

Tokyo Super Eco Town Overview of Project Benefits

Gasified melting and other
power-generation operations



Tokyo Waterfront Recycle Power
Co., Ltd.

Recycling of construction and
demolition waste



Recycle Peer Co., Ltd

Recycling of construction and
demolition waste



Takatoshi Co., Ltd

Recycling of electrical, electronic
and IT equipment



Re-Tem Corporation

Treatment of PCB waste



Japan Environmental Safety
Corporation

Recycling of electrical, electronic
and IT equipment



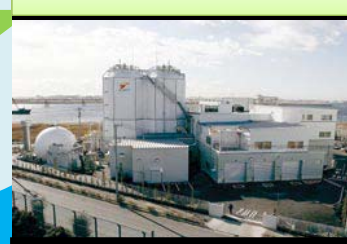
Future Ecology

Recycling of food residue
into animal feed



Alfo Ltd.

Recycling of food residue into biogas



Bioenergy

Recycling of rubble and
construction sludge



Seiyu Kogyo



1. Benefits of the Tokyo Super Eco Town project

1) The project handles about 10% of intermediate treatment of Metropolitan Tokyo's industrial waste (FY2008)

2) The project achieves advanced, highly efficient recycling through close liaison among participating companies.

Benefits of the Tokyo Super Eco Town project

3) 9–14% reduction in Metropolitan Tokyo's final disposal volume

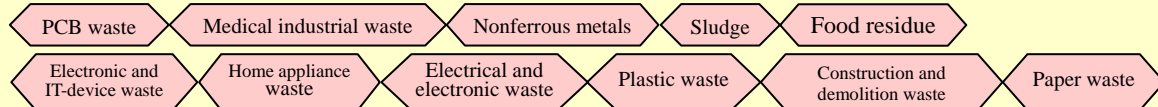
* Waste volume generated in Metropolitan Tokyo in FY2008. Sources: 3Rs IN TOKYO 2010, Bureau of Environment, Tokyo Metropolitan Government (TMG), 2010; Tokyo-to Sangyo Haikibutsu Keinen Henka Jittai Chosa Hokoku, 2008 ("Report on Changes Over the Years in Industrial Waste in Metropolitan Tokyo, 2008"), Bureau of Environment, TMG, 2011

* Volume of waste treated at Super Eco Town from FY2008 to FY2010

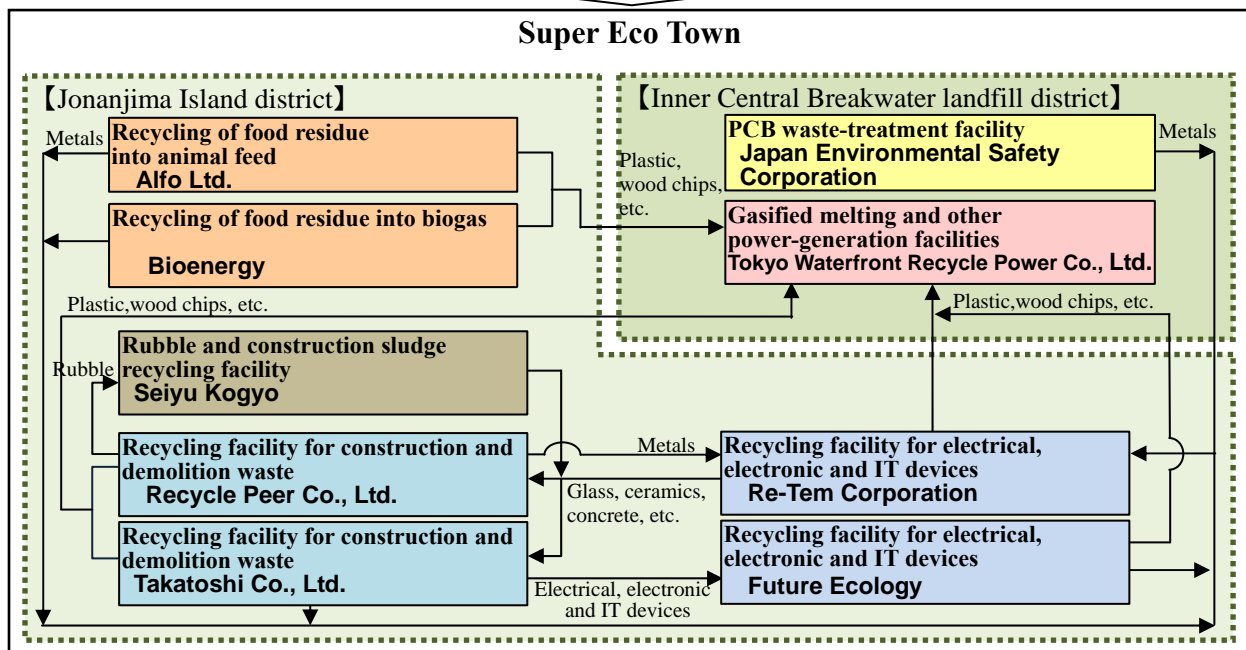
Mutual liaison among Super Eco Town participating companies

Industrial waste from Metropolitan Tokyo: 21,912 thousands of tons per year

Municipal solid waste from Metropolitan Tokyo: 4,910 thousands of tons per year



Amount accepted: 450,000–680,000t (of which amount generated in Metropolitan Tokyo: 290,000–520,000t)



Volume recycled: 300,000–480,000t

Minerals	→ Subbase coarse material for roads, soil additives	Fibers	→ Fiber raw materials, fuels
Wood chips	→ Fuel chips, compost	Plastics	→ RPF raw materials
Rubble	→ Recycled crushed stone and sand	Paper	→ Raw materials for papermaking
Glass	→ Raw material for public-works projects, glass fibers, artificial sand	Food residue	→ Synthetic animal feed
Sludge	→ Improved soils	Consumer electronics	→ Raw materials for consumer electronics
Metals	→ Valuable metals such as gold, silver, copper, steel, aluminum and stainless steel		

Figure 1-1

Liaison among companies active in Super Eco Town

2. Waste Treatment Results

2-1 Overall waste

- ◇ **Approx. 10% of Metropolitan Tokyo's intermediate waste treatment**
- ◇ **Increase in share of 1.3 points (2004: 35.8% 2008: 37.1%)**
- ◇ **Volume of waste generated in Metropolitan Tokyo and treated in Super Eco Town:
2008: 293,000t 2010: 516,000t Increase of 80%**

In the 2008 fiscal year, the total intermediate-treatment volume* for industrial waste across Metropolitan Tokyo was 8.6 million tons. Of this figure, 3.19 million metric tons was further processed. Project facilities processed 293,000t of the waste generated in Metropolitan Tokyo, comprising about 10% of the total.

*intermediate-treatment volume for industrial waste: Does not include sludge from waterworks and sewer operations.

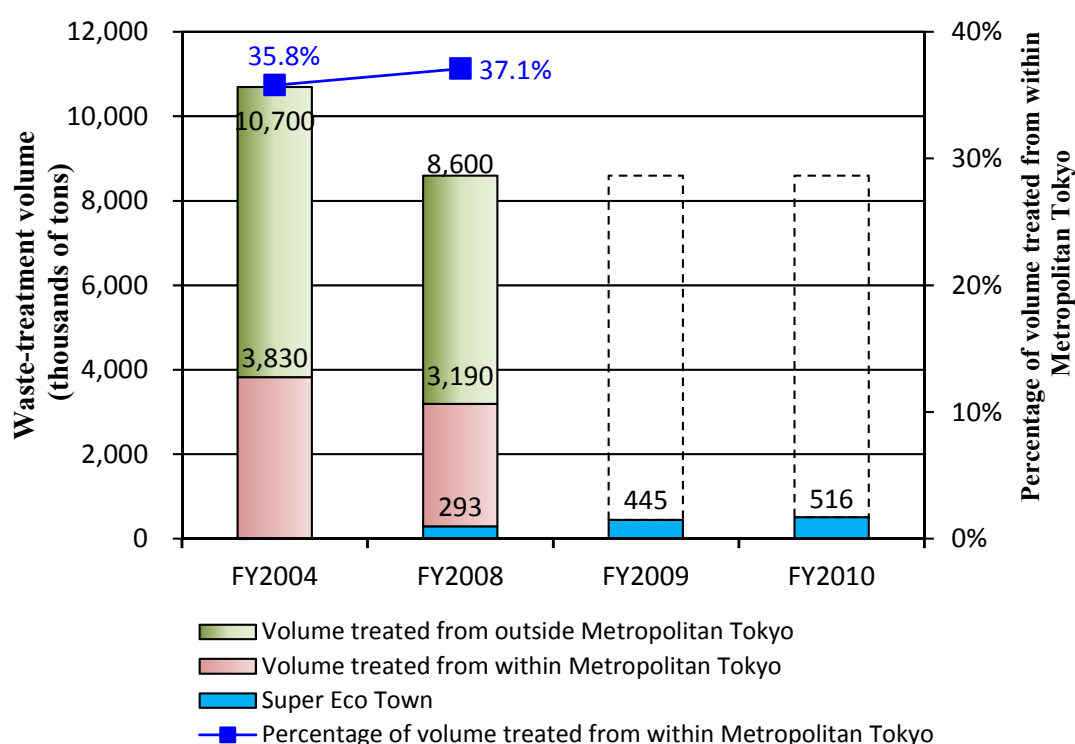


Figure 2-1 Treatment results of Super Eco Town, contribution to improving Metropolitan Tokyo's treatment rate

Table 2-1 Treatment at Super Eco Town

Unit: Thousands of tons

Item	Result
Municipal solid waste volume generated within Metropolitan Tokyo : FY2008	4,910
Industrial waste volume generated within Metropolitan Tokyo : FY2008	21,912

Item	Result
Volume accepted by Super Eco Town	FY2008 453 (293)
	FY2009 586 (445)
	FY2010 682 (516)

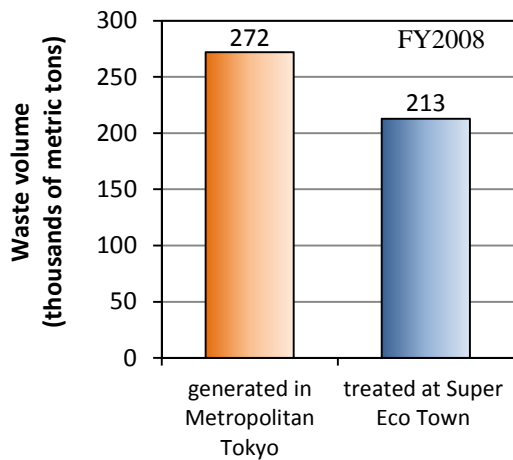
Figure in () indicates portion generated within Metropolitan Tokyo.

Item	Result
Volume recycled in Super Eco Town	FY2008 300
	FY2009 428
	FY2010 483

Item	Result
disposal amount after treatment in Super Eco Town	FY2008 58
	FY2009 56
	FY2010 74

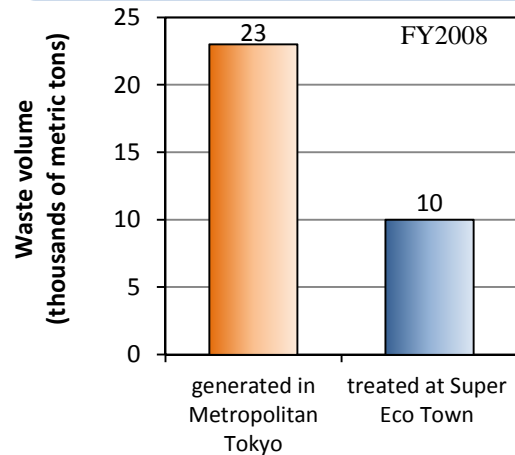
2-2 Treatment Results by Category

• Construction and demolition waste



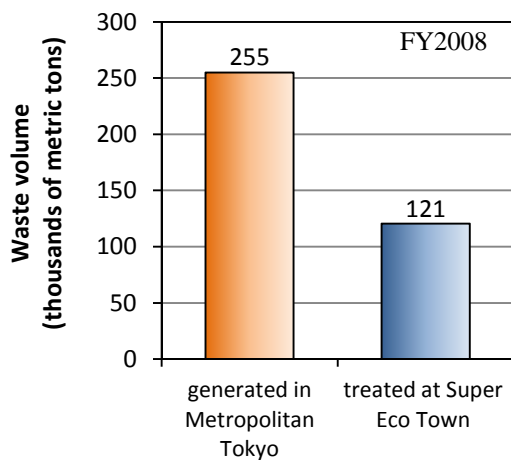
Tokyo Super Eco Town achieves a high recycling rate by converting construction and demolition waste into a wide variety of products. The volume treated here is equivalent to 78% of the construction and demolition waste generated in Tokyo.

• Infectious waste from medical industries



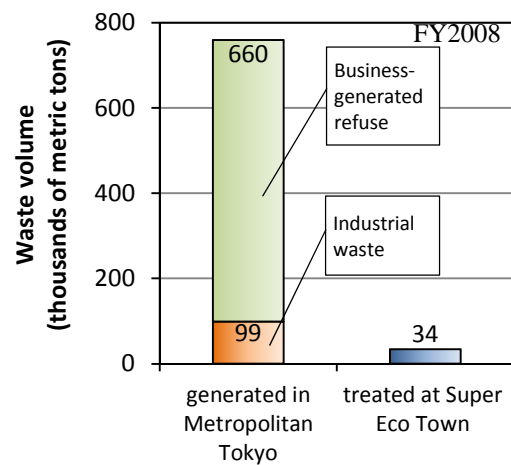
Infectious medical waste is received at gasified melting and other power-generation facilities. 10,000t of this waste was received and processed, constituting 44% of the 23,000t of infectious waste generated in Tokyo by the medical and social-services industries.

• Plastic waste



Tokyo Super Eco Town received and processed 121,000 tons of plastic waste, equivalent to 47% of all the industrial waste generated in Tokyo.

• Food waste



Super Eco Town facilities accepted 34,000 tons of food waste. This figure is equivalent to 5% of the business-generated refuse and to 34% of all the industrial animal and plant residue, both generated in Metropolitan Tokyo.

• PCB waste

Tokyo Super Eco Town facilities accept and process PCB waste stored by businesses not only in Metropolitan Tokyo, but also in Kanagawa, Chiba and Saitama Prefectures. From the start of operations to the end of fiscal 2010, facilities processed a total of 13,331 high-voltage transformers and capacitors.

3. Results in Recycling Rates*

3-1 Construction and demolition waste, rubble, sludge

- ◇ At facilities for recycling of construction and demolition waste, materials are sorted with high accuracy and recycled into a wide variety of products, achieving a recycling rate of 86–88%.
- ◇ Rubble and construction sludge recycling facilities recycle these wastes into useful products such as structural materials and improved soils, using a cutting-edge technique called heating and grinding. This approach yields a recycling rate of 96–100%

*Recycling rate is the volume of waste recycled into usable resources, expressed in metric tons (t), as a percentage of waste volume accepted (t).

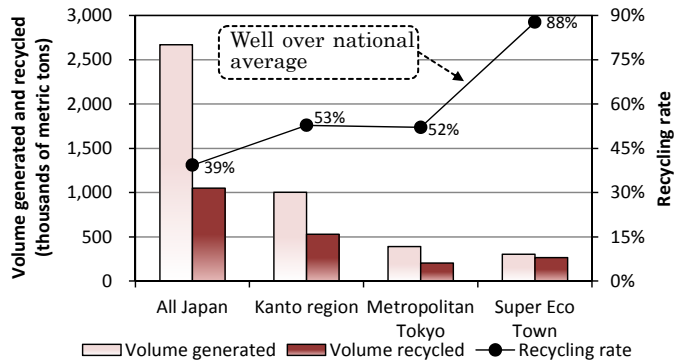


Figure 3-1 Recycling rates by region (2008)

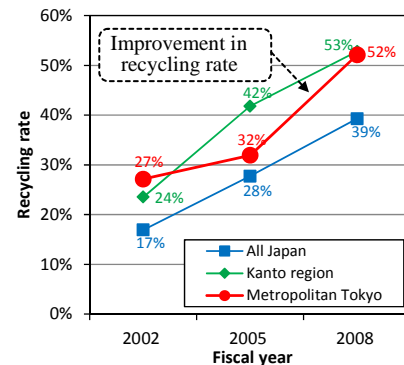
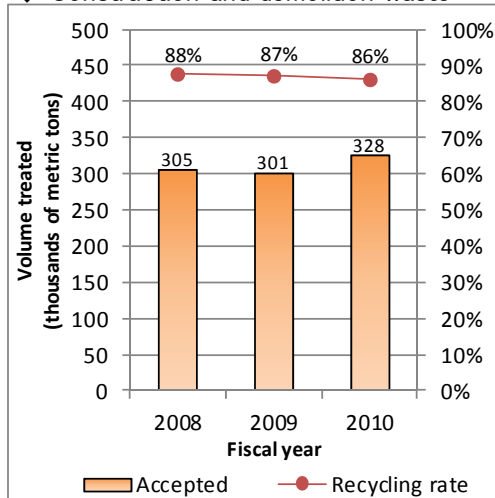


Figure 3-2 Construction and demolition waste recycling rate by region

◆ Construction and demolition waste



◆ Rubble and construction sludge

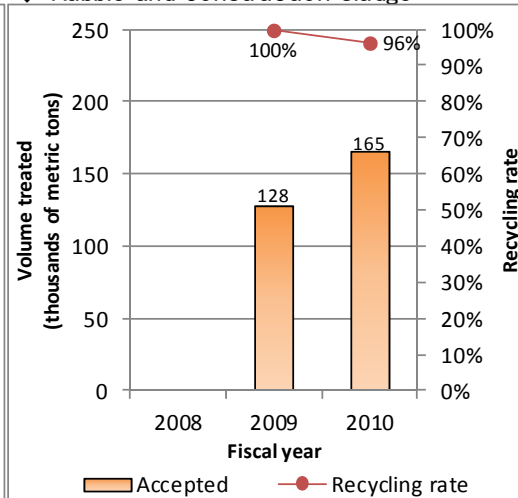


Figure 3-3 Recycling of construction waste, rubble and sludge at Super Eco Town
 ※The facilities for recycling of rubble and sludge began operations in FY2009.

3-2 IT device waste*

- ◇ Metals are recovered in highly pure form, achieving zero emissions.

*IT-device-waste recycling volume includes volume recycled under contract.

The facilities for recycling of IT device waste accept IT device waste, including household electronic and IT-device waste. After disassembly and pulverization, high-purity metal resources are recovered, achieving zero emissions.

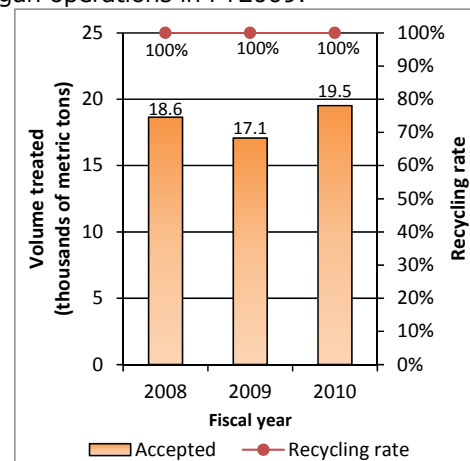


Figure 3-4 Recycling of IT device waste

3-3 Thermal recycling

- ◇ Thermal recycling generates 59 million kWh per year, of which 24 million kWh is sold.
- ◇ This figure is equivalent to the annual energy consumption of 16,000 households.

*Figures for annual electrical-power generation and sale are the averages for the period FY2008 to FY2010.

We calculated the electrical power generated from thermal recycling of plastics etc as a multiple of the average household's electricity consumption (3,600kWh, according to a survey by the Federation of Electric Power Companies of Japan).

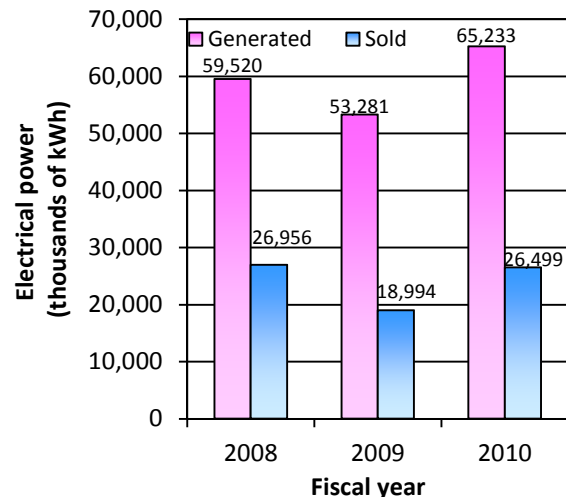


Figure 3-5 Electrical power generated at thermal recycling facilities

3-4 Food-waste recycling

- ◇ Electricity generated by biogas from methane fermentation: Approx. 6.9 million kWh is generated every year, of which 2.9 million kWh is sold.
- ◇ Electrical power output is sufficient to power 1,900 households for a full year.
- ◇ Supply of some biogas for use as city gas
- ◇ Recycling in production of animal feed

*Figures for annual electrical-power generation and sale are the averages for the period FY2008 to FY2010.

We calculated the electrical power generated in biogas power-generation facilities as a multiple of the average household's electricity consumption. The project supplies some 2,400 cubic meters of city gas a year, enough for the gas needs of 2,000 households. In addition, facilities that process food waste into animal feed recycle 100% of this waste in the production of animal feed.

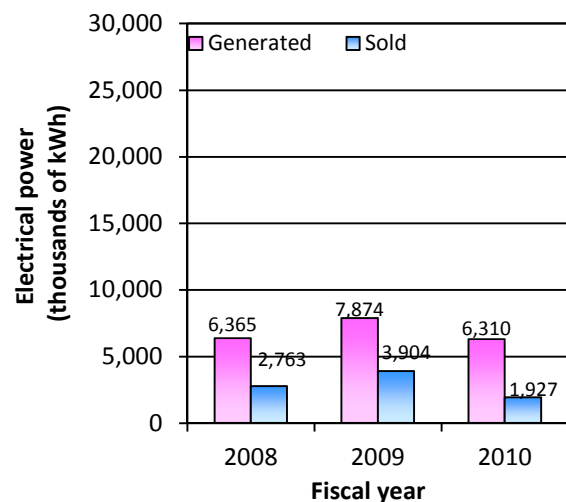


Figure 3-6 Electrical power generated at biogas facilities

3-5 Results in reduction of final disposal volume of industrial waste

Results in reduction of final disposal volume
 FY2008: 395,000t, FY2009: 530,000t,
 FY2010: 609,000t
 (Equivalent to between 9% and 14% of final disposal volume in Metropolitan Tokyo in fiscal 2008)

In fiscal 2008, Super Eco Town reduced final disposal by 395,000t. In fiscal 2010, a reduction of 609,000t was achieved.

These decreases are equivalent to 9% and 14% respectively of the Tokyo area's final disposal volume of 4.36 million metric tons (4.36mt) in fiscal 2008, contributing significantly to reducing final disposal of industrial waste.

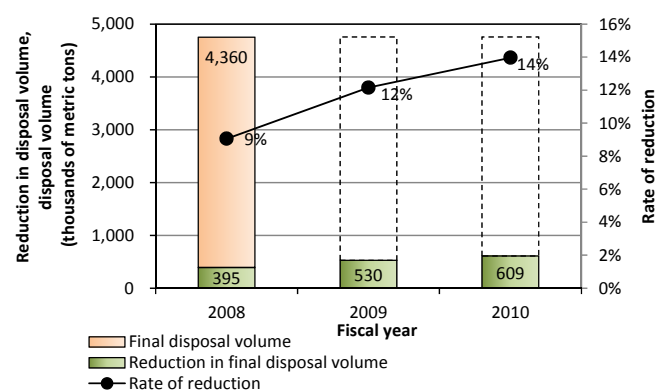


Figure 3-7 Reduction in final disposal volume of industrial waste

Metropolitan Tokyo area
 "Metropolitan Tokyo area" consists of Metropolitan Tokyo plus Ibaraki, Tochigi, Gunma, Saitama, Chiba, Kanagawa and Yamanashi Prefectures. "4.36mt is the landfilling volume for the Tokyo area.

4. Other effects of Super Eco Town operations

4-1 Reduction of greenhouse gases

- ◇ **Reduction of greenhouse-gas emissions totals 38,127* per year.**
- ◇ **This figure is equivalent to the CO₂ emissions of 16,000 households.**

The project is reducing final disposal through a multifaceted range of strategies, including energy generation via thermal recycling and biogas, metal recovery and recycling of organics as animal feed.

Based on greenhouse-gas emissions from the household sector in Metropolitan Tokyo of 14.4mt in FY2009 and a total of 6.4 million households in Metropolitan Tokyo in FY2010, we calculated emissions per household to be 2.3t per year.

Reductions from recovery of metals and recycling of waste as animal feed: Source: Survey and Report on Operations Calculating Reductions in Greenhouse-gas Emissions Achieved by Waste-treatment Facilities in Tokyo Super Eco Town (Tokyo Super Eco Town Association; in Japanese), 2010

Reduction from electrical-power generation: Based on electricity volume generated, the equivalent in electricity purchased from general power companies is calculated using a coefficient of 0.382t-CO₂/1,000kWh.

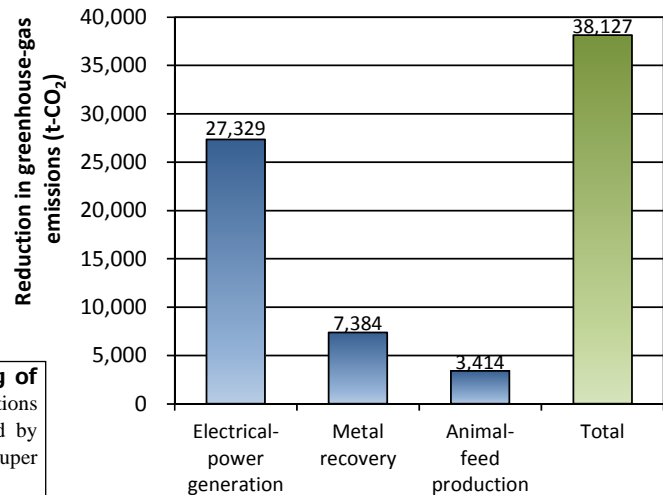


Figure 4-1 Reduction in greenhouse gases

*Total reduction at all four facilities from recycling of IT-device waste, conversion of food waste to animal feed, and electrical-power generation from gasified melting and biogas from food waste

4-2 Efforts to raise public awareness

- ◇ **Over 10,000 observers a year are accepted.**
- ◇ **Observers include ministers and other important persons of Cabinet grade.**
- ◇ **The project earns high regard from professionals in the private and public sectors alike.**

Every year over 10,000 observers visit Tokyo Super Eco Town, for a cumulative total of 56,427. A look at the composition of these observers reveals that a remarkably high 67% are related to the operation of private-sector companies or to government and related agencies. The project attracts keen interest from waste-management operators and professionals. It also commands attention as a vital national project. The project has been visited on many occasions by some of Japan's most important personages, including His Majesty the Emperor, the Prime Minister and the Minister for the Environment.

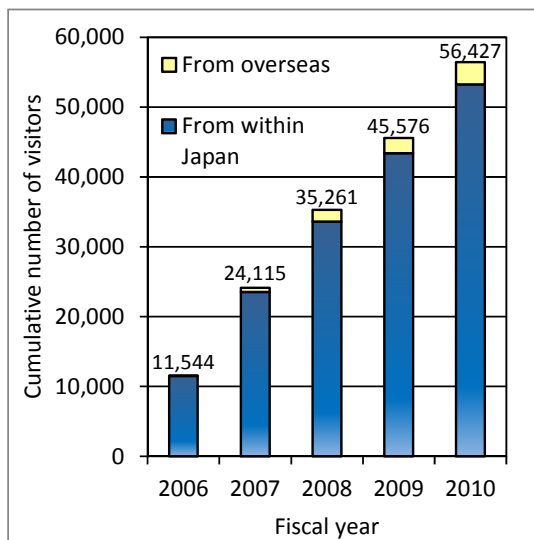


Figure 4-2 Number of observers visiting Tokyo Super Eco Town (cumulative)

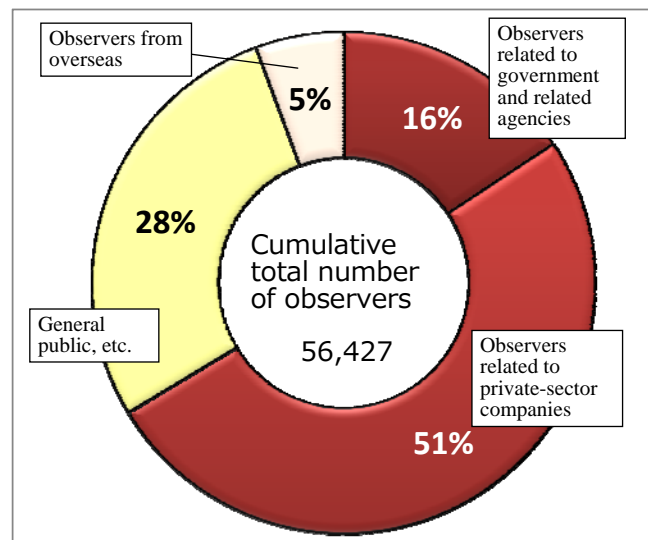


Figure 4-3 Share of total observers by visitor type
Share of cumulative total of observers at all facilities from FY2006 to FY2010

5. Environmental survey of Super Eco Town operations

5-1 Survey details

To ensure safe and reliable recycling operations, Tokyo Super Eco Town undertakes its own environmental surveys. The items included in these environmental surveys and their methodology in the case of Jonanjima Island district are described below. Note that the results of environmental survey of Inner Central Breakwater landfill district are those which are reported in follow-up survey of an environmental impact assessment in the Central Breakwater landfill district.

Table 5-1 Overview of environmental survey items and methodology in the case of Jonanjima Island district

Evaluation item		Survey and measurement methods	Survey locations
Air pollution	Particulates	High-volume sampler Gravimetric method	Borders of each facility's grounds
	Soot and smoke	Point sampling (reduced value of oxygen) JIS Z8808	Emission point of combustion facility
	Nitrogen Oxides	Ion chromatography JIS K0104	
	Asbestos	Survey according to Asbestos Monitoring Manual (ver. 4.0)	Borders of each facility's grounds
Offensive Odor	Calculation Method of Odor Index and Odor Intensity (Environment Agency Notification No.63)	Borders of each facility's grounds and emission points	
Noise and vibration	Acoustics – Description and measurement of environmental noise (JIS Z8731) Methods of measurement for vibration level (JIS Z8735)	Borders of each facility's grounds	
Water pollution	Testing method for industrial wastewater (JIS K0102)	Rainwater drainpipe grid of each facility	

5-2 Results of environmental survey of Jonanjima Island district

The results of the survey of Jonanjima Island district appear in table 5-2. For each item in the survey, both the legal standards and the autonomous management values set by each operator were satisfied.

Table 5-2 Overview of environmental-survey results of Jonanjima Island district

Item	Survey result
• Particulates	All facilities satisfied the structural and management standards prescribed in the Air Pollution Control Law and Tokyo Metropolitan Environmental Security Ordinance with respect to general particulate discharging facility.
• Soot and smoke (from exhaust)	All facilities satisfied the standards set according to scale of facility.
• Nitrogen Oxides	All facilities satisfied the standards set according to scale of facility.
• Asbestos	All facilities satisfied the autonomous management value set for the borders of premises (10 particles/L). Surveys will continue to be conducted at regular intervals in consideration of the safety of the environment surrounding each operator.
• Odor Index	All facilities satisfied the evaluation criteria for all survey items. Surveys will continue to be conducted at regular intervals in consideration of the environment surrounding each operator.
• A-Weighted Sound Pressure Level • Vibration level	All facilities satisfied the autonomous management values for all survey locations. Surveys will continue to be conducted at regular intervals in consideration of the environment surrounding each operator.
• Water pollution	All facilities satisfied the standards for all survey locations. Operators strictly comply with standards for wastewater regarding water pollution generated in waste treatment, and is emitted into the public sewers.

5-3 Results of environmental survey of Inner Central Breakwater landfill district

In the Inner Central Breakwater landfill district, a survey of air pollution was conducted following an environmental-impact assessment. PCBs, dioxins, hydrochlorides, mercury, NOx, suspended particulate matter and other substances were surveyed, and all items satisfied standards.