The Importance of the Daiei Kankyo Group in the Waste Management and Recycling Industry

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#### Industrial waste Generated from business activities

Responsibility for proper disposal: Waste generators

## Daiei Kankyo Group

Leading the way in promoting integrated treatment following a future trend



# Changing the way waste management and recycling are done

Morihiko Shimoda

Executive Officer, General Manager of Corporate Strategy Planning Division, Responsible for Corporate Strategy Planning

# The definite solution—integrated treatment of general waste and industrial waste

In Japan, the waste management and recycling sector produces approximately 40 million tons of CO<sub>2</sub> emissions annually, with 80% of this stemming from the heat treatment (incineration, etc.) of waste plastics and waste oil (see p. 22, Figure 1). To achieve carbon neutrality by 2050, it is necessary to process waste oil and waste plastics with high CO<sub>2</sub> emission coefficients through methods other than heat treatment.

Even if various recycling methods such as material and chemical recycling of waste plastics and the recycling of waste oil into sustainable aviation fuel (SAF) progress smoothly, it is estimated that roughly 60% of waste will still need to be treated by using heat or incinerated by 2050 (see p. 22, Figure 2), generating approximately 10 million tons of CO<sub>2</sub> annually from heat treatment (see p. 22, Figure 3). We have to capture more CO<sub>2</sub> than this amount by 2050 using CCUS\* technology to achieve our carbon negative goal. To generate the energy required for CCUS, we must scale up incineration and other heat treatment facilities. This means it is crucial to change the way waste is treated. Namely, we need to consolidate facilities based on the premise that general waste, in which the private sector has had limited involvement, should be treated together with industrial waste.

Given that the amount of both general and industrial waste has fallen due to population decline, to consolidate facilities, integrated treatment is evidently more efficient than the conventional separate treatment where municipalities handle general waste while private sectors handle industrial waste. This is especially true in regions with significant population declines.

The Daiei Kankyo Group aims to establish local energy centers nationwide through public-private partnerships (PPP) based on the idea of integrated treatment of general waste and industrial waste. Currently, we are preparing facilities in three areas, with plans to expand to 12 by the fiscal year ending March 31, 2030. In the same way as with industrial waste generators, municipalities do not have to bear the cost of facility maintenance or use subsidies for PPP. Municipalities only pay an outsourcing fee based on the volume of waste. This method benefits both parties, as it



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reduces future costs compared to publicly funded facilities, and it allows our Group access to the general waste market (see Figure 4), which has seen very little outsourcing to the private sector. Changing the way waste management is done, we aspire to lead the way as a company that embraces change and boldly takes on challenges.





Source for Figures 1, 2, and 3: Created based on R&D and Social Implementation for the "Achieving Carbon Neutrality in Waste and Resource Circulation" Project, Ministry of the Environment Source for Figure 4: Created based on Waste Management in Japan (2021 edition), Ministry of the Environment



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Plastic bottle horizontal recycling

Sustainability

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## Building broader and deeper relationships of trust based on dealings with many municipalities

Local Circular Ecological Spheres

No. of municipalities Daiei Kankyo has agreements with (as of June 2024)

3

As of the fiscal year ended March 31, 2024, the Daiei Kankyo Group has worked with 467 municipalities in various ways, accounting for approximately 26% of all municipalities in Japan. A significant turning point was gaining the trust of many municipalities through disaster waste management following the Great Hanshin-Awaji Earthquake in 1995, and accelerating the expansion of transactions with municipalities after the completion of the Mie Energy Plaza (a large-scale complex heat treatment facility) by our consolidated subsidiary Mie Chuo Kaihatsu Co., Ltd. in 2013.

Moving forward, the Group aims to establish the integrated treatment of general waste and industrial waste at all of its locations and develop local energy centers through PPP across the country. In this process, by deepening relationships with municipalities with whom we have agreements for waste management and cooperation in the event of a disaster, we intend to become a more trusted corporate group by many more municipalities.



Kagoshima

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### Working to advance resource recycling

## Plastic recycling and enhancement of recycling technologies

A transition to a circular economy is essential to achieve carbon neutrality in Japan.

In waste management and recycling, it is crucial to first recover as much reusable material as possible from discarded resources and products. Since not everything can be recycled, the remaining waste must be properly disposed of. Both the recycling and proper disposal processes must be made carbon neutral.

Circular economy: The driving force for a recycling-oriented society



#### Maximizing resource recycling, minimizing proper disposal

Source: Created based on Efforts toward Resource Circulation (Resource Recycling Business Advancement Bill), Ministry of the Environment



Particularly, plastics with high CO<sub>2</sub> emission coefficients must be recycled through material and chemical recycling to minimize the amount of plastic that needs to be incinerated. At the same time, ensuring economic rationality is essential for creating a sustainable system.

The Daiei Kankyo Group is currently focusing on material recycling based on Articles 33 and 48 of the Plastic Resource Circulation Act. We are working to improve the quality of

recycled materials and develop products that meet market needs. To accurately sort waste containing mixed materials, we are also advancing technologies for automated and efficient sorting using Al. Furthermore, we are conducting a wide range of studies aimed at commercializing chemical recycling. By advancing resource recycling in this manner, we aim to maximize recycling and minimize the waste that must be incinerated or landfilled.

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## Creating Local Circular Ecological Spheres with multifaceted value for the realization of a sustainable and bright future society

#### Achieving carbon neutrality in recycling and proper disposal through the integrated treatment of general waste and industrial waste

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In terms of recycled materials, the integrated treatment of general waste and industrial waste is expected to progress further with the enactment of such laws as the Recycling Business Advancement Act,\* which is currently in the draft



stage. For waste that must be incinerated, we will use local energy centers that handle both general and industrial waste as core facilities, aiming to establish Local Circular Ecological Spheres that provide multifaceted value to the community through PPP.

These local energy centers, contributing to carbon neutrality, will supply locally produced energy for local consumption from waste while also functioning as disaster waste treatment and disaster response center in case of emergency. These centers will play an increasingly important role in creating jobs, linking with the local economy, and providing a place for environmental education. By building a strong trust with local communities, we will contribute to achieving carbon neutrality in waste management and recycling, while enhancing services for those who produce waste in a cost-effective manner.

We believe that creating new value that leads to the realization of a sustainable and bright future society is what enhances the importance of the Daiei Kankyo Group, and most importantly, it allows us to grow together with the local communities we value so much.

\* Recycling Business Advancement Act: Act on Advancement of Recycling Businesses, etc. for Promotion of Resources Recycling



#### A company with the power to create better environments-the goal we aspire to be

Creating new value that will lead to the realization of a sustainable and bright future society