

Waterworks of Yokohama



Minato Mirai district, which faces the Port of Yokohama

©Yokohama City Visitors Bureau



Minato Mirai district, which faces the Port of Yokohama

©Yokohama City Visitors Bureau



Mt. Fuji seen from Doshi Village, one of Yokohama's water sources

When the Port of Yokohama opened in 1859, it was difficult to secure sanitary water and the city was plagued by infectious diseases. Therefore, the governor brought in British engineers who introduced the latest European technology, and in 1887 Yokohama's waterworks began supplying water as Japan's first modern water supply (a water supply that filters water taken from a river and supplies it under pressure using iron pipes). This has greatly improved the sanitary environment.

Since then, over a long history, the City of Yokohama has developed advanced water technology, and through these technologies and efforts, we have succeeded in reducing non-revenue water and water leakage. For more than 50 years, we have been contributing to improving the water situation in emerging countries in Asia and Africa by leveraging the technology and know-how we have cultivated over the years, dispatching staff and accepting trainees.

In recent years, we have been collaborating with Yokohama Water Co., Ltd., which was established with 100% investment from the Yokohama Waterworks Bureau, to work on solving issues in water supply businesses both domestically and internationally.

Water Sources of Yokohama

Yokohama has five water source systems with a total capacity of **1,955,700m³** a day.

1 Doshi river system
172,800m³/day
Orange line on the map

2 Sagami reservoir system
394,000m³/day
Red line on the map

3 Banyu river system
284,700m³/day
Purple line on the map

4 K.W.S.A. Sakawa river system
605,200m³/day
Green line on the map



Doshi river



Abiko intake weir



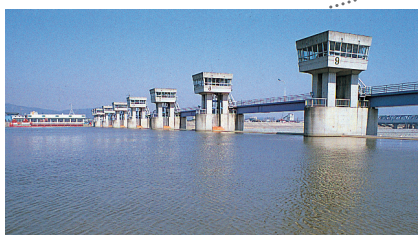
Sagami dam



Numamoto dam



Miho dam



Iizumi intake weir



Sagami Ohzeki intake weir

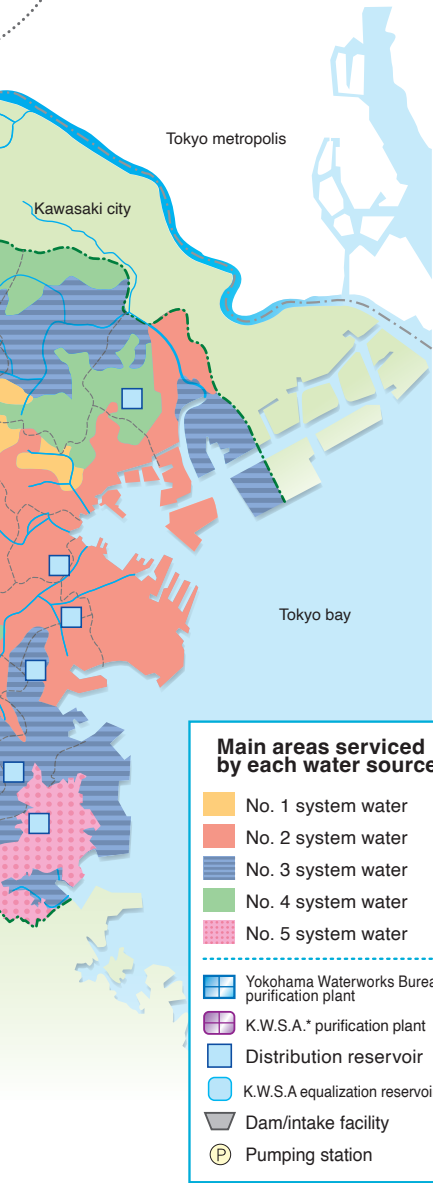


Samukawa intake weir

5 K.W.S.A. Sagami river system
499,000m³/day
 Pink line — on the map



Shiroyama dam



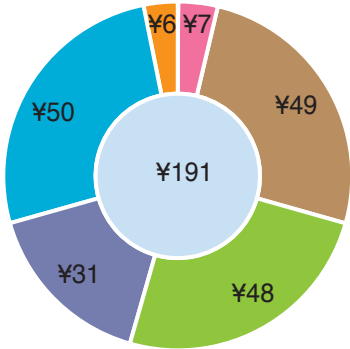
*K.W.S.A: The Kanagawa Water Supply Authority, established in 1969 by Kanagawa Prefecture and the cities of Yokohama, Kawasaki and Yokosuka to avoid overlapping investment and enable efficient location and management of water facilities. It owns purification plants in Isehara, Sagamihara, Nishinagasawa and Ayase and the water from these plants is supplied to the four water utilities.

Water Supply (FY2024)

Total Population	3,769,150
Population Served	3,769,110
Number of Households Served	1,968,872
Service Rate	100.0%
Total Length of Pipeline	9,377 km
Annual Water Supply	402,663,800 m ³
Average Daily Water Supply	1,103,188 m ³
Average Daily Water Supply per Person	292 L
Maximum Daily Water Supply	1,174,100 m ³ (July 8, 2024)
Past Maximum Daily Water Supply	1,607,000 m ³ (September 4, 1992)

Cost to supply 1 m³* of drinking water (FY2024)

*Two thousand 500 ml bottles



- Cost to send water from water sources to water purification plants
- Cost to purify water at purification plants
- Cost to supply water from purification plants to customers
- Cost to repair water facilities
- Cost to prepare for future replacement
- Loan repayment interest

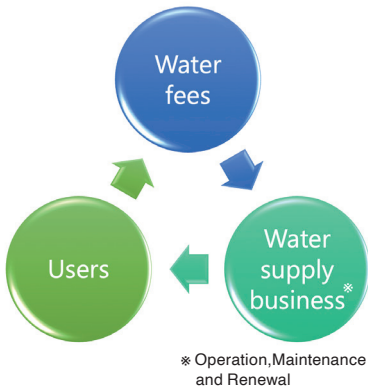
Sustainable Water Business

We provide water services by receiving fees from users as compensation and investing a portion of the proceeds in things necessary for water supply, such as updating and maintaining facilities.

In order to make the water supply business sustainable in the future, there are two important things.

First, it is necessary to set a rate that can recover the costs necessary for operation, maintenance, and planned renewal of the facilities.

Second, it is necessary to ensure that users pay the fees for the water they used.



International Cooperation

We engage in international cooperation by dispatching staff members and accepting trainees to share Yokohama's waterworks technology to water utilities around the world.

Staff member dispatch

approx. 530 persons to 35 countries
 (FY1973-2024)

Trainee acceptance

approx. 4,580 persons from 137 countries
 (FY1987-2024)

Water Purification Plants in Yokohama

A purification plant is where tap water is produced. Yokohama has three purification plants: Kawai, Nishiya and Kosuzume.



Kawai Purification Plant

Constructed: 1901 (1st expansion)
Daily Purification Capacity: 172,800 m³
Water Source: Doshi river system



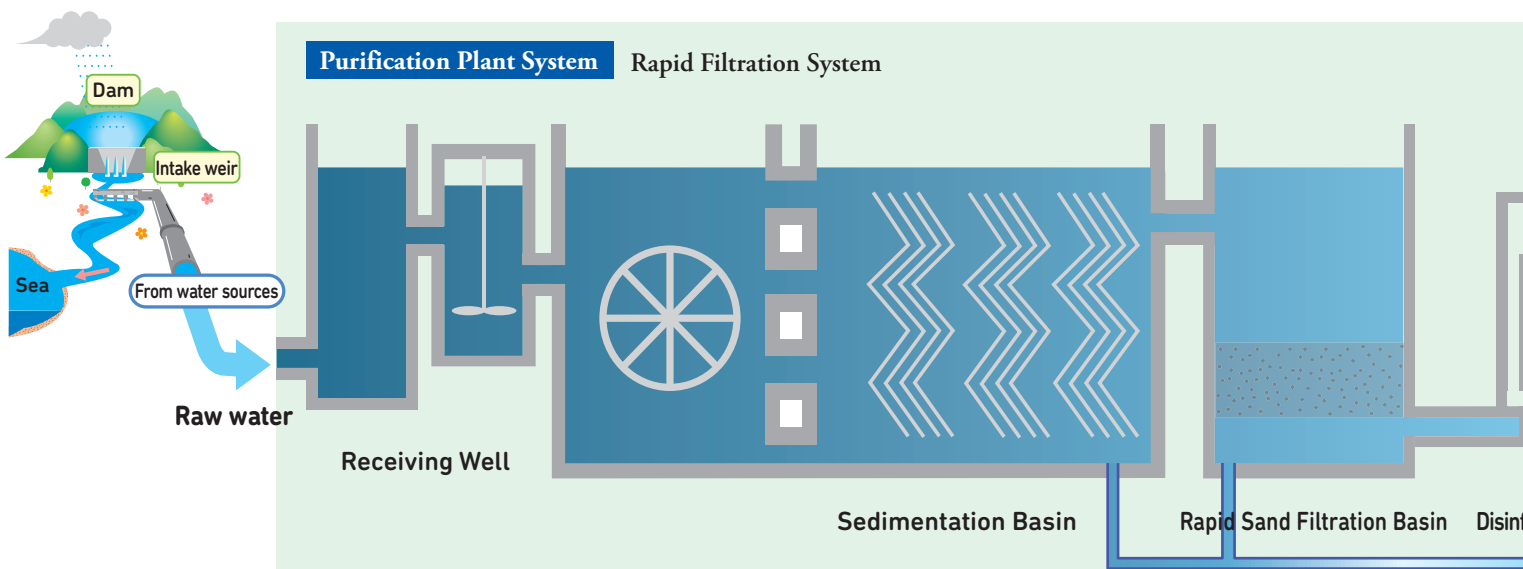
Nishiya Purification Plant

Constructed: 1915 (2nd expansion)
Daily Purification Capacity: 356,000 m³
Water Source: Sagami reservoir system



Kosuzume Purification Plant

Constructed: 1965 (6th expansion)
Daily Purification Capacity: 820,000 m³
Water Source: Banyu river system
* Water from the K.W.S.A. Sagami river system is also treated in this plant.



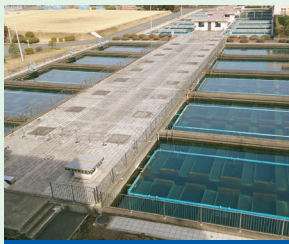
Receiving Well

This is where raw water drawn from rivers and lakes first arrives. The water level is adjusted here and water is sent to the sedimentation basin.



Sedimentation Basin

The coagulant (polyaluminum chloride) is injected into the raw water. Suspended solids coagulate into larger particles called floc and sink.



Rapid Sand Filtration Basin

Microscopic suspended solids that are not removed in the sedimentation basin are removed through a layer of sand and gravel.



Disinfection Facilities

Sodium hypochlorite is added to the filtered water to disinfect it.



Distribution

This is where the water is distributed to the consumers. The water is guaranteed to be safe for drinking and emergency use.

Redevelopment of Nishiya Purification Plant

The redevelopment of the Nishiya Purification Plant has been underway since 2021 with the aims of providing safe and high-quality water, ensuring a disaster-resilient water supply, and promoting an environmentally friendly water supply.

Main Components and Expected Effects

1 Earthquake Resistance

By reinforcing the filtration basins and drainage basins to withstand major earthquakes, the water purification process will be able to continue even in the event of large-scale earthquakes. This will result in a more disaster resistant water supply system.

2 Introduction of Granular Activated Carbon Treatment

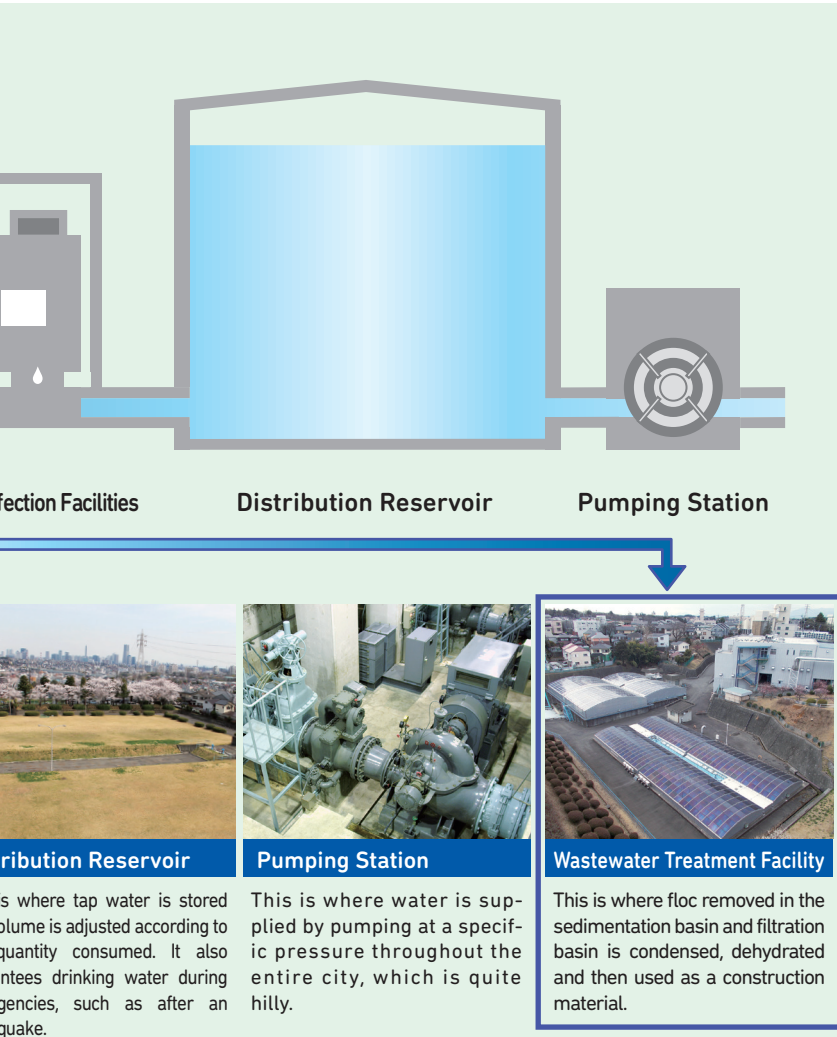
A granular activated carbon treatment process will be introduced to reliably remove musty odors caused by algae growth.

3 Increased Treatment Capacity

The plant's treatment capacity will be increased from the current 356,000 m³/day to 394,000 m³/day, thereby expanding the supply area where water can be delivered by gravity-driven flow without the need for electricity.



Conceptual drawing of the completed Nishiya Purification Plant



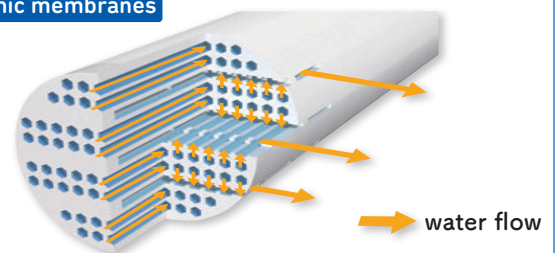
Purification Plant System

Kawai Purification Plant uses a membrane filtration system

Membrane filtration systems filter raw water through fine pores (approx.0.1 μm)* in ceramic membranes.

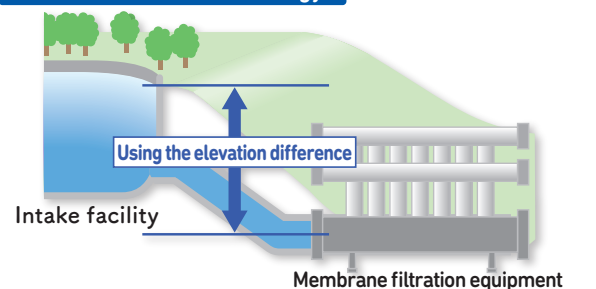
*1 μm=1/1000mm

ceramic membranes



The Kawai Purification Plant makes maximum use of the natural energy generated by the height difference from the water intake facility. This eco-friendly water purification plant filters water without using electricity.

How to utilize natural energy



Water is sent to the membrane filtration device using water pressure and filtered.

Safe and High Quality Water

Water Quality Testing Plan and Disclosure of Results

The national government's water supply quality standards were set to ensure that people can drink household tap water their entire lives without any ill effects and to prevent water being a hindrance in daily life in ways such as causing abnormal odors, discoloring laundry, etc. These rules apply in the same way to all water supply utilities nationwide, and, likewise, we are obligated to maintain water quality as well as conduct tests to check quality.

In order to ensure proper water quality tests and maintain transparency, we compile an annual water quality testing plan that clearly defines the items, locations, and frequency of water quality testing, and then implement inspections based on that plan. Moreover, we compile the results of inspections in a water quality test report. This report can be viewed on the City of Yokohama website, etc.

Water Quality Testing

To ensure greater safety and reliability for our customers, we are certified under the GLP for Water Supply, the national standard for Tap Water Quality Testing Good Laboratory Practice, and strive to conduct accurate water quality inspection. We inspect about 110 items including 52 items defined in the national water quality standards.

● Bacteriological Examination

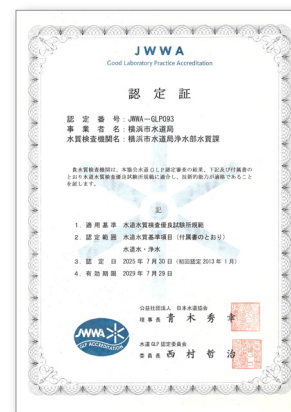
We examine standard plate count and *Escherichia coli* to ensure that pathogenic microorganisms are not polluting the water supply. The water supply is disinfected with chlorine, but microbiological testing is used to confirm its ultimate safety. Examinations are conducted in a clean room with all equipment sterilized in order to avoid polluting the sample during examination.

● Testing Organic and Inorganic Substances

We test for incredibly minute amounts of organic and inorganic substances that can be found in raw water and supplied water. Among organic substances tested for are those derived from agrochemicals, substances that cause musty odors and trihalomethane generated by chlorine disinfecting. We test for these using a gas chromatograph mass spectrometer (GC-MS) or a liquid chromatograph mass spectrometer (LC-MS). Among the inorganic substances we test for are metals and ionized substances. We test for these using an induction-coupled plasma mass spectrometer (ICP-MS).

● Tap Water Quality Examination

When customers are concerned about the quality of tap water and request water quality testing, we conduct an examination to inspect five basic items (taste, odor, color, turbidity, and residual chlorine concentration). For customers who are still concerned after receiving the results or ask for a detailed examination, we conduct further examination for water safety confirmation (turbidity, color, pH, organic substances, etc.) and other examinations required. We issue a "water quality report" with the examination results for the customers.



GLP certificate



Bacteriological examination in clean room



Organic substance examination using GC-MS



Tap Water Quality Examination

Preservation of the Water Conservation Forest

Protecting and Fostering the Water Conservation Forest

The Doshi River, one of Yokohama's water sources, runs through Doshi village in Minami-tsuru-gun, Yamanashi Prefecture. The City of Yokohama has maintained the water conservation forest in this village since 1916. It is currently 2,873 hectares, accounting for about 36% of the total area of the village.

We established a Water Resource Forest Management Office and systematically carry out various activities such as thinning and weeding to protect and foster the water conservation forest.



Water Conservation Forest Eco project “W-eco・p”

The Waterworks Bureau cooperates with companies and organizations to promote the preservation of the the water conservation forest and pass it on to future generations. The project began in May 2009, with donations from partners to maintain the forest.

Volunteer Activities for Doshi Water Conservation Forest

About 4,600 hectares of private forest which occupies 60% of the area of Doshi Village also plays the role of water conservation forest. However, due to a shortage of labor, some forests are not appropriately maintained. Such private forests have been maintained by civil volunteers since 2004. The maintenance is promoted in cooperation with the volunteer organization NPO Doshi Water Conservation Forest Volunteers' Association, which was founded by the participants in these volunteer activities. We also encourage maintenance activities carried out by NPO Doshi Water Conservation Forest Volunteers' Association or local volunteer groups.



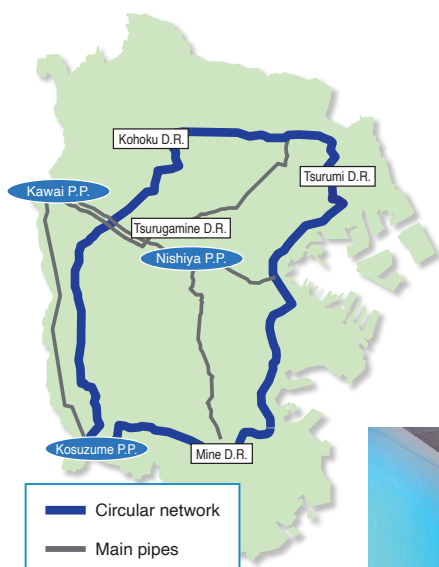
Doshi Forest Foundation

In order to support the volunteer activities in the Doshi water conservation forest and obtain cooperation from people who cannot participate in the activities, we established the Doshi Forest Foundation, a foundation to accept donations from individuals and businesses.

Disaster-Resistant Water Supply System

Circular Network

A circular network, which connects purification plants and distribution reservoirs with a total distance of approx. 70 km, was developed to enable emergency backup in case a purification plant is shut down by a massive earthquake, water quality accident or blackout. Even if a purification plant is shut down during a disaster, transmitting water from other purification plants through the circular network ensures stable water supply to residents.

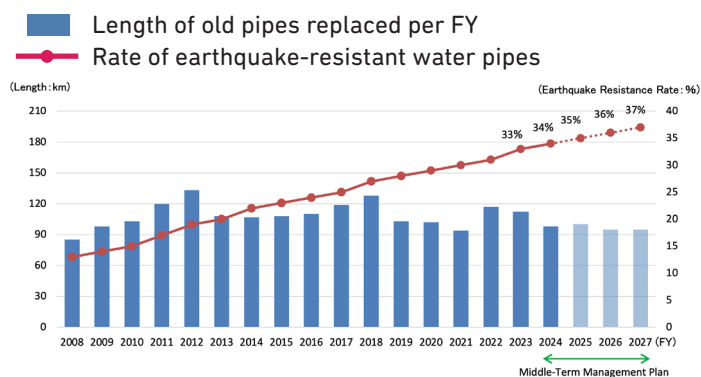


1,350 mm-diameter water pipe inside the utility tunnel

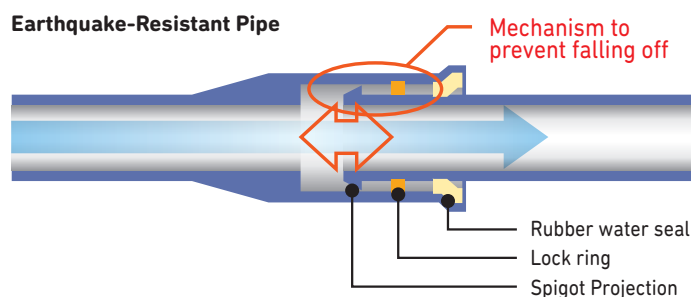
Replacement of Aging Pipes with Earthquake Resistant Pipes

Aging pipes that may leak or burst are systematically replaced with earthquake-resistant water pipes.

The majority of water supply suspensions caused by large earthquakes occur when the joints between pipes become disconnected. Therefore, we replace aging pipes with new ones that are made of stronger materials and have joints that are more resistant to dislodging, thereby enhancing earthquake resistance.



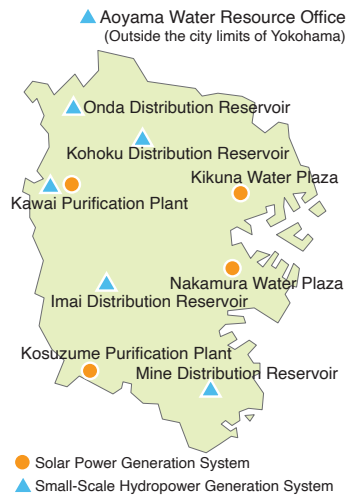
Earthquake-Resistant Pipe



Eco-friendly Water Supply System

Renewable Energy

As about 98% of greenhouse gases emitted in Yokohama consists of carbon dioxide from energy use, we must limit the use of such energy to reduce greenhouse gases – therefore, we need to move away from fossil fuels and instead raise the ratio of renewable energy usage. At the Waterworks Bureau, we are enthusiastically introducing solar power and small-scale hydropower systems to build up an environmentally-friendly water supply system.



Solar Power Generation Facilities

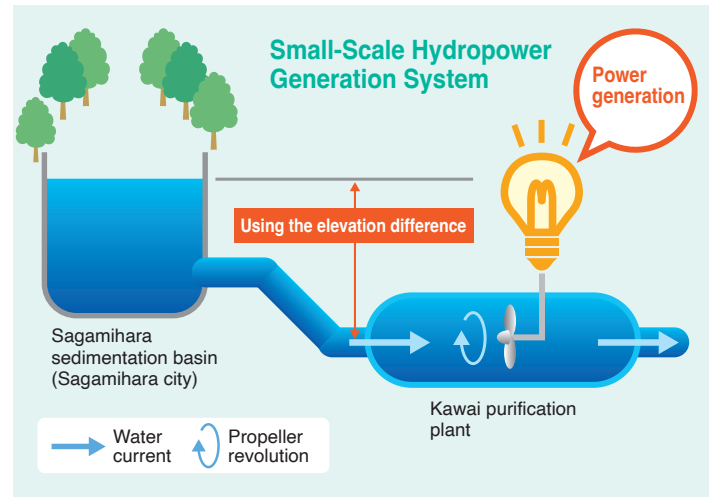
Since installing a movable solar power generation system above a filtration basin at Kosuzume Purification Plant in FY2000 (the first in Japan), we have installed solar power facilities providing 1,390 kW in an ongoing effort to use renewable energy.



A movable solar power generation system above a filtration basin (Kosuzume Purification Plant)

Small-Scale Hydropower Facilities

We are promoting the introduction of renewable energy by installing small-scale hydropower units in water supply pipes to harness the power of flowing water. As of the end of FY2024, we have installed such units at six locations, such as Distribution Reservoirs and Purification Plants.



Renewable Energy Status (as of the end of FY2024)

Facility type	Generation capacity (kW)	Actual power generation (kWh)	CO ₂ reduction (t-CO ₂)
Solar power generation system	1,390	1,134,566	513
Small-scale hydropower generation system	728	2,038,432	921

*For small-scale hydropower generation system, efficacy maintained by Kohoku Distribution Reservoir's installer (The Tokyo Electric Generation Company) is included.

Environmental Measures for Dam Lakes (Reservoirs)



An aerator in action (Lake Sagami)

We circulate lake water and aerate it with aeration equipment to prevent proliferation of algae (Lake Sagami, Lake Tsukui).

Yokohama Waterworks promotional video for overseas



Growth Depends on Water



The History of Yokohama's modern waterworks

International Operations Division, Yokohama Waterworks Bureau (YWWB)

6-50-10 Hon-cho, Naka-ku, Yokohama 231-0005, JAPAN

Tel +81-45-671-3080 Fax +81-45-212-1169 Email su-kokusaijigyo@city.yokohama.lg.jp

Published June 2026

International Cooperation
Since 1973



YWWB Mascot
"Hama-pyon"