Chapter 2

THE ECONOMIC RATIONALE FOR AISWM



2 The Economic Rationale for AISWM

The economics of waste treatment is influenced by a complex mix of driving forces. On the one hand, waste treatment services are similar to disposal services in that the service is typically 'out of sight and out of mind' to the customers of the service. However, waste treatment can generate revenues, from sale of recovered materials and energy which disposal services may not be able to generate.

Waste treatment facilities must compete with waste disposal facilities in the price of the service; the net costs (costs minus revenues) of AWT need to be equal or similar to the cost of disposal in order for the business case to be compelling. Finding a balance to this equation is key to the widescale adoption of AWT.

2.1 Macro-Economics of Waste Management

Waste management services first arose with the aim of protecting public health. With regard to waste collection, the value of the service is in the removal of the materials from the place of generation. Clients of the service tend to be willing to pay for the removal of their waste. The resulting direct *Service → Payment* relationship helps to create a favourable economic environment for the provision and progressive extension/improvement of current services.

Waste treatment and disposal services are, however, different. Service-payment relationships between the client and the service provider is indirect, i.e. the client (waste generator) typically does not 'see' the service that they receive. Furthermore, this has an important effect that the service is often under-valued, and consequently under-provided, unless policy and legislative instruments are in place to drive infrastructure development and service provision.

The quality of disposal services is almost entirely driven by environmental legislation. When left to market forces, the quality of disposal tends to remain very low. This is due to the cost of long-term or cumulative environmental (and indirect health) impacts not being reflected in market prices, unless, there is some form of regulation or policy driver.

The disposal service is a net financial cost activity that the customers of the service often regard as 'out of sight and out of mind'. South African municipalities have made great strides in improving the quality of waste disposal. Legally-compliant landfills are not yet universally provided across the country, although that is the trend. This is driven by the public awareness and environmental enforcement.

2.2 Economics of AWT

Under pure market conditions, the economic viability of recycling and treatment is driven by the market value of the materials extracted from the waste stream; either for re-use, recycling, composting or conversion to energy. The market can be relied upon to deliver a certain level of recycling and treatment, mainly for higher value materials such as ferrous and non-ferrous metals, glass, certain plastics and pure organics/biodegradables.

Experiences from industrialised countries that have succeeded in establishing higher treatment intensity, and diverting larger percentages of municipal waste away from landfill, demonstrate that policy instruments are required to shape the market conditions on the ground. In addition, higher intensity of treatment is driven by a combination of the policy (regulatory, financial, economic) framework, coupled with the specific local market influencing factors.

The basic costs of waste management under the 'business as usual' (BAU) scenario increase as waste collection coverage extends and legally compliant landfill is ensured. Thus, this increase in cost is necessary for alternative treatment to be in a position to try and compete with the BAU scenario.

Once a municipality has secured sufficient landfill airspace to meet its long-term needs, it becomes apparent that a landfill is an 'asset' that should be used prudently. Siting of landfill facilities is a difficult process, and often faces significant public opposition. Every indication suggests that, over time, securing additional permitted landfill airspace will become increasingly difficult.

Given the need to make progress on meeting the *National Waste Management Strategy* targets, municipalities have to consider how best to divert significant quantities of MSW from landfill. With increasing application of policy instruments designed to shape the market over time, the bottom line for introducing AWT will improve. The business and policy drivers in the waste management process flow are conceptually outlined in Figure 3: The business and policy drivers in the waste management process flow.

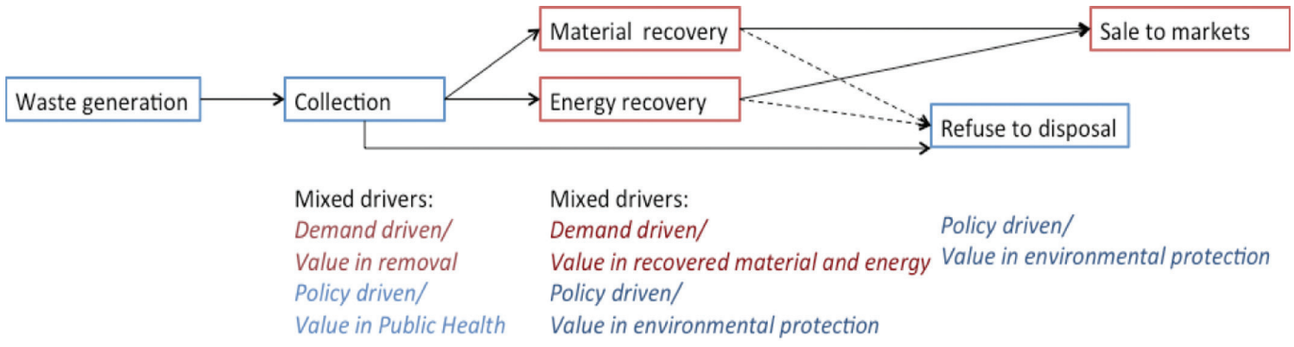

Figure 3: The business and policy drivers in the waste management process flow

Figure 3: The business and policy drivers in the waste management process flow illustrates how revenue streams will vary for the different activities. There is a demand for collection service and usually people are willing to pay a price for removal. Therefore, collecting revenues from the public in the form of user charges and taxes, is possible and sometimes reaches full cost recovery. For low income earning citizens, where affordability is of concern, public funds are allocated due to public health issues that may arise in cases where services may not be available.

There is a demand for recovery that is driven from the intrinsic value of the discarded materials. Revenues for AWT are derived from various sources, including commercial revenues from the sale of recovered materials and energy. Those activities that are not demand driven need an environmental policy push and revenues from subsidies or other public funds. This is the case for the recovery of certain waste streams and for the disposal of such waste streams.

2.3 Economic Costs and Benefits of Waste Management

Advanced waste treatment is generally more expensive than landfilling when only considering the financial costs. However, when considering the wider economic costs and benefits from a societal standpoint, advanced treatment options may become more favourable than that of landfilling, as an option.

The *Global Waste Management, Outlook Report of 2015* concluded that in implementing proper waste management was up to 10-15 times cheaper than the foregone economic costs associated with inaction or insufficient action in waste management.[2]

Internationally, there have been numerous efforts to monetise the negative environmental and health impacts of landfill or dumping. These studies are usually location specific, but typically monetise negative impacts to air, water and soil pollution, health, climate change, nuisance caused by odour and the negative landscape impact. For example, Landfill Tax in the United Kingdom (UK) was originally established based on a monetary calculation of the environmental externalities of landfill. The effect of Landfill Tax is to create a disincentive to landfill and drive market forces towards investing in landfill diversion. Since the introduction of landfill taxes/levies in various forms and at various levels, such policy applications have been taken up in many countries, in order to drive the economics of landfill diversion.

2 *Wilson D.C., Soos R., Simonett O., Chapter 5 Financing Waste Management, Global Waste Management Outlook, UNDP and ISWA (September 2015)*

In South Africa, according to the Council for Scientific and Industrial Research (CSIR) study on *Environmental and disamenity costs associated with landfills: A case study of Cape Town, South Africa,* the **Additional Economic Cost** of landfilling a tonne of waste is estimated to be between **30 ZAR** to **110 ZAR**.[3]

Economic costs are influenced by construction and operation standards, existence of energy recovery and landfill location. Waste treatment is higher in the waste management hierarchy, and as long as pollution control from these facilities is within regulatory norms, they tend to produce fewer negative environmental impacts and generate greater benefits.

Besides pollution control and saving of landfill void space, AWT tends to offer the type of benefits described in the Table 1.

Table 1: Wider benefits to society and the economy from advanced waste treatment4

No	Category of benefit	Explanatory comments
1	Increased resource security	After a century of steady decline, resource prices in real terms doubled between 2000 and 2010[5]. With continued price volatility, developing indigenous supplies of secondary raw materials from recycling makes good sense, particularly in rapidly industrialising countries. For example, e-waste comprises a richer 'ore' for many scarce and critical metals than the natural ores mined for the virgin raw materials.
2	New jobs	Environmentally sound waste management, the recycling of dry and organic materials and energy recovery from wastes all represent 'new' green industrial sectors with the potential for substantial job creation. UK employment in the sector, for example, increased by 50% between 1993 and 2013. The wider 'circular economy' holds further promise: The McKinsey report estimates the potential to create between nine and 25 million new jobs worldwide.[6]
3	Reduction in GHG emissions from waste management	The Intergovernmental Panel for Climate Change reports that MSW accounts for approximately 3% of total greenhouse gas (GHG) emissions, mainly as methane. Efforts in high-income countries to divert biodegradable municipal waste from landfill represent a significant contribution to early progress on GHG mitigation.
4	Energy recovery by using waste to generate energy often together with sparing other precious resources	Through conventional and advanced and waste-to-energy technologies, co-incineration and anaerobic digestion technology. For example, waste to energy plants in China are both reducing fossil fuel use and are known to prevent deforestation, wood being a common source of fuel in rural China.

2.4 Concluding Remarks

When considering all the benefits of AWT holistically, including the wider environmental and social benefits, the attractiveness of AWT increases. Furthermore, AWT is the segment of waste management activities where the private sector can recognise a business interest, and make the best use of the intrinsic and energy values of the various waste streams.

3 *Nahman, A. Rounded figures taken from "Pricing landfill externalities: Emissions and disamenity costs in Cape Town, South Africa", June 2011, Waste Management Journal 31, 2046 – 2056, www.elsevier.com/locate/wasman*

4 *Wilson D.C., Soos R., Simonett O., Chapter 5 Financing Waste Management, Global Waste Management Outlook, UNDP and ISWA (September 2015)*

5 *World Bank Commodity Price Data ('Pink Sheet'), (http://databank.worldbank.org/data/reports.aspx?source=global-economic-monitor-(gem)-commodities)*

6 *http://www.ellenmacarthurfoundation.org/business/reports; McKinsey Global Institute, 2011. Resource revolution: Meeting the world's energy, materials, food, and water needs. Dobbs, R., Oppenheim, J., Thompson, F., Brinkman, M. and Zornes, M http://mckinseyonsociety.com/resource-revolution/*