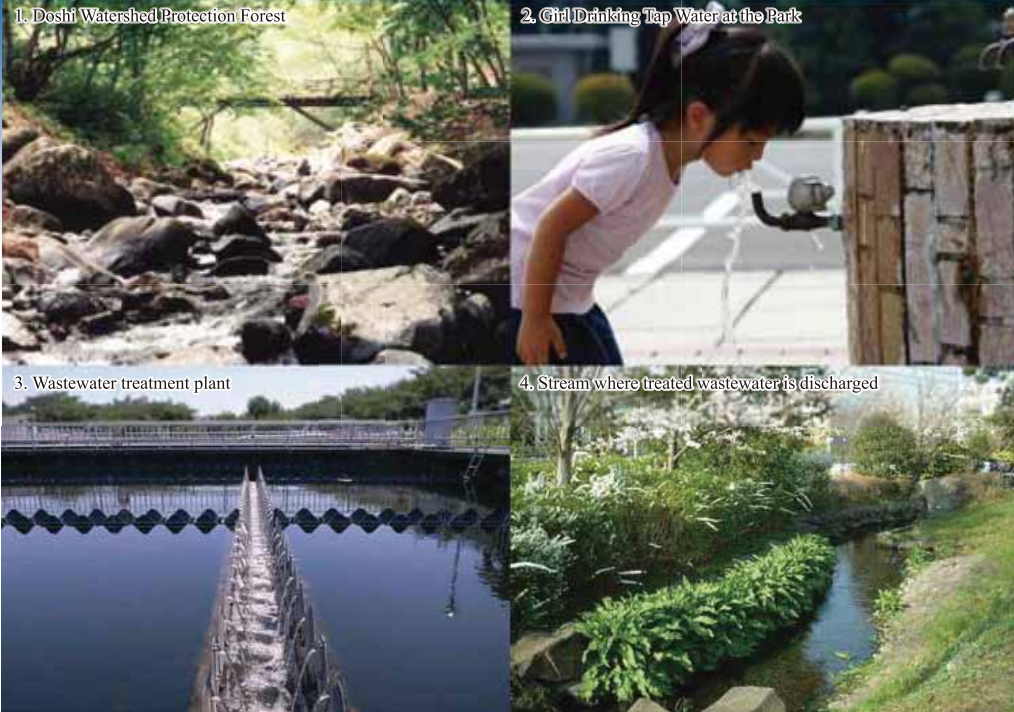


# Providing 24-hour lifeline for All Citizens



Source of Photos: Waterworks Bureau, City of Yokohama (1,2), Environmental Planning Bureau, City of Yokohama (3,4)

## From the Source to the City

Emerging cities face challenges to facilitate necessary infrastructure in a short period to cope with the rapid population growth. Water is one of the essential infrastructures to meet basic human needs.

Lacking water could cause serious damage to citizens' lives and low quality of water affects people's health. In addition, an excessive use of well water by households and companies could cause land subsidence resulting in serious flooding paralyzing city functions.

Since the City started a water supply system in 1869 and in 1887, respectively,

as the first modern system in Japan, the City committed steady development even amid rapid population growth, dramatically increasing the reach of both the water supply and sewer system.

Currently, the water supply and the sewer system have coverage of 100% and 99.8%, respectively. During the course of network development, Yokohama realized that to ensure not only a stable supply but also high-quality water, it is important to return to the basic principle and protect well springs.

Yokohama continues to preserve the Doshi Watershed Protection Forest (see Pic 1), about 2,800 ha of water source land in Doshi Village, which is about 70

km from Yokohama. This provides confidence for Yokohama and enables us to develop a long-term plan of providing high-quality water.

## Phasing Approach to Ensure Implementation

In order to meet a rapid demand increase, Yokohama took a phasing approach and expanded its water supply network eight times during 120 years. The water supply population has been increased steadily according to the population increase of the City.

On the other hand, the development of a wastewater system had lagged behind the population increase.

# Managing a Network of Service and Environmental Impact

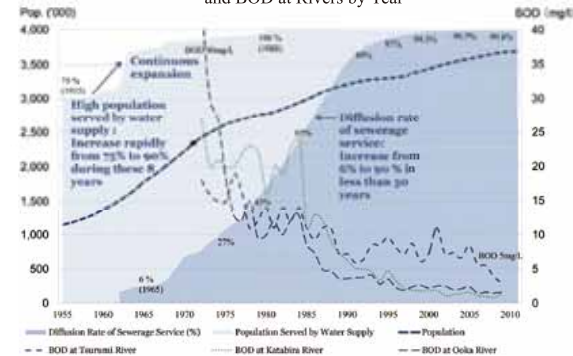
The City adopted a phasing approach with two methodologies to install sewer systems, the combined system and the separate system. In the early stage, the City applied the combined system collecting wastewater and rain water together in order to install the system rapidly and cost-efficiently at a city center; during the expansion period, the separate system was adopted to be implemented in the rest of the city, partly utilizing private funds.

Rivers in the Past



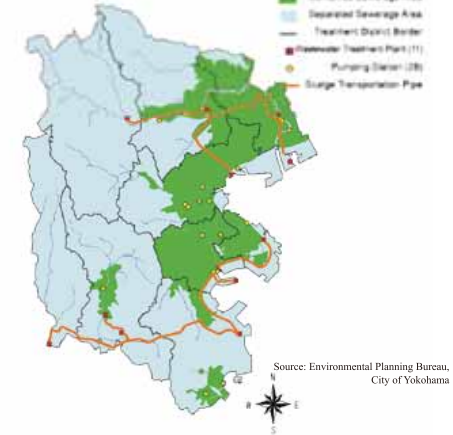
Source: Environmental Planning Bureau, City of Yokohama

Service Coverage of Sewerage and Water Supply and BOD at Rivers by Year



Source: Environmental Planning Bureau and Waterworks Bureau, City of Yokohama

Coverage of Combined/Separated Sewerage Areas



Source: Environmental Planning Bureau, City of Yokohama

## Environmental Friendly Management of the Water Cycle

Rapid urbanization put pressure on the environment. Sewage contamination and factory effluent deteriorated river water quality and exuded a bad smell. Expanding the sewage system and wastewater treatment plant together with appropriate factory effluent control and guidance, Yokohama achieved dramatic reduction of BOD of rivers (see Pic 3). Discharged water is regularly inspected to assure a satisfactory level of quality (see Pic 4).

## Well-Functioning Infrastructure as a Network

Developing a modern water supply and sewer facilities system is one step, however, providing secure and safe operation and maintenance during a life cycle is another key factor to maintaining high-quality water (see Pic 2).

Water source land in Doshi Village, Yamanashi Prefecture is about 70 km from Yokohama and the total length of the pipes from the water intake to the water supply is about 9,200 km. Despite the considerable length, the rate of leakage is about 5%, which can be only achieved by continuous maintenance and

operational management. Moreover, the low rate of leakage enabled efficient expansion of the water supply network with a minimum of funds.

## System of User Pay

Financing of infrastructure development is another challenge for emerging cities. Yokohama, as other cities in Japan, introduced the principle of user-pay on water and wastewater charge and the city government successfully disseminated the concept. With a matured water supply and wastewater system in recent Yokohama, user charges contribute to cover operation and maintenance for assuring 24-hour service of the system.



# Continuous Innovations

Hama Wing (Wind Power Plant)



Source: Environmental Planning Bureau, City of Yokohama

Electric Vehicle



Source: Climate Change Policy Headquarters, City of Yokohama

Child Care Service



Source: Child and Youth Bureau, City of Yokohama

## Challenge with “New Urban Issues”

Yokohama experienced rapid development from a devastated postwar stage in the 1940s to a prosperous modern city within about 60 years, overcoming issues such as urban sprawl, lack of infrastructure, and pollution. Urban challenges for the City did not stop there, however. Instead the City has continued making innovations and efforts to deal with newly arising urban issues.

A new trend is that globally discussed need for energy conservation and emission reduction to tackle global warming and the issues of decreasing natural resources. Cities, which consume lots of energies and emit the majority of greenhouse gases, are required to be “smarter” in energy usage and look for alternative, renewable resources to facilitate more efficient and ecological life-styles and green economy. Another trend is aging and decline of population in large cities. In Yokohama,

its population is expected to start declining in 2019. The elderly population above 65 years old has exceeded 21% in 2013, and is expected to grow close to a million by 2025. At the same time, More and more women are willing to continue their work after having children so that there is an urgent need for the city to create such an environment which can support busy parents.

Without adequate support mechanisms, the birth rate may decline even further, accelerate aging of the population and shrinking of the labor force. Also, Yokohama believes that women’s participation and contribution to its economy and society is essential in order to strengthen and rejuvenate the city. It is a challenge to eliminate any obstacles and create a supportive environment for both working mothers and their children.

Renovation of aging infrastructure is also an urgent need. Faced with global warming and potential natural disasters, “renovation” does not simply mean updating the old infrastructure, but we

need to create much “smarter” and “resilient” solutions.

In Japan, Yokohama plays a leading role to counter these new challenges with close collaborations with the citizens and private companies. In 2011, the City was selected by the Government of Japan as a “FutureCity”, pursuing to be a model city in terms of advanced technology, socioeconomic systems, services, business models and city building in order to resolve these new issues. Yokohama people are forward-looking and eager to make changes, continuously trying new experiments and innovations. The role of the city government is to provide them opportunities as well as necessary incentives and support to facilitate them forming new ideas and making actions.

## Management of the “New Issues” to Achieve Sustainable Development



Source: Climate Change Policy Headquarters, City of Yokohama

Source: Climate Change Policy Headquarters, City of Yokohama

## Carbon Reduction Measures

Since 2010, the city has started an empirical examination of the “Yokohama Smart City Project (YSCP).” The latest smart technologies, including PV generation, storage batteries, various levels of energy management systems (EMS), are installed for operational experiments in many places in Yokohama City with over 1,900 households installed with Home EMS (HEMS), which are connected to the Community EMS (CEMS). The original project vision was created by the city government, which then proposed the idea to the public to see if the private sector would be interested in participating.

Companies with a variety of smart technologies joined the project as a result. A detailed master plan was created, a project management office was established, and the project was put into operation by these private players. The city also promotes “Yokohama Mobility Project Zero”, which aimed to popularize electronic vehicles and eco-driving, in collaboration with an auto manufacturer. These are efforts to develop a model of

an eco-friendly, smart city by means of cooperation among citizens, private companies, and the City Government, and to export the successful model to other cities in Japan and other countries.

## Life Innovations

The City of Yokohama, has been dedicatedly promoting life innovations industry especially in the Keihin Coastal Area and is assigned by the national government as one of Japan’s “Comprehensive Special Zones for International Competitiveness Development (CSZICD)”. Currently, Yokohama promotes 18 R&D projects in its 7 areas of focus; namely, preventive medicine, diagnostics, regenerative medicine, IT (medical databases), drug development, medical device development, and a support mechanism for pharmaceutical/ medical device permission process. The aging society and the latest technologies brought about new market opportunities for both ventures and large global firms. The city helps these innovative players access to the national tax incentives, easing of restrictions, financial support, etc within the CSZICD.

## Improved Accessibility to Child Care Support

In April 2013, Yokohama achieved “zero child on waiting list” for nursery services. For the last decades, large cities have faced capacity shortage in nursery schools, leaving many children on waiting lists and preventing their mothers from going to work. In order to solve the issue, the city has not only built new nursery schools but also introduced new measures to improve accessibility of these services. The city promoted the provision of nursery services by NPOs and other organizations utilizing vacant rooms in regular apartment buildings, which supplemented the shortage of designated nursery facilities. The city also has assigned nursery concierges in each district to provide related advice and information.

This “Yokohama method” was highly recognized by the national government and is now applied to the national plan of “Accelerate the zero childcare waiting list project” for the whole of Japan.

# International Cooperation of Yokohama City

## Long-term International Technical Cooperation of Yokohama City

### Mutual Exchange between Sister Friendship Cities and Partner Cities

Yokohama City has long had friendship exchange and has provided technical assistance to Sister Friendship Cities, Partner Cities, and various other cities through CITYNET and JICA.

### CITYNET (The Regional Network of Local Authorities for the Management of Human Settlements)

CITYNET was established to improve civic life and pursue sustainable urban development through the cooperation of local authorities in the Asia Pacific Region. It was launched in 1987 with 26 members, supporting the development and improvement of sustainable human settlements by the local authority. As of April 1st, 2013, CITYNET has 131 members from 24 countries and regions.

Yokohama City has been active in international assistance for urban transport, water supply, sewerage, solid waste management, etc., through dispatch of experts and acceptance of trainees. The city has also served as the secretariat for over 20 years since the establishment, and has accumulated experience as the leader of networking of local authorities.



Source: Policy Bureau, City of Yokohama

### Technical Cooperation in Urban Development

In the water supply and sewerage sector, the city has actively accepted overseas trainees for technical transfer of operation and maintenance of water treatment facilities, and has also dispatched experts in the sector.

The Yokohama Waterworks Bureau has especially dedicated much effort for international cooperation for 40 years since 1973, with the achievement of accepting over 2,400 trainees (including short-term), and dispatch of over 240 experts to 30

Sister Friendship Cities and Partner Cities



Sister Friendship Cities	Partner Cities	Sister Ports
San Diego City (USA)	Beijing City (China)	Oakland Port
Lyon City (France)	Taipei City (Taiwan)	Vancouver Port
Mumbai City (India)	Busan City (South Korea)	Hamburg Port
Manila City (Philippines)	Ho Chi Minh City (Vietnam)	
Odessa (Ukraine)	Hanoi City (Vietnam)	Friendship Ports
Vancouver City (Canada)	Incheon City (South Korea)	Shanghai Port
Shanghai City (Sister City) (China)	Frankfurt City (Germany)	Dalian Port
Constanta (Romania)		Trade Cooperation Port
		Melbourne Port

Source: JICA Study Team based on map from Policy Bureau, City of Yokohama

countries. The technical cooperation with the Water Corporation in Hue Province is the largest project, and after 10 years of cooperation, the province has managed to pronounce a “Safe Water Declaration.” In 2010, the “Yokohama Water Corporation”, 100% financed by the Bureau, was established to further promote business utilizing the city’s technology and know-how to overseas cities.

The port sector, too, has accepted and dispatched delegations and related agencies through exchange activities with sister ports, and aside from regular anniversary activities and mutual training activities, it continuously accepts an annual 50 delegations from developing countries.

Active technical cooperation through the acceptance of delegations from developing countries is conducted in solid waste management and urban development/ urban transport sectors as well.

Overseas Dispatch of Water Supply Experts



Source: Waterworks Bureau, City of Yokohama

Yokohama Partnership of Resources and Technologies



Source: Policy Bureau, City of Yokohama

### Y-PORT (Yokohama Partnership of Resources and Technologies under Public- Private Partnership)

While developing countries in Asia are undergoing rapid economic growth, various urban issues are occurring today such as the rapid increase of population in cities, urban sprawl, degradation of living and natural environment due to the lack of urban infrastructure, etc. These issues are very similar to what Yokohama City has experienced in the past. Therefore, Yokohama City believes that it can share past experiences with cities in developing countries, and together, solutions can be found.

Many of these urban issues are closely linked with civic life, and each issue is complexly interrelated with one another. Hence, no issue can be solved by a single sector. Solutions must be sought considering the aspects of multiple sectors, and city-to-city cooperation is important in order to solve issues from the citizens’ viewpoint.

Yokohama City has commenced international technical cooperation aiming for “Sustainable Urban Development” by fully utilizing its experiences and know-how for urban development and also environmental technology of the private sector in the city.

Y-PORT, which refers to the Yokohama Partnership of Resources and Technologies under Public-Private Partnership, was launched in 2011. In this initiative, the basic partnership was formulated and strengthened with JICA, JBIC and other governmental agencies along with ADB and other international donors, and the private sector. Y-PORT is further undertaking technical cooperation for sustainable urban development with Cebu City in the Philippines and Danang City in Vietnam.

Currently, the “Asia Smart City Conference” is held as a platform to share best practices of urban development, including the aforementioned major achievements and activities.

International Technical Cooperation Division, City of Yokohama provides consulting service and proposals to solve urban development issues for cities of all over the world through the website below.

<http://www.city.yokohama.lg.jp/seisaku/kyoso/yport-e/>

Asia Smart City Conference



Source: Policy Bureau, City of Yokohama

### Comprehensive Partnership Agreement with JICA

In October 2011, Yokohama City and JICA concluded a Comprehensive Partnership Agreement to further pursue mutual cooperation and to promote new initiatives such as Y-PORT. This is the first comprehensive partnership agreement which JICA concluded with a local authority. Contents of the agreement are as follows:

- (1) Acceptance of technical trainees, dispatch of experts, conduct of JICA Partnership Program, etc. and other technical cooperation
- (2) Promotion of Public-Private-Partnership for solving urban issues
- (3) Participation of Yokohama citizens to JICA volunteer activities
- (4) Education to promote international understanding in schools in Yokohama City
- (5) Conduct of international conferences and events for international cooperation
- (6) Mutual dispatch of staff

Comprehensive Partnership Agreement with JICA



Source: Policy Bureau, City of Yokohama

### Comprehensive Partnership Agreement with JBIC

In October 2010, Yokohama City and JBIC concluded a “Cooperation Agreement for Environment and Urban Infrastructure” to share information and opinions in order to combat both urban issues and global environmental issues arising in developing countries undergoing rapid urban development.



# Utilizing Technology of the Private Sector

## Co-creating with Yokohama's Private Sector for International Technical Cooperation

Yokohama City aims to establish itself as an independent international city. As a representative project to realize this goal, a city center enhancement project to create new business, commercial & cultural center as the City's economic driver is being implemented. The City is attracting global firms to the Minato Mirai 21 District and to the Kannai Station Area in which many major firms have as a result established offices and research centers. JGS Corporation, JFE Engineering Corporation, Chiyoda Corporation, and HITACHI Ltd. are among such representative firms. Yokohama City has concluded partnership agreements with these firms housing world-class technology, and are together pursuing international technical cooperation.



Urban development and industrial development, water supply and sewerage, etc.



Solid waste treatment, sewerage, renewable energy, etc.



Energy management, medication, biological process development, etc.



Energy, water environment, transport system, information and communication technology, etc.

## Yokohama Water Business Conference

Yokohama City has realized a healthy water circulation over the past few decades. The City has closely worked with private firms and groups which support water infrastructure technology, and in November 2011, the "Yokohama Water Business Conference" was established (member firms total 147 as of August 2013). The Conference is led by the Mayor of Yokohama City, and the City's water supply and sewerage sectors are working in cooperation. The Conference aims to introduce the City's and the member firms' technology and know-how. The technology of member firms covers, among others, provision of parts, design and construction of plants, operation and maintenance, etc.



Yokohama Water Business Conference

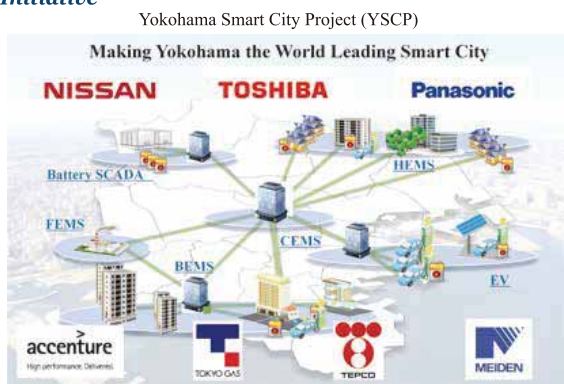
Source: Environmental Planning Bureau, City of Yokohama

## Water Business Provided by Member Firms

<b>Water Usage and Distilling</b>	development of dams and irrigation channels, river improvement, transport of source water, distilling of seawater, etc.
<b>Purification and Supply</b>	development, operation and maintenance of water purification facilities, management of water quality, development and operation of water distribution facilities and supply pipes, etc.
<b>Drainage, Treatment, Disaster Management</b>	development, operation and maintenance of water pipes, pumping facilities, and sewerage treatment facilities, etc.
<b>Reuse and Energy Use</b>	water recycling, digestion gas energy generation, etc.

## Promotion of Environmental Future City Initiative

Yokohama City was selected as the Environmental Future City by the Government in December 2011, a city which reacts to environmental issues and various social issues such as aging society. Under this initiative, the City is working with private firms (Accenture, Tokyo Gas, TOSHIBA, NISSAN, Panasonic, Meidensha, TEPCO, etc.) to challenge for the realization of a "Low-carbon and energy-saving (city)." Major projects being implemented include the introduction of renewable energy and unused energy, energy management in homes, buildings, and the community, development of next-generation transport, etc. The initiative is aiming to promote best practices done under this initiative to overseas in the future.

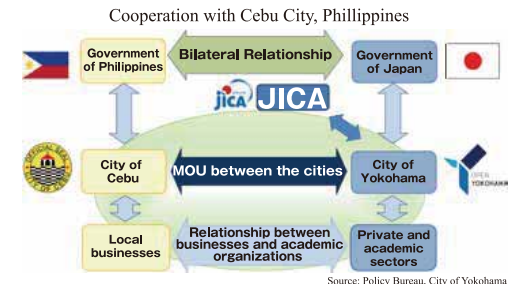


Climate Change Policy Headquarters, City of Yokohama

# Cooperation with Cities

## Cooperation with Cebu City, Philippines

Cebu City in the Philippines is in urgent need for solving issues such as traffic congestion, solid waste treatment, sewerage and drainage treatment, prevention and mitigation of flood disasters, etc., due to its rapid economic development and population growth. In March 2012, Yokohama City and Cebu City concluded a memorandum to promote sustainable urban development in Cebu City.



## Assistance for Developing Long-Term Vision and Initiatives of the Private Sector

JICA and Yokohama City have jointly provided technical assistance to formulate the urban development vision for Metro Cebu entitled "Mega Cebu Vision 2050." This vision is composed of 6 fields and 4 development strategies which support their realization. Upon formulating this vision, the long-term vision of Yokohama City and the 6 Strategic Projects were introduced, and contributed to active debate and consideration by the Metro Cebu side. In addition, 3 private sector firms selected by the Ministry of Foreign Affairs is undertaking an environmental study, and the Yokohama Water Company established by the Yokohama Waterworks Bureau is conducting a capacity building project in Metro Cebu under JICA's technical cooperation project scheme.

Conference on Assistance to Cebu City by the Ambassador of the Philippines and Mayor of Yokohama City (April 2013, Philippine Embassy)



Source: Policy Bureau, City of Yokohama

## Low-cost sewage treatment for wide application of septic management by AMCON Inc.



Dewatering Machine "Volute"

Source: AMCON Inc.

## Hybrid solar-diesel power generation system by UYENO Green Solutions, Ltd.



Solar Diesel Hybrid Solution

Source: UYENO Green Solutions, Ltd.

## Recycling waste plastic materials for better solid waste management by Mansei Recycle Systems Co., Ltd.



RPF and fluff Plastic Fuel Facilities

Source: Mansei Recycle Systems Co., Ltd.

## Dissemination of the scheme on technical cooperation in Metro Cebu to other cities in Asian countries

In April 2013, Yokohama City concluded a memorandum to realize sustainable urban development with Danang City in Vietnam, which itself is aiming to become an Environmental City in the future. Major activities and initiatives under this framework include joint infrastructure site surveys with private firms from Yokohama City and Danang City, inspection of solid waste treatment facilities in Yokohama City by Danang City, "Danang Infrastructure Seminar" held in Yokohama City under the auspices of both cities, etc.

In addition, Yokohama City is cooperating with JICA under the project "Bangkok Master Plan on Climate Change 2013-2023" in Bangkok City, which itself is pursuing the realization of a low-carbon city. The contents of this Master Plan include (1) sustainable transport system, (2) energy-saving and alternative energy, (3) efficient solid waste treatment and sewerage treatment, (4) urban greenery, (5) adaptation measures, and is eyed as an initiative which Yokohama City's advantages of technical cooperation can be well applied to realize comprehensive urban development.