



**environmental affairs**

Department:  
Environmental Affairs  
**REPUBLIC OF SOUTH AFRICA**

# **Solid Waste Tariff Setting Guidelines for Local Authorities**



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## 1. Introduction

As part of a broader process of preparing a tariff strategy for municipal solid waste management, these guidelines have been developed to assist local authorities in the financially sustainable provision of solid waste services. While the *strategy* outlines broadly how solid waste tariffs can be set, these *guidelines* provide a step by step guide to the setting of these tariffs by municipalities.

Closely related to these guidelines is a spreadsheet-based tariff-setting *model* that is intended to assist with calculating the costs, required income and appropriate tariffs for the provision of solid waste services. The data requirements for the model are similar to the data which needs to be gathered during the tariff setting process outlined here.

The following key policy documents were used in the preparation of these guidelines to ensure consistency with the general national approach to the setting of solid waste tariffs and should be referred to for further detail on the legislative and policy context:

- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- The National Waste Management Strategy (NWMS) (DEA 2011)
- The National Environmental Management Act (NEMA);
- Transparent Tariffs Setting Tariffs: a guide for Local Government in South Africa, Namibia and Botswana (SALGA, 2011)
- National Policy for Provision of Basic Refuse Removal Services to Indigent Households (DEA, 2010)
- National Domestic Waste Collection Standards (Government Gazette 2009)

## 2. Why the guidelines?

The NWMS (2011) recommends that the Department of Environmental Affairs (DEA) update the tariff setting guidelines to assist municipalities in instigating “cost-reflective, and where feasible, volumetric tariffs” for solid waste management. The Municipal Systems Act requires that “tariffs must reflect the costs reasonably associated with rendering the service, including capital, operating, maintenance, administration and replacement costs, and interest charges”. However, solid waste services are provided as a public good and the municipality has an obligation to provide certain waste services. The National Policy for the Provision of Basic Refuse Removals for Indigent Households incorporates basic solid waste services into the bundle of free basic services and this allowance needs to be factored into the setting of tariffs. In addition, a strong agenda has been set for waste minimisation, reuse and recycling, which needs to be incorporated into the budgeting for municipal solid waste services.

The factors outlined present a new set of challenges for municipalities with regard to the determination of affordable and equitable solid waste tariffs. It is against this background that the DEA has identified the need for a consistent national municipal solid waste tariff strategy. These guidelines are aimed at assisting municipalities in the translation of the national strategy into practical approaches for establishing solid waste tariffs in their municipal area.

## 3. Principles for Solid Waste Tariff Setting

Alternative tariff approaches for municipal services affect the efficiency, equity and sustainability of the service to different degrees. It is recognised that no single tariff approach can meet all these principles and that trade-offs will need to be made between the principles depending on local circumstances.

The following principles have been amalgamated from the key national policies and legislation and should be used in governing and shaping the design of tariffs for solid waste services.

- *Efficient allocation of resources:* the efficient allocation of available municipal resources between users should be fostered;
- *Efficient supply of services:* incentives should be created to provide services at the lowest cost;
- *Efficient use of natural resources:* the efficient use of resources should be encouraged. 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 costs;
- *Financial viability:* tariffs should allow for the financial sustainability of the service, taking any other subsidies into account;
- *Horizontal equity:* users of services should be treated equitably and should pay the same amount for the same level of service;
- *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 or be subsidised in such a way as to allow access to basic services;
- *Administrative and technical feasibility:* any tariff should be administratively and technically feasible to implement. The implementation process should be less costly than the benefits of implementation itself;
- *Polluter pays:* those responsible for waste generation and externalities from waste generation or disposal should pay for the social costs of this waste;
- *Avoiding illegal dumping:* the tariff should not provide incentives for tariff avoidance through illegal dumping;

- *Proportionality*: the amount the user pays should be in proportion to the use of the service;
- *Transparency*: tariffs should be understandable and any subsidies which exist must be visible and understood by all those affected;
- *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.

## 4. Eleven Steps to Set Municipal Solid Waste Tariffs

The process of establishing tariffs for a municipal service is not only a financial procedure. Tariff setting involves understanding the service and service levels that are being offered; knowing who the customers of the service are and what they are willing and able to pay for the service; analysing the costs of service provision; establishing the institutional conditions for service delivery and finally evaluating all sources of income, including tariffs.

This tariff setting process has been broken down into eleven steps that can be followed by municipalities to set tariffs for solid waste services. These should not be seen as a rigid approach to municipal tariff setting but are intended as a guide. The eleven steps are:

1. Understand consumers
2. Estimate waste generation
3. Assess technical options
4. Determine institutional arrangements
5. Understand costs
6. Identify revenue sources
7. Select appropriate tariff options
8. Determine the primary baseline tariff
9. Make strategic decisions
10. Calculate tariffs
11. Communicate with consumers



### Relationship to Solid Waste Tariff Model

A solid waste tariff setting model has been developed alongside these guidelines. The model is based on an Excel spreadsheet and assists municipalities in evaluating different tariff approaches and tariff levels. The model requires municipalities to enter

information about their solid waste services which is then used in the calculations. The steps in these guidelines similarly require municipalities to gather enough information to make appropriate decisions on solid waste tariffs. The guidelines have been written in such a way that the information gathered in each step can also be used as input to the solid waste tariff model.

## Step 1: Understand consumers

The municipality needs to firstly understand its consumer profile. An understanding of the number and type of consumers will enable the municipality to make accurate cost calculations, to estimate likely volumes of waste generated, and to assess likely income from tariffs. Information on the following categories should be gathered:

### Residential consumers

#### Population and households

The municipality should gather data on the demographic characteristics of its area, specifically:

- Current number of households and average household size in the municipality.
- Income distribution (at least at the level of detail in the table below).

Income category (Rands/hh/month)	% of households
0-1600	
1600- 3200	
3200-6400	
6400+	

- In the event that the municipality does not have this information, the model contains default values per municipality based on the Census 2001 data. If the municipality has access to more accurate or recent figures, the default values can be overwritten. The model will be updated when the 2011 Census data is published.

#### Existing service provision

The current levels of service and access to solid waste removal services need to be clearly understood as a baseline for future solid waste services planning. The municipality should collate information on:

- Current levels of service: from the service level information, the number of households with acceptable levels of service and those with inadequate services can be seen. The issue of what is an adequate service level is discussed further under step 3. The tariff model is fairly flexible and allows for users to include the range of service levels used in the municipality. Service level information includes:
  - Method of collection (kerbside, communal or none)
  - Frequency of collection (e.g. weekly, 2 x weekly, monthly, etc.)
  - Waste storage (black bag, 240l wheelie bin, skip, etc.)
  - Service provider (Municipality, full contract, labour only contract, or none)

Once the municipality has collected the above information it should be able to fill in the blocks in the table below. This table is taken from the solid waste model and the information shown is 'dummy' information from a typical municipality.

Service level	Service Provider	Collection Frequency	No of hhlds
none/on-site	-		5000
Communal-rural	municipality	once weekly	1000
Communal-urban	municipality	twice weekly	5000
hh to skip transfer	Full contractor	once weekly	5000
kerbside	Labour only contract	once weekly	5000
Kerbside	municipality	once weekly	3000

## Non-residential consumers

Commercial and industrial consumers can be an important customer category for many municipalities. There may also be industrial waste generators whom the municipality does not collect waste from but whose waste will be disposed of in municipal landfills.

Information required includes:

- The numbers of commercial, industrial and institutional consumers who require waste to be collected on a regular basis by the municipality. The commercial category would include offices, shops and restaurants. Institutions would include schools, churches and hospitals.
- The total number of commercial, industrial and institutional consumers in the municipal area (including those not serviced by the municipality).
- The volume of 'demand collected waste' (waste collected on an ad-hoc basis) collected from non-residential consumers on an annual basis.

## Step 2: Estimate Waste Generation

The municipality should also have an understanding of the amount of waste that is likely to be generated in the area, and which will therefore require collection and disposal. Total waste volumes are an important driver of current collection costs and of future costs of landfill space. In the absence of waste generation information, the model will calculate an estimated total waste mass based on default values, which should be checked against municipal records. Should the calculated waste mass differ from municipal records, the waste generation parameters should be varied as described below:

### Residential consumers

Typical waste generation rates for different consumer categories should be estimated. The model allows for waste generation to be categorised as low, medium or high. Default values for these categories for households in South Africa are provided in the model. These values can be adjusted if the municipality has better information.

**Table 1: Default waste generation rates (DEA 2010)**

Waste generation level	Waste Generation Rate (kg/p/day)
low	0.41
medium	0.74
high	1.29

- If possible waste density information should be gathered as this affects choice of collection technology

### Non-Residential waste generation

**Error! Reference source not found.** provides a description of the different types of waste generated by commercial, business and industrial users.

The municipality should gather information on:

- The annual amount of waste generated by commercial, industrial and institutional consumers.

## Public services

The solid waste collected from public areas can be a substantial component of the total waste stream and the municipality should have an understanding of the:

- Mass of waste collected through street sweeping per annum
- Mass of waste collected through area cleaning (including illegal dumping) per annum

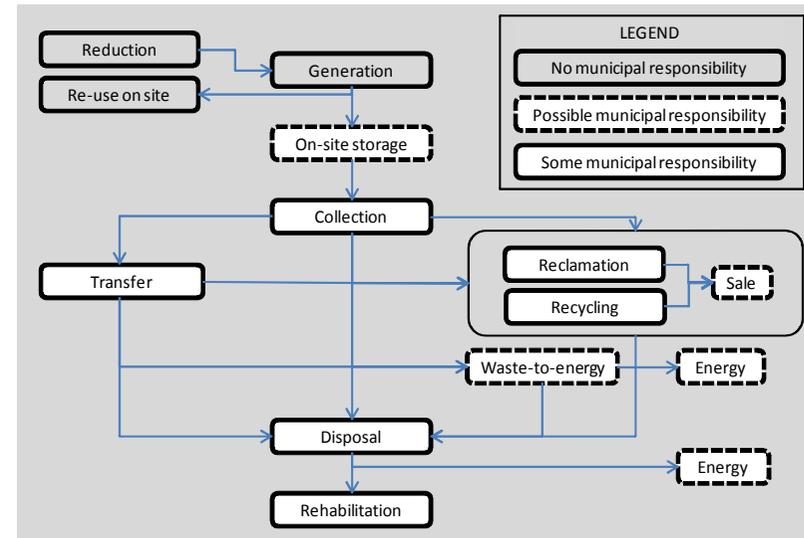
Additional optional information can be used to refine cost projections. This information includes:

- size of public spaces to be cleaned
- length of public roads to be swept
- frequency of public cleansing services
- technology employed (capital- or labour-intensive)

## Step 3: Assess Technical Options

Solid waste services can be provided in a number of ways at different levels of service. The choice of service level, approach and technology will affect the cost, efficiency, sustainability and social acceptability of the service.

There are a number of stages in the municipal solid waste system where different technical options are available (see figure 1. below). Alternative methods and technologies are available for on-site storage, collection, transfer and transport and disposal.



**Figure 1. The municipal solid waste management system**

Note: The dashed boxes show the elements that are not always included in the system.

## Residential consumers

### Service levels

There are a range of service level options that the municipality can consider in providing solid waste services (see table 3 below). Service levels are a key cost driver and need to be established prior to setting tariffs:

- *Adequate service levels:* The adequate service level is context specific and will depend on the settlement type and waste generation characteristics. Municipalities must apply the National Domestic Waste Collection Standards to their own circumstances (DEA 2010):
- *Appropriate collection frequencies:* for medium and high densities are explained as:
  - At least once a week for purely biodegradable domestic waste, but on-site composting should be encouraged
  - At least once a month for recyclable materials in rural areas

- At least once fortnightly for recyclable materials in urban areas
- *Service backlogs:* Any households with a solid waste service below the level considered adequate will constitute a service delivery backlog that will have to be addressed by the municipality. A target for eradication of this back log needs to be set and entered in the model, if applicable.

**Table 2: Description of typical service levels**

Service level option	Description
On-site disposal	This is the most basic level of service applicable largely in rural areas where there are sparsely dispersed settlements. Households should have large plots where they can dispose of waste themselves by burning and/or burying. Disposal areas need to be designated by the municipality and need to be regularly supervised to be considered adequate.
Communal dumping sites	Households are required to transport their own waste to a dumping site outside the settlement area. The dumping site is provided, operated and regularly supervised by the municipality or an appointed contractor, and is basically a small landfill site.
Communal bins (skips)	Households are required to carry their own solid waste to a communal point in the neighbourhood where large bins (skips) are provided. The skips are removed to the landfill site and emptied by the municipality or an appointed contractor.
Residential round collected waste (Kerbside collection)	Households to put their solid waste outside their dwelling (in bins or bags) for collection once or twice a week. Alternatively, contractors are appointed to collect the waste door-to-door and transport it to a local collection point/communal skip. The municipality, or another contractor, then transports the waste in skips to the landfill.

Source: PDG (1999), National Waste Domestic Collection Standards (DEA 2010)

### Collection methods

The same level of service (for example, a weekly kerbside collection) can be delivered using different methods and technologies (for example, more or less labour intensive approaches). The method used impacts the cost and efficiency of the service and also impacts other municipal objectives, such as local economic development and job creation. Prior to setting tariffs the municipality should:

- Evaluate the appropriate collection methods for the different areas within the municipality, given the availability of resources.

- Consider the appropriate technology for waste collection. The appropriate type of vehicle chosen is affected by the density of the waste stream. Small scale and labour intensive collection methods should be considered as viable options alongside more capital intensive approaches. There are a number of examples of successful small-scale, labour intensive collection schemes operating nationally.

### Non-residential

Non residential consumers are typically serviced on a demand basis with their service levels determined by the amount and type of waste generated. The local authority needs to:

- Assess demand for non-residential waste collection services and assess whether there are adequate technical resources to service this demand.
- Evaluate the most appropriate and cost effective technology.

### Public cleansing

The standard of public cleansing and the technical approach used, needs to be considered by the municipalities as it impacts the cost effectiveness of the service and the amount of financing required.

### Waste transfer

Most municipalities operate some form of transfer. This may be the form of a small collection point, a garden refuse dump, or a large collection and sorting facility. Any facility that involves the transfer of waste from one vehicle to another is considered a transfer station. A range of technologies exist from a basic fenced area, to sophisticated automated 'rail and bail' facilities. The technical option must be appropriate to the vehicles being used and the volumes and types of waste being handled. The location of the transfer stations is an important factor in the efficiency of transport costs.

### Waste minimisation and recycling

The National Waste Management Strategy is carrying out the Waste Act's emphasis on waste hierarchy by passing the responsibility of waste minimisation to municipalities.

The technical options in this regard, and their associated costs, should be investigated, as well as other approaches such as education and awareness programmes, the establishment of Material Recovery Facilities and buy-back facilities the use of economic incentives. The amount of waste recycled will affect collection and disposal costs. The municipality should gather data on:

- current and future waste minimisation and recycling amounts should be estimated by the municipality.
- capital and operating costs of any education, awareness and recycling initiatives

### **Disposal by landfill**

Municipal solid waste is typically land-filled by local authorities at general waste disposal sites managed by the municipality. In some areas municipalities dispose of waste at private landfills, or at landfills operated by other municipalities. Alternative disposal options are limited at present, but waste to energy is being considered by some municipalities (see below). Municipalities should gather information on:

- Remaining landfill airspace
- Capital cost for new landfill development
- Operating costs of existing landfills
- Disposal costs at non-municipal owned landfills

The choice of option will have long term impacts on the costs of service delivery and environmental impacts of disposal. The municipality should be aware of the long term financial and environmental costs of alternative landfill or other disposal choices.

### **Waste to energy**

Waste-to-energy is a highly capital intensive process and the financing implications and its impact on tariffs is beyond the scope of this tariff guideline. However, if waste-to-energy facilities are being considered, then it is likely that the municipality has undertaken a feasibility study, or received a business plan from a potential service provider. From these documents, it will be necessary to extract:

- Operating cost for waste to energy facility (and portion of this cost payable by the municipality)
- Financing charges (and portion of this cost payable by the municipality)
- Volumes of waste to be disposed of in this facility and implementation timeframes

### **Principles relating to service levels and technology**

- *Importance of mixed service levels.* it will generally be important to have a range of service levels to offer consumers. This allows appropriate service levels to be matched to the ability of consumers to pay. A range of service levels can also be used to provide "free basic solid waste services" as discussed in section 8. Different service levels will also be appropriate for different settlement types in those municipalities with a range of settlement types within their municipal area.

- *Appropriate technology choices.* a key objective is to keep costs of service delivery as low as possible while still maintaining a good quality of service to consumers.
- *Appropriate collection approaches:* solid waste can be collected through a number of alternative approaches. Some of them, such as small contractors with small vehicles, can be labour intensive and contribute to employment and local economic development. They may also be appropriate in areas which are inaccessible to larger vehicles. These alternative options should be evaluated alongside more traditional service delivery approaches.

## **Step 4: Determine Institutional Arrangements**

There are a number of different role-players involved in solid waste provision and the municipality needs to establish a clear institutional map in terms of who is responsible for what in the solid waste management system. The following issues need to be clarified:

### **Division of responsibility between local and district municipalities**

Local municipalities are responsible for local waste collection and disposal and district municipalities are responsible for operation of regional facilities. This does not reflect a duplication of services as local municipalities typically pay district municipalities to dispose of waste at regional landfill sites. 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.

### **Internal division of responsibilities**

Municipalities have varied approaches to the allocation of solid waste management responsibilities internally. Some locate solid waste management within the health department, while others locate it within the engineering or community services departments. Some have split the functions between the departments. Since the ultimate responsibility for tariff setting typically lies with the treasury, the municipality should ensure that there is proper communication and co-operation between the treasury and the solid waste departments in order to have a co-ordinated tariff setting process.

## External service provider involvement

The municipality is empowered under the Municipal Systems Act, to provide municipal solid waste services by an external mechanism by entering into a service delivery agreement with an outside organisation. This outside organisation can be another public sector body, a private sector firm or a community based organisation. The Systems Act (Section 78) establishes a mechanism which must be followed.

If the decision is taken to involve external service providers (fully or in part), the municipality will need to set up monitoring and regulatory mechanisms to regulate the performance of the service providers.

The municipality can either collect tariffs itself through its normal procedures or it can allocate the responsibility of tariff collection to the external service provider. In the latter case Section 81(1)(d) of the Systems Act requires the municipality to “control the setting and adjustment of tariffs by the service provider for the municipal service in question” in accordance with the tariff policy determined by the council.

The municipality can allow some adjustment of tariffs by the service providers within limitations set by the municipality.

The private sector can also be involved in the operation of reclamation facilities, transfer stations or landfills. This can be under contract to the municipality, as a Public-Private Partnership (PPP), or independent of the municipality. The relationship needs to be clarified prior to setting tariffs, as the municipality needs to be clear on what financial responsibility they have towards these operations, if any.

### Contracting models

- *Direct contracting:* the use of small contractors for refuse collection and street cleaning has been found to be successful in some areas. Service delivery agreements can be entered into with:
  - small firms;
  - single contractors;
  - community-based providers.
- *Principal Contracting:* small contractors may require external support in areas such as financial planning, compliance with labour legislation and raising capital for equipment. It is possible to appoint an intermediary, such as a larger firm, to provide this support to the smaller contractors. Alternatively the local or district municipality could set up an internal department to provide this support to small waste management providers.

## Step 5: Understand Costs

In order to set proper tariffs for consumers, all the costs associated with providing the solid waste service should be reflected as accurately as possible. This will help in the design of appropriate tariffs that will ensure that the revenue required to cover these costs is generated.

Informed decisions about the financing of solid waste services can only be taken if the costs of different components of the service are known. The principles and benefits of full cost accounting (FCA) are described in the Solid Waste Tariff Strategy.

### Cost apportionment and determination

With regard to the different components of service provision in the municipal solid waste system, there are various factors that drive the cost of provision. An analysis of these factors is necessary to assist the municipalities in determining the relative impact on expenditure of different elements of the waste management system. Typical cost drivers are shown in Table 3 below.

**Table 3. Typical cost drivers of MSW provision**

Service provision component	Typical cost drivers
Collection	<ul style="list-style-type: none"> <li>▪ Settlement types – distance and density and road conditions</li> <li>▪ Levels of service – frequency of collection, type of collection approach</li> <li>▪ Collection method – vehicle technology used</li> <li>▪ Composition of waste – determined by household characteristics</li> <li>▪ Distance from disposal site – need for transfer stations, fuel costs</li> </ul>
Street and public area cleansing	<ul style="list-style-type: none"> <li>▪ Settlement types – population density and through-flow of people</li> <li>▪ Levels of service – frequency of cleansing</li> <li>▪ Collection method – labour intensity of method used</li> <li>▪ Levels of littering – public education</li> </ul>
Disposal	<ul style="list-style-type: none"> <li>▪ Land costs</li> <li>▪ Planning and siting costs</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Construction costs – environmental constraints</li> <li>▪ Regulatory compliance</li> <li>▪ Closure and rehabilitation costs</li> </ul>
Overheads	<ul style="list-style-type: none"> <li>▪ Finance</li> <li>▪ Billing</li> <li>▪ Administrative overheads</li> </ul>
Future costs (of policies or legislation that may need to be met)	<ul style="list-style-type: none"> <li>▪ Upgrading waste sites to meet DWAF permitting standards</li> <li>▪ Formalisation of salvaging on waste sites</li> <li>▪ Development of waste management plans</li> <li>▪ Waste information system data collection</li> <li>▪ Financial provision for closure of disposal sites</li> </ul>

### Cost apportionment

For effective tariff setting a municipality will need to understand its costs of operation according to different components.

- *Collection vs disposal:* the costs of disposal are discrete costs that should be understood separately from waste collection costs. The municipality should be able to separate the operating and maintenance costs of disposal sites from other operational costs and should understand the capital costs associated with current and future solid waste disposal.
- *Public vs private:* the municipality may want to fund private and public solid waste services differently from each other; reflect these services separately in the tariff structure; or contract out one or the other of these services. For these reasons it should be able to separate the costs of public cleansing from those of private refuse collection (from residential and non-residential points).
- *Size and cost apportionment:* typically larger municipalities should be able to apportion their costs at a greater level of detail than small municipalities. This is partly because small municipalities will tend to share costs across different services, for example the same truck may be used for solid waste and general parks and gardens services and it may be difficult to apportion costs between the services. Small municipalities may also not organise their solid waste services into discrete delivery components, such as public space cleansing versus household refuse collection.

### Determining waste removal costs

The best way to understand the costs of each component of the solid waste system is to determine these costs on the basis of the main cost items for each component. For solid waste services the main costs items are direct, overhead and capital financing costs. The accompanying solid waste model also assists municipalities in determining

the costs of the various solid waste services on the basis of the key cost elements, as described below (SALGA, 2011):

- **Direct Costs:** exclusive in providing the service
  - *Employee related costs:* normal salaries and wages, bonuses, overtime costs, allowances, fringe benefits and social contributions.
  - *Bulk payments:* any payments for disposal to an external provider, if relevant
  - *Repairs and Maintenance:* vehicle operating and maintenance costs and cost of any materials or equipment used to repair or maintain fixed assets.
  - *Contracted Services:* cost of services contracted out to external service providers
  - *Other Costs:* all other expenditure not grouped under these categories.
- **Overhead Costs:** not directly attributed to individual service, but pertain to the cost of running municipality as a whole. This can be accounted for in two ways:
  - *activity based costing:* the most accurate way to apportion costs. It takes the activity as a unit and determines what the underlying cause for the action is. It allocates the costs based on the causative actions between services.
  - *pro-rata allocation of costs:* allocates indirect costs on a proportionate basis by using measures that are easily available (such as number of employees or budget size)
- **Capital Financing:** financing infrastructure expansion, rehabilitation, capital funding to ensure long-term sustainability of service
  - *External interest:* the cost associated with financing capital expenditure with external loans
  - *Depreciation:* the cost of 'using up' assets. If assets are properly depreciated, a cash surplus on the operating account transpires, which can be transferred to a reserve to finance asset replacement.
  - *Provisions to capital reserves:* a cost item used to create a cash surplus on the operating account, which can be transferred to a reserve used to finance asset expansions.

The information above will be used to develop indicators of cost, such as cost per service point, or cost per ton of waste collected.

### Determining waste disposal costs to landfills

The following costs associated with waste disposal to landfill sites should be calculated:

- *Direct Costs:* the operational costs associated with landfill operation are relatively easy to identify. These include vehicles, plant, equipment, personnel, and consumables such as cover material.
- *Capital financing (airspace costs):* the capital costs associated with landfill development, rehabilitation and aftercare are generally referred to as “airspace costs” and need to be considered. It is important that airspace costs are always included when disposal costs are calculated and disposal fees are set. The capital costs, combined with information on the total landfill capacity, can be used to determine a cost/ton of solid waste disposed of. This can be combined with the operating costs to arrive at a total cost/ton of solid waste disposal which will be used in setting disposal charges. Typical airspace costs which the municipality will need to have information on are:
  - land acquisition costs
  - sitting costs, such as search costs and the cost of environmental assessments
  - development costs including all the engineering works, infrastructure and buildings
  - capping, rehabilitation and aftercare costs

## Step 6: Identify revenue sources

In order to provide solid waste services in a financially sustainable manner, the municipality should have a sound revenue base for both operational costs and capital funding. All the funding sources available to the municipality should therefore be identified.

### Sources of capital finance

It may not be possible for the municipality to bear all the costs of providing solid waste infrastructure to all unserved or under-served users. It may only be able to make a limited contribution and the rest will have to be raised from other sources. It is therefore important to assess the extent to which loan funding will be required since the cost of servicing loans affects the tariffs that should be set to raise recurrent expenditure. The following are the possible sources to be investigated:

- Intergovernmental Grants
- Capital subsidies (MIG, USDG, NDPG, EPNP)
- External loans;
- Own sources.

### Sources of operating revenue

The type of solid waste infrastructure provided and associated levels of service have a significant impact on operating costs. The primary sources of revenue for operating expenditure are:

- *Tariffs:* solid waste services are provided to individual households and businesses and therefore it is appropriate and possible to establish tariffs for these services payable by each customer served
- *Rates:* solid waste services include public services, such as street cleaning. They also have a public good component in the sense that the cleanliness of each individual stand affects the overall environmental health quality of the area. In this regard it may be appropriate to finance solid waste services through rates which are typically used to finance public goods.
- *Equitable share:* the equitable share subsidy from national government is meant for the provision of basic municipal services to the poor. Solid waste can be regarded as a basic service.
- *Other subsidies:* there may be other operating subsidies, such as for environmental health, fuel levies and RSC that can be used.
- *Other revenue streams:* sale of recyclables, electricity generation or carbon credits.



## Step 7: Select Appropriate Tariff Options

Once the municipality has identified possible revenue sources it should focus on the options available to raise the required revenue from these sources. A distinction should be drawn between residential and non-residential tariffs.

With regard to residential tariffs, there is a wide variety of options available which should be evaluated against the tariff principles outlined in section 3. Depending on the municipality, each will emphasise different principles as they weigh their significance for their own circumstances. 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.

It is after this evaluation that the most suitable tariff option should be selected from the list below.

An important factor affecting solid waste tariffs is that MSW services have characteristics of both private and public goods. Residential waste collection is a public good in the sense that it is hard to exclude anyone from the service without leading to illegal dumping and public health problems. There are also pure public services in the MSW system, such as street cleaning, which benefit all residents and firms. At the same time MSW collection is a private good in that it is a service delivered to individual households, and it costs more to deliver the service the more households are served. Tariff approaches have to accommodate this dual nature of MSW services.

### Residential tariffs

#### Option 1 – Financing of all solid waste services through 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.

#### 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 thus providing free basic MSW 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.
- Does not provide any incentives for the solid waste department to provide the service more efficiently.

#### Option 2 - Solid waste services funded by user charges

This option is premised on the view that the solid waste operation is a separate, "ring-fenced" service which is expected to recover all its costs from user charges. The utilisation 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.

#### Advantages

- Can be designed to be horizontally equitable (although will not always be so).
- Will encourage municipal efficiency due to a budget constraint.
- 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 various user charge options associated with this approach are:

- a) *Charges based on a proxy for amounts of waste generated* - In this approach a proxy, typically 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.

<b>Advantages</b>
<ul style="list-style-type: none"> <li>▪ The use of stand size is appropriate if collection costs increase with decreasing residential density and therefore this approach promotes the proportionality principle.</li> <li>▪ Stand size is likely to be correlated to a fair degree with the volume of waste generated and with income level.</li> <li>▪ Other proxies, such as tariffs differentiated by location, may be appropriate if different areas have different waste generation rates on average and different costs.</li> <li>▪ Provides no incentive for illegal dumping because people are charged anyway.</li> <li>▪ Is vertically equitable as poorer consumers will tend to pay less for MSW services.</li> </ul>
<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>▪ Does not encourage waste reduction or recycling.</li> <li>▪ There is only a limited relationship between stand size (or other proxy) and waste volumes and it is therefore not always horizontally equitable.</li> <li>▪ May be complex to establish and administer, for example, stand-sizes need to be available on a database.</li> </ul>

- b) *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.

<b>Advantages</b>
<ul style="list-style-type: none"> <li>▪ Has a greater degree of horizontal equity than a flat rate as consumers pay for service received.</li> <li>▪ 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</li> <li>▪ Provides efficiency incentives for the service provider.</li> </ul>
<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>▪ Is only loosely proportional to cost of provision as there are other cost drivers aside from service level.</li> <li>▪ Is not vertically equitable as poor households pay the same as wealthy households if a single service level is provided.</li> </ul>

<ul style="list-style-type: none"> <li>▪ Service level is not always related to amount of waste generated and therefore does not meet the polluter pays principle.</li> <li>▪ The current tendency in solid waste provision is to move towards consistent service levels in municipalities which removes the scope for service level targeting.</li> <li>▪ May encourage illegal dumping if service level choice is available.</li> </ul>
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- c) *Charges based on actual amounts generated (pay as you throw)* - This approach requires a detailed recording of the amounts of waste collected from a site and establishes a charge per amount of waste generated. More crude versions of this approach are based on consumers purchasing special bags, with a surcharge which goes to the municipality, which are the only bags collected by the municipality. The more refuse generated the more bags have to be bought by the household.

<b>Advantages</b>
<ul style="list-style-type: none"> <li>▪ Direct relationship between waste generation and cost to the user.</li> <li>▪ Provides incentives for waste reduction.</li> <li>▪ Is horizontally equitable.</li> <li>▪ May provide scope for cross subsidisation through a rising block approach.</li> <li>▪ 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)</li> </ul>
<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>▪ Has large technical costs and constraints (special collection vehicles, billing systems, and bin coding are required).</li> <li>▪ Has social and management constraints (illegal use of neighbours bins can occur, management systems are more complex, can impose a burden on households).</li> <li>▪ Not vertically equitable as all households pay an equal amount per volume of refuse.</li> <li>▪ Bags are a measure of volume and not mass and overstuffing of bags can occur.</li> <li>▪ Encourages illegal dumping.</li> </ul>

### **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.

<b>Advantages</b>
<ul style="list-style-type: none"> <li>▪ Provides a separation between private and public services.</li> <li>▪ Can be vertically equitable if property rates are used to finance public services.</li> <li>▪ Accommodates cross subsidies relatively easily.</li> <li>▪ Can support the proportionality and polluter pays principles if the private tariff component is well designed.</li> <li>▪ Provides for financial stability.</li> <li>▪ Can be horizontally equitable if designed correctly.</li> </ul>
<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>▪ Reduces the efficiency pressures on solid waste departments.</li> <li>▪ Requires a good cost apportionment between public and private components.</li> <li>▪ May not be very transparent to consumers.</li> <li>▪ May not be vertically equitable if a flat rate is levied on all consumers.</li> </ul>

The more specific combinations under this option are:

- a) *Flat rate and variable user charge:* The use of flat rate on all households and 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.
- b) *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. If such an approach is adopted it should be formalised, i.e. an explicit proportion of the rates revenue being 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. The *ad hoc* 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.

## Non-residential tariffs

Commercial and industrial tariffs should be set within the same framework as residential tariffs. 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.

However, unlike residential users, the tariff options for these consumers are quite limited, with the user charges being the well-developed and preferred tariff setting approach. Municipalities should, as far as possible, link these user charges to actual costs. The tariff structure should therefore reflect the various cost drivers of service provision. These include the distance of the customer, the type of waste (if the waste type imposes specific costs or benefits<sup>1</sup>), 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.

Non-residential consumers also benefit from the public good components of MSW services. The municipality is therefore justified in recovering at least the costs of public service provision from non-residential consumers. 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 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

<sup>1</sup> Some waste may be useful as cover material, for example, which reduces the net costs of the waste removal.

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

## Disposal charges

Those municipalities that manage their own disposal sites (as opposed to disposing of waste at a District or privately owned site) will need to establish waste disposal charges. Disposal charges should be established to recover both the capital and operating costs of waste disposal facilities and will therefore be based on the costs of disposal per ton of waste calculated in step 5. It is generally best to charge for solid waste disposal on a mass basis as the mass of waste disposed bears the most direct relationship to airspace costs. Where a weigh-bridge is in use the charges should be based on mass. Where there are no weigh-bridges, the waste tonnage should be determined using vehicle size and volume to estimate the mass of waste disposed of. A number of other factors should be considered when establishing disposal charges:

- *Pricing basis:* the pricing of disposal services is strongly influenced by the manner in which *capital costs* are estimated and recovered from consumers. The *average historical costs* of disposal are often 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. The *marginal costs of disposal* (the costs of the next most likely disposal site) has the advantage that it provides consumers with appropriate incentives to reduce waste but may be difficult to calculate and apply.
- *Differentiation of waste types:* disposal charges can allow for the differentiation of waste types. For example, waste that can be used as cover material may qualify for reduced charges, while waste that imposes additional operating costs, such as wet waste, may incur a higher charge.
- *Minimising illegal dumping:* some municipalities allow a certain amount of waste to be disposed of at no charge. In this way it is hoped to minimise illegal dumping. If illegal dumping is a problem in a municipal area this is an approach that is worth investigating.
- *Rehabilitation levy:* in most municipalities the costs of closure and rehabilitation of the disposal site are not included in the disposal charge. This leaves the municipality with a large future cost with no associated revenue. Some municipalities have begun to impose a small rehabilitation levy. This levy is set aside in a fund which will be used to finance the environmentally sustainable closure of the disposal facility.

## Incentives for waste reduction and recycling

The pricing of solid waste services can assist in changing consumer behaviour and can be used to provide incentives for consumers to reduce the amount of waste generated. 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 therefore 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.

Unfortunately in almost all current 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) and therefore disposal charges will be passed on to the end consumer by both municipal and private waste service providers.

## Step 8: Determine Primary Baseline Tariff

The primary baseline tariff is a tariff which is uniform across all consumers for a particular service level and which fully recovers all the costs. This tariff can be viewed as the point of departure, and is one of the outputs of the tariff model. Step 9 discusses the decisions as to why the tariff will be above or below the primary baseline. However, municipalities need to know the actual tariff so that they can understand the financial implications for setting a tariff different to this baseline tariff.

The baseline tariff is calculated by dividing the total cost by the total number of consumer units.

## Step 9: Make Strategic Decisions: Revising the Baseline Tariff

There are strategic decisions which the municipality needs to make when setting tariffs. A revised baseline tariff needs to be determined for each consumer group, taking into consideration the strategic decisions as outlined in this section.

The decisions can be divided into financial and affordability decisions.

1. Financial Decisions
  - The municipality needs to decide if it wishes to achieve full cost recovery
  - Is it willing to accept a deficit?
  - Will it be funded from subsidies, rates or cross-subsidisation?
  - Is it willing to accept a surplus?
  - How much of a surplus will it generate?
2. Affordability Decisions
  - Does the municipality plan on subsidising the delivery of solid waste services (excluding free basic services)?
  - Does the municipality want to limit/cap the tariff that a particular group of consumers pay?
  - Does the municipality plan on escalating the delivery of solid waste services on certain users?

One of the government's key areas of focus is the need to alleviate poverty among the poor households and a key mechanism for achieving this is through the provisions free basic services, one of which is solid waste. The principles behind subsidisation of poor households are contained in the National Policy for Provision of Basic Refuse Removal Services to Indigent Households (DEA, 2010).

### Cross-subsidies

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.

### Subsidy targeting

Targeting is necessary where certain groups are earmarked to gain access to services. The following approach should be followed by the municipality in targeting subsidies for solid waste:

- *Identifying the target group(s)*: targeting is about identifying the poor households who need a subsidy and making it available to them. Subsidy administration should be as efficient as possible in order to minimise administrative costs and ensure that most of the resources available are used for the actual subsidy.
- *Designing the subsidy*: three issues need to be considered in designing subsidies:
  - *method of transfer*: how the subsidy is transferred from the municipality to the target group (see section on Subsidy Allocation below);
  - *degree of choice in using the subsidy*: since solid waste provision is one of the services in the "basket of services", a conscious decision needs to be made to use part of the available subsidy on this service; and
  - *transparency of the subsidy*: the use of the subsidy should be fully transparent so that beneficiaries know that the value of the subsidy they receive and so that politicians and other members of the communities are aware of the source and destination of MSW subsidies.
- *Implementing the subsidy*: each subsidy scheme requires a set of rules about who qualifies for subsidies, in what form they are allocated, who can change the rules and how, who administers the system, and what sanctions apply to those found cheating. People need to be educated on how the subsidy scheme works to enable them to take up the subsidy and to ensure that subsidy entitlements reach them.
- *Monitoring, evaluating and reviewing the impact of targeting*: monitoring ensures that the subsidy scheme for solid waste, as it is designed, runs optimally and that the target group remains as accurately identified as possible. It also entails assessing whether the target group is still valid or if there have been changes in the way it is constituted. For instance, have some new households entered while some of the original ones have left the group? Evaluation is about assessing whether or not poor households have gained access to basic solid waste services through the scheme, and to understand why this is so. The evaluation process also assesses whether the broad objectives of poverty reduction are being met by the scheme.

### Options for targeting

The municipality can use one of the options shown in Table 4 to target its poor consumers for solid waste provision.

**Table 4: Options for targeting poor consumers**

Targeting option	Description	Applicability to Solid Waste
Service level targeting	This option requires the provision of a relatively low level of service free to target the poor. Self-selection of the service level, where this is possible, promotes the workability of this option.	<ul style="list-style-type: none"> <li>Requires more than one service level in the municipality</li> <li>Difficult to provide more than one service level in a single area therefore a targeting will be geographically based</li> </ul>
Income based measures	Household income is the most conventionally used measure of poverty. This can be linked to the municipality's indigent policy where available.	<ul style="list-style-type: none"> <li>Both rates based and tariff based options can accommodate an income targeting approach</li> </ul>
Other measures of poverty	The quality of dwelling is one example of another measure.	<ul style="list-style-type: none"> <li>Proxies for income can be used in a tariff based approach to MSW financing</li> </ul>
Geographic targeting	The subsidy can be provided to all those living in an area with certain characteristics.	<ul style="list-style-type: none"> <li>This will be similar to service level targeting in the case of solid waste</li> </ul>

## Subsidy allocation

With the sources and targets of operating subsidies in mind, the municipality needs to develop a framework that will guide the allocation of solid waste subsidies to households. Thus the municipality must:

- Choose *subsidy delivery option*: select the most appropriate subsidy option through which the subsidies will be disbursed. The options are:
  - Supply-side subsidies*: service providers (such as a small waste removal contractor) are directly subsidised to provide lower cost solid waste services to the targeted households. This option requires monitoring to ensure that the poor households receive the service they are entitled to. This would only be applicable to service level or geographical targeting approaches.
  - Demand-side subsidies*: the objective here is to allocate subsidies to the households to cover the cost of the basic solid waste service. This approach can best be applied through credits to the account of the poor. This would be applicable to income-based or other measures of poverty.
- Determine *subsidy amount*: decide on the subsidy amount to be allocated to each poor household. The main aim is to ensure that solid waste charges in particular, and the overall municipal services bill in general, are affordable to poor

households. The subsidy amount will therefore be influenced both by the amount of revenue available but also by the level and extent of poverty in the municipal area.

## Step 10: Calculate tariffs

### Using tariff models

The municipality has to generate the revenue required to recover all the costs incurred in providing solid waste services. In order to do this, appropriate tariffs need to be set to ensure that the municipality's operations are financially viable and sustainable. The various financial models mentioned below can be used to calculate tariffs.

- Local authorities' own models which they have used for tariff setting historically.
- The Solid Waste Tariff setting model that has been developed as part of this tariff strategy process.
- The Municipal Services Financial Model (MSFM) developed by PDG for the Development Bank of Southern Africa.

Any model used should include the cost implications of providing different levels of services and the associated tariffs that should be set for each service level.



### Affordability analysis

An affordability analysis should be conducted as part of the tariff calculations. The monthly bills for households should be compared against the monthly income of households in the municipal area (the income distribution of households should be available from Step 1) to assess whether municipal services will be affordable to households. If some households are not able to afford the service at the calculated tariffs the municipality will need to reconsider its service level approaches and will need to evaluate what subsidy options are available for these households.

The affordability analysis is crucial to ensure that households are not denied or cut-off from services because of an inability to pay. The affordability analysis is also important to ensure that there is not excessive non-payment of service charges. Unaffordable tariffs will translate into high levels of non-payment which is not a sustainable basis for a tariff strategy.

## Step 11: Communication with Consumers

To gain acceptance of solid waste tariffs by the users, it is vital that the process of setting these tariffs is transparent and communicated properly to all parties affected. The communication exercise should be clear to users in terms of what they are entitled to and what is expected of them with regard to solid waste services. The municipality should undertake one or more of the following in its communication process:

- *Integrated Development Planning:* as part of the public participation exercise of the Integrated Development Planning process (IDP), communicate the tariff setting process, how it is being approached, and what tariff options and tariff structures are being considered. Alternatively, this could be undertaken as part of the process of preparing the Integrated Waste Management Plans (IWMP).
- *Consultative workshops:* if there IDP process has not started, a once-off meeting (workshop) should be held with the users where the different tariff options will be presented together with the methodologies followed to arrive at these. Depending on how the meeting goes, a follow up meeting to finalise and adopt the tariffs may be necessary.
- *Municipal tariff policy:* as required in the Municipal Systems Act every municipality must “adopt and implement a tariff policy on the levying of fees for municipal services provided by the municipality itself or by way of service delivery agreements”. The municipality must include a solid waste tariffs policy within this tariff policy.
- *Municipal by-laws:* when the tariffs have been finalised, these should be drafted into the council by-laws for implementation.
- *Enforcement of tariff policy:* agreement should also be reached on how enforcement will be undertaken in cases of non-payment, taking into account the measures that will be in place for the poor households.



## 5. References

- Bahl, R., and Linn, J., 1992: *Urban Public Finance in Developing Countries*, published for the World Bank, Oxford University Press, New York.
- Department of Constitutional Development, 1999: *Municipal Tariff Guidelines*, solid waste tariffs background paper, prepared by PDG, Pretoria.
- Department of Environmental Affairs and Tourism/Department of Water Affairs and Forestry, 1999a: *National Waste Management Strategy*, Version D, Pretoria.
- Department of Environmental Affairs and Tourism/Department of Water Affairs and Forestry, 1999b: *Implementing Instruments Project Plan*, NWMS and Action Plans, Pretoria.
- Department of Environmental Affairs and Tourism/Department of Water Affairs and Forestry, 1999c: *Action Plan for General Waste Collection*, Pretoria.
- Department of Environmental Affairs and Tourism/Department of Water Affairs and Forestry, 1999d: *Action Plan for Waste Treatment and Disposal*, Pretoria.
- Department of Environmental Affairs and Tourism, 2000: *White Paper on Integrated Pollution and Waste Management for South Africa*, Government Gazette No. 20978, Cape Town.
- Department of Finance, 2000: *Municipal Finance Management Bill*, Pretoria.
- Department of Provincial Affairs and Local Government, 2000: *Municipal Systems Act*, Pretoria.
- Department of Provincial Affairs and Local Government, 2001: *Guidelines for Setting Tariffs for Municipal Trading Services*, Draft document, Pretoria.
- Department of Water Affairs and Forestry, 1994: *Minimum Requirements for Waste Disposal by Landfill*, Waste Management Series, Pretoria.
- Environmental Protection Agency, 1996: *Making Solid Waste Decisions with Full Cost Accounting*, US EPA, Solid Waste and Emergency Response.
- Gauteng Department of Agriculture, Conservation, Environment and Land Affairs, 2001: *Guidelines for First Generation Integrated Waste Management Plans for Local Governments*, Draft Discussion Document, Prepared by Jarrod Ball and Associates, Johannesburg.
- Financial and Fiscal Commission, 2001: *A Framework for Local Government Finance in South Africa*, FFC Research and Recommendations Programme, Midrand.
- NEDLAC, 1998: *Memorandum of Understanding Between the NEDLAC Constituencies Towards and Uniform Pricing Policy for Basic Municipal Services*, NEDLAC, Johannesburg.
- Palmer Development Group, 1996: *Evaluation of Solid Waste Practice in Developing Urban Areas of South Africa*, Report to the Water Research Commission by the Palmer Development Group, WRC Report No. 629/1/96, Pretoria.
- Republic of South Africa, 1996: *Constitution of the Republic of South Africa*, Act No. 108 of 1996, Cape Town.
- Urban Management Programme, 1996: *Conceptual Framework for Municipal Solid Waste Management in Low-Income Countries*, UMP Working Paper Series No. 9, Nairobi.
- World Bank, 1999: *What a Waste: Solid Waste Management in Asia*, Urban Development Sector Unit, East Asia and Pacific Region, World Bank, Washington.