



environmental affairs

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Municipal Solid Waste Tariff Strategy

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Acronyms

CDM	Clean Development Mechanism
CER	Certified Emissions Reduction
DEA	Department of Environmental Affairs
EPWP	Expanded Public Works Programme
FCA	Full-cost accounting
IDP	Integrated Development Plan
IWMP	Integrated Waste Management Plan
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
MSW	Municipal Solid Waste
NDPG	Neighbourhood Development Partnership Grant
NEMA	National Environmental Management Act
NWMS	National Waste Management Strategy
PPP	Public-Private Partnership
REFIT	Renewable Feed-In Tariffs
RSC	Regional Services Council
SALGA	South African Local Government Association
SMME	Small, Medium and Micro Enterprise
USDG	Urban Settlements Development Grant

1 Introduction

1.1 Background

The purpose of the Municipal Solid Waste Tariff Strategy is to provide a framework and guidance for municipalities in setting solid waste tariffs that align with the intentions of the National Waste Management Strategy (NWMS, 2011). The NWMS (2011) recognises the importance of full cost accounting as the foundation of financial sustainability, which is critical in the delivery of effective and efficient waste services and in the promotion of waste minimisation, reuse, recycling and recovery. Full cost accounting considers all operational and capital expenditure pertaining to solid waste services. The introduction of cost-recovery tariffs enables municipalities to fund the “maintenance, renewal and expansion of solid waste infrastructure” (NWMS, 2011). The under-pricing of waste services sends inappropriate signals to households and waste generators and discourages waste minimisation. Inadequacies in municipal solid waste tariff setting have been raised by National Treasury (National Treasury, 2011). The strategy aims to reflect the principles that need to be adhered to in solid waste tariff setting, and provides guidance in achieving the correct balance between appropriate subsidisation and full cost recovery.

The tariff strategy is supported by **guidelines** for municipalities to implement the strategy and a spreadsheet-based tariff setting **model**. This document does not provide detailed guidance for municipality tariff setting, as these details, in the form of the required steps are contained in the guidelines.

1.2 Objectives

The specific objectives of the municipal solid waste (MSW) tariff strategy are to:

- *Support local government:* support local authorities in planning for MSW services and complying with relevant legislation;
- *Improve financial sustainability:* assist in better financial management of MSW services to ensure their financial sustainability
- *Assist in poverty alleviation:* ensure that poor households are not denied access to adequate solid waste services because of inability to pay for the service;
- *Assist in the extension of MSW services:* allow for a tariff structure that accommodates future service provision to those without adequate services;
- *Provide a basis for regulation:* provide a consistent basis for oversight and regulation of MSW services by provincial and national government;
- *Investigate the tariff impacts of reduction, re-use, recycling and alternative disposal:* provide a tool for municipalities to proactively plan for the introduction of new waste practices and technologies and adjust tariffs accordingly.

2 Context

2.1 Access to Solid Waste Services

As with other municipal services, backlogs remain in providing universal access to adequate MSW services. According to the General Households Survey (2010), 59% of households were receiving regular municipal waste collection services in 2010, a marginal increase from 57.8% in 2002 (Stats SA, 2011). Access to solid waste services varies with settlement type. Using the minimum service levels defined in the National Domestic Waste Collection Standards¹, the National Waste Management Strategy (2011) reported that 90% of urban and 47% of rural households have access to adequate levels of services. It thus remains that core urban residents have relatively good access, whilst rural residents have limited access to basic levels of MSW services. Government's target is to provide access to basic refuse removal services to 95% of urban and 75% of rural households by 2016 (NWMS, 2011).

South Africa also faces a severe backlog in the disposal of refuse. There are 2000 waste handling facilities, of which 27% are licensed and an estimated 350 (44%) of South Africa's known private and public landfill sites are permitted (DEA, 2009). It is assumed that most unlicensed sites are not maintained or operated in accordance with the Minimum Standards.

At present a relatively small proportion of municipalities provide sustainable waste reduction, recycling or recovery services. A local government capacity study revealed that 87% of the local municipalities do not have the capacity or infrastructure to engage in waste minimisation. Although 80% of municipalities have initiated recycling, they are struggling to sustain these practices (DEAT 2007 in DEA, 2009). The NWMS states that all metropolitan municipalities, secondary cities and large towns (category A, B1 and B2 municipalities) must have initiated separation at source programmes by 2015 and given the policy imperative to focus on waste minimisation, the NWMS has set a target to divert 25% of recyclables by 2015

Current and future access to solid waste services is an important part of tariff setting because the rate of service expansion, and associated capital and operating costs, needs to be matched with financial sustainability.

2.2 Legal and Policy Context

The **Constitution** (RSA, 1996) underpins all environmental policy and law by advocating the right to environmental protection and to live in an environment that is not harmful to health or well-being. Section 156 of the Constitution (Act No. 108 of 1996) gives local government the executive authority over the functions of:

- cleansing,
- refuse removal,
- refuse dumps, and

¹ Government Gazette No. 32687 Notice 1475 of 2009. Department of Environmental Affairs. National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) National Domestic Waste Collection Standards.

- solid waste disposal.

The **Waste Act** (2008) provides a holistic approach to regulating waste management in South Africa. It adopts the internationally recognised waste management hierarchy, which considers disposal of waste as the last resort and encourages a reduction of waste entering the system. The Waste Act established minimum requirements for handling and producing waste and improving the licensing of waste management activities. In terms of the Waste Act, it is the local government's role to ensure universal and sustainable delivery of services at an affordable price, subject to national and provincial legislation.

The **NWMS**² aims to accomplish the objectives set out in the Waste Act by identifying priorities and setting targets to ensure the effective management and the minimisation of waste.

The Waste Act should be read with the **National Environmental Management Act** where applicable (NEMA, 1998). NEMA has been influential in introducing the lifecycle approach to waste management, emphasizing the concept of producer responsibility to environmental matters and promoting the "polluter pays" principle.

In addition to the Waste Act and the National Waste Management Strategy, the following legislation is important with respect to MSW services:

Municipal Finance Management Act (2003): states that municipalities must provide municipal services on a cost-effective and equitable basis.

Municipal Systems Act (Act No. 32 of 2000) requires that municipalities ensure that all members of the community have access to at least the minimum level of basic services, and that these services must be equitable and financially and environmentally sustainable. In terms of Act 'municipal services' can only be delivered by a municipality or by a municipal contractor. However, the Act does not define a 'municipal service' specifically for solid waste, and therefore there is no final clarity over which aspects of solid waste management can be regarded as a municipal service. Current practice is that domestic refuse collection and disposal is treated as a municipal service, while non-domestic collection and disposal is not. If the waste management service is not regarded as a municipal service, municipalities will not have the responsibility or power to impose tariffs for the provision of the service by private operators nor will they be able to provide the service on an exclusive basis.

The following policy documents have also been produced to guide municipalities in the provision of MSW services:

National Domestic Waste Collection Standards: sets solid waste services' standards which must be uniformly applied throughout South Africa. These standards uphold the right to an environment that is not harmful to health or wellbeing.

National Policy for the Provision of Basic Refuse Removals for Indigent Households: incorporates basic solid waste services into the bundle of basic free services. It endorses the right to access basic solid waste services for those who cannot afford it.

² Department of Environmental Affairs, 2011. National Waste Management Strategy November 2011

2.3 Institutional Context

2.3.1 Allocation of powers and functions

Part B of Schedule 5 of the Constitution (Act No. 108 of 1996) designates solid waste collection and disposal as local government functions. In terms of the allocation of powers and functions between local and district municipalities, the Municipal Structures Act (Act No. 117 of 1998) (including amendments) allocates bulk waste transfer and disposal sites for more than one municipality (regional services) to district municipalities. Local authorities are therefore allocated the functions of refuse collection and public waste management services, such as street and area cleaning. Some areas of responsibility, such as recycling and education, are not clearly allocated and it is likely that responsibility for such activities will need to be determined through consultation between district and local municipalities.

The implications of the allocation of powers and functions for tariff setting is that local municipalities will have tariff setting responsibilities for collection services and for disposal in those case where they retain responsibility for the disposal site. Where the district municipality operates the disposal site it will have the responsibility for establishing disposal charges. The local authority will be subject to these charges if it disposes solid waste in the district site. Local and district municipalities both have to finance their public waste management responsibilities, public cleansing and planning respectively, from tariffs or other sources.

2.3.2 External service providers

A distinction must be made between private service providers that operate a commercial business in the waste sector, and those that operate under contract on behalf of the municipality, to undertake municipal solid waste services. A third category of external service provider exists, where public-private partnerships (PPPs) are entered into by the municipality and the private sector.

Municipal contractors and PPPs

Private firms are routinely contracted by the municipality to carry-out refuse removal services and manage disposal sites. Small, Medium and Micro Enterprises (SMMEs), single contractors or community-based systems are increasingly being used for refuse removal and street cleaning under two contracting models:

Direct contracting: Municipality contracts directly with a large firm, SMME or Co-op with an internal or external management structure. This includes 'Food for Waste' programmes.

Principal contracting: Municipality contracts with a Managing Agent who procures SMMEs as subcontractors

Recycling is commonly undertaken by private firms, either as private enterprises or as Public-Private Partnerships (PPPs). Furthermore, it is anticipated that when waste-to-energy is implemented at scale in South Africa it will be in the form of PPPs.

Private waste management service providers

Many private firms contract directly with customers to remove and dispose of commercial, industrial and hazardous solid waste.

2.3.3 Implications for tariff setting

Similar involvement by the private sector does not occur to a significant extent in the provision of the other major municipal services and raises some issues particular to MSW management, these include:

- *Competition between the private and public sector:* municipalities and private sector operators offer the same service to commercial customers and are therefore in competition for business. The use of cross-subsidisation from general rates or tariffs can affect the relative competitiveness of municipal services.
- *Recovery of costs of public waste management services:* private sector waste provision affects the capacity of municipalities to recover public cleansing costs from non-residential waste generators who are not provided with other municipal services and hence are not directly subject to municipal solid waste tariffs.
- *Provision of raw materials to private enterprises:* MSW is used, either sorted or unsorted as inputs into private sector enterprises such as recycling and, potentially, waste-to-energy plants. It is unclear who should cover the costs of collection and transfer of the waste; is the municipality subsidising the private company, or is the private company providing a disposal service?
- *Pre-set levels of payment for services* if operating under a larger government programme (e.g. EPWP). This can also mean that solid waste services can be funded out of a separate budget, or in kind (e.g. 'Food for Waste' programmes).

3 Technical Description of the Municipal Solid Waste System

3.1 The Solid Waste System

The flow diagram of a typical municipal solid waste management system is shown in the figure below. The elements not always included are shown with dashed borders.

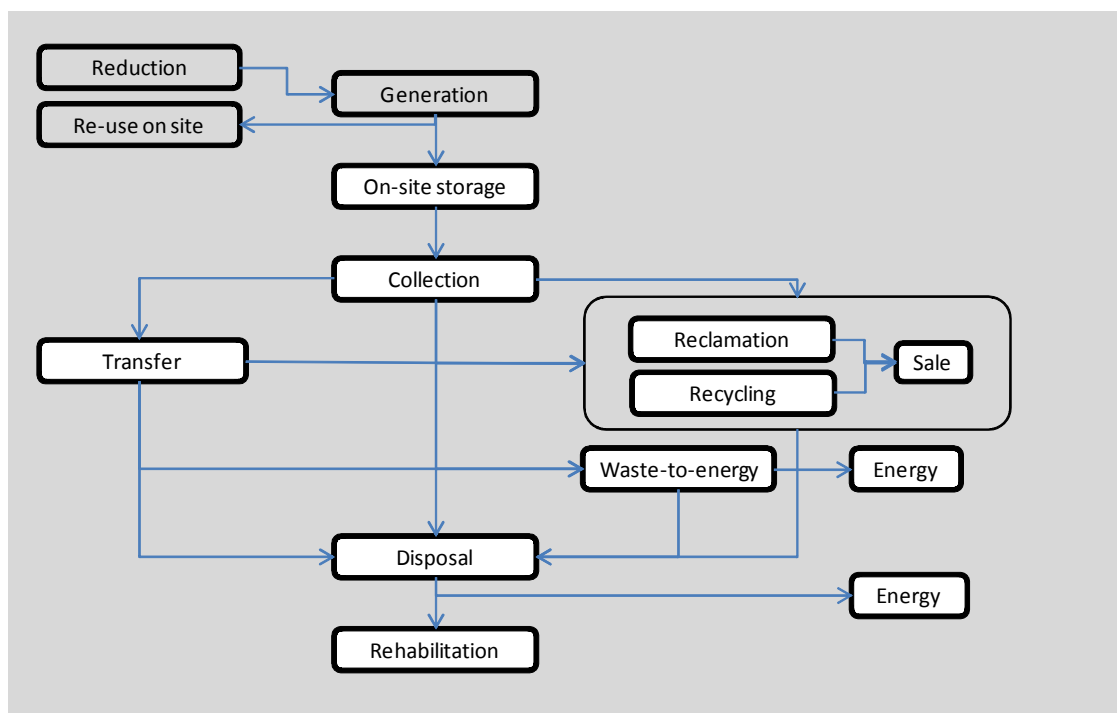


Figure 1: The municipal solid waste system

Waste collection in South Africa is typically carried out using conventional motorised collection vehicle-based systems, often with compactor vehicles. In areas without a formal refuse removal service there is fairly widespread use of communal collection. There is limited but increasing use of labour intensive collection, and of non-motorised collection in non-urban areas.

The current approach to general waste treatment and disposal in South Africa is typical of a developing country in that treatment of the waste generally involves only a reduction of its volume, although some limited incineration and composting is practised. The emphasis remains on disposal of general waste by landfill without treatment as landfill airspace is still fairly readily available in South Africa and it remains the lowest cost disposal option. According to National Treasury (2011), 95% of all South Africa's waste is disposed of in landfill sites. However, when landfill is carried out in compliance with the Draft Minimum Requirements for Waste Disposal by Landfill (2010) and cost of environmental externalities is included, the cost begins to rise steeply such that the viability of waste minimisation processes begins to improve.

South Africa aims at moving towards a more sustainable path of diverting waste from landfills and the waste management hierarchy approach is at the core of this. Waste management is shifting away from the collection and disposal of waste and focusing instead on waste minimisation.

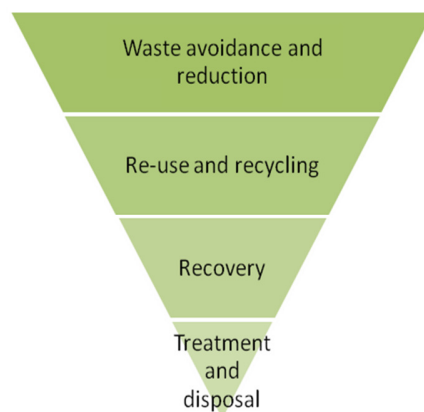


Figure 2: Waste Management Hierarchy (NWMS, 2010)

3.2 Scope of Municipal Solid Waste Services

For the purpose of this tariff strategy MSW services have simply been defined as those services typically carried out by local authorities in South Africa. The approved Domestic Waste Collection Standards require on-site appropriate and regularly supervised disposal in areas designated by the municipality. The typical range³ of services is outlined below in agreement with the Waste Collection Standards.

3.2.1 Collection services and service levels

Residential services in urban areas

- *Residential round collected waste:* the main variations of service level within this are the frequency of service (generally not less than once per week) and the type of on-site storage (bags or bins of various sizes) used.
- *Residential communal collection:* this is typically carried out through the use of skips placed at intervals throughout a settlement which are collected and emptied on a regular basis.
- *Residential garden waste:* this waste may be collected by the municipality or transported by the householder to the local garden refuse transfer station site where the waste is accepted at no charge. In the case of garden refuse collection, there is often a limit to the amount that will be collected during normal collection rounds and a fee for additional collections may be levied. Other areas collect the service fee surcharge through using different collection bags which the householder purchases from the local shopping centre. The cost of the collection and disposal of the waste is built into the purchase price of the bags.
- *Residential collection of recyclables:* mainstream recyclables (paper, plastic, glass and metal) may be collected at households or communal collection points, either by the municipality or private companies. Alternatively households may take their less-frequent recyclables to accessible drop-off centres from where it is transferred to recycling facilities.

³ This will not include all functions undertaken by municipal solid waste departments, but aims to capture the most common activities that make up the greatest proportion of expenditure.

Commercial and business collection

- *Non-residential round collected waste:* Contracts are entered into between the municipality and private companies for the regular collection of non-hazardous waste. A variety of receptacles can be used and service frequencies are determined by public health, nuisance or demand constraints.
- *Non-residential demand collected waste:* Private companies contract municipalities the ad hoc removal of waste, or the supply of an empty receptacle and its removal once full.

3.2.2 Public cleansing services

Municipalities typically carry out a number of public waste management services, including:

- *Street and area cleaning:* this includes street sweeping, road verge maintenance and cleaning, emptying bins and cleaning public spaces. It is carried out at varying frequencies depending on the area being serviced and the service frequencies required.
- *Special services:* this includes services such as carcass removal, removal of wrecks, cleaning after public events etc which are provided on the basis of demand.
- *Illegal dumping:* the collection of illegally dumped waste and the prevention of illegal dumping is often a significant element of MSW management. It typically costs up to 100 times more to clean-up illegally dumped waste than it does to handle waste that has been placed in the formal waste management system.

3.2.3 Waste reduction and environmental education

The promotion of waste reduction, re-use and recovery falls within the ambit of local government waste management services. The following activities may be undertaken by municipalities.

Reduction at source:

The NWMS realises the importance of education and awareness around waste in changing peoples' attitude around waste reduction. Government's goal is for 80% of all schools to conduct waste awareness programmes and 80% of municipalities to be running waste and litter campaigns by 2015.

Reclamation: other 'economic' recyclables sorted and packaged for sale to recyclers

The NWMS promotes the supply of bins to encourage separation at source and the establishment of buy-back-centres so that recyclable items can be diverted from the landfills. SMMEs, often supported by industries, currently dominate this phase of the waste cycle. Municipalities, in trying to fulfil this mandate may explore potential partnerships with the private sector, and need not provide the entire recycling infrastructure themselves.

Recycling: green waste and builder's rubble

Green waste and builder's rubble have been separated from other recyclables as materials that municipalities may recycle on their own or as part of a PPP. Municipalities are responsible for diverting organic waste from the landfill. Green waste can be used for producing compost or biogas. The NWMS endorses the creation of material recovery facilities, whereby green waste, mixed municipal waste, builder's rubble and mixed recyclables can be dropped. Municipalities are generally not involved in material specific recycling processes of converting waste products to new materials (e.g. glass, metal, PET, etc.)

3.2.4 Disposal

Municipalities are generally responsible for the provision and management of disposal sites:

- *General landfill⁴*: MSW is typically landfilled by local authorities at municipally owned landfill sites. The Waste Act requires all landfill sites to be licensed, and those municipalities that are unlicensed need to be licensed or closed as an urgent priority. Several private contractors are managing waste disposal sites on behalf of local authorities through municipal service partnership arrangements. In other cases the contractors have financed the development of the disposal sites in exchange for a long-term exclusive concession.
- *Waste-to-energy*. Some local authorities are piloting waste-to-energy schemes whereby energy is recovered from waste biomass. Different thermal energy technologies include combustion, gasification and pyrolysis.
- *Landfill gas to energy*: Landfill gas (mainly methane) can be used to generate electricity as part of a CDM projects and to be sold to the grid (DEA, 2009). This process is being implemented in a few South African municipalities at present. The White Paper on Renewable Energy Policy of South Africa⁵ is currently being updated and will provide municipalities with options for biogas projects and methane gas from landfills.

The National Domestic Waste Collection Standards deem on-site disposal appropriate in low-density settlements. However, these on-site disposal facilities still need to be monitored and regulated and the costs incurred in these activities need to be considered in tariff determination calculations.

4 Financial and Subsidy Framework

4.1 Municipal Financial Management Act

The Municipal Finance Management Act (Act No. 56 of 2003) (MFMA) provides the overall financial framework in which a municipality must manage its budget and establish its tariffs and other revenue. This implies that the municipality needs to have a

⁴ Local authorities do not typically include hazardous or health care risk waste management and disposal services, which are generally provided by the private sector

⁵ Government Gazette No 26169 Notice 513 of 2004. White Paper on the Renewable Energy Policy of the Republic of South Africa - currently being updated.

sound understanding of all the costs of its solid waste services and a “realistic” estimate of revenue that it is likely to receive from any solid waste charges. The MFMA requires measurable objectives to be set for each vote⁶ in the budget in line with the Integrated Development Plan (IDP)⁷. This means that any expenditure to be incurred has to be linked to some measurable outcome, such as particular level of service to be provided. In this way there is a formal link between expenditure, income (and tariffs) and municipal performance. Thus tariff setting should not be seen in isolation from the operational targets set for solid waste services in the IDP.

4.2 Intergovernmental Grants

4.2.1 Capital subsidies

There is a system of municipal infrastructure grants targeted at providing adequate services nationally. In principle, infrastructure grant finance will only be provided if it is clear that the municipality can financially sustain the resulting infrastructure and services. The capital grants available for municipal solid waste facilities are listed below.

Municipal Infrastructure Grant (MIG)

The MIG is intended to provide basic residential infrastructure for poor households. It is calculated by a formula which considers, among other things, the backlogs in the provision of services, including solid waste. The grant can be used for new or upgrading bulk and connector infrastructure, or the rehabilitation of such existing infrastructure. Municipalities must report on the number of households serviced, in this case, with solid waste services. The MIG is the most common source of external funding for solid waste capital projects. However, the MIG, which is administered by the Department of Cooperative Governance and Traditional Affairs, only funds immovable infrastructure, thereby excluding vehicles, which form a large portion of the capital costs of solid waste management.

Urban Settlements Development Grant (USDG)

This grant replaced the MIG and Human Settlements Development Grant in the metropolitan municipalities, and as such, has similar intentions. The Urban Settlement Development Grant (USDG) seeks to support the development of sustainable human settlements and improved quality of life for households through accelerating the provision of serviced land for low-income households in large urban areas by supplementing municipal resources. It can be used by qualifying municipalities for solid waste capital projects, and has less stringent regulation than the MIG. This grant is administered by the Human Settlements Department.

Neighbourhood Development Partnership Grant (NDPG)

The intention of the NDPG is to support neighbourhood development projects that provide community infrastructure and create the platform for development in targeted underserved neighbourhoods (townships generally). It is prioritised towards projects

⁶ A vote is one of the main segments into which the budget of the municipality is divided and which specifies how much money is allocated for that purpose. The vote can be for a department, such as cleansing, or for a functional area, such as street cleaning.

⁷ Chapter 4: Municipal Budgets, section 17(3b)

that address government priorities, including the promotion of employment, green technology, and youth development. In the context of solid waste, this could include a transfer station or recycling depot in one of the targeted areas. The NDPG is administered by National Treasury.

Expanded Public Works Programme (EPWP) Incentive Grant for Municipalities

The aim of the EPWP Incentive grant is to encourage municipalities to increase job creation efforts in infrastructure programmes through the use of labour-intensive methods. The grant, administered by the Public Works Department, is conditional on achieving a targeted level of employment in government programmes for each qualifying municipality. Although not specifically for solid waste, it can be used for solid waste capital projects that create employment.

4.2.2 Operating subsidies

There are two types of operating subsidies to local government: unconditional subsidies and conditional grants. At present there are no dedicated conditional grants for solid waste management services, but in some areas Provincial government may provide environmental health subsidies which may be used for solid waste management.

Equitable share

The equitable share is provided to local municipalities on a formula basis, largely determined by the number of poor households within the municipal area. The equitable share is disbursed on this basis largely because its intention is to support local municipalities in the provision of basic services. Solid waste is one of the basic services used in the equitable share formula, but municipalities are not obliged in any way to use the portion of the grant calculated by the formula specifically for solid waste services. The equitable share is an unconditional payment but the policy intention is for municipalities to allocate these funds to ensuring that basic municipal services are affordable to poor households.

Regional Services Council (RSC) Levies Replacement Grant

Prior to 2006, district municipalities raised levies on local businesses within their districts through an RSC levy, which was a tax amounting to 'own revenue' which was intended to be used for the general funding of municipal operations. This source of revenue was replaced in 2006/07 with the RSC levies replacement grant, which was allocated to all district and metropolitan municipalities, based on the amounts they had previously collected and remains unconditional in its use. The RSC levies replacement grant was phased out in metropolitan municipalities 2011/12 and replaced by the fuel levy.

Fuel levy

The fuel levy was introduced in 2009 to replace the RSC levies replacement grant in metropolitan municipalities. It is a direct charge on fuel sales, which is distributed to the metros based on relative fuel sales. The fuel levy is a source of municipal own revenue and since it involves the sharing of a revenue source, rather than the allocation of funds, it does not form part of the Division of Revenue Bill and is not conditional in its use.

5 Current Financing of Municipal Solid Waste Services

5.1 Current Sources of Revenue for MSW Services

5.1.1 Conventional revenue streams

There is no fixed approach to the financing of solid waste services at municipal level. On the basis of the tariff survey conducted for the initial strategy, 58% of municipalities relied on user charges for 100% of their income. The degree to which the other 42% relied on user charges to fund the service varied from 97% to 5%, with funds from the rates account being used to 'top-up' the solid waste account. The equitable share is not used widely as a direct subsidy to the solid waste account. In those cases where it is explicitly used to support services to the poor it is generally provided as a general rebate to the accounts of identified indigent households in the municipality.

5.1.2 Other Income Revenue Streams

Recyclables

There is a significant market for recyclables in South Africa; however it is currently dominated by the private sector. Municipalities can tap into the recycling market as a potential income revenue stream. Municipalities can choose their role, either directly by investing in reclamation infrastructure and selling sorted material to recyclers, or by facilitating SMMEs and industry in an indirect approach. Municipalities may be incentivised to provide the raw waste free of charge, as an implicit subsidy to encourage recycling, as well as to reduce transport and disposal costs.

Energy

Waste-to-energy projects and landfill gas to energy projects: these projects have the ability to recover technology costs through expected income streams of electricity sales.

Clean Development Mechanism (CDM) 'carbon credits': The CDM is a mechanism for trading carbon emissions between developed and developing countries. Landfill gas extraction for flaring or energy generation qualifies for Certified Emissions Reduction (CER) certificates, which can be traded as a revenue source.

5.2 Current Tariff Approaches

Tariff approaches are also very varied, although most municipalities are using a flat-rate tariff for residential consumers, with no other formal charges for residential solid waste services. The survey results for type of tariff typically used are tabled below.

Table 1. Current tariff approaches for municipal solid waste services (DEAT, 2001)

Type of tariff	Number	%
Purely rates based	2	3%
Formal combination of rates & tariffs	3	5%
Tariff (property size related)	5	8%
Tariff (a flat tariff for residential customers, and either a frequency or per container based charge for non-residential customers)	53	84%
Total	63	100%

The above table demonstrates the dominant practice amongst municipalities is to charge a *cleansing* charge rather than a collection charge, as indicated by the "flat tariff." The flat tariff implicitly includes a charge for collection, as well as for the operating of the disposal sites, and the cleaning of streets and open spaces.

Domestic tariffs are generally based on a flat monthly tariff. This seems to be loosely based on the domestic share of total waste produced, and the amount of income that needs to be generated. It is also common practice to limit collection to a certain volume. From the tariff survey (DEAT, 2001), only one example was found where income related charges are used for refuse removal using a sliding scale. There may be a small number of similar approaches elsewhere.

Non-residential tariffs are generally loosely based on the average volume of waste produced, by charging per container and/or according to frequency. There is often also a hire charge for mass containers, but this practice seems to be influenced by the frequency of the service. For example the tariff for a regular weekly service would include the hire/use of the container.

The 'polluter pays' principle therefore seems to be applied quite loosely in practice, by applying the relevant tariffs to categories of consumers, according to the average amount of waste generated by that category, rather than by individual households. The 'polluter pays' principle is inherent in volumetric charges, as in the case of non-residential charges based on receptacle size and collection frequency.

Disposal tariffs were only supplied by 12 municipalities. In general they seem to be used sporadically. Where a weighbridge is in use the charges are based on mass, otherwise vehicle size as a proxy for volume is generally used. The relationship between cost of the service and disposal tariff is often not clear.

6 Costing of Solid Waste Services

Proper costing of solid waste services provides the basis for the development of a sound tariff strategy at a municipal level. This document will not go into detail of calculating and allocating costs but will provide some key steps in this process. Further guidance to the costing of solid waste services required for a sound tariff policy is provided in the Guidelines for Local Authorities.

An understanding of the costs of the service, appropriately apportioned, is needed for most key management decisions, including: the planning of future service extension; deciding on capital purchases; evaluating the suitability of using external service

providers; making decisions about levels of cross-subsidisation; and establishing a tariff policy.

6.1 Full cost accounting (FCA)

Full cost accounting (FCA) is a systematic approach to identifying and quantifying the full cost involved in providing a service. The principle of FCA is inherent in the Municipal Systems Act, which specifically states that “tariffs must reflect the costs reasonably associated with rendering the service, including capital, operating, maintenance, administration and replacement costs, and interest charges”.

However, there are some cost items that may well be ignored, for example the *future* costs of landfill rehabilitation which current disposal imposes on the municipality, or the costs of regulating external service providers. An FCA approach underpins the basic approach to cost determination outlined below and should be used as far as possible by municipalities.

FCA does not take into account environmental, health, and social costs – costs termed ‘externalities’. These costs cannot be measured easily or valued readily in the marketplace. Consideration of the full spectrum of costs is often called “true cost accounting” or “environmental accounting,” which is beyond the scope of FCA (EPA, 1996), but which may be needed in some circumstance where there are significant external costs or benefits of MSW operations.

6.2 Cost Determination and Apportionment

SALGA (2011) provides a standard process to carry out a cost apportionment exercise by dividing municipal costs into three categories: direct, overhead and capital financing costs. These steps are based on SALGA (2011)⁸:

- Identify the full scope of MSW services provided by the municipality
- Quantify the full cost of the service, comprising:
 - Direct Costs: exclusive in providing the service. Includes employee-related costs, bulk payments, repairs and maintenance, contracted services and other costs.
 - Overhead Costs: not directly attributed to individual service, but pertain to the cost of running municipality as a whole. This can be accounted for through activity-based costing or pro-rata allocation of costs.
 - Capital Financing: financing infrastructure expansion, rehabilitation, capital funding to ensure long-term sustainability of service. This includes external interest, depreciation and contributions to capital reserves.
- Use the calculated costs to develop indicators of cost, such as cost per service point, or cost per ton of waste collected.

A cost apportionment exercise will assist municipalities in determining the relative impact on expenditure of different elements of the waste management system, and the importance of the various cost drivers associated with these elements (see the table

⁸ More detail on these steps, and a definition of the terms, is provided in the Guidelines.

below). This provides the basis for a sound tariff approach. For example, if street cleaning is a major component of the full costs of service provision a different tariff approach may need to be adopted compared to a situation where disposal costs are the main costs of the service.

Table 2. Typical cost drivers of MSW provision

Service provision component	Typical cost drivers
Collection	<ul style="list-style-type: none"> ▪ Settlement types – distance and density and road conditions ▪ Levels of service – frequency of collection, type of collection approach ▪ Collection method – vehicle technology used ▪ Composition of waste – determined by household characteristics ▪ Distance from disposal site – need for transfer stations, fuel costs
Street and public area cleansing	<ul style="list-style-type: none"> ▪ Settlement types – population density and through-flow of people ▪ Levels of service – frequency of cleansing ▪ Collection method – labour intensity of method used ▪ Levels of littering – public education
Reclamation	<ul style="list-style-type: none"> ▪ Method of collection and sorting – capital vs. labour-intensive ▪ Facility cost ▪ Regulatory compliance
Waste to energy	<ul style="list-style-type: none"> ▪ Cost of facility ▪ Technology employed ▪ Regulatory compliance ▪ Amount of residue produced ▪ Off-setting of costs by revenue
Disposal	<ul style="list-style-type: none"> ▪ Land costs ▪ Planning and siting costs ▪ Construction costs – environmental constraints ▪ Regulatory compliance
Overheads	<ul style="list-style-type: none"> ▪ Finance ▪ Billing ▪ Administrative overheads ▪ Development of waste management plans ▪ Waste information system data collection
Future costs (of policies or legislation that may need to be met)	<ul style="list-style-type: none"> ▪ Upgrading waste sites to meet DWAF permitting standards ▪ Formalisation of salvaging on waste sites ▪ Financial provision for closure and rehabilitation of disposal sites

7 Principles for Municipal Solid Waste Tariff Setting

There are a number of policy statements and statutes that set out objectives and principles for municipal tariffs and for the provision of municipal solid waste services. There is much overlap between these policies and a set of principles have been consolidated from them. A number of MSW tariff options are then presented and evaluated against this consolidated set of principles.

The sources drawn on for the tariff principles are the:

- Municipal Systems Act (Section 74)
- National Environmental Management Act
- Waste Act

- National Policy for Provision of Basic Refuse Removal Services to Indigent Households
- National Waste Management Strategy

The set of principles based on the above sources is tabled below. The tariff options presented will be compared against this set of principles. It is evident that no single tariff approach can meet all the principles and that trade-offs need to be made.

Table 3: Solid Waste Tariff Principles

Principles	Explanation and Origin
Efficient allocation of resources	The efficient allocation of available municipal resources between users should be fostered (Systems Act, NEMA, NWMS)
Efficient supply of services	Incentives should be created to provide services at the lowest cost (NWMS,)
Efficient use of natural resources and encouragement of waste recycling	The efficient use of resources should be encouraged (Systems Act, NWMS, NEMA). This includes the meeting of environmental or recycling objectives.
Cost recovery	Tariffs must reflect the costs associated with providing the service, including operating and maintenance, capital, replacement and financing charges (Systems Act, NWMS (2011), SALGA)
Financial viability	Tariffs should allow for the financial sustainability of the service, taking any other subsidies into account (NWMS, Systems Act, SALGA)
Horizontal equity	Users of services should be treated equitably and should pay the same amount for the same level of service (Systems Act). However, municipalities are specifically allowed to differentiate between consumers on certain grounds to meet the other principles
Vertical equity and poverty alleviation	Poor consumers should pay proportionally less for services. Poor households must pay tariffs that only cover operating and maintenance costs, or have special lifeline tariffs for access to basic services (Systems Act, NWMS, SALGA,, National Policy for Provision of Basic Refuse Removal Services to Indigent Households)
Administrative and technical feasibility	Any tariff should be administratively and technically feasible to implement and implementation should be less costly than the benefits of implementation (Bahl and Linn, 1992)
Polluter pays	Those responsible for waste generation and externalities from waste generation or disposal should be pay for the social costs of this waste (NWMS, NEMA, Systems Act, Waste Act).
Avoiding illegal dumping	The tariff should not provide incentives for tariff avoidance through illegal dumping (NWMS)
Proportionality	The amount the user pays should be in proportion to the consumption of the service (Systems Act, NWMS)
Transparency	Tariffs should be understandable and any subsidies which exist must be visible and understood by all those affected (Bahl and Linn, SALGA)
Promotion of local economic development	Local economic development should not be harmed by the tariff approach and special provisions can be made for commercial and industrial tariffs to encourage local economic activity (Systems Act, NWMS)

7.1 Pro-poor policies

Refuse removal can be regarded as a basic service necessary for the maintenance of a safe and healthy environment. In this regard the service should be provided at an adequate level to all households regardless of the income level of the household. The

implication of universal service provision is that those households who are unable to pay for the costs of their own service provision will require some form of subsidisation.

7.1.1 Cross-subsidisation

Subsidies can be financed from cross subsidisation within the solid waste account (e.g. from high-income to low-income households) or by cross subsidies from other municipal accounts. In the case of solid waste services many consumers are on the same service and tariff level. There is therefore less scope for internal cross subsidies from "high consumption" households to "low consumption" households than in the case of water and electricity services, although there is some scope for cross subsidies from non-residential to residential consumers, as well as from any additional revenue sources such as sale of recyclables or sale of energy. The main cross subsidy approaches available are tariff differentiation according to income through the property rates system or similar approaches, or service account rebates targeted at poor households, with the rebates financed from external or internal sources.

7.1.2 Free basic services

The National Policy for Provision of Basic Refuse Removal Services to Indigent Households (DEA, 2011) requires municipalities to incorporate basic refuse removal services into existing Indigent Policies. The free basic municipal services policy ensures that poor households are not denied basic municipal services, even if they cannot pay.

The main criterion to qualify for the free service is to register on the municipality's indigent register. Qualification may also depend on income levels, residential status, special considerations and value of property. A municipality may declare certain areas or clusters as qualifying recipients (DEA, 2010).

Subsidies can be applied universally to all consumers, regardless of their income level, which has some merits in terms of equity and ease of application. Alternatively, subsidies can be applied selectively, where only poor households are targeted for some form of rates relief. This is an approach used by many municipalities, especially where the costs of universal subsidies are too great for the municipality to bear. The source of income for free basic service subsidies can be from cross subsidies within the municipality or from external operating subsidies, primarily the equitable share. Subsidies should as far as possible be transparent, i.e. visible to all and easy to understand, and set at a sustainable level with a clear revenue stream associated with the subsidy (DEA, 2010).

The use of service level differentiation may also be needed to implement a free basic municipal services strategy. Where it is unaffordable to provide a high level of service to all households, regardless of whether they are contributing to the costs of the service or not, a municipality can provide some households with a lower, yet adequate service level. In this manner a municipality can provide free basic services to all households, with some households choosing to receive, and pay for, a higher level of service.

8 Municipal Solid Waste Tariff Options

It is acknowledged that the final choice of tariff approach should rest with individual municipalities. Local government circumstances still differ to such a degree that a single

tariff approach was not seen as appropriate in all areas. A number of tariff options are therefore presented with their associated advantages and disadvantages. Municipalities can select the most appropriate option for their circumstances.

8.1 Residential Tariff Options

There are a number of options for the recovery of MSW costs from residential consumers. Although residential tariffs appear to be a tariff for refuse removal they are in effect a tariff for both the collection of waste and the disposal of this waste. Both the collection and disposal costs therefore need to be recovered within the tariff.

Disposal tariffs are discussed separately below. For the purposes of calculating collection tariffs the disposal costs should be regarded as a 'bulk' cost of the refuse removal service and passed through to the end consumer within the tariff. If the municipality pays an external provider a fee for disposal it is easy to identify this cost and pass it through to the end consumer. However, if the municipality provides the disposal service it needs to first understand its disposal costs and develop a disposal tariff. This tariff can then be used as an internal "fee" which should be passed through to the end consumer within the collection tariff.

Option 1 – Inclusion of all solid waste services in property rates

Under this approach *all* municipal solid waste services are funded from general rates. The full cost of the service is determined and an appropriate charge is included in the general property rates to recover this cost. The argument for this is that solid waste is primarily a public good and that costs should be recovered from all citizens of the municipality. The provision of adequate refuse removal services also generates positive externalities for the area as a whole. If solid waste is financed out of rates, the only charging basis that can be legally used is property value and the value of improvement, therefore no direct relationship can be established between the "tariff" rate and the waste management service provided.

Advantages

- Charges for MSW services will tend to be correlated with income and in turn with amounts of waste generated. Therefore there is likely to be some relationship between the cost imposed on the consumer and the amount of waste generated
- Provides for vertical equity as poorer households will tend to pay less for waste services
- Low value properties can be zero-rated therefore providing free basic solid waste services to those households
- Public good components of solid waste management are recovered from all citizens of the municipality
- Provides no incentives for illegal dumping as all residents pay for the service in any event

Disadvantages

- It may not be horizontally equitable as households with different service levels may be paying the same amount for their waste services
- Provides no incentive to reduce waste
- Does not meet the polluter pays principle except in an indirect way
- It may be difficult to set-aside the solid waste proportion of rates income for the solid waste department and there may be other requirements on the general rates account that take political

- precedence over solid waste which create financial uncertainty for the solid waste department
- May need to be linked to water or electricity accounts to allow for enforcement of credit control
- Has no incentives for the MSW department to provide the service more efficiently

Option 2 - Solid waste services funded by user charges

Under this approach the solid waste operation is seen as a separate, “ring-fenced” service which is expected to recover all its costs from user charges. The use of user charges is based on the argument that a MSW service has significant private good aspects and stresses the principle that users should pay for their use of services. ‘Ring-fencing’ assists in tracking financial sustainability of the service and hence promotes efficiency in service delivery.

A general problem with user charges is that if they are true charges for the direct *private* waste services provided, they will not recover the additional costs of *public* services (i.e. public cleansing). In principle a flat rate can be levied on all consumers, in addition to a variable user charge, to meet the costs of these public services (this is discussed below).

Advantages

- Can be designed to be horizontally equitable (although will not always be so)
- Will encourage municipal efficiency due to a budget constraint on the solid waste department
- Can approximate the polluter pays principle
- Supports the proportionality principle

Disadvantages

- May not be vertically equitable (although they can be designed to support vertical equity)
- Are not well suited to recovering the costs of public services as they are based on the notion of solid waste services as a private good
- May introduce financial instability if full costs are not recovered from consumers or if consumers change their demand for waste services
- May be administratively or technically complex if multi-tier tariffs are used

The advantages and disadvantages of some specific user charge approaches are discussed below.

Charges based on a proxy for amounts of waste generated

In this approach a proxy, such as stand size, is used as the basis to distinguish the solid waste tariff. Other proxy variables, such as numbers of scholars in an institution, can be used.

Advantages

- The use of stand size is appropriate if collection costs increase with decreasing residential density and therefore this approach promotes the proportionality principle
- Stand size is likely to be correlated to a fair degree with the volume of waste generated and with income level
- Other proxies, such as tariffs differentiated by location, may be appropriate if different areas have

different waste generation rates on average and different costs

- Provides no incentive for illegal dumping because people are charged anyway
- Is vertically equitable as poorer consumers will tend to pay less for MSW services

Disadvantages

- Does not encourage waste reduction or recycling as the household cannot change the value of the proxy variable used (e.g. stand size or location)
- There is only a limited relationship between stand size (or other proxy) and waste volumes and it is therefore not always horizontally equitable
- May be complex to establish and administer, for example, stand sizes need to be available on a database.

Charges based on service level

In this tariff structure tariffs are based on the level of service provided to the consumer. Ideally the consumer would be able to choose the level of service according to need and affordability.

Advantages

- Has a greater degree of horizontal equity than a flat rate as consumers pay for service received
- Allows service level targeting of poor households, i.e. poor households may be able to choose a lower service level for a lower charge or for no charge in the case of free basic services
- Provides efficiency incentives for the service provider

Disadvantages

- Is only loosely proportional to cost of provision as there are other cost drivers aside from service level
- May not be vertically equitable if a single service level is provided as poor households then pay the same as wealthy households
- Service level is not always related to amount of waste generated and therefore does not meet the polluter pays principle
- The current tendency in solid waste provision is to move towards consistent service levels in municipalities which removes the scope for service level targeting
- May encourage illegal dumping if service level choice is not available

Charges based on actual amounts generated (volumetric or mass-based tariffs)

This approach requires a detailed recording of the amounts of waste collected from a site and establishes a charge per amount of waste generated. The most sophisticated version of this requires weighing equipment on collection vehicles to weigh each household's refuse (this approach is not yet implemented anywhere in South Africa). More crude versions are based on consumers purchasing special bags, with a surcharge which goes to the municipality. The municipality will only collect waste in these bags. The more refuse generated the more bags have to be bought by the household.

Advantages

- Direct relationship between waste generation and cost to the user
- Provides incentives for waste reduction

- Is horizontally equitable
- May provide scope for cross subsidisation through a “rising block” approach
- Can allow for a free basic service (for example, collection up to a certain mass or volume of waste can be provided at no charge)

Disadvantages

- Has large technical costs and constraints (special collection vehicles, billing systems, and bin coding are required)
- Has social and management constraints (illegal use of neighbours bins can occur, management systems are more complex, can impose a burden on households)
- Not vertically equitable as all households pay an equal amount per volume of refuse
- Bags are a measure of volume and not mass and overstuffing of bags can occur.
- Encourages illegal dumping

Option 3 - combined approaches

This approach is based on the argument that solid waste services have components of both public and private goods. A combined approach is aimed at recovering the private component through user charges, while the public component is recovered either through a universal flat charge or through an explicit solid waste component incorporated into the property rates.

Advantages

- Provides a separation between private and public services
- Can be vertically equitable if property rates are used to finance public services
- Accommodates cross subsidies relatively easily
- Can support the proportionality and polluter pays principles if the private tariff component is well designed
- Provides for financial stability
- Can be horizontally equitable if designed correctly

Disadvantages

- Reduces the efficiency pressures on solid waste departments
- Requires a good cost apportionment between public and private components
- May not be very transparent to consumers
- May not be vertically equitable if a flat rate is levied on all consumers

The more specific combinations under this option are discussed below.

Flat rate and variable user charge

The use of flat rate on all households and a variable user charge (on one of the bases identified above) provides a workable approach if the municipality would like to ring-fence the service. In this way the service can be ring-fenced and managed efficiently, but the tariff structure still allows for a distinction between the public and private services being provided. Equity considerations can be accommodated through rebates to poor households (with subsidies coming from a higher charge on other households or

from external sources). If free basic solid waste services were to be provided the flat rate could be waived for poor households or households in areas with a very low average income level.

Combination of property rates and user charges

This approach splits the financing of the service between the rates account, for the public components, and user charges, for private components. The advantage of this is that rates are aimed at raising finance for public services and that rates can easily accommodate equity considerations with low value properties having low rates or being exempt. This approach requires a good understanding of the division between the public and private services provided so that the correct amount of revenue can be raised through the rates system. The use of rates raises problems of efficiency incentives, because the waste department or other service provider has an incentive to exaggerate the costs of public services so as to receive a bigger revenue stream from the rates account.

If such an approach is adopted it should be formalised, i.e. an explicit proportion of the rates revenue should be set aside for solid waste services based on a well presented indication of the costs of public waste management services. At present this combined approach is applied by many municipalities on an *ad hoc* basis as the general rates account is used to subsidise any deficit accruing on the solid waste account. This approach, where any deficit (whether coming from public or private services or simply from poor management) is automatically funded out of the rates account, provides no efficiency incentives and should not be regarded as an acceptable tariff structure.

8.2 Comparison of residential approaches

The various tariff structures can be assessed against the tariff principles. An assessment can be carried out using the table below to rank the different advantages and disadvantages of a particular tariff approach from the perspective of a particular municipality. Municipalities will each have a different stress on the different principles and their context will determine the implications of the assessment. For example, some municipalities may focus on the equity and subsidy requirements, while for others the greater need may be to increase the efficiency of the service.

Table 3: Comparison of tariff options with tariff principles

	<i>Efficient allocation of resources</i>	<i>Efficient supply of services</i>	<i>Efficient use of natural resources</i>	<i>Cost recovery</i>	<i>Financial viability</i>	<i>Horizontal equity</i>	<i>Vertical equity and poverty alleviation</i>	<i>Administrative and technical feasibility</i>	<i>Polluter pays</i>	<i>Avoiding illegal dumping</i>	<i>Proportionality</i>	<i>Transparency</i>	<i>Promotion of local economic development</i>
General rates		x		x	x	x	√	√	x	√	√		
User charges (waste generation proxy)	x					x	√	x		√	√		
User charges (service level)	√	√				√	√		x	x			
User charges (pay as you throw)		√	√			√	x	x			x		
Combined approaches (ring-fenced)													
Combined (rates and charges)	x	x			√	√	√		√		√	x	
General: SWS funded by user charges	√			x	x	√	x	x	x		√		

8.3 General Issues to be considered in setting residential tariffs

8.3.1 Affordability of basic waste removal services – vertical equity

The general approach to ensuring affordability of municipal services will underpin specific solid waste tariff approaches. Municipalities need to jointly consider the use of choice of service levels, subsidy mechanisms, cost reduction of service provision and broader pro-poor policies when setting MSW tariffs. The implications of free basic services need to be evaluated in respect of solid waste services.

8.3.2 Should local municipalities have uniform tariffs? – horizontal equity

Local authority boundaries raise difficulties in setting tariffs. A particular issue to be faced is whether equal tariffs are to be applied across a local municipality, in support of the principle of horizontal equity. There may be also political pressures for tariff and service level equality. At the same time the cost of MSW services may well differ across the municipality. Municipalities need to balance these issues, which will affect all municipal services, in the development of their local tariff policy.

8.3.3 Value Added Tax (VAT)

Under current tax legislation VAT is currently not included in property rates, but is included in any user charges. An implication of this is that residential consumers will pay 14% less for a service that is financed through property rates than for one financed through user charges. For purposes of reducing the cost burden on consumers there is therefore an argument for financing at least some solid waste services via property rates. On the other hand there may be some corresponding financial costs imposed on the municipality. This is an issue that needs to be carefully evaluated by municipal Treasurers and included in decision making around a local solid waste tariff strategy.

8.4 Commercial and industrial tariffs

Commercial and industrial tariffs should be set within the same framework as residential tariffs. However, the nature of waste services provided to these customers allows for different approaches and also imposes certain constraints.

Services to these consumers are often on a demand basis which allows the municipality to establish tariffs for specific services (and service levels) rendered, such as removing restaurant wastes. This makes the use of user charges relatively easy to implement.

In many areas the private sector offers refuse removal services to the same set of customers. The fees charged by private firms will then set an upper bound for municipal tariffs. If the municipal tariffs are above this amount the waste generators will use private providers. This removes certain tariff options from the municipality. In particular it makes it difficult for the municipality to generate cross subsidies from commercial or industrial consumers or to include the costs of public services in commercial and industrial tariffs.

However, commercial and industrial enterprises should contribute to public waste management services as they benefit from these services. A viable approach is the use

of a separate public cleansing charge which can be levied on all commercial and industrial enterprises. This can be levied as either a flat charge on non-residential consumers or it can be levied via property rates.

8.4.1 Commercial and industrial tariff options

The tariff options appear more limited for this class of customers. The sole use of the rates system for financing commercial waste removal is clearly unsound as there is no relationship between the amounts of waste generated by a firm and the property rates paid. This would be inequitable and financially difficult to manage.

The use of user charges is well developed in this sector and is the preferred approach. User charges should be linked to costs as far as possible. Ideally a mass based approach should be used, or a volume based approach in the many cases where this is not feasible. The tariff structure should also reflect other costs of service provision. These include the distance of the customer, the type of waste (if the waste type imposes specific costs or benefits⁹), and the type of containers required. The tariff adopted will often have to be cost competitive with private firms.

The collection of commercial and industrial waste should not be subsidised. If the costs of collection of the municipality are higher than those of the private sector the municipality should not reduce its tariffs below its cost of providing the service.

The municipality can recover costs of public cleansing from non-residential consumers through a proportion of the collection user charge, property rates, or a separate public cleansing charge levied on all non-residential consumers whether they use municipal waste collection services or not.

- *Property rates:* If the general approach chosen by the municipality is to finance the public cleansing elements of the MSW service from property rates then these property rates will apply to non-residential and residential consumers. Under this approach all commercial, institutional and industrial consumers will be contributing to the provision of solid waste services. The portion of property rates earmarked for public cleansing will tend to be correlated with the scale of the enterprise which has an element of horizontal equity.
- *Public cleansing charge:* A public cleansing charge is preferred if there is a strong imperative to ring-fence the MSW service. For horizontal equity reasons the charge can be designed in such a way that it is somewhat reflective of the scale of the enterprise. The public cleansing charge would have to be included in the general monthly municipal bill (typically covering property rates, water and electricity) sent to the consumer if the consumer was not already being billed for waste removal services.
- *Proportion of user charges:* It will be difficult for the municipality to recover public cleansing costs from non-residential consumers through user charges. The municipality will not be providing all non-residential consumers with a waste removal service and therefore will not be billing all consumers. Secondly, the inclusion of public cleansing costs will tend to make the municipal provision of waste removal

⁹ Some waste may be useful as cover material, for example, which reduces the net costs of the waste removal.

uncompetitive with the private sector and consumers will use private sector providers – leading to further revenue losses.

8.5 Disposal charges

In those cases where the municipality makes use of disposal facilities from external providers the disposal costs will simply be the fees charged to the municipality and will need to be included in the overall costs and tariffs as mentioned above. However, if the municipality develops and manages its own disposal site the costs of disposal will need to be calculated and an appropriate tariff or pricing policy established.

8.5.1 Marginal cost versus average cost pricing

The calculation of the operating costs of disposal sites is relatively straightforward and fits within the costing process discussed above. These operating costs must be recovered through disposal charges. However, the pricing of disposal services is also strongly influenced by the manner in which *capital* costs are estimated and recovered from consumers through the disposal tariffs.

Typically the *average historical costs* of disposal have been used as the basis for pricing. In many ways this is a sensible approach as it is easy to estimate and provides the required cash-flow for municipalities in the current period. There are, however, some arguments for using a so-called *average incremental cost* of disposal as the basis for charging. This approach is based on the premise that consumers should pay the full cost of delivering the next (or marginal) unit of a service they wish to consume.

In the case of lumpy investments, such as landfill site, there is typically a low marginal cost of disposal until such time as a new landfill site is needed. There is then a sudden rise in the marginal cost as the new landfill is established. Generally in South Africa with rising land costs and more stringent regulatory requirement each new landfill has higher per unit costs than the one before.

The incremental cost approach argues that users should be exposed to this rising marginal cost of disposal, as this will ensure that the proper economic signals are sent to consumers to reduce waste (Bahl and Linn, 1992). The average incremental cost approach is a costing approach that smoothes out the sharp rises in marginal costs and presents consumers with a more gentle increasing cost of disposal, but one that is still reflective of the long run costs facing the municipality.

In principle an incremental cost approach appears the economically correct approach. There are, however, some important difficulties in implementation. These include:

- Difficulties in calculating the marginal costs if the costs of the next landfill are not yet known.
- Sensitivity to assumptions such as discount rates and future waste generation rates (which affect the timing of the next site). These assumptions are often contested.
- Increasing costs which may be politically difficult to introduce

The fact that funds accumulate in an account which is meant to be reserved for the future to finance the next disposal facility. This may be difficult to manage in some municipalities and there may be the temptation to use these funds for current needs.

Given these concerns municipalities need to carefully evaluate the use of average incremental costing approaches. In the light of the tendency for disposal costs to rise over time municipalities are encouraged to indicate this fact to consumers in some way through the pricing system, even if it is not by means of a formal incremental costing approach.

8.5.2 Incentives for waste reduction and recycling

It is well recognised that consumers will respond to price signals. Therefore prices can be used to alter consumer behaviour. If waste services are under-priced there will be a tendency for consumers to over-utilise the service, in other words to generate more waste than they should. The correct pricing of solid waste services is therefore important to send the correct price signals to consumers.

Pricing will only alter consumer behaviour where there is a direct relationship between the amount of waste generated and the price paid. If the consumer cannot reduce his or her costs by reducing the amount of waste generated then the incentive falls away and raising prices is simply a 'tax' on the consumer.

Economic incentives for waste reduction by residential consumers have to be more sophisticated than simply raising the costs of waste removal to these consumers. Incentives have to be accompanied by a mechanism which allows the consumer to alter his or her cost according to the amount of waste generated. Other options can also be investigated, such as the use of 'waste taxes' on packaging material or the use of deposit-refund systems. These alter the incentives for consumers to purchase certain waste creating products or create incentives to keep certain materials out of the waste stream. The introduction of such economic instruments is not within the scope of this generic waste tariff strategy. However, the use of such economic instruments is compatible with the tariff approaches in this strategy and should be investigated further.

Unfortunately in almost all circumstances residential consumers do not have the ability to reduce their bills by reducing their waste generation. The use of economic incentives through the MSW tariff system will therefore apply primarily to commercial and industrial consumers who are charged according to the amount of waste which they generate.

The disposal charge is the most appropriate point to introduce economic incentives to reduce waste generation. If the municipality attempts to raise collection charges to introduce waste reduction incentives consumers are likely to simply move to private sector waste collection providers who are not imposing the same charge. However all waste generated is ultimately disposed of (unless illegally dumped, or an alternative disposal mechanism is utilised) and therefore disposal charges will be passed on to the end consumer by both municipal and private waste service providers.

8.5.3 Landfill taxes

Taxes on solid waste disposal have been introduced in some developed countries by national government as a means of internalising the external environmental costs of waste disposal and thereby encouraging waste reduction. These taxes are also sometimes used to raise revenue for specific waste management expenses, such as rehabilitating old disposal sites.

The introduction of such national taxes is beyond the scope of this strategy but the implementation of such a tax by national or provincial government would have

implications at the municipal level. The implications of such an environmental tax should be evaluated in the context of this municipal solid waste tariff strategy.

8.5.4 Implications of tariff approaches for illegal dumping

The pricing of disposal services cannot be entirely separated from the problem of illegal dumping. Any significant increase in disposal costs is likely to increase illegal dumping. Municipalities should be aware of this and may want to introduce some incentives to encourage legal disposal. This may include free disposal up to certain amount per customer or free disposal of some types of waste that are typically illegally dumped. For example, the introduction of a recycling facility for builder's rubble that accepts this waste free of charge would reduce the illegal dumping of rubble. Recognition of the costs and the need for adequate financing of enforcement is also important.

8.5.5 Disposal tariff options

The municipality must decide whether an average historical or incremental cost approach (or some compromise) will be used. The full costs of disposal then need to be determined, including all planning, financing, regulatory and closure costs. The disposal cost will also include the costs of any alternative disposal mechanism used (i.e. recycling or waste-to-energy), which represents an opportunity cost on landfill airspace. Because it is unlikely that waste from a particular source will be dedicated to a particular disposal mechanism, it is necessary to calculate an average disposal cost in terms of landfill airspace required. On this basis the so-called "airspace cost" can be determined, and from this the airspace cost per ton of waste (Gauteng Department of Agriculture, Conservation, Environment and Land Affairs, 2001).

Once the full airspace cost has been calculated these costs per ton of waste will form the basis for disposal tariffs. Ideally all disposal sites should be equipped with weighbridges and disposal fees should be on a R/ton basis. If such facilities are not available a charge per volume (R/m³) can be used.

Different types of waste may have different costs or benefits and these should be used to adjust the tariff accordingly. For example, those wastes that can be used for cover material (inert material such as soil and rubble) should incur a lower charge than the average. Other difficult to handle wastes may incur a correspondingly higher charge.

8.5.6 Rehabilitation and closure levies

The costs imposed by landfill closure have often not been recovered through disposal charges because they are not accounted for during the life of the disposal site. The introduction of a closure and rehabilitation levy can ensure that sufficient funds exist to properly close and rehabilitate a site (and to indicate the full costs to consumers).

9 Selection of Tariff Approaches

As discussed above a specific tariff option is not proposed in this tariff strategy. Municipalities should be able to choice between the tariff options presented on the basis of local needs and priorities. This strategy outlines the key issues and principles that municipalities should consider when establishing MSW tariffs and it outlines the advantages and disadvantages of different tariff approaches.

10 Implementation Strategy

The solid waste tariff strategy will primarily be implemented by local and district municipalities with some support and oversight from national and provincial government.

Since municipal tariff setting remains a local government function the role of national and provincial government is to provide guidance and support to local authorities and to regulate service delivery where required under such legislation as the Municipal Services Act. Provincial government must also oversee the effective performance by municipalities of their functions of cleansing and solid waste management.

The solid waste tariff strategy forms part of the National Waste Management Strategy and will be implemented alongside other elements of the NWMS. The development of integrated waste management plans (IWMPs), as outlined in the NWMS, will require municipalities to evaluate their current MSW services and to plan for future service delivery from a social, technical and financial perspective. The setting of tariffs for MSW services is an integral part of the financial component of the IWMPs. The three key documents for the setting of MSW tariffs, which will be made available to municipalities, are:

- Municipal Solid Waste Tariff Strategy (this document);
- Solid Waste Tariff Setting Guidelines for Local Authorities; and
- Municipal Solid Waste Tariff Model (MS Excel-based spreadsheet Model).

11 References

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