

Municipal Solid Waste: turning a problem into resource

The management of municipal solid waste (MSW) is not just a public service, it is also an important economic sector. The sector is worth USD 390 billion in both OECD and emerging countries, and provides up to 5% of urban jobs in low-income countries. Global MSW production is projected to double in the next 15 years. MSW management in developing countries is currently inadequate, posing a challenge, yet also an opportunity for private sector.

Alexandra Le Courtois

Urban Specialist, World Bank¹

The solid waste market is not just a public service, it is also an important economic sector, which is worth USD 390 billion in OECD countries (Chalmin, P., Gaillochet, C. 2009) and large emerging economies combined, and provides up to 5% of urban jobs – including waste pickers – in low-income countries. As the world continues to urbanise and develop economically, waste production is growing steadily, with stronger trends in developing countries. In this global waste market, MSW, which refers to the waste generated by residential, commercial and institutional activities, occupies about half of that market (Box). Considering that MSW management in developing countries is insufficient today, the

challenge in these countries will be considerable in the years to come. At the same time, the sector will offer great opportunities for private sector participation and for revenue-making businesses.

A CHALLENGE FOR CITIES

MSW has significant negative externalities, with impact on the environment and health. Uncollected solid waste in cities provides a favourable habitat for insects, vermin, and scavenging animals, which proliferate and spread air- and waterborne diseases such as plague, dengue fever and diarrhoea among local populations. When not disposed of with sound sanitary practices, leachate² produced

by accumulated MSW can leak into the environment and contaminate ground water and surface water. MSW also contributes to some global environmental challenges, such as the increase of greenhouse gas (GHG) emissions in the atmosphere – contributing almost 5% of total human-based GHG emissions (Hoorweg, D., Bhada-Tata, P., 2012). Open burning in dumpsites releases particulates as black carbon and persistent organic pollutants, which bioaccumulate in the food chain. In addition, many cities engaged in flood management programs recognise that uncollected solid waste – which blocks drains – is a major factor causing flooding. Sound waste management is thus a daily matter for local public authorities aiming at offering a safe and quality environment to their residents.

Global urban MSW production, which has nearly doubled in the last 10 years, is projected to double again in the next 15 years, increasing from 1.3 billion tons a year in 2010 to 2.2 billion tons a year in 2025 (Hoorweg, D., Bhada-Tata, P., 2012). The increase is mostly attributed to developing countries, where it is driven by the combination of high urbanisation rates and economic development. When revenues increase, consumption, and consequently, waste production, do too. In developing countries, the per capita waste generation rate ranges from 0.4 to 1.1 kg per day, reaching in some urban areas 2.4 kg per day and more in tourist areas. In poorer settlements, the values can be much lower³ (Chalmin, P., Gaillochet, C. 2009). MSW services vary largely by country, as prac-

“In developing countries, the per capita waste generation rate ranges from 0.4 to 1.1 kg per day.”



ALEXANDRA LE COURTOIS

Alexandra Le Courtois is an urban specialist in the World Bank's Central Urban Advisory Unit. She has ten years' experience working in and with cities and other local governments in France and in developing countries. Her professional focus spans broad urban issues such as urban upgrading, housing, integrated land planning, and municipal service. She holds master's degrees in civil engineering and in urban management.

¹Disclaimer: This article is a personal contribution by the author. The positions expressed do not necessarily reflect the views of the World Bank, the Executive Directors of the World Bank, and/or the governments they represent.

²Leachate refers to liquids that migrate from the waste carrying dissolved or suspended contaminants. It results from precipitation entering the landfill and from moisture that exists in the waste when it is disposed.

³In developed countries, waste generation rate averages 1.4 kg per day (and up to 2 kg per day in the United States). There might be minor differences in values according to the sources.

tics are guided mostly by the availability of financing and ecological awareness. The quality of MSW services in developing countries is improving, but is still lagging behind developed countries. Local authorities rarely offer universal service coverage and sanitary waste disposal. Priority is usually given to collection, rather than disposal. This is aimed at offering a safe and healthy living area for residents, but is also guided by electoral concerns. On average, collection coverage is 41% in lower-income countries and 85% in upper-middle income countries, but can be as low as 10%, as in Parakou, Benin, and as high as 100%, as in many large Chilean cities (Hoornweg, D., Bhada-Tata, P., 2012). Collection also varies according to the waste type and urban location. It is relatively high in industrial, commercial and institutional areas, because costs are lower and payment is better obtained. In contrast, residential waste is more scattered, and thus, collection requires more time and longer distances for the same quantity of waste.

“MSW [...] can comprise as much as half of the municipal budget in many low-income countries.”

Downtown areas, where businesses and hotels usually are concentrated, usually have regular and high-quality collection systems.

Ecological concerns have emerged recently in developing countries, which explains the variation in disposal practices with respect to their environment impact. In fact, open dumping is still the predominant mean of disposal. For example, in the Latin American and Caribbean region, about 60% of the waste ends up in dumps (Hoornweg, D., Giannelli, N. 2007). Provision of sanitary landfills is increasing though, with some facilities meeting international standards. Incineration, which is used in some developed countries, such as Japan, is limited in developing countries because of its high costs and the associated stringent operating requirements.

THE FINANCIAL DILEMMA AND PRIVATE SECTOR PARTICIPATION

Developing countries spend around USD 46 billion annually on MSW management, but it is estimated that they should spend another USD 40 billion to cover the service delivery gap. Considering the projected increase in MSW generation, their financing needs could surpass USD 150 billion annually by 2025

(Hoornweg, D., Bhada-Tata, P., 2012). MSW is often an important budget item for municipalities, and can comprise as much as half of the municipal budget in many low-income countries. Considering the actual gap between MSW costs and the funding of these, and the forthcoming growth of the waste sector, local authorities must enhance their service efficiency and access other sources of funding if they wish to lower the burden on their finances. Public authorities in some middle-income countries – as in developed countries – establish financial schemes to internalise the cost of waste externalities, through a direct fee to the waste generator or a tax on the product used (which adds to the purchase price). But in low-income countries, a residential user fee is largely untapped, with low collection fees. Very often, the issue is not an unwillingness to pay, but improper price setting relative to the low quality of service.

As with many public services, the private sector can provide many benefits. First, it allows for part of the financial costs of MSW to be transferred out of the municipal budget, either for investment, operation, or both. Thus, private sector participation may be a way of assisting the public sector to address the huge financial shortfall. Second, always seeking to reduce financial losses and improve service effectiveness, the private sector is more likely to provide a high-quality service at a lower price, whereas due to a lack of incentive, the public sector often fails to achieve this (Kessides, I.N. 2004). In addition, community-based enterprises prove more innovative in proposing suitable and cheap solutions in slums. In fact, the MSW sector has already started this shift from public to private operation, with the private sector largely active in waste collection, and some successful experiences – notwithstanding failures too – suggesting great potential for the private sector operation of landfills and recycling activities. In this context, local authorities are moving from service operation to service management. The challenge is to build the capacity among local governments to prepare and negotiate contracts and control contract implementation.

NEW BUSINESS OPPORTUNITIES

The natural resources market faced huge price increases in the early 2000s up to the financial crisis in 2008, raising awareness of the limited availability of fossil energy, mineral resources, and agriculture and forest products, and questioning the model of our consumer society.

One solution to limiting the human impact on the planet could take the form of using waste as a valuable resource, either as a form of energy production or for reuse and recycling ►►

FOCUS

The World Bank is a vital source of financial and technical assistance to developing countries around the world in helping to reduce poverty. With regard to cities, its Urban Development and Local Government Unit plays an important role in helping governments address the challenges that come with urbanisation. Established in 1944, the World Bank is headquartered in Washington, D.C. and has more than 9,000 employees worldwide.

▶▶▶ with access to the global market of secondary materials such as scrap metal, paper, or cellulose fibre or local markets such as compost.

The world produces four billion tons of all types of waste per year, but only a quarter is currently diverted from disposal. Even with the high prevalence of valuable products in MSW, such as cardboards, plastics, glass, and metals (up to 50% in developed countries), the recycling and waste valorisation chains have been hardly profitable, considering the low prices of recycling materials on the global market. Only in 2007-2008

“Most recently, the international market [...] exhibited recycling material price increases.”

did the prices of waste-derived materials – pulled up by five-time price increases on energy and primary material markets – grew substantially enough to incentivize the recycling industry. But those prices fell again after the 2008 financial crisis, showing high price volatility and bringing into question the sustainability of the sector. Most recently, the international market again exhibited recycling material price increases, which may this time prove the potential of the sector in a very consumerist world (Kelly, T., Matos, G. 2011).⁴

In developing countries, the recycling sector is very different in many respects compared with developed countries. With very little experience of public incentive, the sector benefits from very cheap labour, driving its local-market-based profitability. Recycling is mostly run by the informal sector involved in waste separation. For this reason, data is scarce, making it impossible to properly estimate the genuine rate of waste diversion. Usually, countries report low levels of waste diversion, except for South Korea, which claims a 49.2% MSW recycling rate (Chalmin, P., Gaillochet, C. 2009). Overall, valuable products, such as glass and metal scarp, nearly never enter the formal waste stream, tending to prove that a certain level of recycling probably exists in this segment. But considering the large amounts of waste disposed of, there is an obvious untapped potential for waste diversion.

As an example of the potential of the sector, composting is a promising recycling chain in developing countries, considering the very high organic content (around 50/80%, mostly food waste) and high moisture levels of MSW, as well as its associated finance-enhancing possibilities: revenues from the sale of com-

post, cost reductions from avoided transportation of waste if composting is operated within the community, and from avoided disposal costs (including the price of land) (Hoorweg, D., Bhada-Tata, P., 2012). Moreover, composting has also positive social impacts, by creating jobs. Yet, except in Europe and few Asian countries, composting is insignificantly developed. The many failures of the sector show its fragility and the need for public intervention to strengthen the regulatory framework and attract the agriculture sector.

In the way forward, how can developing countries move from an informal sector to a more integrated and systematic approach to waste diversion? Based on the experiences of developed countries, the role of public authorities is paramount to creating a favourable environment and supporting the sector's sustainability. In this regard, the implementation of urban policies to encourage recycling commitments from municipalities as well as economic policies to promote the use of recycling or recycled products and materials are essential. As sorting can represent as much as 50% of total operating costs, it is also very important to design incentives to promote waste separation at the source, which ultimately reduces recycling costs. ●

⁴ For example, on the London Metal Exchange, copper even peaked at nearly USD9,000/ton in the first semester of 2008, equivalent to a 5.4 times increase compared with 2002.

BOX: WASTE TYPOLOGY

The waste sector is typically broken down into five main categories of waste: MSW; waste resulting from industrial activities; construction, demolition, and mining waste; agricultural waste; hazardous waste generated by all of the above-mentioned waste producers and normally including medical waste.

Around half of world waste production is MSW from the residential, commercial and service sectors.

MSW is mostly composed of food waste, paper, textiles, garden waste, wood, rubber, plastics, metal, and glass.

Each category usually has its own waste stream, and each waste generator can have a different level of responsibility.

Local public authorities are responsible for the collection and disposal of MSW, even though some large businesses are required to organise their own collection. Special waste producers are usually required by law to manage their own waste.

In fact, a large part of the waste is reused internally by these sectors, without entering the waste stream, and some large waste producers have their own disposal facilities. Hazardous waste requires dedicated collection and treatment care to ensure safe handling and control.