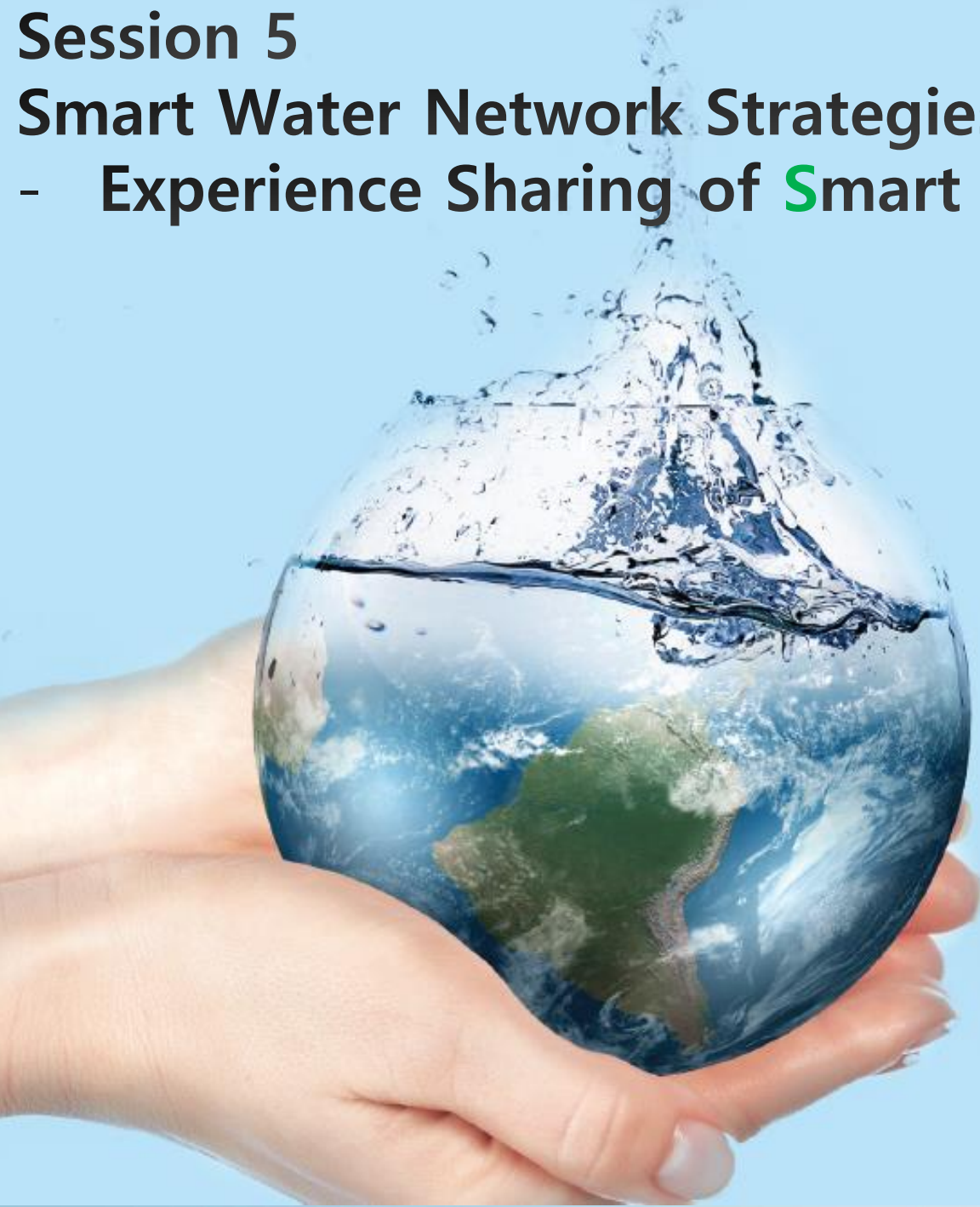


Session 5

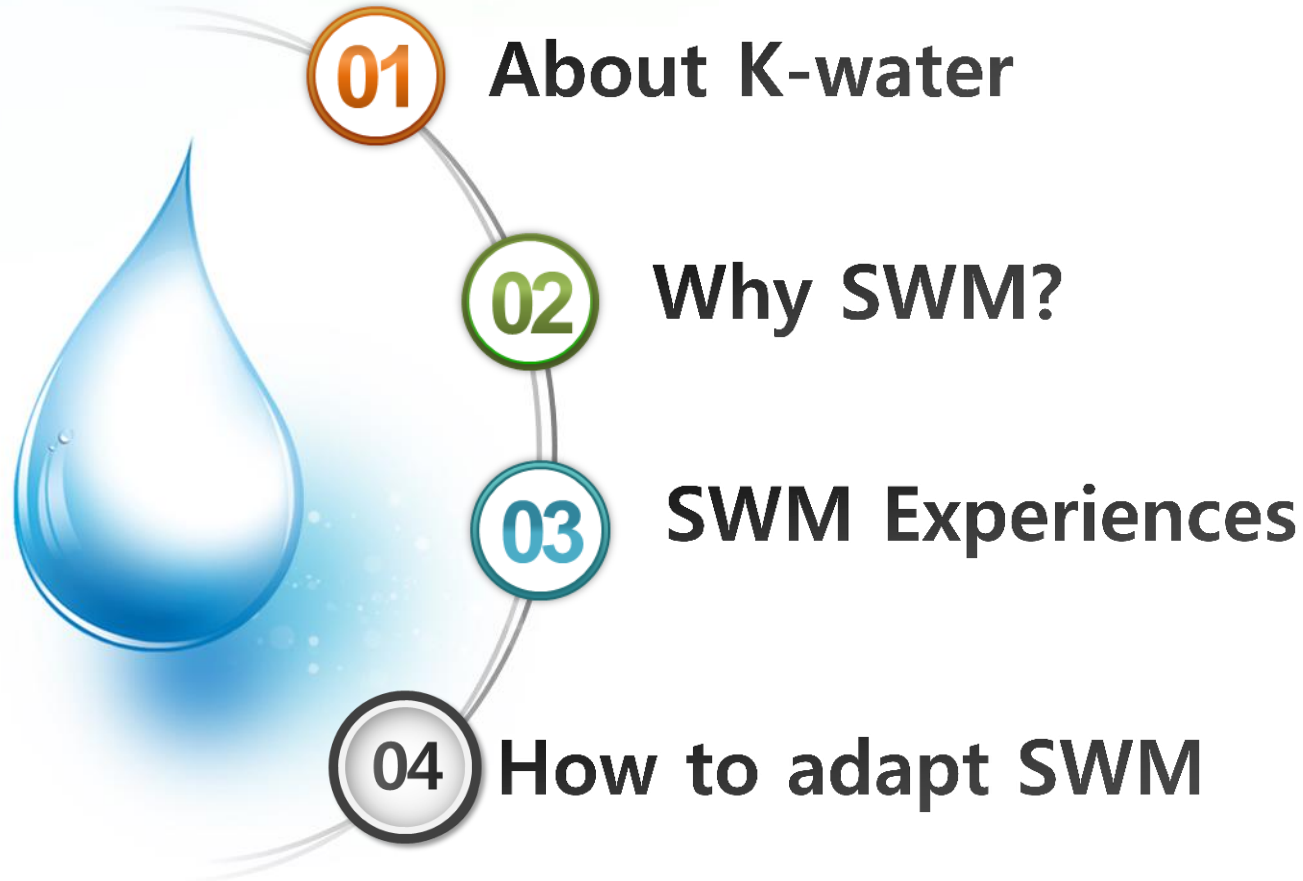
Smart Water Network Strategies for Resilient Cities

- Experience Sharing of Smart Water Management



Tai-whan, Kim (K-water)
nkvision@kwater.or.kr

Index



The background features a soft, ethereal sky with white and light blue clouds. In the top right corner, there are green leaves and branches. The bottom of the image is filled with a light blue grid pattern that recedes into the distance.

01

About K-water

- **Established in 1967**
- **100% government-run company under MoLIT***
 - * Ministry of Land, Infrastructure, and transportation
- **Employees : Approx. 4,300**
 - * 1 headquarter, 8 regional headquarters
 - * about 400 staff are working in water supply business



Water Resources Mgmt.

- Water security & Flood control
- River management

Urban Development

- Industrial complex & City development (Gumi, Yeosu, Sihwa MTV...)
- Waterfront (Busan eco delta city..)

Water Quality

- International standards of 254 items inspection



K-water

Clean Energy

- Hydro, tidal Power
- Installed capacity: 2,000 MW (Domestics & Overseas)

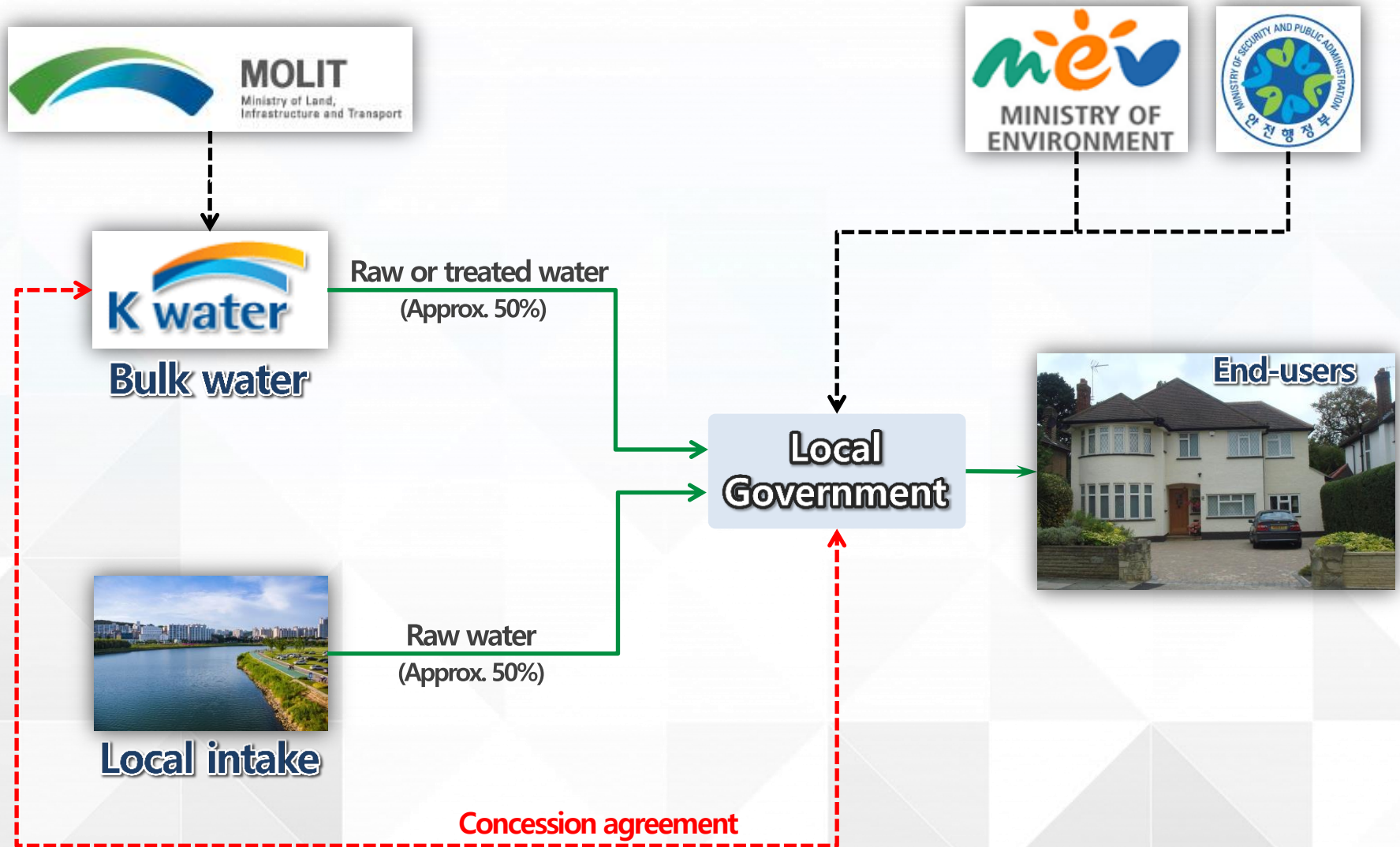
Water Supply

- Bulk & regional water
- 25mn served people

Navigation & Logistics

- Kyung-in Ara Waterway

K-water's Role as Water Supplier

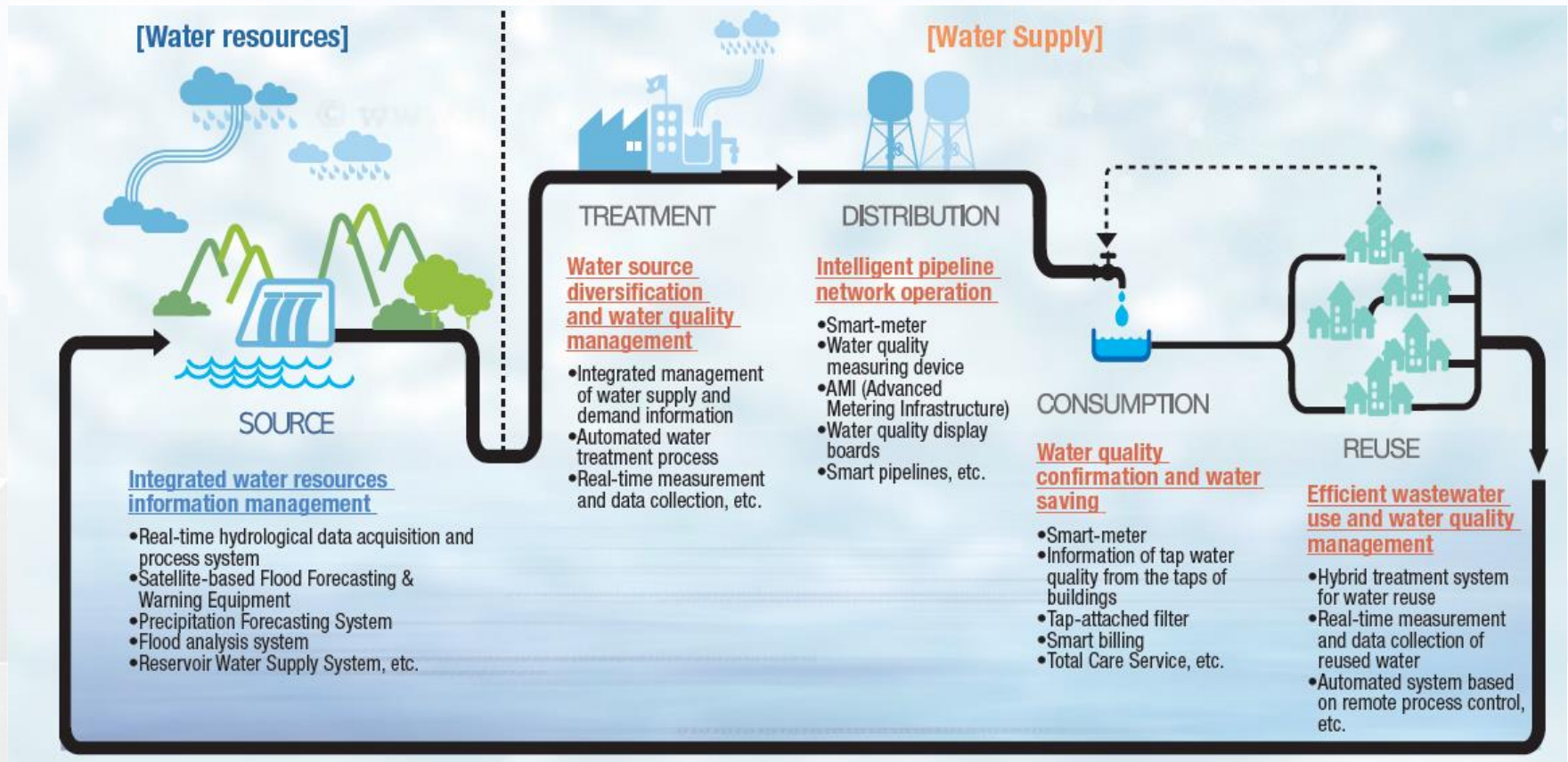




02 Why SWM ?

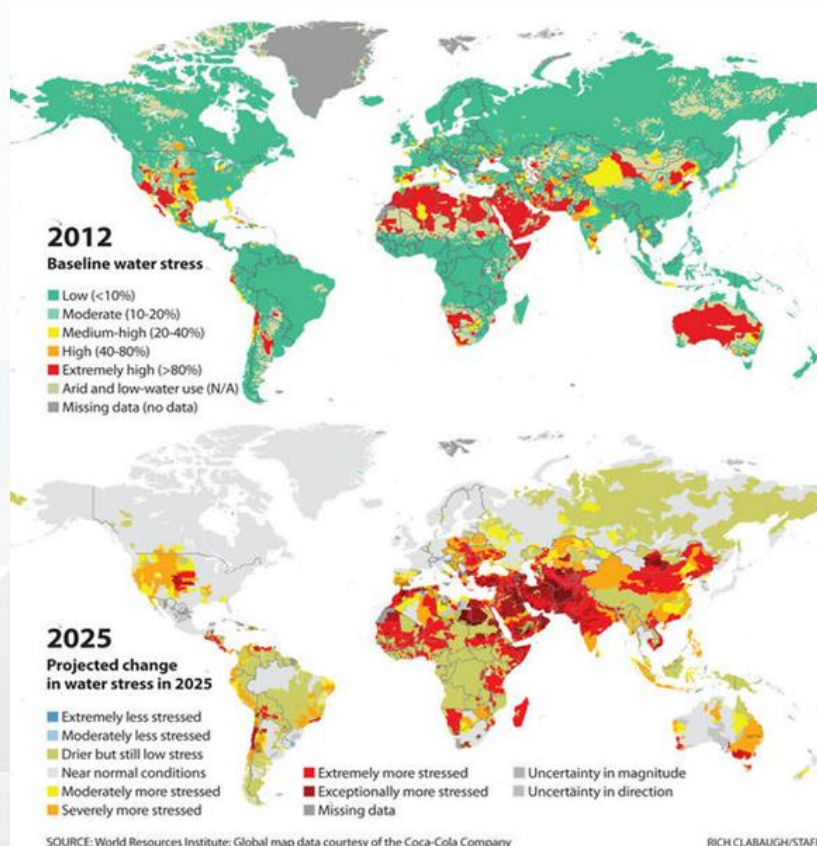
What is SWM ?

A future-oriented water management strategy by ICT-based technologies,
For securing the stability, safety and efficiency of water



Why SWM?

We need more efficient and sustainable method for water security



Smart water network provide the right opportunity to save money and water right now

Maximization of Limited Water Resources

SWM provides the optimal utilization system by combining every water resource available. water can be provided and reused wherever necessary without construction of large scale infrastructures

Reducing Leakage and Incidents through Comprehensive Monitoring

SWM is capable of identifying leakage incidents through information collected from smart devices. Improved response time to incident and pressure management is reducing the risk of incidents

Facilitation of Water and Energy Savings

SWM is capable of accurately predicting the needs and appropriate coordination of production and supply through the ICT-based analysis. As such, water and Energy savings can be promoted.



SWM Experiences

SWM Initiative (Goryeong)

K-water launched Smart water management pilot in Goryeong-gun on Jan. 2015

*Symphony of
Water network with
Maestro
In Goryeong*



SWM Concept

- **SWM, an integrated water supply mgmt. for improving O&M**
 - ✓ This customized solution is integrated of systems, solutions & leakage detection
 - ✓ AMI is consisted of combination of Smart Meter, SCADA & Network sensors.



Hourly usage & sensor
data acquisition



Analysis NRW & optimized
peration

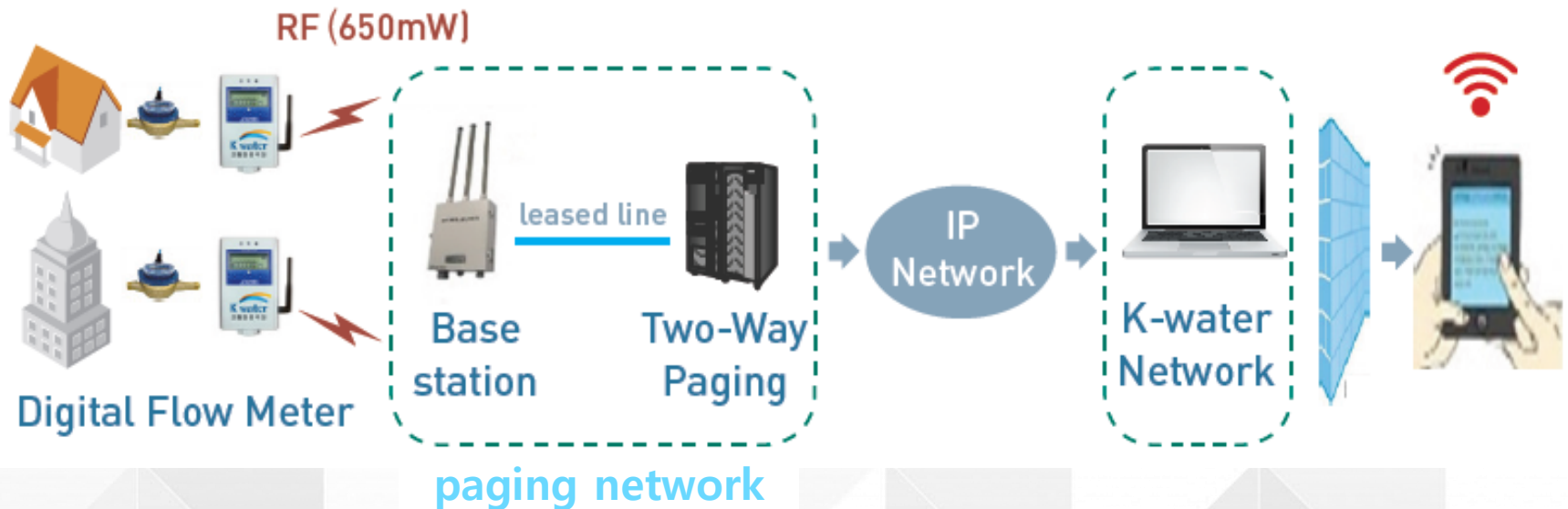


Pipe Inspection
& Leakage detection
(Sahara, NQ-15, WPIS100)



Smart meter, economic efficient & stable flow metering device

- ✓ Metering data is collected hourly, sent 4 times a day for more than 8 years
- ✓ Smart meter adopts paging network which transmits maximum 2km with 650mW of emit power and Repeaters are not needed
- ✓ Several options including paging network can be suggested based on telecommunication condition



Smart Meter



Digital Flow Meter

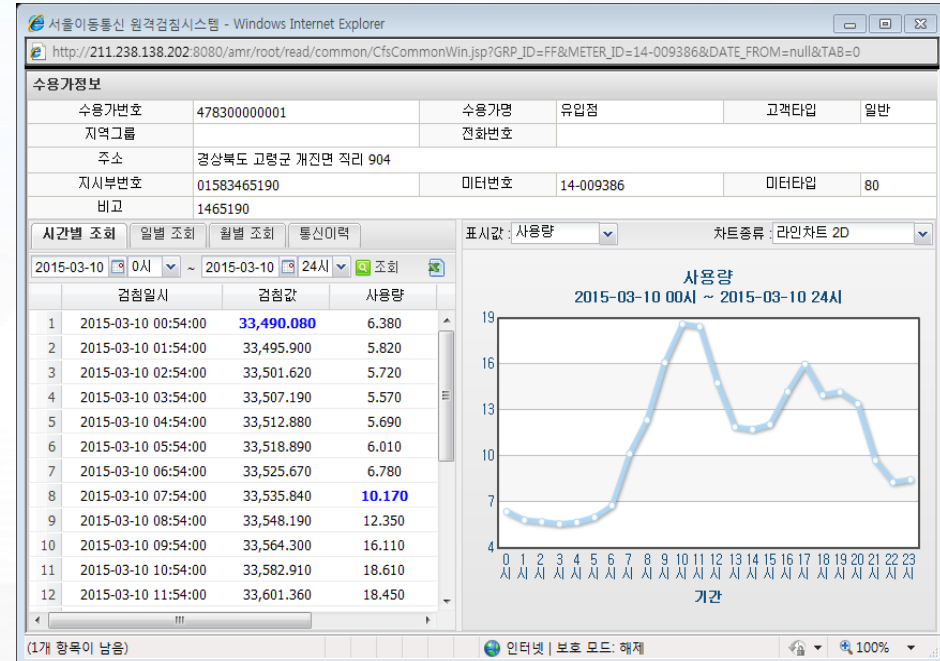
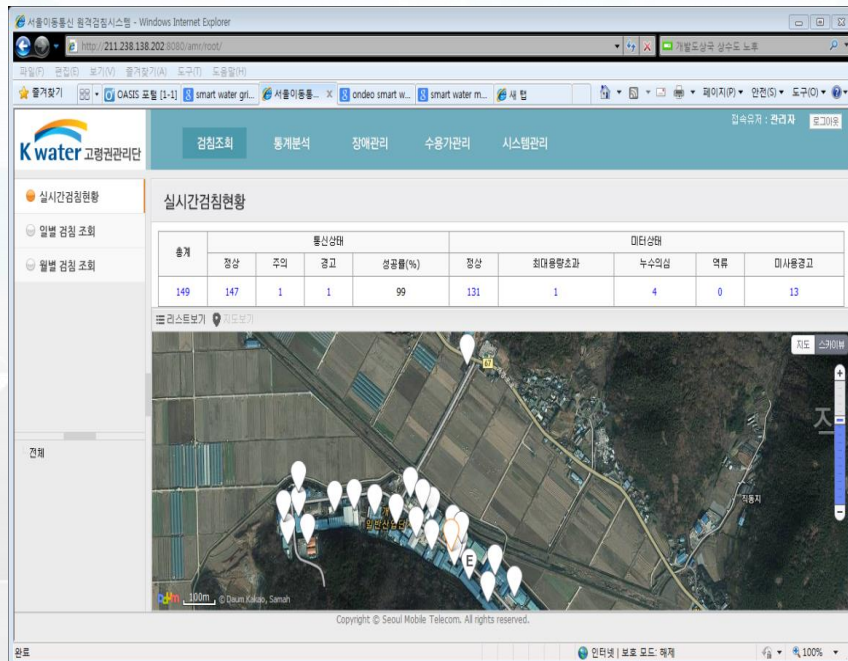


Remote Reading Unit



Smart Meter, Streamlined tool for water supply

- ✓ Hourly usage, signs of leakage, data transaction & battery status can be checked
- ✓ Improve customer satisfaction & water service using mobile app for informing hourly/daily water usage



Example of Installing Smart Meter

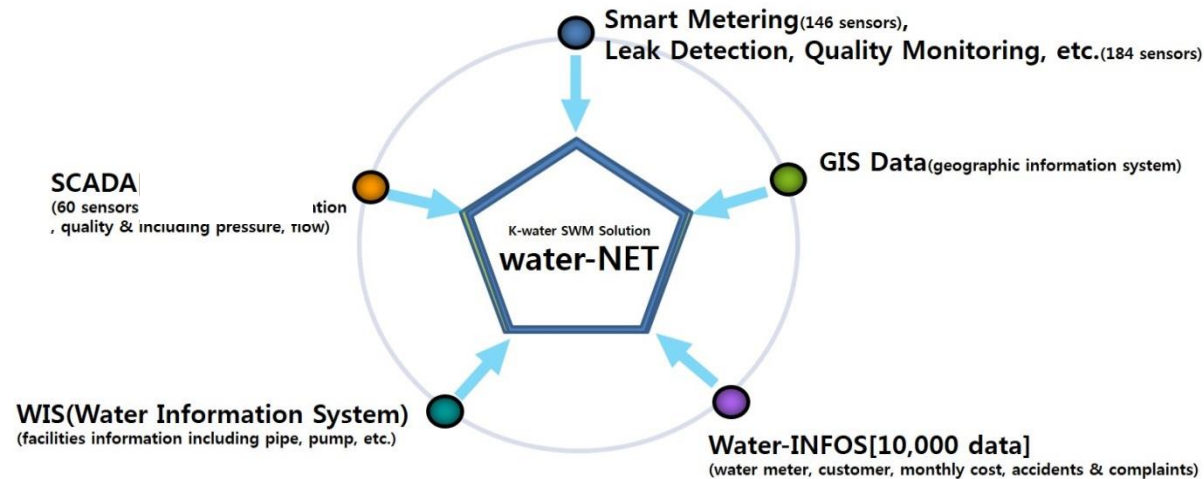
● We installed 32 smart meters in Gaejin industrial complex

- ✓ 3 start point of pipeline + 29 every customer
- ✓ Replaced 4 water meter having error
- ✓ Reduce NRW (34% → 1%) of Gaejin complex after metering



● water-NET, K-water's key tool to manage water networks

- ✓ Network analysis, leakage, NRW, pressure, risk & quality mgmt.
based on about 110,000 real-time data from SCADA, GIS. Etc.



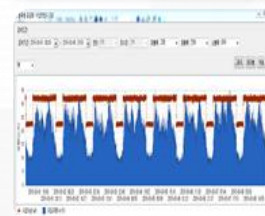
Network Analysis



Leak Monitoring



NRW Mgmt.



Pressure
Monitoring



Risk Mgmt.



Water Quality
Mgmt.

● WAPIS, K-water's Inspection Team

- ✓ WAPIS has been shown professional performance from 2012
- ✓ Their specialties are video inspection, leakage & buried pipe detection

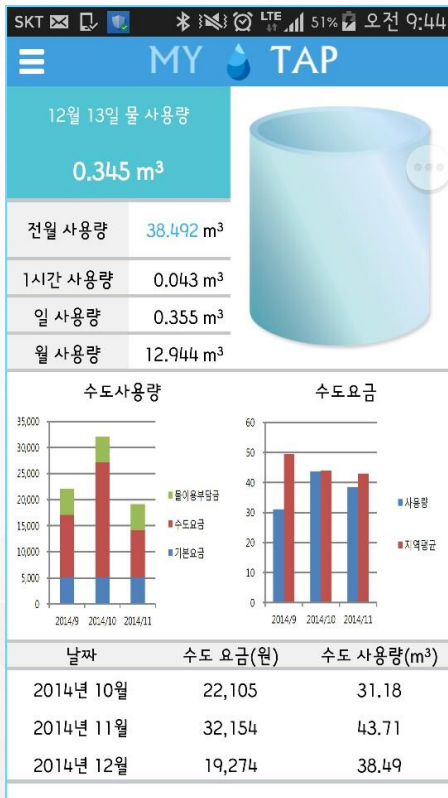
● Scope of WAPIS

- ✓ Video inspection (Sahara, NQ-15, W-PIS100)
- ✓ Leakage & Pipe detection (Sahara, Eureka3, SoundSens, GPS)
- ✓ Pressure management (Pressure logger, Flow meter, etc.)



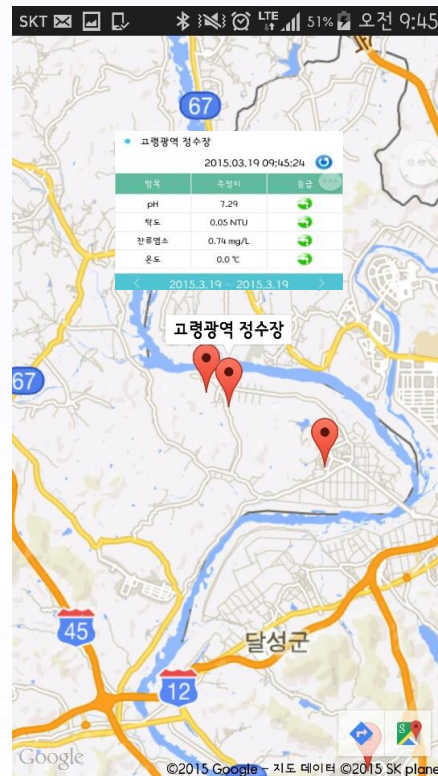
Mobile App

Water Diary



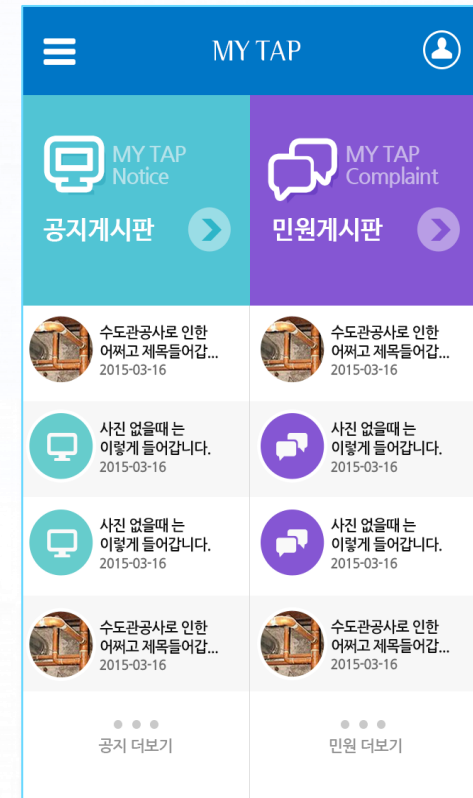
To inform hourly & daily water usage, fare

Water Care



To show water quality at main point in water supply

Water Community



To manage bidirectional notice & complaint board

Building own SWM model & adopting Asset Management

We achieved 3% decrease in NRW & \$0.2 mil./yr(↓ 4%/y) reduced in O&M cost

1. Reducing NRW & Increasing leak detection efficiency

- Near(Real) time monitoring of DMA → Pipe bursting & leakage can be easily found
- Pressure management → Reduction of background losses
- Narrowing down for investigation area to leak detection

2. Saving OPEX & CAPEX

- Decrease O&M costs with reducing pipes bursting, energy saving
- Reducing rehabilitation and replacement of existing pipes(Asset management)

3. Replace malfunction water meter → Reduction of apparent losses

4. Customer satisfaction

- Easily detection for abnormal usage of customer like leakage of the inside of house
- bidirectional communication

ADB Partnership Agreement



" Using these knowledge and smart technologies are very appropriate to solve water problems.."

(Dr. Bindu, vice president of ADB, '15.4)

('16.2.2)



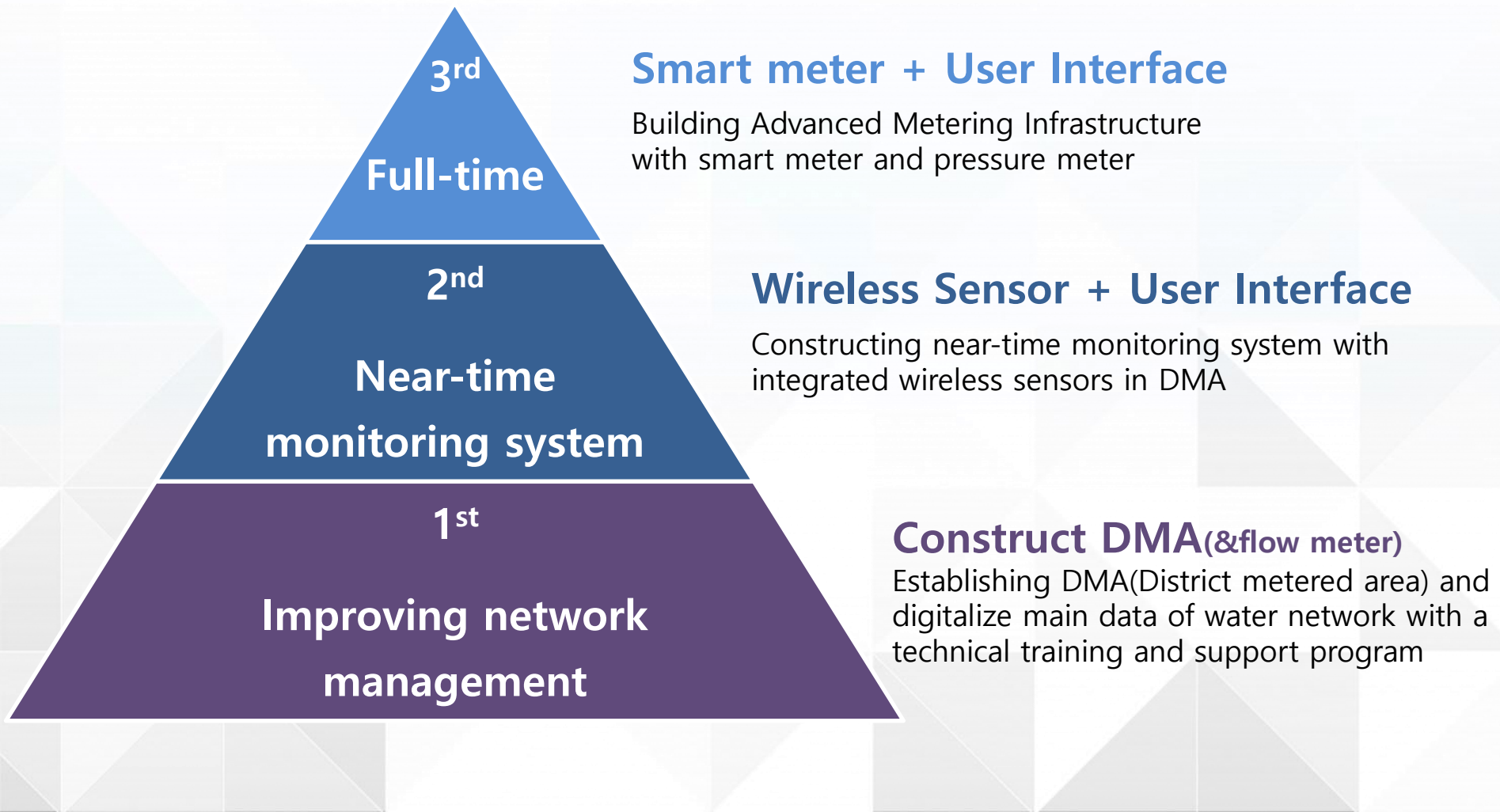
- ◆ project : Promoting Smart Drinking Water Management in South Asian Cities
- ◆ contents : To Enhance sustainable O&M, Suggestion proper SWM implementation, Training and skills development program for trainers and staffs



How to adopt SWM

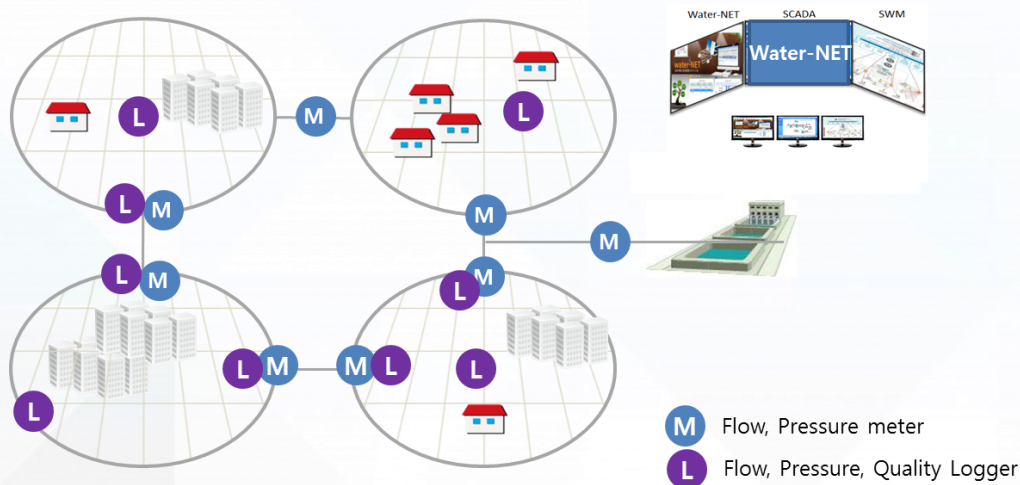
Basic Concept of SWM

Suggesting 3-step Framework for other Countries



Focus on countries operating basic facilities

Improving network management



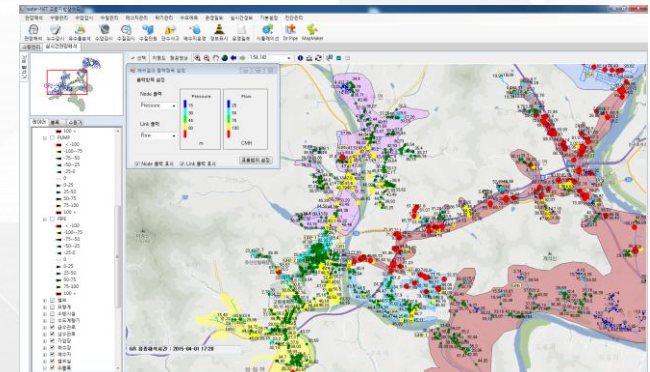
Establishing **DMA** and building a **water network model** and **D/B** by digitalizing data

Installing minimum meter(logger type) and sensor considering technical and economical issues in local area

Co-work with local engineer with the **technical training and support program**

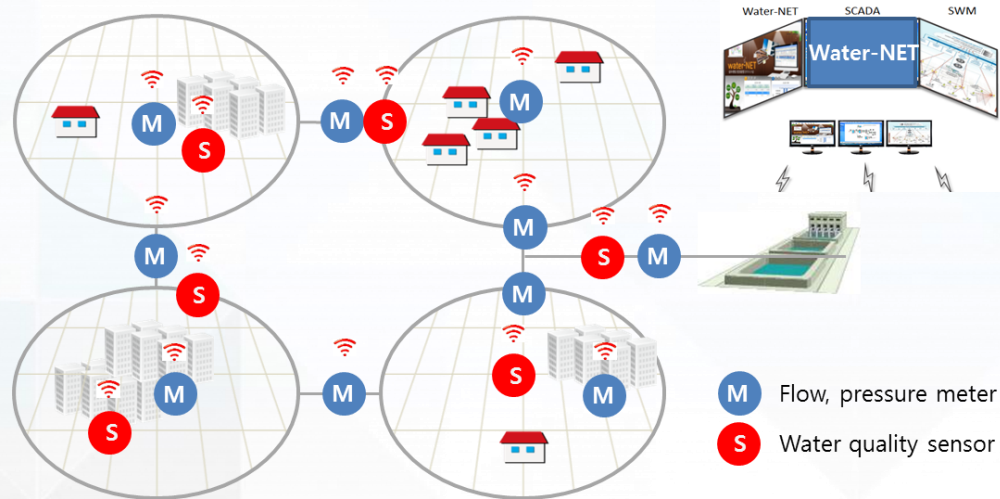
Main Objective of 1st Step

Water network analysis, Monthly NRW management(water audit)



Focus on countries requiring operation system by sensors

Near-time monitoring system



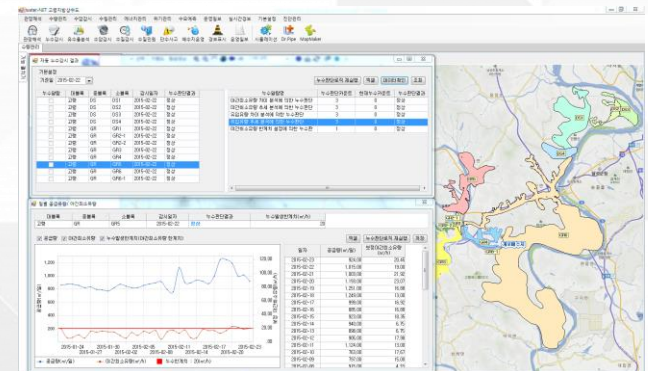
Upgrade water network with **wireless sensors and meters**

Install more flow meters and water quality sensors at main pipe and big customer

Operating **monitoring system** based on **near-time**(hour interval) for low power design

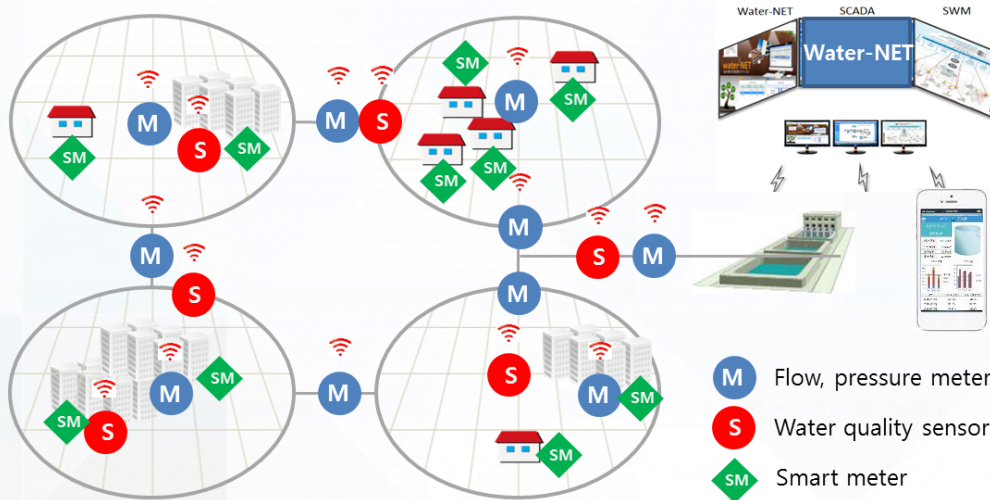
Main Objective of 2nd Step

Water network analysis, leak detection with minimum night flow analysis



Focus on countries requiring SWM with AMI

Smart Water Management



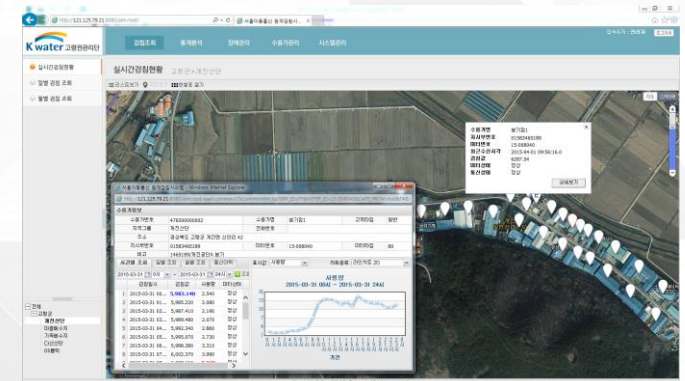
Establish Advanced Metering Infrastructure (**AMI**)

Install Smart Meters on every tap and provide information to customer (**smart phone app**)

Remote control main valve and upgrade to real-time monitoring system

Main Objective of 3rd Step

Real-time water network analysis, NRW management, auto leak detection
By smart systems



Thank You!

