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**NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008
(ACT NO. 59 OF 2008)****NATIONAL HOUSEHOLD HAZARDOUS WASTE MANAGEMENT STRATEGY**

I, Barbara Dallas Creecy, Minister of Forestry, Fisheries and the Environment, hereby, publish the National Household Hazardous Waste Management Strategy for implementation, as set out in the Schedule hereto.



**BARBARA DALLAS CREECY
MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT**

SCHEDULE



**forestry, fisheries
& the environment**

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

NATIONAL HOUSEHOLD HAZARDOUS WASTE MANAGEMENT STRATEGY



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List of acronyms

| | |
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| BCMM | Buffalo City Metropolitan Municipality |
| DFFE | Department of Forestry, Fisheries and the Environment |
| EMI | Environmental Management Inspector |
| EPR | Extended Producer Responsibility |
| HHW | Household Hazardous Waste |
| ISWM | Integrated Solid Waste Management |
| IWMP | Integrated Waste Management Plan |
| NWMS | National Waste Management Strategy |
| PRO | Producer Responsibility Organisation |
| SAWIC | South African Waste Information Centre |
| SEPA | Swedish Environmental Protection Agency |
| WEEE | Waste Electrical and Electronic Equipment |
| WMO | Waste Management Officer |

Preamble

The Swedish Environmental Protection Agency (SEPA) has since 2015 been cooperating with South Africa and the Department of Forestry, Fisheries, and the Environment (DFFE) in the field of solid waste management. The Swedish authorities have been supporting national and local governments to improve solid waste management and handling. The collaboration has over the past four years had a special focus on management of hazardous waste from households, one part being developing and piloting a collection scheme in Buffalo City Metropolitan Municipality (BCMM). The pilot collection scheme was to be a test bed to gather good experiences and build on those for further expansion of separate handling of household hazardous waste (HHW) in South Africa.

Following completion of the pilot scheme in BCMM, SEPA provided assistance to South Africa by commissioning work to develop background studies to formulate a national strategy for HHW management. The background studies comprised of four reports:

- Baseline study – an overview of current handling of HHW in South Africa
- A suggested governance model for HHW – the main framework for the strategy focusing on the local level government
- A legal review – a study to evaluate and identify potential gaps in the legal framework linked to HHW
- A lessons learned review – detailing the pilot project in BCMM and conclusions drawn from interviews with national experts.

The four reports have been developed by a team of national and international consultants in close collaboration with the local authorities. Furthermore, three other support documents were developed and also available for use, and these include:

- Implementation Plan
- Cost assessment for Implementation Plan for HHW
- Communication Strategy

All the reports are available and can be accessed on sawic.environment.gov.za

Executive summary

Management of household hazardous waste (HHW) is an underdeveloped area of waste management in South Africa. Due to the harmful properties of HHW to the environment and public health, it is an area which deserves greater attention. It is also one of the most challenging waste streams to handle because of its complexity in type and form and that is usually generated in small quantities as compared to general waste fractions.

Existing value-chain for collecting and treating HHW on a larger scale includes voluntary extended producer responsibility (EPR) schemes. Such value-chain exist for spent lead-acid batteries and used oils. There are also regulated EPR schemes for waste from electrical and electronic equipment and light sources. However, for most HHW there is no separate collection or special treatment in place in South Africa. The material value for potential recycling of HHW is often low and treatment can be costly. Introducing and achieving sound management of HHW comes with additional costs. The current institutional framework for managing HHW is to some extent unclear, and currently there is a hybrid model in place where responsibilities are split between municipalities and producers.

To address issues associated with improved handling of HHW a strategic governance model has been developed with the objective to assist local governments with recommendations and guidance for introducing HHW collection. The model is based on the value creating principles; a) *Sustainable partnerships*, b) *Waste minimization and sustainable hazardous waste services*, c) *Sound institutional processes*, d) *Innovation and growth* and e) *Financial sustainability*.

The first part of the strategic governance model covers the physical aspects of collecting, transporting and storage of HHW. Based on lessons learned from interviews and case studies, it is recommended that each municipality offer a permanent collection point where residents can drop off their HHW for sound management as a complement to waste collection introduced as part of EPR schemes. As high availability also means better collection results, a mobile collection in combination with events & collection days can be used to make it easier for the residents to dispose of HHW in a correct manner. Collaborations between municipalities and PROs can contribute to a cost-effective waste collection and management thereof. Because of low market value and health aspects associated with HHW, the informal sector is not considered as a suitable option to base operations upon. However, in case the informal sector is to be included as part of a collection scheme, a formalisation process is necessary, ensuring that they receive minimum training requirements for handling HHW. A recommendation for implementation of HHW collection is to start with easy solutions and waste streams rather than implementing a full-scale collection from the onset.

Transportation of HHW comes with special challenges since it is classified as dangerous goods. Trained personnel, accessible information and practical guidelines can help to comply with regulations. To achieve cost-effective transportation to treatment, intermediate storage of HHW is needed. Due to low quantities of waste and long distances between treatment facilities, there are opportunities for collaboration between municipalities to reduce transportation and storage costs.

The second part of the strategic governance model covers participation, roles, and financing. HHW is not only an issue for local governments since much is decided by the legislative framework at a national level. National government bodies have an important role to support municipalities with knowledge, financial support, and clear guidelines on the division of responsibilities. Provincial government can function as a collaborative platform for municipalities exchanging knowledge.

Collaboration with stakeholders such as the private sector, producer responsibility organisations (PROs) and the informal sector are important for finding practical collection solutions. Civil society collaboration is key for raising awareness about the importance of separating hazardous waste from other waste. To fully address the issue of HHW several stakeholders need to collaborate, and local government must take a leading role. Growth and employment opportunities in HHW collection can be achieved by innovation and partnerships.

Major cost factors for collecting HHW includes investment in infrastructure, personnel costs, treatment costs and transportation costs. Introducing EPRs shift the financial burden from waste service tariffs to consumer costs. That does however mean that local municipalities are left to finance the collection of more costly HHW-streams. Even though full cost coverage can be difficult to achieve, it is recommended at least basic operation costs are covered by long term stable revenue streams, such as tariffs for general waste. External funding by subsidies supporting local governments with investment costs may be a justified solution during a transition but ultimately it is important to build financial sustainability into the system.

Proposed outcomes of implementing the strategic governance model are:

- Knowledge of hazardous waste from households is high among all concerned government staff at both national, provincial, and local level.
- Responsibilities for collection and treatment of HHW is well known and included in integrated waste management planning at a national, provincial, and local level.
- EPRs are efficiently implemented through sustainable collaborations between local governments and EPR schemes.
- All municipalities offer their residents a safe collection opportunity for HHW, at minimum in form of a permanent HHW collection point.
- Percentage of households/population with access to HHW collection systems increases over time.
- Implementing collection and treatment of HHW contributes to employment opportunities through involvement of private companies.

1. Introduction



This document describes a proposed strategic governance model for collecting and managing household hazardous waste (HHW) in South Africa on a municipal level. The model presented in this report has been developed by Sweco on behalf of the Swedish Environment Protection Agency (SEPA), in collaboration with the South African Department of Forestry, Fisheries and the Environment (DFFE).

Parallel to the strategic governance model three other reports have been developed, covering the following topics:

- Household hazardous waste in South Africa - Baseline report (Sweco, 2022a)
- Lessons learned – A follow up of the pilot collection scheme for household hazardous waste in Buffalo City Metropolitan Municipality and experiences from other frontrunners in collection of household hazardous waste in South Africa. (Sweco, 2022b)
- Legislation – Identification and analysis of relevant legislation on household hazardous waste in South Africa. (Sweco, 2022c)

1.1 Objective

The objective of the report is to describe a strategic governance model with recommendations for managing HHW at the municipal government level. The document is intended to be a basis for municipalities to build upon for introducing collection of HHW. Municipal governments may use the model as a starting point and do further work to adapt and design a local strategy based on specific local conditions.

1.1.1 Structure of the report

The report includes an assessment of existing HHW streams, information about existing collection systems and value chains, which is found in chapter 2.

Chapter 3 outlines five key value-creating principles upon which each local HHW management strategy should be built. The key principles define what is important and should guide the work forward.

Chapter 4 covers recommendations for collection, transport, and storage.

Chapter 5 addresses the role of authorities, collaboration, financing and innovation and growth, together with recommendations and key action points.

Chapter 6 proposes a process for implementation from the municipality perspective.

1.2 Methods

The strategic development model has been compiled with the support of information contained in the research which took place during this assignment, including literature studies, interviews with stakeholders, internal and external workshops, and international benchmarking.

The national waste management strategy 2020 (Department Environment, Forestry and Fisheries, 2020) (NWMS) has been used as a framework for the development of this report and the strategic governance model align with Pillar 2: Effective and Sustainable Waste Services and its focus areas in the NWMS.

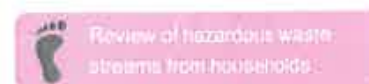
1.3 Scope and limitations

The strategic governance model is limited to hazardous waste from households. Industrial hazardous waste as well as hazardous waste from businesses are not covered in this report. Even though management of general domestic waste is not covered by the report, some of the recommendations are relevant for managing other waste streams.

The strategic governance model focuses on municipalities but includes recommendations for national and provincial government where applicable.

Furthermore, the report covers collection, transportation, and storage of HHW but delimits treatment, a topic only briefly covered and not included in the recommendations.

2. Review of hazardous waste streams from households



This chapter describes and review existing value-chains for HHW.

2.1 Overview of hazardous waste types from households

Hazardous waste is defined in the National Environment Management Waste Act No 59 of 2008 as:

"any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on the health and the environment"

With addition in 2014:

"and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles:"

Commonly hazardous waste generated by households includes *paints and solvents, pesticides, electrical and electronic equipment (WEEE), batteries, chemicals, health care risk waste, aerosols, mercury containing waste, oils, cleaning agents* and more.

The baseline report outlines the current situation of HHW in South Africa in terms of generated amounts, most common HHW streams, existing infrastructure and operations managing HHW. Main conclusions in the baseline report include 1) a general lack of data regarding HHW, 2) few existing and well-functioning value-chains for collecting and treating HHW and 3) a general lack of collection of HHW on a local government level. Apart from a few waste streams, initiatives on a local level to collect HHW are few with low coverage in terms of how many people are serviced or using the existing drop off and collection system. However, there are also fractions where existing infrastructure and collection occur on a larger scale. (Sweco, 2022a)

2.2 Existing collection and value chains

Existing value chains where HHW is collected is characterised by high involvement of the private sector through voluntary or regulated EPR. Due to lack of aggregated data of collection operated by the local governments or the informal sector, it is difficult to get an overall understanding of the existing value chains not covered by voluntary or regulated EPR. Identified existing collection and value chains for HHW streams are outlined in Table 1.

Table 1. Identified HHW streams with existing collection and value chains based on interviews and literature studies made in the baseline report.

| Hazardous Waste Type | System coverage (on a national basis) | Collection system | Main treatment | Private sector involvement | Type of arrangement | Start year |
|----------------------|---------------------------------------|---|--|----------------------------|---------------------|------------|
| Lead acid batteries | High | - Designated drop off points (one-for-one returns system) - Collection service for large volumes | Recycling | Very high | Voluntary EPR | 1942 |
| Waste/ used oils | High | - Collection by licenced collectors - Designated drop off points | Reuse / Heating and to a small extent incineration | Very high | Voluntary EPR | 1994 |

| | | | | | | |
|---------------|------------------|------------------|---------------------|-----------|-----------------------|------------------------|
| WEEE | To be determined | To be determined | Recycling/ disposal | Very high | Authority decided EPR | 2020/2021, in progress |
| Light sources | To be determined | To be determined | Recycling/ disposal | Very high | Authority decided EPR | 2020/2021, in progress |

2.2.1 Lead acid batteries

The recycling system for lead acid batteries has a long history in South Africa mainly driven by the economic value of lead in batteries. Consumers can use the “one-for-one return system” when purchasing a new battery. By doing so, the consumer is entitled to a scrap discount and may avoid levy on purchased products. The “one-for-one return system” is implemented by manufacturers, distributors, retailers, wholesalers, service stations and other retailing points where new batteries are sold. The batteries are then collected by distributors of new batteries and taken to secondary lead smelters for recycling. First National Battery, Donaventa Holdings (Pty) Ltd, AutoX (Pty) Ltd and Dixon Batteries (Pty) Ltd are running “one-for-one return systems” and have recycling plants in the Guateng province (the South African Waste Information Centre, 2022).

Lead acid batteries not collected by the system are possible to trade at scrap metal merchants. Due to the economic value, it is a desired material for waste pickers. The lead acid batteries may then be sold on the open market for recycling in South Africa or internationally.

2.2.2 Waste/ used oils

The ROSE Foundation has collected oils for recycling in South Africa since 1994. Collection is done by licensed private collectors where ROSE assists with legislative compliance and education. Collection exists in the whole country but predominantly in urban areas. In 2021 about 194 collectors and 17 processors were working with ROSE. The generators of used oil are legally obliged to give their oil to licensed collectors. The collectors must, to comply with legislation, fill out a form that details the oil being collected, the generator of the oil and where the oil is transported for treatment. The collectors are provided with a standard form from ROSE.

Collection from households is limited but exists for example when licensed collectors are contracted to collect oil from municipal collection events or designated waste collection points.

Treatment of collected oil involves either refining back to base oil for reuse or incineration. (ROSE foundation, 2022)

2.2.3 WEEE

WEEE collection and treatment is undergoing a transformation due to implementation of the legally mandated EPR. EPR Regulations, 2020 as amended have been published under the National Environmental Management: Waste Act, No 59 of 2008. Some of the components within the regulatory framework includes financing, tender and contract for collection and treatment of waste, reporting, and establishing new infrastructure. An EPR scheme should also utilise existing infrastructure and collaborate across schemes where feasible. Producers are obliged to either set up their own collection and treatment of WEEE or join a PRO. It is yet too soon to evaluate the changes the EPR Regulations will bring.

In general, WEEE do contain parts and components with high material value and has historically been an attractive material for waste pickers in the informal sector. Collection of some WEEE exists today, however the amount of WEEE recycled is still thought to be under 10% (Department of Environmental Affairs, 2018).

2.2.4 Light sources

As in the case of WEEE an authority mandated EPR is under implementation.

2.2.5 Other HHW streams

For other waste streams no nation-wide value chains for collecting and treating HHW have been identified. Some municipalities have started collection of HHW by introducing waste collection points or collection events where for example WEEE, paints, solvents, cleaners, pool chemicals, pesticides, used motor oils and lubricants, fluorescent tubes, aerosols, and batteries are collected. From case studies it is understood that some waste streams are often excluded from collection due to explosion risks (explosives and compressed gases) or security issues (pharmaceutical wastes and sharps). There are many potential HHW streams to be collected, each with its own challenges. Among the most difficult waste streams to manage are mixed and unmarked HHW

due to high costs of classification and treatment, as well as liquid HHW due to the current landfill-ban and subsequent high costs for pre-treatment.

None of the other HHW streams are considered as having a positive material value and come with high treatment costs. Due to low coverage of HHW collection on a national level, waste streams without special collection schemes are considered as non-functioning value chains.

Among the possible treatment/disposal options for HHW are:

- Recycling
- Recovery facilities, for example, pre-treatment for producing refuse derived fuel for the cement industry
- Chemical/physical treatment, including recovery
- Thermal destruction/incineration
- Disposal at hazardous waste landfill, if not prohibited
-

2.3 Current financing

Waste management services typically consists of planning and administrative costs, investment costs and operational costs. Due to lack of reliable data, it is impossible to fully assess the financial situation of existing value chains. The main financing sources for each value chain are described below.

2.3.1 Lead acid batteries

The system broadly described in 2.2.1 is driven mainly by the material value of the waste, determined by the content and market value of lead. Incentives are used in form of levy for new batteries as well as “scrap discount” if returning old batteries. It is unknown whether material value in its own cover full cost for administration, investment and operation for collection and recycling. Major cost categories of the system are expected to be collection at retailer, transportation to recycling facilities and recycling.

2.3.2 Waste/ used oils

Collection schemes run by the ROSE foundation are partly driven by value of the material and rely on licensed private companies for collecting used oils. It is however noted that an informal sector exists which competes for used oils. Coverage of full costs varies depending on each licensed private company’s collection endeavours making it difficult to give an overview of these costs. The system functions as a voluntary EPR receiving funding from oil producers and re-sellers who are members of the ROSE foundation.

2.3.3 EPR for WEEE and light sources

The EPR for WEEE as well as light sources are financially based on mandatory fees from producers which are paid to the respective EPR schemes. Fees are proposed by producers or PROs which act on their behalf and approved by government. In 2022 which represented first year of EPR implementation; the Minister approved submitted EPR fees after obtaining concurrence from the Minister responsible for finance. On publication of this Strategy, the Minister is yet to obtain concurrence from the Minister responsible for finance for 2023 which marks a second year of EPR implementation. The Regulations stipulate nett cost recovery which must include a differentiated rate per item category, of each product or class of product. Material value for the waste streams is in overall considered low, and EPR fees are considered as the main contributor to reach nett cost recovery. EPR fees are likely to be transferred to consumers directly or indirectly.

2.3.4 Other HHW streams

Collection systems for other HHW are generally initiatives run by local governments, in many cases in the form of pilot schemes. The material value of other HHW streams is low or negative and treatment of the waste will be associated with relatively high costs. There are examples of collaboration from case studies where companies offer to contribute with collection and treatment of certain waste streams free of charge to the municipality. Funding involves budgeting processes based on general waste service tariffs from households. Other possible funding opportunities are private donations or external funding.

External funding and/or allocation of general waste service tariffs from households are required to achieve full cost coverage for collection.

3. Strategic approach



Strategic approach

This chapter forms the overarching strategic approach to integrated waste management of HHW. It outlines five key value-creating principles upon which each local HHW management strategy should be built. The key principles define what the focus of the strategy is and they should guide the work forward. Outcomes of implementing the HHW management strategy are also proposed.

3.1 Value-creating principles

When managing hazardous waste several aspects must be considered. Considerations for safe and environmentally sustainable disposal of HHW is critical, but institutional, financial, and social aspects must not be forgotten. Hazardous waste management solutions must be financially sustainable, technically feasible, socially, and legally acceptable and environmentally friendly and sustainable. **In other words, an Integrated Solid Waste Management (ISWM) framework must exist.** ISWM should be based on the waste management hierarchy while finding a suitable way of dealing with waste. It also depends on collaboration among all the organisations and individuals involved in waste management.

The proposed strategic model for HHW is based on five key value-creating principles (Figure 3-1). These key principles define what is important and needs to permeate the work forward. Each principle is described in more detail in the following sections.

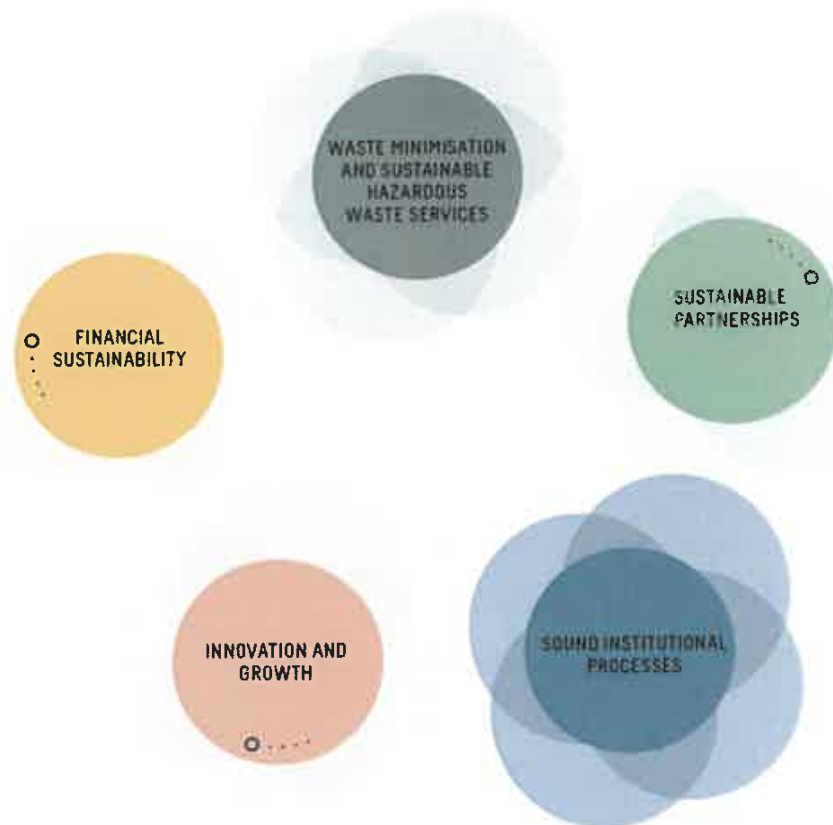


Figure 3-1. Strategic model value-creating principles

3.1.1 Waste minimisation and sustainable hazardous waste services

Solid waste generation is a worldwide problem. Improper handling and management of solid waste can have major impacts on the environment and public health. Solid waste management also influences how a society

functions and may, in stressed and crisis situations, have very large consequences. At a global scale, solid waste contributes to climate change and is one of the largest sources of pollution of oceans.

Hazardous waste is no exception. Households generate hazardous waste in the form of batteries, light sources, electric and electronic equipment, pesticides, household and pool chemicals etcetera.

Hazardous waste is a waste with properties that make it dangerous or capable of having harmful impacts on human health or the environment. It is therefore of utmost importance that hazardous waste is handled correctly throughout the value chain. Equally, or maybe even more important, is that the generation of hazardous waste is minimised.

Waste minimisation has two entry points as stated in the NWMS 2020. These two entry points are 1) waste prevention (avoidance), and 2) managing waste as a resource.

Sustainable hazardous waste services means that the services delivered need to function over time and in a stable institutional and policy environment. The hazardous waste framework and solutions/services need to be sufficiently flexible to function in the very different circumstances and challenges that exist locally. When services are formulated and designed, the waste management hierarchy need to form the foundation (see Figure 3-2). The first step of the hierarchy, the most desirable option, is the avoidance and reduction of waste generation. The next step of the hierarchy is reuse where the waste is reused for a similar or different purpose without changing its form or properties. The next steps of the hierarchy are recycling where particular waste materials are converted into a new material to be used for a different purpose, and recovery where components or materials are recovered. The final level of the hierarchy is treatment and disposal. This is the least desirable option. It is clearly stated in the NWMS 2020 that all efforts must be made to first divert waste from landfill disposal.



Figure 3-2. The Waste Management Hierarchy, from State of Waste Report (2018).

3.1.2 Sound institutional processes

Successfully implementing a strategy requires a sound institutional process with capacity for planning, compliance monitoring, enforcement, and managing operations.

The integration of policies, institutional roles, financing mechanisms, technologies and stakeholder participation is essential, already at a planning stage. In solid waste management this is included in ISWM. In the NWMS integrated waste management planning is one of the focus areas, where planning responsibilities are divided between national, regional, and local governments. Several targets regarding planning are also set in the NWMS, for example producing updated guidelines and reporting standards on a national level (2021), adopted

integrated waste management plans (IWMPs) on a provincial level (2022) and submitted IWMPs on a municipal level (2025).

Effective implementation is even more important than planning to do the right thing. Implementation effectiveness can be described as the sum of compliance of every individual in the system. To assess compliance, a monitoring system is needed. Compliance can be achieved voluntarily by building trust or through the exercise of power (enforcement). The effect on behaviour can be the same, but the reasons why people adopt a certain behaviour differ. Understanding available enforcement tools and levels of trust held by citizens in national, regional, and local authorities are valuable insights to predict and improve compliance with a strategy (Gunningham, 2010).

3.1.3 Sustainable partnerships/stakeholder engagement

Waste management is an essential municipal service that requires planning, management, and coordination across all levels of government and stakeholders (World Bank Group, 2018). Stakeholder engagement is the process of building relationships with different government agencies, citizens, business groups, interest groups, and other impacted entities to gain support for solid waste management policies, programs, and service issues. Working with stakeholders helps create a robust solid waste management system that can be operated in both an economically sustainable and efficient manner.

Cross-cutting initiatives and partnerships between different government bodies is essential. These should be formed to identify synergies and maximise opportunities and results between both governmental bodies with different subject responsibilities and different levels of government (national, provincial, and local administrations).

A partnership model is one way to formulate how collaborations should function. The government need to consider and select strategic partners to create strong and sustainable alliances. Roles and responsibilities of all stakeholders involved need to be carefully formulated, communicated, and followed up to ensure accountability and ownership.

Some potentially important stakeholders are outlined in more detailed in sections 3.1.3.1 to 3.1.3.3.

3.1.3.1 *Private sector*

Private operators can bring efficiency and financial security to a waste management system under the right conditions (World Bank Group, 2018). A partnership with the private sector is commonly pursued as a mechanism for achieving efficiency, technical expertise, and to increase capital investment in waste management systems. Public-private partnerships (PPP) could potentially reduce the burden on local government budgets. PPPs need to be carefully and properly structured and managed as to not result in compromises in service quality.

Both public and private sector operators can deliver effective services in the appropriate situation. The key is a strong client organisation responsible for municipal solid waste management within the municipality, with stable political and financial backing and capacity to manage service delivery.

3.1.3.2 *Informal sector*

The informal waste sector plays an important role in the overall waste sector in South Africa. Even though the informal sector is often overlooked in waste management planning, it is deeply embedded in existing systems, and contributes significantly to landfill diversion and increased recycling (DEA, 2016b). Although there are obvious advantages to involving the informal waste sector, there is a challenge in building on the existing systems in leading to the desired outcome of better managed hazardous waste from households. Due to the challenges associated with integrating the informal waste sector into the formal sector, integration initiatives need to be carefully tailored to suit the local context. Initiatives should seek win-win solutions that benefit not only the municipalities, formal recycling sector, and the local community, but also the waste pickers (Department of Environmental Affairs, 2018).

3.1.3.3 *Awareness raising and resident engagement*

The success of sustained solid waste management is critically linked with public engagement and trust. Waste managers rely on residents to consciously reduce the amount of waste they generate, separate, or manage

specific waste types at home, dispose of waste properly, pay for waste management services, approve new disposal sites, and support new waste management initiatives and services. To motivate this support, governments must gain the trust of residents. Cities and countries are engaging the public by providing high-quality services that earn approval and trust and that, in turn, motivate residents to pay for services, be environmentally aware, and comply with guidelines and regulations. Although changing resident's behaviour can take time, the benefits of a strong relationship with the public are invaluable to a waste management system (World Bank Group, 2018).

3.1.4 Financial sustainability

Financial sustainability includes securing short-term and long-term funding for implementing and operating a system for collection and disposal of HHW. Costs can be categorised in three main categories (United States Environmental Protection Agency, 2020):

- Planning and administrative costs
- Investment costs
- Operational costs

A key principle in waste management is the polluter pays principle, allocating costs to the person responsible for pollution. In waste management, this generally refers to a waste generator. For household waste, a waste generator can be considered individual households or producers as well as consumers buying corresponding products ending up as household waste.

Collection and disposal of household hazardous waste are activities which increases costs related to waste management in short terms. Failing to provide sustainable waste management services may have long-term impacts. The cost of inaction can be defined as the damage incurred to human and environmental health, because of environmental degradation, in this case from poor waste management services. External costs related to negative consequences to public health and environment if hazardous waste is not collected and disposed according to acceptable standards partly justifies increased expenses in waste management. However, finding a balance between efforts to collect and dispose of HHW and the economic burden on residents is crucial to reach a financial sustainability. (United States Environmental Protection Agency, 2020)

Economic instruments and financing options are described in the South African National Pricing Strategy for Waste Management (Department of Environmental Affairs, 2016). Some of the examples outlined in the pricing strategy are:

- Fees collected directly from citizens as part of the general tariff for domestic waste services. Ideally tariffs are differential based on amount or volume of waste generated by each household, however as currently implemented only a fix tariff is used.
- External funding for investments can be utilised to collect funds for larger investments but is a short-term solution. Combined with a financial plan covering operational costs this can be a viable option to manage high start-up costs.
- Voluntary or obligated extended producer responsibilities where producers are responsible for financing collection and disposal of waste. Producers pass on the costs to residents by increasing retail prices.
- Advance recycling fees are a product tax upstream the value chain, based on the estimated costs of collection, processing and recycling or disposal of the product after its usage. Ideally the revenue collected is used for building capacity in waste management. Advance recycling fees are an economical tool and does not regulate producer responsibility for waste management of its products after usage.
- Virgin material tax, input tax or product tax are taxes in various stages upstream the value chain. It can be used to deter from overuse and consider external costs associated to a material or product. In theory upstream taxes can be complemented by a subsidy mechanism to support sound waste management.

Since sound hazardous waste management is more expensive than management of domestic waste for corresponding amounts, considerations must be made to ensure that the charges to households does not turn out to be a negative incentive for households. A separate and higher fee for hazardous waste compared to

domestic waste may discourage households to separate hazardous waste. In fact, a well-structured financing plan for HHW management may instead work as a positive incentive for encouraging households to use an appointed collection system.

3.1.5 Innovation and growth

There is plenty of room for improvement in management of HHW in South Africa. It is therefore important that the strategy supports and stimulates innovation. New ideas and techniques in hazardous waste services – both infrastructure (collection, storage, transportation, and treatment) and management - need to be developed, tested, and evaluated. Successful pilots and trials should be scaled up and be implemented to form a stable and long running system.

Functional and effective partnerships between different levels of government need to be established based on local conditions and opportunities. New and locally adopted ways to build capacity and to raise awareness should be sought.

The strategy should also support arenas where circular economy business models, which aim to reduce the amounts of hazardous waste created, can emerge and develop.

The solid waste sector, including hazardous waste, also holds a great potential to create employment opportunities. Resources need to be devoted to capacity building and to increase the number of people employed in the waste sector.

3.2 Strategic overarching outcomes

In addition to the key principles, the strategy should also formulate overarching outcomes.

Because of the lacking HHW quantities data, the outcomes should focus on performance indicators other than collected waste amounts. It should be noted that collection of waste quantity data is both costly and highly time consuming.

A foundation for developing the strategic model is source separation of HHW. As far as possible, separating and collecting HHW separately from other waste should be done close to the source. The need for source separation of household waste is highlighted as a key action in the NWMS.

Proposed overarching strategic outcomes are presented in Figure 3-3:



Figure 3-3. Proposed strategic outcomes

4. Collection, transport and storage



This chapter describes common alternatives for collecting HHW and important aspects of transportation and storage of HHW.

4.1 Proposed collection systems

For each HHW stream a strategic choice is made regarding the responsibility to handle collection of the stream. The main alternatives for responsible parties are EPRs or local authorities, however many hybrid alternatives with a mix of them both exists. Another way of expressing this is in terms of privatisation of waste management as illustrated in Figure 4-1. Strategic choices whether EPR should be adopted for a particular waste stream are determined on a national level.

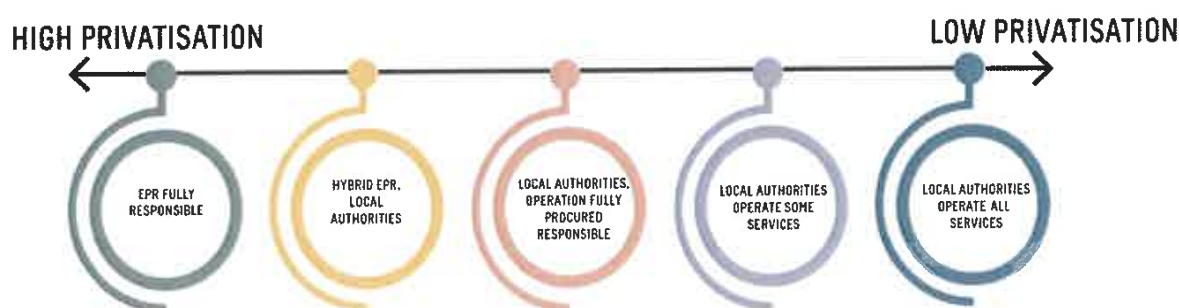


Figure 4-1. Overview of responsibility and privatisation in waste management.

Since responsibilities for HHW in South Africa are divided between EPRs and local governments, an overall hybrid environment is in place today, where collaboration between stakeholders is necessary. The collection alternatives are described and evaluated below based on financial availability and settlement arrangement/distribution of serviced households regardless of whom is responsible for the waste collection.

4.1.1 Collection

Due to contamination and health risks when collecting HHW mixed with domestic waste, only waste separation at source is proposed as a viable collection alternative. This ensures safe hazardous waste management, sound working conditions and lower treatment costs.

Common waste collection alternatives include *curbside collection*, *waste collection points*, *consumer close collection points*, *mobile collection points*, *events/collection days*, *buy-back centres* and *take-back systems*.

4.1.1.1 Curbside collection

Curbside collection of HHW may be implemented as an integral part of domestic waste collection. The system can in this case include special boxes collected by ordinary waste trucks. Another option is collection by a special adapted waste truck for hazardous waste collection. If collected with an adapted hazardous waste truck, collection can be done on a fixed schedule, for example monthly, or by demand.

Curbside collection offers a high availability and service to the residents. Curbside collection may be designed for all hazardous waste streams for households but requires trained personnel. Challenges with curbside collection includes high collection costs in terms of investment in collection vehicles and operational costs.

4.1.1.2 Waste collection points

Permanent waste collection points offer a fixed location where residents can discard their hazardous waste. Permanent waste collection points can be used for all hazardous waste streams from households. The collection results are dependent on the resident's willingness and possibilities to transport hazardous waste from their homes to the nearest waste collection point. As a rule, high availability will lead to better collection results. Resident's possibilities to leave waste do however differ and what is considered as a short distance to the nearest waste collection point for some people may be considered as too far for others. Availability and service level depend on the number of waste collection points, opening times and localisation, but are generally considered as a medium availability/service alternative.

It is highly recommended, if not required, that collection points are manned with competent personnel, either by the municipality or by a private company procured by the municipality. In case of a private solution, careful consideration is needed during the procurement process to ensure competence, relevant equipment, and environmental protection.

A larger waste collection point may also be used as an intermediate storage where waste is aggregated before transported to treatment facilities. If waste that runs a higher risk of being stolen (e.g., WEEE, medical waste) is accepted, security considerations are needed when deciding site location and design.

Waste collection points offers a relatively inexpensive method for collecting hazardous waste on a basic service level.

4.1.1.3 Consumer close collection points

As a complement to permanent larger waste collection points, small consumer close collection points in supervised public facilities can be an option. Possible locations are groceries, pharmacies etc. Due to security issues, consumer close collection points are limited in what HHW streams can be accepted, such as small WEEE and medicine. Unsuitable HHW can be oils, solvents, paints etc.

Consumer close collection points are generally unmanned but agreements for supervision of collection points are needed. Consumer close collection points can be used as a low investment option with medium availability for some HHW streams.



Figure 4-2 Consumer close collection point at grocery store

4.1.1.4 Mobile collection points

Mobile collection points may be used in areas where the distance to a permanent waste collection point is far, or the resident's possibility to transport their hazardous waste is limited. A mobile collection point can be created with special adapted vehicles and trained personnel operating on a fixed schedule where appointed areas are visited several times annually. This collection scheme requires an appropriate area to set up operations at each location. Reliability in services is important to gain trust and high usage.

Mobile collection costs are in relative terms high compared to waste collection points but offers a viable option to increase availability for the population.

4.1.1.5 *Events/collection days*

Mobile collection points can easily be combined with events/collection days where public awareness and communication are in focus. A successful collection initiative creates attention, increasing the number of people attending and thereby also the collected waste amounts. Working with events/collection days includes communication and education not only during the event itself but also before, to raise the awareness of the upcoming event.

Events and collection days focuses mainly on awareness and are therefore suitable when a new system is to be implemented or a tool to use in areas with low collection results. It comes with higher personnel and administration costs compared to only mobile collection, which may be offset by collaborating with other strategic partners such as private sector, retailers and EPR schemes.

4.1.1.6 *Buy-back centres*

Buy-back centres is an alternative for collecting waste with value. Buy-back centres offer monetary gain for people or entrepreneurs leaving waste at the centres. The value can be real in terms of the actual material value or an artificial value in form of incentives. WEEE, batteries and oils are waste streams which might have a real value high enough for a buy-back system without implementing other incentives. For other HHW streams incentives are needed to create a market value for waste collectors. How the waste is collected from households are of less importance for a buy-back centre. Therefore, availability/service towards residents is uncertain as well as low control of working conditions for entities using the buy-back system. Combined with the dangerous nature of HHW, buy-back system should be considered as an unsuitable system for most types of HHW, especially for waste streams with low/negative material value. A possible method to mitigate risks are adopting licensing systems for collectors with minimum requirement of collection method and safety equipment.

4.1.1.7 *Take-back system*

A take-back system involves the possibility for consumers to drop off HHW at a retailer selling the corresponding product. This can be limited to times when a new product is bought by the consumer. In a take-back system the retailer is responsible for the waste after the take-back. Unless retailers are mandated by legislation (for example EPR) or offered a full cost payment for the service few retailers would be interested in implementing a take back system.

Costs as well as availability and service level of a take-back system depends on which retailers and waste streams are included. Since retailers generally differs for the different waste streams, coordination of HHW management is difficult leading to several systems operating in parallel. A positive aspect of a take-back system is involvement of personnel familiar with the corresponding products, for example medicines at pharmacies. However, it can be unsuitable for waste streams where the retailers do not have knowledge or capability of handling HHW.

4.1.1.8 *Evaluation of available collection methods*

Each collection method has been evaluated based on cost factors such as infrastructure demands, transportation and personnel costs and expected availability and service levels in

Figure 4-3. As a rule, high availability and service level are associated with higher system costs. The evaluation has not considered the effect on downstream costs factors due to larger amounts of collected HHW when offering a higher availability.

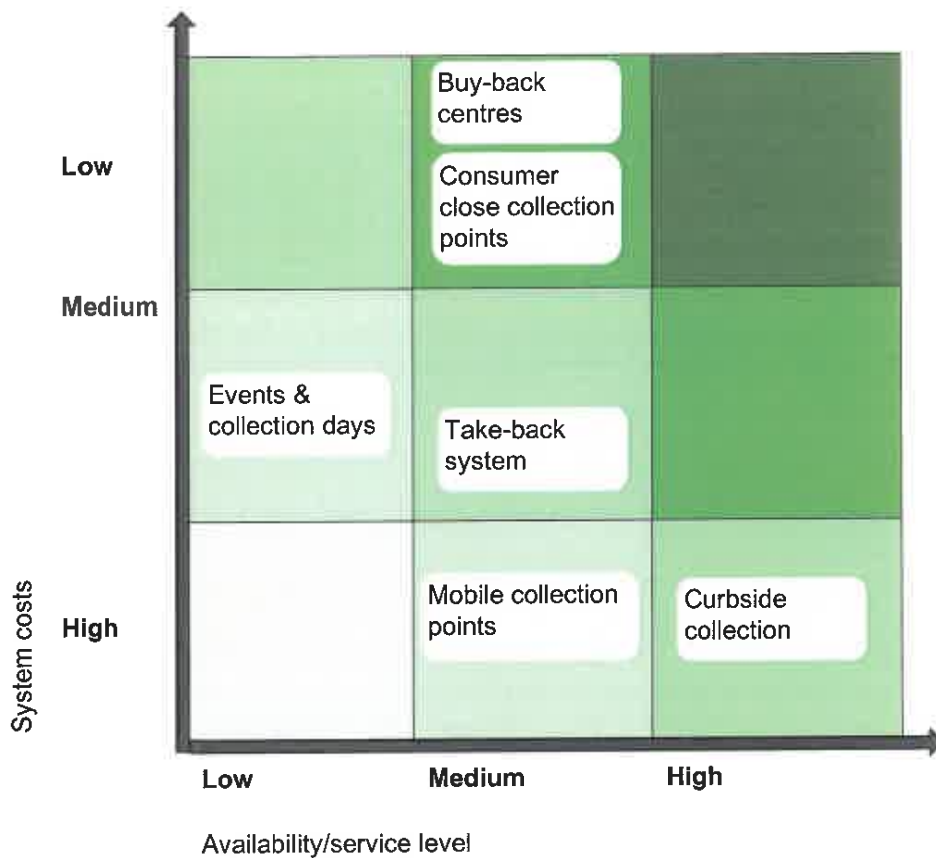


Figure 4-3. Estimated system costs and availability/service level for different collection methods. An optimal collection scheme has low system costs and a high availability/service level. In the figure this represents the upper right corner in dark green.

RECOMMENDATIONS

- WASTE COLLECTION POINTS OFFER A BASIC AVAILABILITY AT A REASONABLE COST. IT IS A GOOD START WHEN IMPLEMENTING HHW COLLECTION.
- CONSIDER SECURITY, LOGISTIC AND AVAILABILITY ASPECTS WHEN DECIDING LOCALISATION OF WASTE COLLECTION POINTS
- BY COMBINING PERMANENT WASTE COLLECTION POINTS WITH MOBILE COLLECTION POINTS OR EVENTS & COLLECTION DAYS, A HIGH PERCENTAGE OF THE POPULATION CAN BE SERVICED.
- COLLABORATION WITH VOLUNTARY AND AUTHORITY DECIDED EPR-SCHEMES CONTRIBUTE TO AN EFFICIENT WASTE COLLECTION WITH HIGHER AVAILABILITY AND LOWER COSTS FOR MUNICIPALITIES.

4.1.2 Transportation

After collecting HHW, transportation to an intermediate storage or treatment facility is the next step in the management chain. Since hazardous waste fractions often are classified as dangerous goods, applicable dangerous good regulations need to be considered. The classification must be done by personnel with adequate competence and training. Product safety data sheets and product labels can be used to identify potentially dangerous goods. It is advised that personnel operating collection are trained and given practical guides and tools for the classification process.

If classified as dangerous goods transportation methods including packaging, labelling and documentation are required to comply with the National Road Traffic Act and relevant standards, including but not limited to:

- SANS 10228 (Identification and classification of dangerous substances and goods),
- SANS 10229 (Packaging of dangerous goods for road and rail transportation in South Africa),
- SANS 10231 (Transportation of dangerous goods - Operational requirements for road vehicles).

Dangerous goods are to be packaged and labelled according to Regulations on Transportation of Dangerous Goods and Substances by Road of 17 March 2000. Depending on the waste classification outcome, approved packaging must be used. Typical packaging options include drums, tank, jerrycans, boxes, bags, and containers. Depending on the hazardous properties and materials, compatible combination packaging and overpacks can be used. SANS 10228 lists approved containers for different material as well as which materials can be transported together without risk. Packages as well as vehicles transporting HHW which are classified as dangerous goods must be labelled according to Regulations on Transportation of Dangerous Goods and Substances, 2000.

RECOMMENDATIONS



- KEY PERSONNEL SHOULD BE EDUCATED IN DANGEROUS GOODS REGULATION AND MANAGEMENT.
- INFORMATION ABOUT DANGEROUS GOODS MANAGEMENT SHOULD BE AVAILABLE AND EASY TO UNDERSTAND FOR PERSONNEL PERFORMING CLASSIFICATION AND PACKAGING OF HHW AT WASTE COLLECTION POINTS.
- PRACTICAL GUIDELINES IN DANGEROUS GOODS MANAGEMENT ARE PREFERABLY DEVELOPED IN COLLABORATION WITH OTHER MUNICIPALITIES AT A NATIONAL OR REGIONAL LEVEL.

4.1.3 Intermediate storage and transport to treatment

Due to low amounts of HHW, intermediate storage is needed for individual streams to achieve a cost-effective logistics of waste to a licensed treatment facility. Smaller municipalities may have to collaborate with others. To fully understand the need for storage, existing intermediate storages operated by authorities or private companies needs to be investigated on a regional and local level. In some cases, a waste collection point or transfer station can be used as an intermediate storage.

The aim of intermediate storage is to aggregate the amount of a certain HHW stream to such a level a full consignment can be made to a treatment facility. Aggregation is necessary to reduce the transportation costs which in many cases can be substantial.

The same considerations around compatibility, labelling, and packaging of waste during transportation needs to be adequately addressed at intermediate storages.

In terms of design and construction of hazardous waste intermediate storage, it is recommended that the National Norms and Standards for the Storage of Waste (Department of Environmental Affairs, 2013), always is used as 'best practice' for storage requirements. If storage capacity exceeds 80 m³, the waste facility also needs to register with the competent authority.

RECOMMENDATIONS



- COLLABORATION BETWEEN MUNICIPALITIES, REGIONAL GOVERNMENT AND THE PRIVATE SECTOR IS NECESSARY TO DEVELOP INTERMEDIATE STORAGE FACILITIES WITH A REASONABLE COVERAGE.

5. Participation, roles and financing



This chapter describes the roles and responsibilities of government at different levels in the strategic governance model as well as participation of other stakeholders and financing aspects.

5.1 Roles and responsibilities of governments

Successfully implementing a strategy requires sound institutional processes with capacity for planning, compliance, monitoring, enforcement, and managing operations. Roles and responsibilities need to be clearly defined and accepted by all parties to not create gaps or overlapping responsibilities. Each party must commit to and be responsible for agreed undertakings for each role.

As stated in the NWMS, responsibilities for waste management are divided between national, regional, and municipal authorities. There is a lot to build on regarding roles and responsibilities stated in the NWMS, also when it comes to HHW. Management of HHW should rather be seen as one of many components of the waste sector rather than a single decoupled element.

Roles and responsibilities for government bodies should form under the umbrella of the District Development Model, which was initiated in South Africa in 2019 (Government of South Africa, 2022). The Model consists of a process by which joint and collaborative planning is undertaken at local, district and metropolitan by all three spheres of governance. The model mechanism enables all three spheres of government to work together, with communities and stakeholders, to plan, budget and implement in unison.

Key roles and responsibilities together with key action points for national, provincial, and municipal government are suggested below.

5.1.1 National level

The Ministry of Forestry, Fisheries and the Environment and its Department has the overall responsibility for ensuring the implementation of the NWMS. The overall responsibility for ensuring implementation of the future strategy for HHW is proposed to also lie with that same ministry.

Although the suggested strategic model mainly targets local governments, it is crucial that the national government implements its commitments and creates an enabling framework in which local governments can then operate. Key action points for national government to support local governments in HHW management are:

Raising awareness

- Take a strong role in promoting and creating knowledge and awareness about waste policies.
- Take lead on awareness raising regarding hazardous waste and its potentially harmful effect on human health or the environment on a national level
- Develop a common national communication standard and brand (communication materials such as messages, texts, images, symbols etcetera) regarding HHW

Financing and guidance

- Ensure that HHW is included when models for financing (as a support to municipal authorities above all) of the overall waste sector are developed.
- Provide guidance, for example through the development of a resource (data)base that contains information towards how and where to apply for funding that would enable the municipalities to carry out implementation. The resource base should be a tool for the municipalities to seek cooperation and above all funding/financing.
- Develop key standard documents for communication and education, procurement, type agreements and contracts, etcetera that may be used by municipal governments

Collection schemes

- Investigate opportunities to develop additional EPR schemes for hazardous waste in addition to those currently exist.

Collaborations and innovation

- Take lead on the development and strengthening of collaborations with academia, researchers, and the private sector to boost innovation, growth, and employment opportunities for the benefit of circular economy models, hazardous waste avoidance and use of best available technology for hazardous waste collection services, recycling and treatment.

5.1.2 Provincial level

Provincial government should have a coordinating role, facilitating collaborations and partnerships within the province, as well as the exchange of experience and good practices between municipal authorities. Key action points for provincial government are:

- Responsible persons should be appointed, that is waste management officers (WMO)
- Establish a platform where municipalities can meet and collaborate on waste related issues
- Provide support for collaborations between municipal authorities.
- Identify possible synergies between neighboring municipalities and facilitate to unlock opportunities such as cost savings and knowledge transfer.
- Collect and disseminate insights and good practices to municipal authorities within the province.
- Provide guidance on different types of collaborations and agreements especially between municipal authorities and PROs.
- Plan and guide public and private investment in regional hazardous waste management and waste facilities.

5.1.3 Municipal level

Metropolitan (Metro), district and local municipalities are critical to implementation of the future strategy for HHW as they are responsible for the planning and delivery of waste collection and disposal services and infrastructure.

The responsibility for certain hazardous waste types is regulated by the strategic approach of EPR (for more on EPR see section 5.2.2).

The municipalities are responsible for ensuring that other hazardous waste types generated by households, that do not fall under the EPRs, are collected and treated.

Financial constraints are historically a key challenge for achieving sustainable waste management services. Services for HHW has to date not been prioritised. Foremost, municipal authorities need to get a better overall picture and understanding of the costs associated with waste management services in general and HHW services in particular. It is also of critical importance to identify and evaluate sources for funding.

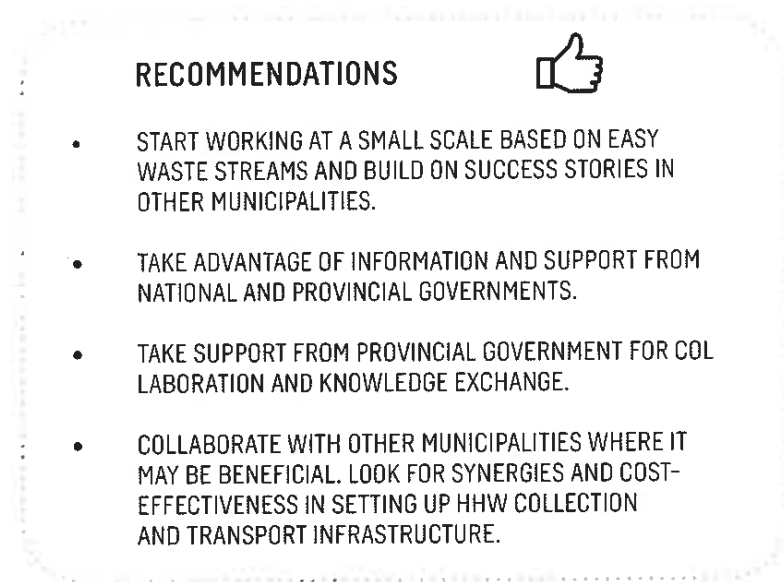
Long-term planning is needed to build a well-functioning and sustainable system. It is important to identify goals, milestones, and activities in both the short and long-term. Coordination with other municipalities is necessary to reduce collection and treatment costs.

Rather than starting everything at once, it is better to focus on and get started with one or a few things on a small scale. For example, to get one (a pilot) collection point up and running or to focus on selected hazardous waste types.

Key action points for municipal government are:

- Municipalities should keep separate financial statements, including a balance sheet of the services provided. Even though this may not lead to full cost accounting, it will acknowledge that there is an underfinancing. Investigate local cost factors and what opportunities and economic instruments are available to achieve higher cost coverage for solid waste management
- Identify, evaluate, and secure sources for funding
- Responsible persons should be appointed, that is WMOs and EMI:s responsible especially for waste management.
- Develop and decide on an economically feasible, sound, and long-term plan to set up collection systems for HHW. Develop a realistic and feasible detailed action plan, with clear milestones, based on the long-term plan. Implement and follow up.

- Piggy-back on success stories from other municipal authorities
- Investigate and launch suitable partnerships and collaborations. For example, partnering with the retail industry to create take back systems or cooperating collection points, partnering with landowners to secure location for collection points, joint awareness campaigns with different stakeholders, etcetera.
- Explore alternative service delivery mechanisms and partnerships – to achieve expansion of hazardous waste services to un-serviced communities



5.2 Collaborations

Municipal governments need to engage stakeholders to gain support for solid waste management policies, programs, and service issues. Working with stakeholders helps create a robust solid waste management system that can be operated in both an economically sustainable and efficient manner. Different stakeholders can be engaged in almost all stages of the value chain and the implementation of a HHW management system.

The District Development Model offers an integrated district-based approach, which should be applied in the process to establish HHW management systems. The model addresses service delivery challenges and job creation, promotes and supports local businesses, and involves communities and stakeholders to plan, budget and implement in unison (Government of South Africa, 2022).

The government firstly need to consider and select strategic partners to create strong and sustainable alliances. As different partners get involved, the local authorities need to take lead in the process of defining the roles of all stakeholders involved. Responsibilities need to be carefully formulated, communicated, and followed up to ensure accountability and ownership.

Figure 5-1 shows typical waste sector stakeholders which the local government could potentially involve. Some stakeholders are described further in chapters 5.2.2 to 5.2.5.

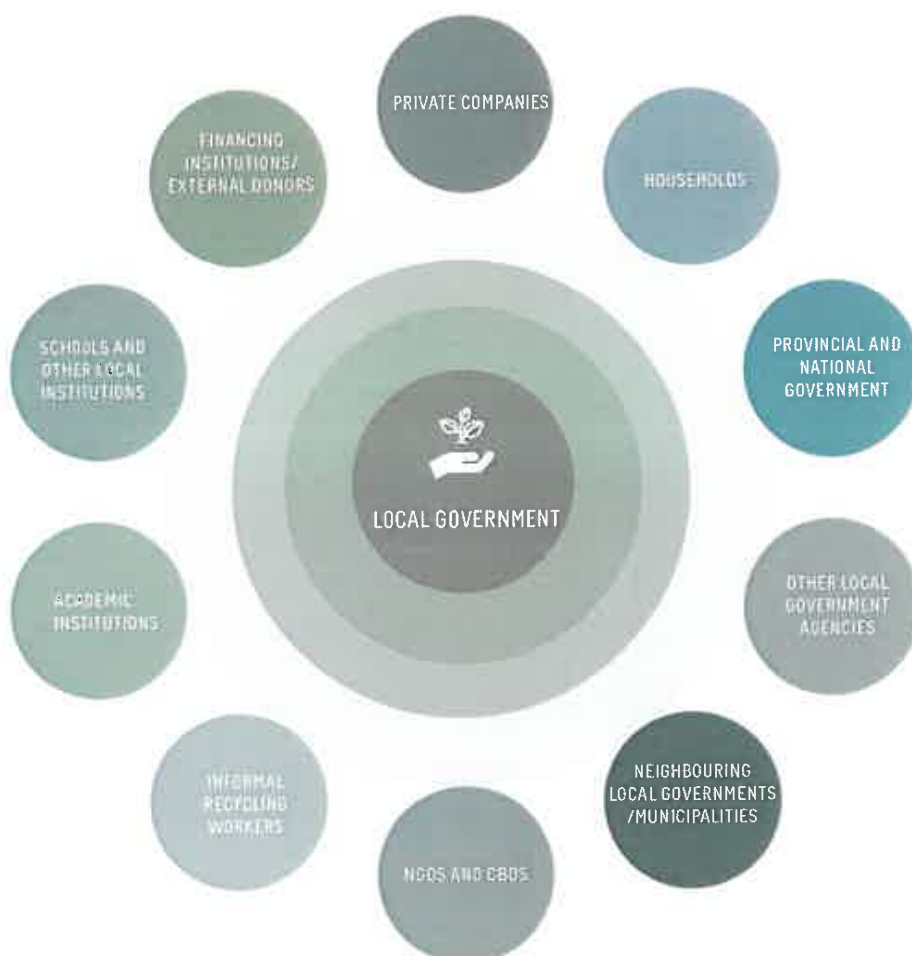


Figure 5-1. Typical household generated waste sector stakeholders

5.2.1 Awareness and community participation

Even if all pieces related to planning, financing and infrastructure are in place, management of HHW will never be better than what the waste producers make it. Consumers must dispose of hazardous waste correctly, ideally by separating the waste at source to ensure high-quality recycling. Additionally, consumers need to be aware of waste reduction and responsible consumption and should observe and comply with legislation. The responsibility for communicating and creating awareness lies both on all levels of governments and respectively PRO for HHW covered by EPR.

One of the intentions of collaborating is to establish sustainable HHW management systems which are readily available and, above all, used by the residents. Through collaborations, different stakeholders may be engaged and the level of awareness among the residents will increase.

5.2.2 Private sector

The private sector is involved throughout the waste sector, and private service providers play key roles in all stages of waste management, including in waste service delivery, recycling and as an interface to consumers.

Until recently, waste sector collection schemes have largely been run by voluntary industry-driven organisations. One example is the Rose Foundation, which is a national non-profit organisation, established to promote and encourage the environmentally responsible management of used oils and related waste. Rose Foundation gathers the major stakeholders in the lubricant industry.

On a national level, the government (DFFE) is now collaborating with the private sector in relations to priority wastes such as WEEE and lighting.

On a more local level, an expansion of waste services to un-served communities will require local authorities to explore alternative service delivery mechanisms, including public private partnerships. An expansion of collection services for HHW types which are not regulated by EPR, also calls for collaboration with the private sector. The private sector is encouraged to actively engage in making universal service provision a reality and growing the green economy. The private sector should also respond creatively to new technologies in the fields of waste processing and treatment and establish capacity in these areas as technologies become commercially viable.

In addition to collaborations regarding collection and service provision, joint ventures between the private sector and local authorities regarding awareness raising towards consumers should also be encouraged and sought.

5.2.3 Extended Producer Responsibility (EPR)

The introduction of EPR Regulations in South Africa is a step towards a circular economy. The intention behind EPR is to ensure producers take responsibility for the life cycle of the products they put into the market, from manufacturing right through to post-consumer waste recycling or disposal. With producers financially and/or operationally responsible for the waste that their products generate, it is hoped that this waste will be increasingly diverted from landfills and more recycling and other circular economy activities will gain momentum. EPR also have the potential to reduce the burden typically placed on municipalities and taxpayers to manage end-of-life product costs.

An EPR scheme can be financed mainly either by 1) product fees that are added onto the retail price; and/or 2) income from the sale of the recycled material.

Producers must develop their own EPR schemes or establish a Producer Responsibility Organisation (PRO). A PRO would typically be a non-profit company run on behalf of producers.

Producers or PROs may collaborate in various degrees with municipalities to provide collection systems for their end-of-life products. Producers may pay the municipality directly for the cost of collection and disposal or develop a system for residents to return the product. In either case, producers will often price the cost of disposal into the product so that consumers ultimately bear the disposal cost. Therefore, both producers and consumers are financially and logistically responsible for their resource usage. (World Bank Group, 2018)

To date, two EPRs have been introduced for hazardous waste. The EPR regulations and sector notices are applicable to lighting and WEEE. Work is also underway for EPR for pesticides, lubricant oils, and portable batteries. However, assessing the success of EPR schemes in place is essential as to not move too quickly.

While the regulations and overarching principles for EPR have been formulated on a national level, the schemes now need to be implemented. Targets for collection and recycling are set on a five-year basis.

5.2.3.1 *Role and responsibilities for PROs*

The primary role of a PRO, as defined in the National Environmental Management: Waste Act, is to implement an EPR scheme on behalf of its registered producer members. The PRO is accountable for fulfilling its tasks and for spending the funds paid by the member companies accordingly.

The PRO is responsible for setting up, developing, and maintaining the system, as well as assuming the take-back obligations of the member companies.

A PRO should operate as the coordinating body between producers and take-back/recycling operators. The PRO organises take-back and recycling activities on behalf of its members and is also responsible for providing information about the system and maintaining communications between the stakeholders in the supply chain.

The PRO also plays an important role with the education of consumers to encourage more recycling, and helping the members improve product design to make products easier to collect and recycle. The wide range of responsibilities make the PRO an important stakeholder organisation.

The PROs should seek collaboration with other stakeholders, including local authorities, to utilise existing infrastructure for waste management where feasible.

Joint ventures between the PROs and municipal authorities regarding for example awareness raising towards consumers should be encouraged and sought.

5.2.4 Informal sector

Hazardous waste has properties that can have major impacts on both environment and public health. Correct handling of this waste is essential. Initiatives to involve the informal sector should therefore only be made through a formalisation of existing informal workers. Municipal authorities can support this process for example through integration and incorporation of waste collectors into municipal collection services. Information about integration of the informal sector can be found in the waste picker integration guidelines for South Africa (Department of Environment, Forestry and Fisheries and Department of Science and Innovation, 2020).

All government levels also have the potential to advocate for integration and incorporation of waste collectors and other employments into the EPR systems.

5.2.5 Civil society

Civil society organisations such as NGOs, non-profit organisations, community-based organisations, cooperatives, and trade unions may play important roles in the delivery of waste management services. For example, these organisations may constitute important facilitators and implementers for advocacy and awareness raising campaigns towards consumers and households. However, attention is needed to carefully design roles and responsibilities for civil society actors/partners. For HHW under the responsibility of local authorities, local authorities must lead and coordinate the work and activities. If coordination does not take place, there is a risk for ambiguous messages and overlapping initiatives.

5.3 Financing HHW collection

RECOMMENDATIONS



- INVOLVE THE PRIVATE SECTOR AND PROS EARLY WHEN DEVELOPING COLLECTION SYSTEMS TO ACQUIRE THEIR KNOWLEDGE AND TECHNOLOGIES.
- INVOLVEMENT OF THE INFORMAL SECTOR FOR HHW COLLECTION IS MORE DIFFICULT COMPARED TO OTHER WASTE STREAMS. SEEK SOLUTIONS WHERE WASTE PICKERS MAY BE INTEGRATED AND FORMALIZED.
- COLLABORATE WITH IMPORTANT MEMBERS OF THE CIVIL SOCIETY TO CREATE COMMUNITY PARTICIPATION AND AWARENESS.

Before starting up a collection scheme for HHW streams a financial plan is crucial. Cost factors of HHW collection as well as funding possibilities needs to be explored in the process. The financial plan aims for full cost coverage but should at minimum ensure long-term coverage of costs associated to basic operations.

5.3.1 Cost factors of HHW collection

A first step should always be to investigate local costs for the planned collection activities. Example of cost factors to be expected are (major cost factors highlighted as bold text):

Planning and administrative costs:

- Personnel costs for planning
- Administration costs for documentation, compliance, and monitoring.
- Costs related to procurement processes
- IT-costs for monitoring collection
- Permits and other administrative costs
- Awareness campaigns
- Pilot projects

Investment costs:

- **Construction of waste collection points**
- Adapted vehicles for mobile collection
- Collection equipment
- Costs related to intermediate storage
- Consultant costs related to facilities and other
- Costs for reinvestment in equipment

Operational costs:

- **Personnel costs including wages, training, personal protection equipment etc.**
- **Treatment costs and transshipment costs from intermediate storage to waste treatment facility**
- Property leases
- **Fuel, maintenance and repairing of vehicles**
- Packaging material
- Electricity
- Monitoring facility
- Communication/information related costs
- Other fees and miscellaneous costs related to operation

5.3.2 Funding

As outlined in chapter 3.1.4 several different funding methods exist, however municipalities are limited to downstream tariffs, external funds and subsidy programs managed at national level. Another source of funding can be collaboration with PROs within an existing EPR.

5.3.2.1 *Service fees/Tariffs*

Service fees and tariffs from waste generators are the main waste revenue for a municipality. For a sustainable financial strategy, the municipalities should at least be able to cover operating costs by its revenues from tariffs. Although collection and treatment of HHW is more expensive than domestic waste, it is recommended that a separate tariff is not added to avoid a situation wherein people are deterred from dropping off HHW. Ideally the service of collecting HHW is included "free of charge" and incorporated into households' general tariffs. When supplying services free of charge there is a risk of overusing of the system by actors for which the collection is not intended. To avoid such effects, a fixed number of free of charge visits to a waste collection point can be used combined with a service fee for those wanting to use the collection point more frequently. If implementing such a system, careful consideration must be made not to deter households from using the intended collection. The important thing is to avoid HHW being dumped or being treated inappropriately.

5.3.2.2 *External funding/subsidies*


During the development of this report no subsidy programs dedicated to collecting HHW on a national level have been identified. Since the lack of collection of HHW comes with external costs for the society in form of environmental and health issues, systems for balancing the external costs and collection costs are recommended. Eventual future levies or upstream taxes on product and material can be used to form a subsidy program covering at least some of the investment cost for municipalities implementing collection of HHW.

5.3.2.3 *EPR*

For HHW streams covered by EPR the main responsibility for collecting and treatment of waste lies on producers and PROs. However, collaborating with municipalities in terms of co-collection at a waste collection point, transport, and treatment of non EPR waste as well as some of the costs associated with operation of a waste collection facility could burden EPR schemes. For co-funding infrastructure and operational costs, agreements between municipalities and PROs are necessary. Today such agreements are rare or non-existent. It is recommended that successful local collaborations are explored, and municipalities receive support from national and provincial government in developing a framework for necessary agreements.

5.3.2.4 *Avoided costs*

By collecting and sending HHW for treatment separately, costs are avoided that otherwise would occur if HHW is collected mixed with domestic waste, for example costs for transportation to landfill, disposal costs and saved landfill space. Savings are however in relative terms small compared to the overall costs for waste management since the amount of HHW is low compared to general domestic waste.

RECOMMENDATIONS 

- INVESTIGATE MAJOR COSTS FACTORS FOR COLLECTING HHW SUCH AS INVESTMENT IN INFRASTRUCTURE, PERSONNEL COSTS, TREATMENT COSTS AND COSTS RELATED TO TRANSPORTATION.
- EXPLORE FUNDING OPPORTUNITIES INCLUDING GENERAL WASTE TARIFFS FROM CITIZENS, EPR, AND EXTERNAL FUNDINGS THROUGH SUBSIDIES OR DONORS. FOR MOST HHW-STREAMS A POSITIVE MATERIAL VALUE CANNOT BE EXPECTED.
- AT LEAST BASIC OPERATIONS SHOULD BE FINANCED BY GENERAL WASTE TARIFFS, BUT FULL COSTS NEED TO BE COVERED BY FUNDING FROM A COMBINATION OF SOURCES.

5.4 Innovation and growth

The NWMS outlines long-term collaboration and partnership between government and the private sector as a critical enabler. Innovation is also included in several focus areas. This need to be considered by local, provincial, and national government when addressing the HHW sector.

Implementing a separate collection of HHW in South Africa's municipalities will require investments in both infrastructure as well as administrative systems. Innovations can enable and speed up the implementation process and at the same time contribute to both growth and employment opportunities. Prioritised areas where innovation is beneficial are:

- Construction and management of cost-effective waste collection methods.
- Development and distribution of guidelines and systems for classification of HHW.
- Equipment for mobile collection of HHW.
- Pricing models and systems for collecting tariffs.
- Safe and environmentally friendly transportation of HHW from intermediate storage to treatment facilities.
- Improving monitoring systems and data collection.
- Treatment of HHW contributing to a circular economy.
- Communication and awareness building

Local municipalities should take a leading role in innovation on a local level. However, since not all municipalities have such capacity in-house today, it is important to understand the enabling role even smaller municipalities can have for creating an innovation friendly environment. A direct way of promoting innovation is to involve private companies in design and operational management of HHW collection by procurements, in other words buying innovation. Governments can also contribute to innovations on a national and provincial and district level by regulations, guidelines, subsidies, support, and information to local municipalities. Another way of promoting innovation is sharing experiences and examples of successful stories between municipalities on a regional or national scene, as well as capacity building in key-personnel.

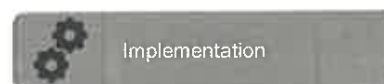
It is important to remember that innovations in HHW collection must consider environmental and health issue in a more careful manner compared to lower risk waste streams. If procuring services promoting innovation, it is necessary to include minimum requirements to secure environmental and health aspects.

RECOMMENDATIONS



- TAKE A LEADING ROLE IN LOCAL INNOVATION BY PROCUREMENT OF SERVICES AND KNOWLEDGE SHARING.
- INVOLVE THE PRIVATE SECTOR TO STRENGTHEN INNOVATION AND EMPLOYMENT GROWTH IN HHW COLLECTION.
- BE AWARE OF ENVIRONMENTAL AND HEALTH ISSUES RELATED HHW DURING INNOVATION PROCESSES. TAKE RESPONSIBILITY BY SETTING MINIMUM REQUIREMENT FOR SAFETY AND PROTECTION.

6. Implementation



Based on the recommendations in chapter 4 and chapter 5 an implementation process from a municipality perspective is proposed in Figure 6-1.

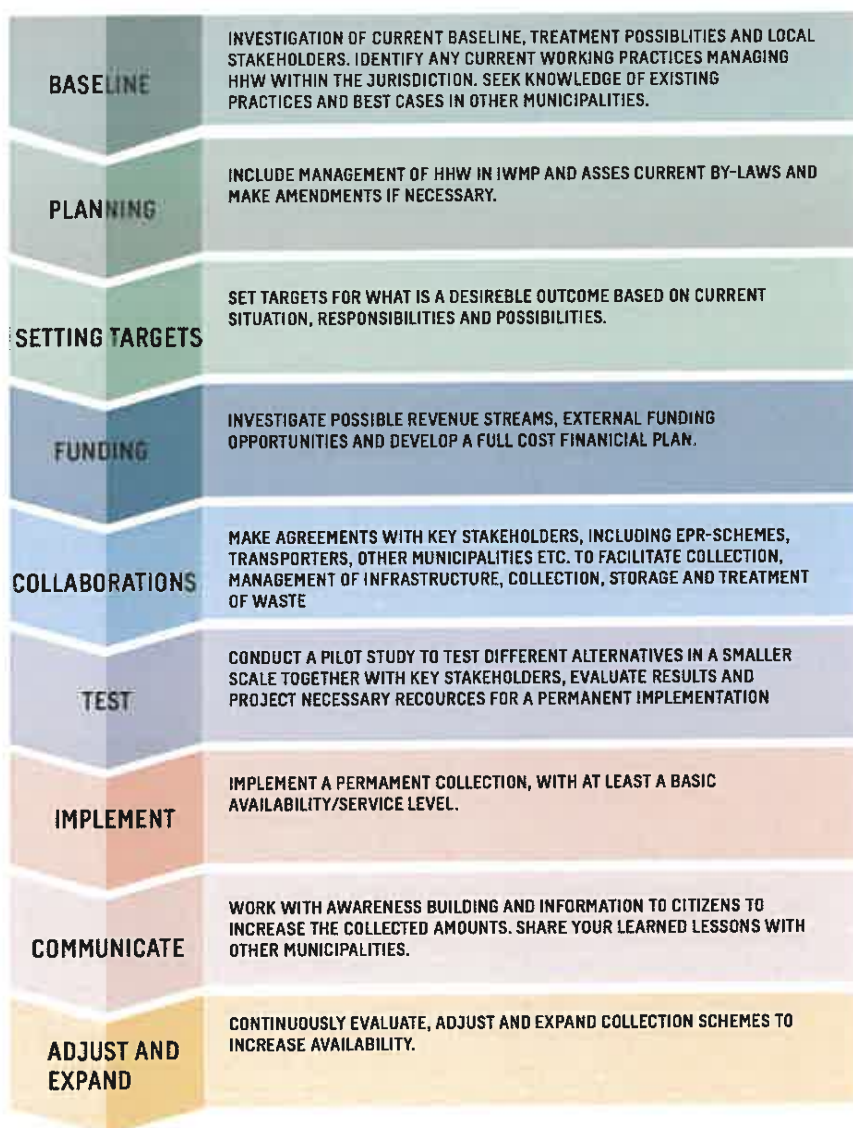


Figure 6-1. Proposed implementation process for collection of HHW at a municipality level.

6.1 Incentives for implementation

Municipalities' willingness to implement collection of HHW as well as current barriers and enabling factors has been identified from case studies and conducted interviews during the development of this strategic governance model.

Municipalities currently collecting, or investigating how collection can be implemented, acknowledge a social and environmental responsibility for hazardous waste from household as their main driving force for collecting hazardous waste.

Identified barriers includes low priority of HHW due to small amounts whilst other waste streams are more prioritised and uncertainties of responsibilities, especially in what extent municipalities are obligated and mandated to participate in collection of HHW. Finally, the main barrier involves financial pressure and difficulties in implementing collection of HHW while achieving full costs coverage.

The following are proposed to increase municipalities' willingness to participate in collection of HHW:

- Clarification of responsibilities in regulations with minimum requirements for municipalities' participation in collection HHW.
- Increase awareness of environment and health issues connected to HHW at a local government level.
- Economical support in the form of national subsidy programs or others external sources which helps funding necessary investments in infrastructure.
- An increased demand for services from population

Enabling factors for municipalities willing to take a responsibility for management of HHW includes:

- Education and capacity building of personnel as well as the public.
- Practical guides, knowledge, and support.
- Framework for collaborations with other municipalities, private companies, civil society, informal sector and EPR schemes.
- Available capacity at treatment facilities.
- Development of regional intermediate storage facilities.
- Efficient administration systems which reduce the administrative burden on the municipalities in planning, reporting and compliance to relevant standards and regulations.

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