



CASE STUDY

Singapore | Food Waste Management

Cooking Food Once, Using It Twice

High-traffic mixed development Our Tampines Hub (OTH) has pioneered a new system for more sustainable, efficient and cost-effective food waste management, by collecting food waste and recycling it into useful products.

Challenge

Eating out is a quintessential part of Singaporean culture. But this thriving food scene also generates substantial waste. In 2017, the island of 5.6 million people generated 809,800 tonnes of food waste, of which only 16% was recycled. The rest—some 700,000 tonnes of discarded and expired food—was incinerated, incurring significant economic, environmental and energy costs. The incineration ash also goes to landfill, which space-constrained Singapore can ill-afford.

In 2015, Singapore announced a vision to become a Zero Waste nation as part of its Sustainable Singapore Blueprint. The goal: an economy where unsustainable

waste generation and landfill disposal are no longer standard practices. Instead of incineration, new solutions are being sought to reduce, treat and recycle food waste.

Our Tampines Hub (OTH) is a mixed-use development providing integrated community, government and lifestyle services. Featuring a 24-hour supermarket, 30 eateries, and a hawker centre with 42 stalls, OTH serves an average of 1.5 million visitors each month and generates a significant amount of food waste daily. This presented an opportunity to put innovative waste management approaches into practice.



OTH's multiple F&B establishments generate 1.4 tonnes of food waste daily.



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Each day, up to 1.4 tonnes of food waste is taken to two digesters ... yielding useful by-products such as organic fertiliser.

Solution

OTH serves Tampines, a town of more than 250,000 people with a strong municipal focus on being green. With support from OTH's stakeholders, including the National Environment Agency (NEA), a new food waste management programme was born. OTH implemented a system that collects and channels leftovers from the hawker centre and eateries, as well as expired foods from the supermarket, to food waste digesters.

"Eco-sustainability was always a key focus of the Hub from its inception," explains OTH Director Suhaimi Rafdi. "We realised OTH had an opportunity to not only contribute towards being a Zero Waste nation, but also to serve as a platform to educate and to nurture a culture that would continually engage in practices to reduce food waste in Singapore for the longer term."

Each day, up to 1.4 tonnes of food waste is taken to two digesters in the OTH basement. These break down food waste through natural decomposition within a controlled environment, using a sludge management system consisting of a grease separator, microbial treatment and an ultra-fine filter. Microbes accelerate decomposition, yielding useful by-products such as organic fertiliser, liquid plant nutrients and non-potable water. The fertiliser is used in OTH's community gardens and landscaping, and also distributed in 180g packets to residents, community clubs and schools. The non-potable water is used to clean OTH facilities.

Beyond engineering solutions, food waste control also requires waste to be segregated and sorted, which is a matter of social practice. All F&B tenants operating within the Hub, including the supermarket and hawker centre, have to undergo comprehensive training to learn how to separate their food waste from other general waste. To ensure commitment, food segregation to support the food waste management programme is incorporated into their tenancy agreements.

Innovative food waste management at Our Tampines Hub

A look at OTH's eco-digester system

1 Food waste collection

At the **Hawker Centre**, cleaners or patrons deposit used utensils and unfinished food at the **tray return station**.



Food waste from **eateries** and the **supermarket** is manually sorted. Organic materials are collected in bins.

Non-biodegradable food waste joins the rest of the **non-food waste**.

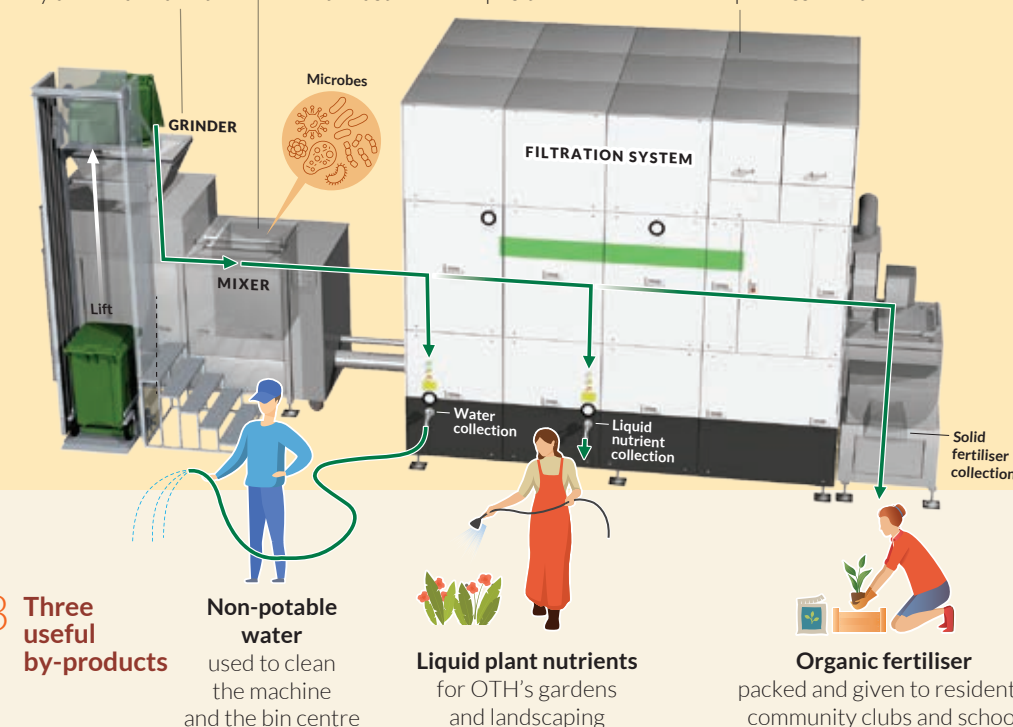
2 Eco-digester

Bins are taken to the digester twice a day.

a. Bins of food waste are emptied into a **grinder** by a mechanical lift.

b. The ground-up food waste is mixed within a drum with **microbes** to hasten decomposition.

c. The slurry is channelled to a filtration system and processed into:



3 Three useful by-products

Non-potable water
used to clean the machine and the bin centre

Liquid plant nutrients
for OTH's gardens and landscaping

Organic fertiliser
packed and given to residents, community clubs and school

Benefits

up to **1.4 tonnes** of food waste recycled daily

1 garbage truck needed daily instead of 3



01 OTH's hawker centre boasts 42 stalls, 800 seats and 24-hour dining.

02 Eateries receive a steady stream of patrons throughout the day.

“Beyond engineering solutions, food waste control also requires waste to be segregated and sorted, which is a matter of social practice.”

The People's Association (PA), the local government agency for community development which manages OTH, also runs programmes to foster community participation and education. Students, OTH staff and volunteers help to pack and distribute the fertiliser packets. Regular learning tours to the Eco-Digester Centre are held so that corporate and community partners can appreciate how waste is managed at OTH and how everyone can play a part by making it easier to segregate food waste.

02



“As a pioneer in food waste recycling, OTH faced an uphill task in convincing tenants, partners and stakeholders that this was not only the better option environmentally but commercially also,” the OTH Director recalls. He adds that OTH continues to engage closely with vendors and tenants so that the programme can be further improved.

Outcome

Today, the OTH system serves as a “living lab” for public education and an example to other developments on how to reduce food waste. After implementing the food waste control system, the number of garbage trucks needed to haul away waste each day was reduced from three to just one.



03

The financial, energy and labour savings have been apparent, along with reduced vehicular carbon emissions and improved traffic flow. Also, food waste no longer sits in facility bin centres awaiting disposal: this improves hygiene and reduces infestation by rats and other pests.

After more than a year of operation, OTH is still continuing to learn from its experiences with food waste management,

and growing the programme. More educational initiatives will be included, as well as more measures to segregate food waste and prevent non-recyclable elements—such as sugar cane stalks, hard shells, coffee powder, and non-organic materials such as plastic packaging—from entering the system. ○

01 To facilitate waste food collection, a points rewards system encourages patrons to return their trays.

02 Students from schools in the vicinity help to pack the fertiliser.

03 Fertiliser produced from recycled food waste are used in OTH's gardens.

01

