

Chapter 7

SOLID WASTE

Beijing was upgrading its aging waste management system well before the city was awarded the Games in 2001.

Over the past three decades, investment in solid waste treatment and classification facilities combined with new regulations, policy frameworks, technology and education campaigns have transformed the city's approach to solid waste management.

A Beijing canal with visible pollution photographed on 2 August 2008, the same week as the Olympic Games Opening Ceremony.

In UNEP's 2007 Environmental Review, waste management was identified as an area where Beijing was close to achieving its goals set during the candidature phase. Of note in the interim is that Beijing experienced its fastest population growth for the past five years in 2007, largely due to an influx of migrant labourers recruited to work on infrastructure projects for the Olympic and Paralympic Games.

The efforts of planners to achieve the city's waste management goals, including supporting the sanitation demands of new arrivals before and during the Games, provide many lessons which can inform similar exercises in areas that are also facing waste management challenges due to rapid population growth.

This chapter provides a final overview of the efforts made in Beijing to keep the city's waste-related Olympic bid commitments in two areas—domestic solid waste and medical and radioactive hazardous waste. Bid commitments are listed for each area, and existing and planned programmes and infrastructure are evaluated according to their

contribution towards achieving the commitments. An additional section discusses waste management in Olympic venues.

7.1 DOMESTIC SOLID WASTE

The Beijing bid committed to the establishment of a safe urban domestic waste disposal system capable firstly of sorting, or classifying, 50 per cent of all domestic solid waste in the city, and secondly, able to recycle 30 per cent of all domestic solid waste produced within the city by 2008.

Infrastructure and programmes

Beijing's waste management system has been transformed from traditional open-air storage to a system of sanitary landfills and integrated treatment facilities.

Solid waste treatment improved substantially when A-suwei landfill opened in 1991. A-suwei was influential in ending open-air waste storage and established a new waste management standard which triggered the construction of several other landfills,

incineration and composting facilities. Figure 7.1 indicates the number of waste treatment facilities, including composting and incineration facilities, increased from 17 in 2003 to 32 in 2008.

In addition, the city invested in waste classification facilities. Two waste sorting lines were recently completed in downtown Chaoyang District—one, built in Xiaowuji transfer center, is a spectral imaging-based sorting line with a daily capacity of 150 tonnes, and a second, built in Datun transfer center, is an automatic sorting line with a daily capacity of 100 tonnes. Both centres are situated within 3 km of the Beijing National Stadium, the 'Bird Nest'.

New regulations and policy frameworks compliment the improvements to Beijing's physical infrastructure. Certain shops are now required to charge for plastic bags, which has led consumers to reuse cloth bags. A domestic waste compensation mechanism, introduced in 2007, has made solid waste collection more efficient. Under the

programme, waste-generating areas pay 50 yuan (US\$7) to waste-disposing areas for every tonne of waste to be treated.

Technological improvements and education campaigns also contributed to advancements in waste management. Research conducted in preparation for the Games resulted in a series of technological breakthroughs, including ultra-fine powders produced from rubber tires and chemical paints produced from plastic wastes.

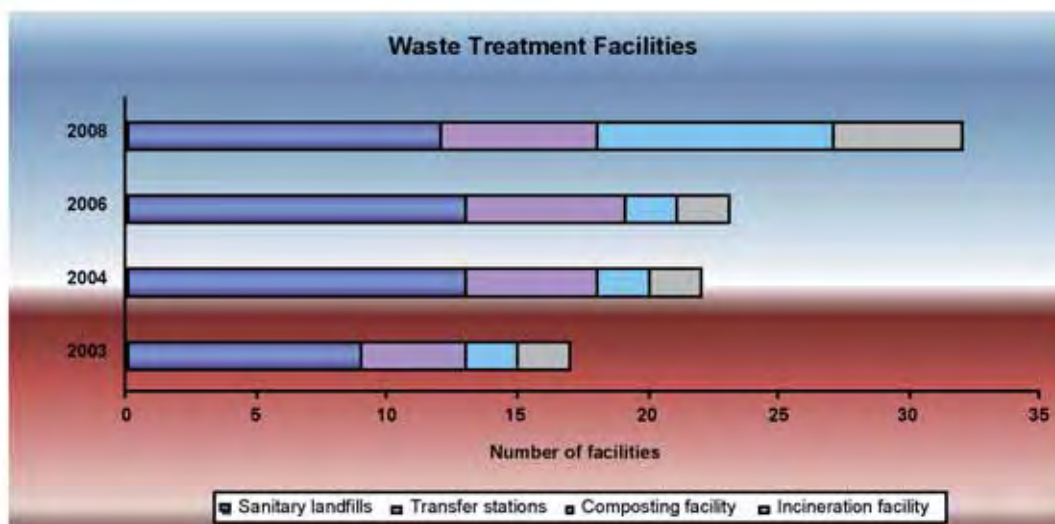
Education programmes and campaigns included a Recyclable Waste Collection Day that showcased successful recycling experiences, a creative Olympic public service advertisement that encouraged people to do small things on a daily basis to protect the environment and school environmental programmes that allowed students to exchange used paper for flower seeds, pencils and notebooks.

Fulfilment of Olympic bid commitments

Beijing made progress towards developing a safe urban domestic waste disposal system. The rate of safe disposal (i.e. landfill, incineration and composting) declined sharply in 2003, but has since increased as shown in Figure 7.2).

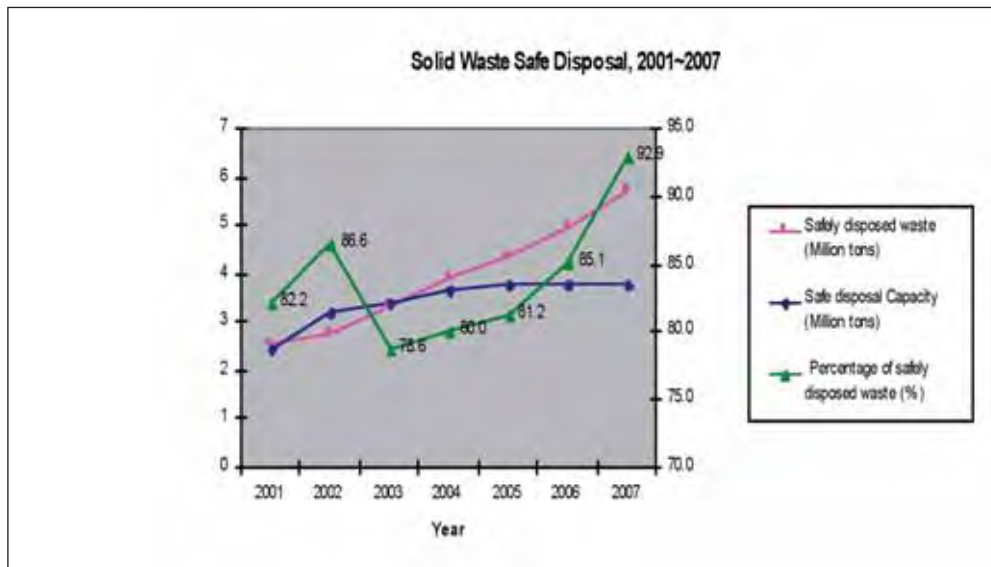
In 2004, approximately 81 per cent of waste generated in the city was disposed of safely, while 93 per cent was disposed of safely in 2007. However, the amount of safely disposed waste exceeded designed treatment capacity because safe disposal capacity remained constant from 2005 levels while waste production continued to increase. This has resulted in a gap between the treatment capacity and actual treated amount. For example, the designed daily capacity in Liulitun landfill is 1,500 tonnes but the facility accepts up to 2,500 tonnes on a daily basis. The

FIGURE 7.1: WASTE TREATMENT FACILITIES IN BEIJING MUNICIPALITY, 2003-2008



Source: Beijing Environmental Protection Bureau

FIGURE 7.2: SOLID WASTE SAFE DISPOSAL



Source: Beijing Environmental Protection Bureau

lifetime of the Liulitun landfill has been shortened by seven years as a result.

Nevertheless, Beijing surpassed the Olympic bid goals for waste classification and recycling. In 2007, the waste classification rate reached 52 per cent and the recycling rate reached 35 per cent. The achievement of this goal is almost certainly related to waste classification and recycling efforts. By 2007, waste classification and recycling services in 2,255 residential communities, high-rise buildings and industrial areas covered 27 per cent of the population of the city.

7.2 MEDICAL AND RADIOACTIVE HAZARDOUS WASTE

The Beijing Olympic bid contained a commitment to construct hazardous waste management facilities, including medical and radioactive waste processing and disposal plants, with an annual disposal capacity of approximately 10,000 tonnes.

Infrastructure and programmes

Beijing has invested heavily in medical and hazardous waste treatment facilities over the past

seven years. There are currently eight certified hazardous waste treatment plants in Beijing, of which two are for medical waste and six for hazardous waste.

In addition, the Beijing Environment Protection Bureau (EPB) conducts clean production audits at steel plants, funds the processing of spent battery and exhausted commercial lights at Eco-Island hazardous waste treatment plant and relocates high polluting factories away from the city.

Fulfillment of Olympic bid commitments

Of the 40,000 tonnes of hazardous waste produced in Beijing in 2008, approximately 30,000 tonnes were incinerated and 10,000 tonnes were recycled. This is a major accomplishment considering annual hazardous waste treatment capacity was 2,000 tonnes in 2001.

The disposal capacity in 2008 clearly exceeds the Olympic bid commitment. However, authorities attest that the total production of hazardous waste is much larger than the treatment capacity of certified facilities. In order to partially fill unmet demand, two new facilities are

undergoing pilot tests and are expected to be in full operation later this year. In total, there will be ten hazardous waste treatment facilities in operation by the end of 2009.

7.3 WASTE IN OLYMPIC VENUES

In addition to domestic solid waste and hazardous waste commitments, the city established a goal to classify 100 per cent and recycle 50 per cent of all waste generated in Olympic venues. Beijing attempted to reach these goals through initiatives led by the city and Olympic sponsors. No information was available about steps taken at Olympic venues outside Beijing.

Much of the progress toward achieving Olympic venue commitments occurred because of the efficient processing of food waste. Upon signing an agreement with the Beijing Municipal Administration Commission in 2007, 155 participating governmental organizations, Games contracted hotels, and 31 venues committed to standardized food waste collection and disposal practices.

The Coca Cola Company, a Worldwide Partner of the

Games, formed a joint effort to send all waste beverage containers generated in the venues to Yinchuang waste treatment plant for recycling. All garbage containers in the venues were made of recyclable and biodegradable materials.

Approximately seven per cent of food waste was composted in on-site facilities through microbiological processes, and the products were used as fertilizer, manure or animal feeds. The remainder of food waste was transferred to certified food waste treatment facilities outside the venues for safe disposal and reuse.

Olympic organizers achieved their goal of 100 per cent waste classification and 50 per cent recycling in venues. All competition and non-competition venues practiced 100 per cent solid waste classification and 4,688 tonnes of waste generated in the venues was recycled. This is a 73 per cent recycling rate.

7.4 COMMENTS AND RECOMMENDATIONS

Beijing achieved its domestic solid waste, hazardous waste, and Olympic venue classification and recycling commitments. Waste classification and recycling goals were exceeded by 2 per cent and 5 per cent, respectively. Further, hazardous and medical waste treatment facilities were expanded and updated, all solid waste was sorted in venues, and the in-venue recycling rate was 23 per cent higher than the committed level.

It is still difficult to determine whether or not Beijing has a safe urban domestic waste disposal system. However, efforts by city planners are resulting in progress toward this goal. The waste classification and recycling rates for the city are expected to reach 60 per cent and 40 per cent respectively by 2010. It is further



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expected that the safe disposal rate for downtown and suburban districts will reach 99 per cent and 90 per cent respectively by 2012 and that the recycling rate will reach 45 per cent.

These goals will be met, at least partially, by four new waste disposal plants expected to be completed by 2010. The first two are located in Liulitun and Gao’antun and will service the eight downtown districts. The remaining two are located in Nangong and Dongcun and will service the eight suburban districts.

Despite these estimates and new facilities, additional policies and infrastructure could be used to increase waste treatment efficiency and capacity. Planners should pay particular attention to the suburban districts of Beijing municipality that have experienced rapid growth in recent years. The growing population produces an increasing amount of domestic waste which strains sanitation processing capacity. Even greater financial resources may be needed to improve waste classification, recycling and safe disposal in these areas.

Planners should also develop economic incentives to compliment waste reduction,

classification, and recycling education programmes. One possibility is to reform the refuse disposal fee programme. Fees in areas practicing waste classification are the same as areas that do not practice waste classification. Since fees are charged based on the cost of waste transfer, the full cost of waste treatment and management is not borne by the waste generators. This leads to two problems: First, the waste management department receives less revenue, and second, waste treatment is not fully valued by the public. As a result, waste management improvements are slow to occur.

Additional possible steps in the area of waste reduction, classification and recycling include more comprehensive policies and regulations, increased economic incentives that facilitate engagement by more stakeholders, and better performance analysis and evaluation methods. Beijing could also increase safe disposal capacity of domestic and hazardous waste within the city.

A cleaner rides a special bicycle with a recycled waste container.

Beijing’s Beishenshu Landfill is the first in China to feature a Water-Biogas Associated Treatment System.



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