

Food Waste Recycling in Seoul, Korea

Type

- Volume based charging and food waste collection in apartment buildings

Best Practice Strategy

- 2.08 Provide Equal Convenience Disposal
- 2.11 Provide opportunities for feedback
- 2.17 Reduce food waste generation
- 2.19 Design to incorporate financial incentives such as SAYT (residential)
- 2.23 Organic waste pretreatment (residential)

Background

In the 1990s South Korea made extensive efforts to reduce the amount of waste going to landfills and to improve waste management and public hygiene. Municipalities started collecting recycling and the government started looking at introducing a pay-as-you-throw system to increase recycling collection and reduce generation of trash. Pilot projects were done in several neighborhoods, which showed an average 40% reduction in waste and 100% increase in recycling collection.¹ Previously, a fixed rate via taxes or monthly fee was charged for municipal solid waste. In 1995 the introduction of the volume-based charging scheme nationwide required



Above: Central refuse, recyclables and food waste collection area.

Left: Workers collecting food waste from the RFID bins.

non-commercial, commercial entities and individuals to pay for the amount of waste they generate. Disposing of food waste costs a resident about half as much as trash, and recyclables are collected free of charge. These measures led to an increase in Korea’s waste diversion rate for household solid waste rose from 24% in 1995 to 62% in 2017. Waste generation also decreased from 1.3kg/capita/day in 1994 to around 1.0kg/capita/day since 2012.²

The government also considered the fact that large apartment buildings typically used garbage chutes to convey garbage to the cellar where it was stored. They decided that this was not sanitary nor helpful for achieving their waste goals. So in 1991 they changed the building codes and refuse chutes were no longer allowed in new buildings, and existing buildings were encouraged to close chutes.³ The use of central waste areas instead makes it equally convenient to dispose of many different waste types, and allows for easier oversight to ensure residents separate correctly. It also allowed for easier implementation of “pay-as-you-throw” volume-based charging schemes. Korea typically collects at least 5 types of recycling (plastic, paper, glass bottles, vinyl and aluminum cans) as well as trash, food waste, e-waste and bulk waste, and having a large central room or outdoor area makes this much easier.

In 2005 a law was passed prohibiting the landfilling of food waste, and Korea introduced further policies and equipment which have reduced the generation of food waste. Now only 3-5% of food waste ends up in landfills. These included prioritizing methods which charge the individual over those which charge the building for the total amount of food waste within communal bins. These include 3 methods, based on designated bags, tags or use of an RFID food waste bin.

For the bag method, individuals and small-sized commercial entities are required to purchase pre-paid bags for food waste, in 1.5 to 10-litre sizes. For the tag system a prepaid waste slip has to be attached to a designated food waste bin. For apartment buildings, Radio Frequency Identification (RFID) bins incentivize households to reduce the amount of waste they put in communal bins, without the use of designated plastic bags. Each resident has an individual identification card that they use to operate the RFID bin. They tap the card on the screen, and if there is space the lid opens and they can dispose of their food. The screen displays how full each bin is. Each household receives a monthly food waste disposal bill. The RFID bin system has been shown to reduce food waste generation by 30% compared to communal food waste bins.⁴

Food waste treatment process - ① Disposal of food waste

✔ General customer disposes of garbage using either a designated envelope, a designated container with a payment receipt (chip) attached, or a weighing device (RFID).



✔ Producers of large amounts of waste either dispose of their own waste or entrust the disposal of waste to a disposer authorized by the local government.

1. https://seoulsolution.kr/sites/default/files/policy/2%EA%B6%8C_Environment_Pay%20as%20you%20throw%20system%20oE%20Seoul.pdf
<https://publications.iadb.org/publications/english/document/South-Koreas-Experience-with-Smart-Infrastructure-Services-Integrated-Solid-Waste-Management.pdf>
2. https://s-space.snu.ac.kr/bitstream/10371/90501/1/4_Strategies_for_Developing_Responsive_Solid_Waste_Management_in_Seoul_City_Institutional_Arrangement.pdf
<https://www.youtube.com/watch?v=VgUYTgwPKn8>
3.
4.

Seoul, a city of 25 million residents, which is twice as densely populated as NYC, is also promoting the use of food waste equipment to dehydrate and biologically break down the waste, reducing the volume by 80-85%. Incentives of 35-65% of the equipment cost is given to large apartment buildings, and it is recommended that they are installed in all new large apartment buildings. This reduces pollution from collection vehicles and is necessary because of the difficulties in establishing food waste infrastructure in Seoul. Some buildings use the fertilizer in their gardens, and there has been an urban farming boom in the country, as city governments often fund 80-100% of the initial installation fees.⁵

Most districts have a designated hauler for collecting food waste, but alternative licensed recycling businesses or those using the food waste for livestock feed or compost may be used. Food waste is typically collected by 1 or 5 ton trucks although 11 ton trucks may be used if the facilities are located far away. Most food waste is converted to fertilizer or animal feed, and anaerobic digestion is also used to produce biogas or bio-oil.

Challenges & Opportunities

The RFID bins have been generally effective in collecting food waste, but there is still some confusion about how to use them, and frustration when the bins break and are down for maintenance. Although many residents say that the new food waste collection system can be inconvenient, they do agree that it has helped them become more environmentally conscious and reduce the amount of food they purchase. It has also led some to seek solutions to reduce the weight of their food waste, by manually draining and squeezing out liquids, or

buying household-sized units to squeeze out water and dry the food waste. The promotion of community urban farms has helped provide a local use for some fertilizer generated in buildings, but Korea has had challenges finding markets for the product. This could change as the price of fossil-fuel based fertilizer continues to rise, especially if Korea is able to produce a consistent quality product which it can sell to agricultural customers.



Above: Rooftop community garden in Seodaemun-gu.

Left: A food waste dehydrator.

5. https://www.koreatimes.co.kr/www/nation/2018/10/281_256714.html