

Speaker of Japan



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Work Experience:

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2012-2013 (Osaka City Government)

Manager of Environmental Policy Department, Environment Bureau

2010-2011 (Osaka City Government)

Manager of Global Warming Department, Environment Bureau

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Manager of Comprehensive Planning Department, Public Works Bureau

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Manager of Treatment Plant Department, Environment and Sewage Bureau

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Manager of Railways Planning Department, Planning and Coordination Bureau

2002-2003 (Osaka City Government)

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Current Status and Challenges of Sewage Sludge Disposal and Recycle In Osaka City

23 July, 2014

Toshiharu SAZAKI

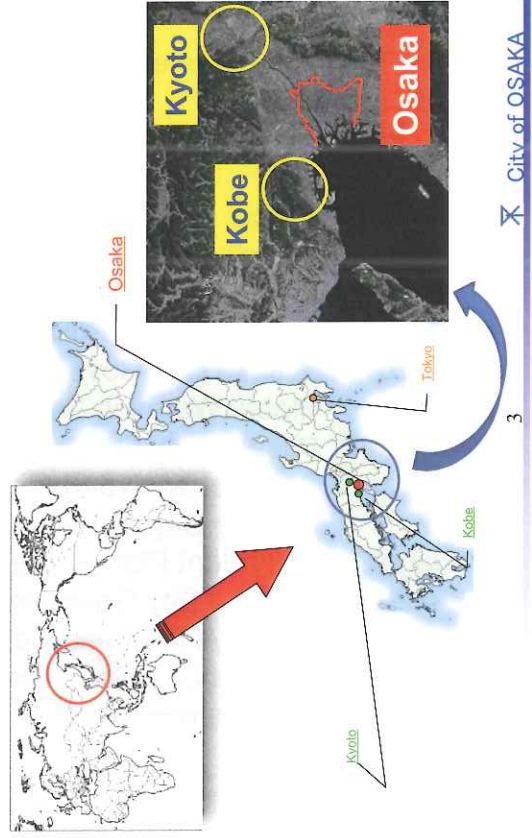
Public Works Bureau of Osaka City, Japan

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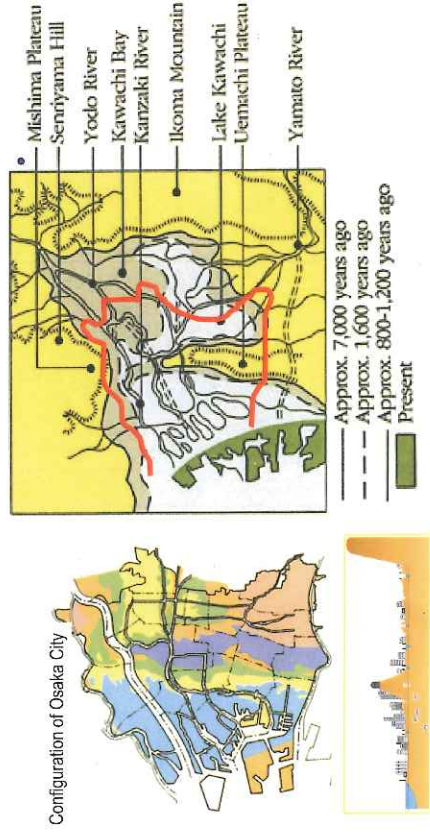
1 Overview of sewer Osaka

Located in Osaka City



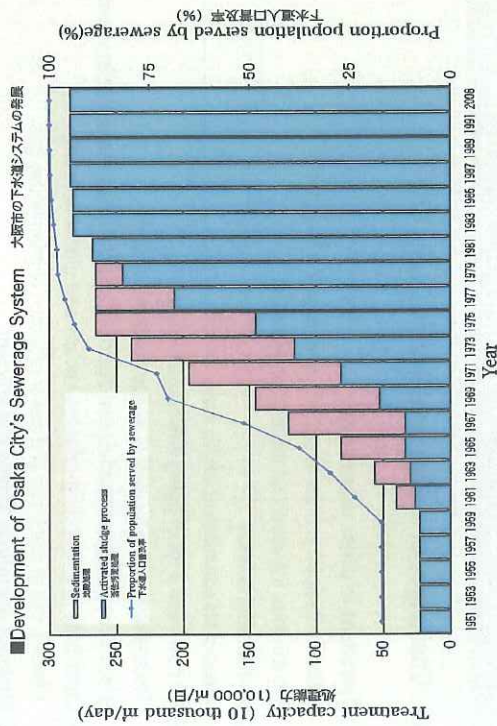
1 Overview of sewer Osaka

Topographical features of Osaka



1 Overview of sewer Osaka

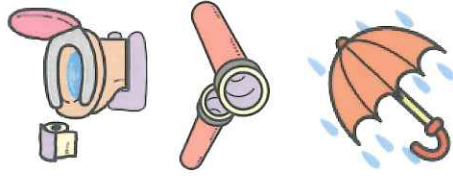
Changes in sewage treatment capacity



1 Overview of sewer Osaka

Present status

- Proportion 99.9%
- Total sewer length 4,900km
- Number of sewage treatment plants 12
- Treatment capacity 2,844,000 m³/day
- Number of pumping stations 58
- Drainage capacity 1,350 m³/Sec.
- Countermeasures rate against 60mm rainfall 79.5%
- Estimated once 10 years



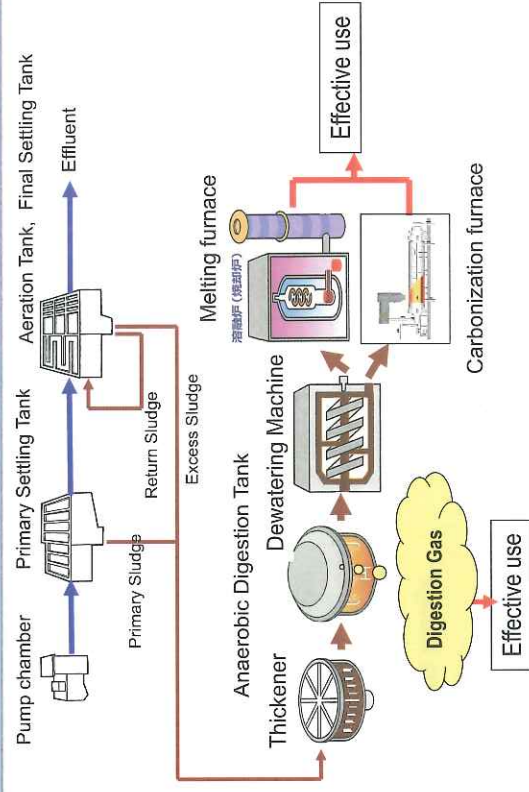
2 Current Situation of Sewage Sludge Disposal

Change of sewage treatment facilities in Osaka City

- 1894 Start of Modern Sewage Works
- 1940 Tsumori and Ebie Sewage Treatment Plants were commenced their operation.
→ Sewage Sludge was disposed to the sea (Ocean Disposal)
- 1960 Start of landfill
- 1972 The start of operation of the incinerator at Tsumori and Hanaten Sewage Treatment Plants
- 2000 The start of operation of the melting furnace at Hirano Sewage Treatment Plant
- 2014 The start of operation of the carbonization furnace at Hirano Sewage Treatment Plant
→ Achievement of the total amount effective use of sewage sludge

2 Current Situation of Sewage Sludge Disposal

Process of sewage sludge treatment



Processing capacity of the sewage sludge, the amount of processing

(1) Processing capacity

- 1) Sludge melting units
 - Maishima Sludge Center : 150 t/day × 5units
 - Hirano Sewage Treatment Plant : 150 t/day × 1unit
- } 900 t/day
- 2) Sludge carbonization units
 - Hirano Sewage Treatment Plant : 150 t/day × 1unit
- 150 t/day

(2) The amount of sludge treatment

- 1) Generation of melted slag (At the end of 2012)
 - The amount of Dewatered sludge : Approx. 360 t/day (74 DS-t/day)
 - The amount of sludge treatment : Approx. 30 t/day
- 2) Generation of solid fuel (Planned)
 - The amount of Dewatered sludge : Approx. 135t/day (30 DS-t/day)
 - The amount of solid fuel : Approx. 23t/day

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The purpose of sludge treatment

(1) Sewage Sludge

The sludge generated by sewage treatment, the amount also many out of the box, it is easy to generate a bad smell unhygienic includes many organic matter.

(2) The purpose of sludge treatment

- To reduction sewage sludge
- To stabilize and secure the sewage sludge

To this end, performs appropriate processing in the sludge treatment facility and recycled and final disposal.

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Challenges of sludge treatment

◇ Challenges of sludge treatment in Osaka City

- 1) Operations in dense urban areas
 - Require disposal in order to stabilize and reduction of sludge
 - To minimize the impact on the local environment
- 2) Final landfill is finite
 - Need of life extension of landfill sites
- 3) We now have a lot of aging sewerage facilities
 - Reconstruction and renewal of sludge treatment facilities
 - Need to be addressed to advanced treatment and combined sewer overflow control
- 4) Contribute to a recycling-oriented society and global warming
 - Effective use of resources and sewer reduction of greenhouse gas
- 5) Business operations simple and efficient
 - Cost reduction, public-private partnerships

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Countermeasures to challenges

(1) Implementation of "Thermophilic high concentration digestion"

⇒ Stabilization and reduction of sludge,
Small scale of the facility (cost reduction),
Measures of global warming through the effective use of digestion gas

(2) Sludge centralized treatment through sludge transportation pipes

⇒ Consideration to the surrounding environment, such as odor measures
Cost reduction by pipeline transport,
Renovation of facilities update efficient

(3) The introduction of melting furnace and carbonization furnace

⇒ Stabilization and reduction of sludge,
Prolonging the life of final disposal sites,
Contribute to a recycling-oriented society by reuse of the product,
Reduction of greenhouse gases

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“Thermophilic high concentration digestion”

(1) Thermophilic high concentration digestion

Excess sludge is concentrated hard to put into the digester at high concentrations (4-5%) by carrying up to mechanical thickener.

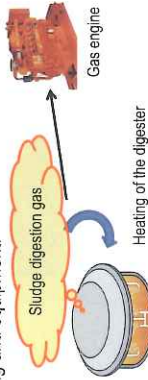
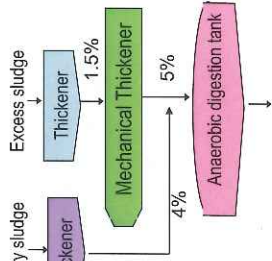
Digestion temperature (°C)	53~55
Digestion of days	15
Digestion method	No solid-liquid separation

(Feature)

1. Small scale of the facility due to the high concentration digestion
2. Due to the high stability of the digestion rate, an increase in digester gas and the amount of sludge reduction.
3. Increase of excess gas and energy-efficient heating and equipment.

(2) Use of digestion gas

- Use to heating of the digester
- The power generation by digestive gas



Sludge digestion gas power generation

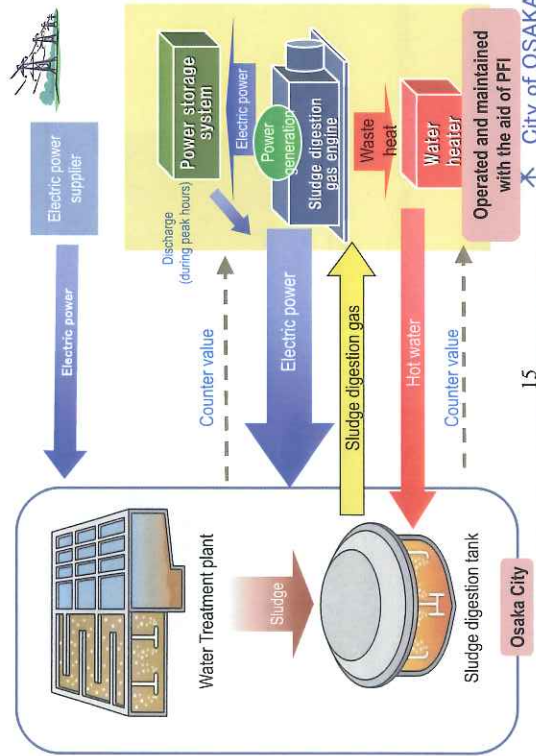
(Tsumori Sewage Treatment Plant)

Power generation at the sludge digestion co-generation site based on private finance initiative scheme

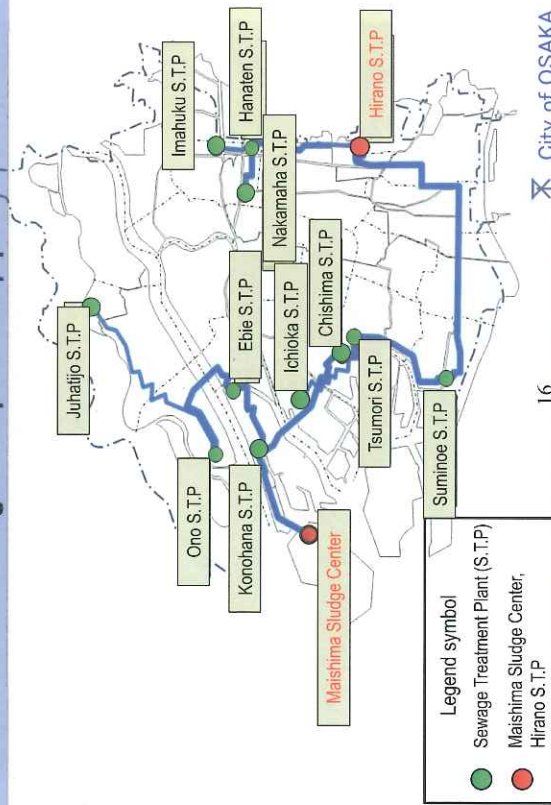


The contents of business	The supply to Tsumori S. T. P. power and waste heat by digestion gas power generation (Sludge digestion gas engine)
Business approach	PFI (BTO: Built transfer operation)
Project period	For twenty years (2007~2027)
Project cost	(Construction) About 1.8 billion yen (management and operation) About 3.0 billion yen
Major facility	Sludge digestion gas engine : 793 kw × 3units, 440kw × 1unit Water heater : 1unit

Flow of sludge digestion gas power generation



Sludge transportation pipes



Characteristics of sludge transportation pipes

(Summary)

- The aggregated into Hirano S.T.P. and Maishima Sludge Center carbonization furnace and melting furnace and dewatering machine.
- Length of pipes: Approx. 39km, Pipe diameter: 150mm ~ 350mm
- The abolition of the trucking of sludge



Trucking



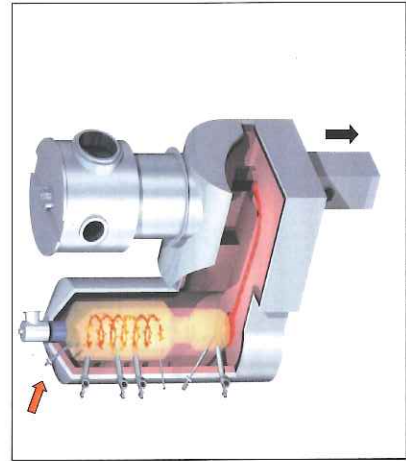
Pipe transportation

Appearance of Maishima Sludge Center

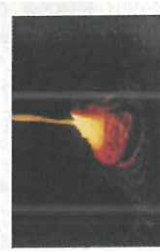


Sludge melting furnace

- Combusted at 1,300~1,400°C into melted slag, 1/15 of its original volume
- Reuse as materials for construction and other purposes



(Melting furnace)

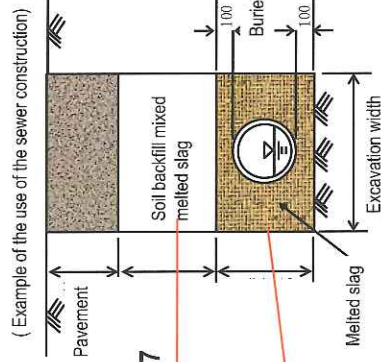


Melted slag
溶融スラグ



Granulated slag
(Water-cooled slag)

Reuse as construction materials of melted slag



Melted slag : Soil for backfilling = 3 : 7

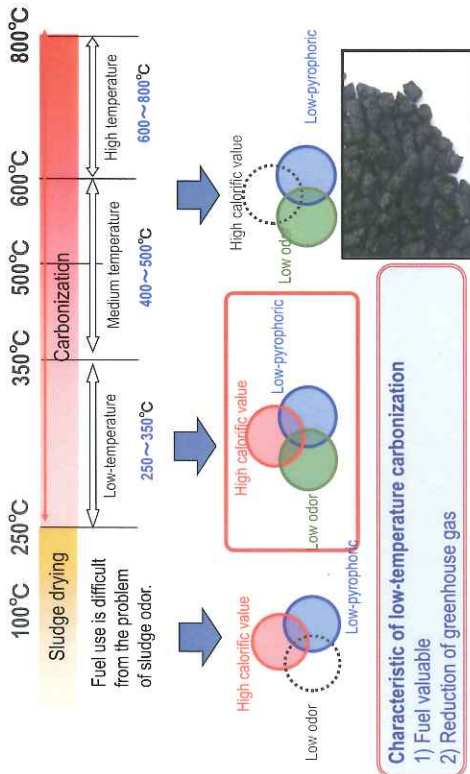
Melted slag 100%

(In the future)

- To promote the use of such soft soil to improve material and paving material
- Also need to use the expansion of private business

Carbonization

The type of fuel technology

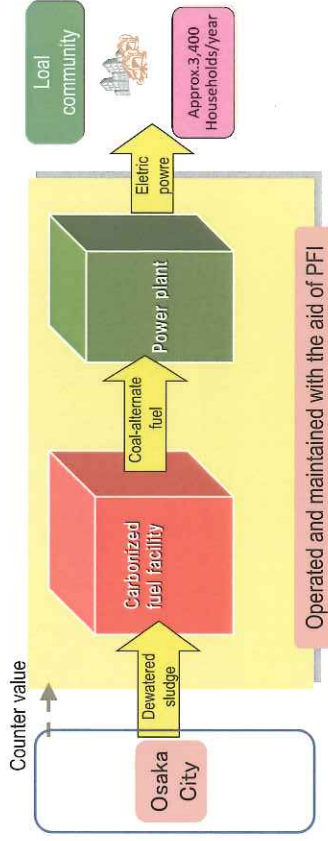


Characteristic of low-temperature carbonization

- 1) Fuel valuable
- 2) Reduction of greenhouse gas

Carbonized fuel product

Processing capacity /Production volume (plan)	33 t-DS/day / 23 t-DS/day
Business approach	PFI (BTO: Built transfer operation)
Project period	For twenty years (2007~2027)
Project cost	(Construction) About 5.9 billion yen (management and operation) About 11.8 billion yen



Summary

- In Osaka, we have developed a sludge treatment facility in order to respond to the constraints of the final disposal site, in order to correspond to the local environment, in order to respond to the increase in sludge volume due to the widespread use of sewer.
- In recent years, in order to respond to the formation of a recycling-oriented society, in order to respond to global environmental issues, the effective utilization of resources sewer, efficient operations are required.



In the future, we accurately grasp the needs of the times and we will continue to build a sludge treatment and disposal system safe sustainable.

Thank you very much