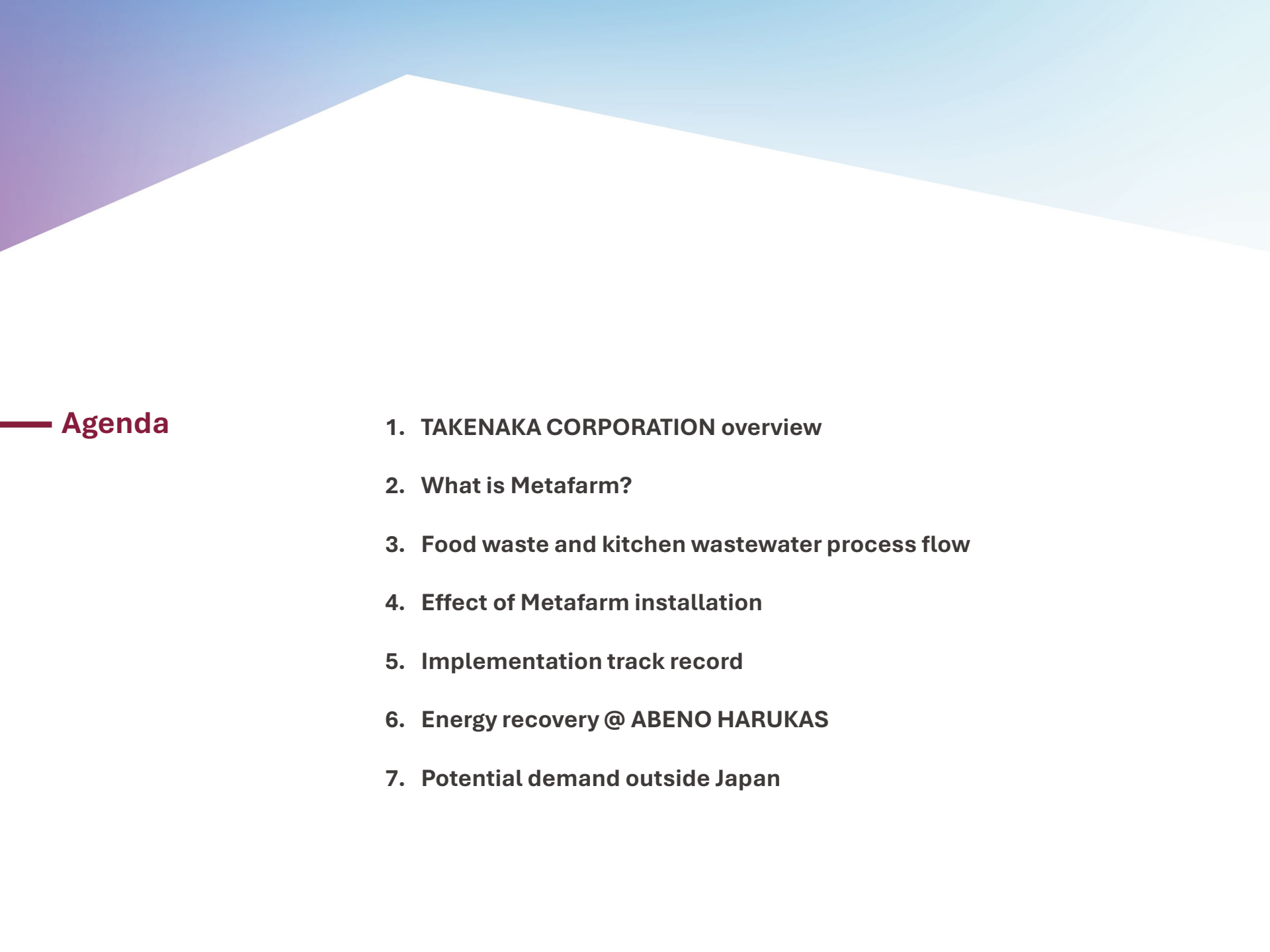


June 5, 2026

— Biogas Generation System "Metafarm"

TAKENAKA R&D Institute Tomoyuki Nara



— Agenda

1. **TAKENAKA CORPORATION overview**
2. **What is Metafarm?**
3. **Food waste and kitchen wastewater process flow**
4. **Effect of Metafarm installation**
5. **Implementation track record**
6. **Energy recovery @ ABENO HARUKAS**
7. **Potential demand outside Japan**

■ Corporate profile

- Founded :1610
- Headquarters : Osaka, Japan
- Employees: 7,907 (as of January 1, 2026)
- Sales : ¥1,615 billion (consolidated, fiscal 2025)

■ Business Areas

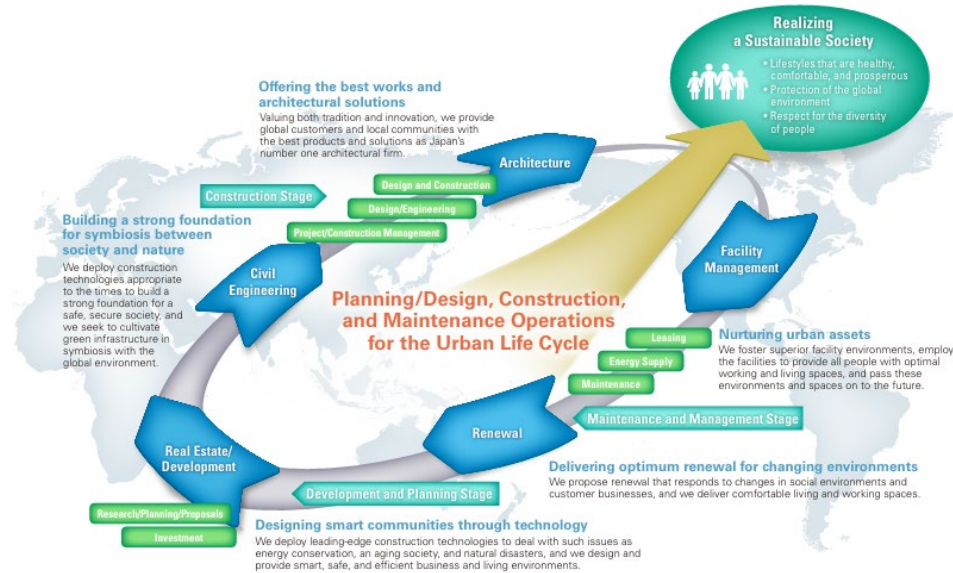
- Construction
- Design & Engineering
- Urban Development
- Environmental Solutions

■ Key Strengths

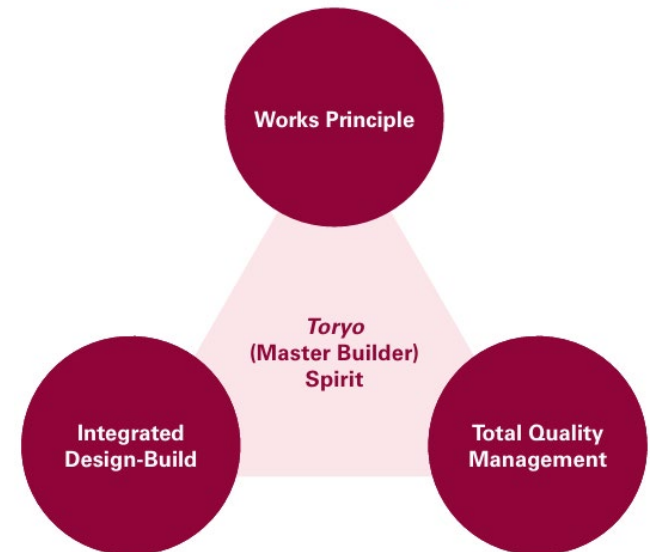
- Master Builder Spirit : Over 400 years history
- Works Principle
- Integrated design-build approach

■ Global Presence

- Operations across Asia and beyond



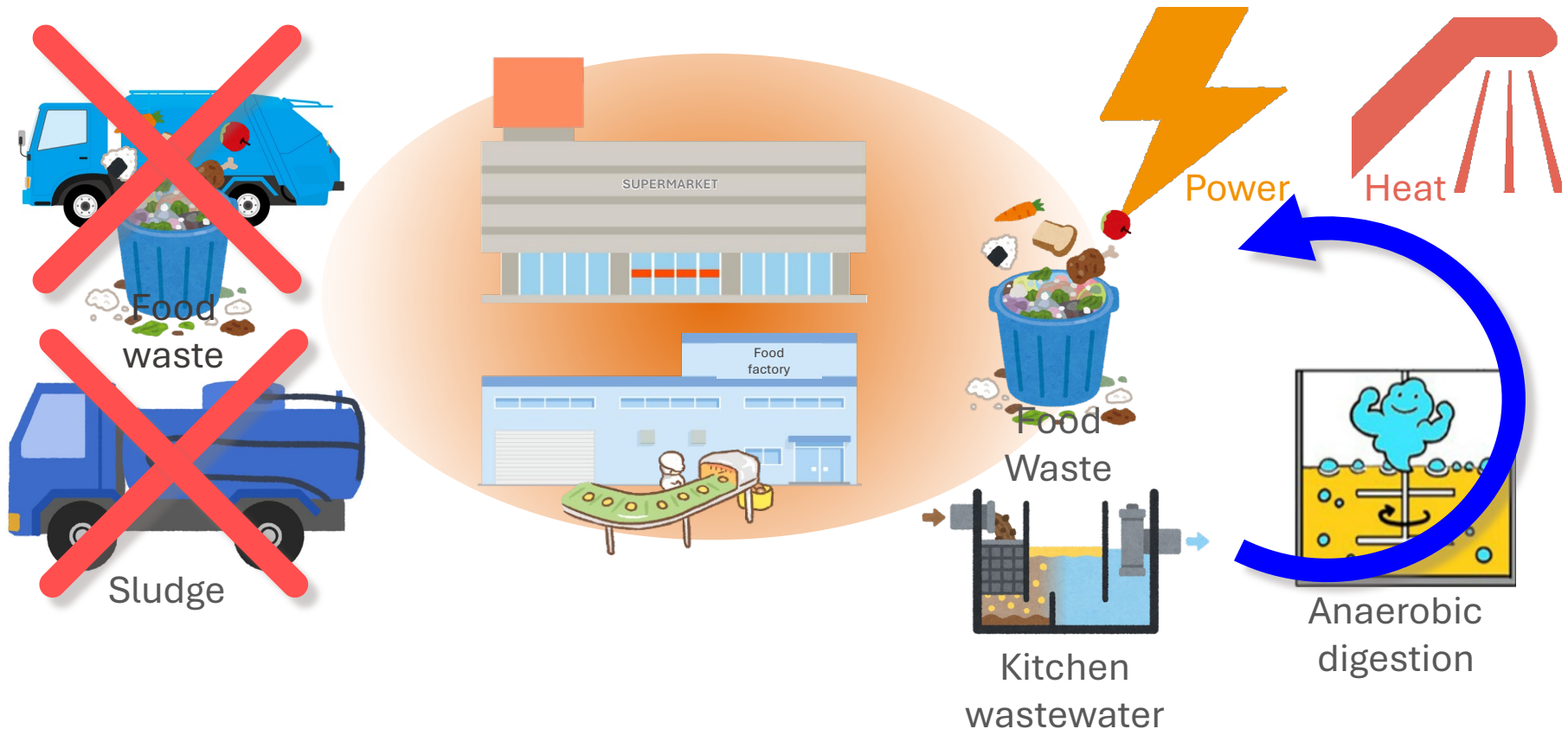
Contribute to society by passing on the best works to future generations



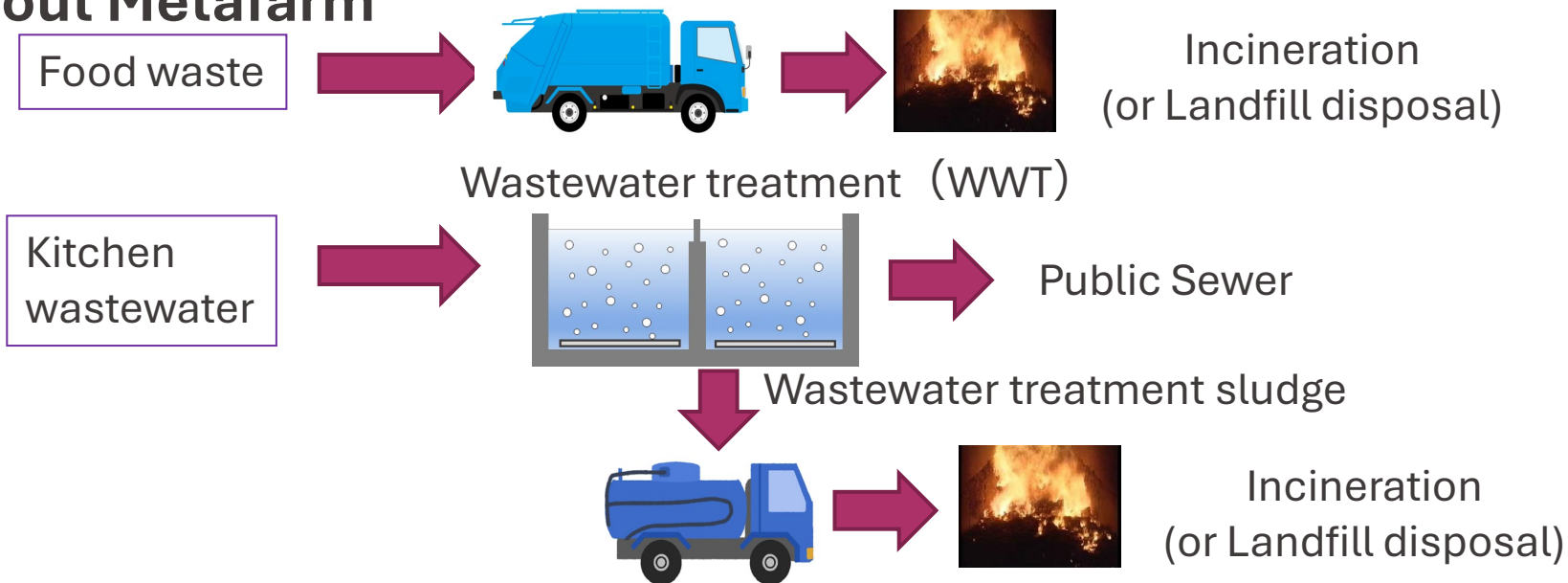
✓ Overview

Food waste and solid components in kitchen wastewater are converted into energy and recycled without being transported outside.

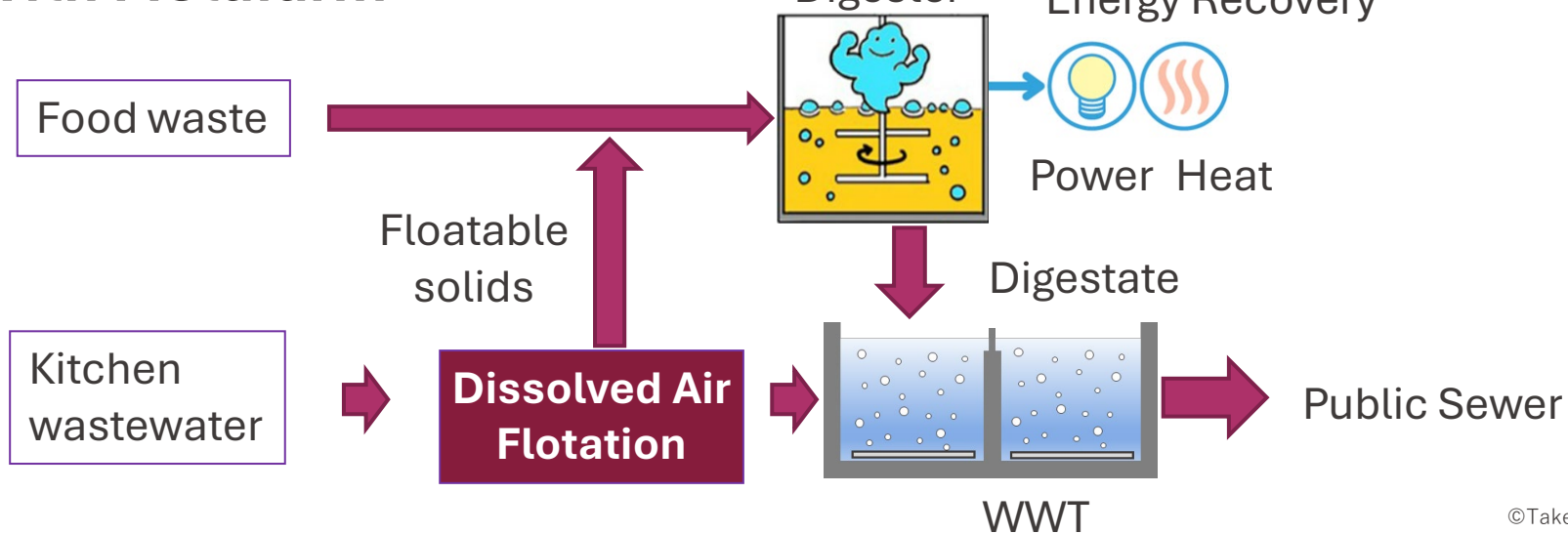
(Main objective: To reduce the removal of waste from the buildings.)



Without Metafarm



With Metafarm



The effects of processing 3 tons of food waste per day and 700 m³ of kitchen wastewater per day are as follows:

Recycle food waste to energy

Excess Energy: 40 kW × 24 H

Reduce excess sludge (kitchen wastewater treatment)

- 50% reduction
(in case reuse kitchen wastewater to non-potable water)
- 99% reduction
(in case public sewage discharge)

Return on investment

< 10 years
(In the addition of Anaerobic Digester)

Reduction of CO₂

300t-CO₂ /year

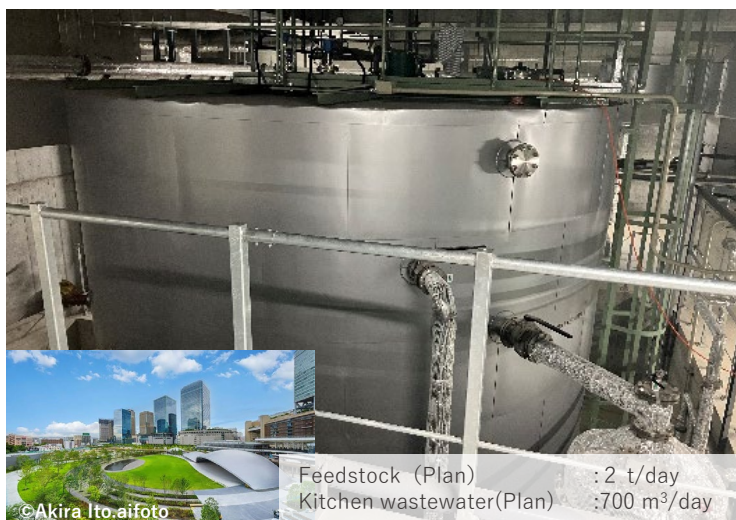
In Japan, the following four facilities are in operation:



ABENO HARUKAS(Mixed-use building)



SEVEN PARK AMAMI(Shopping Mall)



GRAND GREEN OSAKA(Mixed-use building)

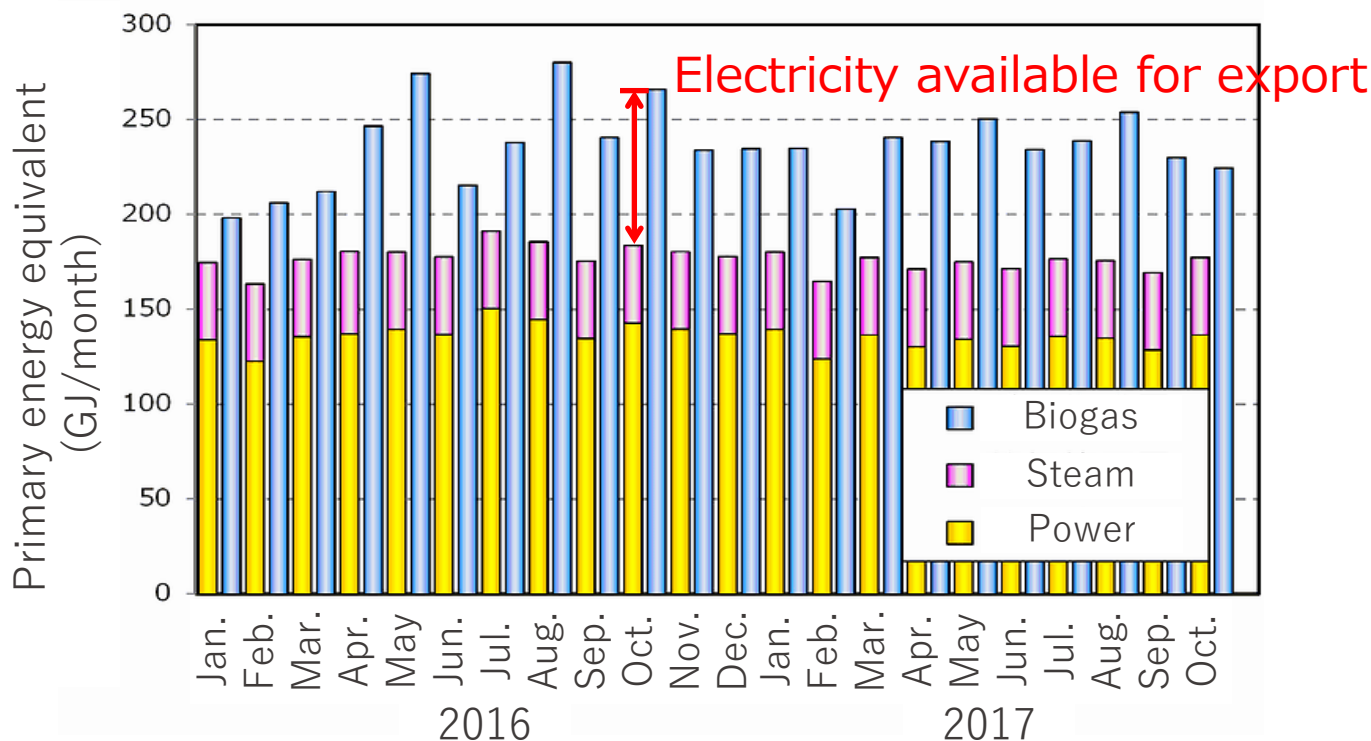


Calbee Setouchi Hiroshima Factory
(Food factory)

Food waste 2 t /day
Kitchen wastewater 600m³/day

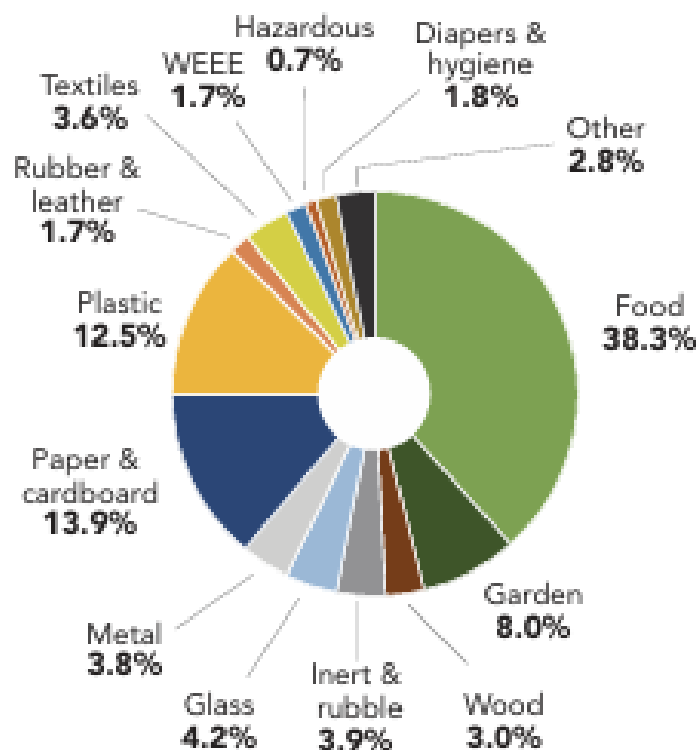


Biogas yield
 300Nm³~350Nm³/day (CH₄:70%)
 ※ Electricity available for export : **10kW**+α

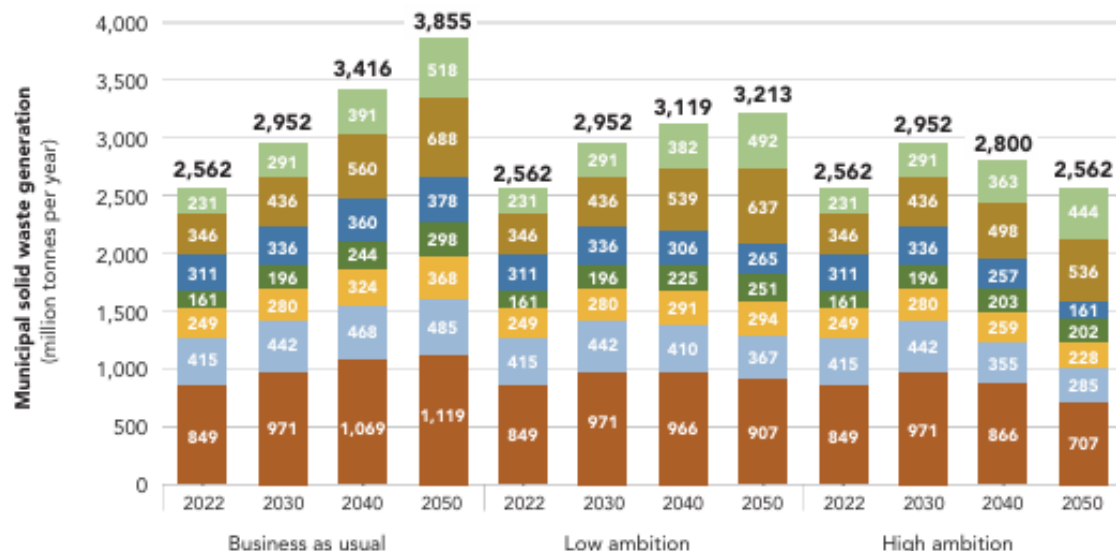


In primary energy equivalent
Biogas > on-site power & steam consumption

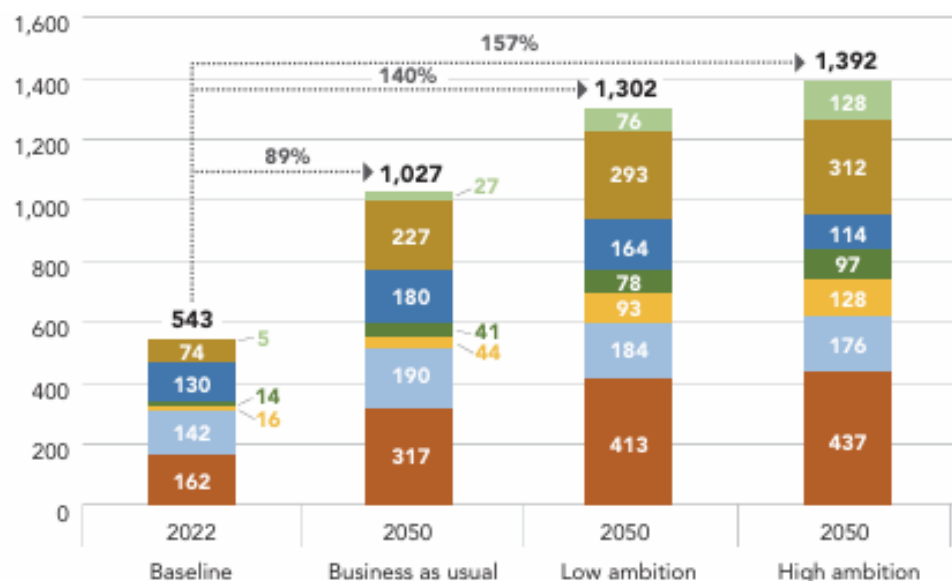
Composition and prediction of municipal solid waste



Food waste accounts for the largest proportion of municipal waste, and to reduce its generation, recycling needs to be promoted.

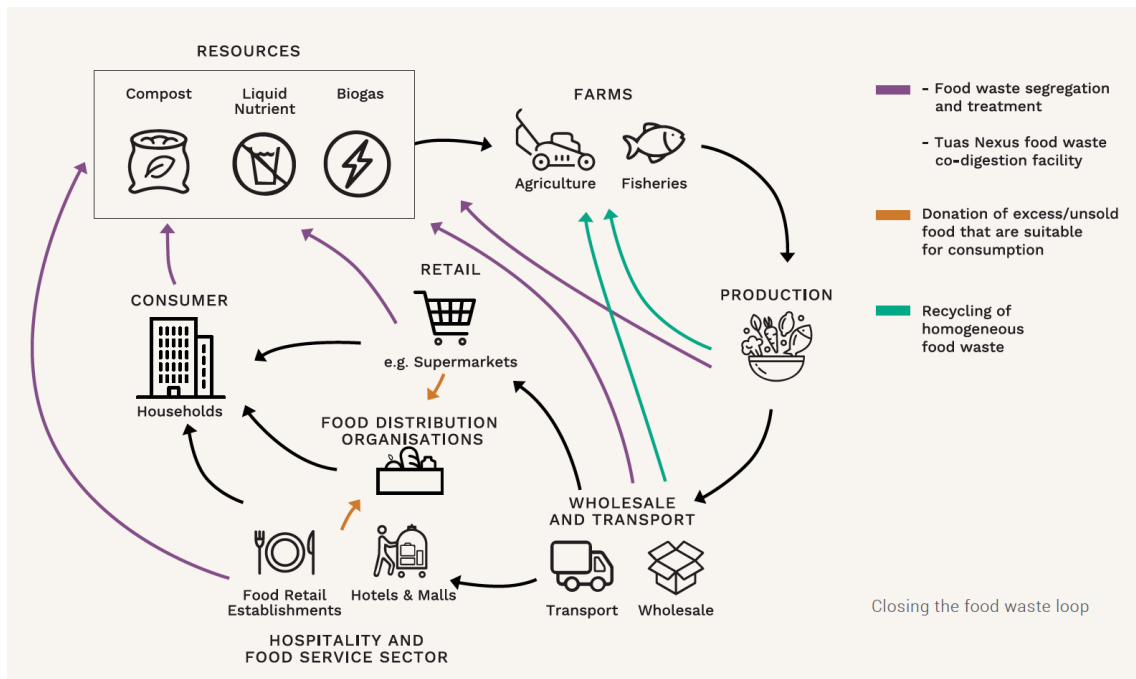


Municipal solid waste recycling, composting & AD (million tonnes)



East Asia & Pacific Europe & Central Asia Latin America & the Caribbean Middle East & North Africa North America South Asia Sub-Saharan Africa

- **Zero Waste Master Plan**
 - Plan to reduce waste by 30% by 2030
- **Resource Sustainability Act**
 - New large-scale buildings constructed from 2024 onwards will be required to separate and recycle food waste.



Source : Ministry of Sustainability and the Environment Singapore, Zero waste masterplan

We are currently exploring implementation strategies in collaboration with a venture platform specializing in deep tech startups.



Thank you very much for your kind attention.