

Smart City Strategy of Korea

- focus on Smart Water Management -

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I. Why Smart City?

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Source : MoLIT, K-water

1. Why Smart City?



We Live in City



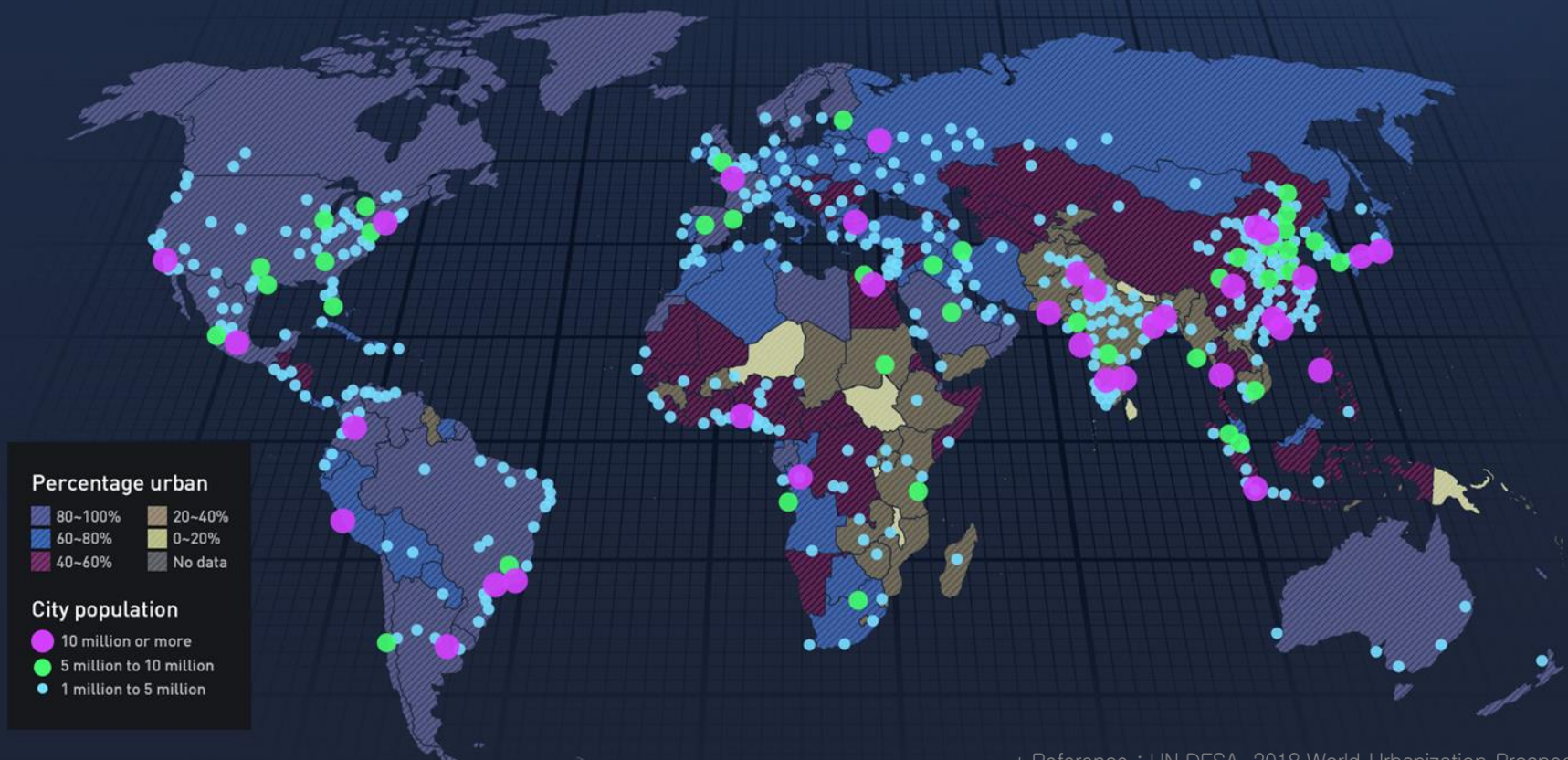
55% of World Population

(UN DESA, 2018 World Urbanization Prospects)

* Image Source : NASA Pics about space

World city population will go to 9 billion in 2050 from 5 billion now
World Urbanization Prospect will go to 68% in 2050 from 55% now

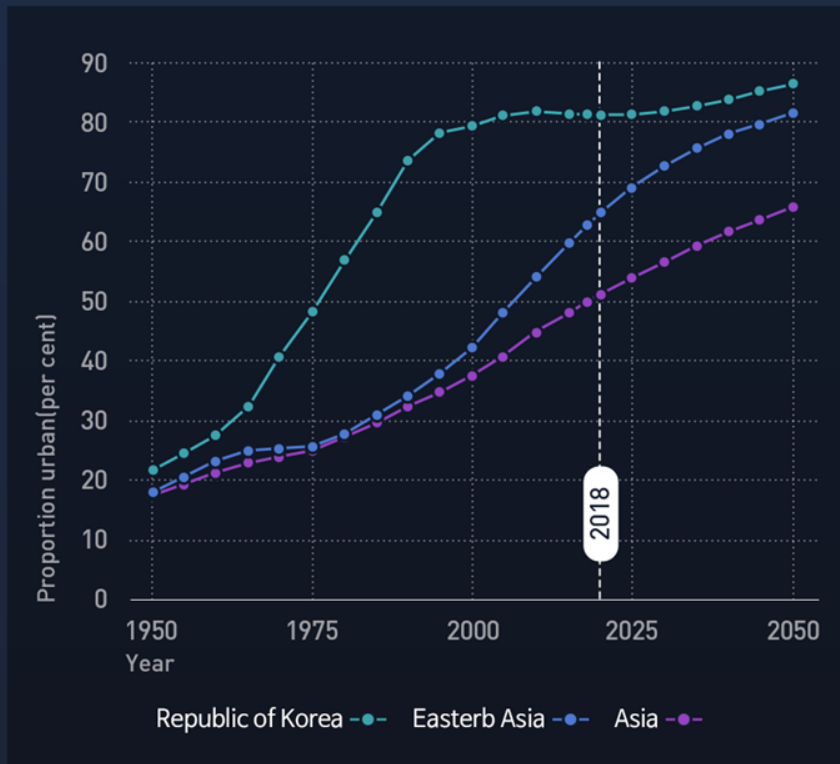
2018 World Urbanization & City Population



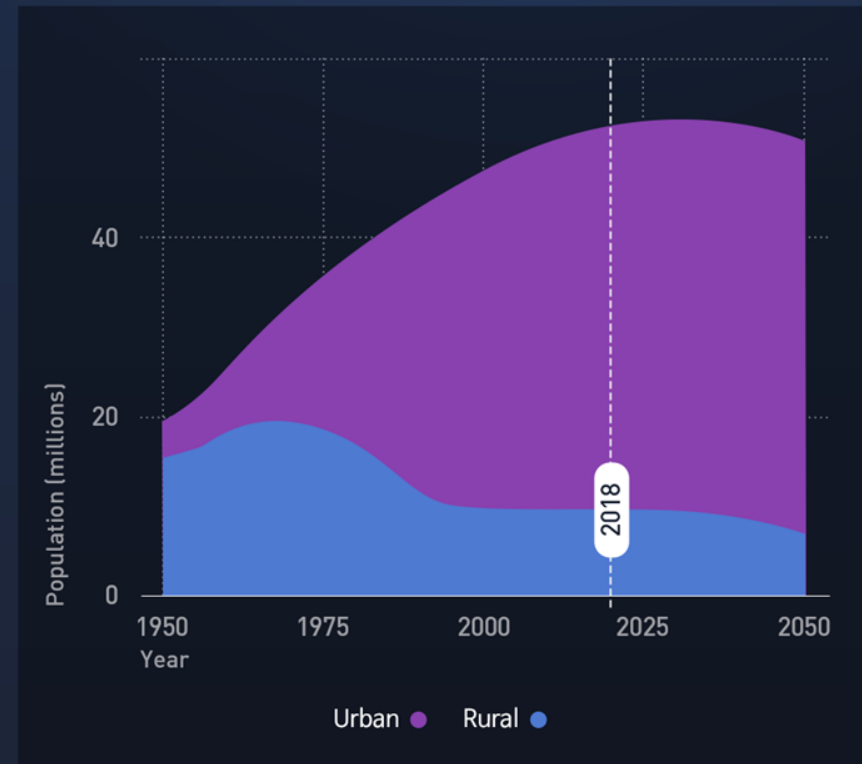
* Reference : UN DESA, 2018 World Urbanization Prospects

Urbanization is a mega trend here Korea and Asia.
Especially, percentage urban in Korea is over 80% now

Percentage urban by region and subregion



Urban and rural population Republic of Korea



* Reference : UN DESA, 2018 World Urbanization Prospects

Urban problems such as more air pollution, traffic congestion result from concentration of population and resource consumption into cities

Fine dust

Annual deaths
8.8million (2015)

GHG emission

20.6billion tons (2009)
» 32.5billion tons (2017)

Traffic congestion

Registered vehicles
930 million (2006)
» 1.3billion (2015)

Urbanization Rate

55%

Water shortage

Population facing water shortage
700 million (2004)
» 2.8 billion (2025)

Natural disaster

Damages (2016)
7,628 deaths
118 trillion KRW

Aging

Population aged over 65
8.3% (2015)
» 18.1% (2060)

Global action is on the rise to tap into the **Fourth Industrial Revolution** to solve **urban problems** and ensure **sustainability** of cities



Many countries in the world are developing their own smart city pilot projects, living labs, and data platforms



2. Smart City Strategy of Korea



SMART + CITY

We have dramatic histories and experiences of rapid urban development after Korean War



Korean War
1950s



Industrial City



Urbanization and
infrastructure expansion
1960~70s



Sustainable City



New town (phase 1)
1990s

New town (phase 2)
2000s



Smart City



Innovation city
2005~

New town (phase 3)
2019~

70 Year History of
Korean Urban Development

SMART CITY is



An innovative city that utilizes such means as ICT to raise the quality of life for citizens, and efficiency and competitiveness in urban operation and services (2014).

+

A smart city is a place where traditional networks and services are made more efficient with the use of digital and telecommunication technologies for the benefit of its inhabitants and business.

+

In Korea, Smart City is a **platform** upon which technological innovation is channeled to **improve living standard, sustain urban life** and **create new industries**.



Example
01

Urban Unified Control Center

- ✓ Urban Control Center for data collection and analysis
- ✓ Integrated Data Platform connecting legacy systems



Unified Data Platform Concept



Results from Deajon (2018)

Crime rate	Criminal arrests	Dispatch time (fire engine)	Support for vulnerable groups	Emergency Response
6.2% Down	2.7% Up	15.4% Down	142 cases	438 cases

Example
02

Smart Transportation

- ✓ One Pass for convenient access to public transport
- ✓ Introduction of ITS (Intelligent Transport System)



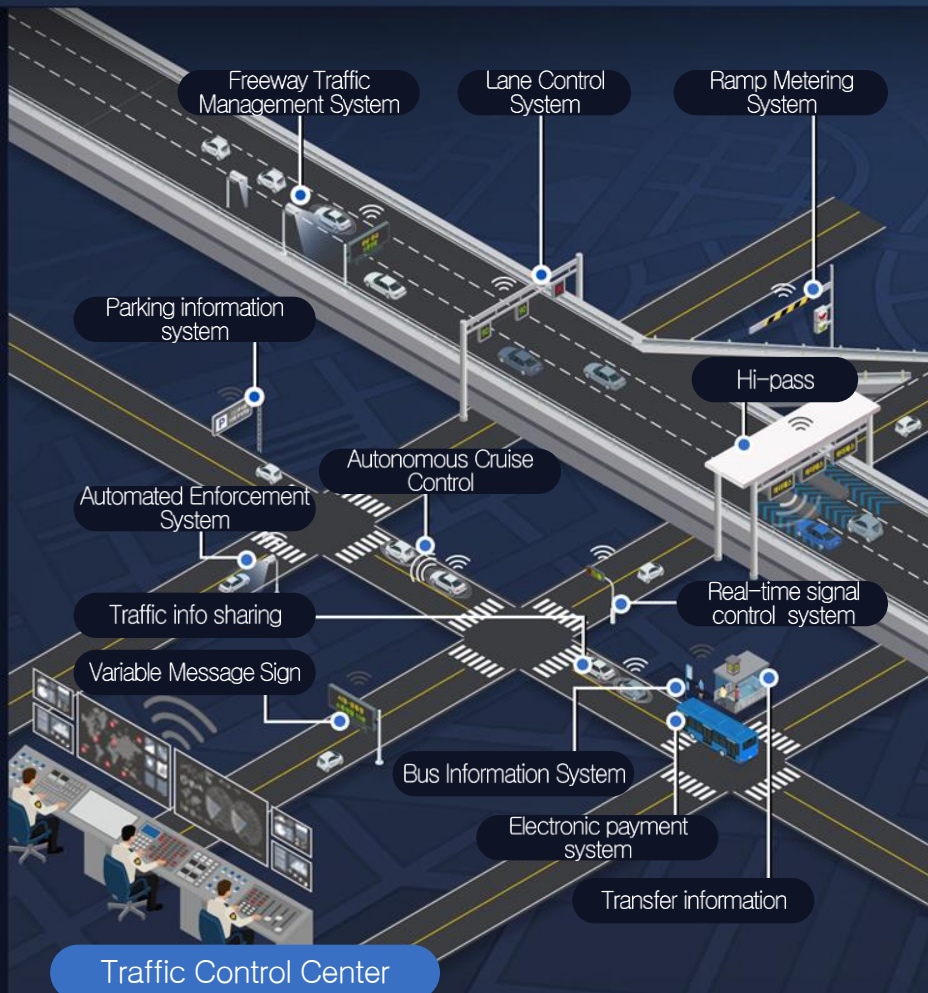
One Pass Card



On-line ticketing



Hi - pass



Bus Information System



Bus Rapid Transit (BRT)



Smart Crosswalk

Example
03

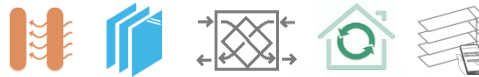
Zero Energy Housing

Establishment and spreading of zero energy housing complexes using **passive** and **active** technologies

Seoul Nowon Zero Energy Housing Complex

17,728 m², 115 Houses
R&D Verification Project
(2014-2017)

74% Energy Saving



Insulation System Win. HRV Air Tightness EVB

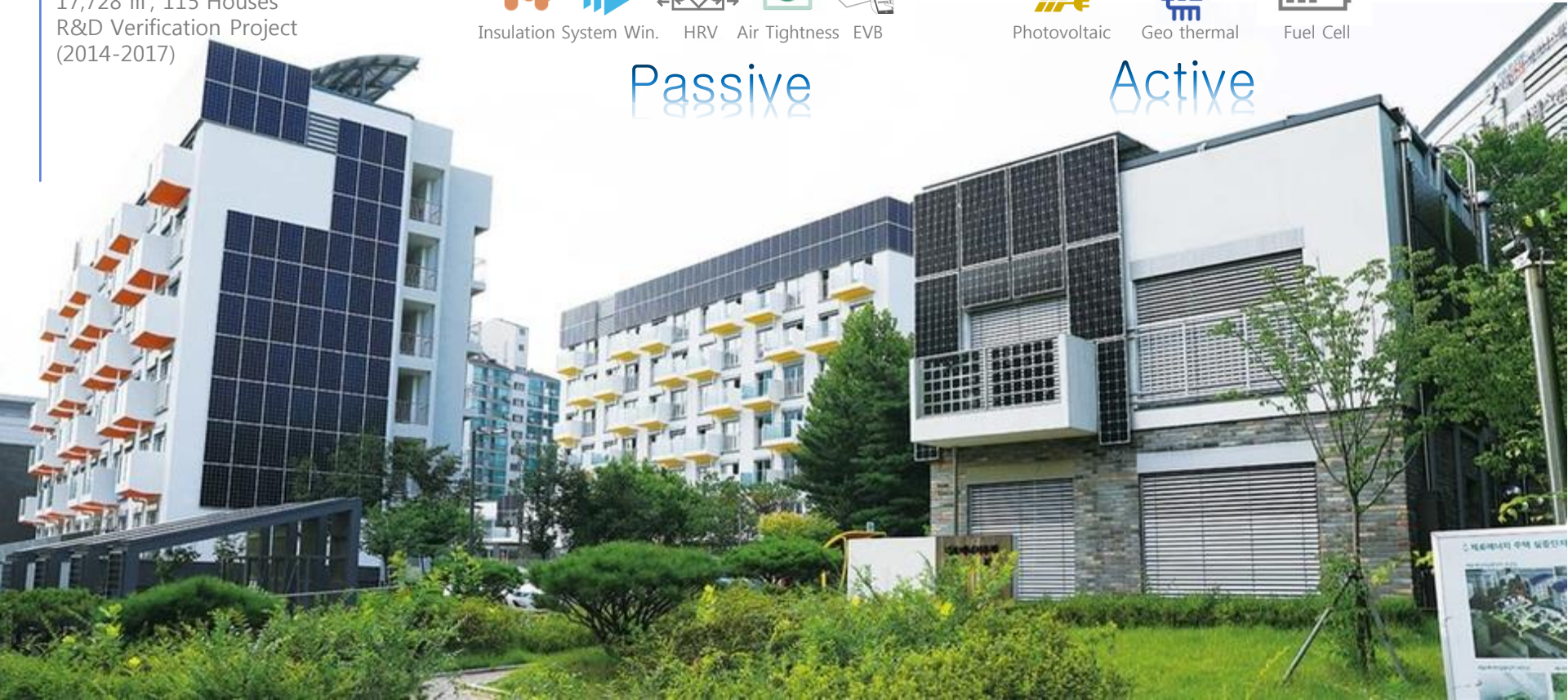
Passive

26% Energy Production



Photovoltaic Geo thermal Fuel Cell

Active



VISION

Smart City: a platform that changes people's lives

VISION >>>
01

+ Offer location & data-based services
to solve urban problems

Quality of Life



VISION >>>
02

+ Build a city that
embraces all citizens
Inclusive Smart City



VISION >>>
03

+ Spur global collaboration
by creating an innovation eco system
Smart Eco System



strategy

01

Specialized city design



New City

Existing City

strategy

02

Infrastructure building



R&D

Urban Platform

Human Resources

strategy

03

Ecosystem for innovation



Regulation Reform

Governance

Industrial Eco-system

strategy

04

Global networking



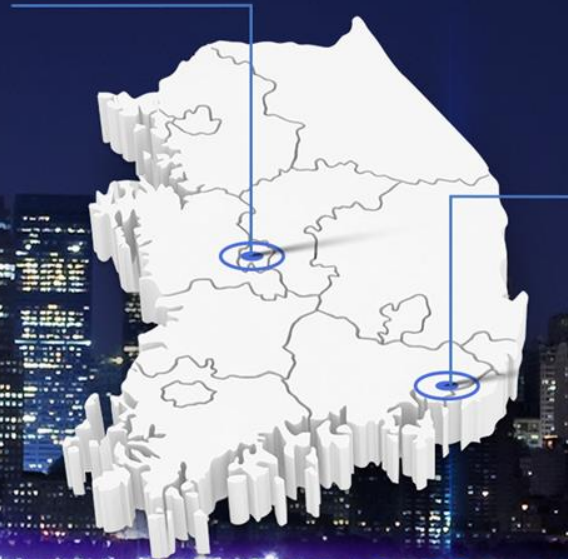
Global Cooperation

World Smart City Expo



National Pilot Project: Greenfield development project to build a futuristic city with application of latest smart city technologies and solutions.

- MP : Prof. Jae-sueng Jung (Brain Scientist)
- Executor : LH corp.
- Area: 2.7km²
- Population: 22,500
- Completion : 2022~



- MP : Doctor Jong-sung Hwang (Data & Platform Expert)
- Executor : K-Water corp.
- Area: 2.2 km²
- Population : 8,500
- Completion : 2021~

SEJONG

BUSAN

Smart City Challenge

An initiative where **businesses propose, test and spread solutions** designed in reflection of the needs of citizens

1st year

Funding for planning & pilot projects
(6 cities/year, 1.5billion KRW/project)



2nd year

Funding for expansion
(1~2cities/year, 20billion KRW/project)

Incheon

3 companies(Hyundai Mobis)
Demand-responsive
Transportation system(testing)



Bucheon, Gyeonggi

10 companies (KEPCO KDN)
e-Mobility to manage parking in the city



Daejeon

10 companies (LG CNS, KT, etc)
Parking and related services



Suwon, Gyeonggi

11 companies(Samsung Electronics)
5G-based Digital Twin(mobile platform)



Gwangju

9 companies(Glosfer)
Blockchain-based Data
Reward Platform



Changwon, Gyeongsangnamdo

3 companies(LG CNS))
Smart city-Industrial complex
development project

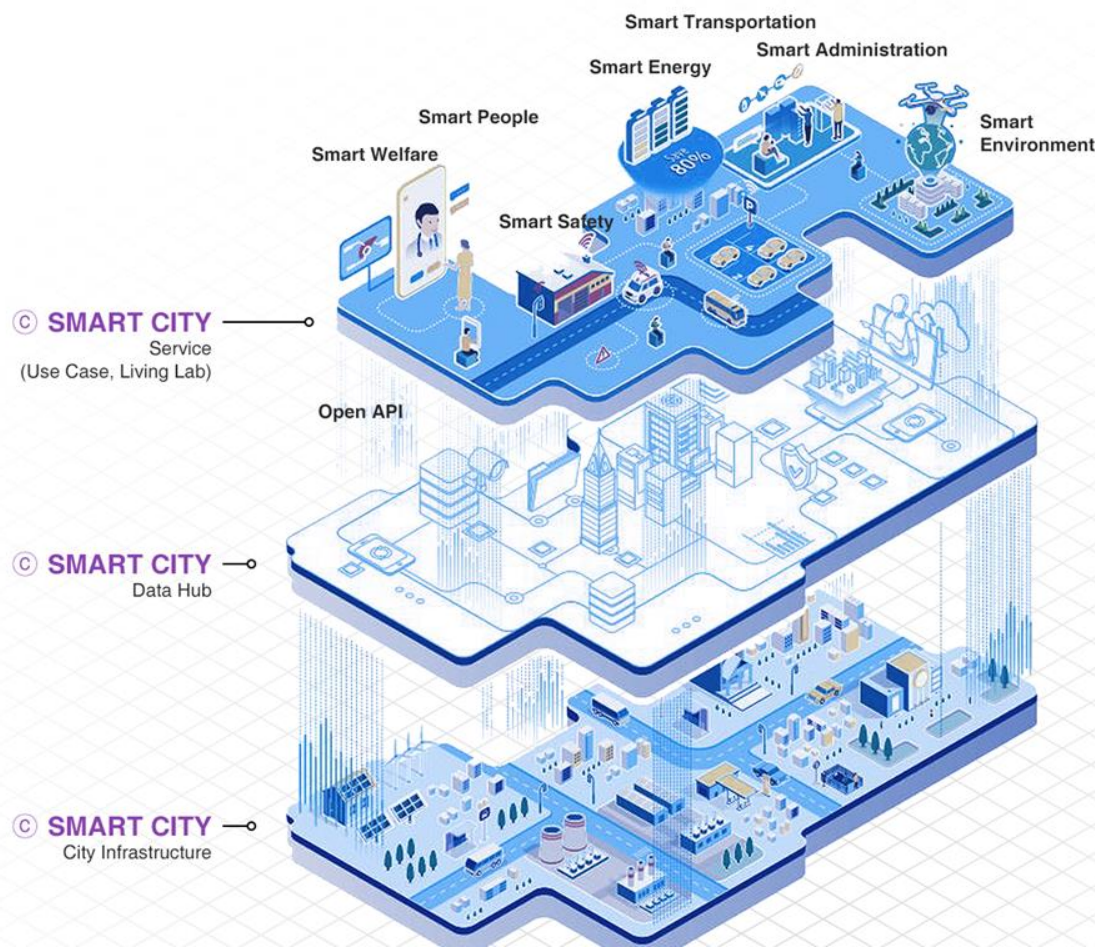


2019



R&D

Initiating national R&D program on a smart city based on data and AI for building a smart city infrastructure



✓ National priority project
130 million dollars investment(18-22)

* Government
(84.3billion) + Private sector(23.5billion)
+ Municipal governments (20.9billion)

•• Phase 1

Data hub technology development(18-19)

•• Phase 2

Pilot introduction to Daegu and Siheung (19-21)

•• Phase 3

Spread and expansion (22-)

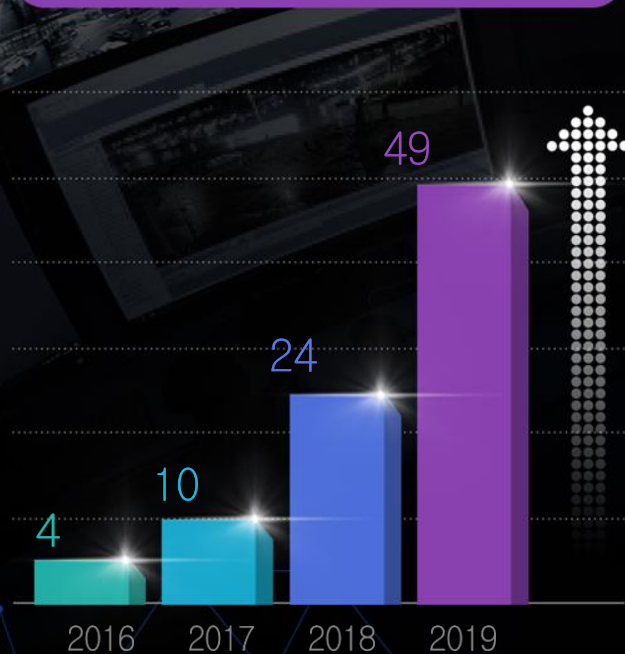
✓ Participants:76

* companies, universities, research institutes

Platform

Expansion smart city integrated platform to a total of 229 local governments by 2023 diversifying public services using this

Cities with the platform



17 Hub centers (introduction in 2020):
Linking local agency systems with the central
agency systems(112/119)

Service expansion plan



Creating an ecosystem for innovation

Governance

Regulatory Sandbox: a mechanism for granting temporary waivers to businesses for new technology testing and pilot service introduction



STEP 1 Legislation (2008)

Introduction of 'Smart City Act*' to provide a legal framework for smart city development/management
Provisions on project implementation procedure, governance, measures for industry promotion, etc.

STEP 2 Regulation improvement(2008~2018)

Inter-ministerial collaboration for improving regulations on new industries(privacy, mobility, energy) to remove obstacles to smart city development
* Regular consultations with businesses/local governments to identify regulations needing revision

STEP 3 Regulatory sandbox(2019)

Temporary waiver(4+2/up to six years) from a list of regulations for selected companies
Process: committee review → waiver → result review and improvement of existing regulations

Creating an ecosystem for innovation

Industrial Eco-System

Provide **business support** and create a **marketplace for solution** to promote domestic smart city industry

Support for young entrepreneurs

01

Provide seed funding
(up to 100mil. KRW) for start-ups
in the smart city field

Offer consulting/training/mentoring

Support in the smart city sector:
110 /400 case in 17 technology areas
(A joint initiative between MOLIT and MSS, 19.3.)

02

Build an online marketplace

- Create an online market to match solution developers with solution users
- Build a database that tracks records of solution development/assessment

03

Smart city 'group buying'

- Encourage group buying of smart technologies and services developed for a smart city project
- Develop a new procurement model that gives preference to companies with new technologies/solutions



Build a global network on smart city with governments, organizations, and academic institutes around the world to ensure **sustainable development of smart cities** in the future





Rebranding of 'World Smart City Week' as 'World Smart City Expo' to shape global smart city trend and develop a leading platform in Asia

Features



New International
Conference

Brand recognition

Expand the WSCW
platform with the launch
of World Smart City Expo



G2G Cooperaiton

Taking global initiative

Pursue G2G cooperation
via diplomatic missions,
international organizations,
KOTRA's branch offices,



B2B Event

Industry promotion and
economic growth

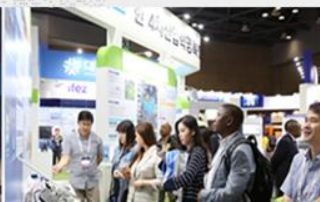
Expand business
exhibition, Arrange
business meetings



Public Event

Venue for sharing
innovation/vision

Explore possibilities by
discussing convergence
and new ideas
in the smart city field

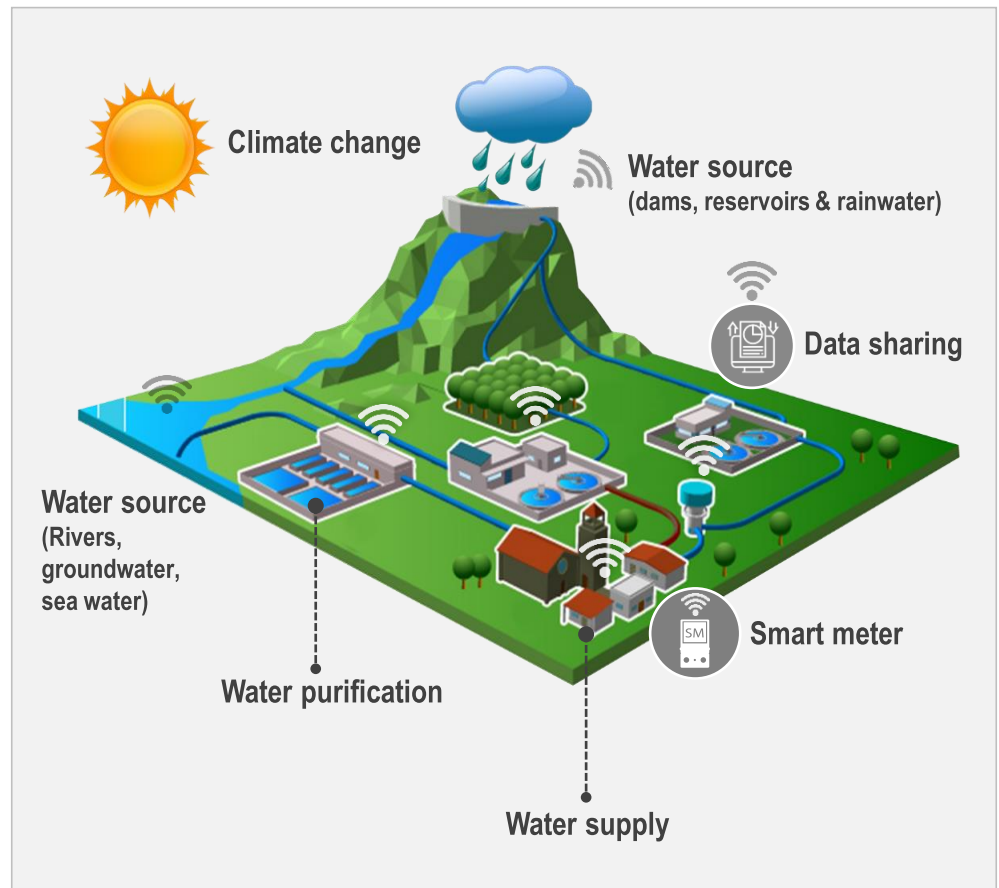
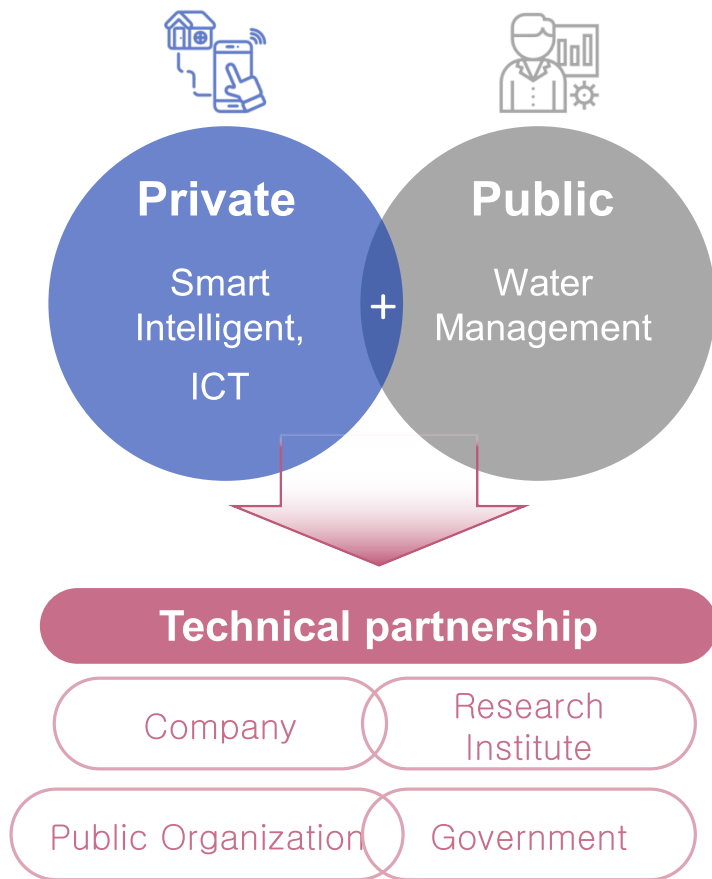


3. Smart Water Management



01 What is Smart Water Management (SWM)?

Smart Water Management by incorporating ICT tech to enhance the efficiency of water services from source to tap



01 What is Smart Water Management (SWM)?

Safe Intake Management

- Monitoring improvement of intake source water
- Diversity of intake source (Macro/Micro Water Loop)

Healthy Water Production

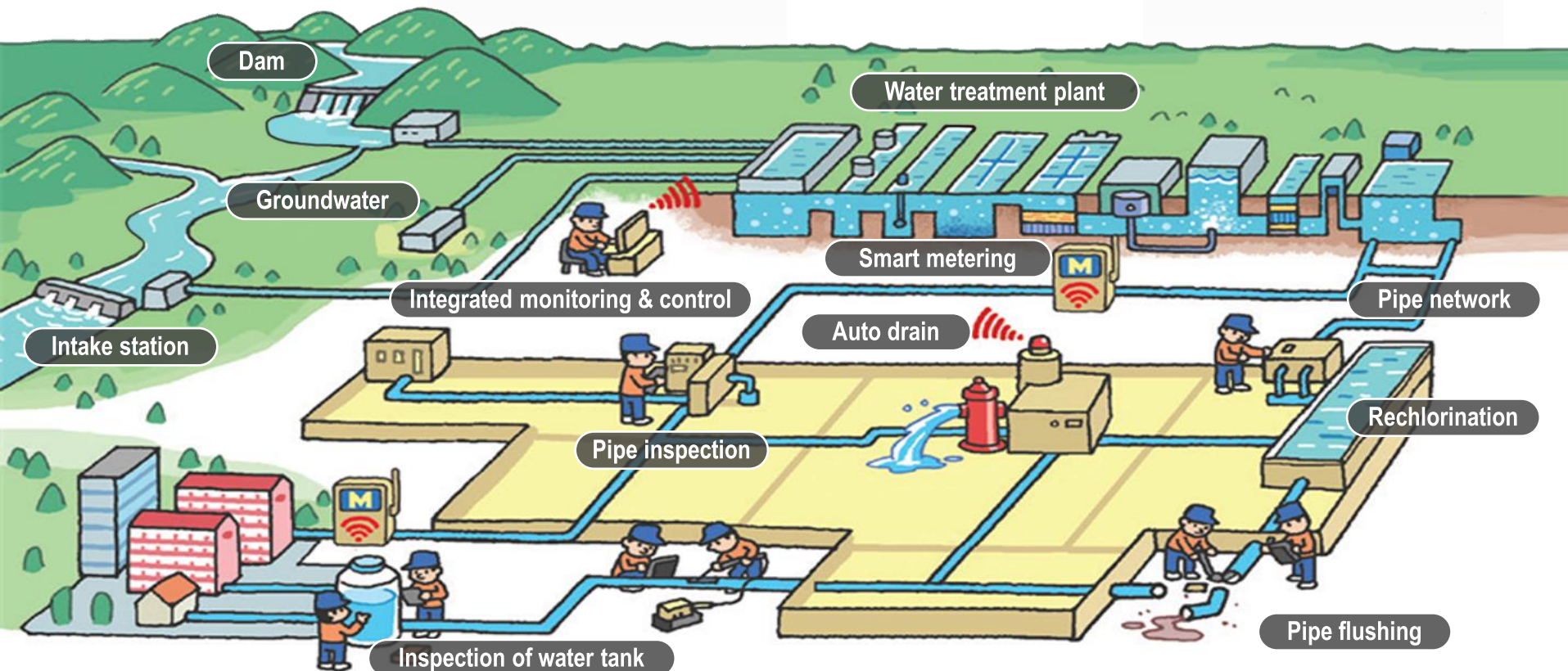
- Intelligent water treatment linked by intake water quality
- Production optimization & strengthening of WQ

Thorough Supply Management

- Water quantity & quality management by real-time
- Pipe network optimization (Inspection, flushing, etc)

Consumer-oriented Service

- WQ info. provision (Mobile App, Electric board)
- Total Care Service (WQ test, pipe diagnosis, etc)

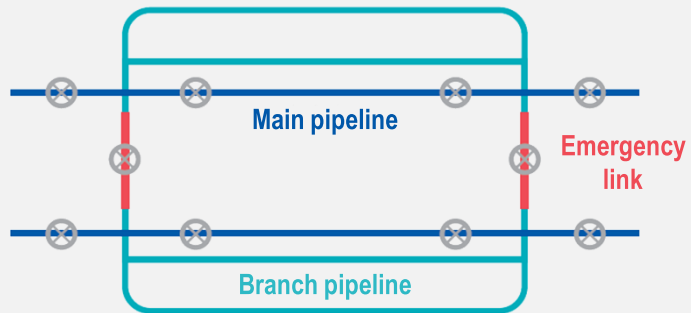


Capabilities of SWM and implementation of SDGs

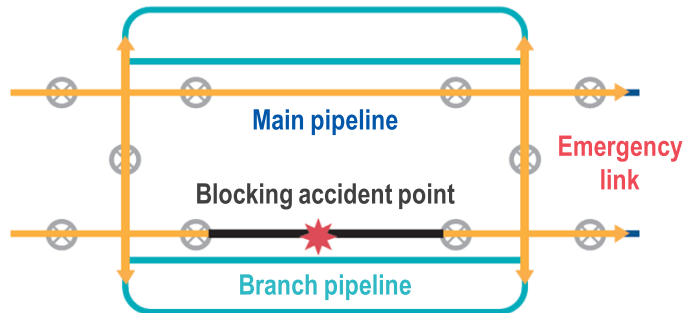


Stable Water Supply

Macro/Micro Water Loop

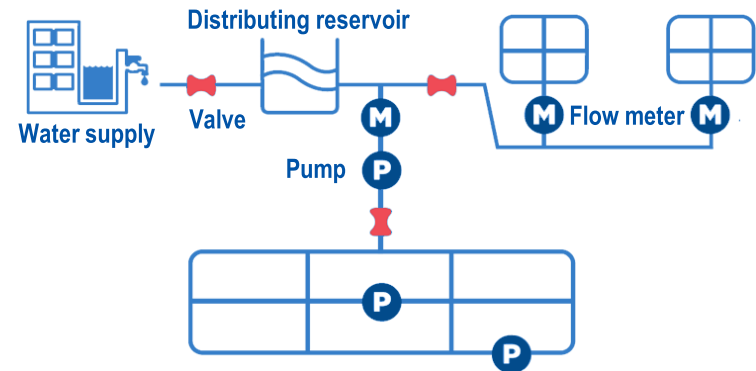


[Water Loop Concept]



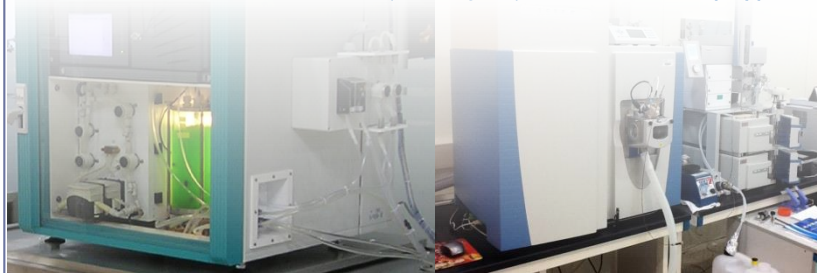
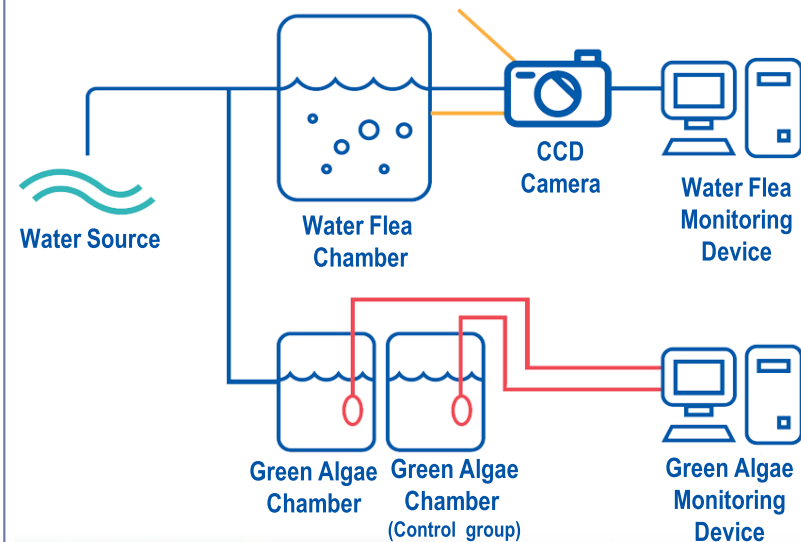
[Accident Response System]

Block System

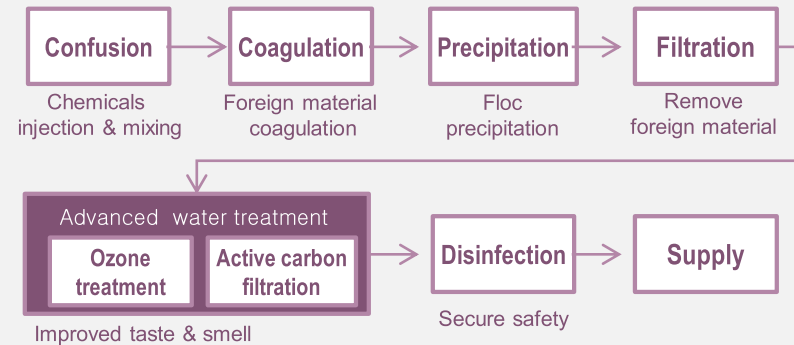


Produce Healthy Tap Water

Water quality monitoring

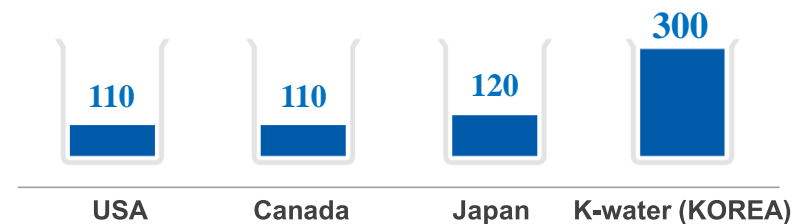


Advanced water treatment



Water quality analysis of 300 compounds

[Number of water quality analysis items]

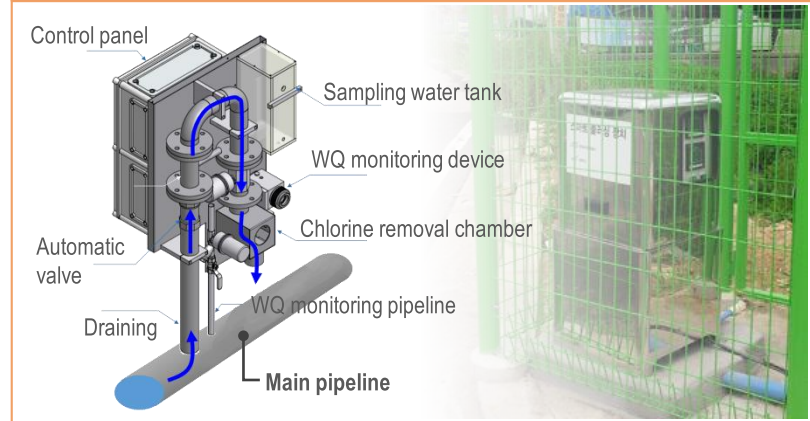


Supply Chain Management

Equalization residual chlorine



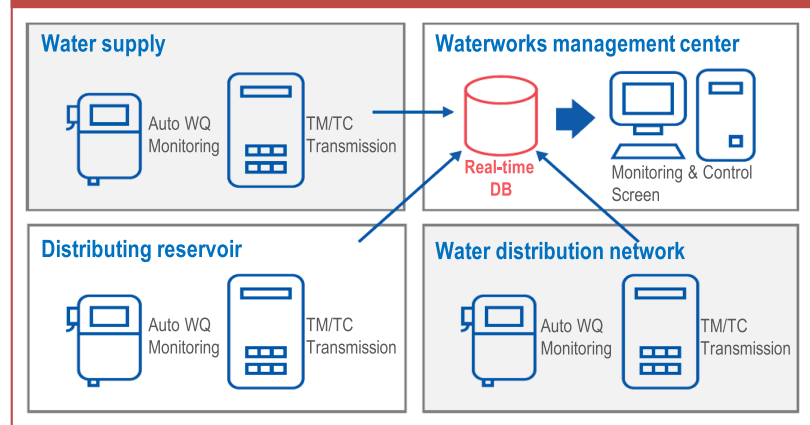
Auto drainage facility



Pipe-cleaning system



Real-time water quality surveillance



Providing Consumer–Oriented Services

Water Diary

To inform hourly & daily water usage, fares, etc.



Water Care

To show water quality at main points in the water supply network



Water Community

To manage bi-directional notices & a complaint board

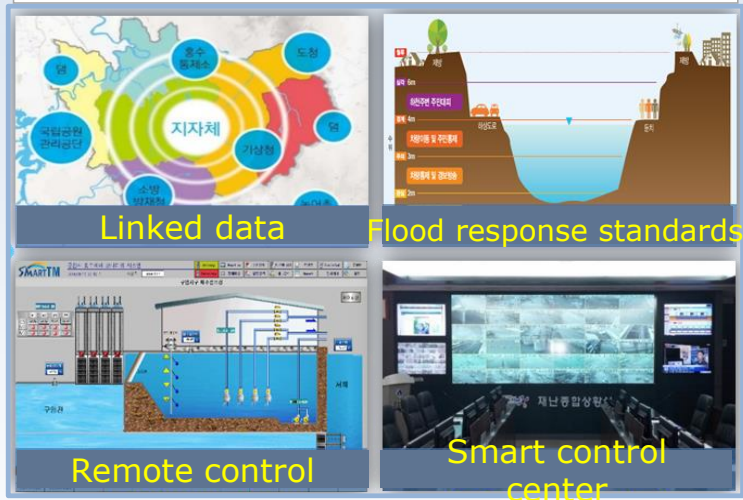


Water Disaster Minimization by the Prevention-Oriented of Disaster Management

Integrated management for floods

Development of customized integrated flood management systems for local governments

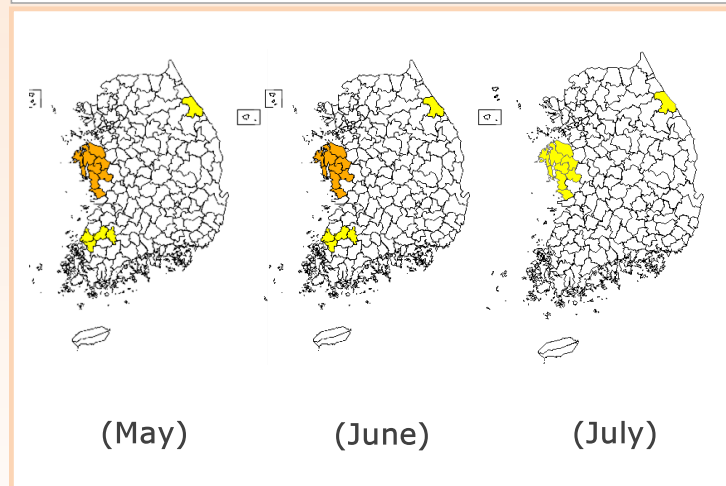
- Integrated monitoring of flood conditions such as linked data, remote control
- Introduction of flood response standards



Prediction and warning for droughts

Implementation of drought forecasting for anticipative drought prevention (Sep. 2015)

- Warning criteria : 3 steps (attention/severe/extremely severe)
- Contents: 1, 3 monthly drought forecasts



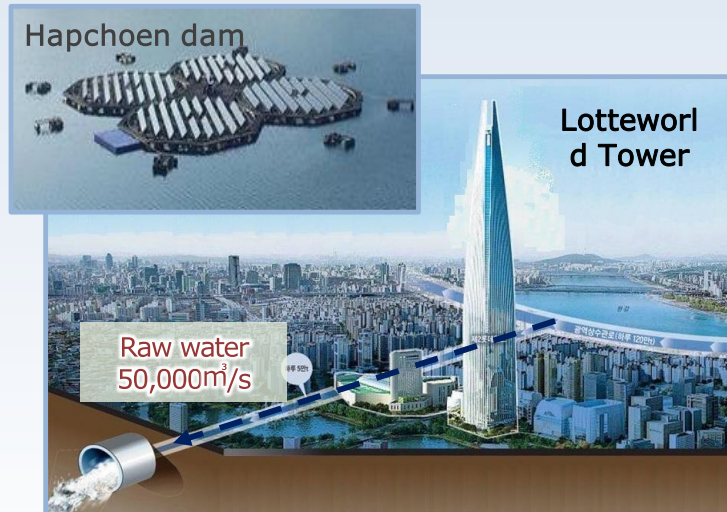
Expanding the Value of Water

Renewable Energy (Water-Energy convergence)

Utilizing floating photovoltaic and Hydrothermal energy

(Utilizing the surface of dams,
Raw-water source heat supply)

- 5.7MW - Solar energy generation on 3 dams
- Energy supply in Lotterworld tower for raw water(10.5MW)

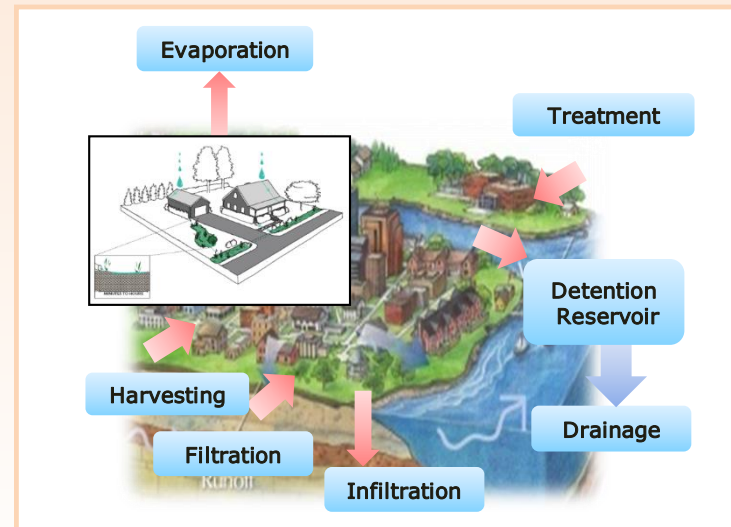


Eco-friendly Water cycle city (LID)

Introduction of LID considering Water cycle system

(Plan the natural facility and
design the water cycle based on LID)

- Application to Busan EDC and Songsan Green City
- Maximization of utilization, filtration, and retention of rainwater



04 SWM Case – Paju Pilot Project

➤ Location

Paju, Gyeonggi-province

(Population : 406 thousand, Supply : 149 thousand m³/d)

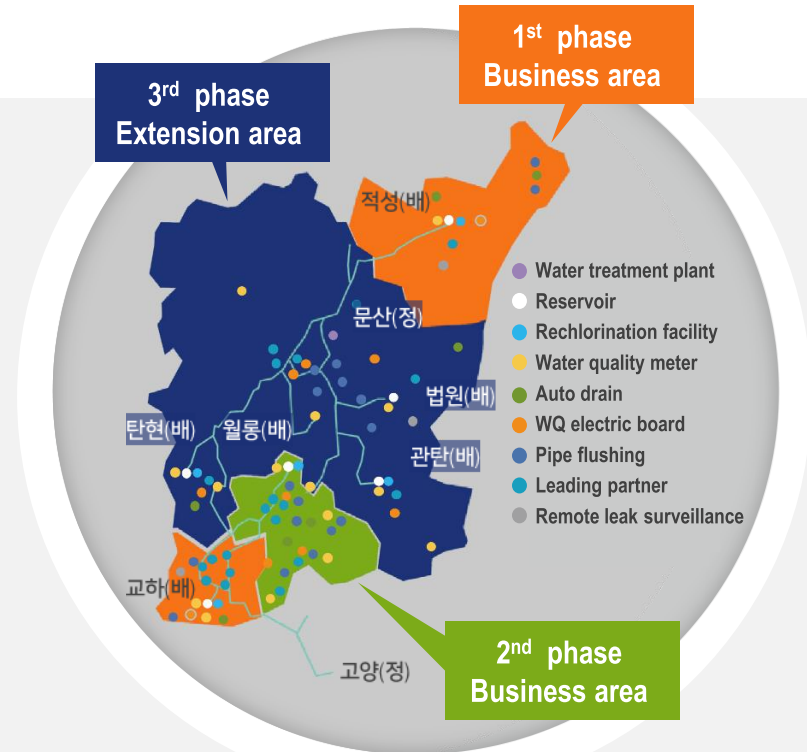
➤ Duration

1st · 2nd phase (Population : 223 thousand, `14.4~`16.3),

3rd phase (Population : 406 thousand, `16.4~`16.12)

➤ Objective

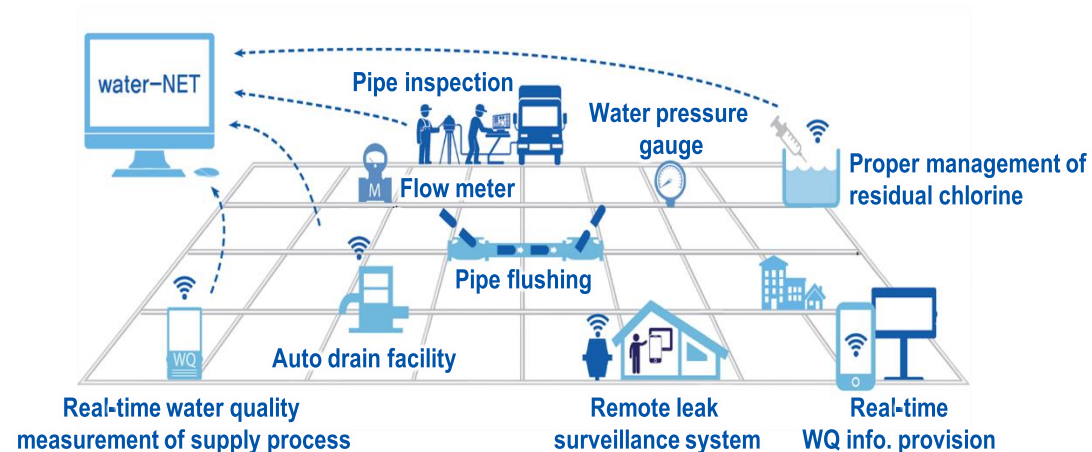
Establishment of water-NET and block systems,
improvement of water supply system,
providing real-time water quality information



Water quality
electric board

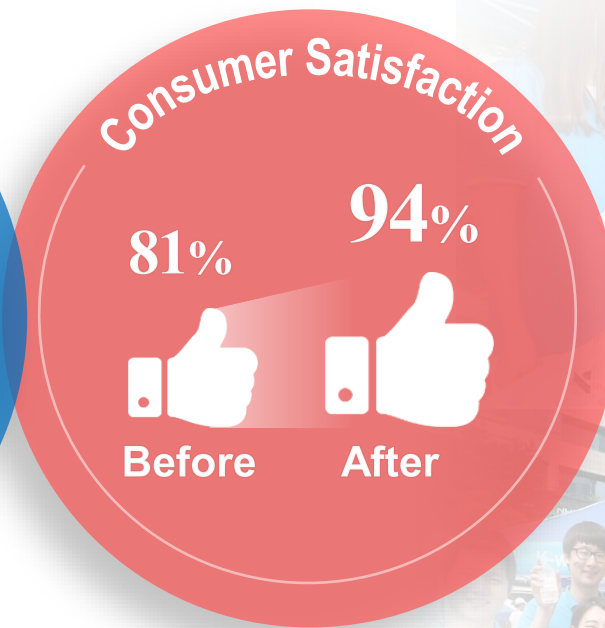
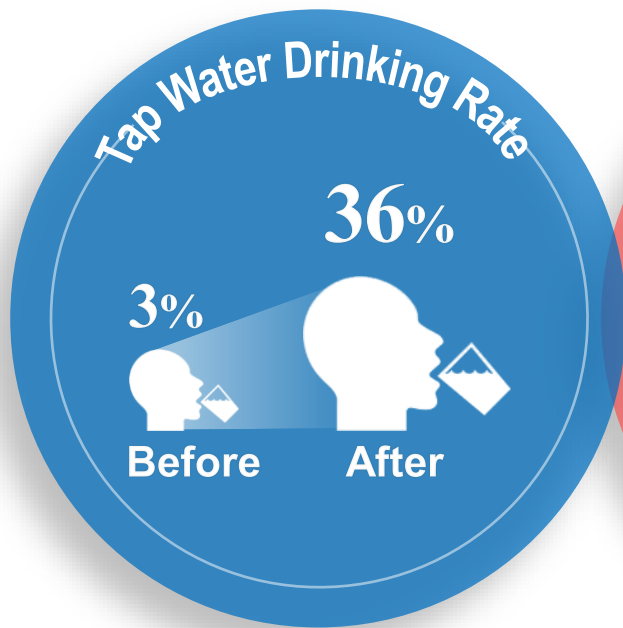


Inspection
of indoor water pipe



Drinking tap-water rate(3%→36%), Consumer Satisfaction(81%→94%)

Future water management based on healthier water supply and trust on tap water



05 SWM Outcomes – Seosan city

- Replace analog meters with **smart meters** in distribution system
- **Scientific water management** with fractionized block system(2 → 9)

Paradigm in water management

TM facility & Analog meter
"Block System"

Smart Meter
"Sub-block System"

Improve

2 Blocks

2 Blocks + 9 Sub-blocks

Analysis

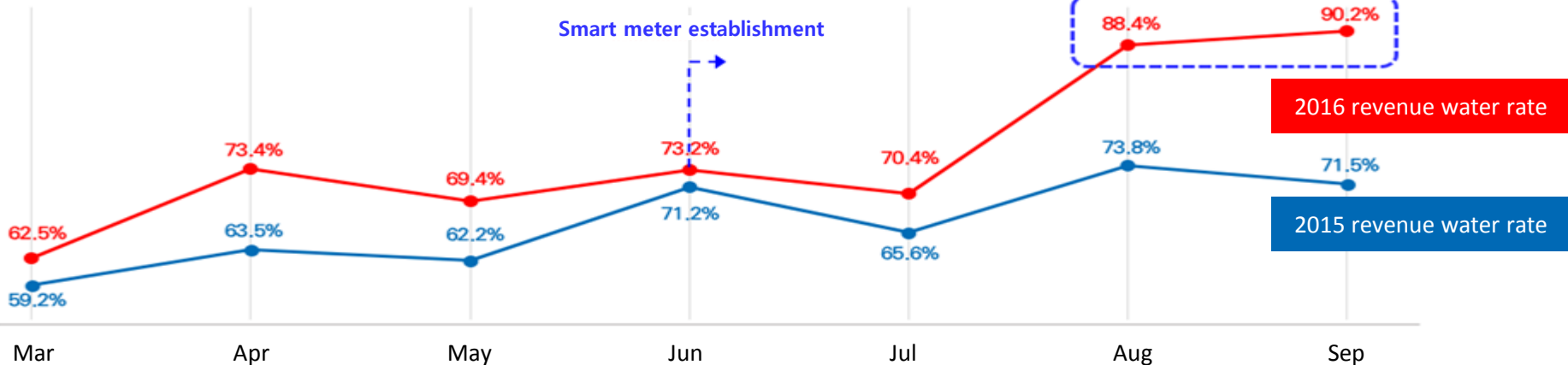
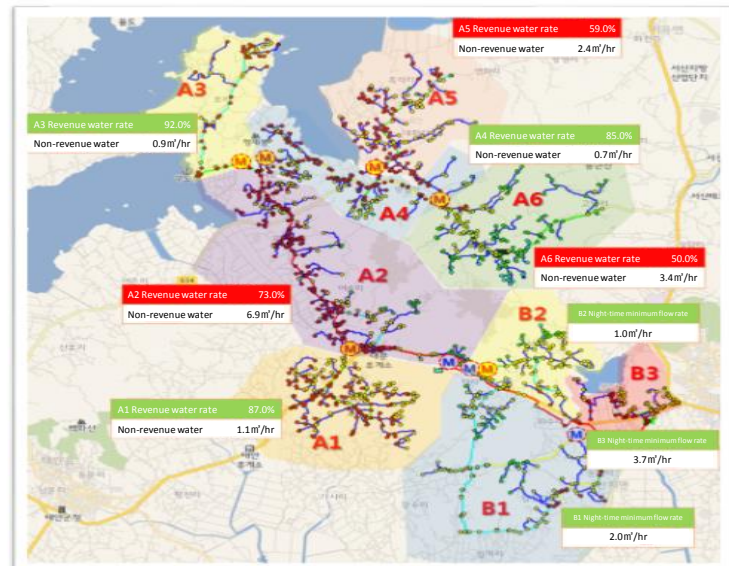
Monthly revenue water analysis

Daily revenue water analysis

Surveillance

3 points flow rate surveillance

12 points flow rate surveillance



06 SWM Outcomes – Busan city

- National pilot project for Smart City : A lakeside city that harnesses data and technology and introduces 10 innovative components

Robot	Digital assistant, Delivery robot, Rehab robot, Robot industry cluster
LWP	Hub place that mixes learning, work and play
City Admin.	Administration based on AI and augmented reality
Water	Water technology exhibition, Low Impact Development(LID), Smart purification plant
Energy	Utilization of renewable energy ESS, City energy management system
Education	Smart home, Smart shopping, Smart education
Health Care	Healthcare cluster, Real-time personal health monitoring
Mobility	Total mobility solution provision by linking all mobility services
Safety	Intelligent disaster prediction system Intelligent CCTV for citizen safety
Park	Smart park for experiencing innovations in technologies and design



07 Challenges ahead

Risks of open data
(privacy violation, hacking)



PRIVACY



Introduce stringent privacy regulation
strengthen cyber security

Exclusion of the elderly/disabled
and low-income families



SMART DIVIDE



Build an inclusive city through 'Living lab,'
online public education, and Smart Silver
Care

High costs from managing/running
high-tech cities



COST



Cost-sharing between
the governments(public services)
and businesses(private-sector services)

Thank You

