Devising HRD for Digital Transformation In Waterworks

2024

K water HRD Institute

Contents

Why Digital Transformation?

The transition to a digital platform government is actively taking place, utilizing the latest technologies to solve social problems and create value together with citizens, businesses, and the government	Since 2020, U.S. businesses have invested about $7 trillion in DX, with more than $6 billion going to startups and small businesses. (Furr et al., 2022)	To be competitive in the water industry, traditional analog elements embeded throughout the organization must be rapidly transformed into digital ones using Iot technologies and AI
Launch of the digital platform government	**Increasing investment in DX by many companies**	**DX is not an option, It is a must**

K-water's efforts for DX

K-water →

water -NET

2017
Establishment of a web-based water supply network system

ERP

2017
Integration of individual business systems

Digital Depart-ment

2020
Establishment of a digital innovation department

SWM & DT

2021
Starting to build a Digital Twin for the waterworks
- AI Water Treatment
- Smart Water Mangement
- Asset Management

Plans for DX

2023
Establishment of a plan to build a digital twin for the entire company (in all sectors)

Establishment of a DX department

Drinking water
Water resources
Global business
Complex business (Smart city)

DX implement-tation

2024
Establishment and implementation of a plan for DX across the entire water supply sector

Waterworks →

K-water's DX plan by 2030

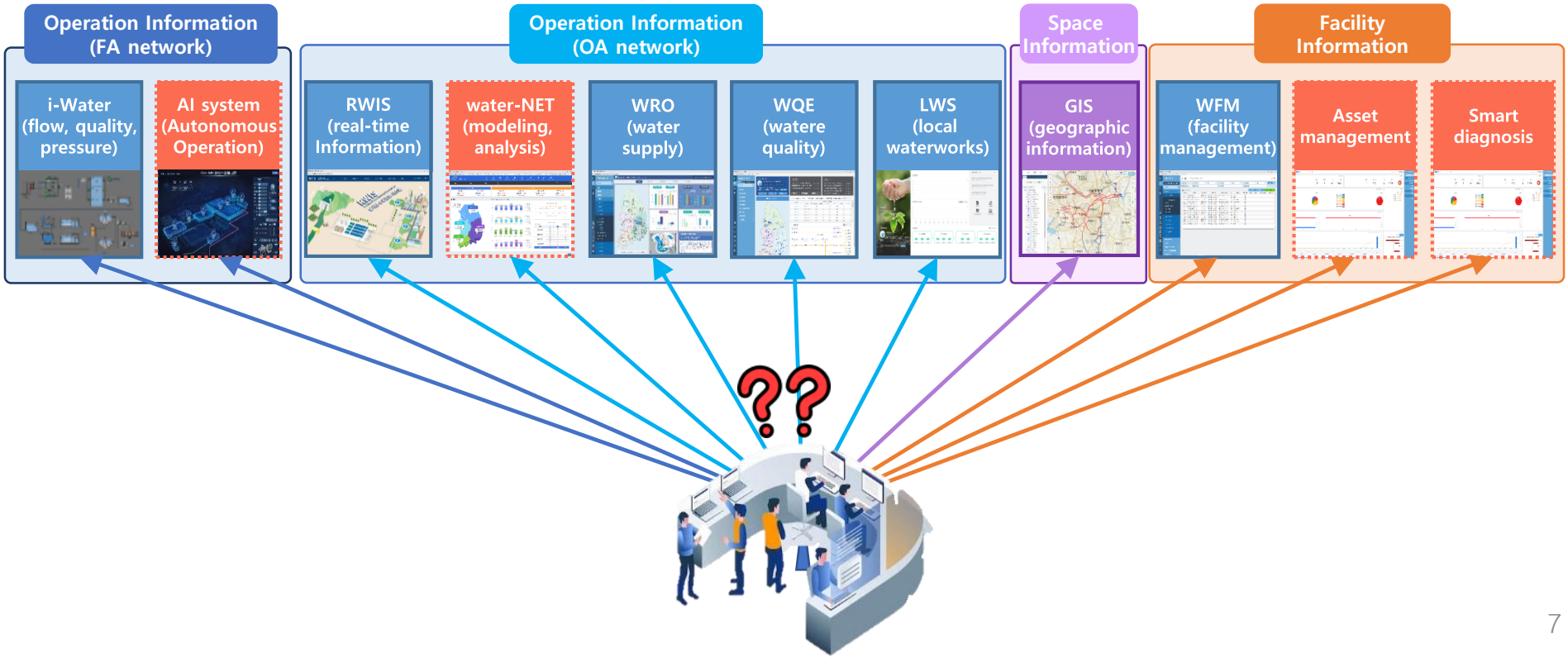
	2024	2025	2026	2027	2028	2029	2030
DX for waterworks	DX strategy, System establishment, ISP implementation	Complete ISP	Connect with DT for 10 facilites		System advacement and Complete all facilities		
Strengthening facility Infra							
1. Digtal Twin	Complete pilot project of Hwasung WTP	Expand and complete DT project for 42 WTP					
2. New tech, Smart Infra	Development and pilot operation of new tech, analyze the effects	Establish guidelines and expand			Apply to all waterworks facilities and add infra required		
Improving data usability							
1. Improving date management	Improve GIS-based data input methods, ISP implementation	Improve data management			Improve and enhance the system		
2. Establishing a digital-based risk management system	Advane AI detection, Revision of the network model building standard	Expand to all waterworks facilities					
Building a digital environment							
1. Collaborate across departments	Collaborate on the development of digital-related techs, conduct internal consulting, monitoring						
2. Organization, systems, HRD, PR	Recruiting professionals, Education, PR etc	Construct DT learning center, Develop and Improve DT tech review system, Advance education					
3. Commercializing digital solutions	Commercialize digital related techs	Build and sell techs modules		Transit to a digital tech-based portfolia stage			

K-water's DX plan by 2030

2024	2025	2026	2027	2028	2029	2030
DX strategy, System establishment, ISP implementation	Complete ISP	Connect with DT for 10 facilites		System advacement and Complete all facilities		
Complete pilot project of Hwasung WTP	Expand and complete DT project for 42 WTP					
Development and pilot operation of new tech, analyze the effects	Establish guidelines and expand			Apply to all waterworks facilities and add infra required		
Improve GIS-based data input methods, ISP implementation	Improve data management			Improve and enhance the system		
Advane AI detection, Revision of the network model building standard	Expand to all waterworks facilities					

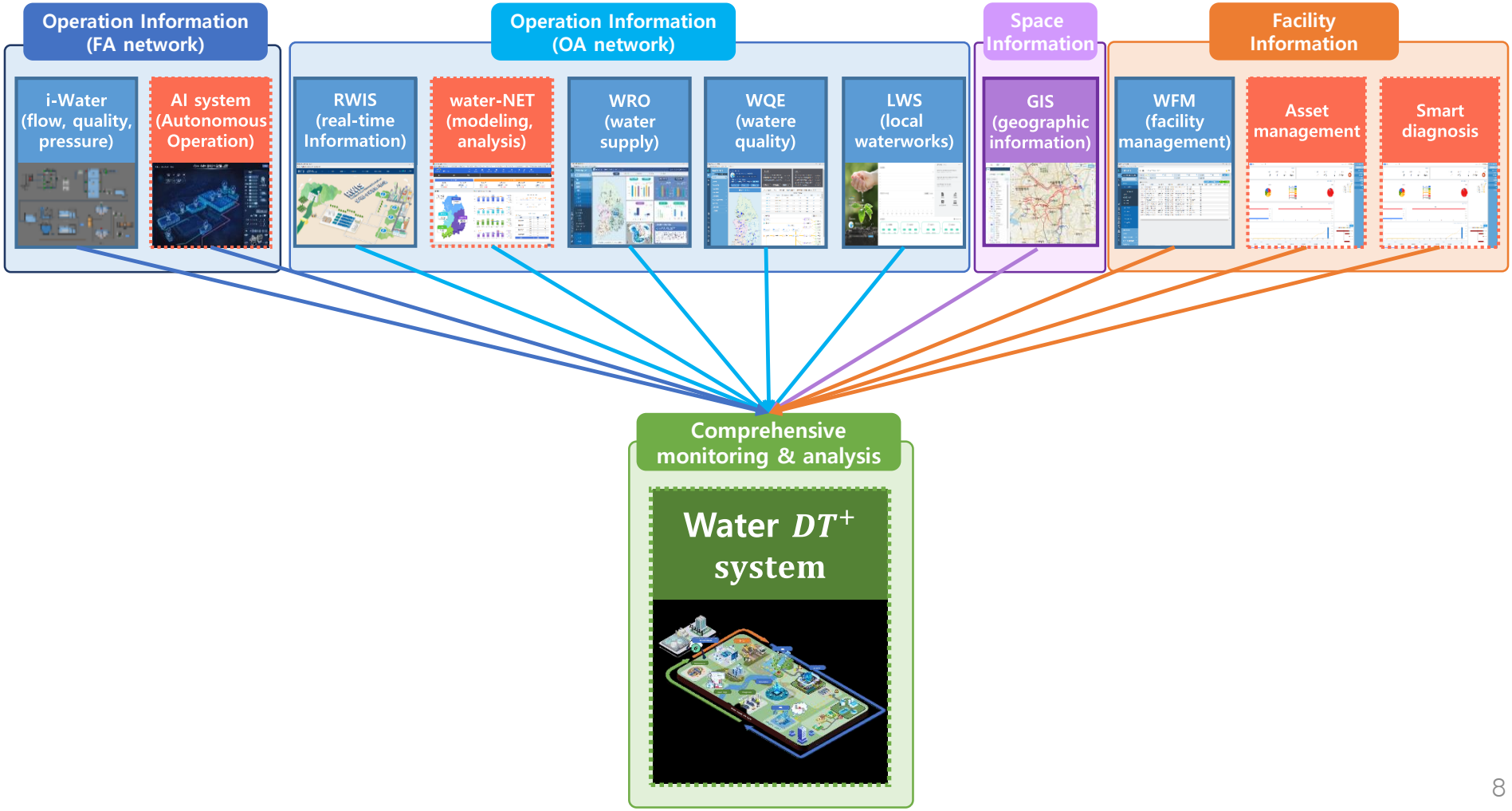
Challenges to overcome

- The systems of business function units are individually scattered, hindering users' accessibility to information and data usability.
- Insufficient spatial information mapping of facility and operation management data, and low accuracy of source data.



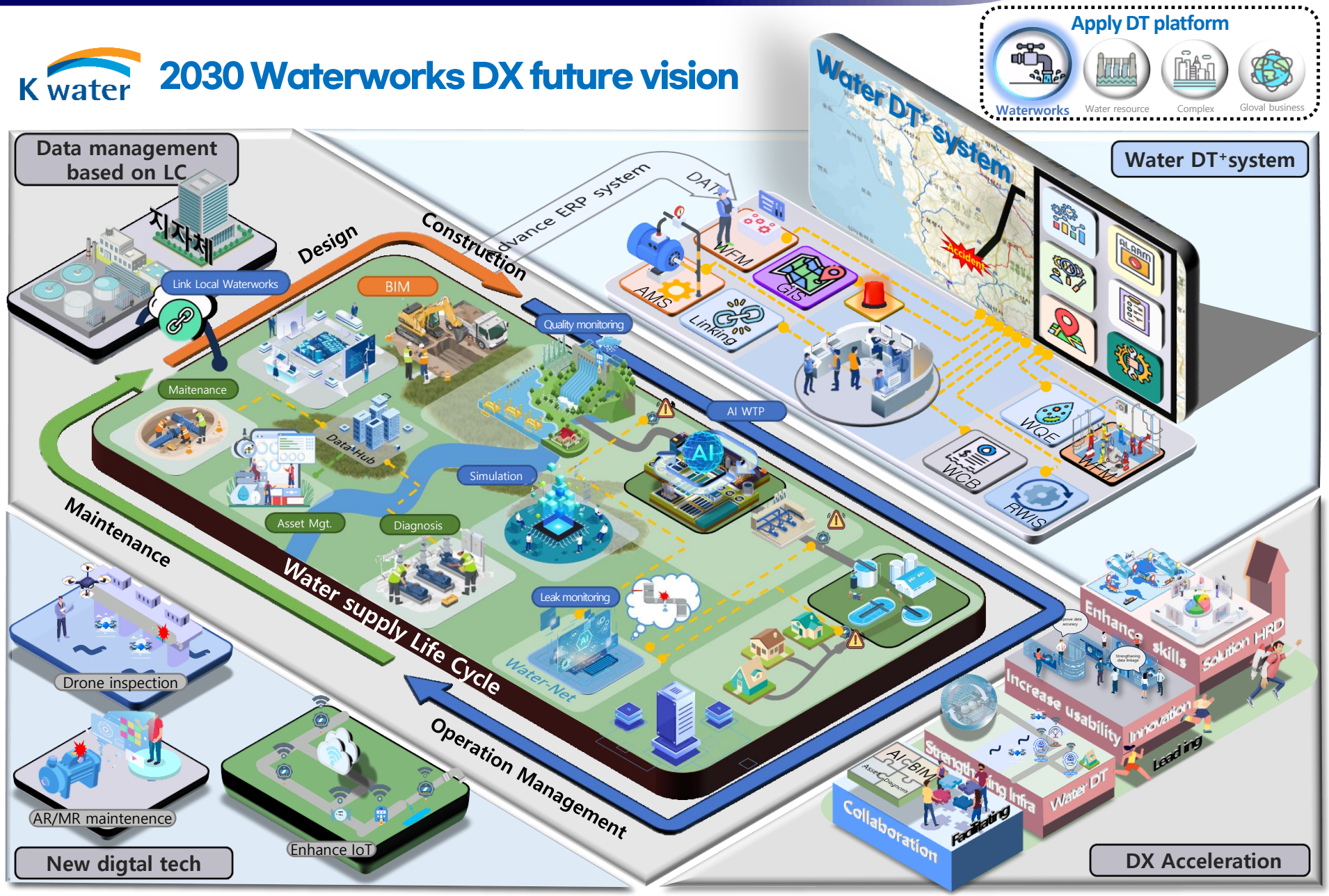
Ⅰ. K-water's DX for waterworks

Strengthening the quality of basic data, systematic linking of individual system data are required.



Ⅰ. K-water's DX for waterworks

2030 Waterworks DX future vision

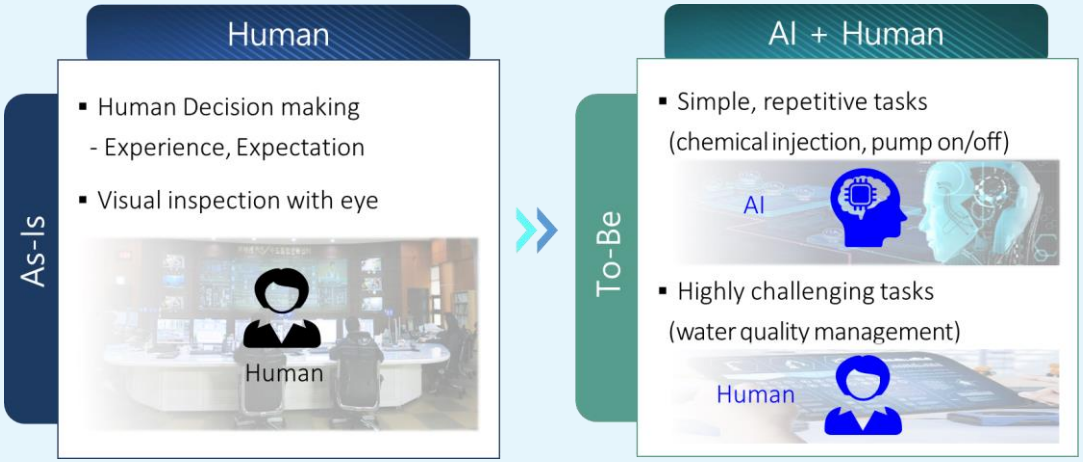


AI Water Treatment Concept

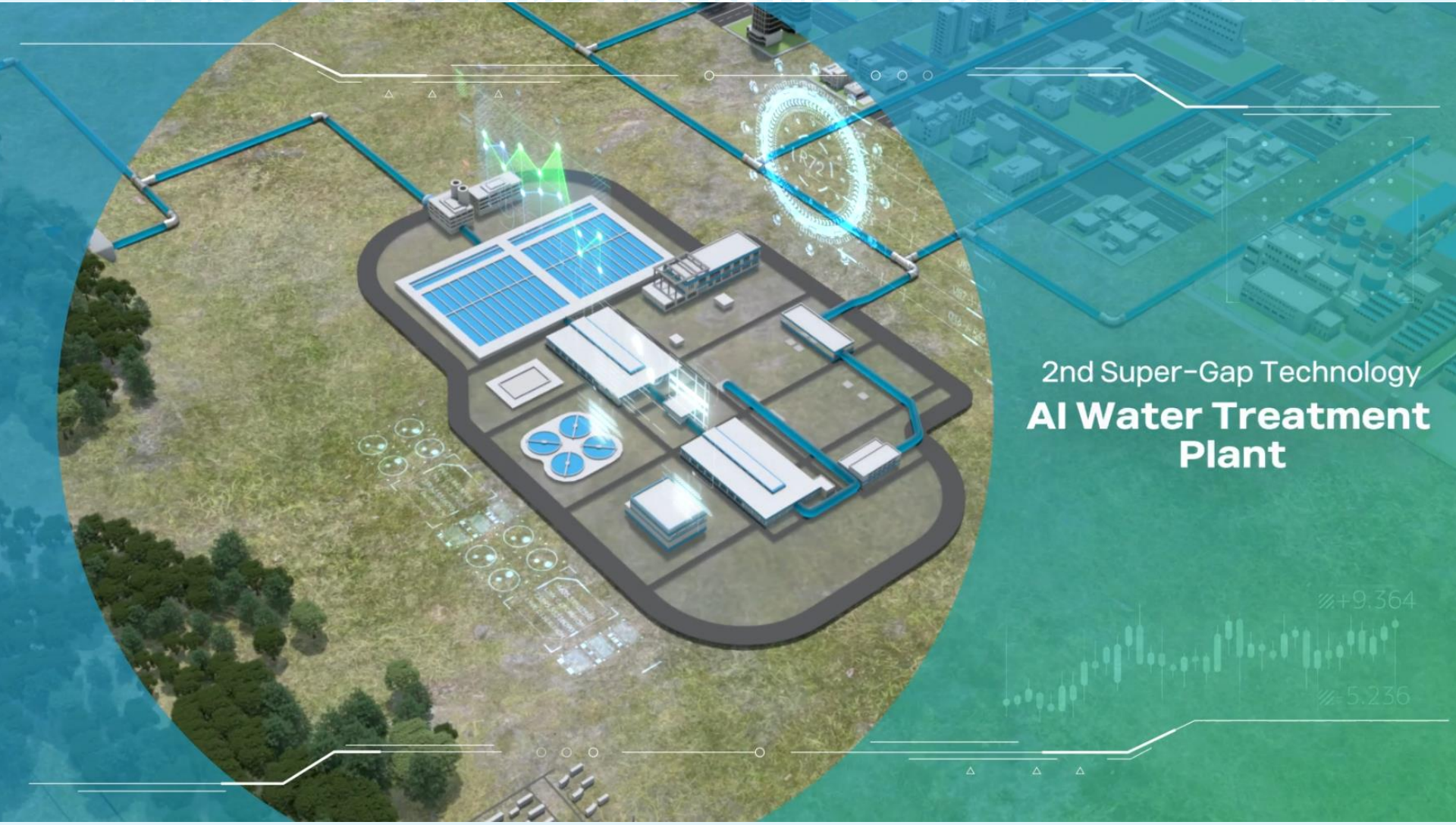
Futuristic Water Treatment Plant operation

by BigData+AI technology

- **Autonomous Operation**
- **Energy Management System(EMS)**
- **Predictive Management System(PMS)**
- **Intelligent Video Surveillance**



Ⅱ. Smart(AI) WTP



Ⅱ. Smart(AI) WTP

K water

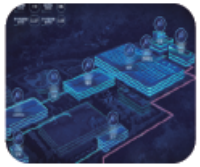
Automate the entire water treatment process

Full autonomy for all 8 processes

Processes	Simulator	Autonomous operation
Intake	Inlet valve openings Water levels	Open inlet valve
Chemicals	Raw water quality classification Chemicals injection rates	Chemical injection rate
Mixing & Flocculation	Flocculation mixer rpm	Mixer rpm (revolutions per minute)
Disinfection	Sedimentation basin residence time Chlorine evaporation	Chlorin injection rate
Sedimentation	Sedimentation basin sludge occurrence	Sludge collector scheduling
Filtration	Number of filters Water level for each filter	Filter scheduling
Ozone	Residual ozone	Ozone injection rate
GAC Filtration	Number of filters Water level for each filter	GAC filter scheduling

Ⅱ. Smart(AI)

Process & Modules

PROCESS	package / module	Autonomous operation	EMS	PMS	Intelligent video surveillance
P1 Pre-diagnosis / evaluation		❶ Water treatment plants targeted for introduction AI technology level assessment(using evaluation tools) ❷ Establishment of AI water treatment plant construction strategy / plan ❸ Prediction / analysis of expected effects of building AI water treatment plant (using simulator)			
P2 AI water treatment plant build	M1 Infrastructure Construction / Supplement	❶ Supplementation of equipment / process automation infrastructure ❷ Supplementation of related measuring instruments to implement AI technology (Vibration , Temperature , Water quality, etc.) ❸ Improvement of network-based infrastructure performance			
	M2 S/W Development — Basic AI Recommen-dation operation				
	M2 S/W Development — Extended AI Optimization autonomous operation	① Intake ② Chemicals ③ Mixing and flocculation ④ Sedimentation ⑤ Filtration ⑥ Disinfection ⑦ Ozone	① Pump control ② Power peak management	① Abnormal signs pre-detection ② Self-diagnosis	① Water leak ② Fire ③ Electric shock ④ Fall down ⑤ Protective equipment ⑥ Loitering ⑦ Intrusion ⑧ Rescue
		Functions can be selected according to site conditions			
		❶ AI operation optimization (operation optimization analysis and AI learning by package and process) * Includes visualization of AI operation process ❷ Interactive AI chatbot (Decision-making support)			
	M3 H/W introduction	❶ Server construction (analysis / operation) ❷ Establishment of AI operating system ❸ Building a simulator			
P3 Pilot operation and training		❶ Simulation → Test run for each unit process → Comprehensive test run (6 months) ❷ Local training , invitation training			
P4 After-sales service (A/S)		❶ Technical support ❷ Qualitative and quantitative effect analysis			

Preliminary Diagnosis / Evaluation

Step 1
Assess tech level

- 7-domain,
  Level 1~5 assessments

* Vision & Strategy, Information Systems, Process Automation, Operations Management, Facilities & Energy Management

Step 2
Strategy/Planning

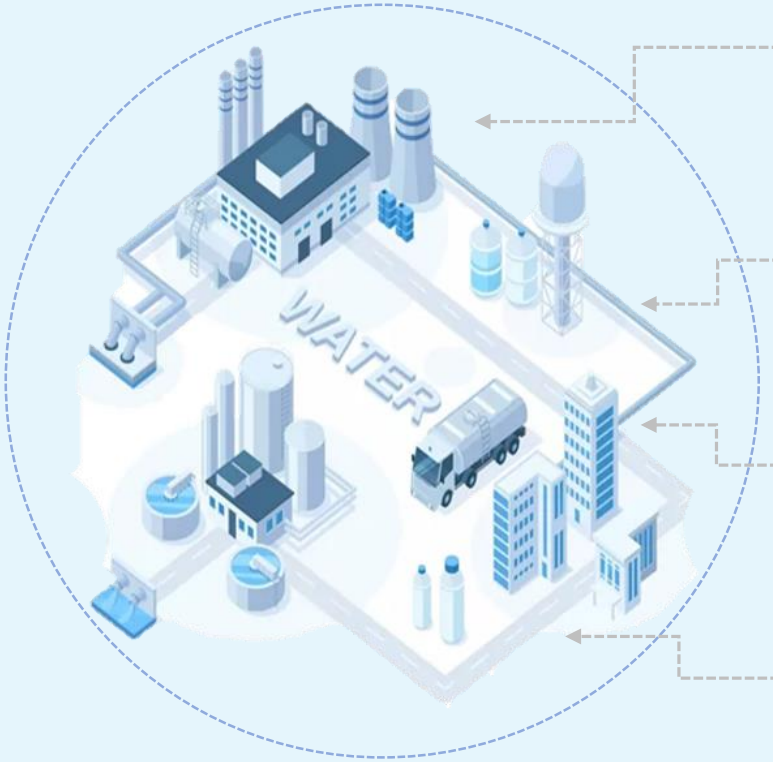
- Establish a building strategy by assessment level
- Calculate budget size
- Select the modules based on site conditions

Step 3
Predicting/Analytics

- Utilize virtual data-driven simulators
- Analysis the impact of AI WTP adoption with real-time and autonomous operations simulation

Construction of AI WTP

M1 Infrastructure Construction/Supplementation



Expands remote control infra
- Facility automation infra

Improve network performance
- Improving system stability

Supplements measuring equipment
- Algorithmic advancements

Enhances data management
- Improving prediction accuracy

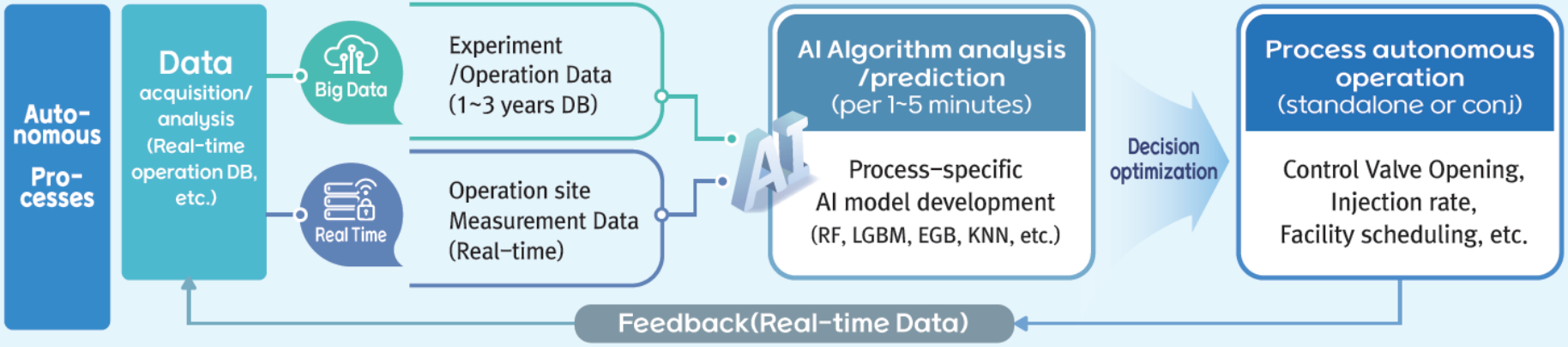
M2 Software Development

(Basic) AI recommendation operation

1. Selection of technology package to be introduced considering the project goals and site conditions.
2. Development of customized algorithms based on big data acquired and managed on-site.

Autonomous operation of water treatment plant

Real-time operational data (quantity, quality, etc.) of the water treatment plant is analyzed and optimal operation is predicted through AI algorithms, allowing for independent or linked autonomous operation of the water treatment processes (8 processes).

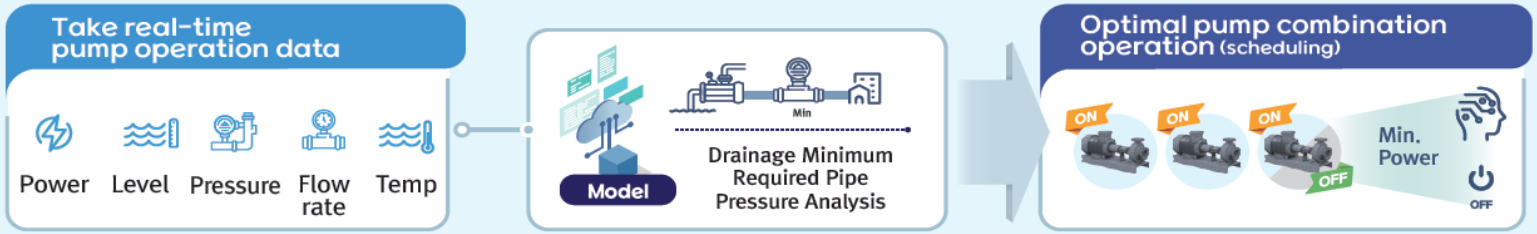


M2 Software Development

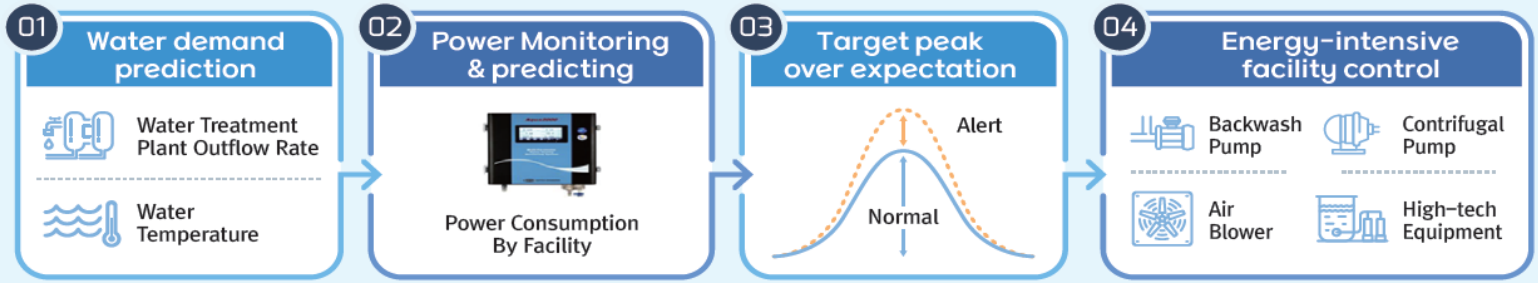
Smart Energy Management System EMS

Proposes optimal operation plans through real-time analysis of power consumption data for energy-intensive facilities.

Pump Control



Power Peak



M2 Software Development

Facility Predictive Maintenance System

PMS

A predictive maintenance system that detects failures and diagnoses causes through real-time equipment status data analysis.

Sensors setup

Install vibration sensors on pumps at all times

Real-time monitoring

Generate and acquire vibration data

Anomaly detection

Machine learning-based data analysis

Autonomous diagnostic

Visualization of analysis results

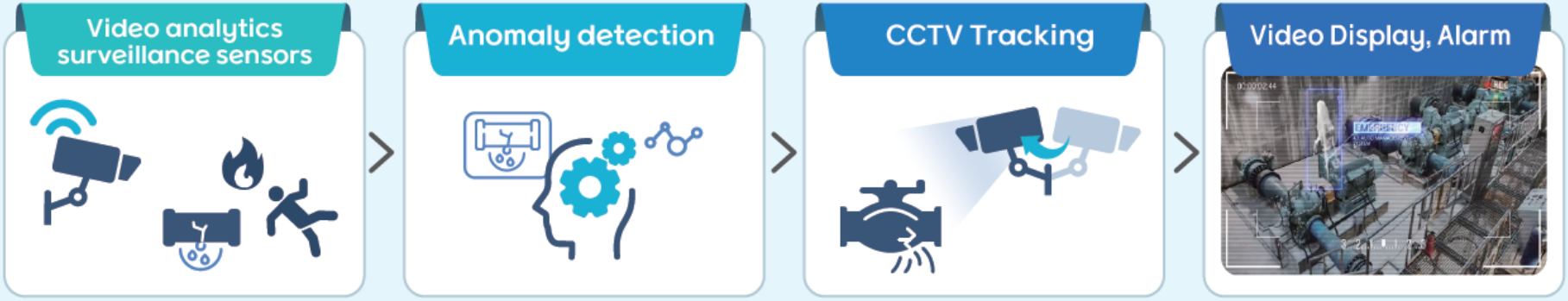
Alarms and Causes

Crisis response and predictive maintenance

Intelligent Video Surveillance System

A safety management system applying AI video analysis/automatic tracking technology to CCTV/surveillance sensors (8 items):

* Equipment-related: fire, pipeline leakage, failure to inject chemicals / Security-related: intrusion, loitering / Safety-related: collapse, help sign, electric shock



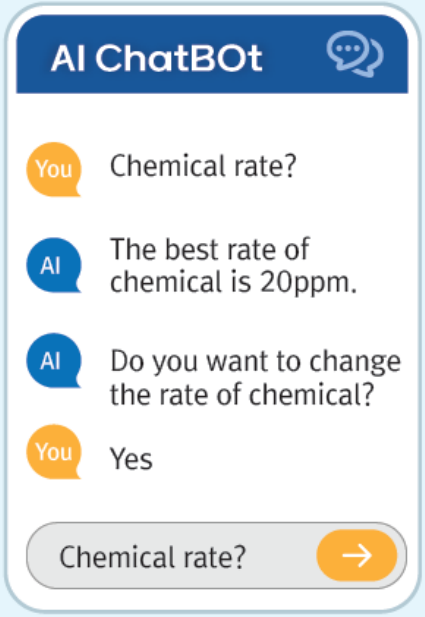
(Extended) AI Optimization Autonomous Operation

❶ AI Optimization Autonomous Operation

- Supports decision-making with process efficiency and equipment condition reports.
- Supports crisis response for abnormal water quality and water supply accidents.
- Visualization of AI control process from data input to AI control.

❷ AI Chatbot Construction

- Learns operation data, operation logs, manuals, design drawings, etc., to recommend optimal operation plans.



M3 Hardware Introduction

❶ Server construction

Central server (Big Data Hadoop*), local server at each site (AI operation, web service)

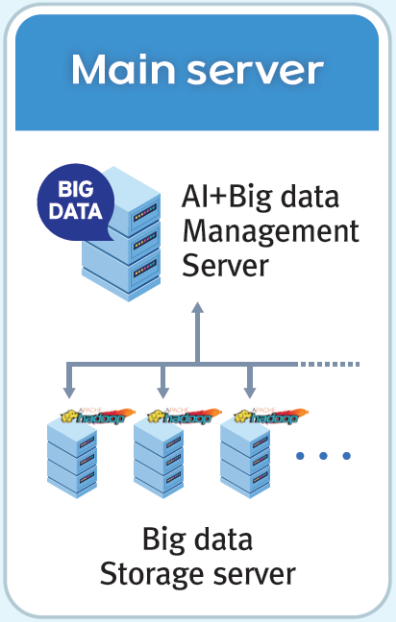
* Stores approximately 200,000 data points per minute for 3–5 years.

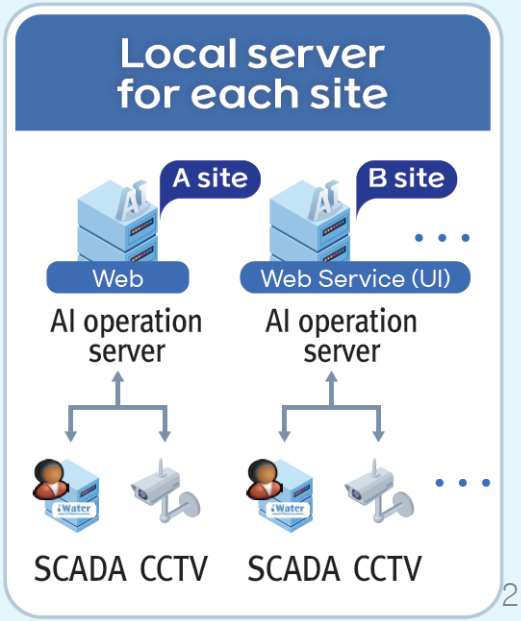
❷ AI Operating System Construction

Systems running on open-source bases such as Python, Docker, Kafka.

❸ Simulator

Simulated virtual data for various situations.





Business Performance

Pilot Project

Development of core technologies for AI water treatment plants and construction of standard models.

* Target: Hwaseong(water treatment plant) / Budget: 3.8 billion won(2.7 million USD) / Duration: '21~'22

Hwaseong AI WTP listed as a "Global Lighthouse" by the World Economic Forum

Global LightHouse Network ?

› A company that is leading the future of global manufacturing by introducing 4th industrial technologies such as AI and big data, and is selected by the World Economic Forum through annual assessment. (153 companies worldwide)

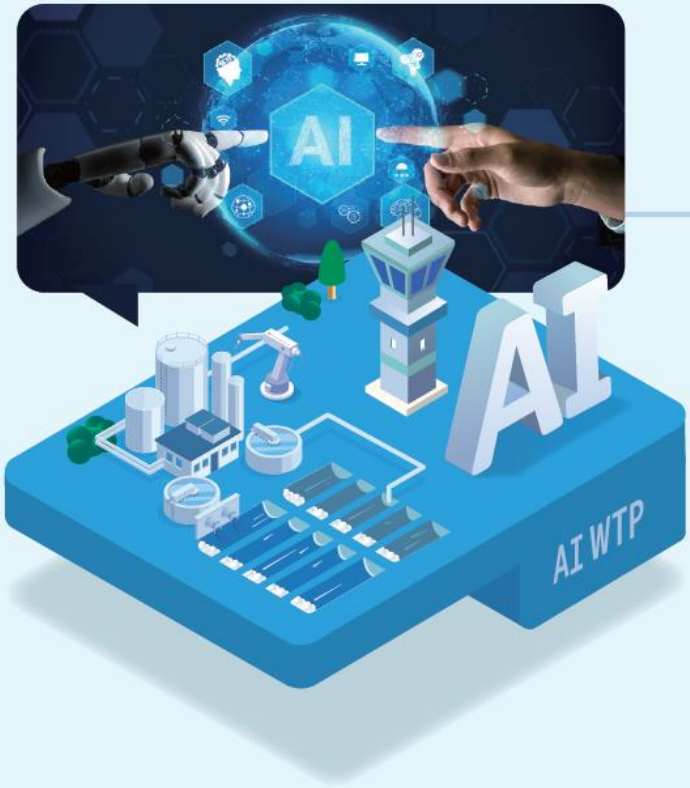
Expansion Project

Verification and enhancement of technology through expansion to wide-area WTPs in South Korea * Target: 42 plants of K-water / Budget: 44.7 billion won(32.4 million USD) / Duration: '22~'24

Partnership

Holding partnerships with 39 domestic ICT SME(small and medium-sized enterprise), participating in CES, ACE, etc. for technology transfer to private companies and promoting overseas joint ventures

Business effects



→ Reliable supply of high-quality tap water

Climate change response

Minimizes human error and optimizes processes

* 42% reduction in operator manipulation frequency
* Reliable autonomous operation 24 hours a day

→ Reducing tap water production costs

Reducing the burden on the public

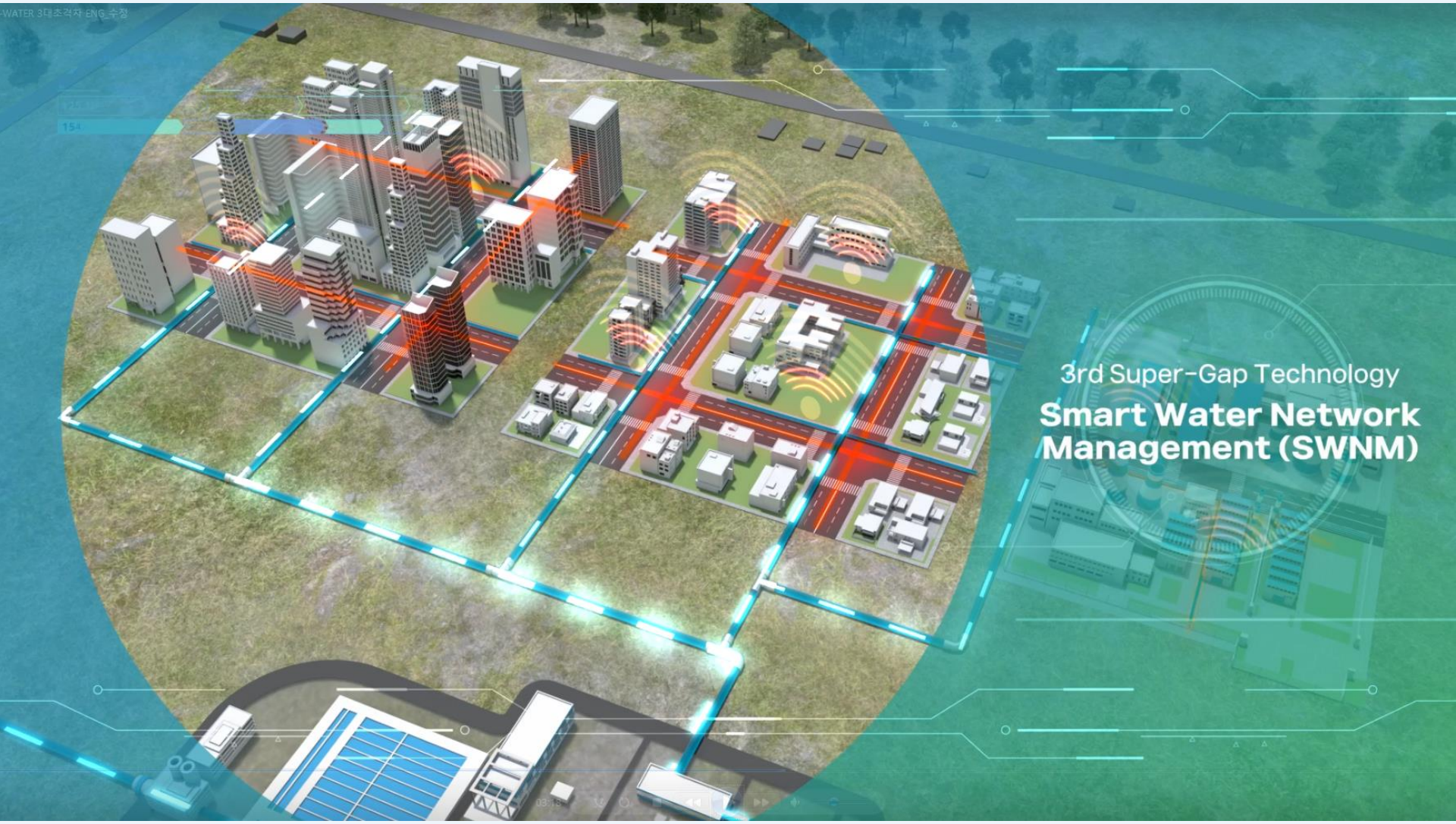
Reduces operating costs such as chemicals, electricity, and maintenance

* 4% reduction in chemical costs and 5% reduction in electricity costs
* Saved KRW 1.7 billion in annual operating costs per 1 million tonnes/day of water treatment plant output

What is SWNM?

Optimal water distribution network management technology that builds and operates a water supply system that can **preemptively and proactively respond to accidents** such as leaks and water quality abnormalities **by incorporating IoT and AI technologies** into the entire water supply process

Ⅲ. SWNM


3rd Super-Gap Technology
Smart Water Network Management (SWNM)

SWNM Key Technologies

Basic Data Collection & Analysis

- Current state of water supply facilities
- Waterworks operation DATA
- Current customer usage

Site Investigation

- Investigating current state of waterworks facilities
- Investigating and Exploring Water supply pipes and Valves

DMA, PMA Establishment

- Building large/medium/small/sub DMA (considering system, topography, scale, etc..)
- Establishing appropriate PMA by blocks
- Real-time monitoring of water pressure

Water distribution network management system establishment

- Real-time monitoring of operation data
- Analyzing RWR and MNF
- Optimal control of water pressure
- Asset management system

Map Digitalization

- Digitalizing pipeline map based on the investigation
- Establishing GIS-based pipeline map
- Entering Attribute DB of facilities
- Managing 3D-based pipeline map

Leakage Detection

- Sound locater, electronic/correlation leak detection method, etc..
- Utilizing leak detection sensors
- Applying AI-based leak detection

Advancement of water quality management

- Water quality measuring instrument
- Rechlorination input facility
- Automatic drain facility
- A precision filter

Water distribution network maintenance

- Pipeline diagnosis and deterioration assessment (setting priorities based on leakage, water quality, etc..)
- Selecting optimal maintenance section
- Using line-stopping/hot-tapping method, non-excavation method

Ⅲ. SWNM

Process & Modules

SWNM consist of 7 modules (Level 1 to 3) that can be customized by selecting different combinations.

→ Packaged by selecting & combining functions customized to the water utility

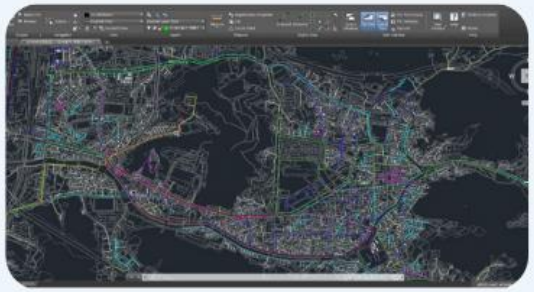
PROCESS	Module \ Level	Level 1	Level 2	Level 3
P1 Pre-diagnosis		Collection of water supply facilities and operation status & diagnosis of operation level such as RWR		
P2 SWNM	M1 Investigation/ analysis	❶ Creating water pipeline map(CAD) ❷ DMA Design ❸ Water flow, pressure management plan	❶ Water pipeline map(management system) ❷ DMA Design (small/sub) ❸ Water flow, pressure, quality management plan	❶ 3D based water pipeline map ❷ DMA Design ❸ Incident response advancement plan
	M2 DMA establishment	❶ Building small DMA ❷ Water flow, pressure management	❶ Building sub DMA ❷ Water flow, pressure, quality management	❶ Incident response advancement ❷ Water flow, pressure, quality management and emergency linkage
	M3 Water leakage management	❶ Leak detection with manpower ❷ Analyzing MNF of small DMA	❶ Leak detection with IoT sensor ❷ Analyzing MNF of small/sub DMA	❶ AI-based leak detection ❷ Analyzing daily revenue water ratio
	M4 Water pressure management	❶ Managing water pressure of small DMA ❷ Simply decreasing water pressure ❸ Simply increasing water pressure(ON/OFF)	❶ Managing Small DMA(large capacity) ❷ Decreasing water pressure in proportion to flow ❸ Increasing water pressure in proportion to flow	❶ Managing Small/sub DMA(large capacity) ❷ Real-time active decompression ❸ AI-based self pressurizing
	M4 Water pressure management	❶ Managing water pressure of small DMA ❷ Simply decreasing water pressure ❸ Simply increasing water pressure(ON/OFF)	❶ Managing Small DMA(large capacity) ❷ Decreasing water pressure in proportion to flow ❸ Increasing water pressure in proportion to flow	❶ Managing Small/sub DMA(large capacity) ❷ Real-time active decompression ❸ AI-based self pressurizing
	M5 Reorganization of the pipeline network	❶ Diagnosing pipe specimen ❷ Selecting emergency leakage maintenance section	❶ Endoscopic diagnosis with branching method ❷ Selecting aging pipe(short-term) replacing section	❶ Diagnosing water pipe network with asset system ❷ Selecting aging pipe(long-term) replacing section
	M6 System construction	❶ Building small DMA TM/TC ❷ Automatic analysis of small DMA units	❶ Real-time waterworks information offering system ❷ Managing real-time water flow and risk	❶ Building control center ❷ Establishing AI-based pipeline network system (RWR analysis, incident response)
	M7 Water quality control	❶ Automatic Water Quality Measurement Device ❷ A rechlorine facility	❶ Automatic drain facility ❷ Establishment of pipe cleaning infrastructure (general)	❶ A precision filter ❷ Establishment of pipe cleaning infrastructure (advanced)
P3 Pilot operation and Training		Test operation of water supply and Maintenance training with SWNM		
P4 Operations Management		❶ Facility operation	❷ Facility Replacement	❸ Improvement and Maintenance of Revenue Water Ratio

M1 Investigation/Analysis

❶ Site investigation and water pipeline map establishment

– Site investigating of water supply facilities, planning DMA & pipe management strategy with basic information, establishing water pipeline map for waterworks maintenance

Lv1. Water pipeline map(CAD)

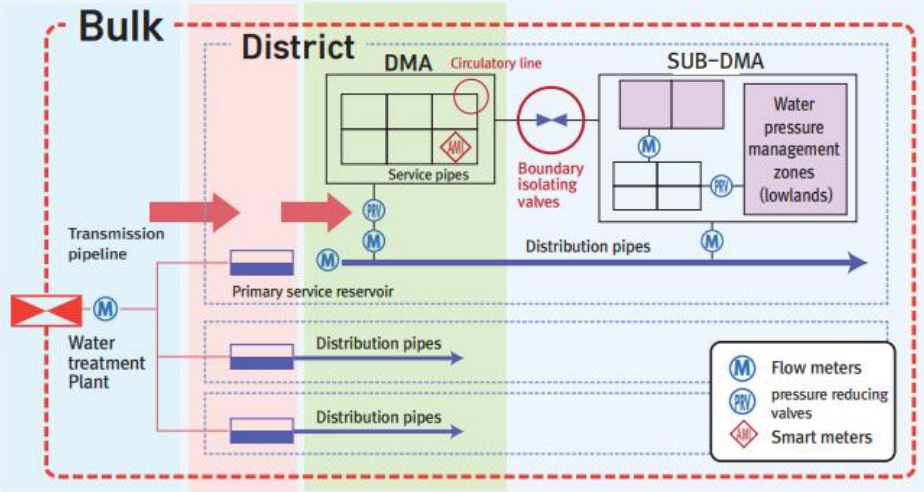


Lv2. Water pipeline map(System)

Lv3. Water pipeline map(3D)

❷ DMA design

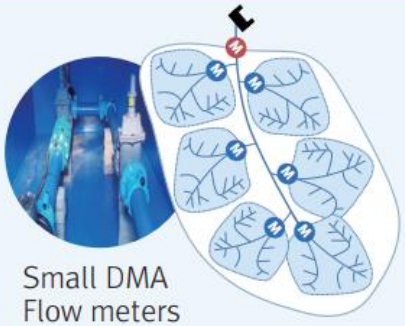
– Technology to review the plans of appropriate DMA division and facility installation in consideration of stratified water monitoring system (large-medium-small), water pressure, water usage and surroundings (road, river, etc..)



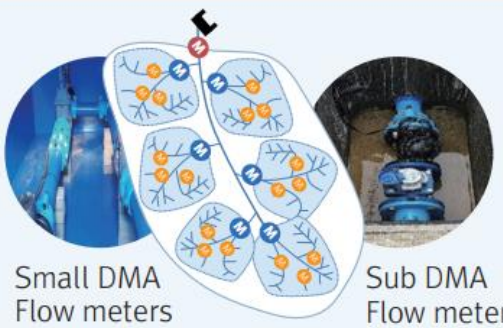
M2 DMA establishment

› Installing facilities such as flow meters, PLC based on the appropriate DMA division plan

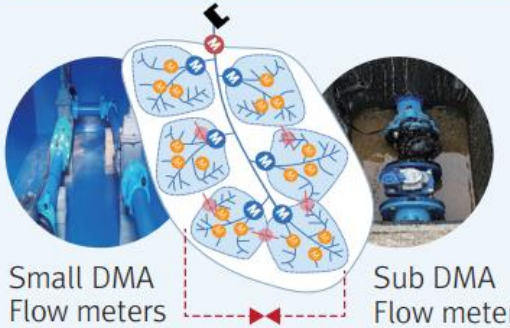
Lv1. Building small DMA



Lv2. Building Sub DMA



Lv3. Advancing incident response

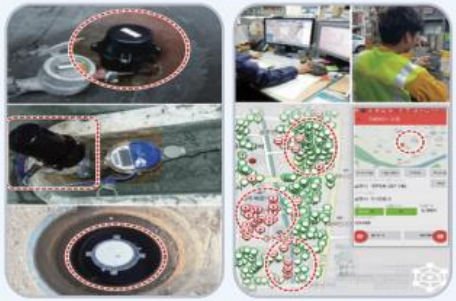


M3 Water leakage management

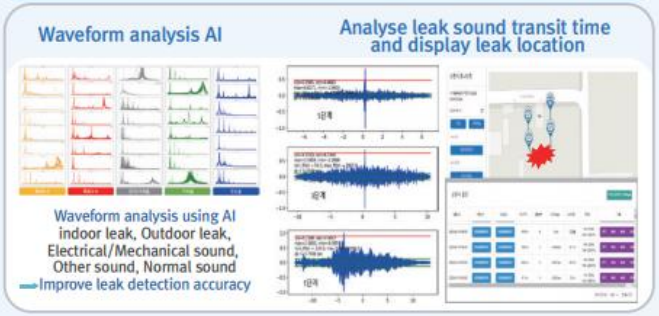
› NRW reduction key technology that checks the location of leaks from underground through equipment, sensors, etc

Lv1. Leak detection with manpower

Lv2. Leak detection with IoT sensor



Lv3. AI-based leak detection

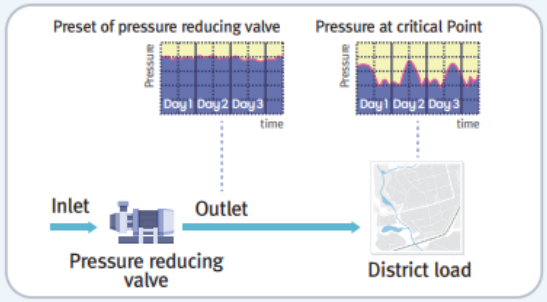


M4 Water pressure management

› Reduce leakage and ensure supply stability by setting appropriate water pressure for high water pressure and excessive water deviation

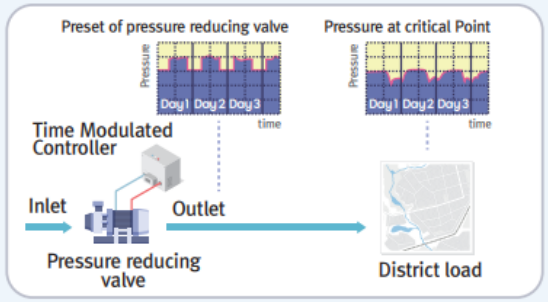
Lv1. Simply decreasing water pressure

Water pressure changes at critical point depending on usage of decompression zone



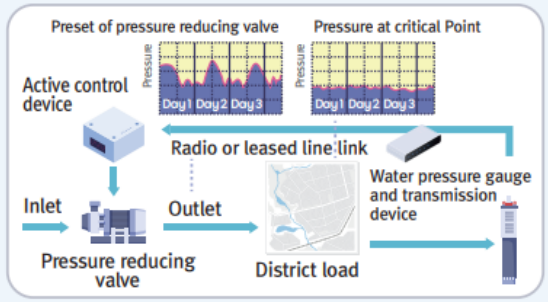
Lv2. Multi-stage decreasing water pressure

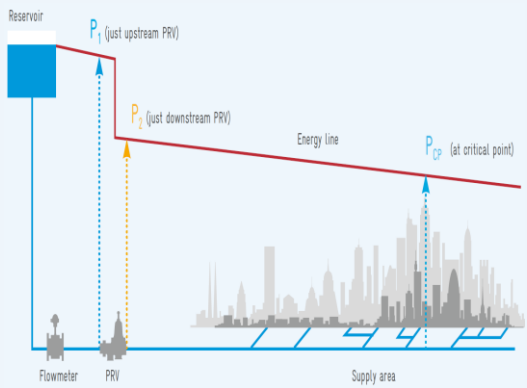
Decreasing water pressure time-by-time



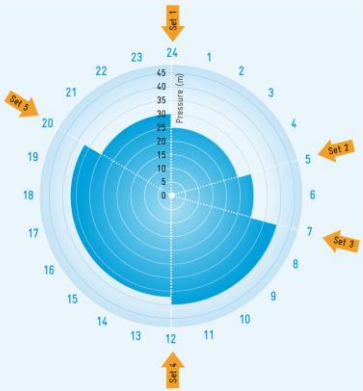
Lv.3 Real-time active decompression

Real-time active pressure control to stabilise critical point water pressure

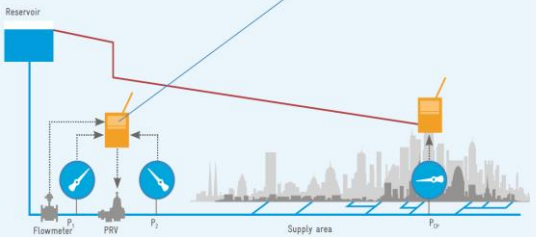




Setting	Time (hh:mm)	Pressure (m)
Set 1	0:00	25
Set 2	5:00	30
Set 3	7:00	40
Set 4	12:00	38
Set 5	20:00	30



Setting	Flow rate Q (m³/h)	Head loss H (m)
Set 1	8,00	0,40
Set 2	11,00	2,65
Set 3	15,00	7,40
Set 4	19,00	14,50
Set 5*	24,00	26,10



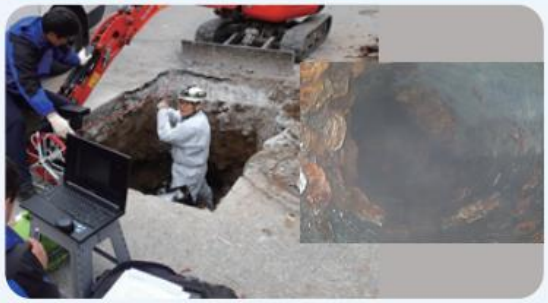
Source: giz(Germany, 2011)

M5 Reorganization of the pipeline network

❶ Water distribution network diagnosis

– Systematic and effective selection of pipe maintenance areas based on pipe flow analysis, water quality diagnostics and pipe condition assessment

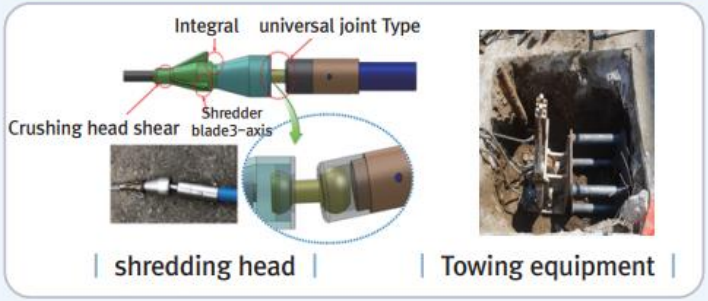
Lv.1 Diagnosing pipe specimen	Lv.2 Endoscopic diagnosis with line-stopping/hot-tapping method	Lv.3 Diagnosing water pipe network with asset system



❷ Non-excavation method

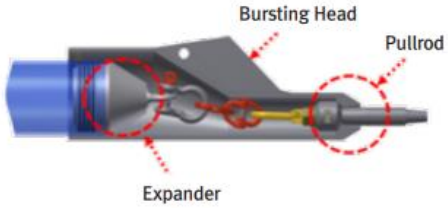
– In case when open cut methods is difficult, the network maintenance is carried out by using a the non-excavation method

Small diameter pipe (D15mm~80mm)	Medium diameter pipe (D100mm~500mm)



shredding head

Towing equipment



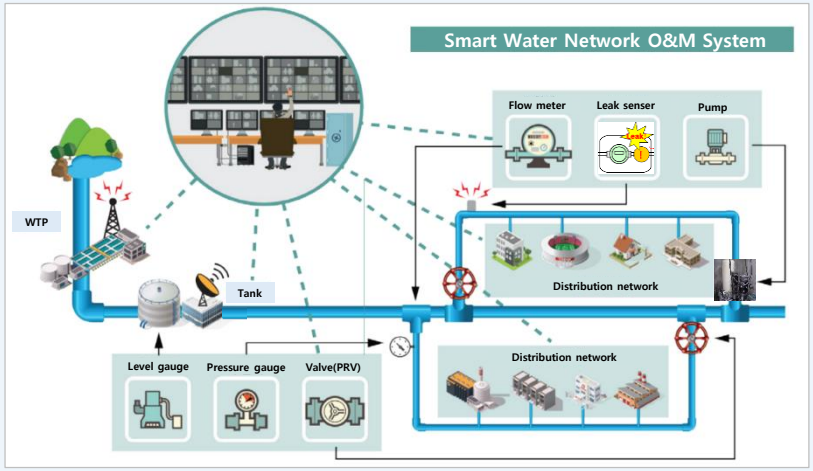
M6 System construction

- Establish a pipeline network monitoring system for real-time monitoring of facility operation DATA (flow rate, water pressure, and water quality, etc.)
- Establish a pipeline network managing system for systematic management of water flow rates and MNF analysis

Lv1. Building small DMA TM/TC

Lv2. Real-time waterworks information offering system

Lv3. Building a control center

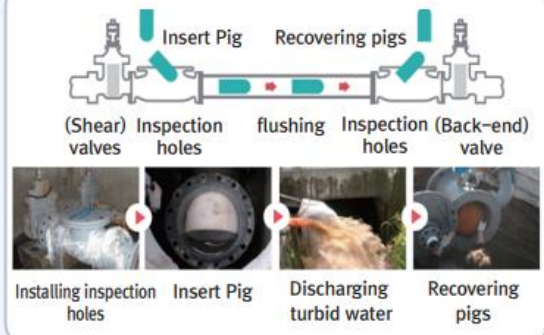


M7 Water quality management

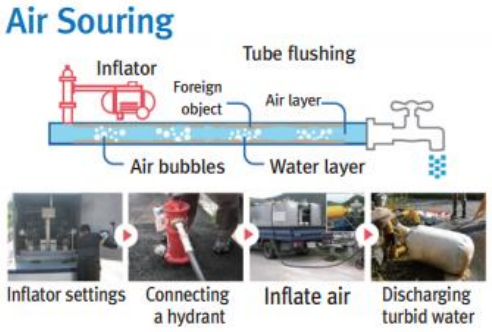
› Establishment of water management facilities to supply clean tap water at all times

Lv1. Automated Water Quality Measuring Devices, Re-chlorination Facility

Lv2. Automatic drain, pipe Cleaning infrastructure(general)



Lv3. Precision Filters, Pipe Cleaning Infrastructure (advanced)

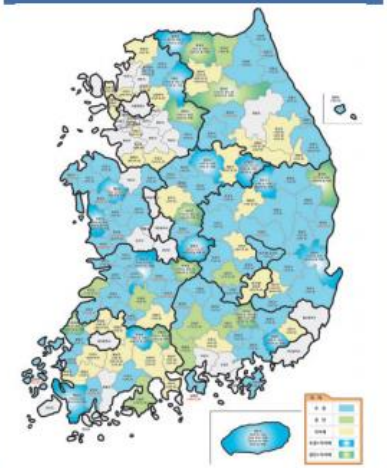


Business Performance

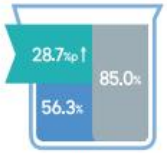
Domestic

- Successful Promotion of 82 Local Government Projects

Current Status of the Modernization Project of Local Water Supply



01 Improving Revenue Water Ratio



Before work After work

02 Securing water resources (reducing leakage)

110 million m³/ year reduction → The Great Pyramid of Giza 42 volumes

03 Economic effect

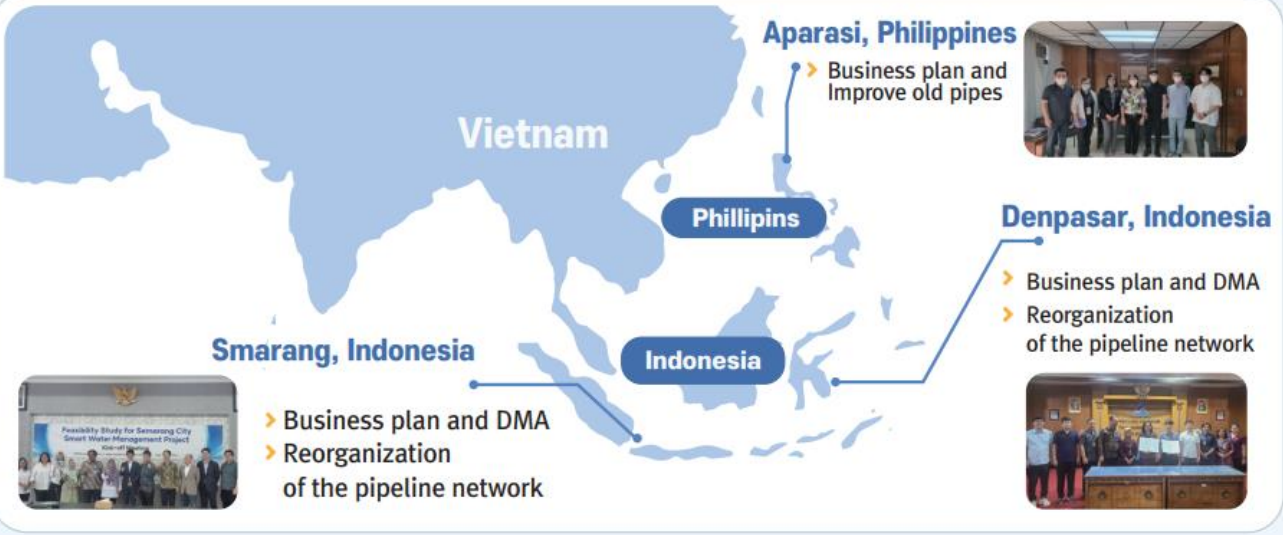
Making economic effects 1.1 trillion won/year

04 Carbon reduction

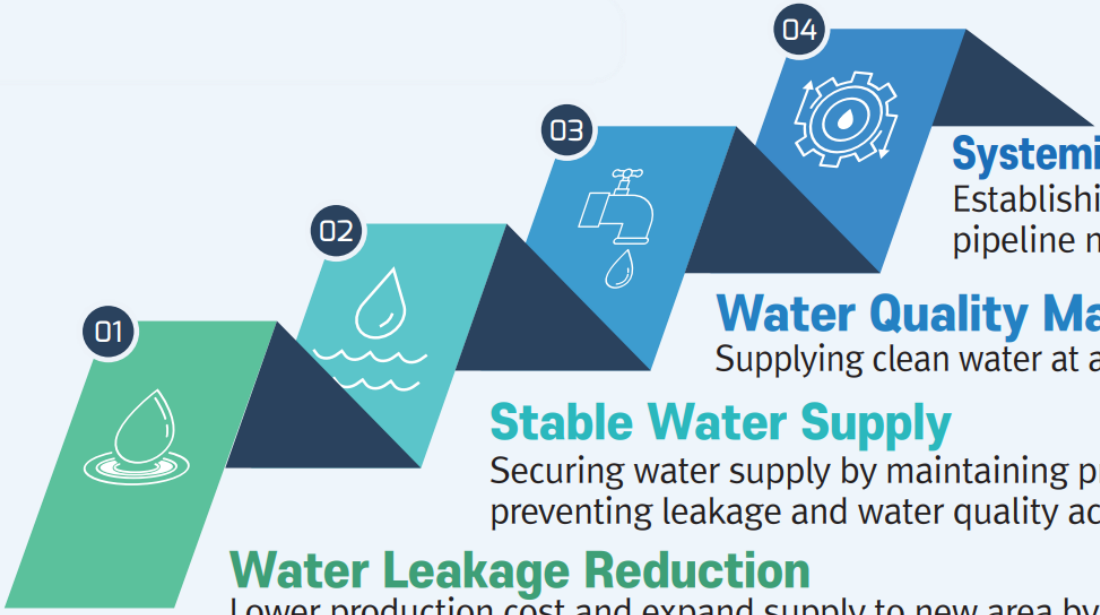
Carbon reduction 27,531tCO₂/year → Replacement of pine trees 200,000 trees

Overseas

- SWNM projects are being promoted
  - Indonesia (Smarang City, Denpasar) and the Philippines (Aparis City)



Business Effects



Systemization of Pipeline Network Management
Establishing scientific and systematic
pipeline network management system

Water Quality Management
Supplying clean water at all times by monitoring water quality in real time

Stable Water Supply
Securing water supply by maintaining proper water pressure,
preventing leakage and water quality accident

Water Leakage Reduction
Lower production cost and expand supply to new area by reducing water leakage

* Water leak reduction effect of 7,000 m^3/year per 1 km of pipeline

Scope and role of the K-water HRD Institute

Serves as a global water professional education institute that fosters essential talent to achieve K-water's strategic goals and support national water management policies.

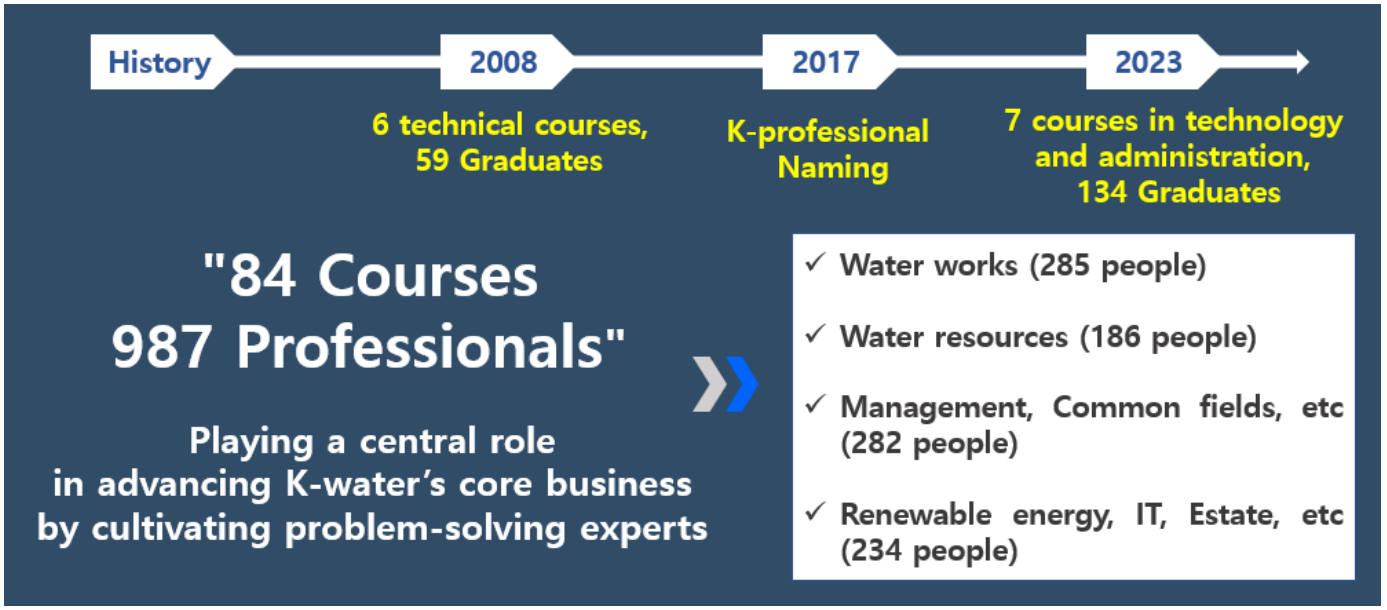
- Strengthening leadership capabilities
- Empowering people on the job
- Global training hubs
- Training for the water industry

In the case of job training…

- Running **286 courses** (including K-Professional program) to enhance K-water's employees' competencies
- Providing **14,450 trainees** with on-the-job, problem-solving, and field-oriented training

K-water's K-Professional program

- K-water's flagship job training course
- Unique program among public companies in Korea
- 100% based on K-water's strategies to succeed in business
- Focuses on fostering talents who will take the lead in future cutting-edge businesses and new growth engines in preparation for the rapidly changing environment



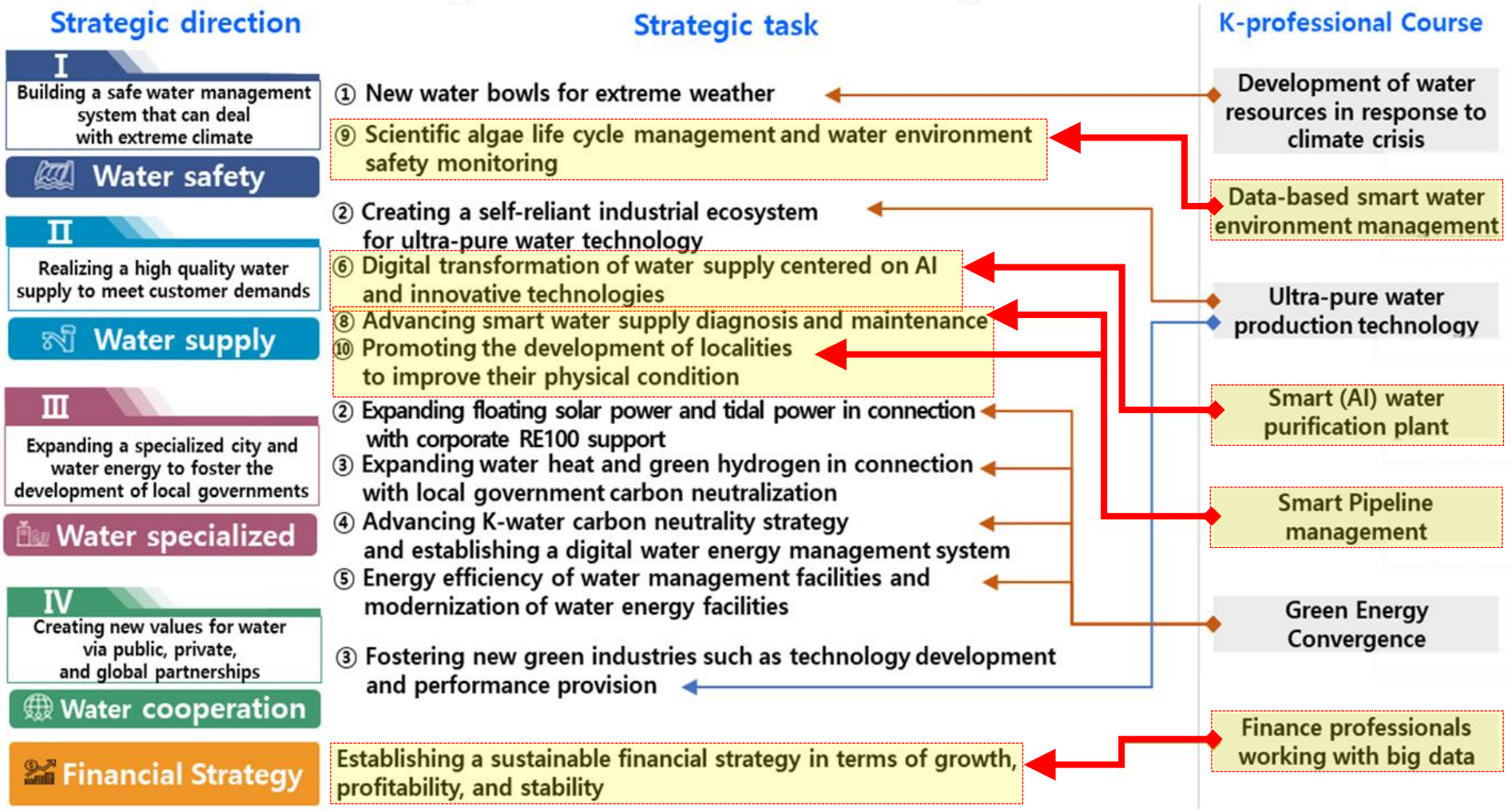
History of K-water's K-Professional program (2008~2023)

	2008 ~ 2016	2017 ~ 2020	2021 ~ 2023
Name	K-water Expert	K-Professional	
Learning Methods	Pre-Learning→Combined Training→Overseas training, on-the-job assignments		Modularization by stage (B-I-A-P stage)
Selection Method	Employees who wish to participate in the program apply for training, and a group of internal experts and leaders screen applicants' qualifications, experience, etc. to select trainees.		
Graduates	648 People	112 People	227 People
Business Environment Trends	• Climate crisis response • Ubiquitous • Efficient energy management • Smart control	• Response to Climate Crisis • sustainable development • Digital Transformation • Renewable Energy	• Response to Climate Crisis • Digital Transformation • Emphasizing ESG • AI Technology • Green Energy
Key Strategic Challenges	• Globalization • IWM • Expansion of local water supply business • Smart operational efficiency • Smart Pipeline management	• Grow into a global water management company • IWM • Cope with digital transformation • Smart Pipeline management	• Response to Climate Crisis • leading the global water management paradigm • IWM • digital, AI-based water management technology • Smart Pipeline management • Securing new water resources
Course Contents	• Overseas Business • Local Water Supply Business Management • SWNM • IWM • Waterfront Business • Equipment control • Seawater Desalination	• Smart Pipeline management • IWM • Waterfront business • Customized Industrial Water • Financial management • Hydropower, Hydrothermal Energy • Seawater desalination	• Financial management utilizing big data • Smart Pipeline management • IWM • Carbon-neutral urbanization • Green Energy • Ultra-pure water expert • AI water treatment expert

* IWM: Integrated Water Management / * SWNM: Smart Water Network Management

IV. Linking Digital & Education

The integration of K-Professional with strategic initiatives (2024)



Educational structure & contents of K-Professional program

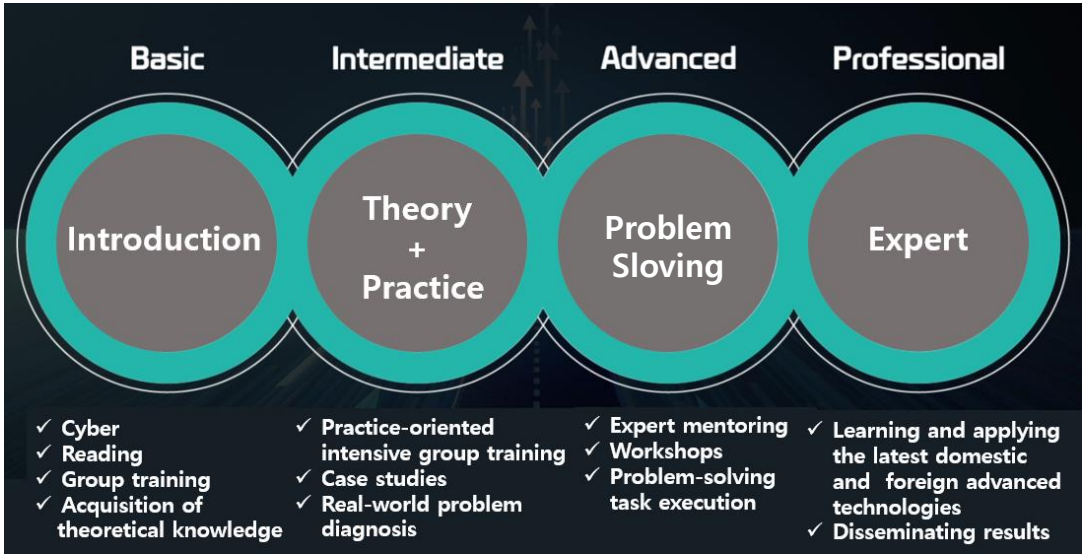
"Strategic projects & Focused training"

Self-directed learning focused on problem-solving through project execution

4-level specialized training over 180 hours

B I A P

Basic Intermediate Advanced Professional



"B"-Basic		"I"-Intermediate		"A"-Advanced			"P"-Professional	
March	April	May	June	July	August	September	October	November
Cyber,Reading, Lecture		Lecture, Field Trip		Lecture, Workshop, Task, Presentation, Mentoring			Advances Case study	
(40h)	------→	(40h)		------→	(60h)		------→	(40h)

Smart(AI) WTP course curriculum

Professional Advanced Case Study			40 hrs
Objective	• Learning advanced technologies and analyzing cases to suggest application plans and contribute to solving current issues		
Contents	• Learners make detailed plans for overseas education destinations and learning contents at the advanced stage by themselves * (Destination) Lighthouse Factory, a leading manufacturing innovation company • The final results of related cases, advanced technologies, etc. are announced and shared internally and externally.		
Advanced Performing Problem-solving Tasks			14 hrs
Objective	• Proposal for improving or optimizing smart (AI) water purification algorithm		
Contents	• (Workshop) Smart(AI) Water Treatment Algorithm Improvement Mentoring Workshop	• Presentation and Evaluation * Evaluation by internal and external judges, selection of outstanding students	
Intermediate Collective Training + Workshop			98 hrs
Objective	• Acquisition of specialized knowledge such as basic procedures for big data analysis and understanding of smart (AI) water purification algorithms		
Contents	Collective training	Workshop	
	①Understanding data analysis and task planning with mentoring ②Python data collection/refinement/visualization ③Python data modeling	①(Workshop 1) Field trip to domestic global lighthouse factories * LS Electric (Cheongju), Hwaseong (AI) Water Treatment Plant, etc. ②(Workshop 2) Presentation of interim results, feedback	
	• (Task Selection) Individualized problem-solving tasks are selected and carried out. * Create and submit a detailed task performance plan		
Basic Cyber + Collective Training			57 hrs
Objective	• Acquisition of basic knowledge required for optimal operation management of smart (AI) water purification plants		
Contents	**"Optional Education: 2 Courses"** ①(Cyber) Operation management of water treatment process ②(Cyber) chatGPT of working people	**"Required Education : 2 Courses"** ①Python programming practice ②(Cyber) Understanding Data	

IV. Linking Digital & Education

SWNM course curriculum

Professional Advanced Case Study		40 hrs
Objective	• Study the latest technologies in water loss management in developed countries, research data, and examine domestic applications	
Contents	• (Participants) Select outstanding students after comprehensive evaluation (70 points or more) until advanced stage • (Destination) Select a destination (country, institution, etc.) and establish a detailed training plan under the learner's initiative • (Content) Learn the latest water loss management in developed countries, collect data, interview experts, and build networks • (Use) After the training, review K-water applications including the latest technologies, write reports and share them within the company	
Advanced Task Performance, Mentoring, Presentation and Evaluation		50 hrs
Objective	• In-depth training in related fields, presentation of results and selection of candidates for training in advanced regions	
Contents	• Special lectures, tours, and on-site training - Lectures by academics and industry experts, field trips to specialized organizations and companies - IWA Watching lectures of Water Loss Specialist Group and submitting reports and presentations • Performance Presentation	
Intermediate Task Performance, Workshop		50 hrs
Objective	• Acquisition of specialized knowledge through on-the-job training in related fields, task performance, and workshops	
Contents	• (Lecture) Water supply operation management, diagnosis process * Observation-analysis-diagnosis-cleaning, etc. • (Field trip) Field and specialized organizations and companies related to water supply improvement, operation management, and diagnosis • Tasks and Workshops	
Basic Reading, Collective Training, Task Selection		50 hrs
Objective	• Acquisition of basic knowledge on water loss management of water supply pipes and selection of problem-solving tasks	
Contents	• (Reading) Water Loss Management, Introductions to Urban Water Distribution learning and translation • (collective Training) Water Supply ArcGIS learning • (assignments) Problem-solving sub-tasks	

IV. Linking Digital & Education

K-Professional program's connections with HRM

HRD Institute	HRM Department
• Share the K-Professional Program Graduates List with the HRM department every year	• Assigning relevant departments when Department Rotaiton Season every year • Use information in promotion reviews

866 People
K-Professional Program Graduates
2008~2023

482 People
Alignment with Current Duties
2024.8

56% Match
K-Professional =Job

Business performance through K-Professional program

K water

Competency Building by K-Professional Program

- ✓ Digital Competency
- ✓ Data Utilization Skill
- ✓ Optimal Facility Operation

2008~

Ministry of Environment

Government Policy to Improve Public Trust in Tap Water

- ✓ Smart Pipeline Management
- ✓ Water Facility Modernization
- ✓ AI Water Treatment Facility

2019~

Business performance through K-Professional program

K water

Policy Implementation & Strategy Formulation by K-water

- ✓ Smart Pipeline Construction
- ✓ Water Facility Modernization (82 Facilities)
- ✓ AI Water Treatment Facility Construction

2019~

K water

Selection as "Global Lighthouse" Cost Saving of KRW97.7 billion

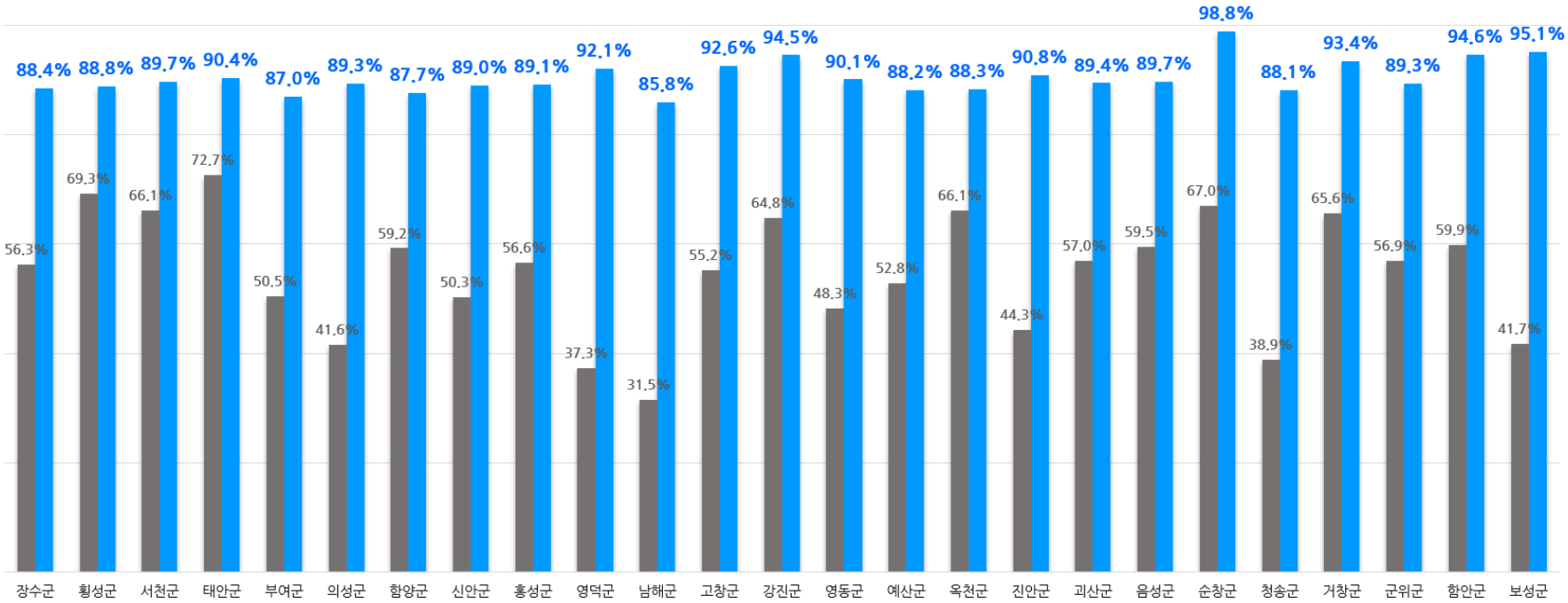
- ✓ Smart Pipeline Management
- ✓ Water Facility Modernization
- ✓ Reduction of Water Leakage (37.42 million ton)
- ✓ AI Water Treatment Facility Open('22)

2021~

Business performance through K-Professional program

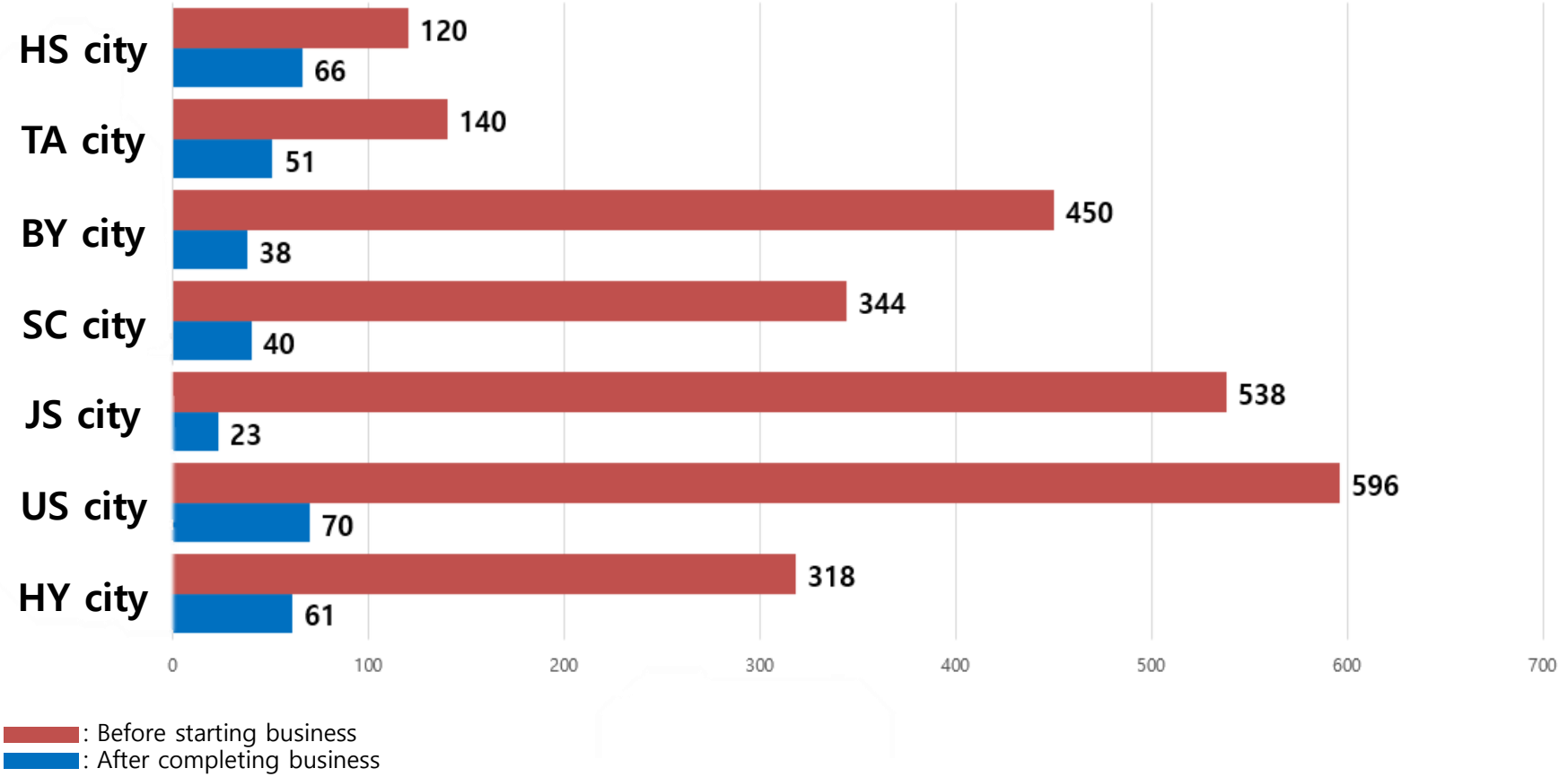
Of the 75 RW improvement(NRW reduction) projects in Korea, 25 have exceeded the business goals, and the remaining projects are being successfully implemented.

- The goal of the project: To increase the RW ratio by 85%
- Out of 82 projects, 75 are RW ratio improvement projects and 7 are aging pipe replacement projects



Business performance through K-Professional program

After the network was reorganized, complaints about pressure and leaks decreased significantly



Thank You