
MANAGING WATERWORKS SYSTEM IN MEGACITY TOKYO

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Today's Topic

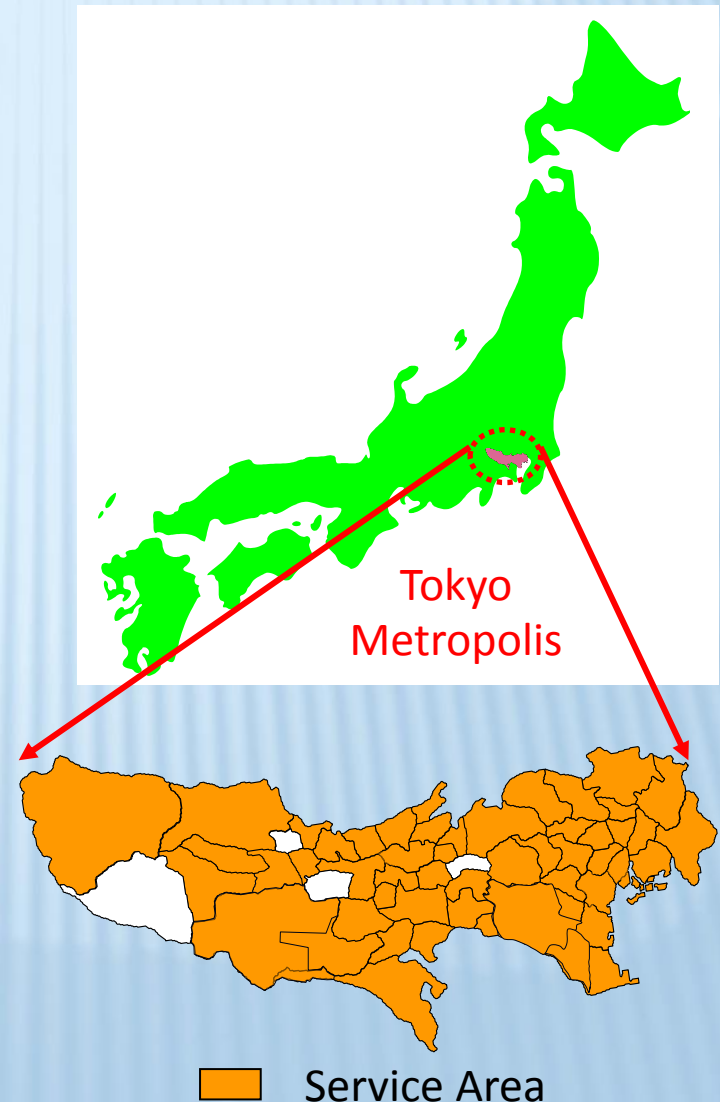
- 1 Overview of the Tokyo Waterworks**
- 2 History of Securing Water Volume and Quality of Water**
- 3 A Path to Resilient and Sustainable Waterworks**

1 Overview of the Tokyo Waterworks

Overview of the Tokyo Waterworks

Supply Started	1898
Service Population	13.3 mil.
Daily Average Distribution Volume	4.19 mil. m ³ /day
Daily Maximum Distribution Volume	4.51 mil. m ³ /day
Total Length of Distribution Pipes	27,038 km

*As of FY 2016

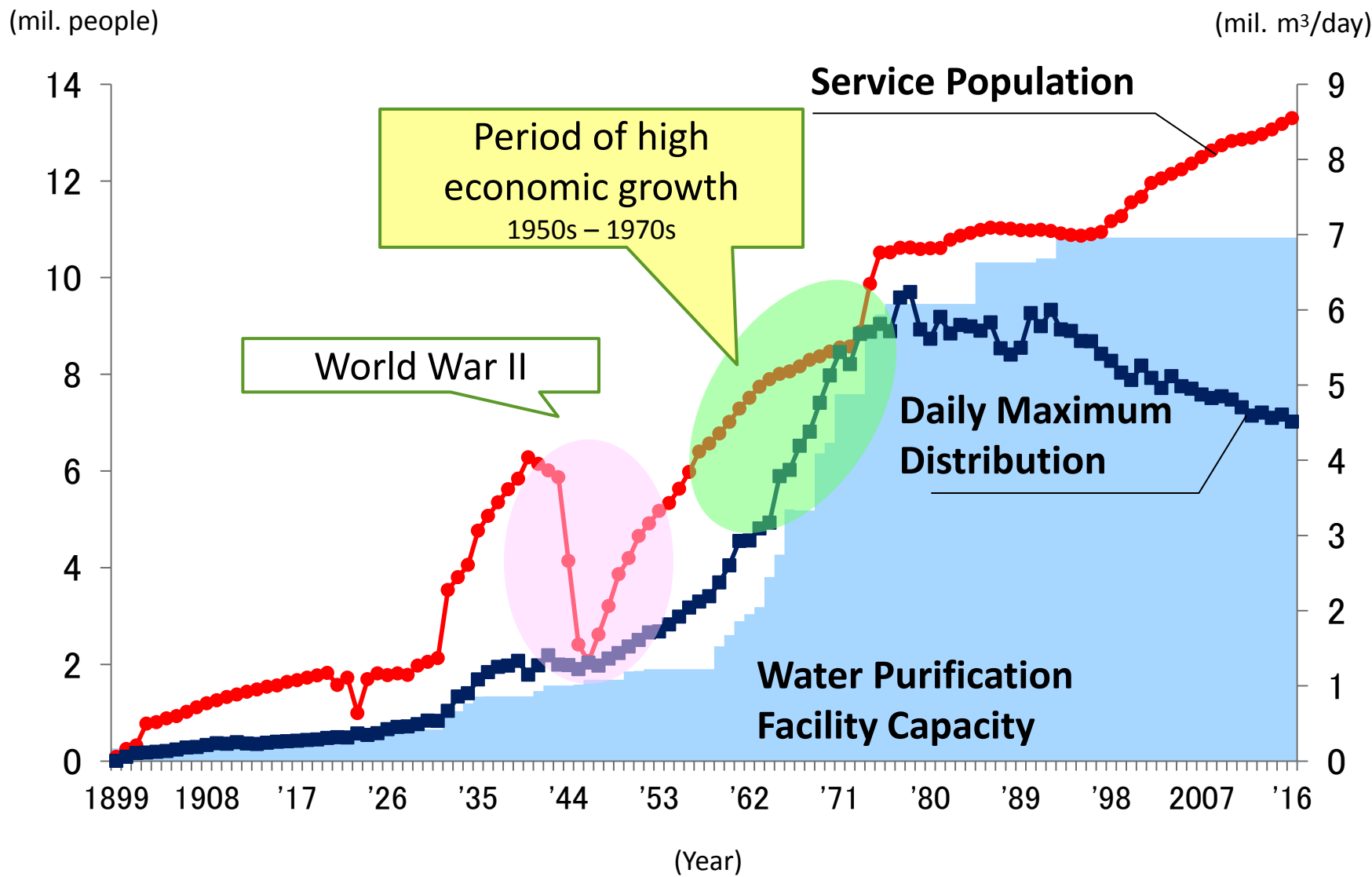


2 History of Securing Water Volume and Water Quality

- ① Responding to Increased Demand**
- ② Leakage Prevention Efforts**
- ③ Water Quality Improvement Efforts**

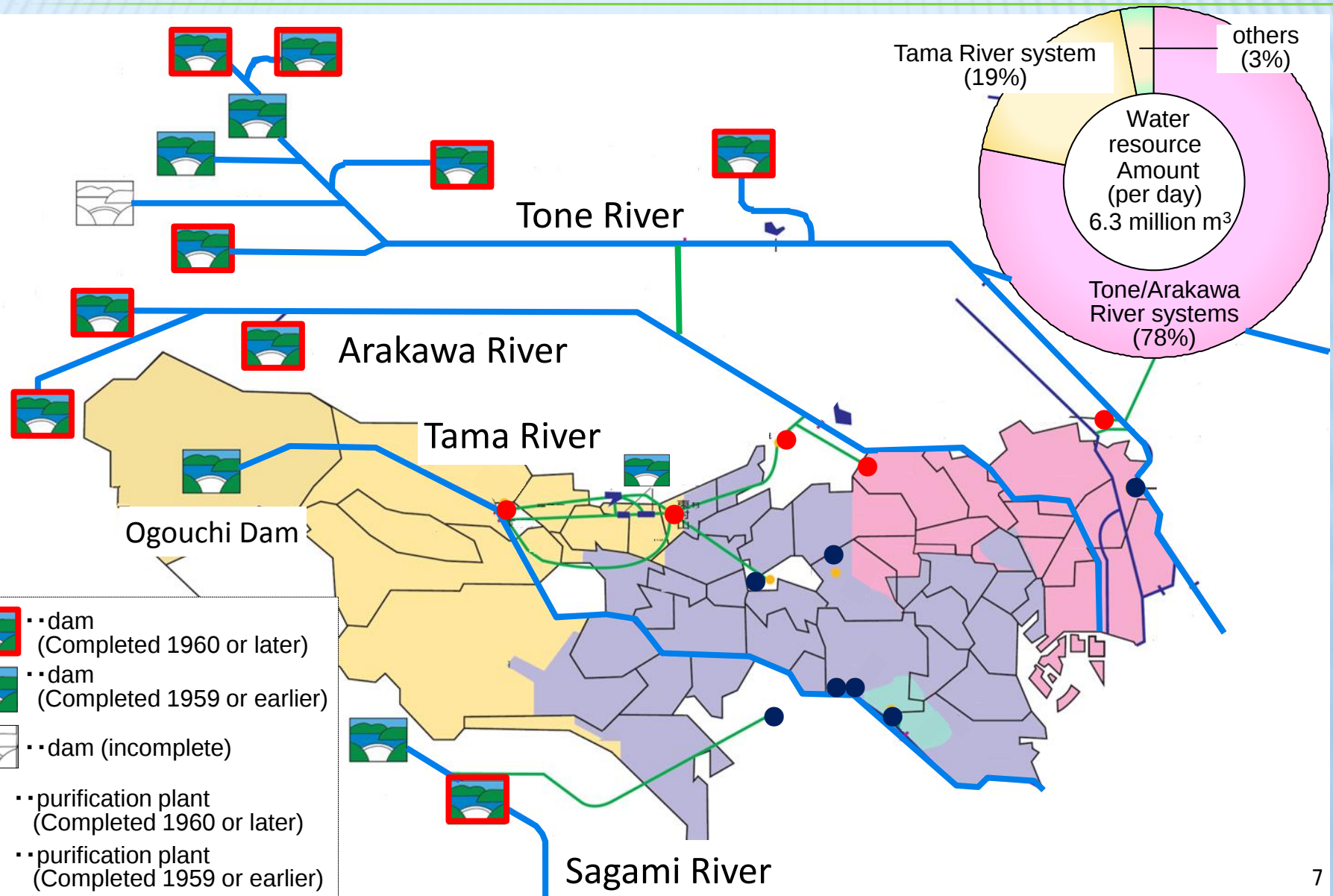
① Responding to Increased Demand

Transition of Water Demand

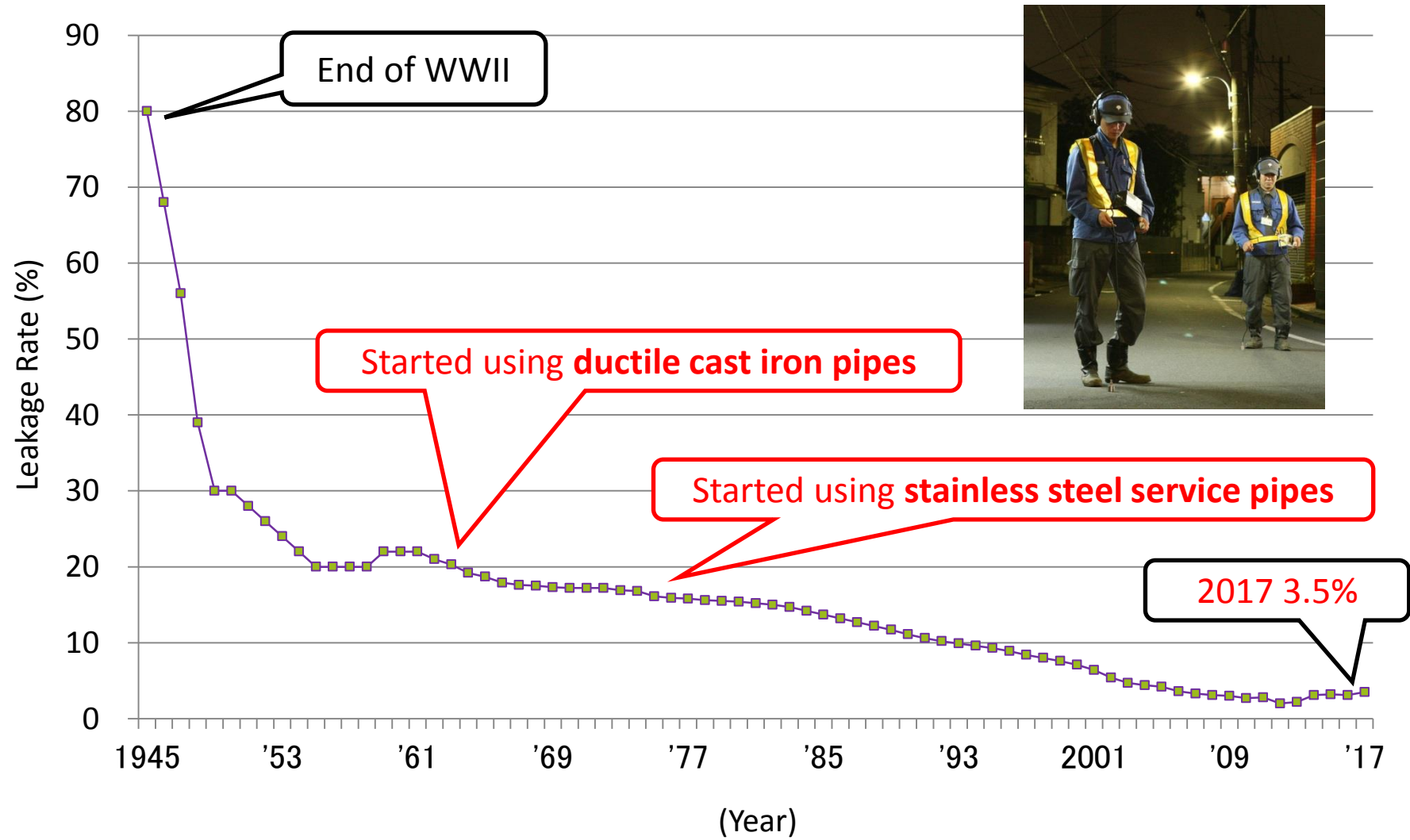


① Responding to Increased Demand

Water Resources and Purification Plants



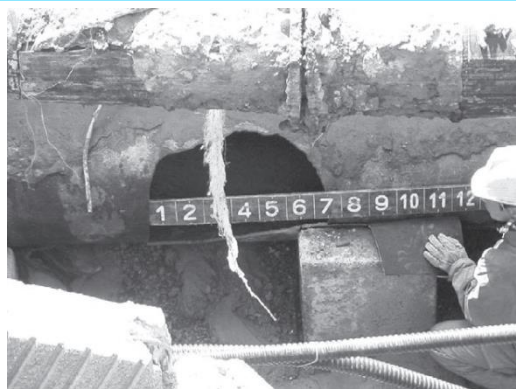
Trends in Leakage Rate



② Leakage Prevention Efforts

Improving Pipe Material Quality

< Replacement with **ductile cast iron pipes** >

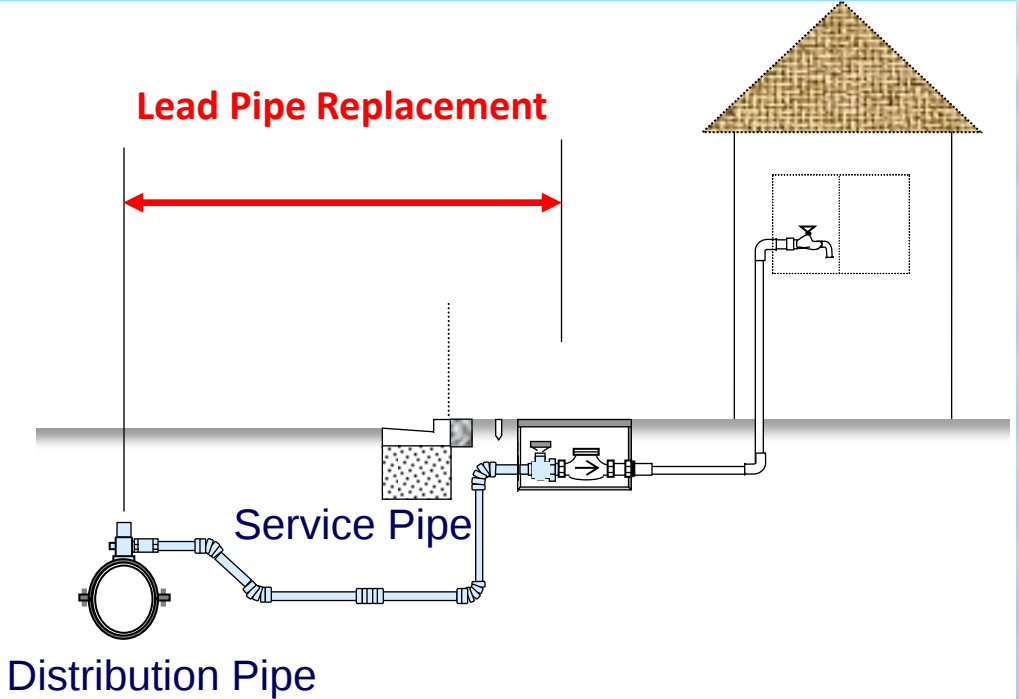


Old cast iron pipes breaking



Ductile cast iron pipe covered with a polyethylene sleeve

< Replacement with **stainless steel service pipes** >



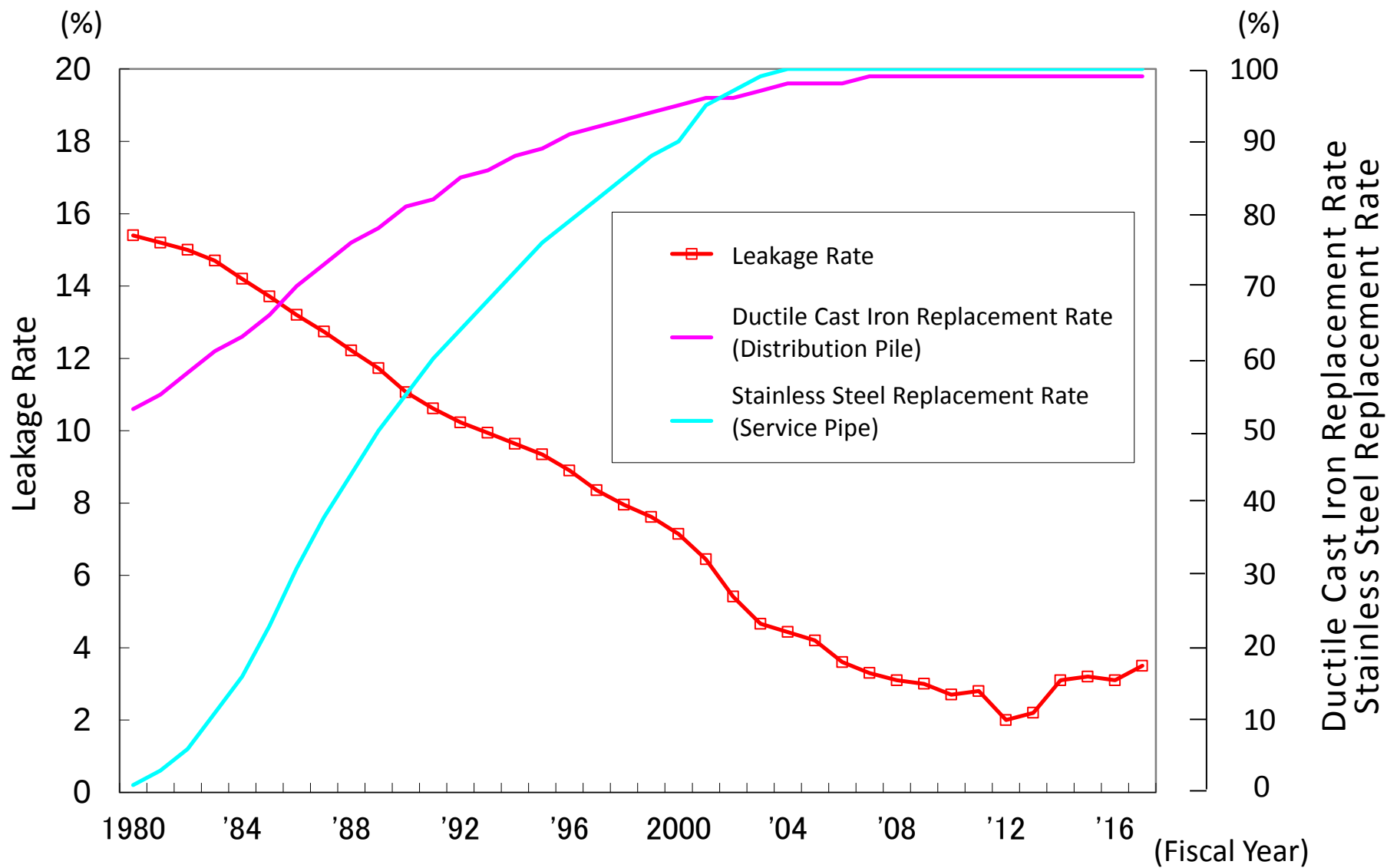
Lead Pipe



Flexible Stainless Steel Pipe

② Leakage Prevention Efforts

Trends in Leakage Rate in relation to Ductile Replacement Rate/Stainless Steel Replacement Rate



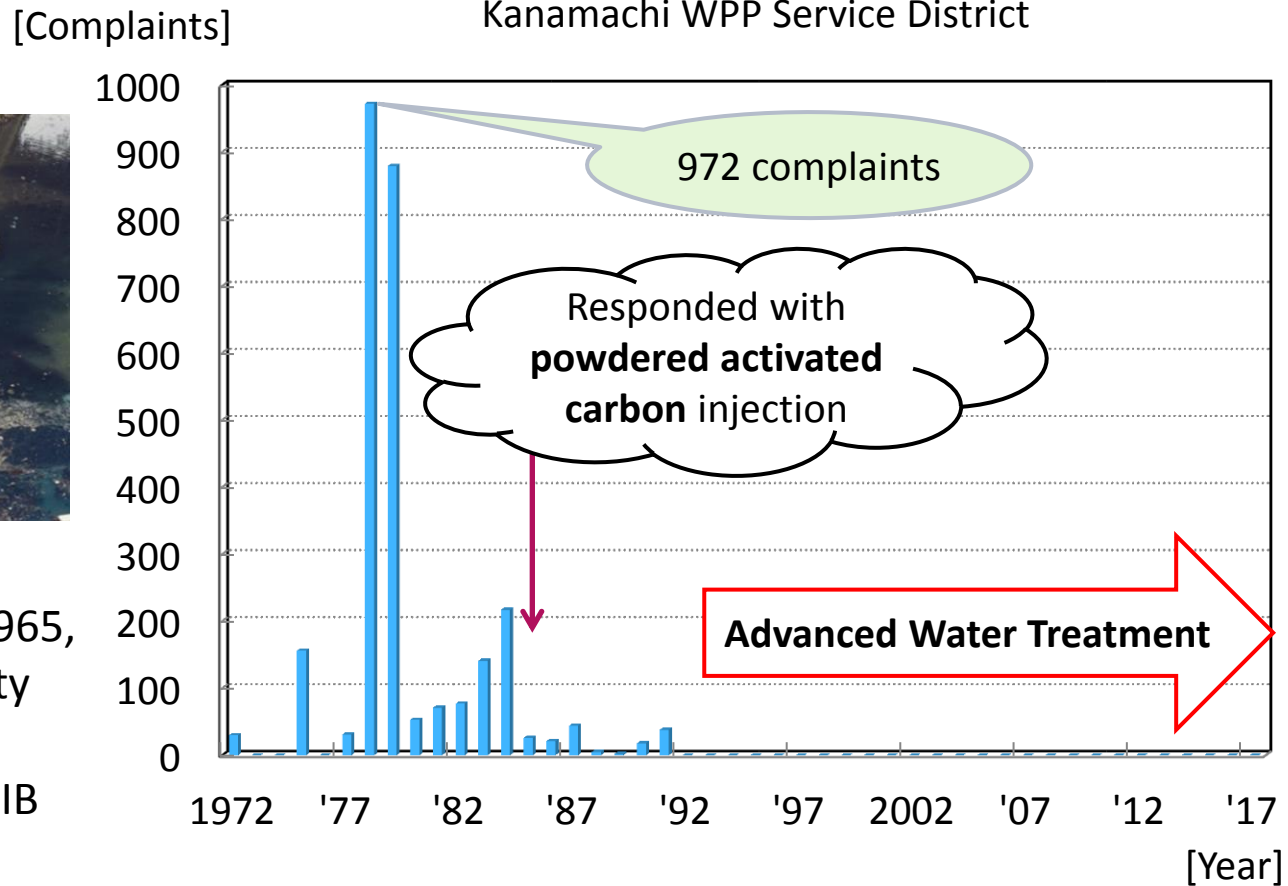
Degradation of River Water Quality Caused by Urban Development



- Rapid urbanization since 1965, degraded river water quality
- Musty odor caused by 2-MIB

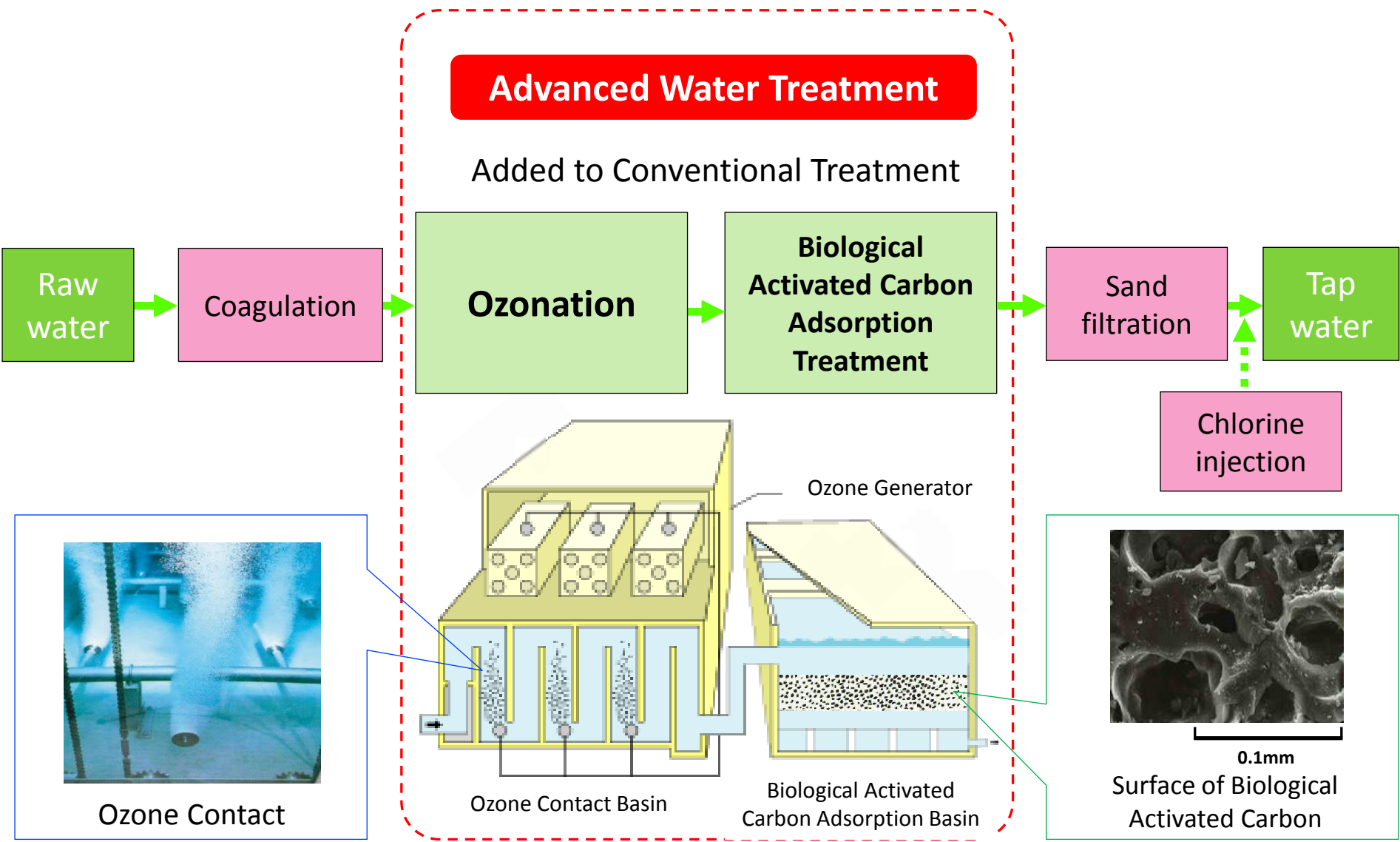
< Trends in complaints about musty odor >

Kanamachi WPP Service District



0 musty odor complaints since the introduction of advanced water treatment

Introduction of Advanced Water Treatment



3 A Path to Resilient and Sustainable Waterworks

- ① Rebuilding Core Facilities**
- ② Preparing for Various Disasters**
- ③ Using Energy More Efficiently**

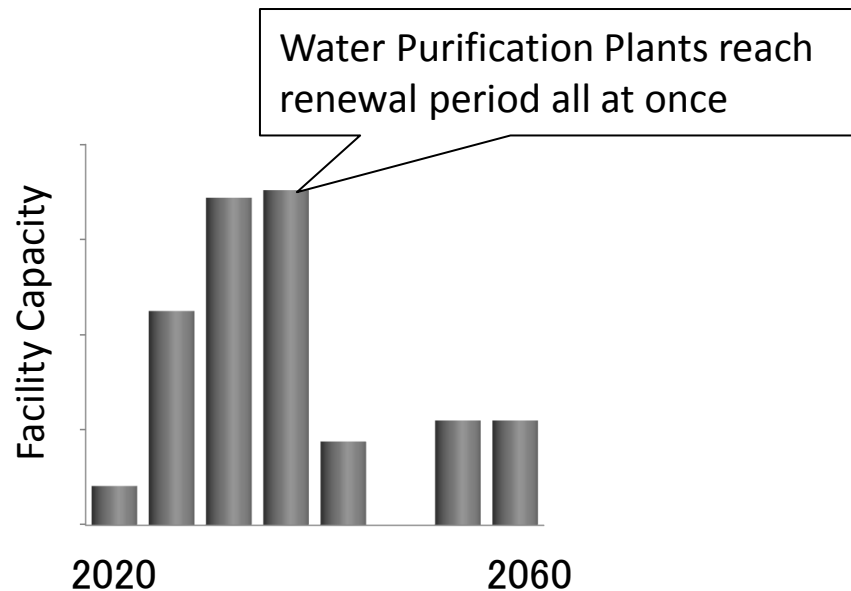
① Rebuilding Core Facilities

Renewals of Water Purification Plants

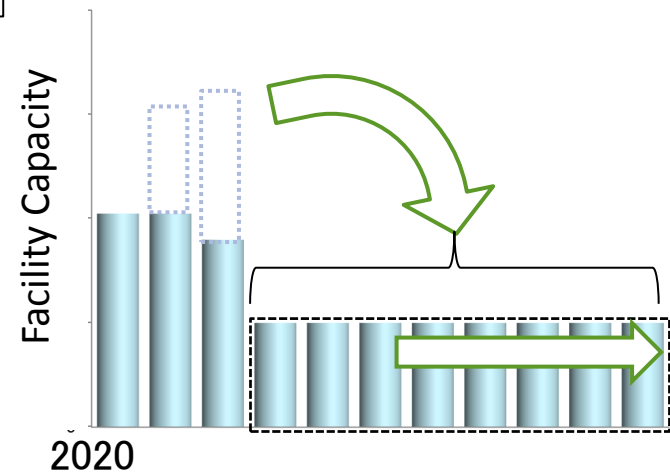
- Planned Renewals of Large Water Purification Plants
- Life Prolongation and Standardized Renewals of Facilities by Using Asset Management

< Conceptual Diagram of Renewals >

(Renewed 60 years after Construction)

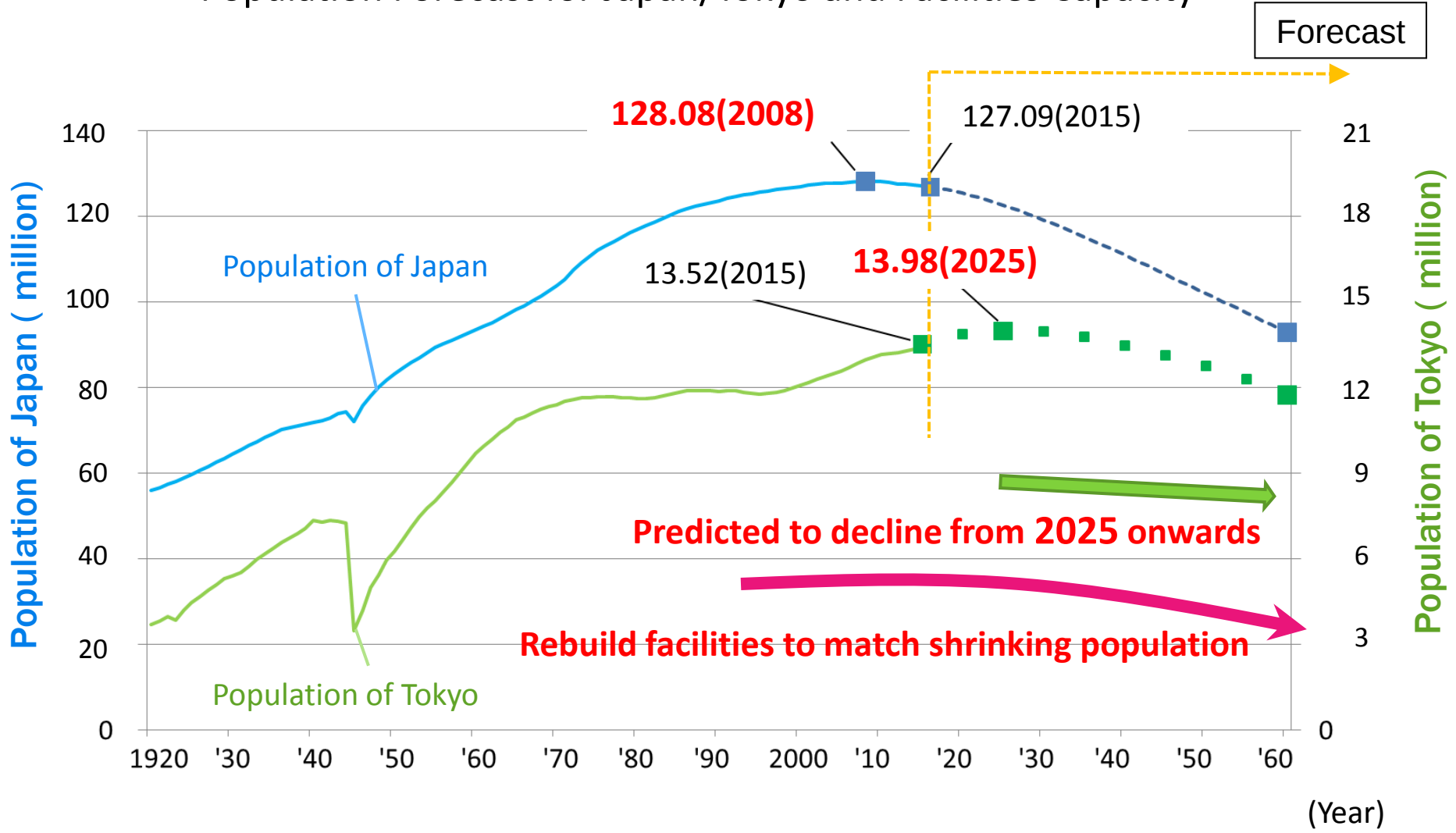


(Planned Renewals)



Shrinking Population and Rebuilding Facilities

< Population Forecast for Japan/Tokyo and Facilities Capacity >

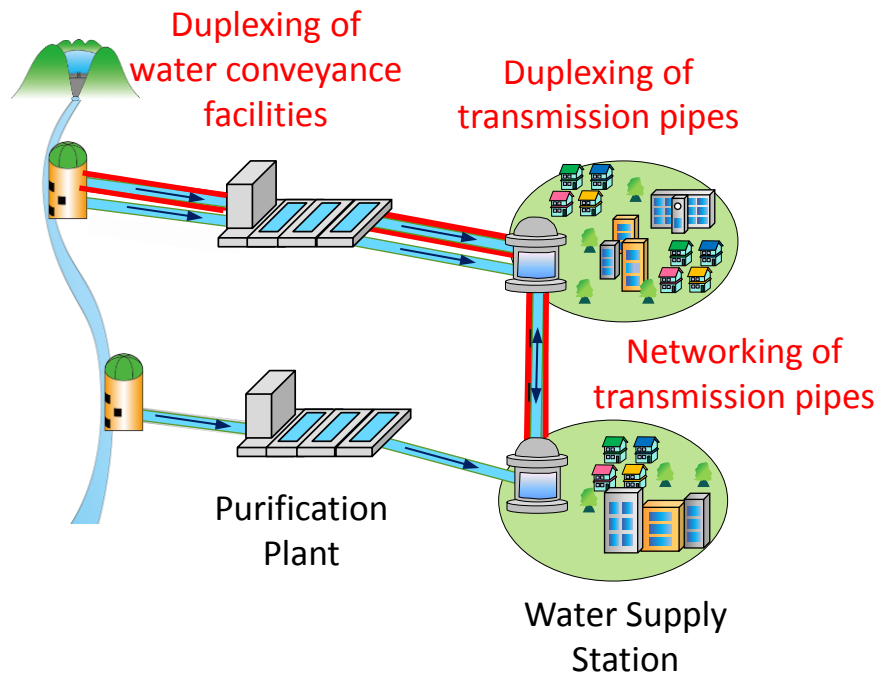


① Rebuilding Core Facilities

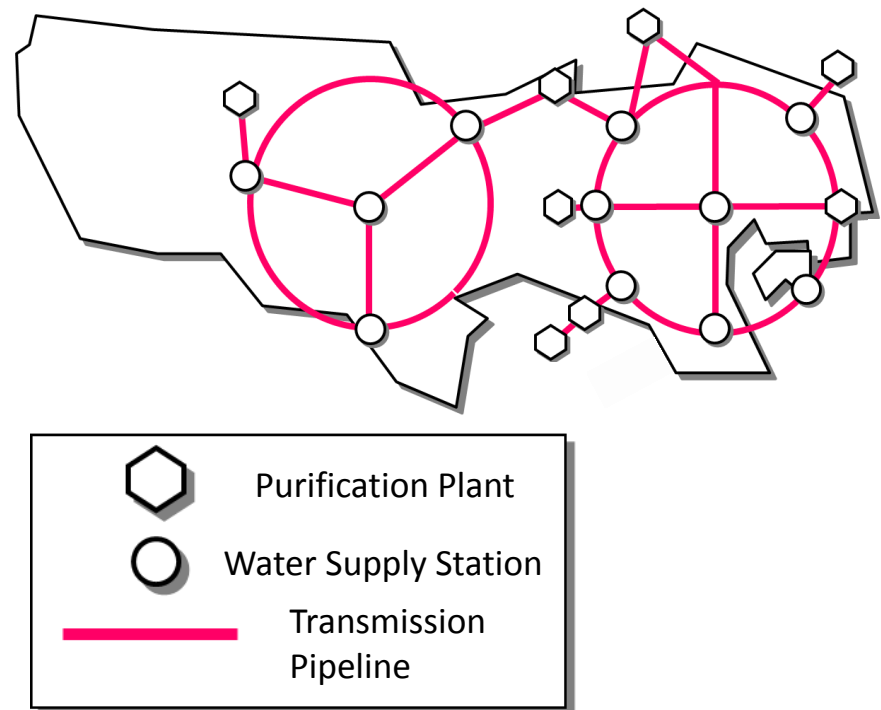
Duplexing and Networking of Main Pipelines

- Securing **Back-up Functions** upon Constructions due to **Disasters, Accidents, or Renewals**

< Duplexing and Networking Main Pipelines >



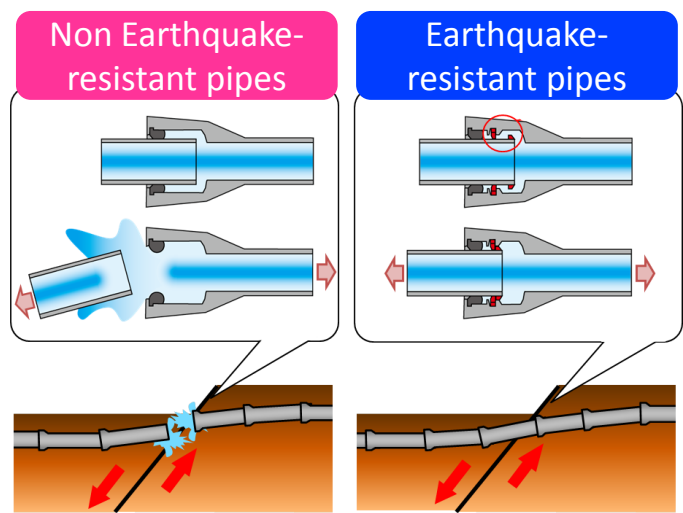
< Transmission Pipe Network >



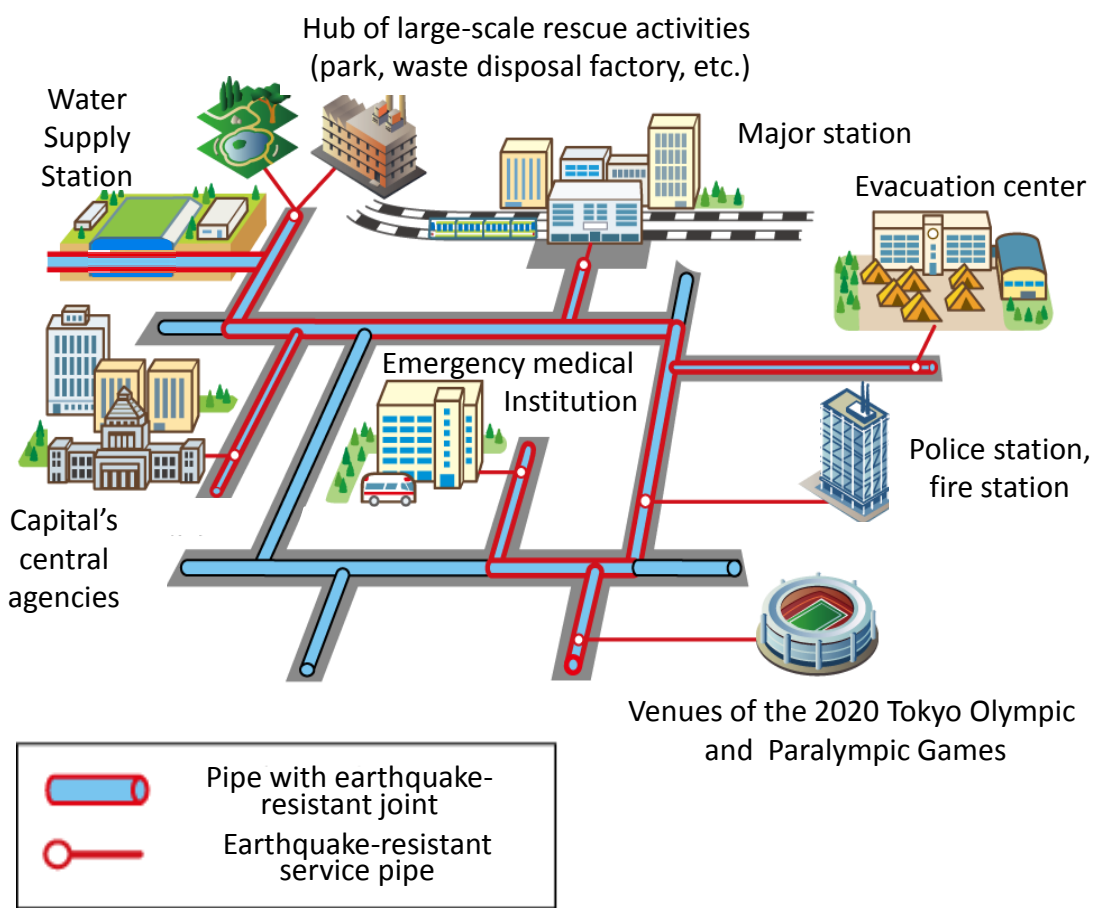
② Preparing for Various Disasters

Reinforcement of Distribution Pipes to Earthquake-Resistant Joints

< Structure of earthquake-resistant pipes and movement in earthquakes >



< Pipe jointing by earthquake-resistant joints in water supply pipes connected to major facilities >

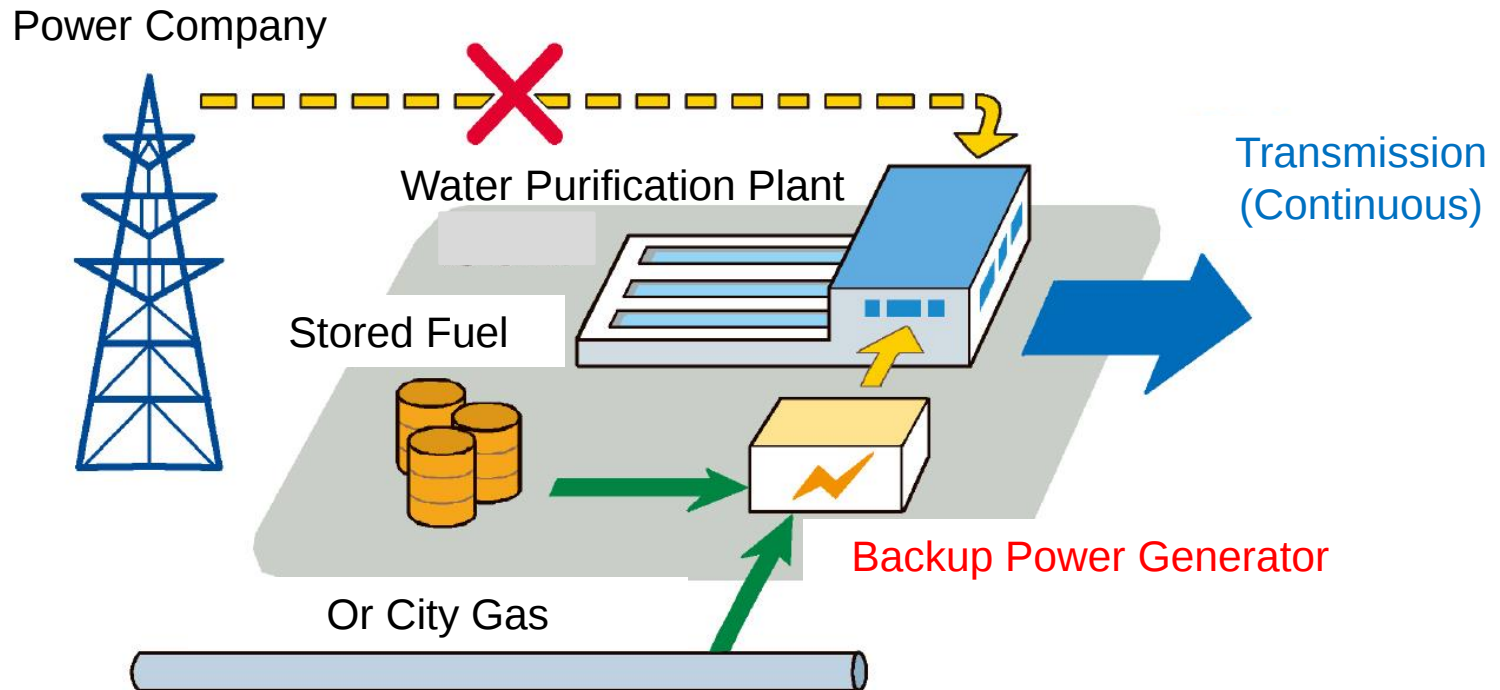


② Preparing for Various Disasters

New Construction and Reinforcement of Backup Power Generators

- Scale that allows **water purification plants** to demonstrate **100% of capacity**
- **Service stations** to operate **the same as normal**

< Securing electric power in a large blackout (conceptual image) >



② Preparing for Various Disasters

Measures against Flooding due to Heavy Rain

< Example of flood damage in Yamaguchi >

Courtesy of JWWA



Submerged water
purification plant



Flooded pump room

< Example of flood countermeasures >



Elevation

Courtesy of Central Disaster Management Council
Committees for technical investigation



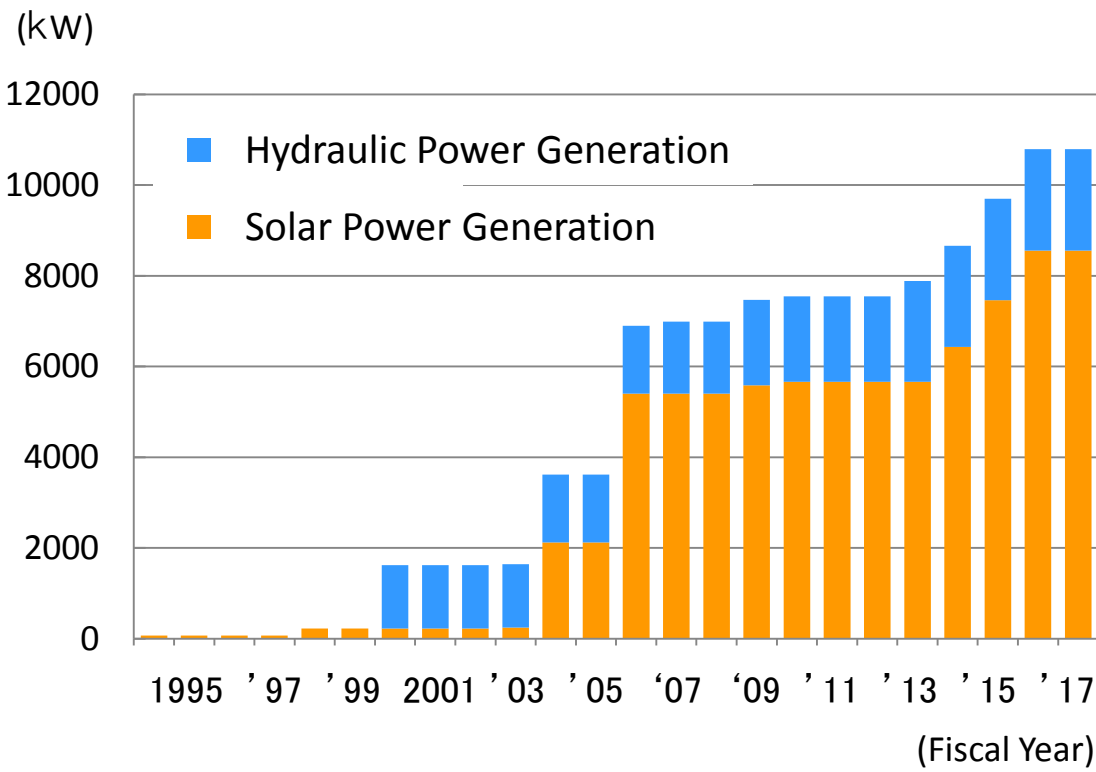
Cutoff weir

③ Using Energy More Efficiently

Use of Renewable Energy

- Tokyo Waterworks consumes approximately 1% of electric power used in Tokyo
- Reduce greenhouse gas emissions by using renewable energy

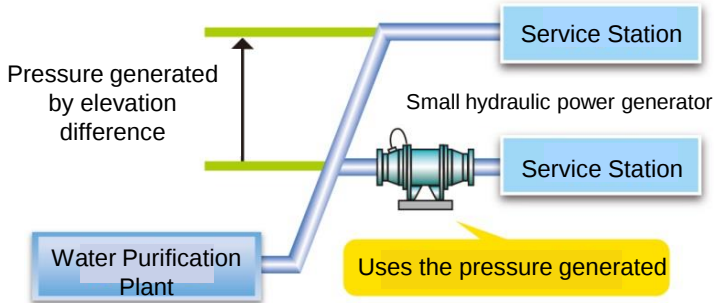
< History of renewable energy use >



< Solar panels on top of filtration basins >



< Small hydraulic power generators >



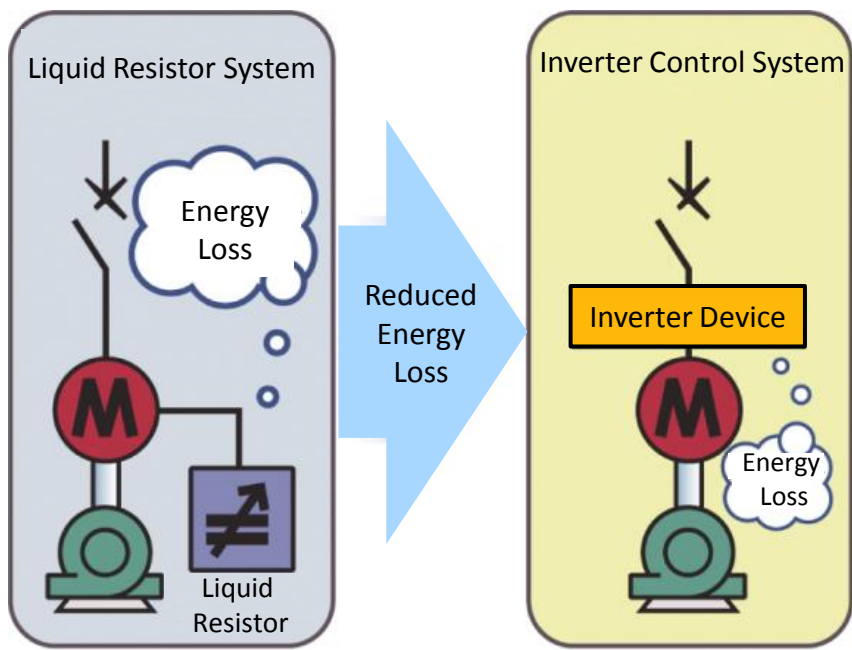
③ Using Energy More Efficiently

Energy Saving

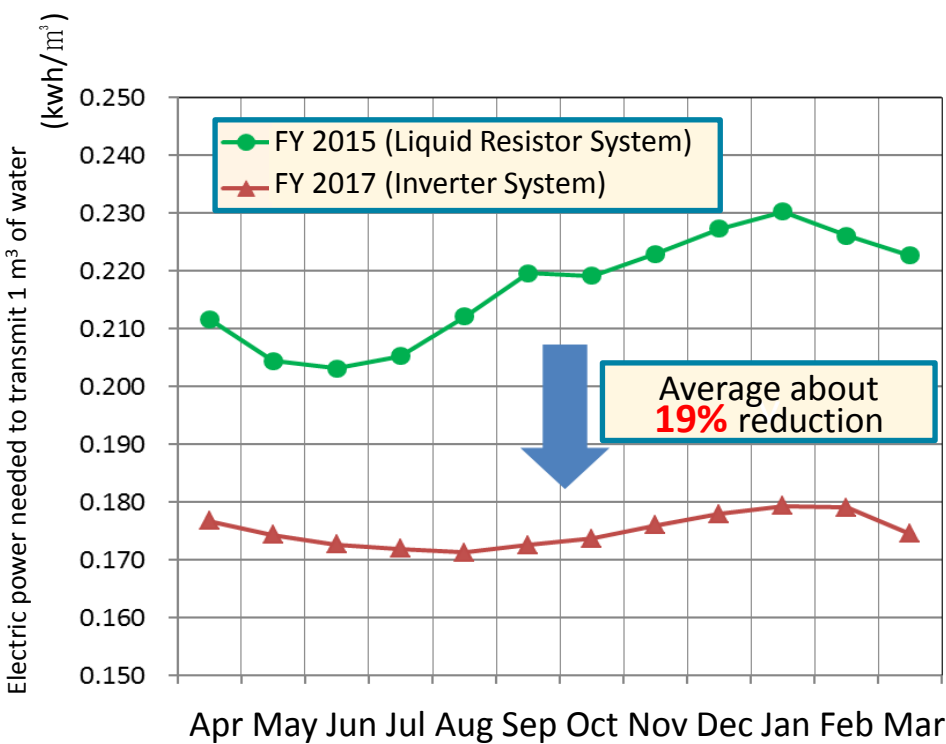
Example:

- ◎ Improve energy efficiency in pump operation using inverter control

< Conceptual diagram of inverter control >



< Energy saving benefits from converting to inverters >



- **Experience and Technology Cultivated through History over 120 years**
- **Response to Disasters, Climate Change, and Social Change**



Realizing **Resilient and **Sustainable** Waterworks
that Support Tokyo, the Capital of Japan**

THANK YOU FOR LISTENING!

