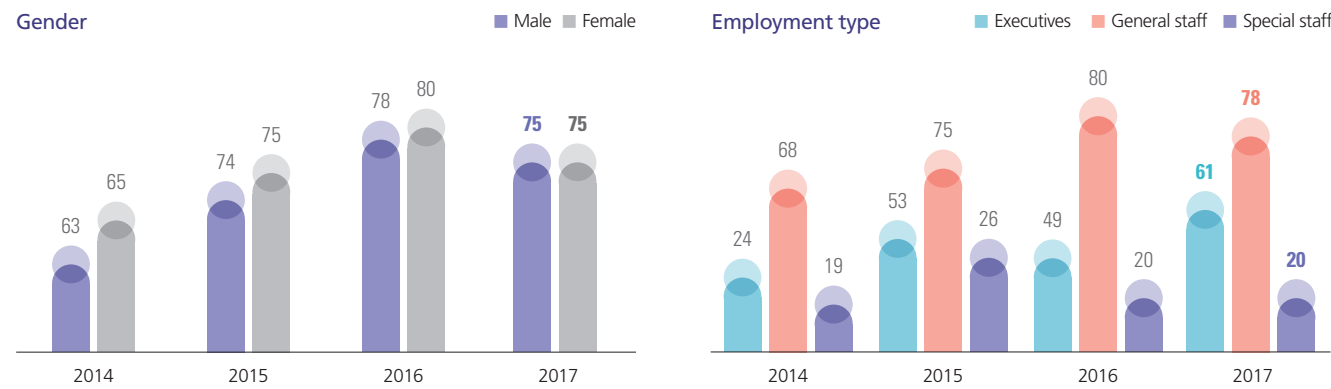
No. of research presentations (items) Research tasks (items) R&D expenses (unit: KRW 100 million)



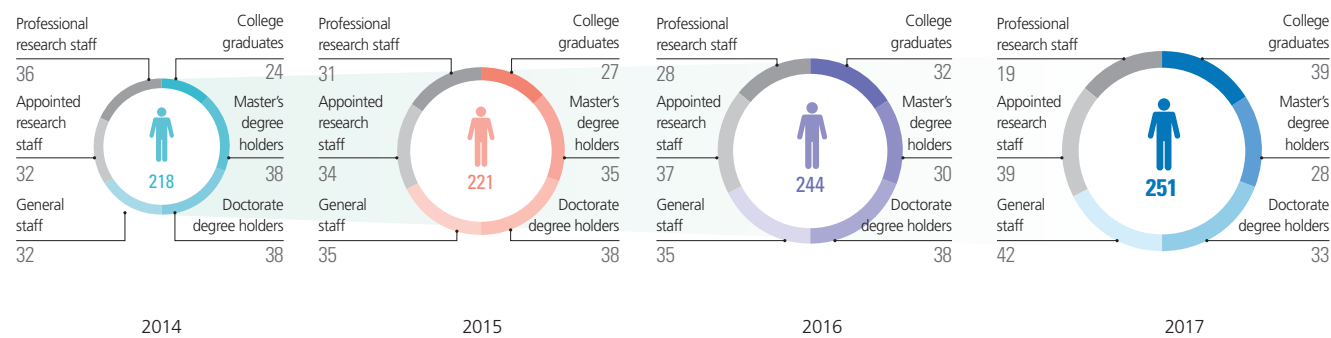
Education for executives and employees



Education time per person (hour)

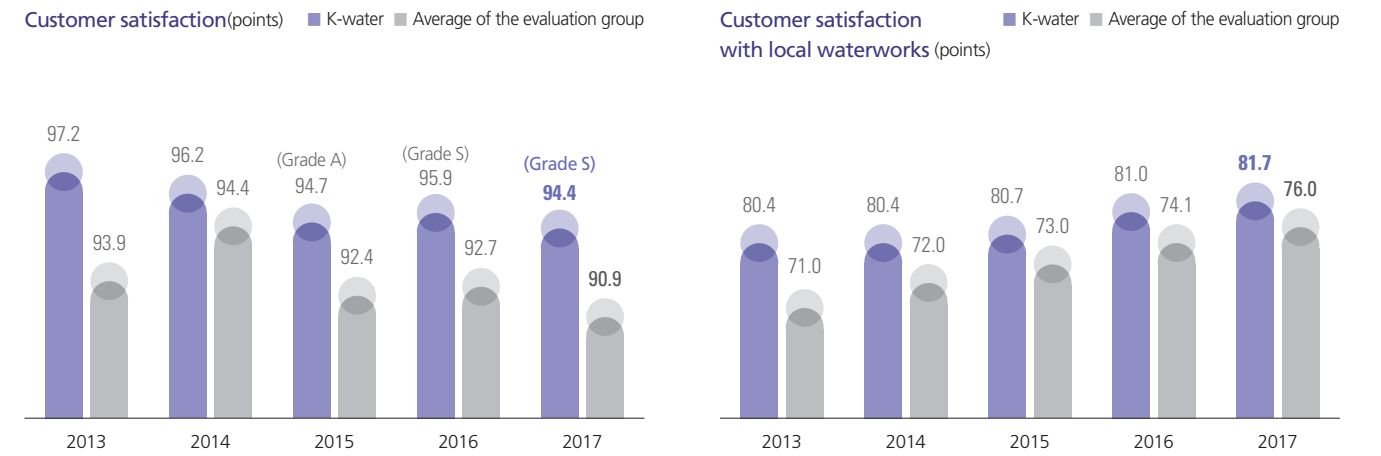


Securement of R&D professionals (%)



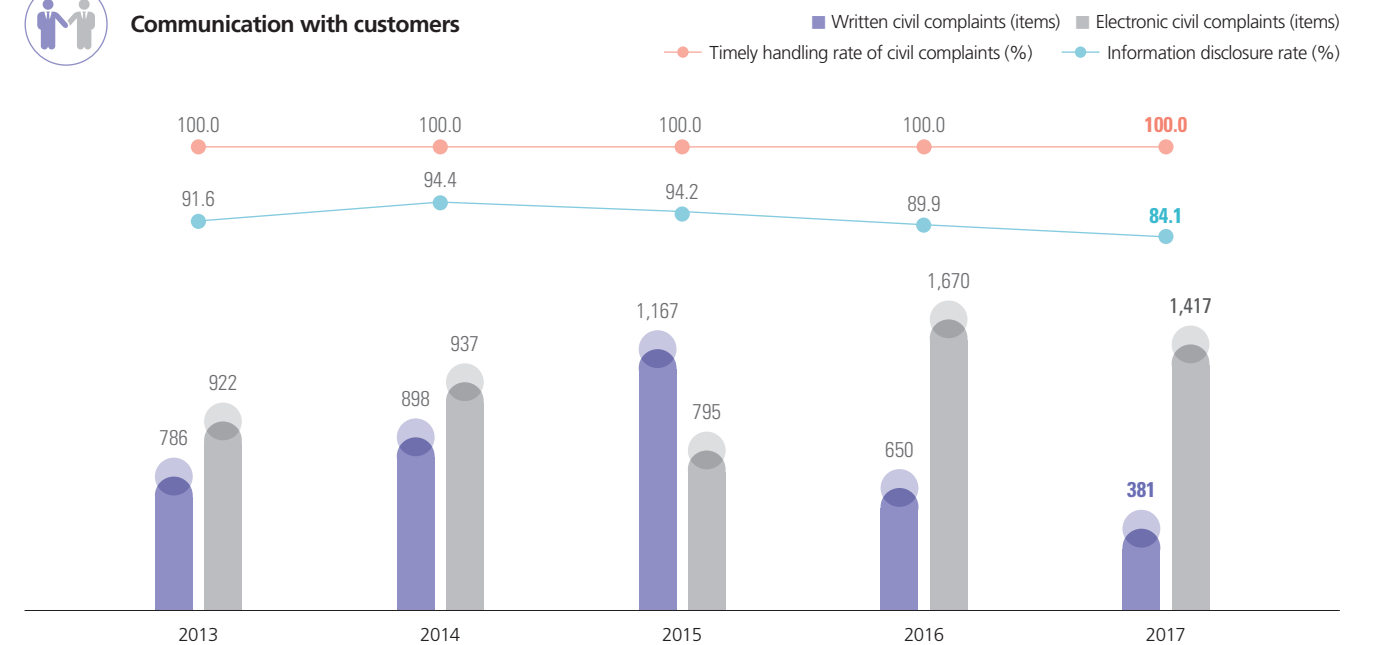
Social performances | Customer impressions beyond customer satisfaction

Customer satisfaction

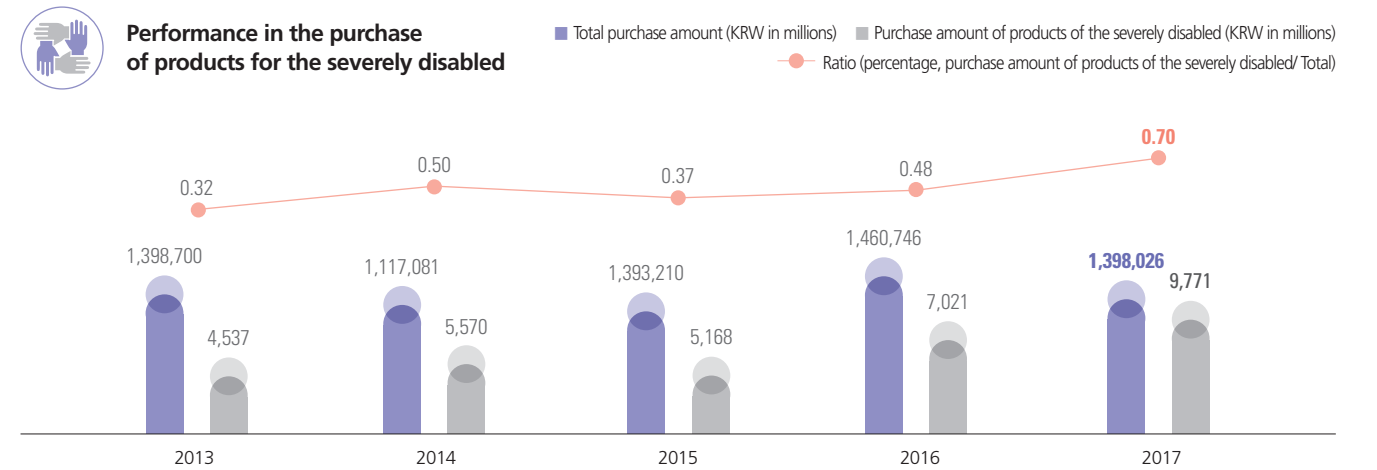
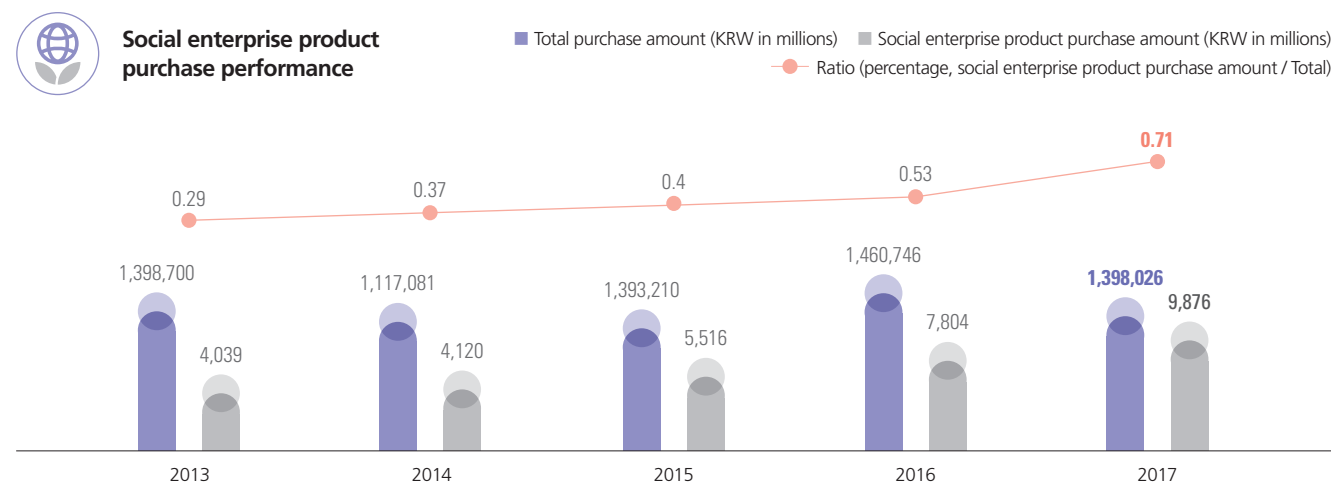
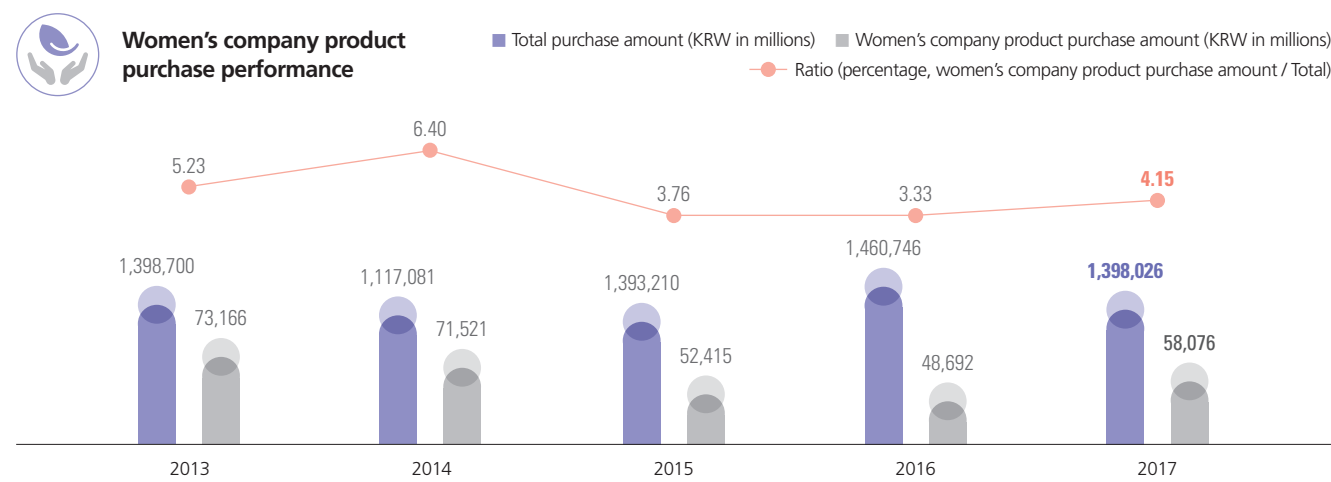
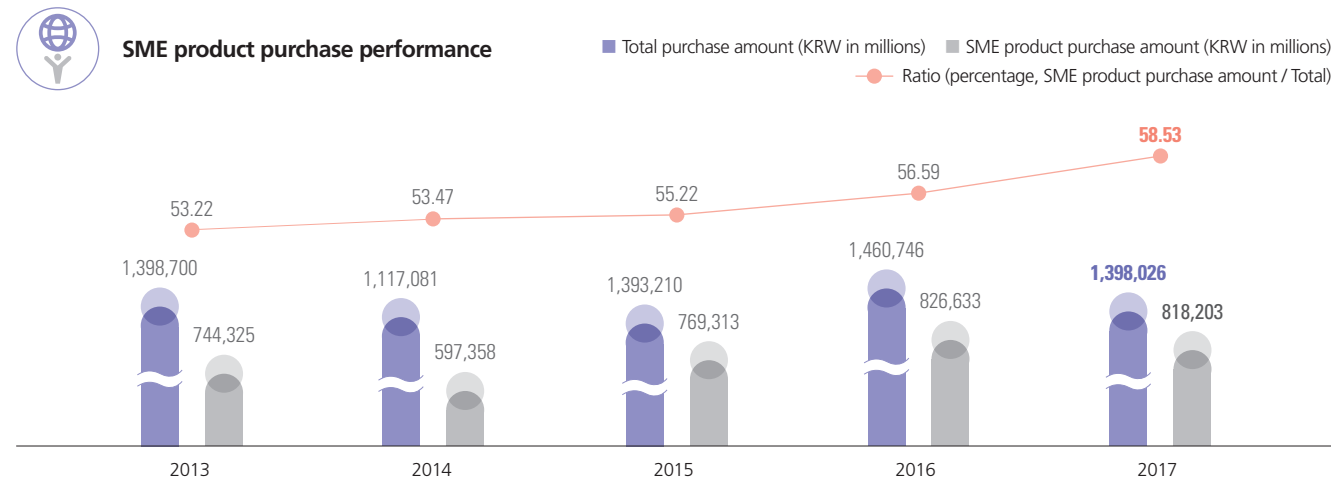


*Grading system applied since 2015

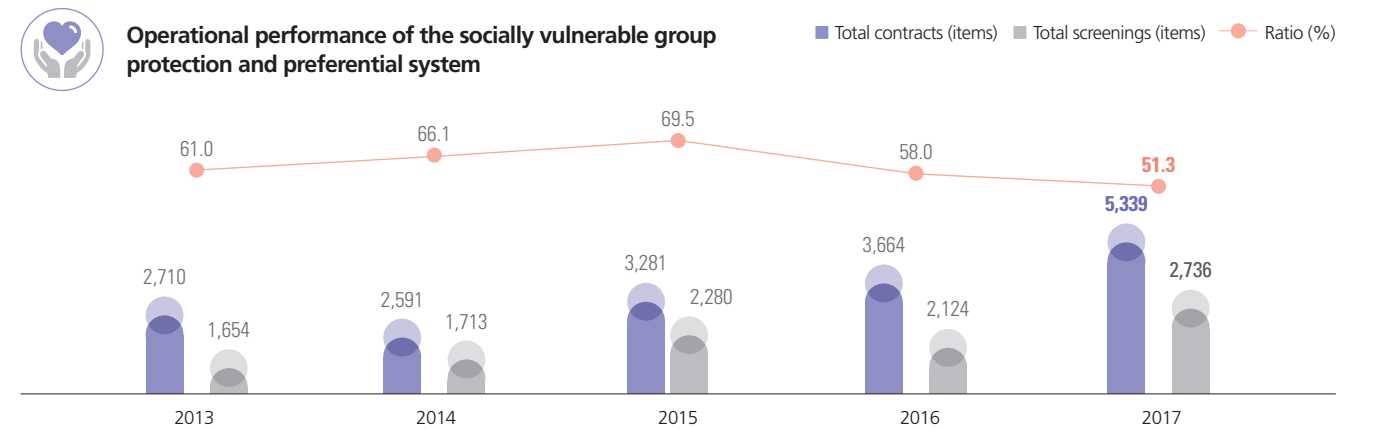
Communication with customers



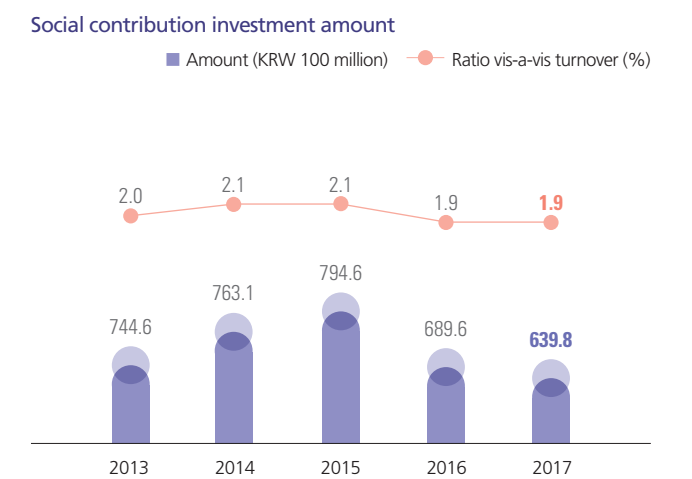
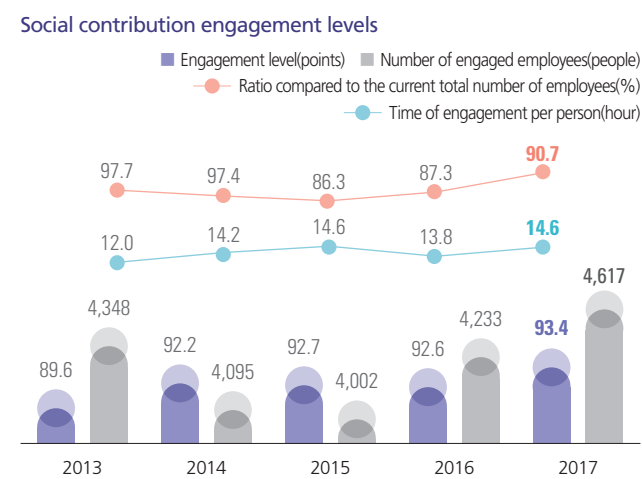
I Horizontal partnership and vertical growth



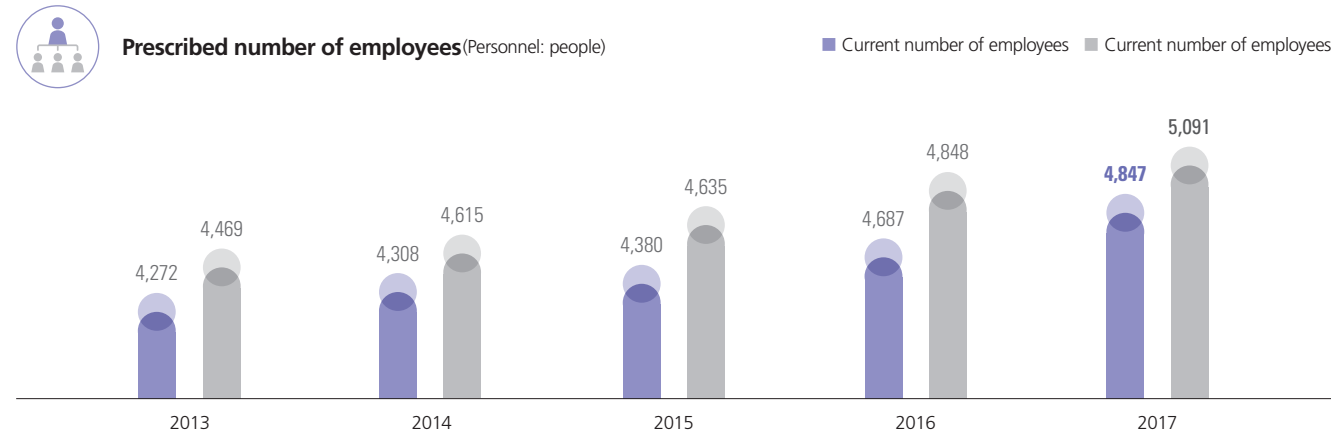
I Together with local communities



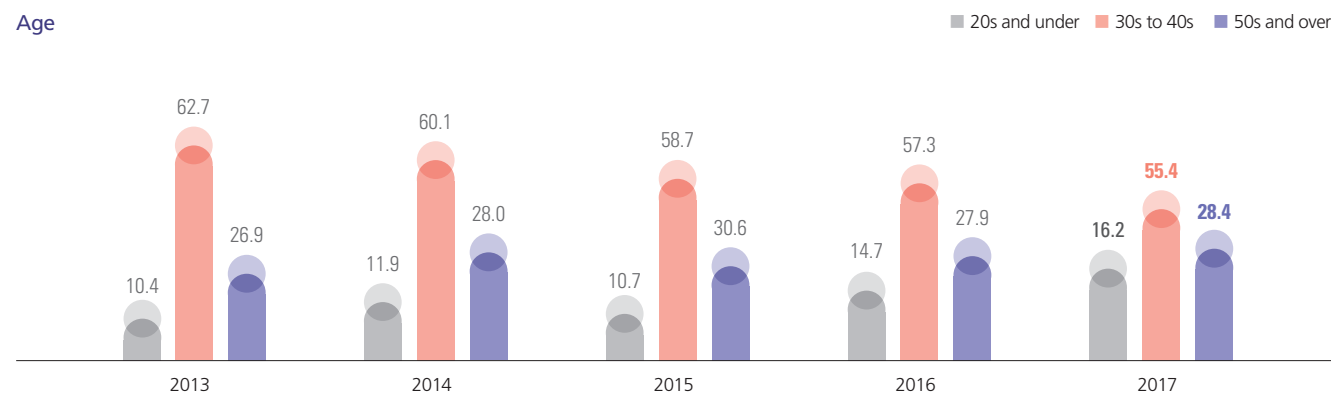
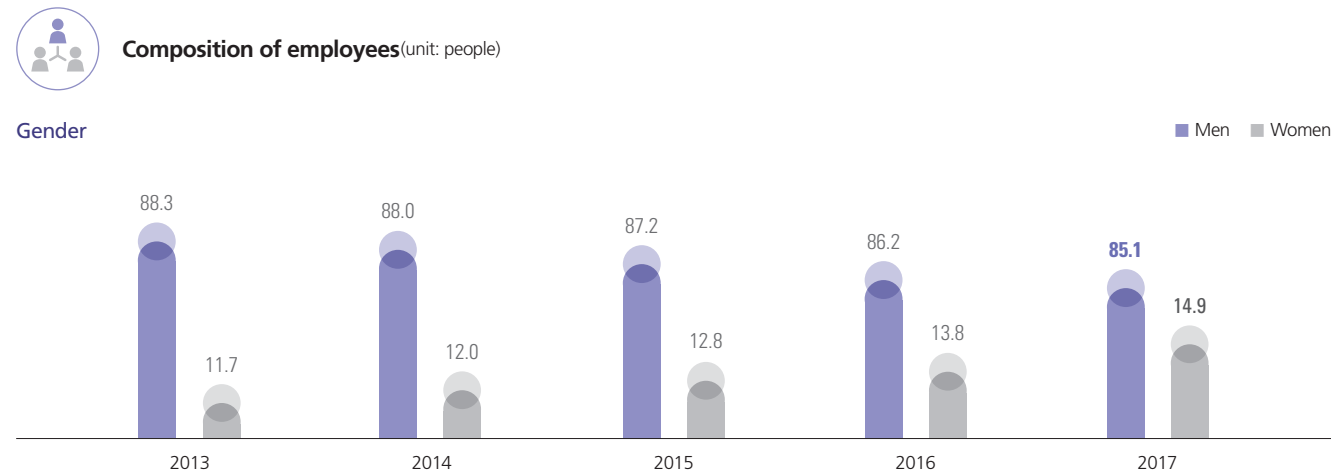
Social contributions



I Workplace assured of fairness and diversity



*Current number of employees: total current number of regular employees, including employees for entrusted projects, on parental leave and in military service who are excluded from the data disclosed in the ALIO system



Composition of employees by employment type

Category	2013		2014		2015		2016		2017	
	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)
Current No. of employees										
Executives										
Total	7	-	7	-	7	-	7	-	7	-
Age										
20s and under	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0
30s to 40s	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0
50s and over	7	100.0	7	100.0	7	100.0	7	100.0	7	100.0
Gender										
Male	7	100.0	7	100.0	7	100.0	7	100.0	7	100.0
Female	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0
General										
Total	3,682	-	3,717	-	3,726	-	3,826	-	3,956	-
Age										
20s and under	367	10.0	388	10.4	393	10.5	479	12.5	582	14.7
30s to 40s	2,385	64.8	2,335	62.8	2,324	62.4	2,323	60.7	2,337	59.1
50s and over	930	25.3	994	26.7	1,009	27.1	1,024	26.8	1,037	26.2
Gender										
Male	3,287	89.3	3,301	88.8	3,283	88.1	3,317	86.7	3,380	85.4
Female	395	10.7	416	11.2	443	11.9	509	13.3	576	14.6
Operating										
Total	233	-	366	-	434	-	499	-	672	-
Age										
20s and under	94	40.3	159	43.4	202	46.5	233	46.7	239	35.6
30s to 40s	110	47.2	174	47.5	191	44.0	220	44.1	333	49.6
50s and over	29	12.4	33	9.0	41	9.4	46	9.2	100	14.9
Gender										
Male	224	96.1	341	93.2	397	91.5	449	90.0	518	77.1
Female	9	3.9	25	6.8	37	8.5	50	10.0	154	22.9
Professional										
Total	153	-	156	-	176	-	192	-	197	-
Age										
20s and under	1	0.7	-	0.0	1	0.6	2	1.0	1	0.5
30s to 40s	111	72.5	112	71.8	125	71.0	127	66.1	140	71.1
50s and over	41	26.8	44	28.2	50	28.4	63	32.8	56	28.4
Gender										
Male	138	90.2	140	89.7	158	89.8	170	88.5	171	86.8
Female	15	9.8	16	10.3	18	10.2	22	11.5	26	13.2
Special										
Total	394	-	369	-	292	-	324	-	259	-
Age										
20s and under	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0
30s to 40s	189	48.0	155	42.0	128	43.8	110	34.0	11	4.2
50s and over	205	52.0	214	58.0	164	56.2	214	66.0	248	95.8
Gender										
Male	291	73.9	272	73.7	199	68.2	234	72.2	258	99.6
Female	103	26.1	97	26.3	93	31.8	90	27.8	1	0.4



Employment of minority workforce

Category	2013		2014		2015		2016		2017	
	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)
Total No. of new recruits	252		261		220.5		309.75		327.5	
Type										
Selective working hours	0	0	12	0.46	10	4.54	13	4.2	13	4.0
Women	47	18.7	42.25	16.2	41.75	18.9	87.25	28.2	92.5	28.24
Disabled	4	1.6	7.5	2.9	4.75	2.2	5	1.6	3	0.92
Non-capital area talents	161	63.9	175.5	67.2	119.75	54.3	157.25	50.77	171.5	52.37
High-school graduates	71	28.2	86	33	54.75	24.8	62.5	20.2	57	17.4

*Ratio (%) : ratio versus total number of new recruits

Non-regular employment

Category	2013		2014		2015		2016		2017	
	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)
Total No. of new recruits	414	8.5	403	8.1	359	7.2	360.81	6.92	161.63	2.99
Type										
Short-term employees	340	7.0	322	6.5	323	6.5	343	6.58	153	2.83
Part-time employees	74	1.5	66	1.3	21	0.4	17.85	0.3	8.63	0.16
Other temporary employees	0		15	0.3	15	0.3	0		0	

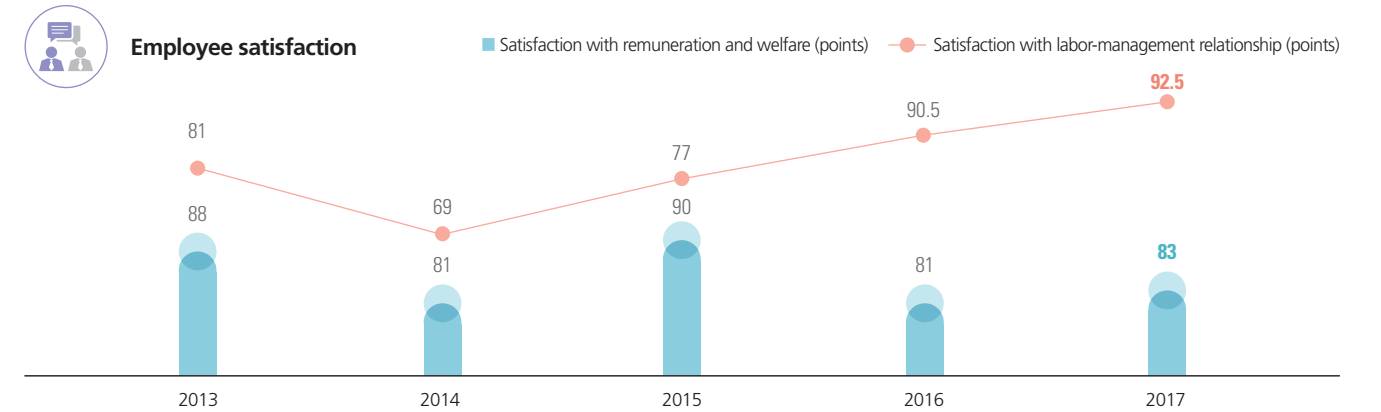
*Ratio (%) = temporary employees / (temporary employees + non-fixed term contract employees + regular employees)

Turnover status (unit: %, people)



*Ratio (%): calculated based on the current number of employees

I Pleasant workplace that harmonizes work and family life



Creation of a corporate culture for balance of work and family life

- Expanding flexible work**
 - Increasing Smart Work Centers and at-home work on alternating workdays and days off
 - Operating various types of part-time and flexible work systems
- Improving working practices**
 - Operating "Family Day" (every Wednesday)
 - Implementing shutdown of electricity and mandatory PC shutdown at 7 p.m. during weekdays, and PC shutdown on weekends
 - Enhancing work efficiency through improvement of working process
 - Improving meeting practices
- Responding to the national childbirth promotion policy**
 - Operating maternity leave and parental leave pre-notification system
 - Operating a daycare center in the workplace (expanding the maximum accepted number of children by converting idle facilities to childcare facilities)
- Supporting the balance of work and life**
 - Providing family-engaging education such as couple coaching, father school (parenting program), etc.
 - Continuously adding recreational facilities, expanding support for employee recreational clubs, cultural performances, etc.

Workplace safety

(Unit: KRW in millions)

Category	2013		2014		2015		2016		2017	
	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)	Personnel (people)	Ratio (%)
Injuries	10	0.22	7	0.16	13	0.30	10	0.23	9	0.19
Occupational diseases	0	0.00	0	0.00	0	0.00	0	0	0	0
Industrial accident rate		0.08		0.06		0.25		0.23		0.11
Disease prevalence		7.0		6.7		8.7		457		8.8
										10.8

*Ratio (%): Ratio of personnel compared with the current number of employees



Status of flexible work

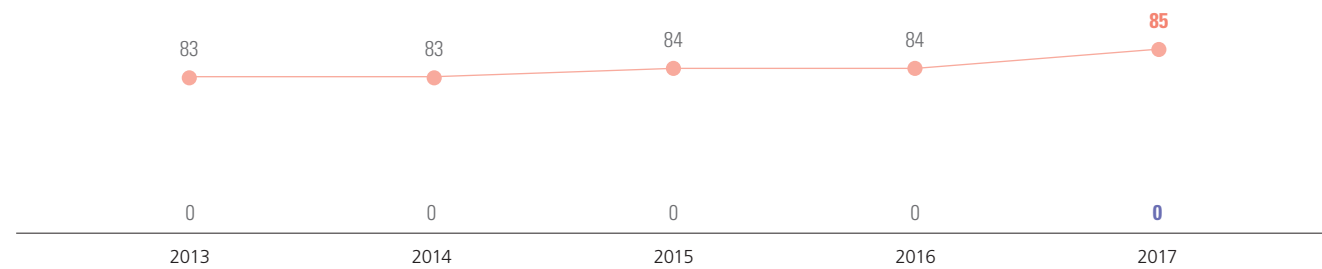
Category	2013	2014	2015	2016	2017
Part-time	New recruits	0	12	10	13
	Conversion	2	28	31	29
Flexible work	Staggered office hours	662	858	978	1828
	Flexible working hours	0	0	0	0
	Intensive work	3	3	5	14
	Discretionary work schedule	0	0	0	0
	At-home work	0	0	9	0
Smart work	0	0	0	6	0

*Ratio (%): calculated based on the current number of employees



Labor-management relations

■ Number of labor disputes (item) ● Rate of labor union membership (%)

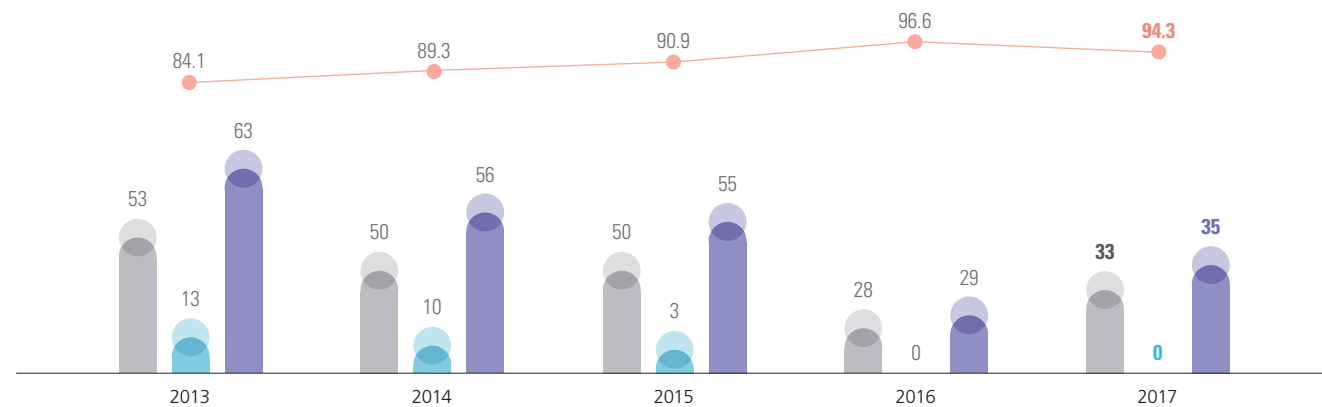


*Ratio (%): calculated based on the current number of employees (including those not qualified for membership such as those at grade 2 or in higher positions)



Record of grievance settlements

■ Number of settled grievances (items) ■ Number of grievances that have been received previously, but was settled in the following year or later on (items) ■ Total number of grievances (items) ● Settlement ratio (%)

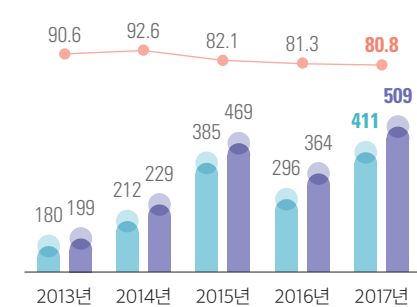


Environmental performances | Expanding environmental considerations for the entire corporate supply chain



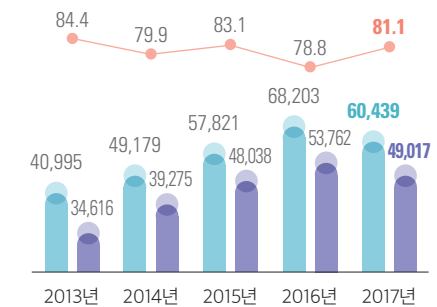
Purchase of green products

Purchase of green products
 ■ Purchase amount of green products (KRW 100 million)
 ■ Purchase amount of green products (KRW 100 million)
 ● Purchase ratio of green products (%)



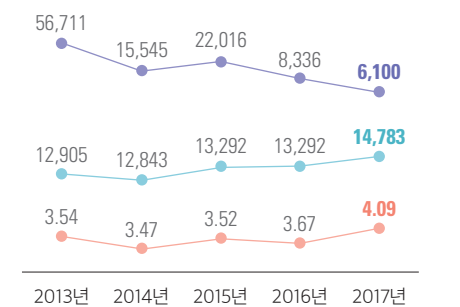
Water

■ Used (discharged) amount (thousand m)
 ■ Used (discharged) amount (thousand m)
 ● Recycled ratio (%)



Energy

● Recycled ratio (%)
 ● Consumption intensity (TJKRW 100 million)
 ● Reduced amount (MWh)



Output

(Unit: KRW in millions)

Category	2013	2014	2015	2016	2017	Standard for discharged water quality		
Quality of discharged water	Water purification plant	BOD(mg/l)	2.0	1.7	1.4	1.9	2.2	10 or lower
		COD(mg/l)	3.3	3.4	4.5	3.9	4.3	20 이하
		SS(mg/l)	2.4	1.6	2.0	2.0	2.2	10 이하
Sewage treatment plant		BOD(mg/l)	1.5	1.8	1.9	2.3	2.6	5 이하
		COD(mg/l)	6.8	6.6	7.6	8.0	9.4	20 이하
		SS(mg/l)	3.0	2.5	2.9	2.8	3.0	10 이하
Effluent treatment facility		BOD(mg/l)	6.0	6.3	6.8	5.9	5.4	20 이하
		SS(mg/l)	5.4	6.0	6.2	5.6	5.3	20 이하

*The highest requirements for each facility in accordance with the Water Quality and Water Ecosystem Conservation Act/ Sewerage Act

Category	2013	2014	2015	2016	2017	
Greenhouse gases	Total emissions (ton CO ₂)	631,431	624,660	646,559	651,687	720,687
	Carbon cleanliness (ton CO ₂ /TOE)	17.32	16.89	17.12	18.01	19.92
	Reduced amount (ton CO ₂)*	79,702	60,551	29,133	50,615	4,522
Emissions of air pollutants	Fine dust(kg)	226	220	256	226	210
	SOx(kg)	1,628	1,443	1,671	1,559	1,476
	CO(kg)	4,568	4,223	5,565	3,050	1,031
	HC(kg)	1,197	1,106	1,470	766	202
	NOx(kg)	11,566	10,892	14,166	8,038	3,275

*GHG reduction target pursued since 2012. The goal of 2014 includes the reduced amounts of the previous years in addition to that of the year.

Category		2013	2014	2015	2016	2017	
Waste	Water purification plants	Generated amount (tons)	110,027	110,397	107,388	119,898	121,581
		Generated amount compared to the quantity of supplied water (g/m ³)	54.2	55.3	52.3	56.4	59.9
		Recycling rate (%)	100	100	100	100	100
		Raw material of cement	83.8	40	43	61	37
		Soil covering material, fill dirt material	12.4	57	50	39	63
	Green soil, pebbles, etc.	3.8	3	7	0	0	
Sewage treatment plants	Generated amount (tons)	39,565	42,083	37,894	37,856	60,808	
	Recycling rate (%)	49	59	65	89	48.7	
Construction sites	Generated amount (tons)	496,260	520,149	4,230,643	814,978	132,986	
	Waste concrete	255,578	258,881	4,143,304	139,839	63,556	
	Waste ascon	121,827	218,061	17,376	71,479	69,056	
	Wood waste	69,669	1,646	145	1,215	0	
	Waste synthetic resin	1,314	183	525	236	278	
	Mixed waste	47,873	41,377	69,292	602,218	96	
	Recycling rate (%)	96.8	98.9	99.1	99.9	100	
	Waste concrete	98.9	99.5	99.2	99.9	63,556	
	Waste ascon	99.2	99.7	100	100	69,056	
	Wood waste	100	100	100	100	0	
	Waste synthetic resin	14.1	100	100	100	278	
Mixed waste	76.7	91.5	96.4	99.2	96		

Post-environmental impact investigation of construction sites (2017)

Category	Hantan Dam	Gimcheon Buhang Dam	Seongdeok Dam	Yeongju Dam	Bohyeonsan Dam	Environmental criteria	
Water quality environment	BOD(mg/L)	4.6	1.6	1.8	1.1	2.2	3 or lower
	COD(mg/L)	3.0	3.0	3.1	3.3	4.7	5 or lower
Atmospheric environment	PM-10(μg/m ³)	-	36.5	-	30.3	36.3	50 or lower
	NO2(ppb)	-	14.0	-	11.0	6.9	30 or lower
Noise and vibration	Noise (dBA)	-	46.5	-	44.5	43.6	65
	Vibration (dBV)	-	24.4	-	20.7	24.7	65

* In the case of the Hantan Dam and Seongdeok Dam, post-environmental impact investigations have been conducted while the dams were in operation after the completion of the construction.(Atmospheric quality and noise and vibration levels have not yet been measured).

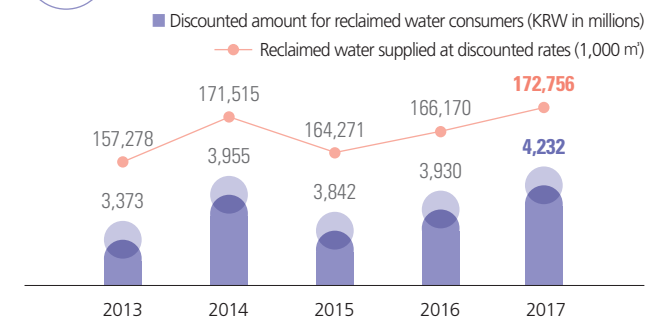
Category	Hantan Dam	Gimcheon Buhang Dam	Seongdeok Dam	Yeongju Dam	Bohyeonsan Dam	
Mammals	Total species	11	14	13	14	13
	Legally protected species	1	2	2	2	2
	Legally protected species (detail)	Hantan Dam: wildcat/ Gimcheon Buhang Dam, Seongdeok Dam, Yeongju Dam, Bohyeonsan Dam: otter and wildcat				
Fish	Total species	22	13	17	23	20
	Legally protected species	1	0	0	0	0
	Legally protected species (detail)	Hantangang Dam: Cyprinid Fish				
Amphibians & reptiles	Total species	16	12	7	11	15
	Legally protected species	1	0	0	0	0
	Legally protected species (detail)					
Birds	Total species	40	52	42	69	51
	Legally protected species	4	3	0	6	10
	Legally protected species (detail)	Gimcheon Buhang Dam: Eurasian hobby, Grey Frog Hawk, kestrel, and mandarin duck Yeongju Dam: Black-headed stork, mandarin duck, sparrow hawk, kestrel, Eurasian hobby, and long-billed ringed plover Bohyeonsan Dam: whooper swan, mandarin duck, kestrel, scops owl, collared scops owl, long-billed ringed plover, eagle-owl, Korean buzzard, goshawk, and sparrow hawk				

* In the case of the Hantan Dam, due to the reduced number of investigations and survey sites, the number of legally protected species observed in the dam area decreased compared to 2016.

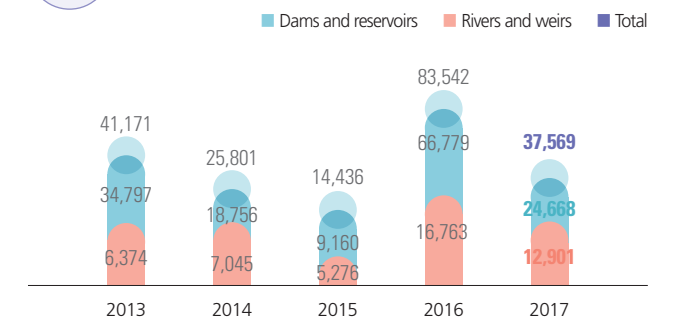
I Efforts to preserve and improve the local environment



Promotion of reclaimed water use through rate discounts for consumers of water



Disposal of waste that flowed into dams, reservoirs and rivers (m³)



Creation of local eco-cultural spaces

Category	2013	2014	2015	2016	2017	
Total	Alternative habitat (No. of places)	45	52	54	54	53
	Fish spawning ground (No. of places)	12	11	11	13	13
	Eco-corridor (No. of places)	116	116	116	116	116
	Artificial marsh (No. of places)	17	17	17	20	20
	Fishway (No. of places)	4	4	4	5	5
Gunwi Dam	Alternative habitat (No. of places)	6	6	6	6	5
	Fish spawning ground (No. of places)	5	5	5	5	5
	Eco-corridor (No. of places)	6	6	6	6	6
	Artificial marsh (No. of places)	6	6	6	6	6
	Fishway (No. of places)	0	0	0	0	0
Gunnam Dam	Alternative habitat (No. of places)	8	8	8	8	8
	Fish spawning ground (No. of places)	0	0	0	0	0
	Eco-corridor (No. of places)	6	6	6	6	6
	Artificial marsh (No. of places)	1	1	1	1	1
	Fishway (No. of places)	1	1	1	1	1
Hantan Dam	Alternative habitat (No. of places)	0	0	0	0	0
	Fish spawning ground (No. of places)	0	0	0	0	0
	Eco-corridor (No. of places)	7	7	7	7	7
	Artificial marsh (No. of places)	0	0	0	0	0
	Fishway (No. of places)	0	0	0	0	0
Gimcheon Buhang Dam	Alternative habitat (No. of places)	12	12	12	12	12
	Fish spawning ground (No. of places)	2	3	3	3	3
	Eco-corridor (No. of places)	46	46	46	46	46
	Artificial marsh (No. of places)	4	4	4	4	4
	Fishway (No. of places)	3	3	3	3	3
Seongdeok Dam	Alternative habitat (No. of places)	15	22	24	24	24
	Fish spawning ground (No. of places)	5	3	3	3	3
	Eco-corridor (No. of places)	45	45	45	45	45
	Artificial marsh (No. of places)	2	2	2	2	2
	Fishway (No. of places)	0	0	0	0	0
Yeongju Dam	Alternative habitat (No. of places)	0	0	0	0	0
	Fish spawning ground (No. of places)	0	0	0	1	1
	Eco-corridor (No. of places)	1	1	1	1	1
	Artificial marsh (No. of places)	0	0	0	3	3
	Fishway (No. of places)	0	0	0	1	1
Bohyeonsan Dam	Alternative habitat (No. of places)	4	4	4	4	4
	Fish spawning ground (No. of places)	0	0	0	1	4
	Eco-corridor (No. of places)	5	5	5	5	5
	Artificial marsh (No. of places)	4	4	4	4	4
	Fishway (No. of places)	0	0	0	0	0

Third Party's Assurance Statement

I To the Readers of K-water 2018 Sustainability Report :

Foreword

Korea Management Registrar Inc. (hereinafter "KMR") has been requested by of Korea Water Resources Corporation (hereinafter "K-water") to verify the contents of its 2018 Sustainability Report (hereinafter "the Report"). K-water is responsible for the collection and presentation of information included in the Report. KMR's responsibility is to carry out assurance engagement on specific data and information in the assurance scope stipulated below.

Scope and standard

K-water describes its efforts and achievements of the corporate social responsibility activities in the Report. KMR performed a Type 2, moderate level of assurance using AA1000AS (2008) as an assurance standard. KMR's assurance team(hereinafter "the team") evaluated the adherence to Principles of Inclusivity, Materiality and Responsiveness, and the reliability of the selected GRI Standards indices as below, where professional judgment of the team was exercised as materiality criteria.

The team checked whether the Report has been prepared in accordance with the 'Core Option' of GRI Standards which covers the followings.

- GRI Reporting Principles
- Universal Standards
- Topic Specific Standards
- Management approach of Topic Specific Standards
- Anti-Corruption: 205-1, 205-2
- Anti-Competitive Behavior: 206-1
- Water: 303-1, 303-2, 303-3
- Biodiversity: 304-1, 304-2, 304-3, 304-4
- Emissions: 305-1, 305-2, 305-3, 305-5, 305-6, 305-7
- Effluents and Waste: 306-2, 306-3
- Environmental Compliance: 307-1
- Employment: 401-1, 401-2
- Local Communities: 413-1
- Supplier Social Assessment: 414-1, 414-2
- Customer Health and Safety: 416-1, 416-2

This Report excludes a data sand information of joint corporate, contractor etc. which is outside of the organization, i.e. K-water, among report boundaries.

Our approach

In order to verify the contents of the Report within an agreed scope of assurance in accordance with the assurance standard, the team has carried out an assurance engagement as follows:

- Reviewed overall report
- Reviewed materiality test process and methodology
- Reviewed sustainability management strategies and targets
- Reviewed stakeholder engagement activities
- Interviewed people in charge of preparing the Report

Our conclusion

Based on the results we have obtained from material reviews and interviews, we had several discussions with K-water on the revision of the Report. We reviewed the Report's final version in order to confirm that our recommendations for improvement and our revisions have been reflected. When reviewing the results of the assurance, the assurance team could not find any inappropriate contents in the Report to the compliance with the principles stipulated below. Nothing has come to our attention that causes us to believe that the data included in the verification scope are not presented appropriately.

● Inclusivity

Inclusivity is the participation of stakeholders in developing and achieving an accountable and strategic response to sustainability

- K-water is developing and maintaining stakeholder communication channels in various forms and levels in order to make a commitment to be responsible for the stakeholders. The assurance team could not find any critical stakeholder K-water left out during this procedure.

● Materiality

Materiality is determining the relevance and significance of an issue to an organization and its stakeholders. A material issue is an issue that will influence the decisions, actions, and performance of an organization or its stakeholders.

- K-water is determining the materiality of issues found out through stakeholder communication channels through its own materiality evaluation process, and the assurance team could not find any critical issues left out in this process.

● Responsiveness

Responsiveness is an organization's response to stakeholder issues that affect its sustainability performance and is realized through decisions, actions, and performance, as well as communication with stakeholders.

- The assurance team could not find any evidence that K-water's counter measures to critical stakeholder issues were inappropriately recorded in the Report.

We could not find any evidence the Report was not prepared in accordance with the 'Core Option' of GRI Standards.

Recommendation for improvement

We hope the Report is actively used as a communication tool for stakeholders and we recommend the following for improvements.

- Establishment of sustainable management system: K-Water has made impressive effort to determine and prevent different organizational risks in advance in the context of social responsibility. To pursue sustainability in a more systematic way, the organization is advised to develop both short-term and long-term quantitative objectives for the implementation of sustainable strategies and set up a dedicated team to report the progress.
- Strengthening stakeholder inclusiveness: K-Water is advised to segment stakeholders, identify their individual expectations, report the organization's responses and results, and disclose the possible impact on each stakeholder of key issues identified by materiality assessment as well as performance.

Our independence

With the exception of providing third party assurance services, KMR is not involved in any other K-water's business operations that are aimed at making profit in order to avoid any conflicts of interest and to maintain independence.

GRI Standards/ ISO26000

Material topics	Topic	Disclosure	Verification			
			ISO 26000	Page	Omissions/Comments	Assurance
General increase in interest of governance responsible management)	Organizational Profile	102-1 Name of organization	6.3.10/ 6.4.1-6.4.2/	13		✓
		102-2 Activities, brands, products, and services	6.4.3/ 6.4.4/ 6.4.5/	13		✓
		102-3 Location of headquarters	6.8.5/ 7.8	13		✓
		102-4 Location of operations		14		✓
		102-5 Nature of ownership and legal form		13		✓
		102-6 Nature of ownership and legal form		14		✓
		102-7 Scale of the organization		13		✓
		102-8 Information on employees and other workers		13		✓
		102-9 Organization's supply chain		69		✓
		102-10 Significant changes to the organization and its supply chain		12		✓
		102-11 Precautionary principle or approach		72-79		✓
		102-12 External initiatives		56-57		✓
		102-13 Memberships of associations		82		✓
	Strategy	102-14 Statement from senior decision-maker	4.7/ 6.2/ 7.4.2	4-5, 103		✓
		102-15 Key impacts, risks, and opportunities		4-5		✓
	Ethics and Integrity	102-16 Values, principles, standards, and norms of behavior	4.4/ 6.6.3	100-101		✓
Governance	102-18 Governance structure	6.2/ 7.4.3/ 7.7.5	19-20		✓	
Stakeholder Engagement	102-40 List of stakeholder groups engaged by the organization	5.3	21		✓	
	102-41 Collective bargaining agreements		77		✓	
	102-42 Identifying and selecting stakeholders		21		✓	
	102-43 Approach to stakeholder engagement		22		✓	
	102-44 Key topics and concerns that have been raised through stakeholder engagement		24-25		✓	
Reporting Practice	102-45 List of all entities included in the organization's consolidated financial statements (subsidiary and joint venture)	5.2/ 7.3.2/ 7.3.3/ 7.3.4	13		✓	
	102-46 Defining report content and topic boundaries		24		✓	
	102-47 List of material topics		About This Report		✓	
	102-48 Restatements of information		About This Report		✓	
	102-49 Changes in reporting	7.5.3/ 7.6.2	About This Report		✓	
	102-50 Reporting period		About This Report		✓	
	102-51 Date of most recent report		About This Report		✓	
	102-52 Reporting cycle		About This Report		✓	
	102-53 Contact point for questions regarding the report		About This Report		✓	
	102-54 Claims of reporting in accordance with the GRI Standards GRI content index		98		✓	
	102-55 External assurance		104-105		✓	
	Anti-corruption Increase in requirements of transparency and ethical management from enterprise	Anti Corruption	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	72, 73	
205-1 Operations assessed for risks related to corruption			6.6.1-6.6.2/ 6.6.3	72, 73		✓
205-2 Communication and training on anti-corruption policies and procedures				72, 73		✓
Increase in requirements of fair trade	Anti-Competitive Behavior	103 Management Approach	6.3.10/ 6.4.1-6.4.2	52-54		✓
		206-1 Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	6.6.1-6.6.2/ 6.6.5/ 6.6.7	9, 52-54		✓

Material topics	Topic	Disclosure	Verification			
			ISO 26000	Page	Omissions/Comments	Assurance
Water use Depletion of natural resources (water, mineral resources, fossil fuels)	Water	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	29-30		✓
		303-1 Water withdrawal by source	6.5.4	41-44		✓
		303-2 Water sources significantly affected by withdrawal of water		29-30		✓
		303-3 Water recycled and reused		95		✓
	Biodiversity	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	96		✓
		304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	6.5.6	96, 97		✓
		304-2 Significant impacts of activities, products, and services on biodiversity		96		✓
		304-3 Habitats protected or restored		97		✓
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations		96		✓		
Climate change Prevention of environmental pollution (pollution of atmosphere, water quality, and soil) Reduction of energy use (producing renewable energy, such as hydropower)	Emissions	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	70		✓
		305-1 Direct (Scope 1) GHG emissions	6.5.5	70, 95		✓
		305-2 Energy indirect (Scope 2) GHG emissions		70, 95		✓
		305-3 Other indirect (Scope 3) GHG emissions		-	Not applicable	✓
		305-5 Reduction of GHG emissions		70, 95		✓
		305-6 Emissions of ozone-depleting substances (ODS)	6.5.3/6.5.5	-	Not applicable	✓
		305-7 Nitrogen oxides (NOX), sulfur oxides (SOX), and other significant air emissions	6.5.3	95		✓
Effluents and Waste	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	69		✓	
	306-2 Waste by type and disposal method	6.5.3	69, 96		✓	
	306-3 Significant spills of harmful substances	4-5	-	Not applicable	✓	
Reinforcement of environmental regulations Compliance with laws and regulations of environmental area	Environmental Compliance	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	69		✓
		307-1 Non-compliance with environmental laws and regulations	4.6	-	Not applicable	✓
Enhancement of importance in securement of human resources	Employment	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	75-79		✓
		401-1 New employee hires and employee turnover	6.4.3	62-63, 91-92		✓
		401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	6.4.4/ 6.8.7	93		✓
		401-3 Parental leave	6.4.4	93		✓
Social contribution to local communities	Local Communities	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	64-67		✓
		413-1 Operations with local community engagement, impact assessments, and development programs	6.3.9/ 6.5.1-6.5.2 / 6.5.3/ 6.8	64-67		✓
Increased importance of corporate partnership with partners	Supplier Social Assessment	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	52-54		✓
		414-1 New suppliers screened using social criteria	6.3.3/6.3.4/6.3.5	53		✓
		414-2 Negative social impacts in the supply chain and actions taken	/6.6.6	52-54		✓
Increased safety requirements of products and services (water quality) Acceleration of technological advancement Intensifying competition (technological development, patents, overseas expansion, etc.) Diversified and enhanced increase of customers' requirements Increase of consumers thinking highly of health, green environment, and prosocial value Customer satisfaction to products and services	Customer Health and Safety	103 Management Approach	5.2/ 7.3.2/ 7.3.3/ 7.3.4	34		✓
		416-1 Assessment of the health and safety impacts of product and service categories	6.7.1-6.7.2/ 6.7.4/ 6.7.5/ 6.8.8	34		✓
		416-2 Incidents of non-compliance concerning the health and safety impacts of products and services	4.6/ 6.7.1-6.7.2/ 6.7.4/ 6.7.5/ 6.8.8	-	No violation	✓

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 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 practice customer-oriented management by approaching customers based on the management philosophy "The values of customers are our values."

We will provide water and waterfront spaces of the highest quality so as to ensure customer trust.

We will provide information and services for the safety and ownership protection of customers even before customers request them.

We will always be open to the advice and suggestions of customers, regularly accept opinions, and use them for the improvement of customer services.

We will perform our tasks without any discrimination to customers and will secure the profit of customers to the maximum by seeking out the most efficient management practices.

We promise that we will set the best service performance standards that K-water can provide and practice them in order to realize ideal goals on the side of customers.

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).

Support for the UN Global Compact's 10 Principles

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; and Principle 2: make sure that they are not complicit in human rights abuses.

Labour

Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;

Principle 4: the elimination of all forms of forced and compulsory labour;

Principle 5: the effective abolition of child labour; and Principle 6: the elimination of discrimination in respect of employment and occupation.

Environment

Principle 7: Businesses should support a precautionary approach to environmental challenges;

Principle 8: undertake initiatives to promote greater environmental responsibility; and

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



K-water, as the only public enterprise for water services in Korea, has contributed to the economic development and water welfare of Korea by providing clean and healthy water stably using scientific water management technologies and experience accumulated over 50 years in water infrastructure and management.

Especially, K-water has made diverse efforts to achieve the water-related SDGs established by the UN. To bridge the gap of water supply among regions, K-water is implementing improvements and expanding existing facilities. Furthermore, K-water is doing its best to secure stable water resources and manage water quality to achieve water sustainability. In addition, K-water is actively involved in new & renewable energy businesses relevant to water including floating photovoltaic systems and hydrothermal energy as an effort to respond to climate change.

K-water strengthened its water management and disaster response capabilities by establishing Integrated Water Resources Management (IWRM) and by introducing Smart Water Management (SWM) based on 4th industrial revolution technologies. Moreover, K-water is making efforts to apply Low Impact Development (LID) technology aimed at reinforcing the water circulation system for waterfront areas currently under development.

Also, with a keen interest to solve global water problems, K-water has proceeded with cooperative projects with global water-related associations and international organizations such as WWC, World Bank, ADB, and UNESCO. K-water has also been very active in establishing relevant governance and took the initiative to help establish Asia Water Council (AWC). As the chair nation of AWC, K-water is hoping to solve water problems in Asia by drawing active participation and support from Asian nations.

K-water is committed to achieving the United Nation's SDGs and gives its wholehearted support. K-water will endeavor to find various ways to improve the value and accessibility of water for all humanity.

[SDG 6, 7, 9, 11, 13, 17]

11 September 2017

Hak-Soo LEE

K-water CEO & President of Asia Water Council

Questionnaire for Readers

We welcome your valuable opinions. With a view to publishing a better sustainability report in the future, K-water wants to hear the opinions of various stakeholders including our readers about the 2018 sustainability report. Please complete the following and send it to the address listed at the bottom of this questionnaire by mail or fax.

1. Which of the following groups do you belong to?

- Customer Employee Government Local resident Partner NNGO and Civic Group Specialized organization Others()

2. How did you find this sustainability report?

- K-water's home page Media such as newspaper Web surfing K-water's employee Seminar/lecture Others()

3. For what purpose do you use this report? (Multiple responses are allowed)

- To get information about K-water To understand K-water's sustainability management activities
 To compare and analyze the characteristics of the industry to which K-water belongs For research and education
 Others()

4. Which section was most interesting to you in this report? (Multiple answers are allowed)

- K-water, 100 Years as the Leading National Water Company Water Safety Services
 Water Sharing Services Water Convergence Services
 Making a Happier Korea with Water Appendix

5. Which section requires more supplementing information? (Multiple answers are allowed)

- K-water, 100 Years as the Leading National Water Company Water Convergence Services
 Water Sharing Services Appendix
 Making a Happier Korea with Water
 Water Safety Services

6. Was this report helpful for you to have a better picture of K-water's sustainable management activities?

- Very helpful Helpful Moderately helpful Slightly helpful Not at all helpful

7. How satisfied are you with this report?

- Understanding of information Very Satisfied Satisfied Neither Satisfied Nor Unsatisfied Unsatisfied Very Dissatisfied
 • Accuracy of information Very Satisfied Satisfied Neither Satisfied Nor Unsatisfied Unsatisfied Very Dissatisfied
 • Quantity of information Very Satisfied Satisfied Neither Satisfied Nor Unsatisfied Unsatisfied Very Dissatisfied
 • Design Very Satisfied Satisfied Neither Satisfied Nor Unsatisfied Unsatisfied Very Dissatisfied

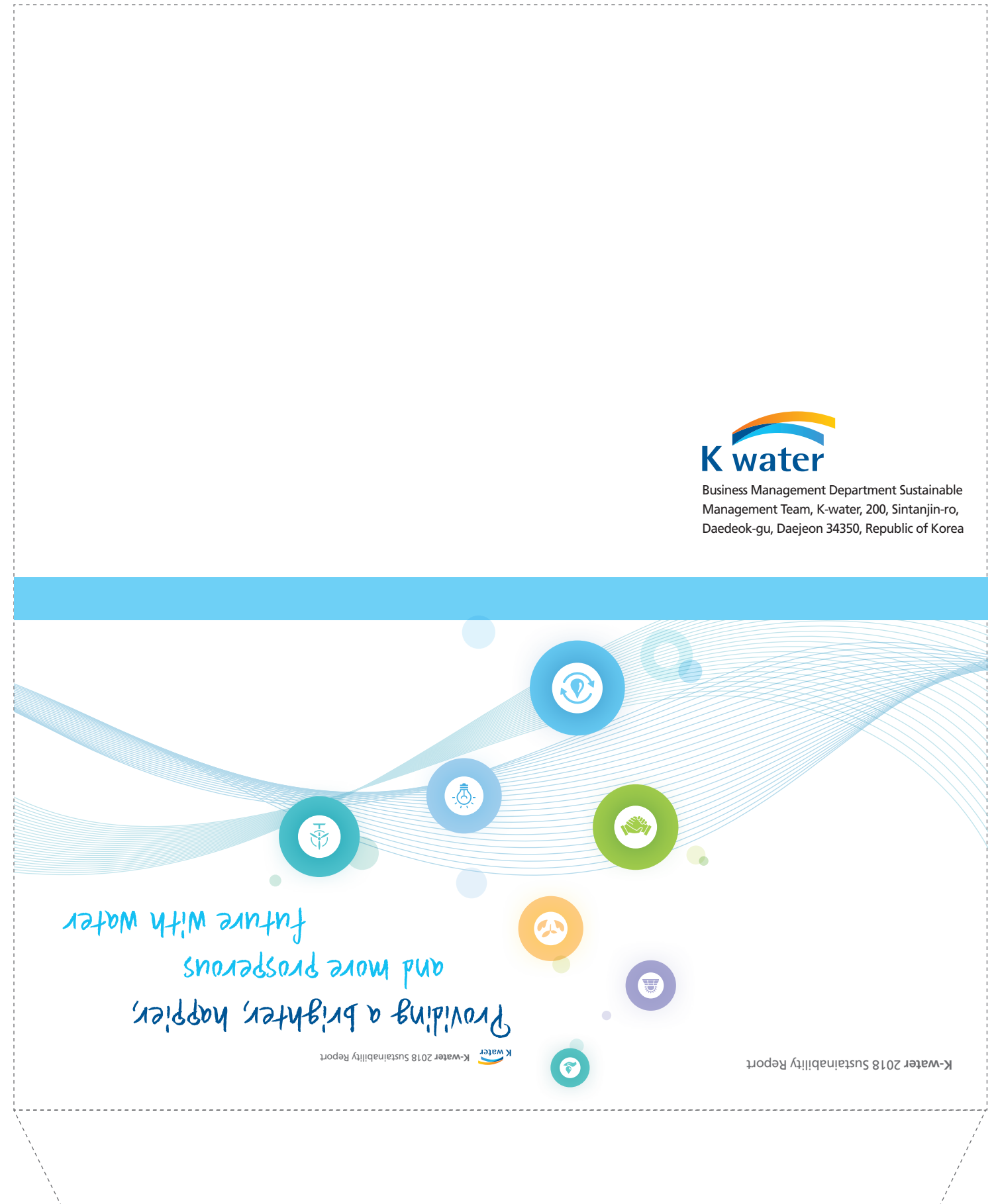
8. Feel free to write your opinions about the overall configuration and contents of the report.

Send to Business Management Department

Sustainable Management Team, K-water, 200, Sintanjin-ro, Daedeok-gu, Daejeon (34350) / Tel. 82-42-629-2356 to 8 / Fax. 82-42-629-2399



Business Management Department Sustainable
Management Team, K-water, 200, Sintanjin-ro,
Daedeok-gu, Daejeon 34350, Republic of Korea



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

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K-water will be the source of flowing that
embraces both humanity and nature