

# Strengths of Tokyo Waterworks

## ■ Our history – overcoming various problems

We started water supply as a modern water supply utility in 1898. At the beginning, our facility capacity was 170,000 m<sup>3</sup> per day, which is about one fortieth of the current capacity.

Facing various problems during our history over 120 years, we have grown along with Tokyo's development while overcoming them one by one. We have now become a waterworks utility with the world-class facilities and technologies.

### ● **Post-WWII period: Efforts for leakage prevention measures**

Our facilities were damaged due to the World War II. In particular, the domestic supply systems were devastated. In the immediate post-war years, the water leakage rate reached up to 80 percent. As a result of the emergency measures taken for leakage prevention, however, the rate dropped to just about 30 percent in 1948, just 3 years afterwards.

Thereafter, as a result of working on leakage prevention measures in an energetic and systematic manner, we have now achieved one of the world's lowest leakage rate of about 3 percent.

### ● **1950's-70's: Responses to rapid increase in water demand and period of financial difficulties**

The water demand rapidly increased due to population and industrial concentrations associated with high economic growth. Moreover, we had a large drought due to extremely low rainfall in 1964, the year the Tokyo Olympics were held.

Consequently, we have responded to the rapid increase in water demand by increasing the facility capacity by 3.8 million m<sup>3</sup> in 14 years through the expansion works of the Tone river water system while securing water resources.

Furthermore, financial pressures significantly grew due to large-scale expansion works and rapid price increase associated with the high economic growth.

During the period, we have overcome financial difficulties by making various managerial efforts such as promoting operational efficiency, and revised water charges as required while gaining understanding of Tokyo citizens.

Currently, we have realized stable management by setting the direction of policies from a long-term perspective and formulating financial plans in every 3 to 5 years.

### ● **After 1990's: Responses to raw water quality deterioration**

In the process of urban development, we received many complaints about problems such as musty odor caused by deterioration of river water quality.

Thus, in order to constantly remove musty odor substances throughout the year, we introduced the advanced water treatment using the ozonation and the biological activated carbon adsorption treatment in order to supply pure and high quality water.

## ■ Working toward a better future

The population of Tokyo peaks in 2025 then begins to decline, and water rate income will also decrease along with it. We plan to upgrade facilities properly, including large water purification plants built during the period of high economic growth.

The Waterworks Act, which came into effect on October 1st, 2019, stipulates that infrastructure shall be strengthened through public-private partnerships and wide-area partnerships.

In addition, the environment of Tokyo's waterworks business is in a phase it has never experienced before, facing frequent occurrence of natural disasters due to climate change, and the promotion of the digital transformation.

Based on these situations, we formulated "Tokyo Waterworks Long Term Strategic Initiative 2020" in July 2020, which is our basic principle for business management from a long-term perspective for the following 20 years.

To achieve the future plans on this initiative, we formulated "Tokyo Waterworks Management Plan 2021", which is a mid-term management and financial plan for FY 2021 to FY 2025.

While operating our business on a long-term perspective, we will enhance effectiveness of our management plan, and thoroughly manage objectives for business management and facility development to ensure accountability for Tokyo citizens.

Also we will conduct verification on a regular basis, and brush-up initiatives to achieve our objectives. Finally, we will construct resilient Tokyo Waterworks, exerting our all efforts.

## Pursuit of safety and security - Drinking water directly from tap

We have made it possible to ensure a stable supply of even safer, purer and higher quality water through precise water quality controls and advanced water purification.

We have given customers opportunities to try safe, pure and high quality water, by offering water tasting at events. Those who have tried Tokyo tap water have said “The quality of water has improved.” and “I drink tap water often.”

### Precise water quality control

We conduct precise water quality control all the way from the water source to the faucet, in order to provide safe, pure and high quality water.

As for water resources such as rivers, we have made efforts to obtain the reality of actual conditions and early detect abnormalities in water through regular water quality monitoring and patrols.

Also at purification plants, we carry out constant monitoring and water examination using water quality meters, thereby working on appropriate water treatment.

Moreover we have carried out multiple checks of water safety by installing automatic water quality meters within the water supply area and conducting regular detailed inspection (e.g. constant monitoring of the color, turbidity, and residual effect of disinfectants).



▲ Automatic water quality meter

### Advanced Water Treatment

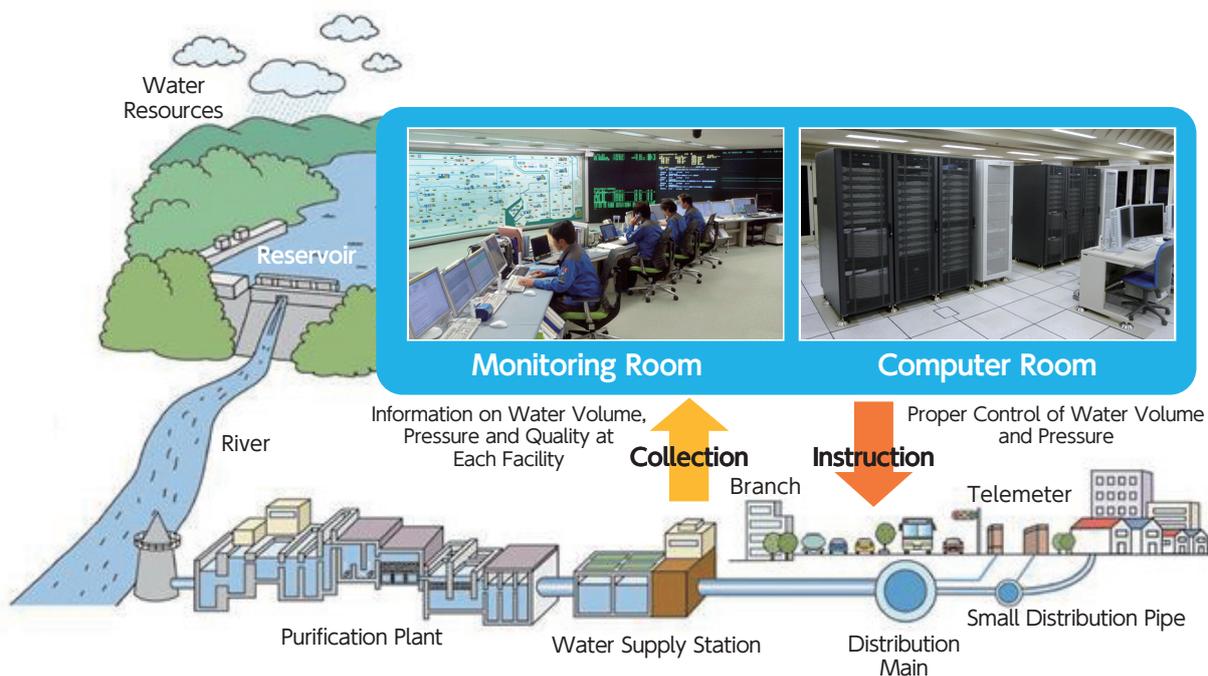
We have introduced the advanced water treatment as a countermeasure against musty odors that cannot be removed adequately by normal treatment.

The advanced water treatment is the one that combines rapid sand filtration with ozonation and biological activated carbon adsorption treatment, which produces effects on the treatment of organic substances such as musty odor substances.

## Stable supply of water - 24 hours a day control system

In order to accurately track the operating conditions of Tokyo's massive and complex waterworks system, we use a water supply operation system composed of mainframe computers and communications devices. With this system, we can centrally gather all manner of information from water sources to water distribution pipes, and monitor the network 24 hours a day.

Utilizing the advanced functions of this water supply operation system and the knowhow of our highly experienced staff, we respond to daily fluctuations in demand and emergencies including accidents and disasters, properly controlling our massive waterworks system.

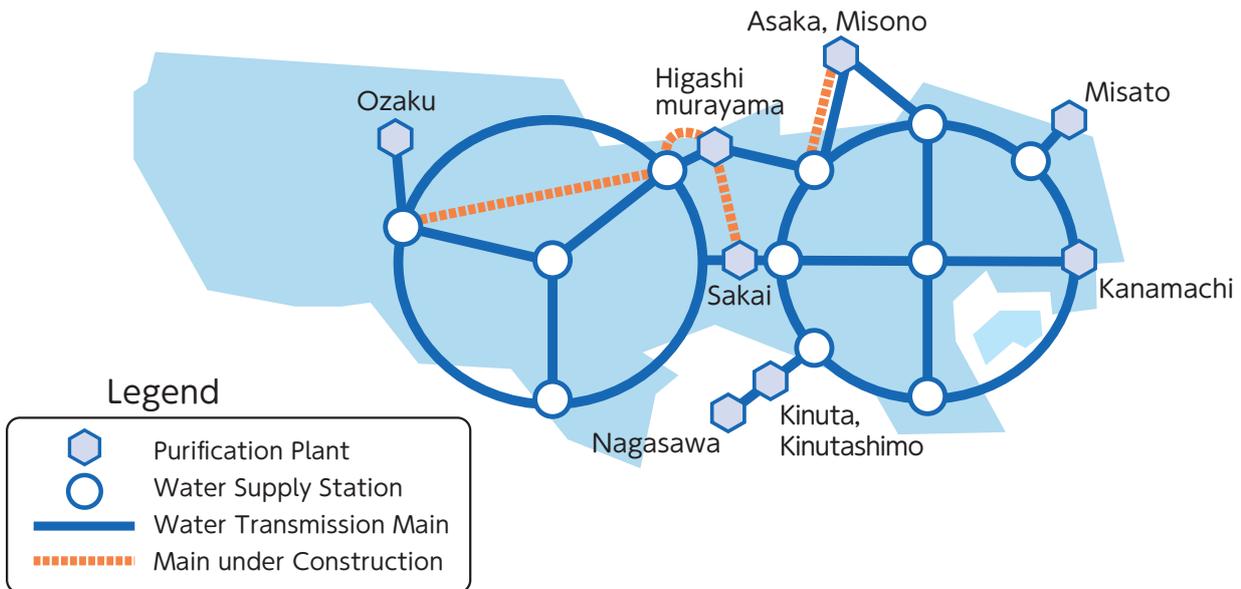


▲ Relationship diagram for water supply control management

## ■ Enhancement of backup functions – Delivering water even in times of disasters

In order to supply water even when an individual facility has shut down for upgrades or because of a disaster or accident, we are strengthening the backup functions of our overall waterworks facilities. This includes building substitute purification facilities, building new water supply stations, enhancing existing water supply stations, adding redundant pipelines, and pipe networking to ensure backup.

Furthermore, to minimize damage to waterworks facilities during disasters and ensure water supply as much as possible, we are implementing seismic retrofitting throughout the entire waterworks system, from water intake to water supply. This involves seismic retrofitting of facilities such as purification plants and water supply stations, as well as converting to water pipelines with earthquake resistant joints.



▲ Network of water transmission pipes

The total length of water distribution pipes amounts to approximately 27,000km, which is equivalent to about two thirds of the way around the globe.



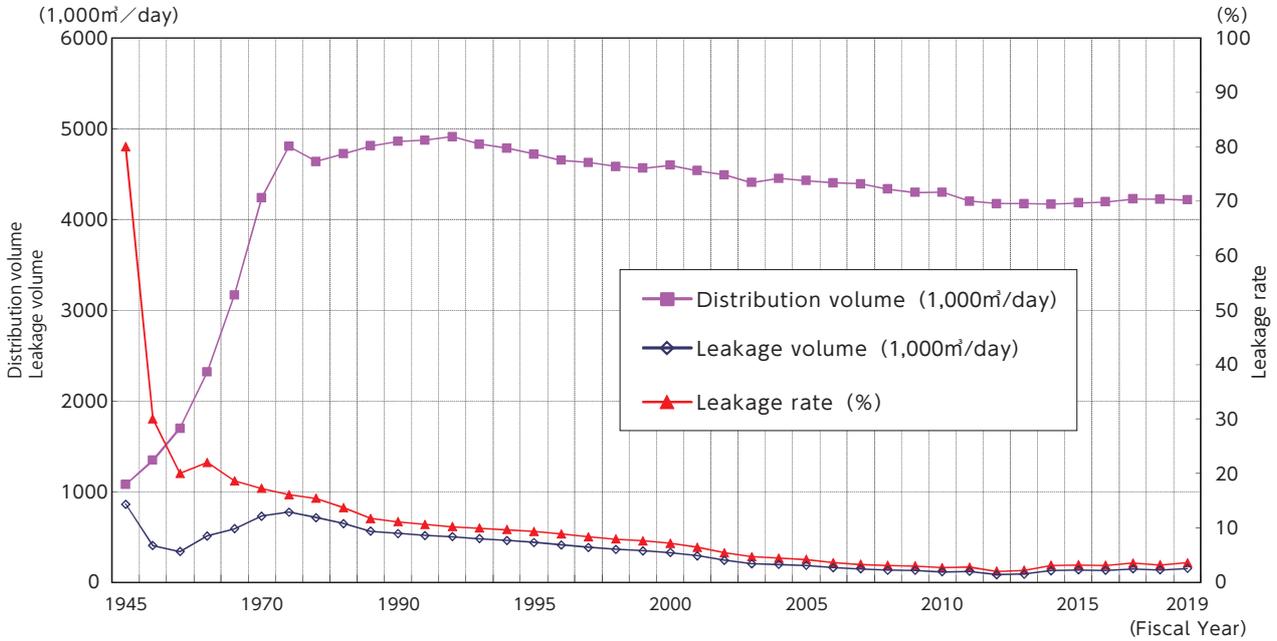
In order to secure supply routes to central government institutions during disasters, and respond swiftly to sudden accidents, we have established the Specialized Unit of Crisis Management, which operates actively 24 hours a day, 365 days a year.

Also, to offer mutual assistance including rapid restoration of facilities when a disaster does occur, we have established cooperative relationships with other waterworks utilities by signing memorandums of understanding.

## World's lowest leakage rate – High technologies based on experiences

As a result of planned replacement of distribution pipes, early detection and repair of leakage, and securing of staff's advanced high technologies, we have now realized the world's lowest leakage rate of about 3 percent.

The leakage prevention measures have contributed to not only efficient use of our limited water resources but also the prevention of secondary disasters (e.g. poor water flow, sagging road, and inundation) and energy-saving in the process of water purification, transmission and distribution.



▲ Trend in water distribution amount, water leakage and leakage rate

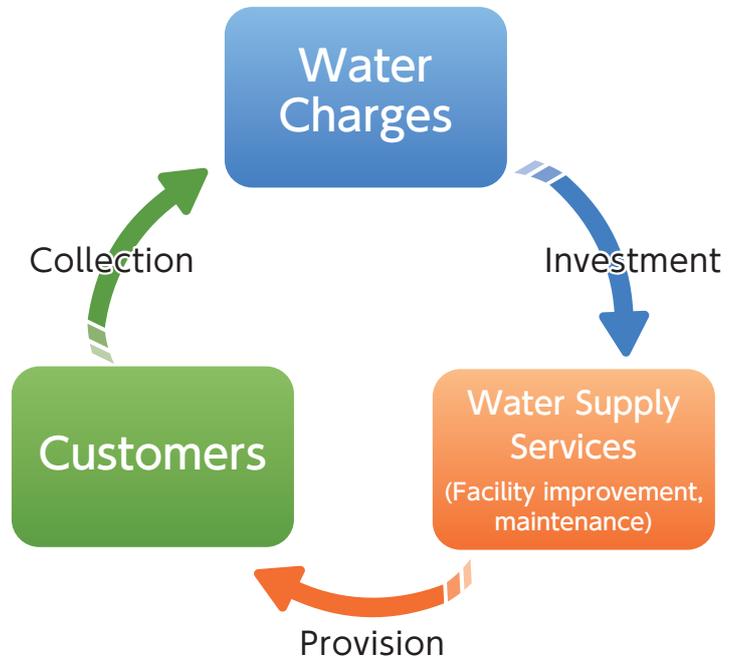
## Long-term perspective management – Financial basis for stable management

A strong financial basis is essential in order to realize sustainable management. This basis is made possible by realizing a management cycle in which we provide a water supply service through appropriate investment, collect payment for this service from customers in the form of water rates, and reinvest collected payments back into our services.

We must also formulate management plans and facility construction plans based on a long-term initiative with a view to the future, and operate our business based on a long-term perspective, by giving concrete shape to our future direction.

We publish these plans on our website, and explain them to customers in an easily understood format.

Furthermore, by establishing diverse methods of payment and an appropriate rate collection system, we have realized a final collection rate\* of 99.9%, which supports this sustainable management system.



▲ Sustainable management cycle of water services

\*Final collection rate is calculated by subtracting the deficit rate from 100 percent.