

KOBE AQUA PLAN 2015



City of Kobe

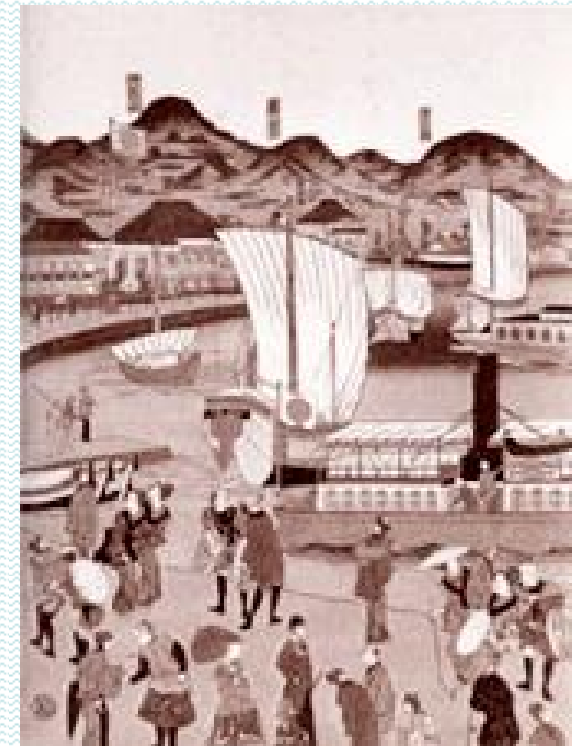
Hyogo Prefecture



Opening of the Kobe Port to Overseas



Map of Foreign Settlement (in 1868)



Opening of the Kobe Port

History of Kobe city

The **Foundation** of Kobe (in 1889)



Population :
134,704people
Area :
21.28km²

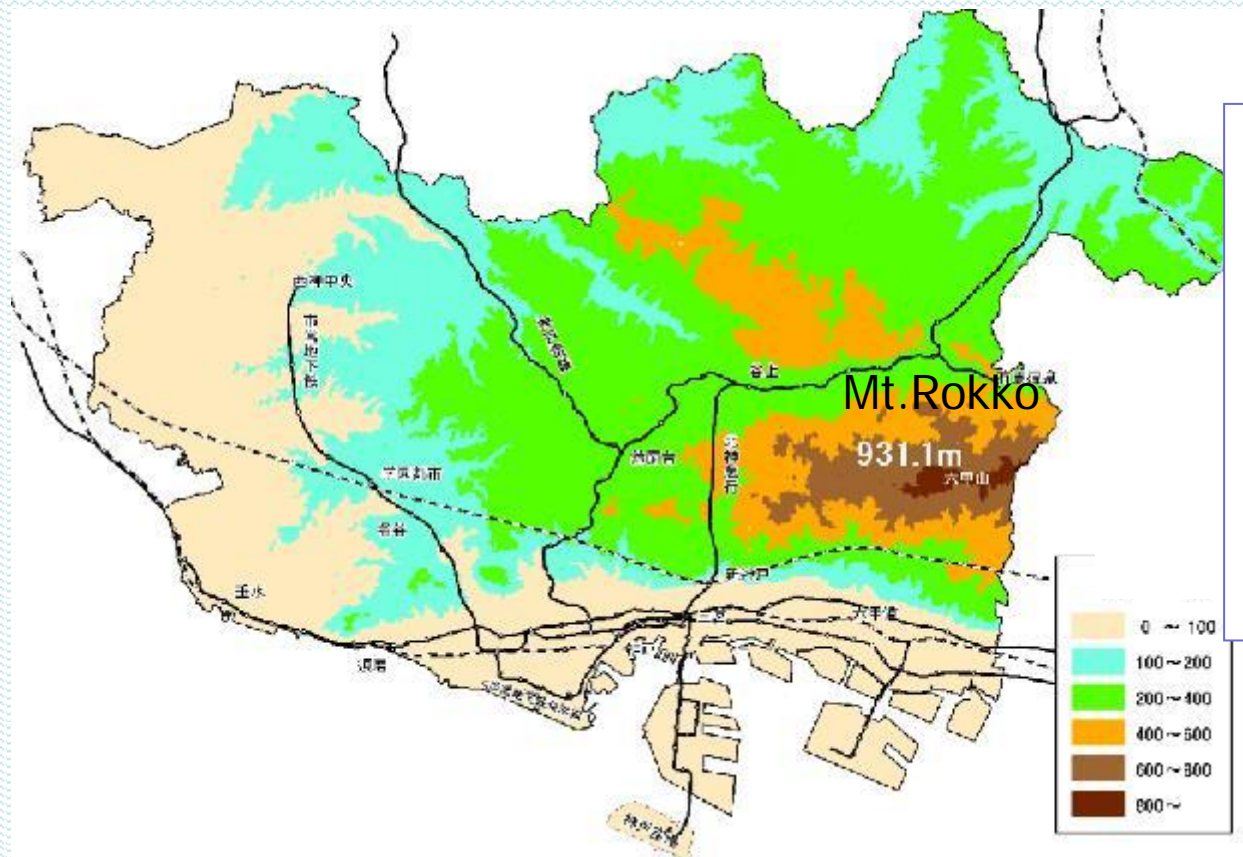


Current City View

Population :
1,538,245people
Area :
552.80km²
(May 1, 2010)

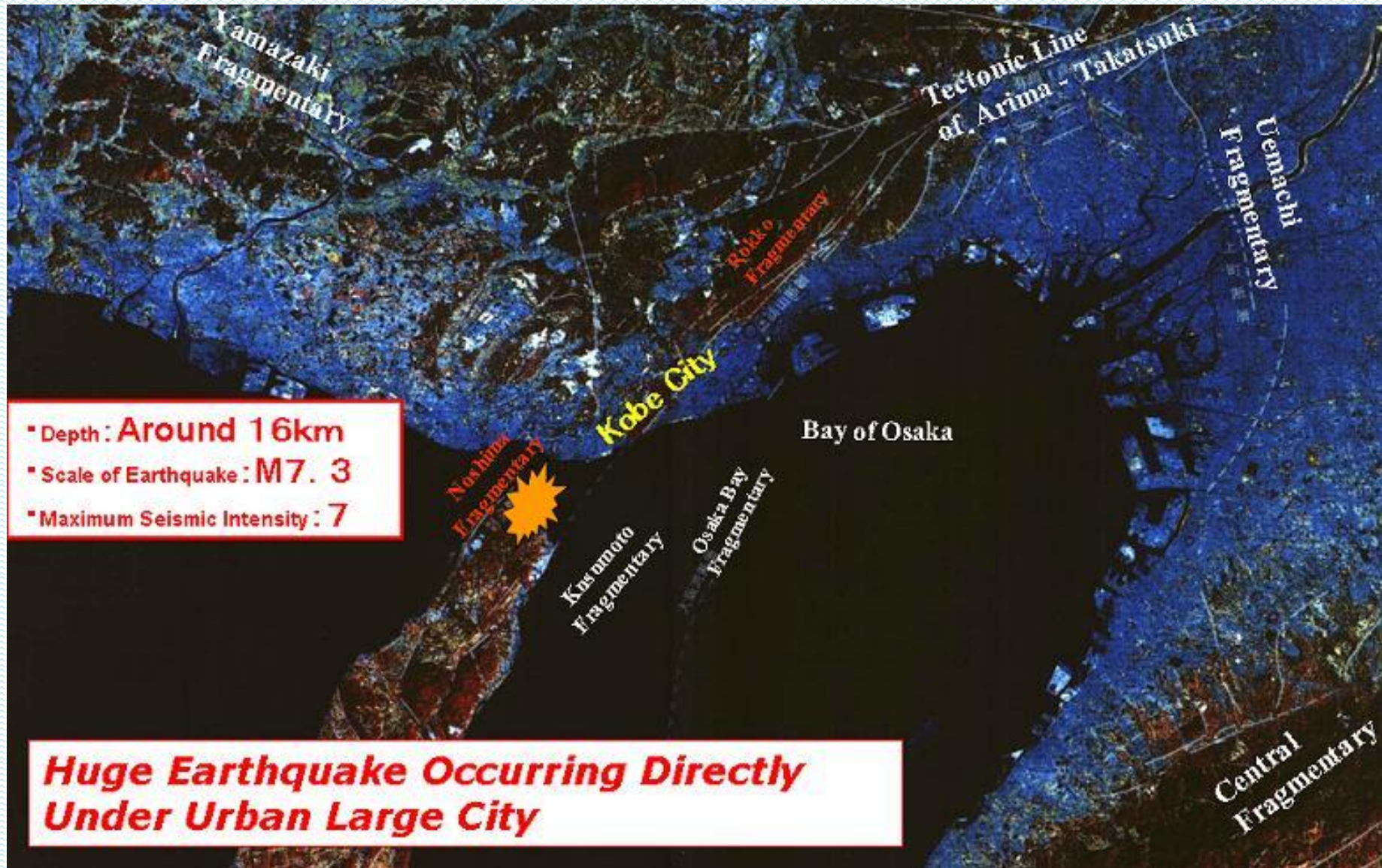


Features of Kobe City



- **Elevation :**
+931. 3m
~ -0. 2m
- **Annual Rainfall**
Amount: 1,041 mm
- **Average**
Temperature: 17°C
(2009)

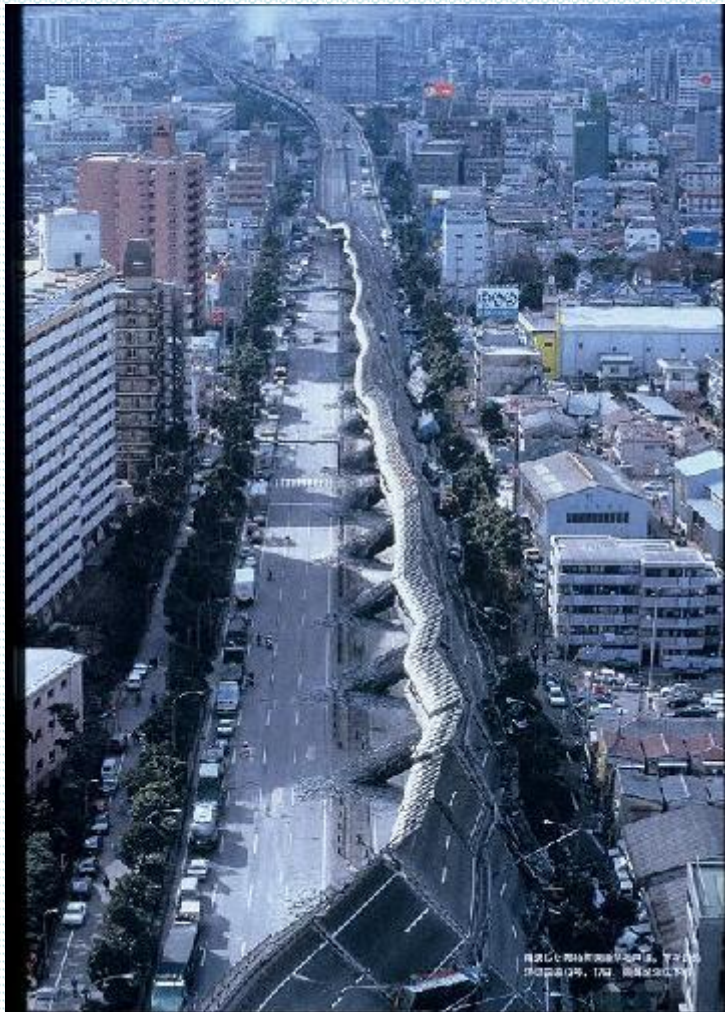
Great Hanshin-Awaji Earthquake 1995.1.17 AM5:46



Great Hanshin-Awaji Earthquake

1995.1.17

Collapse of Highway



Victims

Dead : 6, 434 people

Injured : 43,792 people

Collapsed houses

: 249, 180 buildings



Lifesaving

Conflagration



Serious Damage of Wastewater Facilities



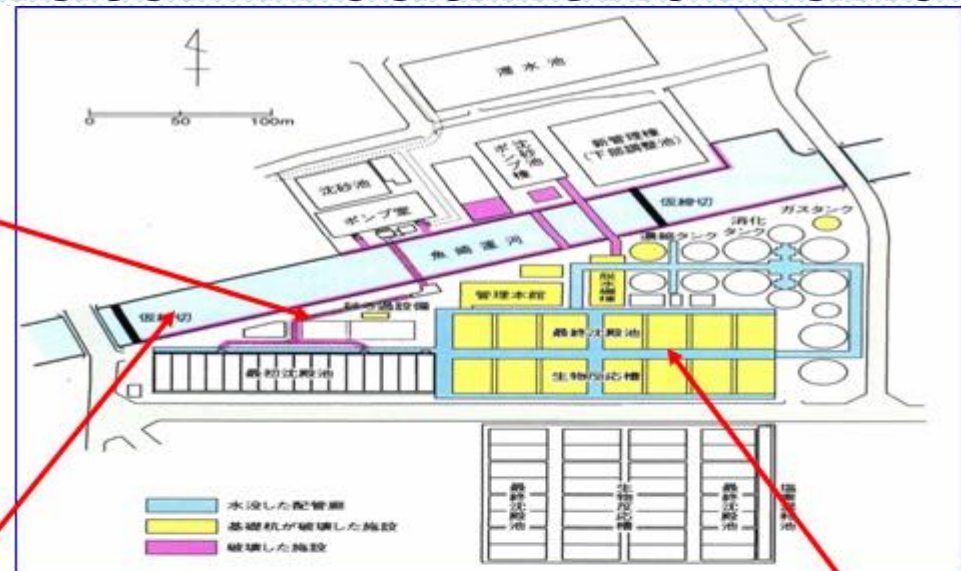
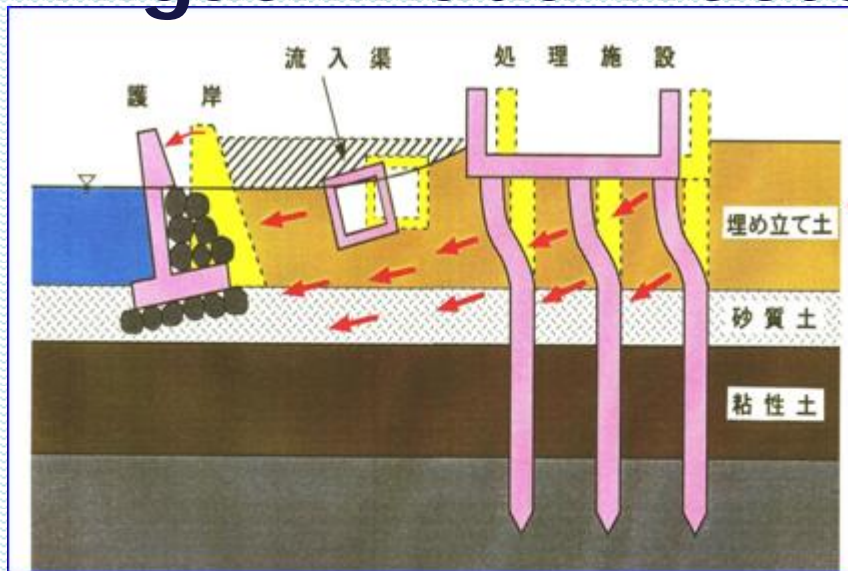
Sewer Pipes



Wastewater Treatment Plants



Interruption of Service at Higashinada Wastewater Treatment Plant



Higashinada WWTP



Restoration after Earthquake



POR
T



16 years later



HIGHWA
Y



Restoration after Earthquake



Tetsujin 28



16 years later



Urban Area (Nagata Ward)



Sewage Works in KOBE



Sewerage Network System



Brook of Matsumoto Area



Kobe Bio Gas

Sewerage System in Kobe

-Origin-

The Port of Kobe was opened in 1868.

A western-style sewerage system was constructed in the foreign settlement in 1872.



The foreign settlement at the time of the port opening to overseas.

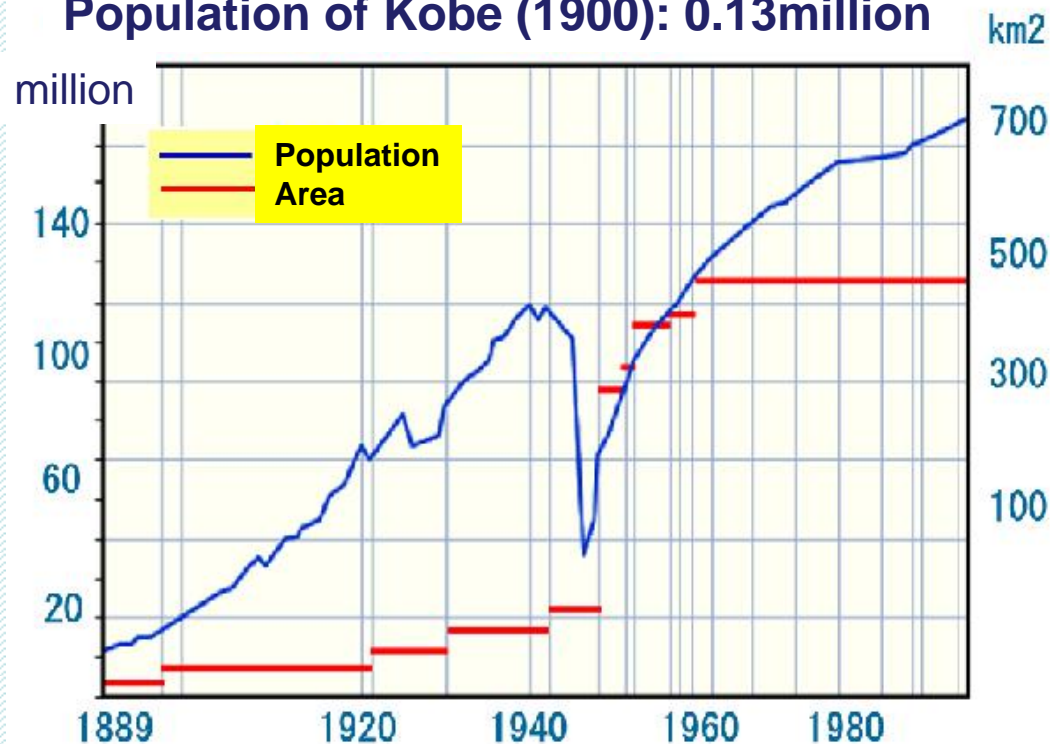


Storm sewer made of Brick
(Legacy of Urban Works)

Kobe in the 1900s

- ◆ Vast farmlands around Kobe
- ◆ Use of manure as a valuable product

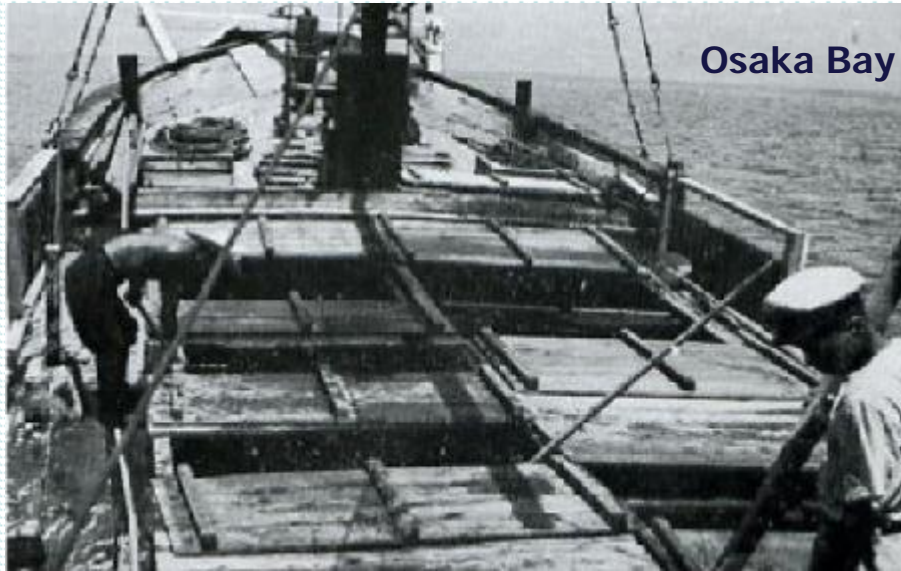
Population of Kobe (1900): 0.13million



Agricultural use of night soil



Kobe in the 1960s



Water pollution caused by rapid economic growth

Population increased quickly (around 1.1million) resulting in additional dumping of raw sewage in ocean.

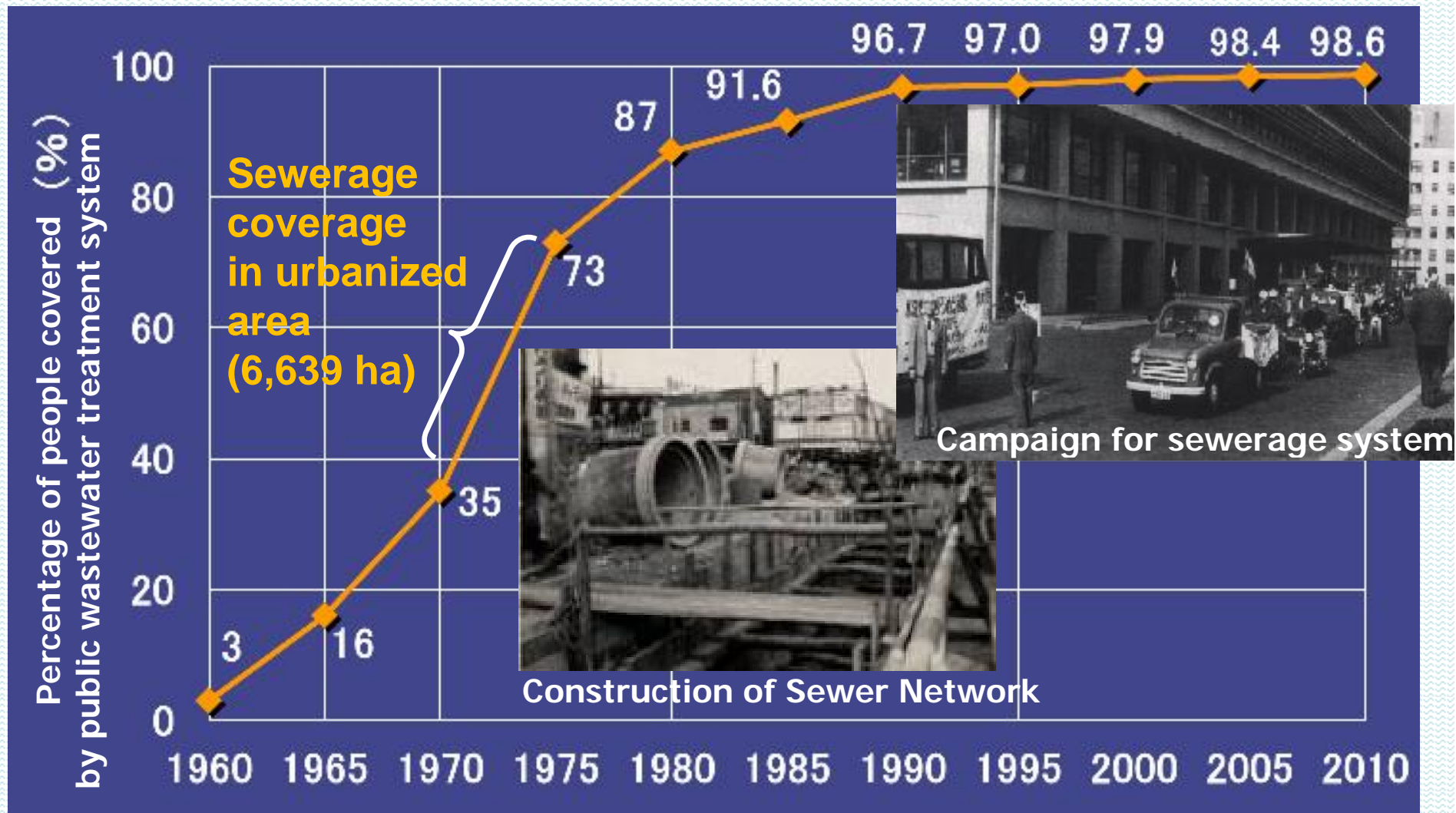


Canal of Hyogo (called as 'canal of death')



Mayor Miyazaki

Sewerage System in Kobe



Improvement of water quality

-Hyogo Canal revived-



Hyogo Canal in 1964
(`Canal of Death`)

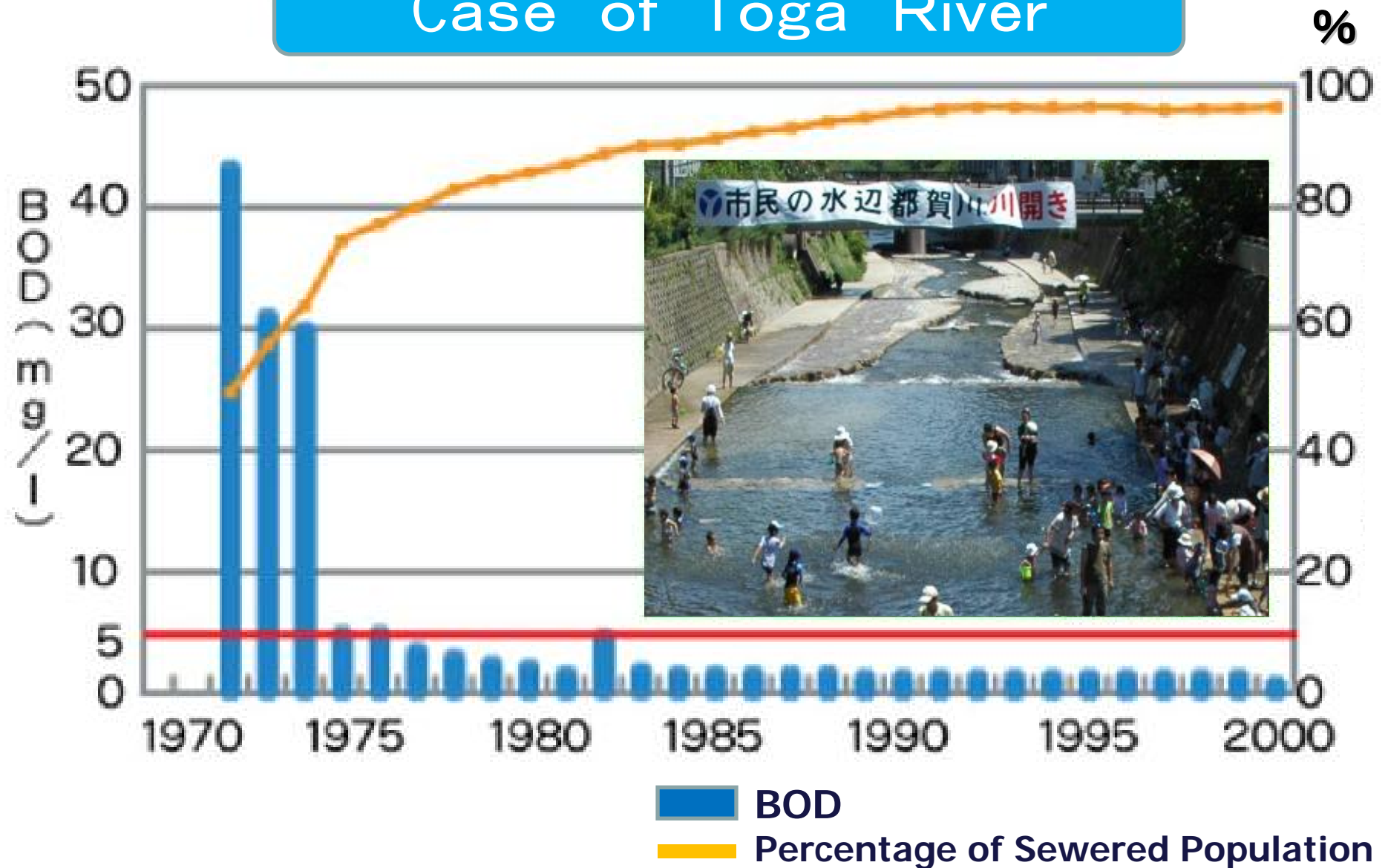


Current Hyogo Canal



Improvement of water quality

Case of Toga River



Plan of Domestic Wastewater

KOBE

**Agricultural
WWTP**

**Household
WWT Tank
(johkasou)**

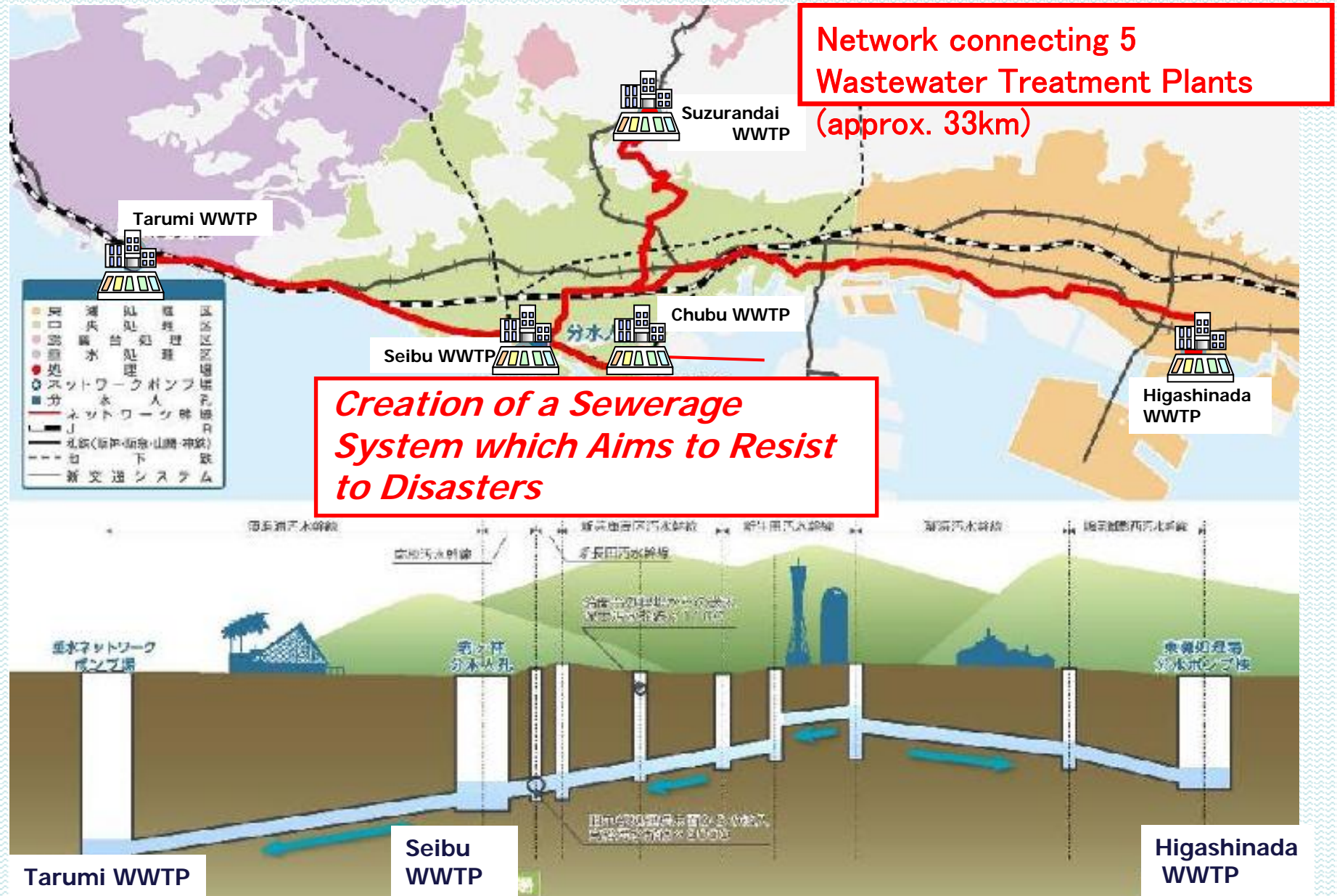
Public Sewerage (98.7%)

Agricultural Wastewater (0.9%)

**Household wastewater
treatment tank - johkasou (0.2%)**

凡例	
	公共下水道区域
	農業排水区域
	浄化槽設置区域

Sewerage Network System



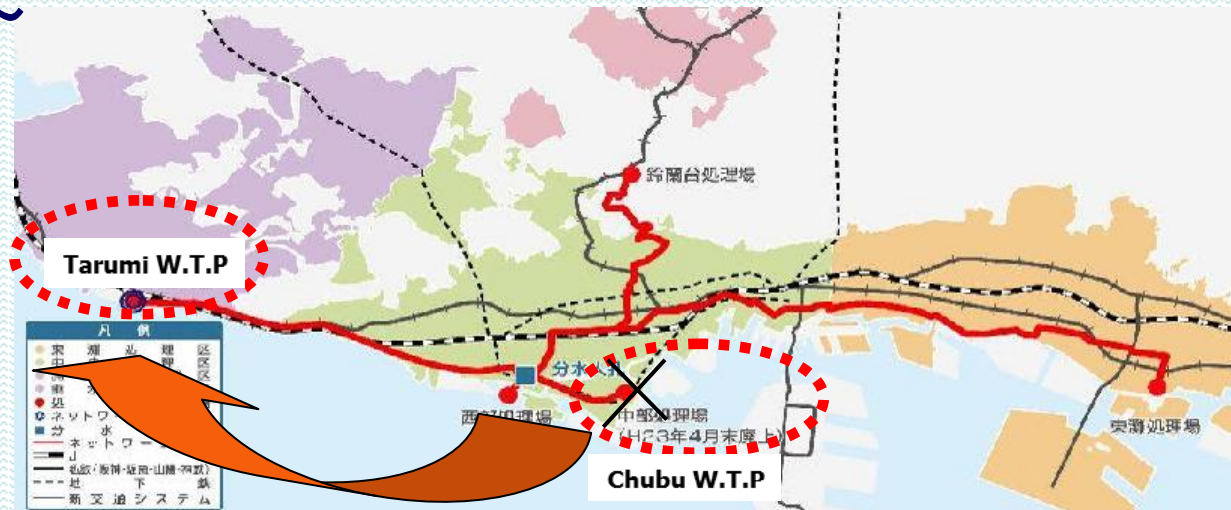
Reconstruction of Chubu WWTP



Chubu WWTP
1951~



Tarumi WWTP

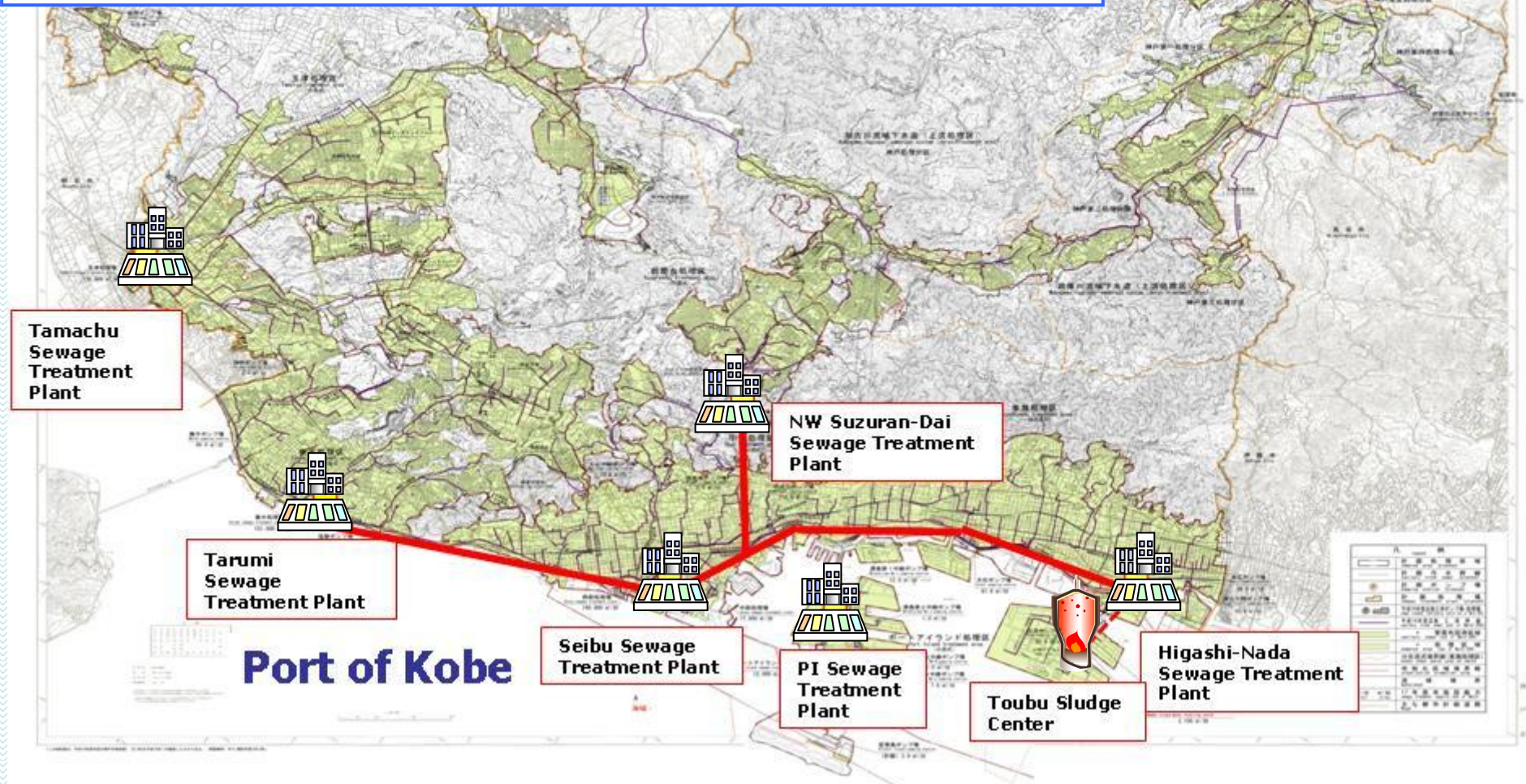


Sewerage Network System

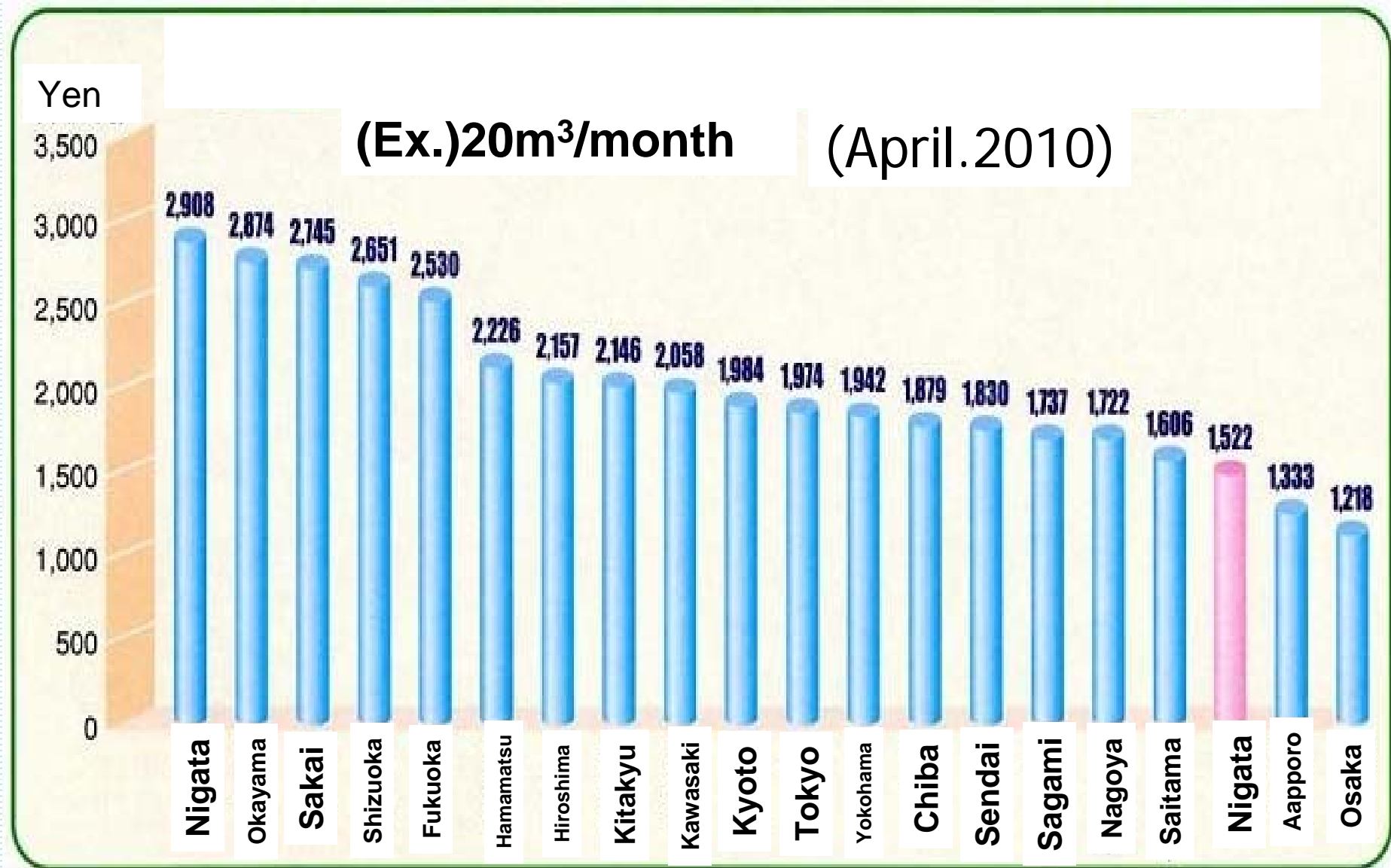
Map of Sewerage Implementation Plan

- Treatment area: 17,030ha
- Total pipe length of sanitary sewer: 4,037km
- Wastewater treatment plants: 6
- Sludge Incineration Facility: 1
- Percentage of sewerage population: 98.6%

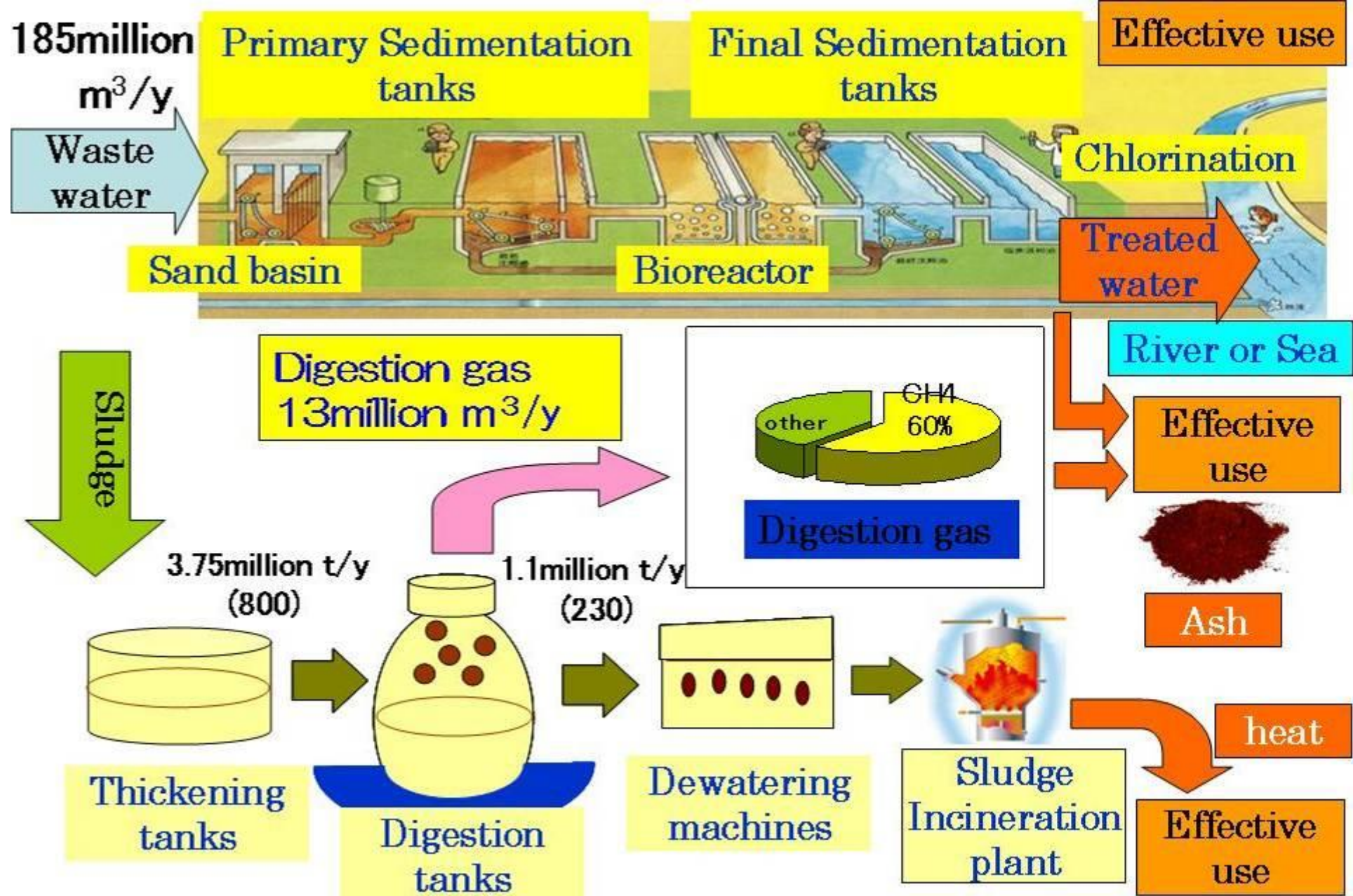
On the end of March, 2011



Comparison of Sewer Service Charge



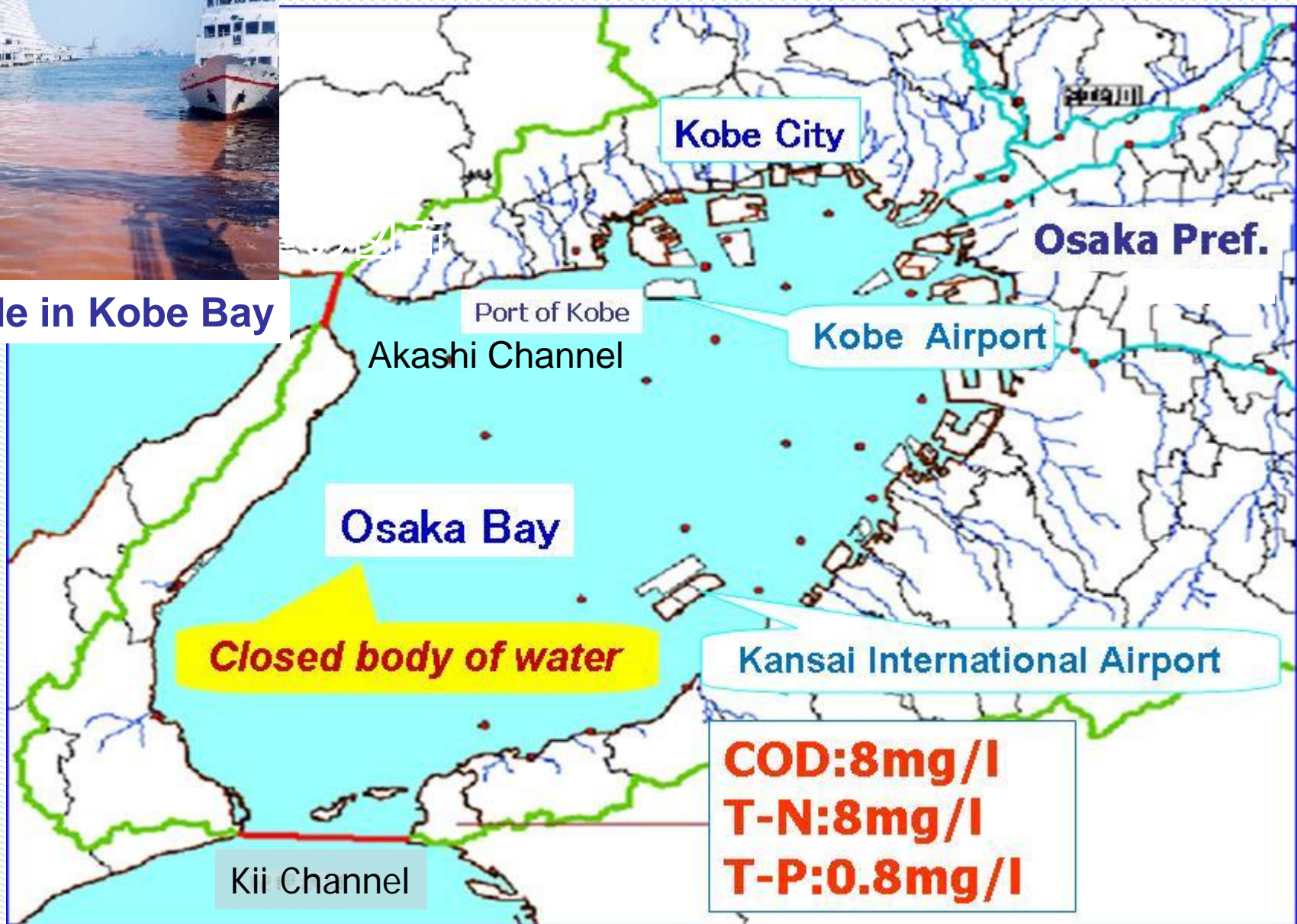
Outline of Wastewater Treatment



Promotion of Advanced Wastewater Treatment Plant



Red Tide in Kobe Bay



Kobe City

Osaka Pref.

Port of Kobe

Akashi Channel

Kobe Airport

Osaka Bay

Closed body of water

Kansai International Airport

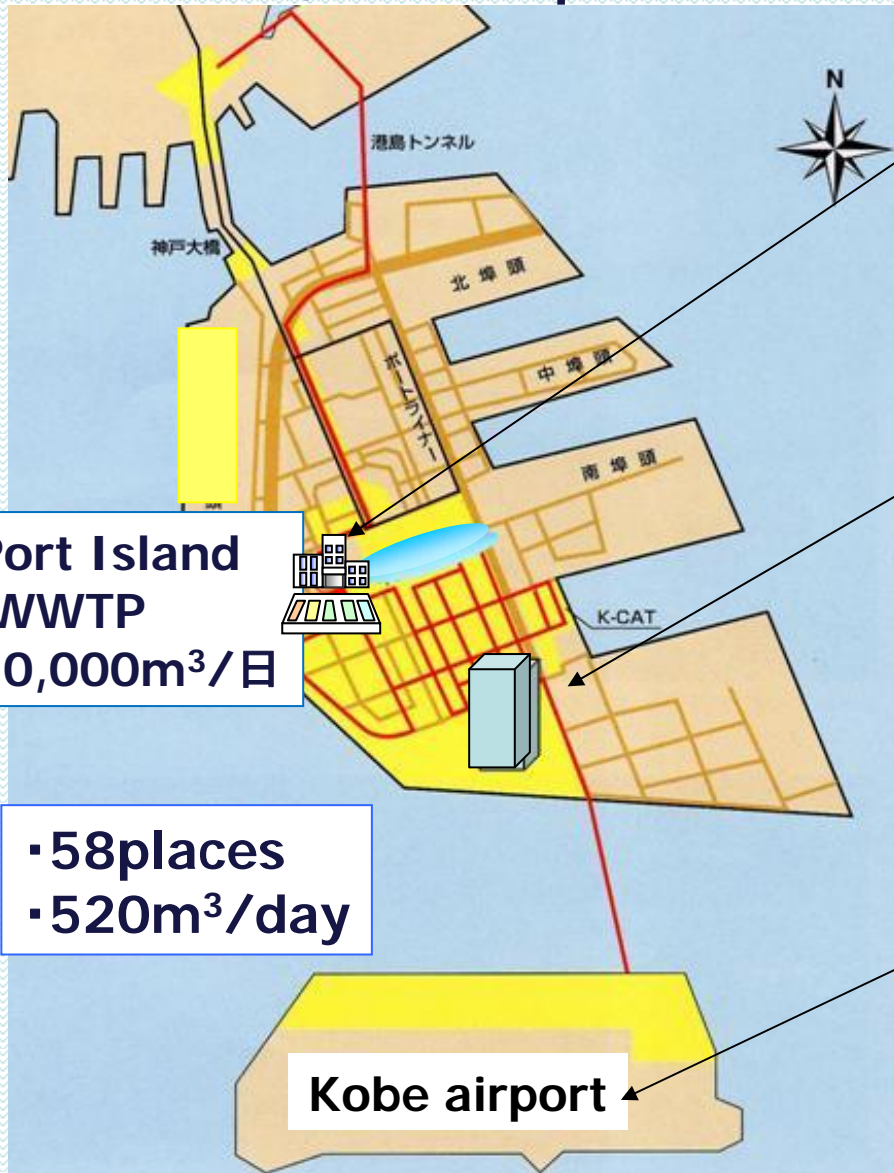
Kii Channel

COD:8mg/l
T-N:8mg/l
T-P:0.8mg/l

Treated Water Recycling

Port Island, Kobe airport (305ha)

**Method of advanced treatment
→ ozonation + sand filtration**



No.1 super computer in the world “京(K)”

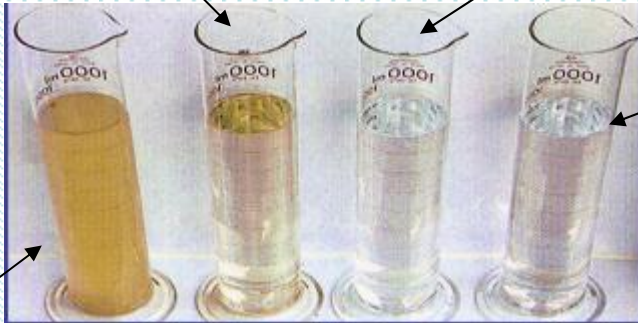


Treated Water Recycling

Treated wastewater

Reclaimed wastewater

Potable water

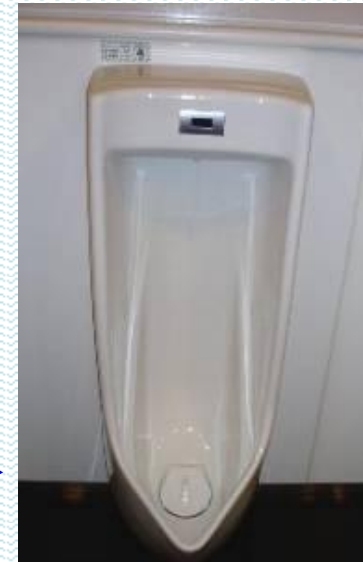


Raw wastewater

Water sprinkling for green space



Water for landscaped use



Water for toilet
(Kobe Airport)



Advanced Treatment of Suzuran-Dai Wastewater Treatment Plant - The Brook of Matsumoto Area -



Before Earthquake (1994/5)



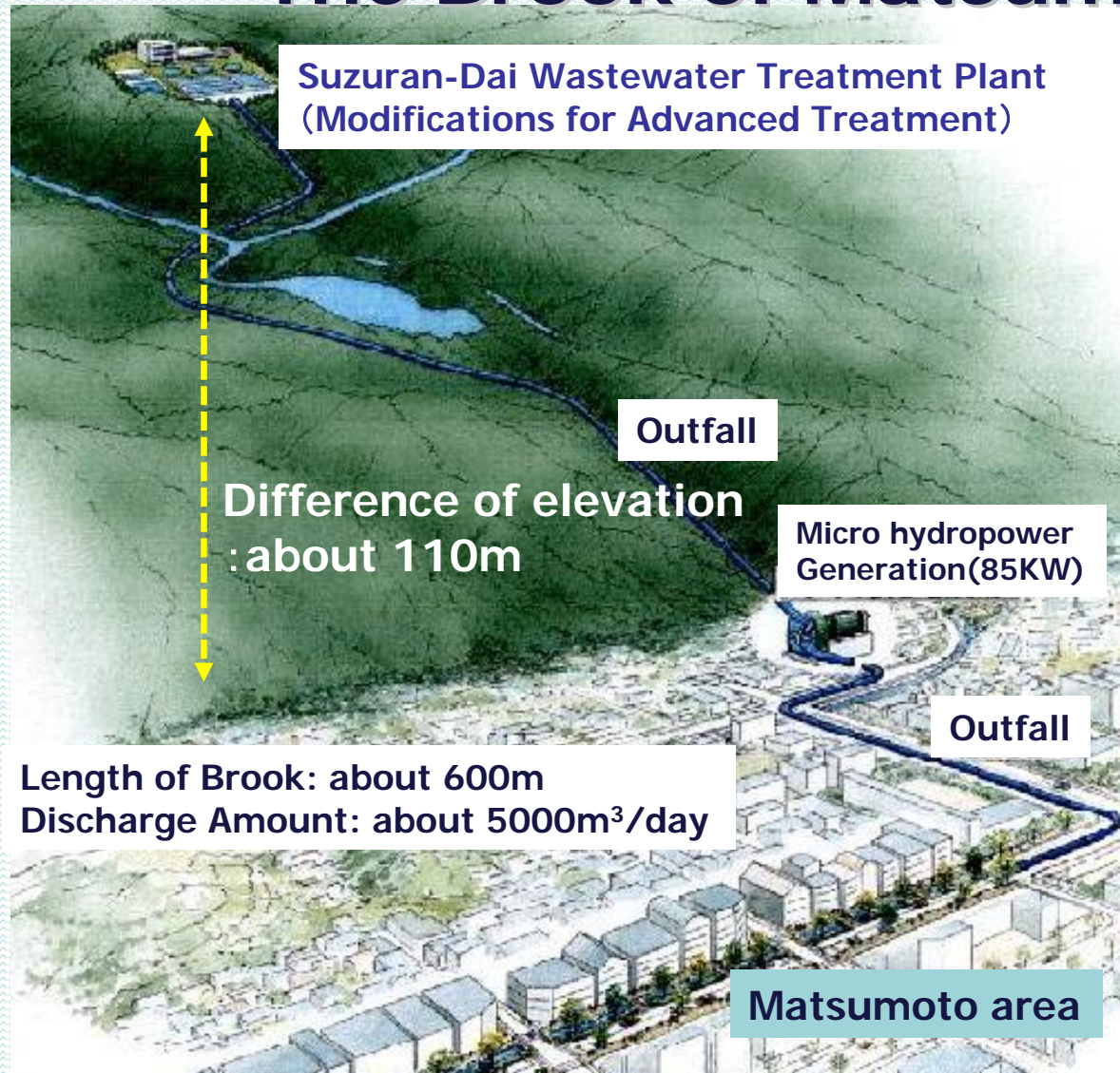
After Earthquake (1995/5)

If there was water
at that time ...



Town Planning Council
of Matsumoto Area

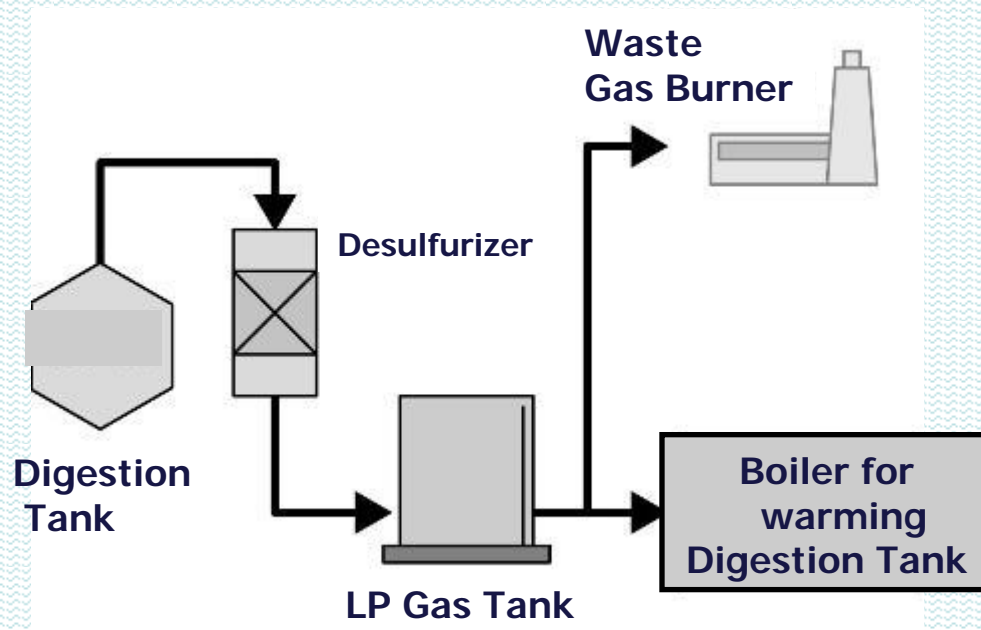
Advanced Treatment of Suzuran-Dai Wastewater Treatment Plant -The Brook of Matsumoto Area-



**Maintenance of brook
by local community**



Problem with Digestion Gas

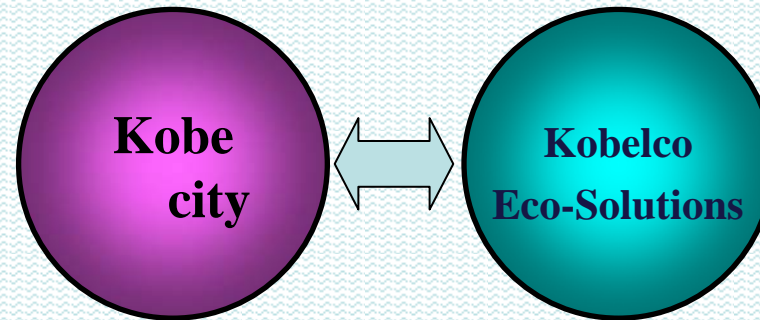


Problem for utilization

- ① Warming facilities and gas tank are corroded by digestion Gas which contains hydrogen
- ② Digestion gas which contains Siloxane creates problem by crystallization to warming facilities and gas blower.
- ③ Methane concentration is approximately 60%. Consequently, heating capacity is lower with about half of the capacity of the city gas.

Refining Digestion Gas to Bio Natural Gas

■ 2004

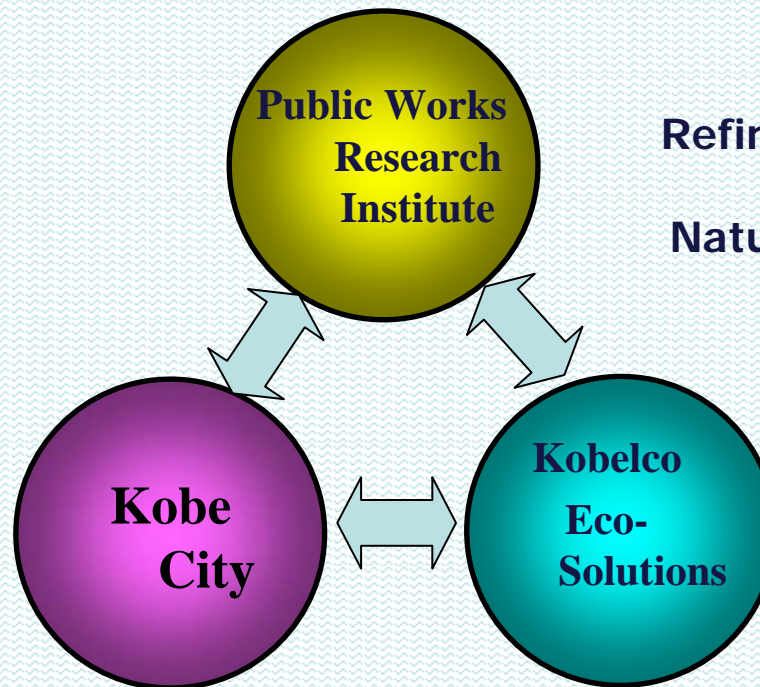
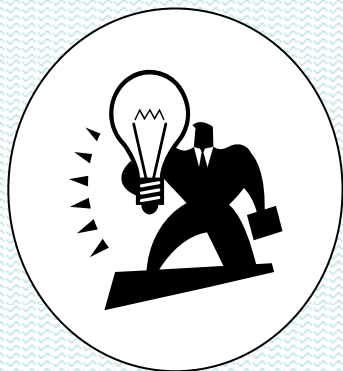


Refining Digestion Gas to Natural Gas (Joint Research)



Gas refining system

■ 2005

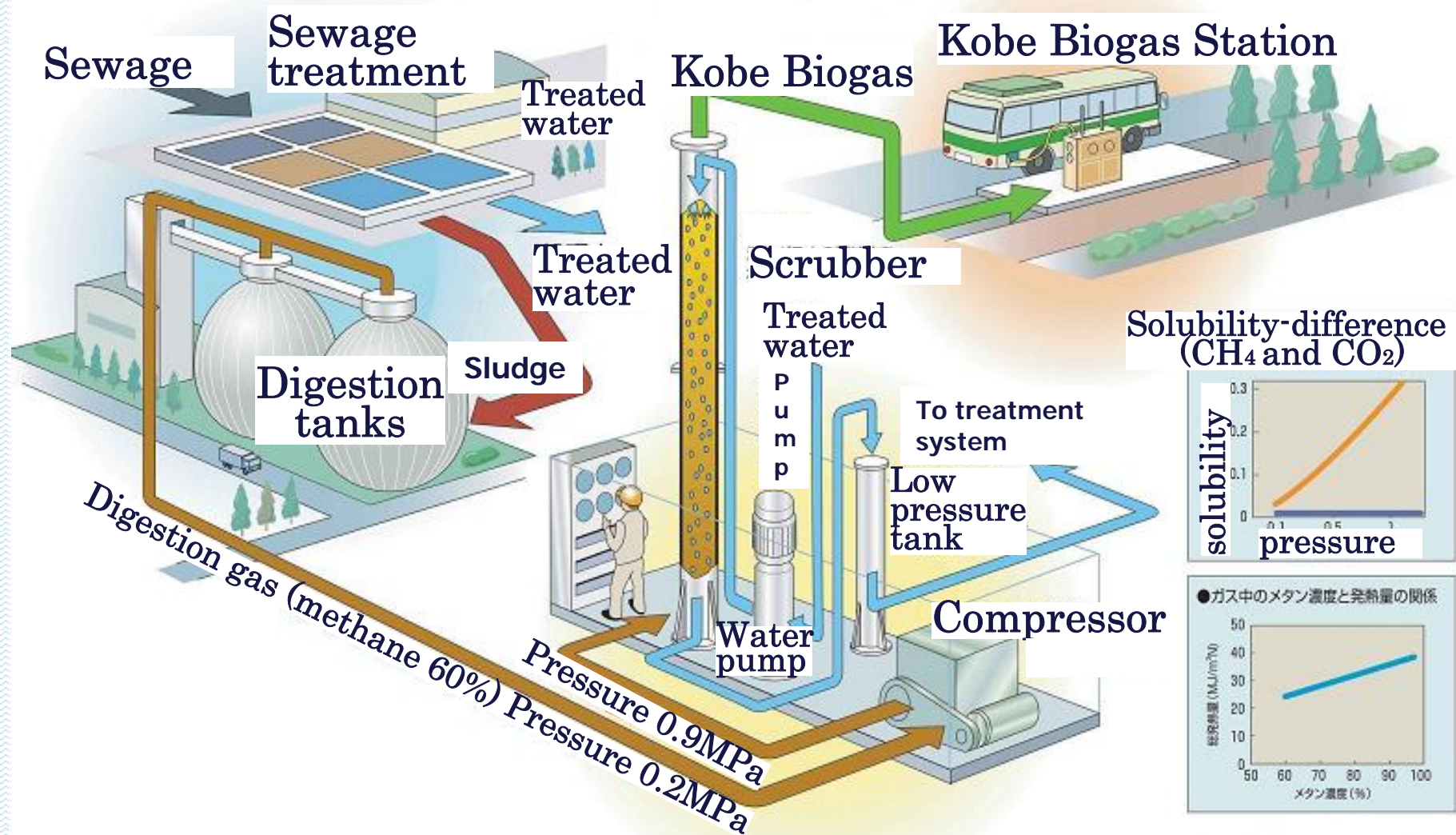


Refining Digestion gas to Natural Gas and commercialization for Natural Gas car fuel (joint Research)



Kobe Bio Gas Station

Refining System of Digestion Gas (water scrubbing process flow)



Effective use of Kobe Biogas

Official vehicle



Taxi



Truck for sludge cake



Kobe city bus



Garbage wagon

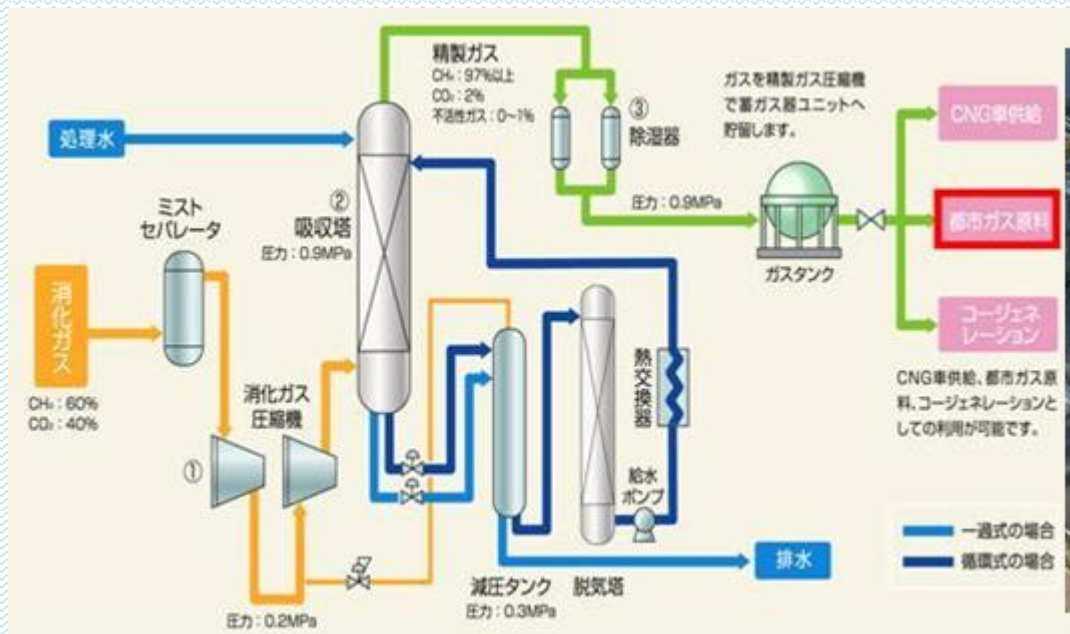
Home
dispatch



Drain pipe
sweeping
machines



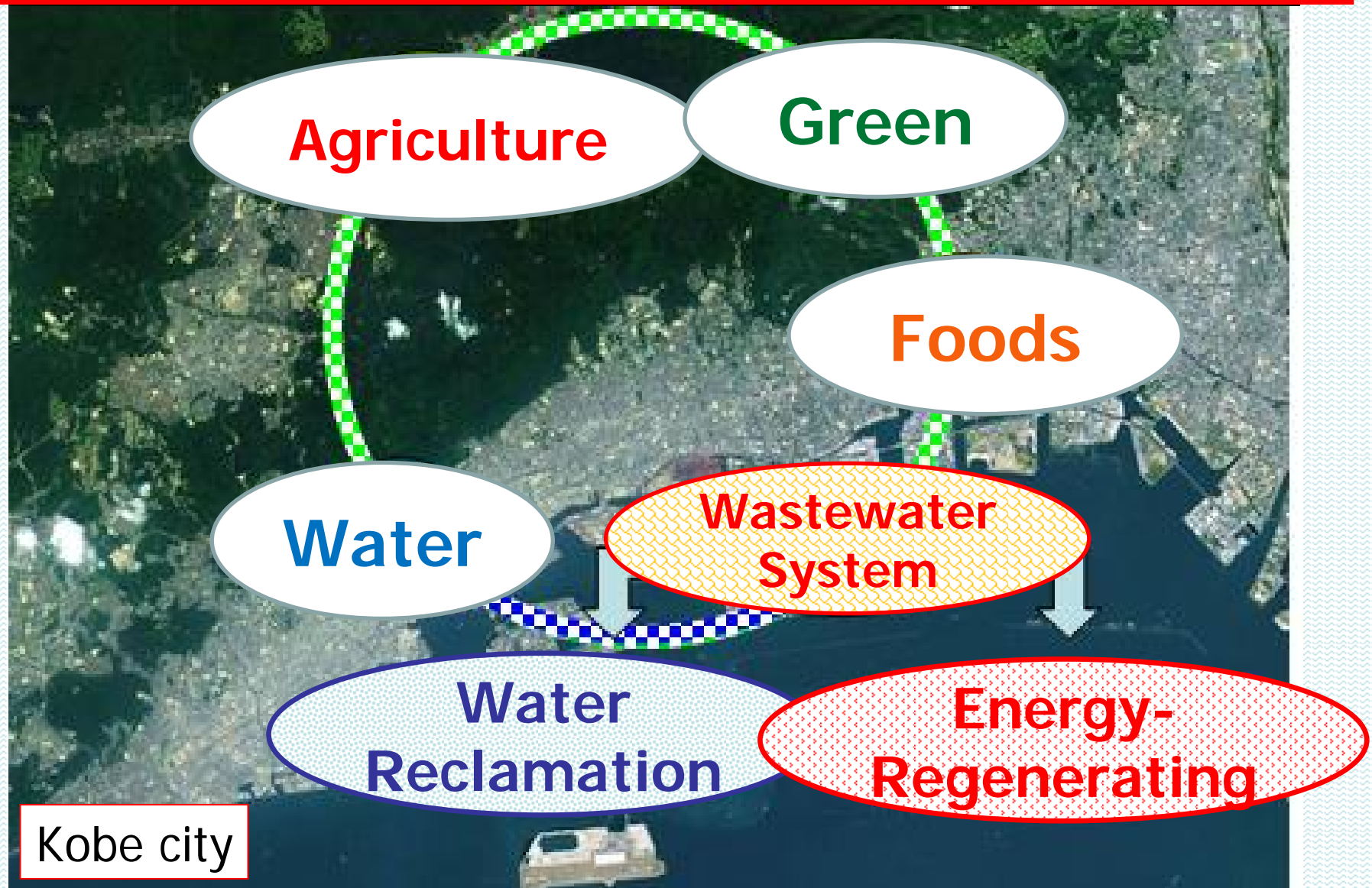
Project: Pouring into the City Gas



Actual proof facility of Pouring into the city gas.

Properties	Unit	Digestion Gas (Pre-Desulfurization)	Kobe Bio Gas	Acceptance standard value by Osaka Gas
Methane	Vol%	59.7	98.2	—
Carbon dioxide	Vol%	37.0	0.6	≤0.5
Oxygen	Vol%	0.4	0.2	≤0.01
Nitrogen	Vol%	0.8	1.0	≤1.0
Hydrogen Sulfide	ppm	330	<0.1	≤0.65
Siloxane	mg/Nm ³	14.53	0.005以下	—
High rank calorific value	MJ/Nm ³	23.8	39.3	45.0
Smell	mg/Nm ³	—	—	12~16

Networking of renewable biomass energy



Kobe Aqua Plan 2015

○Implementation period: 2011~2015 (5 years)

○Project Expenses: 98billion yen

○Substantive Goals:

①To realize a safe and sound living environment

②Stock management

③To preserve a quality water control

④To provide assistance with community revitalization

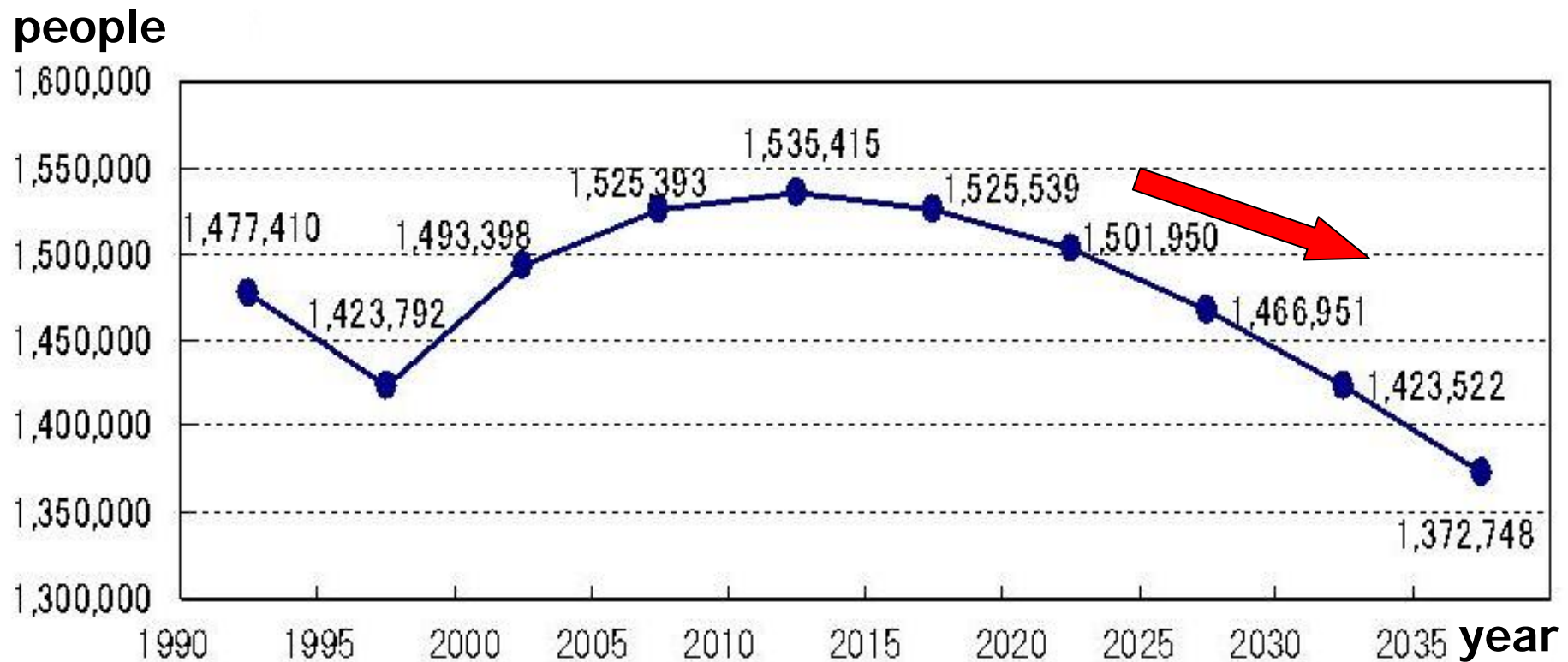
○Administrative Goal

Balance a fiscal year budget and maintain a sound and stable management

Current situations and issues

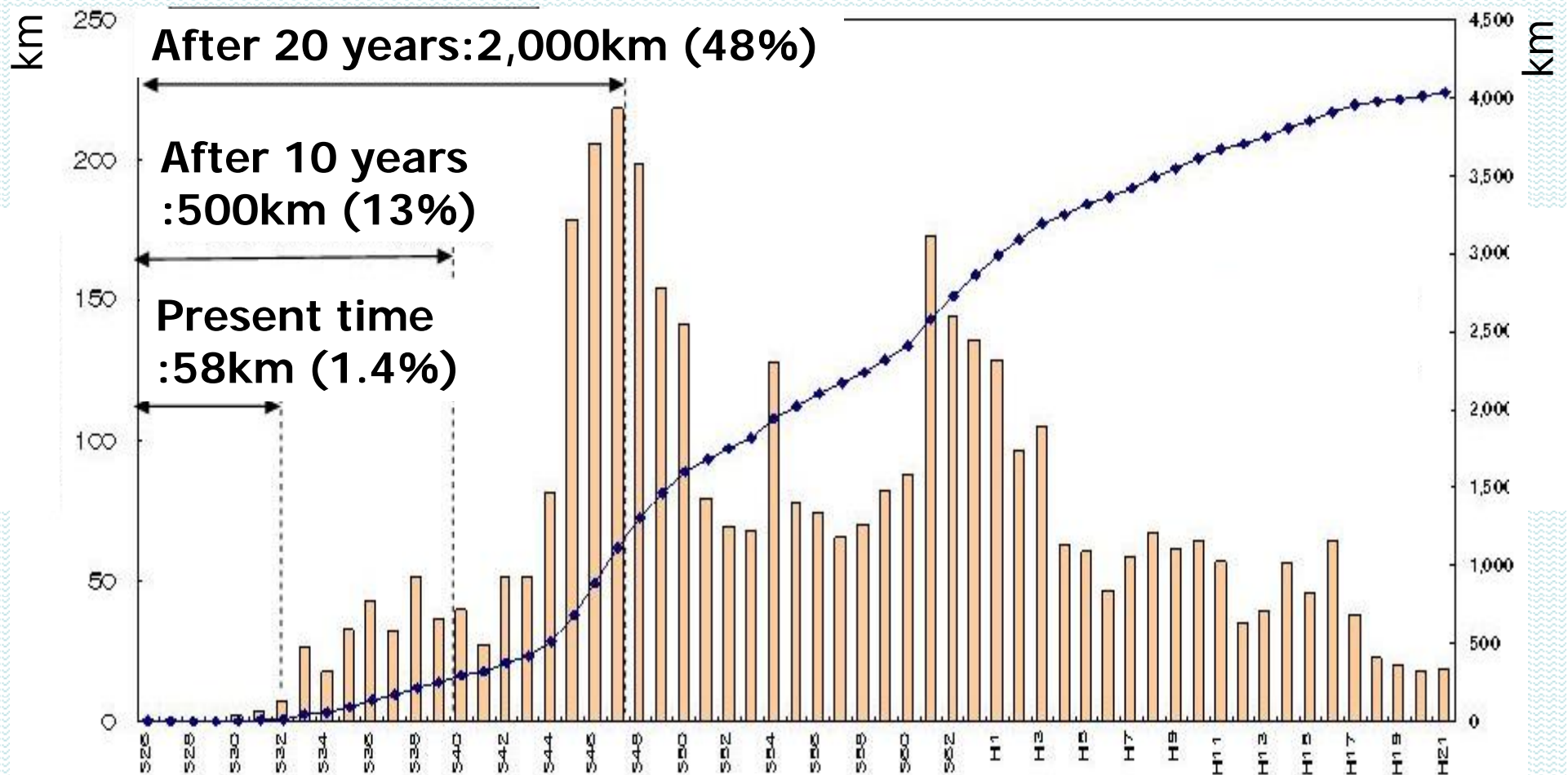
◆ The advent of depopulating society

Population forecast of Kobe city



Current situations and issues

◆ Increase of Aging Facilities



Current situations and issues

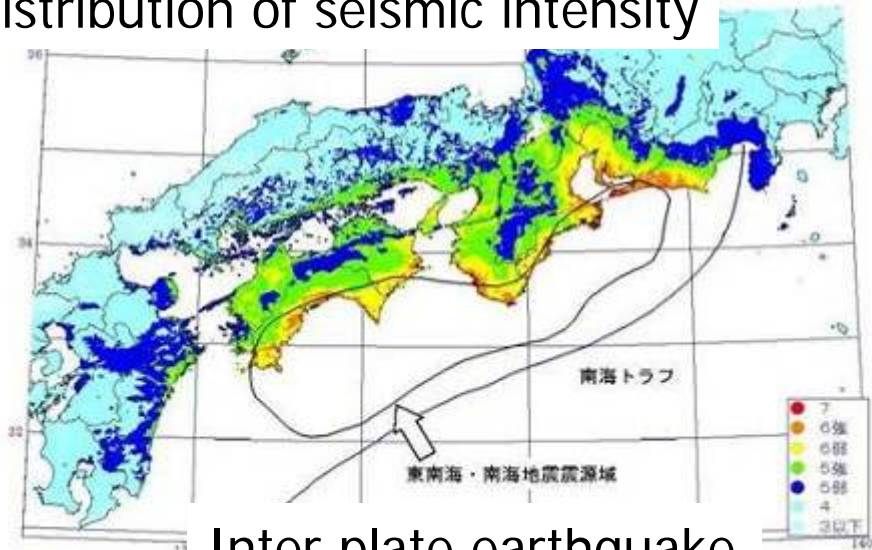
◆ Increase of disasters

Frequency of heavy rain (over 50mm/hr)



inundation

Distribution of seismic intensity



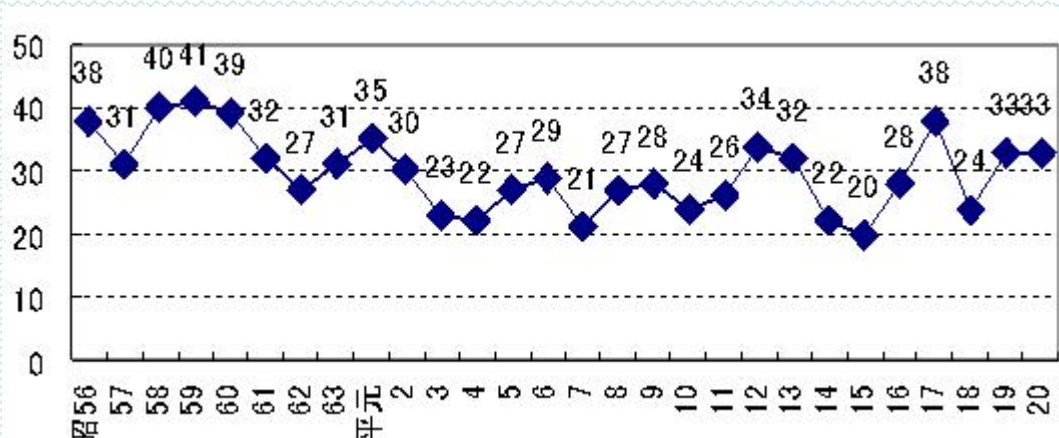
Inter plate earthquake



Damage by earthquake

Current situations and issues

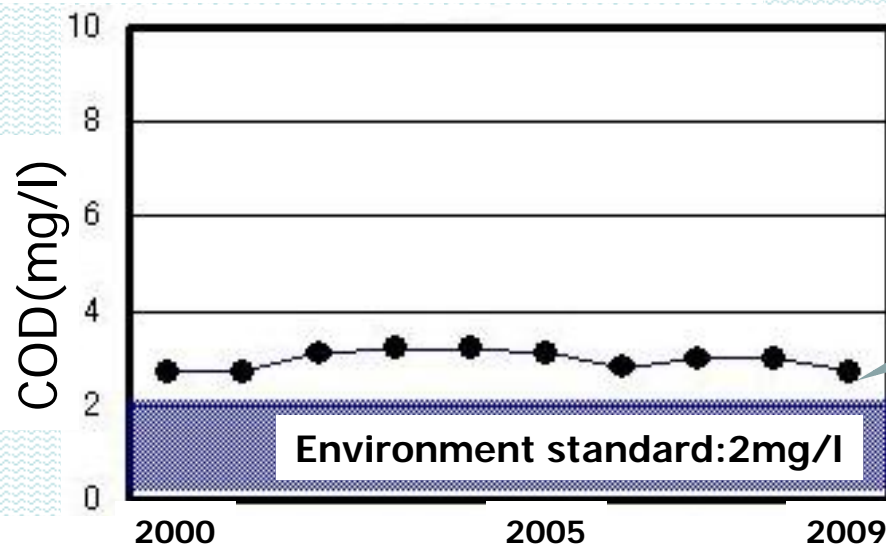
◆ Conservation of water environment



Incidence of red tide (Osaka Bay)



Port of Kobe

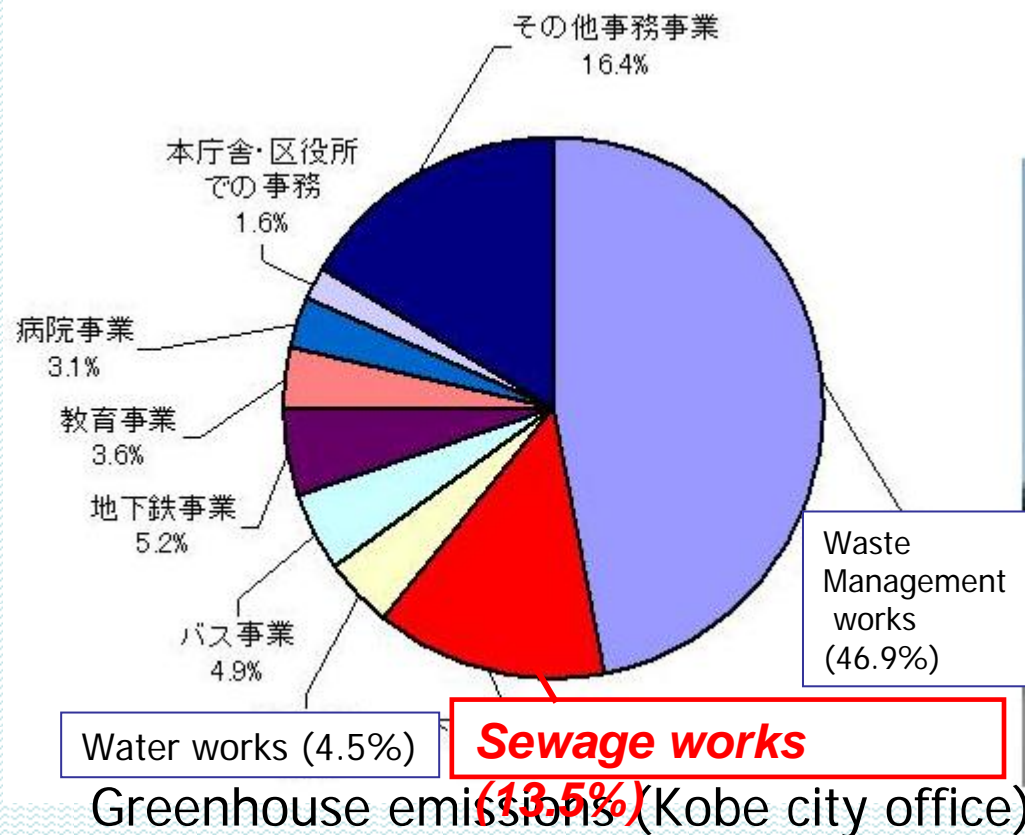


Environment standard: 2mg/l

Still not achieved!!

Current situations and issues

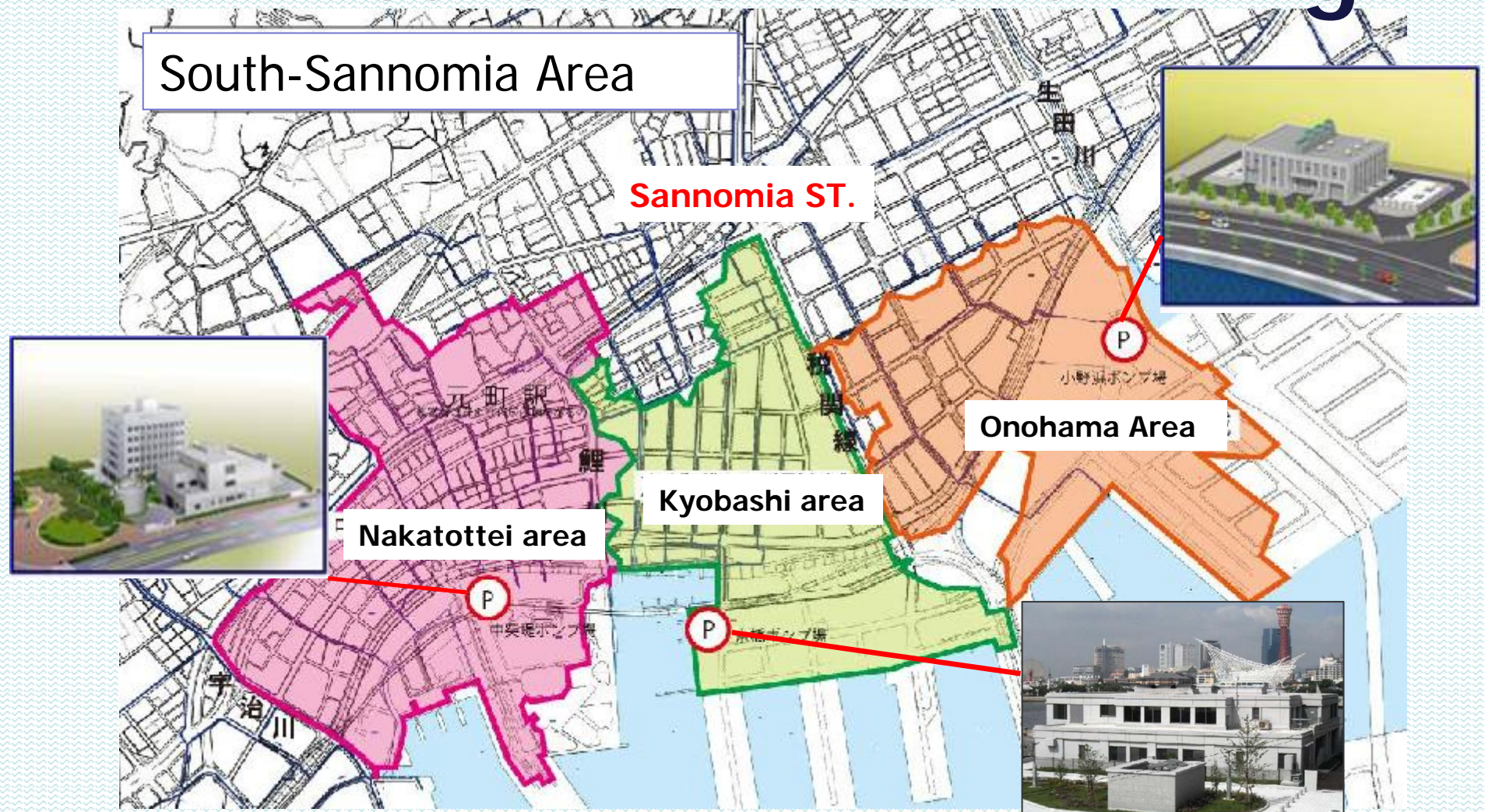
- ◆ Measures against Global Warming
- ◆ Creation of recycling society



Kobe biogas station

Target1.

Achievement of safe and secure living

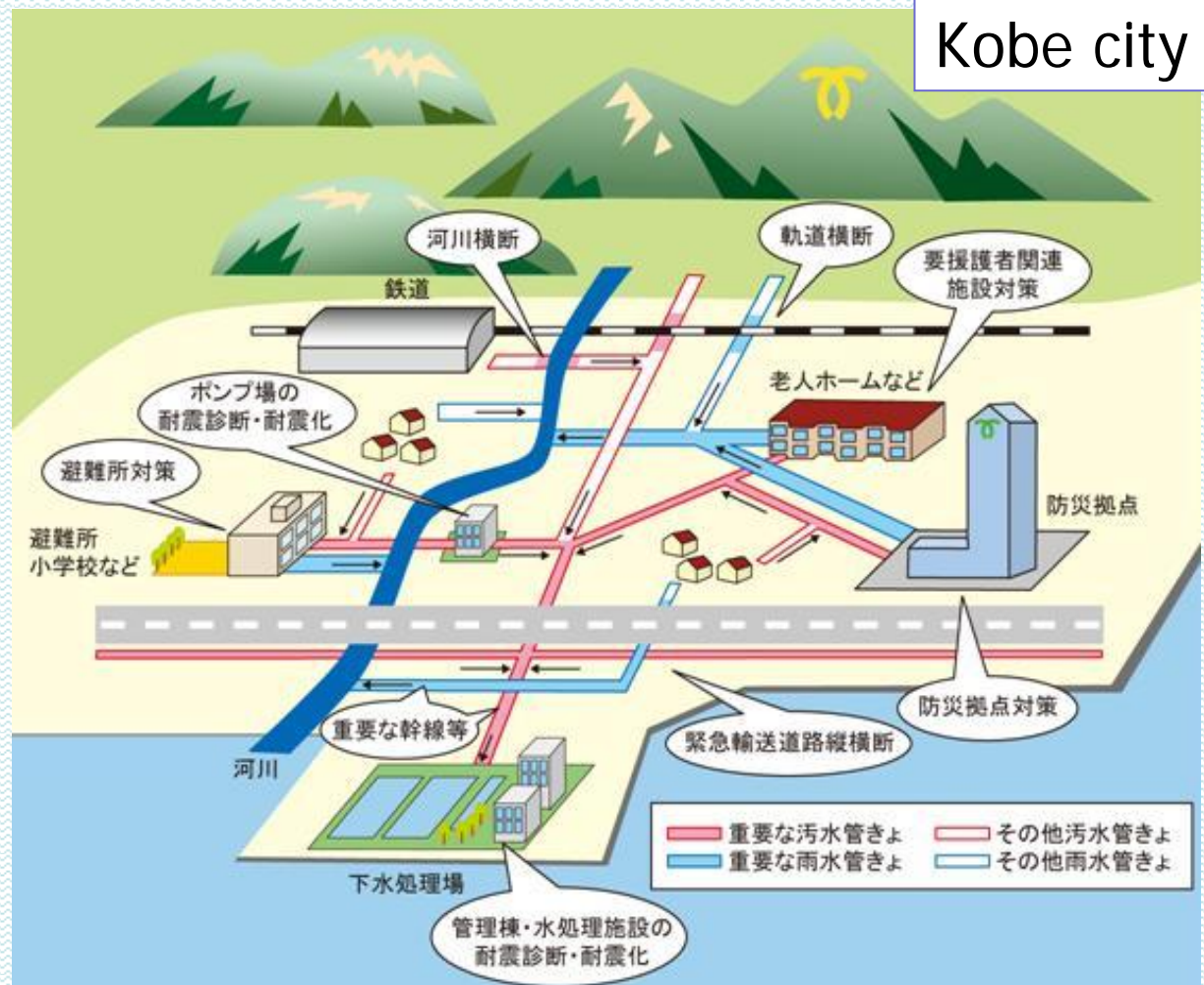


Target1.

Achievement of safe and secure living



Temporary toilet



Comprehensive anti-earthquake measures

Target2. Asset Management



Aging pipe facilities



Occurrence of road subsidence



Reconstruction of Seibu WWTP

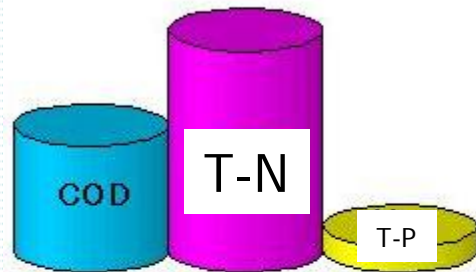


Reconstruction of Tobu incineration sludge center

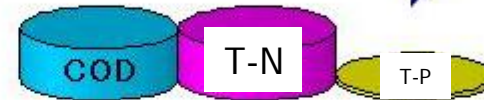
Target3.

Creation of Comfortable Environment

Standard water quality



COD:20mg/l
T-N:35mg/l
T-P:4mg/l



COD:8mg/l
T-N :8mg/l
T-P :0.8mg/l

Goals of water quality treatment



Method of advanced wastewater treatment

Target3.

Creation of comfortable environment



Interlocking block by
using sewage sludge
Incinerator ash



Brook flowing
advanced treatment water

Target3.

Creation of comfortable environment



Solar power generation(Tarumi W.T.P.)



High-temperature incineration(Tobu S.C.)

Target4. Regional Activation



Water environmental fair



Aqua supporter's meeting



Water environmental education at elementary school

Target4. Regional Activation

Newly International Contribution to Water Infrastructure



Conclusion of Partnership

Target of Kobe City

**① International
Contribution**

**② Revitalization of
Kobe**

**Economy
③ Succession of
Technique and Skill**

(November 24th, 2011)

**○ Formulation of Newly International Contribution to
Water Infrastructure**

○ Conclusion of Partnership with Local company

Goals of Kobe Aqua Plan 2015

Elimination of flooding area
 Number of advanced WWTP
 Effective use of treated water
 Effective use of incinerator ash
 Effective use of digestion gas
 Volume of CO2 gas

2010

2areas
 3W.T.P.

12%

17%

57%

67,700t

2015

5areas
 5W.T.P.

23%

35%

83%

56,600t



Tamatsu
W.T.P.

Network system

Tarumi
W.T.P.

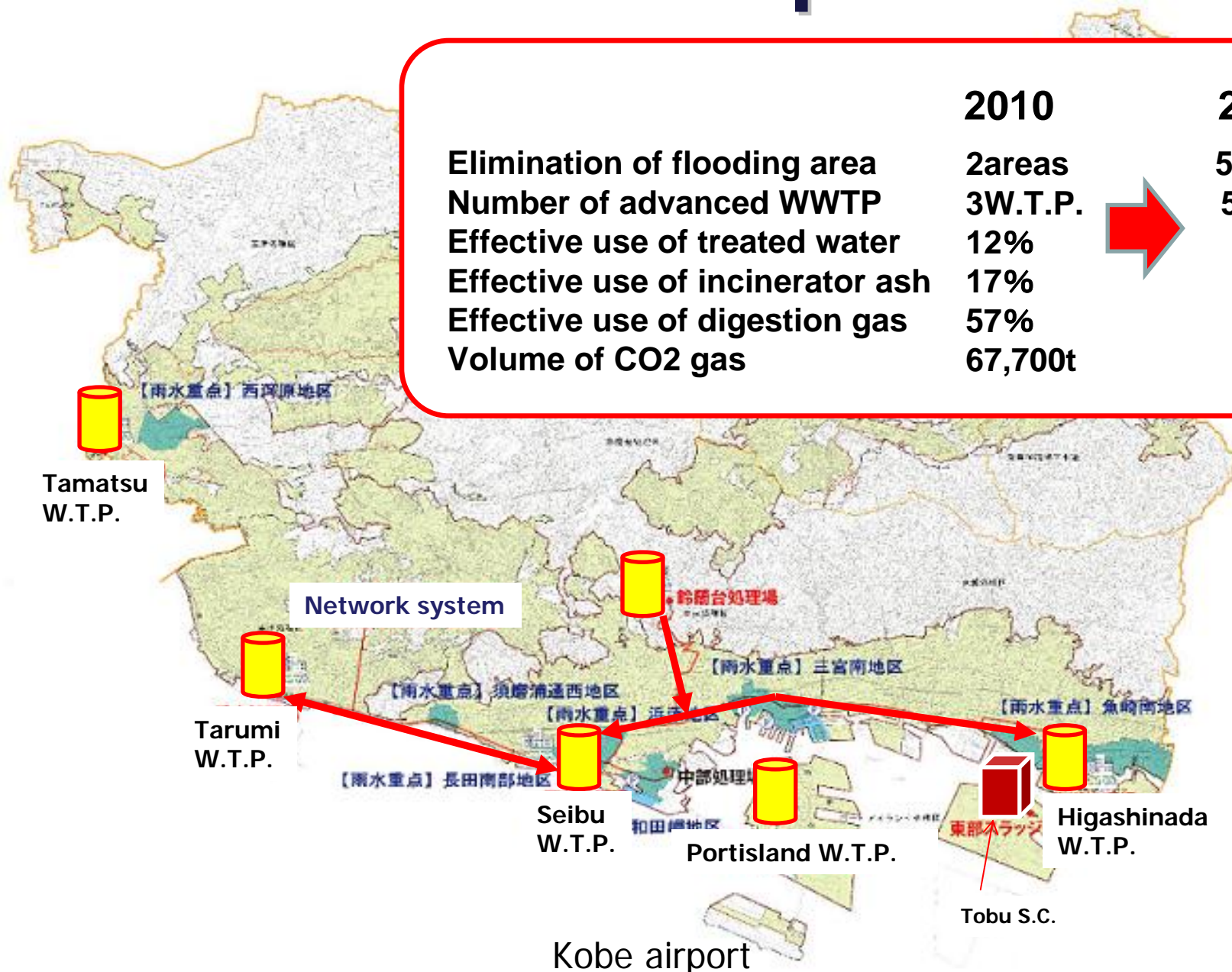
Seibu
W.T.P.

Portisland W.T.P.

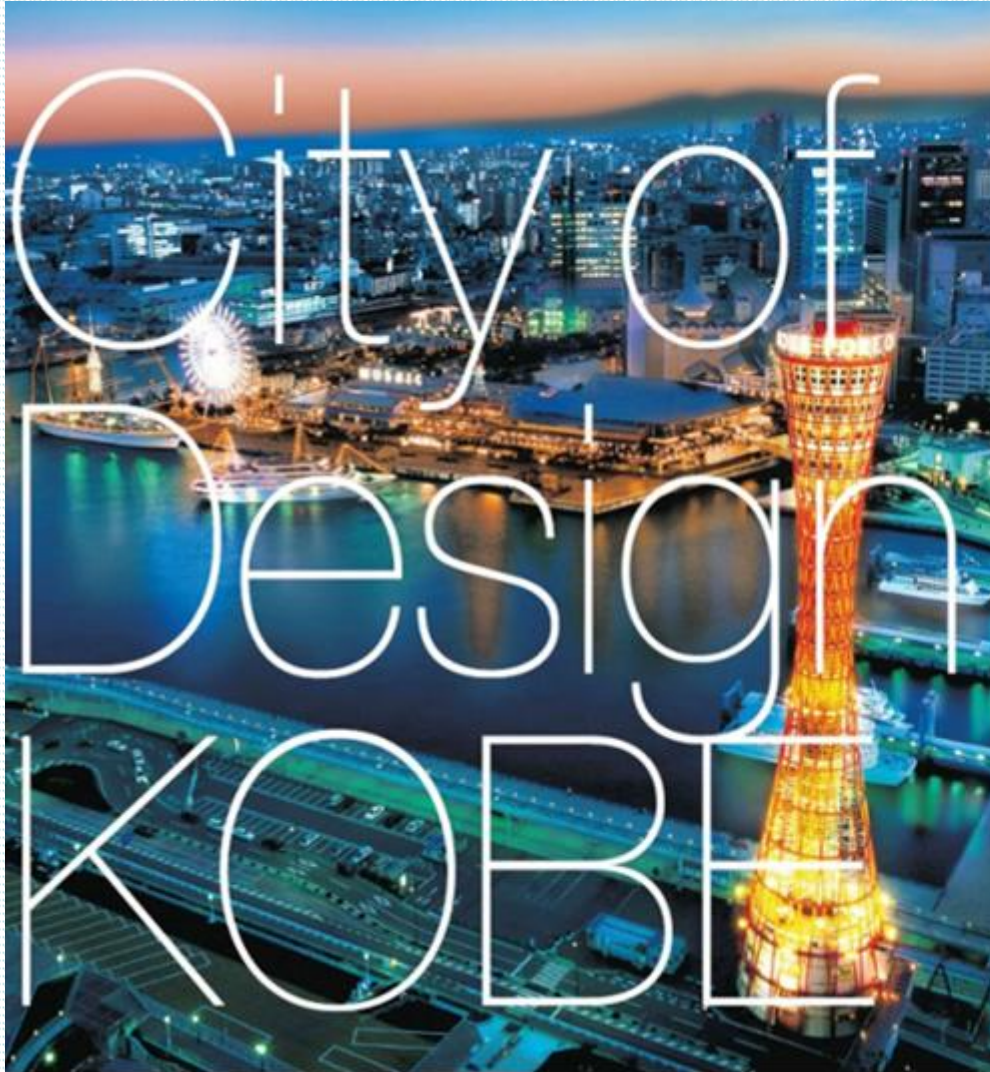
Higashinada
W.T.P.

Tobu S.C.

Kobe airport



City of Design KOBE



United Nations
Educational, Scientific and
Cultural Organization

City of Design
KOBE 

- Member of the UNESCO
- Creative Cities Network
- since 2008

City of Design KOBE



City of Design KOBE

Kobe Beef



Kobe Sweets

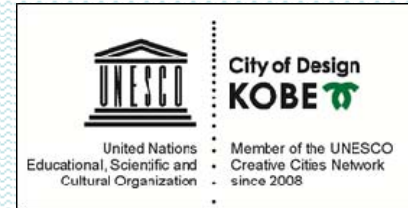


NADA Sake



KOBE Wine





“10 million-dollar sparkling view” (KOBÉ)
Thank you for
your attention!



Moguro & Mogumi



<http://feel-kobe.jp/>