



**JFM Green Bond  
Impact Report 2020**

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# About this report

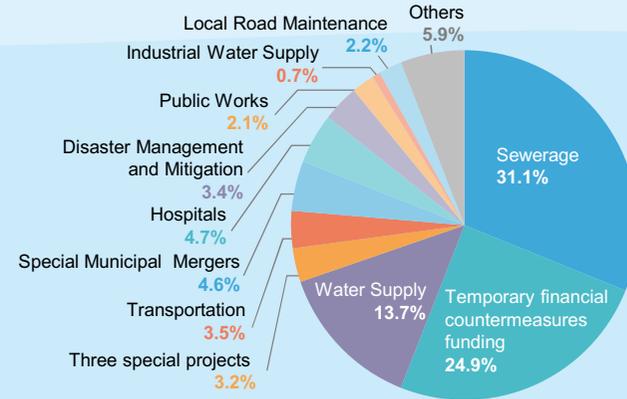
Japan Finance Organization for Municipalities (JFM) provides loans to projects operated by local governments. As of 31 March 2020, total outstanding loans stood JPY 23.3996 tn, of which JPY 7.2805 tn was for sewerage, accounting for 31.1% of the total amount.

JFM issued its inaugural green bonds in February 2020 to finance Japanese local government's sewerage projects and fully allocated the net proceeds by 31 March 2020 after issuance.

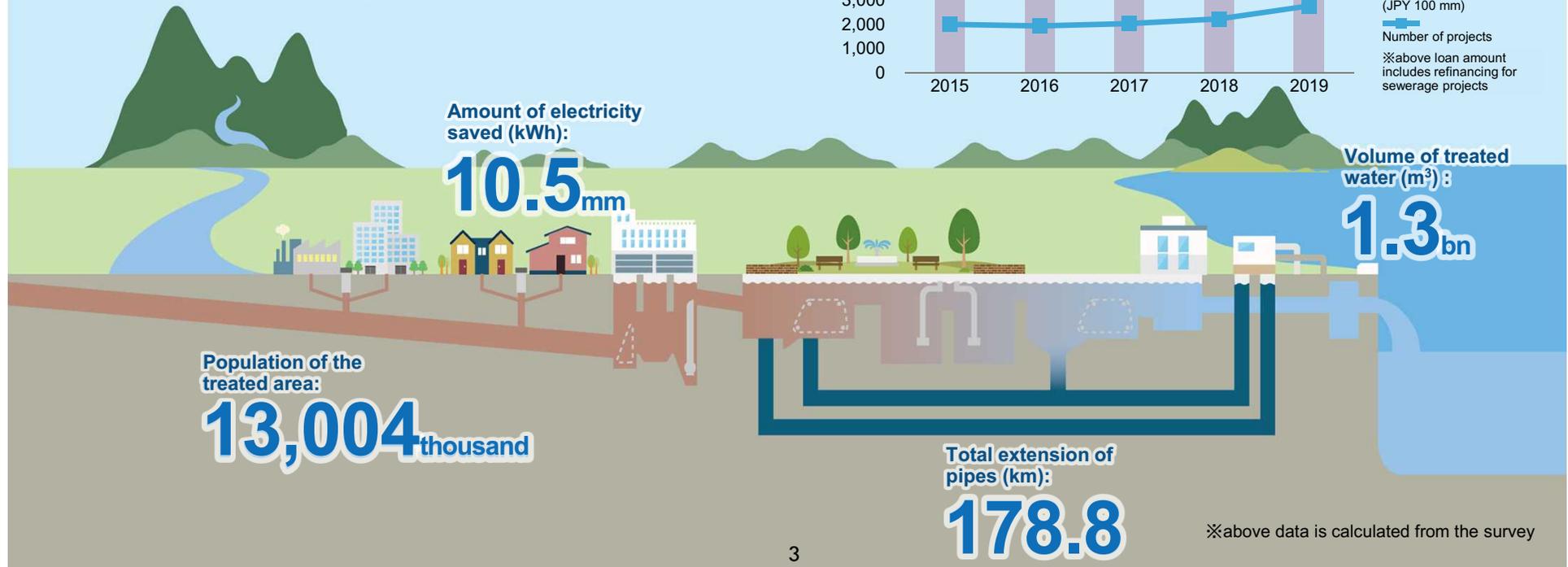
JFM conducted a survey to 48 local governments selected by JFM's Green Bond Working Group where loans were made between 27 February and 31 March 2020 and of which the loan amount for the project was JPY 300 mm or higher in principle and obtained effective response from 39 local governments. (Total loan amount: approximately JPY 80 bn, effective response rate: 81%)

In this report, JFM put together the overview of each sewerage projects which JFM financed and its environmental impacts including impact indicators based on the response in the survey. The objective of this report is to actively disclose to investors the Japanese local governments' efforts on SDGs and the environmental impact of each projects.

JFM's Loan Portfolio by Project Types



The amount and number of JFM loans made for sewerage projects



# Executive Summary

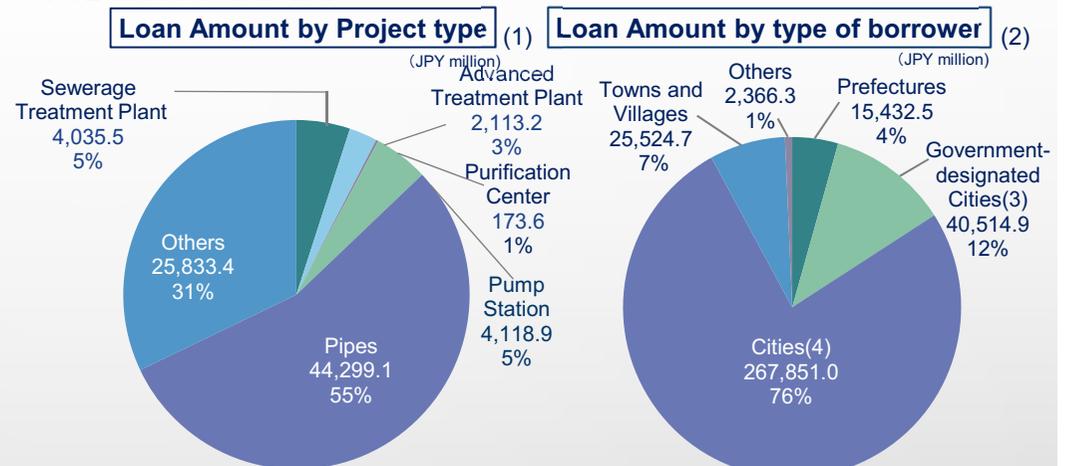
JFM provides loans to local governments on SDGs related projects. Sewerage projects take up a large portion of JFM's total lending, which reaches about JPY300~400bn annually.

On the back of the growing concerns on SDGs globally, JFM issued EUR500mm inaugural green bond in February 2020, in order to promote actively the Japanese local governments' efforts on SDGs and to secure stable provision of long-term funding at low interest rates. JFM's green bond has been certified by Vigeo Eiris, a second-party opinion provider, and has attained the highest level of assurance.

## Summary of Terms – Green Bond

Bond Ratings:	A1 / A+ (Moody's / S&P)
Tenor:	7-year
Issue Amount:	EUR500mm
Pricing Date:	4 February 2020
Issue Date:	12 February 2020
Maturity Date:	12 February 2027
Coupon:	0.050%
Third-party Opinion Provider:	Vigeo Eiris
Assurance Level:	Reasonable (Highest level)

The breakdown of the sewerage projects related loans by JFM for FY2019 is as follows:



- (1) Breakdown of green bond allocated projects (Approximately JPY 80 bn)  
 (2) Breakdown of sewerage project loans from 1 April 2019 to 31 March 2020  
 (3) Cities with populations of 500,000 or more designated by the government  
 (4) Excluding government-designated cities

JFM has conducted surveys to relevant local government borrowers in order to measure the environmental impact of their sewerage projects. Loans from 27 February to 31 March 2020 were targeted for the survey, and the refinancing rate for sewerage projects was 0%. Moreover, the following effects were observed:

## Summary of Survey Results

Total extension of pipes (km)	Covered area population	Water management Capacity (m <sup>3</sup> )	Amount of electricity saved (kWh)
178.8	13,004,835	1,377,655,620	10,513,189

※ Survey sample 48 local governments. 39 returned effective response (81%)

※ Summary Methodology

• Total extension of pipes are addition of new constructed pipes

• Covered area population are addition of new pipes, new/renewal of sewerage related facilities

• Water management Capacity are addition of annual planned/ actual water management capacity in sewerage related facilities

• Amount of electricity saved are addition of monthly planned/actual electricity saved

# JFM and Sewerage

JFM was established as a joint funding organization wholly owned by all Japanese local governments and has provided long term and low interest rate loans to local governments. JFM supported local government's finance in the capital markets and contributed to their sound financial management and promoted the welfare of its residents.

Local governments, amidst a decrease in the Japanese population, are facing various administrative issues, such as promoting the revitalization of regions, measures against the declining birth rate and an aging population, deteriorating infrastructure, measures against large-scale and intensifying natural disasters.

To address these challenges, JFM provide loans to local governments who develops infrastructure and administrative services to its residents of the region and contribute to a sustainable development of the region's community and environment.

Sewerage, which covers the largest portion of JFM's loan portfolio, is managed by local governments and the quality of water is regulated under the laws of Japan. Sewerage play an important role and contributes to the improvement of living conditions, prevention of floods and preservation of water quality through waste water treatment and rain water drainage. The national government and the local government work together to create a sustainable sewerage system such as measures against aging facilities and minimizing the effect of national disasters and JFM contribute to a sustainable development of the system by providing loans to local governments.

The Japanese government has set specific targets on sewerage business based on the Paris Agreement, by setting environmental measures such as sludge recycle rate. Moreover, in accordance with the Act on Promoting of Global Warming Countermeasures and its related policies, Japan has set a policy goal of achieving the utilization rate of sewage sludge as energy such as biomass power generation.



Japan Finance Organization for Municipalities  
President and CEO  
SATO Fumitoshi

# JFM SDGs related lending operations

## Sewerage

### Purification Center



## Water Supply / Industrial Water Supply

### Water Supply Plant



## Transportation

### Tramway



## Hospitals and Elderly Care Services

### Hospital



## Disaster Management and Mitigation

### Tsunami Evacuation Tower



# JFM Green Bond Framework

January 2020

## • Approach to Sustainability

- Local governance in Japan and JFM's contribution
  - \* SDGs mapping-fund usage by JFM, 31.6% (As of 31 March 2019) are financed for sewerage projects
- Development of sewerage system in Japan
  - \* Sewerage business is operated by municipalities and quality of water is regulated under laws of Japan
- Further initiatives and towards achievement of SDGs

## • Rationale for Issuance

- Sewerage industry can contribute to a sustainable economy and public health
- JFM hopes to broaden its investor base by attracting green bond investors

## • Eligibility Criteria

- Eligibility Criteria for JFM green bond is as set forth on the table below

GBP Eligible Green Project Category	Eligibility Criteria	Environmental Objective	Alignment with UN SDGs
<b>Sustainable water and wastewater management</b>  <b>Pollution Prevention and Control</b>	Development, construction, maintenance, updates, operation of sewerage related assets, which are in line with sewage drainage standards set by Japanese law including: <ul style="list-style-type: none"> <li>• Pipes</li> <li>• Sewerage Management Related Facilities</li> <li>• Facility/Equipment</li> </ul>	Pollution Prevention and Control Natural Water Resource Conservation Energy use of sewage sludge, sewerage sludge recycle	     

## • Alignment with the Green Bond Principle, 2018(GBP)

- JFM's Green Bond Framework is aligned with four core components of the GBP

### 1. Use of Proceeds

- An amount equal to the net proceeds will be allocated to the Eligible Green Projects set forth below

### 2. Process for Project Evaluation and Selection

- JFM Loan Department will confirm that the borrower has obtained consent or approval on the borrowing from relevant authorities

- Green Bond Working Group will conduct a survey to municipalities to determine the effective portfolio

### 3. Management of the Proceeds

- JFM's Green Bond Working Group will track, monitor and account for the allocation of the proceeds

### 4. Reporting

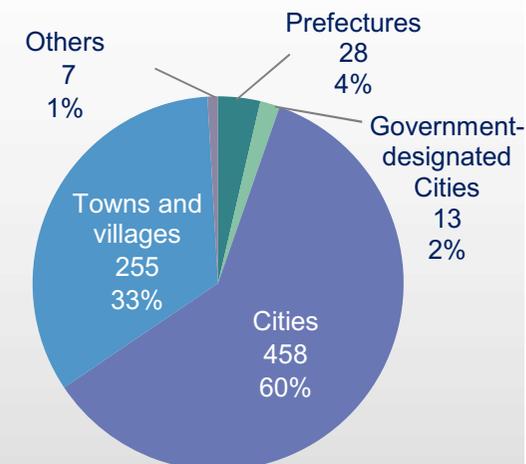
- JFM Green Bond Working Group will conduct a survey on municipal borrowers with respect to the environmental impacts of sewerage projects
- JFM Green Bond Working Group will then report the effective portfolio for the allocation which only includes projects that borrowers return effective response
- JFM will publish the following impact report on website annually
  - ✓ Amounted of net proceeds of the Notes allocated
  - ✓ Break down of Effective Portfolio
  - ✓ Expected or estimated KPIs
  - ✓ Case studies of JFM's lending to sewerage projects
  - ✓ Refinancing rate

## ( i ) Amount of loan to sewerage projects

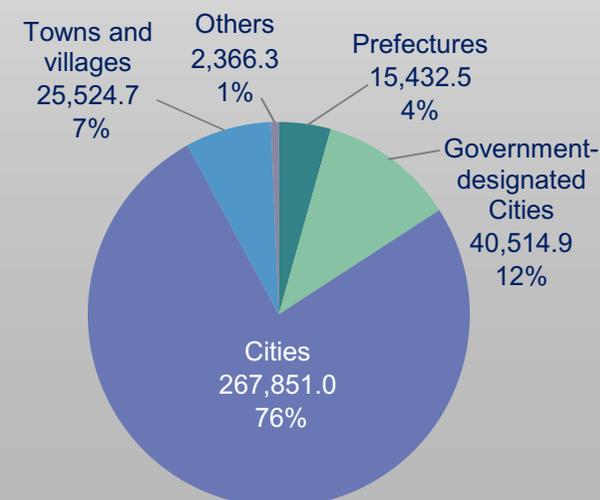
	Prefectures	Designated City	Cities	Towns and villages	Others	Total
Number of Local Governments	28	13	458	255	7	761
Number of Loans	72	48	1,809	608	16	2,553
Loan Amount (JPY million)	15,432.5	40,514.9	267,851.0	25,524.7	2,366.3	351,689.4

	JPY 2 bn or over	JPY 1 bn or over	JPY 500 mm or over	JPY 100 mm or over	Below JPY 100 mm	Total
Number of Loans by Loan Amount	12	34	105	650	1,752	2,553

Number of Local Governments by type of borrower



Loan Amount by type of borrower (JPY million)



The total loan amount to sewerage projects from 1 April 2019 to 31 March 2020 (excluding refinance) was JPY 351.6 bn.

Number of local governments were 761, Number of Loans were 2,553. In terms of types of borrowers, cities were the highest with 76%, followed by government-designated cities with 12%, then towns and villages with 7%.

In terms of the number of loans by loan amount, JPY 2 bn or over were 12, JPY 1 bn or over were 34, JPY 500 mm or over were 105, JPY 100 mm or over were 650 and below JPY 100 mm were 1,752.

## ( ii ) Breakdown of Green Bond effective portfolio

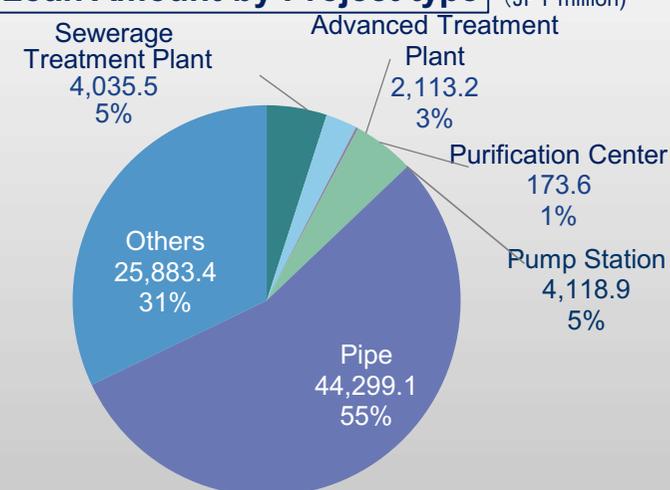
	Sewerage Treatment Plant	Advanced Treatment Plant	Purification Center	Pump Station	Pipes	Others	Total
Number of Projects by type	13	3	4	15	55	16	106
Loan Amount by type (JPY million)	4,035.5	2,113.2	173.6	4,118.9	44,299.1	25,883.4	80,623.7

	New	Renewal	Total
Number of Projects by type	44	62	106
Loan Amount by type (JPY million)	36,808.8	43,814.9	80,623.7

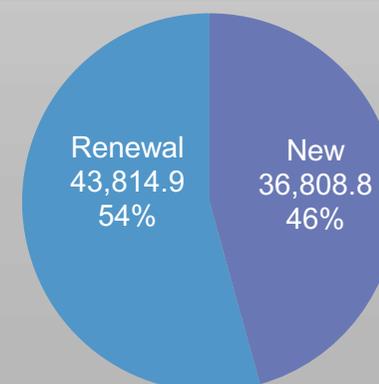
The Green Bond Working Group have selected 48 local governments which financed sewerage projects between 27 February 2020 and 31 March 2020 with the loan amount over JPY 300 mm in principle and conducted a survey for the purpose of this green bonds reporting. The working group obtained effective response from 39 local governments (effective response rate:81%) and a total of approximately JPY 80 bn in loan amount.

The table above shows the survey results from relevant local governments. Regarding the types of projects by loan amount, pipes cover the largest portion 55%, followed by pump station 5%, then sewerage treatment plant 5%. 46% of the loan amount to sewerage projects were financed to new facilities and 54% were for renewal.

**Loan Amount by Project type** (JPY million)



**New/Renewal percentage** (JPY million)



## ( iii ) Project by project reporting Sewerage Treatment Plant 1

### Sewerage Treatment Plant (New)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Covered Area Population	Water Management Capacity (m <sup>3</sup> )	Water Quality(BOD) (Year/Period Average)(mg/L)	Water Quality (phosphorus) (Year/Period Average)(mg/L)	Other positive environmental impact
Toyohashi City(1)	Aichi	New construction of sewerage treatment plant	297,952	167,423	56.19	266,772 →267,877	7,328,105 →24,528,000 (planned volume/year)	15.0	2.6	<ul style="list-style-type: none"> <li>•Sludge-based energy: combine sewage sludge, human waste and sludge from septic tanks to generate biogas through methane fermentation to be used for power generation. Remaining sludge is used as carbonized fuel</li> <li>•Utilize the heat produced by sludge disposal to heat up methane fermentation tanks</li> </ul>
Toyohashi City(2)			145,756	72,878	50.00					
Total Amount of Sewerage Treatment Plant (1 projects)			443,708	240,301						

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

### Sewerage Treatment Plant (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Covered Area Population	Water Management Capacity (m <sup>3</sup> )	BOD Planned [Year/Period Average] (mg/L)	BOD Actual [Maximum monthly results] (mg/L) after treatment	Phosphorus (Year/Period Average) (mg/L)	Phosphorus Actual [Maximum monthly results](mg/L) after treatment	Other positive environmental impact
Gifu City(1)	Gifu	Renovate mechanical / electrical equipment at plants	1,567,869	739,900	47.19	382,890	46,383,388	15.0	3.3→5.1	1.5	improved 0.4→0.3	N/A
Gifu City(2)			290,182	113,100	38.98							
Himeji City(1)	Hyogo	Upgrade aging sewerage facilities	1,210,680	644,413	53.23	N/A	64,372,672	15.0	2.0→2.8	3.0	improved 0.49→0.71	•Sludge dewatering (annual) increased 452,996 Ws-t→ 460,531 Ws-t
Himeji City(2)			355,257	355,163	99.97							
Hakodate City	Hokkaido	Improve aging facilities including the system 3 reaction tank mechanical equipments, electrical instrumentation equipments and non-utility generators at sewerage facilities	533,420	451,900	84.72	125,144	21,113,451	15.0	4.2	N/A	1.0	N/A
Uji City	Kyoto	Install advanced treatment at water treatment facilities to improve the water environment and update facilities earthquake-resistant to extend their operating life which reduces life-cycle cost	838,040	418,900	49.99	176,656	1,148,397	10.0	improved 5.6→4.8	0.8	improved 2.21 →1.62	•Electricity consumption (monthly average) decreased 335,633 kWh → 331,034 kWh

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iii ) Project by project reporting Sewerage Treatment Plant 2

### Sewerage Treatment Plant (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Covered Area Population	Water Management Capacity (m <sup>3</sup> )	BOD Planned [Year/Period Average] (mg/L)	BOD Actual [Maximum monthly results] (mg/L) after treatment	Phosphorus (Year/Period Average) (mg/L)	Phosphorus Actual [Maximum monthly results](mg/L) after treatment	Other positive environmental impact
Takasaki City	Gunma	Improve mechanical / electrical equipments and sewerage pipes	300,000	300,000	100.00	275,150	25,511,385	15.0	improved 7.1→5.4	N/A	1.3→2.5	•Electricity consumption (monthly average) decreased 551,091 kWh → 543,387 kWh
Wakayama City	Wakayama	Renovate sewerage treatment facilities and aged facilities	401,241	188,800	47.05	N/A	628,090	15.0	0.7→1.9	0.5	improved 0.44→0.04	•Electricity consumption (monthly average) decreased 711,208 kWh → 580,400 kWh
Tokai City	Aichi	Upgrade treatment facilities including earthquake-resistant construction and extend operating life Construction of rainwater pump stations	414,670	184,452	44.48	99,213	8,685,381	15.0	improved 2.6→2.5	1.0	0.19→0.42	•Electricity consumption (monthly average) decreased 333,457 kWh → 302,104 kWh
Mibu Town	Tochigi	Renewal of sewerage treatment plant facilities	133,200	133,200	100.00	28,305	N/A	N/A	N/A	N/A	N/A	N/A
Hachinohe City	Aomori	Expand water treatment facilities and renovate diversion tanks	1,551,232	102,430	6.60	112,344	N/A	15.0	N/A	N/A	N/A	•Electricity consumption (monthly average) decreased 456,958 kWh → 434,789 kWh
Nagoya City	Aichi	Upgrade aging water treatment equipment and install one system line for advanced treatment	652,008	63,245	9.70	152,900	18,233,200	15.0	improved 2.4→2.1	1	improved 0.65→0.19	•Upgraded aging facilities with efficient equipment to reduce power usage
Toyama City	Toyama	Renewal of sewerage treatment plant facilities	112,104	50,364	44.93	222,780	48,281,470	14.0	N/A	N/A	N/A	N/A
Funabashi City(1)	Chiba	Renewal of sewerage treatment plant facilities (Corrosion protection of gravity thickeners and concentrated sludge storage tanks, upgrading of covers, storage battery equipments and instrumentation equipments)	1,394,711	25,000	1.79	569,142	30,302,000	9.7	improved 4.0→1.8	0.5	0.32→0.84	N/A
Funabashi City(2)			467,665	14,300	3.06							
Funabashi City(3)			1,394,711	10,000	0.72							
<b>Total Amount of Sewerage Treatment Plant(Renewal) (12 projects)</b>			<b>11,616,990</b>	<b>3,795,167</b>								

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iii ) Project by project reporting Advanced Treatment Plant

### Advanced Treatment Plant (New)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Covered Area Population	Water Management Capacity (m <sup>3</sup> )	Water Quality(BOD) (Year/Period Average) (mg/L)	Water Quality (phosphorus) (Year/Period Average) (mg/L)	Other positive environmental impact
Chiba City	Chiba	Build advanced treatment facilities to replace aging standard activated sludge treatment facilities	1,139,614	549,850	48.25	137,440	24,680 (Maximum planned per day)	12	0.5	Installation of advanced treatment facilities would improve the water quality of discharged water, which helps improve the water quality of the Tokyo Bay
<b>Total Amount of Advanced Treatment Plant (New) (1 project)</b>			<b>1,139,614</b>	<b>549,850</b>						

### Advanced Treatment Plant (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Covered Area Population	Water Management Capacity (m <sup>3</sup> )	BOD Planned [Year/Period Average] (mg/L)	BOD Actual [Maximum monthly results] (mg/L) after treatment	Phosphorus (Year/Period Average) (mg/L)	Phosphorus Actual [Maximum monthly results](mg/L) after treatment	Other positive environment impact
Shiga Prefecture(1)	Shiga	Renovate and upgrade aging treatment facilities	4,441,082	918,500	20.68	795,400	96,394,936	4.8	0.6	0.3	0.05	Electricity consumption (monthly average) decreased 212,674 kWh → 155,252 kWh
Shiga Prefecture(2)			2,962,032	433,500	14.64							
Chiba City	Chiba	Make effluent conduits at Nanbu purification center earthquake-resistant to ensure sewerage treatment function in case of earthquake.	432,153	211,350	48.91	412,326	57,853,657	12.0	N/A	0.5	1.08	N/A
<b>Total Amount of Advanced Treatment Plant (Renewal) (2 projects)</b>			<b>7,835,267</b>	<b>1,563,350</b>								

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iii ) Project by project reporting Purification Center

### Purification Center (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Covered Area Population	Water Management Capacity (m)	BOD Planned [Year/Period Average] (mg/L)	BOD Actual [Maximum monthly results] (mg/L) after treatment	Phosphorus (Year/Period Average) (mg/L)	Phosphorus Actual [Maximum monthly results](mg/L) after treatment	Other positive environment impact
Hakodate City	Hokkaido	Improve drying equipments and electrical instrumentation equipments at aging sludge treatment facilities.	220,429	102,900	46.68	125,144	21,113,451	N/A	N/A	N/A	N/A	N/A
Toyohashi City(1)	Aichi	Conduct aseismic reinforcing work and make important sewerage facilities earthquake-resistant to minimize damage	61,628	28,605	46.42	267,877	8,853,770	15.0	3.0→13.5	1.8	improved 0.45→0.39	-Electricity consumption (monthly average) decreased 1,433,297 kWh → 1,396,509 kWh
Toyohashi City(2)			40,770	24,930	61.15							
Toyama City(1)	Toyama	Upgrade Hamakurosaki purification center	42,100	17,159	40.76	222,780	48,281,470	N/A	N/A	N/A	N/A	N/A
Toyama City(2)		Upgrade Oyama sewerage treatment plant				13,250	1,814,780					
<b>Total Amount of Purification Center (Renewal) (4 projects)</b>			<b>364,927</b>	<b>173,594</b>								

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iii ) Project by project reporting Pump Station 1

### Pump Station (New)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Covered Area Population	Water Management Capacity (m <sup>3</sup> )	Water Quality(BOD) (Year/Period Average)(mg/L)	Water Quality (phosphorus) (Year/Period Average)(mg/L)	Other positive environment impact
Hirakata City	Osaka	Enhance pump station capacity to reduce flood damage in the area	905,694	529,600	58.47	N/A	N/A	N/A	N/A	•Reduction of flood damage
Ichikawa City(1)	Chiba	Build new pumping stations required after the reorganization of the district covered by the public sewerage (rainwater) system. The district is located at a low level where natural drainage is difficult, requiring drainage by pumps	369,800	369,800	100.00	N/A	N/A	N/A	N/A	• Expect improvement of public health by removing landside water efficiently and eliminating risk of house flood damages
Ichikawa City(2)			1,100	1,100	100.00					
Wakayama City	Wakayama	Build rainwater pumping stations to prevent flood	394,580	125,300	31.76	N/A	1,039 (Annual actual volume )	N/A	N/A	N/A
Toyama City	Toyama	Construction of pump station	18,948	8,527	45.00	222,780	15,413,208 →42,281,470 (Annual planned volume)	N/A	N/A	N/A
<b>Total Amount of Pump Station (New) (4 projects)</b>			<b>1,690,122</b>	<b>1,034,327</b>						

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

### Pump Station (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Covered Area Population	Water Management Capacity (m <sup>3</sup> )	BOD Planned [Year/Period Average] (mg/L)	BOD Actual [Maximum monthly results] (mg/L) after treatment	Phosphorus (Year/Period Average) (mg/L)	Phosphorus Actual [Maximum monthly results](mg/L) after treatment	Other positive environment impact
Okazaki City	Aichi	Update of pump station facilities	2,461,818	1,622,100	65.89	343,316	N/A	N/A	N/A	N/A	N/A	N/A
Toyama City	Toyama	Update of pump station facilities	629,194	283,137	45.00	222,780	42,281,470	N/A	N/A	N/A	N/A	N/A
Hakodate City	Hokkaido	Update aging pump station facilities including electrical instrumentation equipments at Yunokawa, Ugaura and Ote pump station	387,760	282,500	72.85	125,144	21,113,451	N/A	N/A	N/A	N/A	N/A
Chiba City	Chiba	Upgrading switchboards and pipes at pump stations	434,028	266,200	61.33	N/A	N/A	N/A	N/A	N/A	N/A	N/A

## ( iii ) Project by project reporting Pump Station 2

### Pump Station (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Covered Area Population	Water Management Capacity (m <sup>3</sup> )	BOD Planned [Year/Period Average] (mg/L)	BOD Actual [Maximum monthly results] (mg/L) after treatment	Phosphorus (Year/Period Average) (mg/L)	Phosphorus Actual [Maximum monthly results](mg/L) after treatment	Other positive environment impact
Akita City(1)	Akita	Connection of regional sewerage system in Akita Prefecture	340,400	154,177	45.29	42,787	7,148,200	15.0	improved 3.5→2.3	N/A	improved 0.32→0.16	<ul style="list-style-type: none"> <li>Electricity consumption (monthly average) decreased 373,372 kWh → 340,089 kWh</li> <li>More efficiency in sludge treatment in the region and can expect reduction of carbon dioxide emission</li> </ul>
Akita City(2)		Upgrade rainwater drainage pump stations to retain ability to reduce flooding in the surrounding areas	229,900	103,127	44.86	N/A	77,424	N/A	N/A	N/A	N/A	<ul style="list-style-type: none"> <li>Electricity consumption (monthly average) decreased 1,361 kWh → 1,348 kWh</li> </ul>
Akita City(3)		Upgrade facilities that return combined rainwater to the mainline of the wastewater pipe to retain ability to prevent river pollution	112,900	66,019	58.48		390,581					N/A
Wakayama City(1)	Wakayama	Renovate rainwater pump stations	220,503	113,000	51.25	N/A	47,314	N/A	N/A	N/A	N/A	<ul style="list-style-type: none"> <li>Electricity consumption (monthly average) decreased 6,852 kWh → 5,579 kWh</li> </ul>
Wakayama City(2)		Renovate aging pump stations that is out of use	172,727	86,300	49.96		609,740					
Takasaki City	Gunma	Upgrade manhole pumps	60,300	60,300	100.00	275,150	25,511,385	N/A	N/A	N/A	N/A	<ul style="list-style-type: none"> <li>Electricity consumption (monthly average) decreased 551,091 kWh → 543,387 kWh</li> </ul>
Toyohashi City	Aichi	Upgrade important sewerage facilities earthquake-resistant and minimize damage from disasters	89,380	45,840	51.29	267,877	114,840	N/A	N/A	N/A	N/A	<ul style="list-style-type: none"> <li>Electricity consumption (monthly average) decreased 2,965 kWh → 2,835 kWh</li> </ul>
Funabashi City	Chiba	Update of pump station facilities	75,900	1,900	2.50	569,142	30,302,000	9.7	improved 4.0→1.8	0.5	0.32→0.84	N/A
<b>Total Amount of Pump Station (Renewal) (11 projects)</b>			<b>5,214,810</b>	<b>3,084,600</b>								

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iii ) Project by project reporting Pipes 1

### Pipes (New)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Newly constructed pipe length (m)	Covered Area Population	Positive environment impact
Sagamihara City	Kanagawa	Install new rainwater pipes to reduce flood damages, install new wastewater pipes in the areas adopt a separate sewerage system to prevent untreated sewage inflow into river during rain	6,127,935	2,081,700	33.97	1,500	694,229	<ul style="list-style-type: none"> <li>・The extension of sewer pipes will increase the amount of treated water by 43,247 m<sup>3</sup> (estimates, annual total)</li> <li>・The installation of new wastewater pipes will reduce the amount of untreated wastewater flowing into public water areas</li> </ul>
Funabashi City(1)	Chiba	Construction of new pipes	3,187,146	2,026,800	63.59	22,892	569,142	<ul style="list-style-type: none"> <li>・The extension of sewer pipes will increase the amount of treated water by 410,708m<sup>3</sup> (estimates, annual total)</li> <li>・Improvement in reduction of total phosphorus through water treatment (Before introduction 6.815mg/L→ After introduction 6.96mg/L)</li> <li>・Improvement in reduction of total nitrogen through water treatment (Before introduction 38.0mg/L→ After introduction 48.7mg/L)</li> <li>・Recycle rate of sludge is expected to be 100%, conversion to cement</li> <li>・Actively constructed pipes and the city's sewerage coverage increased from 87.3% to 88.4% in fiscal 2019</li> </ul>
Funabashi City(2)			3,677,751	434,100	11.80			
Funabashi City(3)				289,700	7.88			
Yokkaichi City	Mie	Reduce uncovered areas of the sewerage system	3,304,923	2,022,600	61.20	11,385	244,669	<ul style="list-style-type: none"> <li>・The extension of sewer pipes increased the amount of treated water by 607,411.6 m<sup>3</sup> (actual, annual total)</li> </ul>
Wakayama City	Wakayama	Install new sewer pipes, improve sewerage coverage ratio, implement countermeasures against flood and improve environment in the public water areas	2,562,965	1,778,200	69.38	9,937	N/A	<ul style="list-style-type: none"> <li>・The extension of sewer pipes will increase the amount of treated water by 361,195m<sup>3</sup>(estimate, annual total)</li> <li>・BOD improvement. Before extension (septic tank, pump type) 25.2 mg/L → After extension 4.5 mg/L</li> </ul>
Ichikawa City(1)	Chiba	Install new wastewater pipes in uncovered areas where public sewerage (wastewater) system has not been developed. The purpose of the project is to improve public health and preserve water quality in public water areas	1,658,900	1,658,900	100.00	2,171	233	<ul style="list-style-type: none"> <li>・The extension of sewer pipes will increase the amount of treated water by 31,041.425m<sup>3</sup> (estimates, annual total)</li> <li>・Water quality in public water areas has been gradually improving by replacing single septic tanks with public sewerage system</li> <li>・Water quality is expected to improve in gutters and rivers by reducing discharge of untreated household</li> </ul>
Ichikawa City(2)			1,407,000	1,407,000	100.00	11,719	3,767	<ul style="list-style-type: none"> <li>・The extension of sewer pipes will increase the amount of treated water by 501,858.575m<sup>3</sup> (estimates, annual total)</li> <li>・Water quality in public water areas has been gradually improving by replacing single septic tanks with public sewerage system</li> <li>・Water quality is expected to improve in gutters and rivers by reducing discharge of untreated household</li> </ul>
Ichikawa City(3)		Install new rainwater pipes in uncovered areas where public sewerage (rainwater) system has not been developed. The project aims to reduce flood damages in populated areas where urban functions are concentrated	337,300	337,300	100.00	150	63	<ul style="list-style-type: none"> <li>・The extension of sewer pipes will increase the amount of treated water by 1,737,002.88m<sup>3</sup> (estimates, annual total)</li> <li>・Rainwater pipes efficiently removes landslide water and eliminates risk of house flood damages, resulting in improvement of public health</li> <li>・The number of house damages has declined in the areas where rainwater pipes have been installed</li> </ul>
Ichikawa City(4)			20,800	20,800	100.00	762	287	<ul style="list-style-type: none"> <li>・The extension of sewer pipes will increase the amount of treated water by 10,533,339.36m<sup>3</sup> (estimates, annual total)</li> <li>・Rainwater pipes efficiently removes landslide water and eliminates risk of house flood damages, resulting in improvement of public health</li> </ul>
Okazaki City	Aichi	Install new wastewater pipes and rainwater pipes	2,461,818	1,622,100	65.89	6,360	343,316	<ul style="list-style-type: none"> <li>・The installation of new wastewater pipes has improved the public health</li> </ul>
Yao City	Osaka	Develop public sewerage system in uncovered areas. Improve water quality in public water areas by expanding the sewerage coverage, increase the number of households using flush toilets to enhance the living environment	1,841,878	1,528,800	83.00	5,914	1,427	<ul style="list-style-type: none"> <li>・The extension of sewer pipes has increased the amount of treated water by 473,328m<sup>3</sup> (actual, annual total)</li> <li>・The sewerage coverage and the population using flush toilets has increased</li> </ul>

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iii ) Project by project reporting Pipes 2

### Pipes (New)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Newly constructed pipe length (m)	Covered Area Population	Positive environment impact
Kagoshima City	Kagoshima	Install new sewer pipes and expand the area covered by the sewerage system	2,173,508	1,334,300	61.39	5,680	471,100	•The extension of sewer pipes has increased the amount of treated water by 102,186.7m <sup>3</sup> (actual, annual total)
Chiba City	Chiba	Install wastewater pipes in uncovered areas where sewerage system has not been developed. Install rainwater pipes to reduce flood damages and strengthen relevant countermeasures. Install manhole toilets to secure sewerage system in the event of earthquakes	1,561,621	1,118,600	71.63	4,519	N/A	•Increased the number of households using flush toilets and contributed to securing stable population, conserving the water quality in rivers and seas and improving the public health •The installation of rainwater pipes has reduced flood damages
Toyohashi City(1)	Aichi	Install new sewer pipes. Develop the sewerage system in line with the city's land readjustment projects. Switch the wastewater treated through combined sewerage system to separated sewerage system to conserve water quality in public water areas	1,998,375	1,112,719	55.68	4,969	267,877	•The extension of sewer pipes will increase the amount of treated water by 3,126,000m <sup>3</sup> (estimates, annual total) •The project has contributed to conserving water quality in public water areas
Toyohashi City(2) *		Install new sewer pipes. Promote measures against aging facilities and earthquake-resistant measures to prevent deterioration in public health	153,053	76,526	50.00	N/A		
Takasaki City	Gunma	Install new sewer pipes in uncovered areas where sewerage systems has not been developed (Installation of sewer pipes and rainwater pipes)	1,107,700	1,107,700	100.00	18,106	275,150	•The extension of sewer pipes has increased the amount of treated water by 44,516,228m <sup>3</sup> (actual, annual total) •BOD: Before extension (septic tank) 183 mg/L→ After extension 5.4 mg/L •increased the sewerage coverage ratios and enhanced the city's rainwater countermeasures against heavy rain that frequently occurs due to climate changes
Akita City	Akita	Update sewer pipes to preserve water quality	1,761,500	1,021,498	57.99	6,812	287,094	•Prevented public water from water pollution by installing sewage pipes
Hachinohe City	Aomori	Extend sewer pipes and reduce uncovered areas of the sewerage system	1,551,232	918,070	59.18	6,175	141,630	•The extension of sewer pipes has increased the amount of treated water by 151,912m <sup>3</sup> (actual, annual total)
Uji City	Kyoto	Install new sewer pipes and improve water quality in the public water areas to enhance the living environment Construct rainwater storage facilities to promote flood countermeasures	1,409,838	909,500	64.51	8,319	176,656	•The extension of sewer pipes has increased the amount of treated water by 965,000m <sup>3</sup> (actual, annual total) •BOD: Before extension (septic tank) 6.6 mg/L→ After extension 4.8 mg/L •Increased the sewerage coverage ratio by 0.6 points to 95.9%.
Matsudo City(1)	Chiba	Install sewer pipes (main line and sub-line)	1,625,123	809,200	49.79	2,085	431,806	•The extension of sewer pipes will increase the amount of treated water by 240,000m <sup>3</sup> (estimates, monthly average) •Increased the sewerage coverage ratio (2018: 85.89% → 2019: 86.54%)
Matsudo City(2)		Install new sewer pipes	734,950	357,100	48.59	3,558		•The extension of sewer pipes will increase the amount of treated water by 490,000m <sup>3</sup> (estimates, monthly average) •Increased the sewerage coverage ratio (2018: 85.89% → 2019: 86.54%)

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan  
\* Not included in the calculation of total newly constructed pipe length on the summary page

## ( iii ) Project by project reporting Pipes 3

### Pipes (New)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Newly constructed pipe length (m)	Covered Area Population	Positive environment impact
Fukuyama City(1)	Hiroshima	Install new sewer pipes	785,663	641,163	81.61	9,930	347,322	・The extension of sewer pipes has increased the amount of treated water by 119,940m <sup>3</sup> (actual, annual total) ・BOD : Before extension (integrated septic tank, etc.) 2.5 → After extension 2.0 mg/L
Fukuyama City(2)			201,939	161,939	80.19			
Mito City(1)	Ibaraki	Install new sewer pipes to increase the number of households using flush toilets, enhance public health and improve water quality in public water areas	803,333	607,500	75.62	3,348	214,653	・The extension of sewage pipes will increase the amount of treated water by 1,417 m <sup>3</sup> (estimates, monthly average) ・BOD : Before extension (integrated septic tank, etc.) 7.7 mg/L → After extension 7.1 mg/L
Mito City(2)			680,518	514,000	75.53	1,937	214,768	
Himeji City(1) *	Hyogo	Install new sewer pipes	575,187	575,037	99.97	N/A	1,291	・The extension of sewer pipes has increased the amount of treated water by 471,085m <sup>3</sup> (actual, annual total)
Himeji City(2) *			597,525	382,087	63.94			
Tokai City(1)	Aichi	Install new sewer pipes in uncovered areas where public sewer system has not been developed	665,570	508,148	76.35	11,130	99,213	・The extension of sewer pipes has increased the amount of treated water by 286,335m <sup>3</sup> (estimate, annual total)
Tokai City(2)			608,929	389,661	63.99			
Hirakata City(1)	Osaka	Reduce flood damages in the Kuzuha area	960,000	480,000	50.00	1,191	N/A	N/A
Hirakata City(2)		Reduce uncovered areas where wastewater pipes have not been installed	605,186	450,800	74.49	1,367	386,793	・The extension of sewer pipes has increased the amount of treated water by 181,876m <sup>3</sup> (estimate, annual total)
Hirakata City(3)		Reduce flood damages in the construction areas	469,838	347,100	73.88	174	N/A	N/A
Toyama City *	Toyama	Install new sewer pipes	748,836	429,632	57.37	N/A	385,540	N/A
Tottori City	Tottori	Install new sewer pipes	365,300	365,300	100.00	807	617	・The extension of sewer pipes has increased the amount of treated water by 310,617m <sup>3</sup> (estimate, annual total)

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan  
 \* Not included in the calculation of total newly constructed pipe length on the summary page

## ( iii ) Project by project reporting Pipes 4

### Pipes (New)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Newly constructed pipe length (m)	Covered Area Population	Positive environment impact
Gifu City(1)	Gifu	Install new sewer pipes and construct drainage channels	684,224	364,100	53.21	1,590	382,890	<ul style="list-style-type: none"> <li>•The extension of sewer pipes has increased the amount of treated water by 41,425m<sup>3</sup> (actual, annual total)</li> <li>•New pipes enabled household wastewater to be treated at plants, resulting in improvement of public health and living environment</li> <li>•The construction of drainage channels has reduced flood damages</li> </ul>
Gifu City(2)		Install new sewer pipes and construct drainage channels	550,397	300,000	54.51	1,891		<ul style="list-style-type: none"> <li>•The extension of sewer pipes has increased the amount of treated water by 49,283m<sup>3</sup> (actual, annual total)</li> </ul>
Ikaruga Town	Nara	Install new sewer pipes and expand areas covered by the sewerage system to improve water quality in rivers and living environments	646,734	355,300	54.94	2,143	17,846	<ul style="list-style-type: none"> <li>•The extension of sewer pipes has increased the amount of treated water by 9,950m<sup>3</sup> (estimate, annual total)</li> </ul>
Tottori City	Tottori	Install new sewer pipes	216,300	216,300	100.00	807	142	<ul style="list-style-type: none"> <li>•The extension of sewer pipes has increased the amount of treated water by 71,524m<sup>3</sup> (estimate, annual total)</li> </ul>
Mibu Town	Tochigi	Install new sewer pipes	186,700	186,700	100.00	1,955	28,305	N/A
Sendai City *	Miyagi	Maintenance to secure the backup function of the city's main sewer pipes in the event of a disaster	157,530	79,231	50.30	N/A	750,272	N/A
Maniwa City	Okayama	Install new sewer pipes and addition of reaction tanks	181,300	42,500	23.44	1,212	10,088	<ul style="list-style-type: none"> <li>•The extension of sewer pipes has increased the amount of treated water by 3,200m<sup>3</sup> (estimate, annual total)</li> <li>•Improvement in quality of water in rivers by expanding sewerage coverage and positive environmental impact such as providing habitat for aquatic life such as fireflies</li> </ul>
Wakayama City	Wakayama	Install new sewer pipes, improve sewerage coverage ratio, implement countermeasures against flood and improve environment in the public water areas	32,052	17,500	54.60	198	N/A	<ul style="list-style-type: none"> <li>•The extension of sewer pipes has increased the amount of treated water by 7,212m<sup>3</sup> (estimate, annual total)</li> <li>•BOD : Before extension (integrated septic tank, etc.) 25.2 mg/L → After extension 4.5 mg/L</li> </ul>
<b>Total Amount of Pipes(New)(35 projects)</b>			<b>51,388,377</b>	<b>31,387,211</b>				

※ Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan  
 \* Not included in the calculation of total newly constructed pipe length on the summary page

## ( iii ) Project by project reporting Pipes 5

### Pipes (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Amount of treated water (actual, annual total, before and after renewal) (m)	Positive environment impact
Higashiosaka City(1)	Osaka	Reinforce rainwater drainage facilities by installing flood control manholes and sewer pipes as part of flood control measures. Renovate or upgrade aging sewerage facilities	3,608,157	2,716,100	75.28	14,958,446 → 13,564,482	N/A
Higashiosaka City(2)		Develop wastewater and rainwater drainage facilities to increase the population using flush toilets	1,359,749	1,225,800	90.15		
Sagamihara City	Kanagawa	Make sewer pipes earthquake-resistant to ensure that sewerage facilities will continue functioning in the event of large-scale earthquakes	6,127,935	2,081,700	33.97	N/A	· Prevent wastewater from flowing into public water areas by maintaining the functions of sewerage facilities even in the event of large-scale earthquakes
Okazaki City	Aichi	Upgrade or replacement of aging pipes to make pipes earthquake-resistant	2,461,818	1,622,100	65.89	N/A	· Improve public health by installing wastewater pipes. Mitigate flood damages by installing rainwater pipes
Chiba City	Chiba	Upgrade of aging pipes to make pipes earthquake-resistant	1,960,705	1,304,000	66.51	N/A	N/A
Toyama City	Toyama	Upgrade of pipes	1,378,967	874,675	63.43	N/A	N/A
Akita City	Akita	Upgrade of pipes	948,900	587,289	61.89	38,734,985→34,234,246	N/A
Hiroshima City	Hiroshima	Upgrade of aging facilities	1,000,000	500,000	50.00	159,298,963→155,151,455	<ul style="list-style-type: none"> <li>· Reduced annual electricity consumption from 72,315,396 kWh to 71,471,604 kWh</li> <li>· Recycle rate of sludge after the upgrade to be 100% (actual), conversion to fertilizer, cement, and fuel</li> <li>· In April 2012, the city started a project to convert sewage sludge into fuel by carbonization and using it as fuel for thermal power plants resulting in 100% effective usage of its sewage sludge</li> <li>· 100% effective utilization of digestion gas generated in the process of treating sewage sludge through a digestion gas power generation project.</li> </ul>
Toyohashi City(1)	Aichi	Implement comprehensive earthquake-resistant measures (pipe rehabilitation, prevent manholes from floating).	847,406	435,166	51.35	2,168,598→2,419,910 (actual, monthly average, before and after renewal)	· Prevent deterioration of public health caused by flood by flushing wastewater to treatment facilities in the event of large-scale earthquakes
Toyohashi City(2)			293,809	281,913	95.95		

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iii ) Project by project reporting Pipes 6

### Pipes (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Amount of treated water (actual, annual total, before and after renewal) (m)	Positive environment impact
<b>Fukuyama City(1)</b>	Hiroshima	Upgrade of pipes	533,816	388,450	72.77	41,439,136 → 39,361,810	N/A
<b>Fukuyama City(2)</b>			117,461	88,446	75.30		
<b>Hamamatsu City</b>	Shizuoka	Reduce greenhouse gas emissions from sewerage facilities by installing energy-saving equipments, etc.	3,230,224	199,500	6.18	93,529,915 → 95,155,735	N/A
<b>Takasaki City</b>	Gunma	Upgrade or replacement of pipes	160,800	160,800	100.00	23,194,272 → 25,511,385	· Prevent serious accidents and facility outages caused by aging of sewerage facilities, minimize life-cycle costs and improve functionality for earthquake-resistance measures
<b>Funabashi City(1)</b>	Chiba	Upgrade of pipes	192,102	122,300	63.66	28,756,999 → 30,302,000	· Improvement in reduction of total phosphorus through water treatment (Before introduction 6.815mg/L→ After introduction 6.96mg/L) · Improvement in reduction of total nitrogen through water treatment (Before introduction 38.0mg/L→ After introduction 48.7mg/L) · Recycle rate of sludge after the introduction to be 100% (actual), conversion to cement · Extended the life of pipes beyond 50 years by 15 years through earthquake-resistant measures and life-extension work
<b>Funabashi City(2)</b>		Take disaster countermeasures by extending the life of sewer pipes and making them earthquake-resistant	207,059	65,000	31.39		
<b>Funabashi City(3)</b>		Upgrade of pipes		40,000	19.32		
<b>Yao City</b>	Osaka	Renovation and upgrading of aging pipes to improve the function and extend the life of pipes	100,941	100,900	99.96	N/A	· Prevent road cave-in accidents by improving the strength of aging pipes
<b>Wakayama City(1)</b>	Wakayama	Renovate or upgrade rainwater pipes	105,594	55,100	52.18	N/A	N/A
<b>Wakayama City(2)</b>		Renovate or upgrade sewer pipes that have expired	12,107	12,100	99.94		
<b>Mito City</b>	Ibaraki	Upgrade of pipes and related facilities	33,330	25,700	77.11	N/A	N/A
<b>Ichikawa City(1)</b>	Chiba	Make sewer pipes (which were installed in accordance to the former earthquake-resistant standards and laid under sewerage treatment routes from emergency transportation routes or shelters) earthquake-resistant and install manhole toilets	13,000	13,000	100.00	N/A	· Expected to ensure public health and water quality even in the event of earthquakes by ensuring minimum sewerage function  · Upgrade of facilities will extend the life of pipes and will ensure public health and water quality in public water areas
<b>Ichikawa City(2)</b>		Upgrade of pipes at aging pump facilities	11,800	11,800	100.00		
<b>Total Amount of Pipes (Renewal) (20 projects)</b>			<b>24,705,680</b>	<b>12,911,839</b>			

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iii ) Project by project reporting Others

### Others (New)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Positive environment impact
Kawasaki City	Kanagawa	Measures to install advanced treatment at water treatment centers to remove nitrogen and phosphorus which is a cause of eutrophication of the Tokyo Bay. Maintenance of flow equalization tanks, existing reaction tanks and denitrification filters	18,921,089	1,807,000	9.55	N/A
Hatsukaichi City(1)	Hiroshima	New construction of sludge concentration facility to process increased volume of sludge by improving efficiency in sludge dehydration	1,143,663	689,900	60.32	<ul style="list-style-type: none"> <li>By operating sludge concentration facilities, operating hours of the machine will shorten as concentration of input sludge would increase and sludge dewatering efficiency would improve (Water management capacity: 10,572,660m<sup>3</sup> (annual plan))</li> <li>The installation of new sewer pipes has expanded the areas covered by the sewerage system and increased the connection to the system. This has reduced the amount of untreated wastewater, resulting in improvement of living environments and conservation of water quality in public water areas (Newly constructed pipe length 6,188m, covered area population: 68,932people)</li> </ul>
Hatsukaichi City(2)		New construction of sewerage pipes (sewage, rainwater) for the purpose of preventing flood damage to city areas located lower than sea/river levels by removing rainwater, expand areas covered by the sewerage system to improve the living environment, conserve water quality in public water areas and prevent flood damages	777,812	370,700	47.66	
Fukuyama City(1)	Hiroshima	Construct facilities for rainwater treatment project	513,977	275,394	53.58	N/A
Fukuyama City(2)			810,330	454,123	56.04	
<b>Total Amount of Other facilities (New) (3 projects)</b>			<b>22,166,871</b>	<b>3,597,117</b>		

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

### Others (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Positive environment impact
Sapporo City	Hokkaido	Renovate aging pipelines and facilities, install rainwater expansion pipes as part of flood control, and make pipelines earthquake-resistant and other general sewerage facilities	17,881,924	5,256,100	29.39	<ul style="list-style-type: none"> <li>100% sludge recycle rate, used for cement</li> </ul>
Hatsukaichi City(1)	Hiroshima	Upgrade aging pump stations and build facilities to handle recent rainwater volume and prevent flood damage in city areas	661,279	264,500	40.00	N/A
Hatsukaichi City(2)		Upgrade aging sludge dewatering facilities and other sewerage facilities	241,015	102,200	42.40	
Kobe City(1)	Hyogo	Upgrade of general sewerage facilities including sludge treatment, advanced treatment, purification center, pump station and pipes	5,473,000	3,419,000	62.47	<ul style="list-style-type: none"> <li>Efficient usage of sludge by reusing gas to bio gas electricity, city gas injection, boilers and eco gas station was 85.9% in average in April 2020</li> <li>Electricity consumption (monthly average) decreased 7,684,166 kWh → 7,252,193 kWh</li> <li>Reusing heat from sludge incineration for hot water supplies in apartment houses</li> </ul>
Kobe City(2)			8,445,886	1,396,000	16.53	
Kobe City(3)			1,135,900	819,000	72.10	
Hiroshima City(1)	Hiroshima	Upgrade of pipes, pump station and other sewerage related facilities	9,463,000	2,601,400	27.49	<ul style="list-style-type: none"> <li>Electricity consumption (monthly average) decreased 6,026,283 kWh → 5,955,967 kWh</li> </ul>
Hiroshima City(2)			3,057,000	328,800	10.76	

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iii ) Project by project reporting Others

### Others (Renewal)

Borrowing Entity	Prefecture	Project Description	Total Project Cost (thousand JPY)	JFM Loan Amount (thousand JPY)	JFM Loan Amount/ Total Project Cost (%)	Positive environment impact
Osaka City(1)	Osaka	Upgrade of general sewerage facilities including sludge treatment, advanced treatment, purification center, pump station and pipes	53,215,000	1,693,000	3.18	-Decrease of CO2 emission (monthly average) in sludge incineration 1,601,962 kg → 1,367,380 kg -Completed upgrading to earthquake-resistant pipes of around 28km
Osaka City(2)				183,000	0.34	
Kagoshima City	Kagoshima	Upgrade aging facilities and other general sewerage facilities including sludge treatment, advanced treatment, purification center, pump station and pipes	2,173,508	1,334,300	61.39	N/A
Tokai City	Aichi	Upgrade treatment facilities earthquake-resistant and extend the life of rainwater pumping stations	908,551	413,239	45.48	N/A
Higashiosaka City	Osaka	Sewerage projects in the southern basin of Neya River	370,791	369,300	99.60	-Electricity consumption (monthly average) decreased 10,600,000 kWh → 2,000,000 kWh
Mito City	Ibaraki	Renovate the monitoring and control panels of treatment facilities and pump stations	430,341	209,100	48.59	N/A
Fukuyama City(1)	Hiroshima	Upgrade facilities for rainwater treatment project	283,082	118,093	41.72	N/A
Fukuyama City(2)			116,944	60,792	51.98	
Toyama City	Toyama	Upgrade of administrative building and emergency power facility	184,130	77,306	41.98	N/A
Takasaki City	Gunma	Maintenance and management of the Tone River upstream sewerage system. Constructions include upgrade of sewerage facilities (pipes, machinery, electrical )	71,200	71,200	100.00	N/A
Nishinomiya City(1)	Hyogo	Upgrade of general sewerage facilities including sludge treatment, advanced treatment, purification center, pump station and pipes	6,097,704	1,915,600	31.42	N/A
Nishinomiya City(2)			5,735,530	1,180,900	20.59	
Nishinomiya City(3)			1,077,346	473,500	43.95	
<b>Total Amount of Other facilities (Renewal) (13 projects)</b>			<b>117,023,131</b>	<b>22,286,330</b>		

※Numbered brackets after borrowing entity are cases where there are several JFM loans in one project, or several projects in one JFM loan

## ( iv ) Case Study 1: Osaka City Nakahama Sewage Treatment Plant Maintenance Project



※Rendering image (Project period: 2016 to 2023 - Planned)

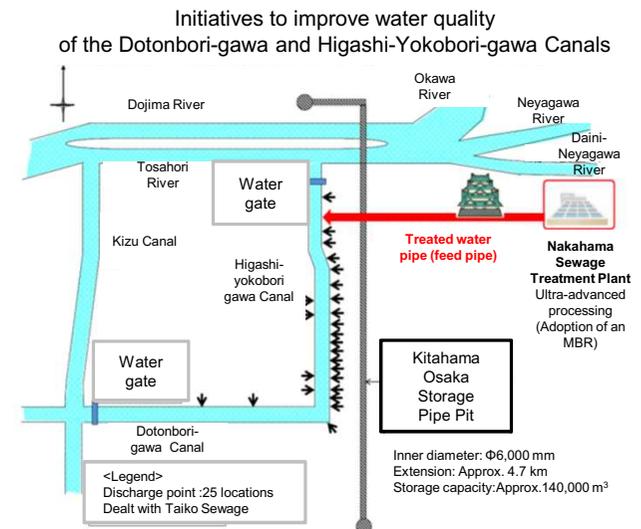
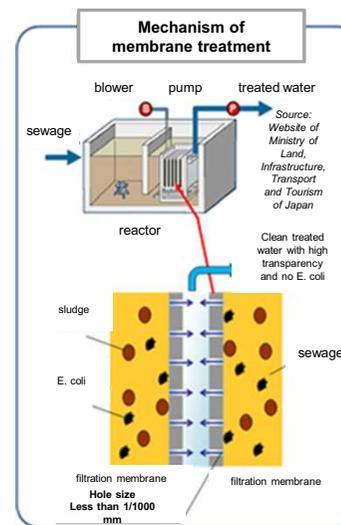
### Project Overview

Total project cost : JPY 53,215.0 million  
 - of which JFM fund : JPY 1,876.0 million  
 (Apr. 2019 to Mar. 2020)

- Osaka City launched its sewerage projects in 1894 and adopted a combined system. While this method can reduce maintenance costs, it has a problem that untreated wastewater is partially discharged into rivers with rainwater during heavy rain, which increases environmental burden
  - The City has 12 sewage treatment facilities. Among them, Nakahama Sewage Treatment Plant has been in operation for more than 50 years and its facilities show significant signs of aging
- ▼
- Upgrade it to a plant equipped with an advanced treatment system using MBR (One of the largest MBR facility at the start of the project in Japan)
  - JFM funds are used for the maintenance of Nakahama Sewage Treatment Plant and other sewage treatment facilities in Osaka City

### Highlights

- Remove almost all fine particles and viruses (ex. E. coli) in sewage and treat sewage into clear water
- Reduce power consumption by using membrane bioreactor (MBR) and a siphon filtration system that uses water level differences to reduce membrane filtration power
- Improve the water quality of rivers and create an attractive, clean waterfront environment by directing treated water to the Dotonbori-gawa and Higashi-Yokobori-gawa Canals which make Osaka City known as "City of Water"
- Significantly reduce the size and space of facilities by eliminating the need for a sedimentation facility, which is required in conventional sewage treatment processes
  - Use highly effective technology for renovation and improvement in treatment facilities in large cities or other locations with limited space



# <Reference> Osaka City



## Overview

Since the 1500s, Osaka City has flourished as a commercial and financial center and has long contributed significantly to the development of Japan's industrial economy.

The area of Osaka City is only less than 0.1% of the total area of Japan, or about 225 km<sup>2</sup>, where about 2.75 million people (2.2% of Japan's total population) reside, forming one of the largest metropolitan areas in the world.

Located close to western gateways of Japan such as Itami Airport and Kansai International Airport, Osaka City has been accelerating its internationalization as a center of the Japanese economy with increasing foreign tourists and residents.

In such settings, Osaka City will host the World Exposition in 2025 for the second time since 1970, and is leading the world with various initiatives to realize "Advanced City for SDGs" which will contribute to the achievement of SDGs.

## DATA

Population: 2,751,613 (as of Jul. 1, 2020, the 2<sup>nd</sup> largest in Japan)

Area: 225.30 km<sup>2</sup> (as of Jan. 1, 2020)

Sewage coverage: 100.0% (as of Mar. 31, 2019)

City budget: JPY 1,769.98 billion (FY2020 General Account Initial Budget)

## (Demographic trend)



Source: "National census 2010",  
"Population Projections for Japan by Region -2018 projections" published by  
the National Institute of Population and Social Security Research



Osaka Castle

## ( iv ) Case Study 2: Kawasaki City Todoroki Water Treatment Center Renovation Project



※Under construction(Project period : FY2017- FY2021(planned))

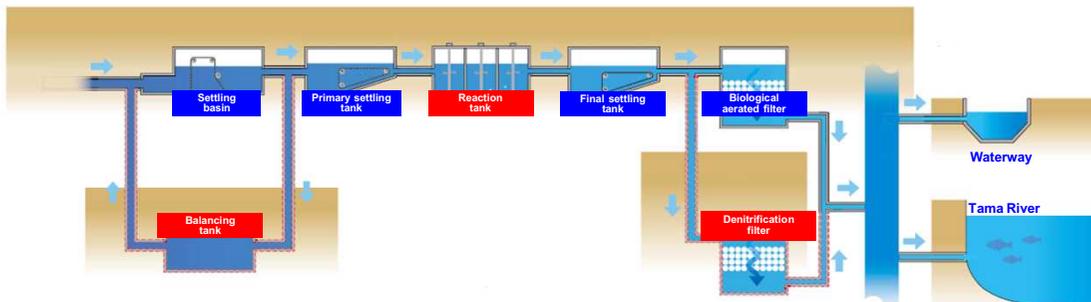
### Project Overview

Total project cost : JPY 18,921.0 million  
 - of which JFM fund : JPY 1,807.0 million  
 (Apr. 2019 to Mar. 2020)

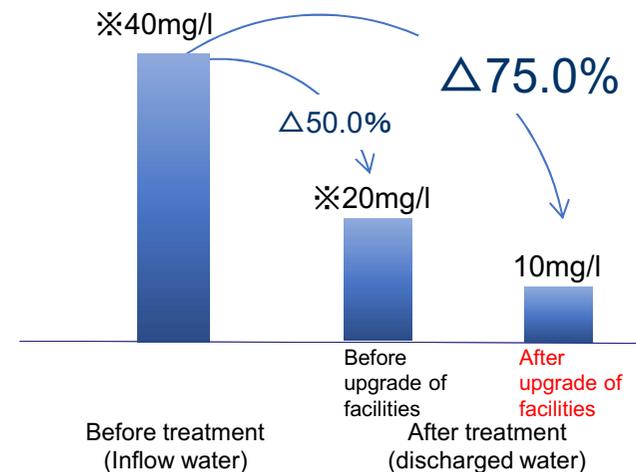
- A completely underground sewerage treatment plant, which is rare in Japan
  - The Center started its operation in 1982 and treats approx. 5,490ha of sewage
  - In Tokyo Bay, where sewage water flows into, eutrophication has advanced due to nitrogen and phosphorus contained in treated water, causing red tide and other damage and requiring improvement of water quality
- ▼
- Kawasaki City has been promoting the advanced treatment of its water treatment center. The binding immobilization method developed by the City enables water treatment in about half the time of conventional methods
  - JFM funds are used for the maintenance of balancing tanks, the remodeling of existing reaction tanks, and the maintenance of denitrification filtration ponds

### Highlights

- Introduce a treatment method that removes nitrogen and phosphorus at the same time through the action of microorganisms and filtration
- This treatment method satisfies the Tokyo Bay water environment quality standards and ensures a clean water environment



### <Positive effects in reducing nitrogen>



※Amount of annual average nitrogen in sewage (actual, 2018)

# <Reference> Kawasaki City



## Overview

With good access to central Tokyo such as Haneda Airport and Tokyo Station, Kawasaki City is a small-sized, accessible and vibrant city with residential areas spread across the city. The City's coastal area along Tokyo Bay forms a large-scale industrial area.

Kawasaki City launched its sewage project in 1931 as a measure against flood damage in an old city district around Kawasaki Station. In 1961, at the beginning of high economic growth, the City started sewage treatment at Iriezaki Water Treatment Center, the first full-scale sewage treatment plant in Kanagawa Prefecture. Furthermore, Kawasaki City is actively promoting the penetration of sewerage systems, and its initiative has contributed to improving the water environment of rivers and sea, with its sewerage coverage reaching 99.5%.

Currently, Kawasaki City is making various efforts to address sewerage issues, such as securing sewerage functions required in the event of large-scale disasters, measures against flooding, global warming and aging facilities, as well as shift to advanced treatment, and improvement of combined sewerage systems.

## DATA

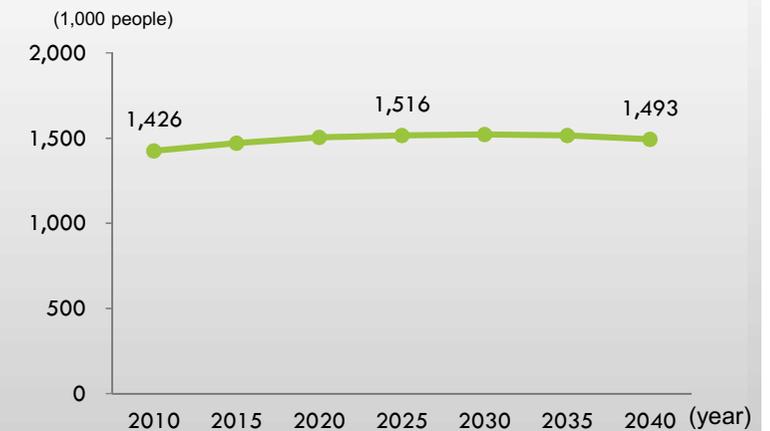
Population: 1,539,783 (as of Jul. 1, 2020)

Area: 143.00 km<sup>2</sup> (2015 Census of Agriculture and Forestry)

Sewage coverage: 99.5% (as of Mar. 31, 2020)

City budget: JPY 792.46 billion (FY2020 General Account Initial Budget)

### (Demographic trend)



Source: Kawasaki City Comprehensive Development Plan (March 2016)



Night view of factories in Kawasaki City

## ( iv ) Case Study 3: Mibu Town Water Treatment Center Upgrade Project



※Project period : FY2010 - FY2026 (planned)

### Project Overview

Total project cost : JPY 319.9 million  
 -of which JFM fund : JPY 319.9 million  
 (Apr. 2019 to Mar. 2020)

- Mibu Town Water Treatment Center, the only water treatment center in the town, has been treating about 3.4 million m<sup>3</sup> of sewage annually, but has shown signs of aging as it has been in service for 50 years since 1968
  - Its facilities and equipment are also aging, and it may fail to meet effluent quality standard\* if renovation is delayed, which may affect residents' daily lives and the water environment
- ▼
- Improve various parts of Mibu town Water Treatment Center
  - JFM funds are used for sedimentation tanks that collect small amounts of sediment and sand in sewage, as well as for chlorine mixing basin

\*Sewerage Act (Act No. 79 of 1958, as amended) :  
 Link: <http://www.japaneselawtranslation.go.jp/law/detail/?id=2810&vm=04&re=01>

### Highlights

- Purify BOD from 226.3 mg/l to 5.5 mg/l after treatment (reduce 97.6%)
- Use sludge as raw material for cement and recycle it into building materials
- Contribute to conservation of river water environment

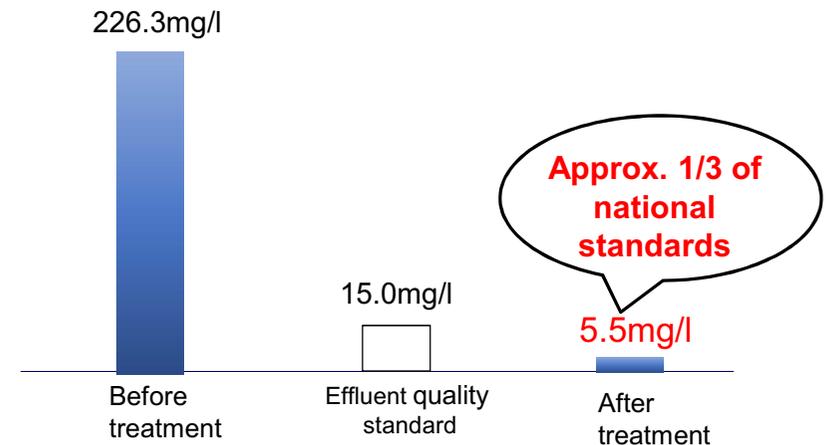


Balancing tank



Mixing basin

### <Positive effects in reducing BOD>



※Amount of BOD in sewage (Average for two years)

# <Reference> Mibu Town



## Overview

Located about 90 km north of Tokyo, Mibu Town is adjacent to Utsunomiya City, the capital of Tochigi Prefecture with about 500,000 residents. In recent years, the Kita-Kanto Expressway, the Mibu Interchange, and the Utsunomiya-Tochigi Prefectural Route have been constructed in the town, making access to the Tokyo metropolitan area more convenient.

Since the 1950s, the town has attracted toy enterprises to form a “Toys Industrial Park”, as well as private medical schools. In 1968, the town introduced its first sewerage system to serving the town's growing population.

Today, the town has greatly improved its medical environment, with the number of doctors per 100,000 people ranking 4th in the country. It also has created green areas such as Mibu Comprehensive Park and Shinonome Park. More than 90% of residents think that Mibu Town is "a green city" and "a good town to live in“.

## DATA

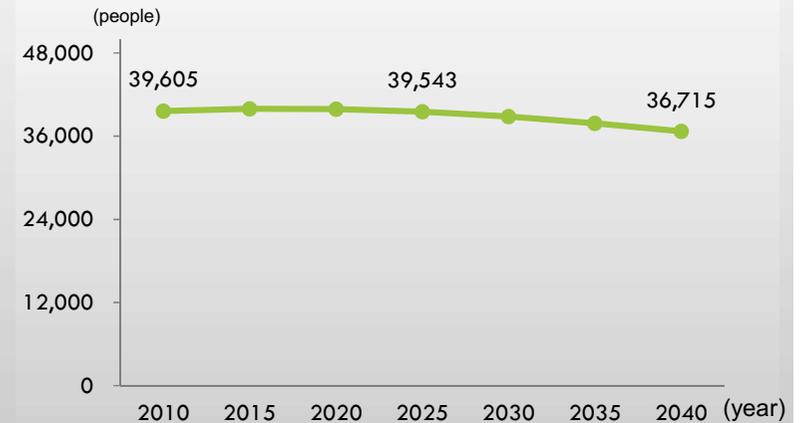
Population: 39,174 (as of Jun. 30, 2020)

Area: 61.06 km<sup>2</sup> (as of Oct. 1, 2019)

Sewage coverage: 72.2% (as of Mar. 31, 2019)

City budget: JPY 14.64 billion (FY2020 General Account Initial Budget)

## (Demographic trend)



Source: “National census 2010”,  
“Population Projections for Japan by Region -2018 projections” published by  
the National Institute of Population and Social Security Research



Cherry blossoms in  
Shinonome Park



Mibu Feudal Food

## ( iv ) Case Study 4 : Maniwa City Ochiai Purification Center Enhancement Project



※Project period: FY2019 - FY2021 (planned)

### Project Overview

Total project cost : JPY 181.3 million  
 - of which JFM fund : JPY 42.5 million  
 (Apr. 2019 to Mar. 2020)

- Ochiai Purification Center is a public sewerage treatment plant constructed on a site of 13,560 m<sup>2</sup> and started its operation on March 27, 2013
- Maniwa City has set out a management policy of "early development of sewerage systems" to create a cleaner water environment. To this end, the City has been promoting the maintenance of sewage pipes, but it has faced a problem of increasing shortage of sewage treatment capacity
- For the treatment system of additional reaction tanks, the City adopted the "2-Point DO Control System", which realizes a high and constant quality of treated water, while reducing treatment costs and energy consumption at the same time
- JFM funds are used for the maintenance of sewage pipes and addition of reaction tanks

### Highlights

- Increase the volume of treated water from 1,220 m<sup>3</sup>/day to 2,440 m<sup>3</sup>/day by adding new reaction tanks, and by using "2-Point DO Control System, reduce power consumption by about 30% compared with an enhancement using a conventional method
- Create a more attractive landscape by improving the water quality of rivers, and contribute to the enhancement of tourist activities such as cycling trails
- Expect positive environmental impacts, where riverbed provides a habitat for aquatic life such as fireflies

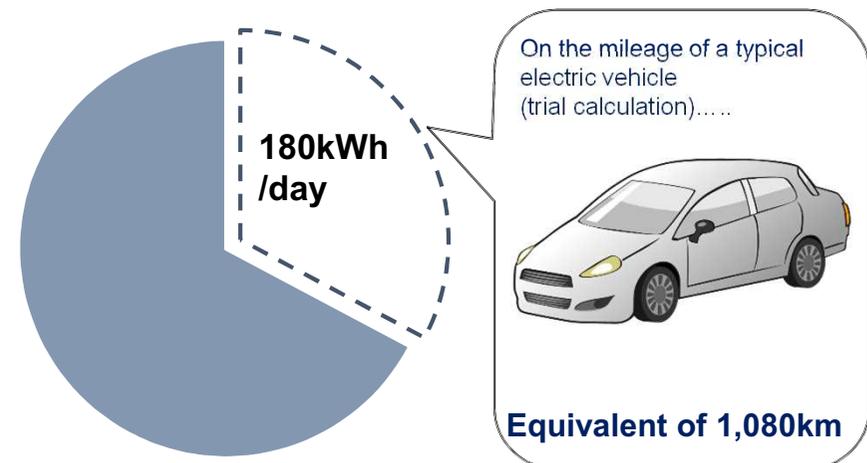


Rinkuru cycling trail in Asahi River



Firefly in Bicchu River

### <Positive effects in reducing power consumption by using 2-Point DO Control System>



# <Reference> Maniwa City



## Overview

Maniwa City, situated in the center of the Chugoku Mountains in the north of Okayama Prefecture, is the prefecture's largest municipality in terms of land area. It stretches 50 km from north to south and 30 km from east to west, and its climate varies from region to region, with heavy snowfalls in the north and warm and mild climate with few rains in the south.

In the northern part of the City, dairy farming is thriving on Hiruzen Kogen Highlands, which especially boasts the nation's largest production of Jersey cows and its dairy products are well-known throughout Japan.

About 80% of the total area of Maniwa City is covered by forests. Historically, forestry flourished in the south, where a large number of logging and wood processing companies are still in business. A woody biomass power plant utilizing forest resources in this area is also in operation and provides electricity to sewage facilities.

Maniwa City is actively promoting its initiatives to achieve the SDGs. The City has been selected as one of 29 "SDGs future cities" by the Japanese Cabinet Office and has also been selected as one of 10 "local government SDGs model projects for its pioneering initiatives to achieve the SDGs.

## DATA

Population: 44,539 (as of Apr. 1, 2020)

Area: 828.53 km<sup>2</sup> (2015 Census of Agriculture and Forestry)

Sewage coverage: 40.6% (as of Mar. 31, 2019)

City budget: JPY 30.98 billion (FY2020 General Account Initial Budget)

## (Demographic trend)



Source: Maniwa City Population Projection (Oct. 2015)



Hiruzen Kogen Highlands

Biomass power plant

