Tokyo's waste management system

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In many ways Tokyo is so very similar to London, although its population of 8.8m people is 10% higher and therefore comparable to the London region inside the M25.

Tokyo is one of Japan's 47 prefectures. Each of the city's 23 wards is responsible for waste collection and disposal. However, up until 2000 the whole city's waste collection and disposal was centralised but in that year the government initiated a system of decentralisation of local government services.

Nevertheless there is still a central body, the Bureau of Environment under the Tokyo Metropolitan Government that deals with the ultimate strategic waste disposal option because Tokyo has access to only one landfill site. A further central organisation, the Clean Association of Tokyo 23 has also been established by the 23 wards in order to provide themselves with certain common services and facilities, such as the two processing centres for incombustible waste, a pulverisation plant for bulky refuse, the Chubo ash melting facility, most co-located near the former Central Breakwater Inner Landfill, now under restoration.

Modernisation in 1964

Up until the early 1960s Tokyo's waste was collected from strategically located permanent street containers by collectors, loaded into hand carts and taken to the local incineration plant. The decision to award Tokyo the opportunity to host the Olympic Games in 1964 meant that the whole waste collection system was modernised. Even today there are elements of the pre-1960 arrangements evident. Householders are expected to bag up and deposit their waste at strategic locations in the street on the basis of 10-20 households per point, giving around 250,000 places throughout Tokyo for household waste deposition. Those translucent plastic bags now act as the containers.

The Minatao incinerator which is located in central Tokyo

The collection equipment is also very modest in size compared to the European/North American/Australian norm with small two axle collection vehicles with a payload of only 2 tonnes but with staffing set at driver and two loaders. However, the distances that these vehicles have to travel before unloading at transfer stations or the incineration plant is generally less than 3km.

Collections

Household waste in Tokyo is required to be separated into the following categories, usually collected according to the following frequencies, but with some ward by ward variation:

- Packaging and paper - once a week
- Combustible fraction - twice a week
- Non-combustible fraction - once a month or twice a month

- Bulky waste - once a week

In 2007 plastics, which had been required to be placed by households in the non-combustible fraction, were allowed into the combustible fraction. Previously it had been the concern with potential pollution from the burning of plastics which had precluded its joining the other combustible components. In consequence, following this change, the non-combustible waste collected halved and the municipalities had to adjust collection frequencies to increase that for the combustibles and reduce for the non-combustible fraction.

Incineration

There are 21 incineration plants serving the 23 wards in Tokyo. The largest is Shinkoto, with a capacity of 1800 tpd and the smallest handles just 200 tpd. All of the incinerators constructed since 2002 have ash melting furnaces. In addition, a specialist plant out in the bay area provides a facility for other plants for turning their bottom and fly ash into a vitrified slag, a very energy intensive operation which detracts from the overall energy recovery efficiency of the plants. All but one of these ash processing plants utilises plasma arc technology. However, the vitrification does encapsulate toxic components in the vitrified slag and halves the ash volume.

While the slag can be used for a number of purposes, such as civil engineering as sub-base for roads or as a constituent for block manufacture, when it is to be re-utilised from those original purposes it ought to be regarded as industrial waste and disposed of to landfill, a costly procedure. Hence much of the slag is used as engineering material within the landfill.

Landfill

There have been a number of landfill sites used to serve Tokyo, most located next to Tokyo Bay but the most recent have been associated with land reclamation schemes in the middle of Tokyo Bay. Although block A is now starting to be restored to create a forested area it still accepts waste and it is cell B which is now should be the more active site but both blocks are accepting less and less waste. The 199ha block A landfill site accepts incinerator ash and the non-combustible and non-recyclable waste generated from processing bulky waste and the incombustible fraction of household waste together with some industrial and commercial wastes. Cell C is being prepared, in that the outer wall has been constructed to cut it off from the sea, and there are plans for Blocks D-G. The limit is actually determined by the political boundary with Chiba prefecture which forms the extreme south eastern boundary of the Central Breakwater Outer Landfill Site.

The former central breakwater inner area landfill, mainly filled in the 1950s with 12.3m tonnes of waste and which finished filling in 1961, has the distinction of being Japan's only landfill gas recovery project, generating a maximum of 180kW from a fairly lean gas mixture (43% methane). In addition, there are two wind turbines (1,700kW maximum output) and a 20kW photovoltaic array on the site.

The amounts of household waste sent to landfill over the past few years has fallen dramatically, partly in response to Japan's long period of slow economic growth but also due to increasing intermediate treatment for Tokyo's waste. Therefore, while landfill of Tokyo's MSW accounted for a million tonnes in 1998 it was reduced to less than 400,000 tonnes in 2009.

The overall cost of waste collection treatment and disposal in Tokyo not surprisingly is very high in comparison to other capital cities totalling Y59,130 (almost £450/€500/$750) per tonne in 2009, made up of Y37,341 for collection and incineration and Y21,789 for treatment and landfill.