

## Waste Minimisation Programmes in South African Secondary Mining Towns

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### Abstract

The study was carried out in order to describe the waste minimisation programmes in place in the respective local municipalities in order to minimise the amount of waste entering landfill sites. The study area covered four provinces and for each province a single local municipality with a major mining town was selected. The study areas selected were; Klerksdorp in the North West Province; Carletonville in the Gauteng Province; Witbank in the Mpumalanga Province; and Welkom in the Free-State Province. On the basis of these results, the following findings are specified. The key findings of the study indicate that the selected study areas do not seem to have precise and clear programmes that are solely and specifically aimed at minimising waste. Instead the financial management and asset management strategies are initiated to overhaul the entire out-dated municipal systems. As a result one of the drawbacks is that the waste management systems indirectly benefit although these are not direct programmes aimed at the waste management systems. Observations suggest that suitably qualified persons should manage in-house programmes and other programmes as these have a major impact in educating people about waste minimisation. The organisational set up of local municipalities does not give adequate space and autonomy to the waste directorate. This has an adverse effect on the recruitment, retention and development of specialist skills. Waste management does not receive adequate budgetary support from local municipalities and, this constrains the ability of waste directorates to up-grade current systems and to improve their record of service delivery. Waste minimisation is a critical element of long-term government goals to protect the environment; yet, it does not receive much attention from senior management across local municipalities.

**Keywords:** Waste minimisation; Minimisation programmes; Landfill sites; Recycling initiatives

### Introduction

According to the Department of Water Affairs and Forestry, (DWAF, 2011) waste is an inevitable consequence of development; and hence it must be managed in an integrated and sustainable manner. As the population increases and development takes place, a concomitant increase in waste generation is expected. There are a number of problems associated with increased waste generation such as the additional risk of air, soil and water pollution, and lack of suitable locations for landfill sites. In order to prolong the life of current landfills and optimally manage new ones, the waste disposed to landfill sites has to be minimised. The vision of the Polokwane Declaration (DEAT, 2012) is to reduce waste generation to 50% of current levels and for zero waste by 2022. In order to manage waste in

a sustainable manner, waste management must consider the waste stream in a holistic manner, in order to optimize the use of resources and to reduce the environmental impacts (Novella, 2000). Thus an integrated approach which combines a number of techniques such as waste reduction, reusing and recycling has to be considered. One of the mechanisms to resolve this problem is to identify what portions of the waste stream can most readily be minimised and recycled. To do this effectively, a quantitative understanding of the total waste stream is necessary. Aspects that will need to be addressed include the identification of the waste stream sources and an assessment of the waste stream composition, as well as the quantification of the main waste streams for each of these sources. Certain waste streams could be targeted for recycling like the high income domestic streams

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due to their high content of packaging material and those streams that are not suitable for recycling, such as low income domestic streams due to high ash and sand content (DEAT, 2012).

#### *Problem statement*

The Department of Water Affairs and Forestry has developed an overall waste generation profile for each of the provinces (DWAF, 2011), which gives a first-order assessment of waste generation in South Africa. There is clearly a need for accurate up-to-date data on waste generation and waste disposal to landfills. This need has been articulated in the National Waste Management Strategy and the Action Plans for a Waste Information System and Integrated Waste Management Planning. It was proposed that local authorities collect and report waste generation rates, waste categorisation and identification of waste streams that have potential for recycling. It is recognised that there are practical constraints such as the unavailability of functioning weighbridges at most medium, small and communal landfills. The security risk comes into play at those landfill sites with weighbridges but no 24-hour armed security personnel. There are financial implications of providing, maintaining and protecting weighbridges. It was proposed that a first round of Integrated Waste Management Plans should be prepared. However, since this was not a legislated requirement, few local authorities have as yet completed their IWMPs, nonetheless, major metros such as Johannesburg, Cape Town, eThekweni, and Tshwane, as well as a number of other cities and towns have initiated the process of compiling IWMPs, and the required information should become available (DEAT, 2011). Recycling has the potential for job creation and is a viable alternative to informal salvaging at landfills, which is undesirable due to the associated problems of health and safety.

#### *Research purpose*

The purpose of this research is to describe the waste minimisation programmes that have been implemented in the study area.

#### *Objectives*

The following objectives are advanced:

1. To assess the current waste minimisation programmes implemented at the study areas.
2. To describe the amount of waste being generated and ultimately landfilled.

#### *Hypotheses*

H<sub>1</sub>: There is a close relationship between the volume capacity of municipal landfill sites (x) and the annual volume of the waste disposed at landfill sites (y) in each study.

H<sub>2</sub>: There is a consistent relationship between the resident population and the totality of landfill sites in the study area. In each of these hypotheses, the null hypothesis H<sub>0</sub> suggests the view that such relationships do not hold.

#### *Rationale*

A number of new developments South Africa in the political, policy and legislation fields, the Constitution (GSA, 2010), the Environmental Management Policy (DEAT, 2011), the National Environmental Management Act (GSA, 2010), the Integrated Pollution and Waste Management Policy and the National Waste Management Strategy, resulted in a re-appraisal of the recycling situation. Integrated waste management requires the implementation of a hierarchical approach to waste management, involving a sequential application of waste prevention, minimisation, re-use, recycling, treatment and ultimately disposal. Hence, recycling is an integral part of the way waste management is being implemented in South Africa (Peter and Duneed, 2013). The majority of commercial waste recycling initiatives have been developed on an ad-hoc basis and have been funded by the private sector, with minor financial inputs from the provincial and local governments. The local municipalities have tried to stimulate waste recycling by assisting with establishing waste buyback centers and garden waste drop-off centers in the larger cities and towns, at which waste is separated into different waste streams, such as glass, paper and cardboard, cans, scrap metal, plastics and garden waste (Mukawi, 2009). A number of capital-intensive recycling plants have been launched but have been unsuccessful in Klerksdorp and Witbank. Although these plants worked from a mechanical point of view, their failure has been attributed to an over-estimation of the value of recoverable materials, unrealistic requirements of the municipalities involved, and a downturn in the economy at the time the projects were launched. Due to the large quantities of recyclable materials in the waste arriving at landfill sites, informal salvaging is widespread (Leonard, 2009). This practice leads to unacceptable health and

safety risks for the salvagers, as well as operating problems for the landfill staff. The implementation of successful recycling initiatives is not a short-term activity but rather an ongoing initiative that must be reviewed and revised based on experience. An ongoing campaign will be required to change people's behaviour and to take responsibility for their waste.

## Background

Johannesburg has experienced flooding, heat waves, hailstorms and other extreme weather conditions. Besides its other impacts environmental pollution produces greenhouse gases, which are considered to be a major influence in climate change (Ecotec, 2011). As a result, the City of Johannesburg is ensuring that the environmental pollution impacts stemming from waste are averted and that greenhouse gas emissions are reduced. The City's integrated waste management operation incorporates waste separation at source, garden dumping sites and composting plants. In addition, Johannesburg has successfully implemented two landfill gas-to-energy projects (Smith and Scott, 2009). At the Robinson Deep landfill site and the Marie Louise project, landfill gas is extracted, combusted and flared as carbon dioxide, to generate electricity. In the near future a total of 19MW of electricity will be generated from five landfill sites, enough power for about 12500 middle-income households. The waste separation-at-source project encouraged residents to separate their waste - paper goes into orange bags and recyclables like bottles and cans in colourless bags (Skumatz, 2008).

The city of Johannesburg has created garden dumping sites for the disposal of light garden waste, where it's chipped into manageable sizes and transported to a composting plant. The composting plant processes about 150,000 tonnes of green waste per year into soil-enhancing compost. This compost is then sold to the agricultural sector and to city homeowners for suburban gardens. The city of Johannesburg is currently disposing of about 1.6 million tonnes of waste in the four operational landfill sites. On the other hand as a result the city is spending much on transportation costs, which also contributes to air pollution and greenhouse gas emissions from the trucks used in this process. The landfill gas-to-energy projects minimise environmental damage by reducing methane emissions. Methane is sucked through the combination of vertical and horizontal pipes

to the flare system where it is burnt and carbon dioxide which is less harmful than methane gas is released (Patton, 2009). The Robinson Deep landfill was completed in May 2011. For this project, 68 gas wells were installed in the first phase and this number will be increased during the second phase of the project. The project has produced 137,888 Certified Emission Reductions (CERs) and destroyed 18,288,457m<sup>3</sup> of landfill gas, which would have otherwise been released into the atmosphere. Construction of the Marie Louise project commenced in February 2012 with 28 wells being installed (Lehtoranta, 2010). By 2015 a total 19,042 CERs were amassed and 3,157,656 m<sup>3</sup> of landfill gas was destroyed since May 2012. Eventually a total of 19MW of electricity will be generated at five landfill sites, which could power about 12,500 middle-income households (Leeuwen, 2011). Construction for the three remaining sites of Goudkoppies, Ennerdale and Linbro Park will commence in the near future. In October 2013, the Department of Energy approved the project and agreed to sign a Power Purchase Agreement (PPA) with Eskom for 18MW contribution as part of the Independent Power Producers programme (McGurty, 2011). The project was registered with United Nations Convention on Climate Change (UNFCCC) in December 2012 wherein it can start selling carbon credits accrued from date of commissioning of the sites under the Kyoto Protocol. The City of Cape Town has managed to divert 10 million cubic meters of garden refuse from going to landfill. The City recently celebrated the major milestone in the war against waste, which it achieved in partnership with Reliance, the leading organic compost provider in the Western Cape. Cape Town's solid waste landfill sites are quickly filling up and waste will need to be transported to sites outside of the municipal boundaries in the near future at a significant cost. Reliance was contracted to shred green garden refuse collected from the city's drop-off facilities and landfills in 2001 and has been taking care of Cape Town's green waste since. Reliance recycles garden refuse into compost and has put over 750 000 tons of organic compost back into the soil. The company's zero organic waste to landfill mission is in line with the City's vision. Reliance is carbon neutral and has had its composting technology approved as a Greenhouse Gas Emission Reduction method according to the guidelines of the United Nations Framework Convention on Climate Change (Mechelson, 2009).

In Port Elizabeth, the municipality decided to launch a campaign in 2008 to stop the waste to landfill



practice by asking residents not to dump waste but rather exchange it to save the environment. It was called the NMB Waste Exchange, and is one of the waste reduction projects of the Integrated Waste Management Plan. It is a free web-based system that enables generators and users of waste material to exchange waste material at no cost to them, thereby reducing waste to landfill. Once a user is registered on the system, they can either post a listing or advert for wanted waste material or search on the listings of unwanted waste material posted by other users (Lynes, 2011). Waste material can be anything that can still be used by someone else such as cardboard boxes, left over building material, recyclables, wood, obsolete furniture or building rubble, to name just a few. By signing up and taking part, residents helped the Port Elizabeth municipality reduce the carbon footprint while improving their business environmental and social responsibility image (McCool and Stanskey, 2011).

Landfill sites are growing at a rapid rate and waste has direct and indirect impacts on human and ecosystem health, including contamination of surface and ground water. In addition, methane emissions from waste contribute to the greenhouse gas emissions profile of South Africa. These impacts could be significantly reduced with improved waste management practices. Although the secondary cities do not have the same resources as the metropolitan areas, many programmes can still be implemented that suit localised needs and addresses the issues affecting particular municipalities (Shen and Tam, 2010).

## Methodology

This section looks at the programmes that have been identified, implemented or initiated at the different local municipalities. These programmes are aimed at maximising and aiding already established mechanisms in minimising the amount of wastage from entering the waste stream and ultimately landfill sites. These programmes are applied throughout the entire waste chain and should largely be applied at the different phases of the waste hierarchy to ensure its effectiveness and efficiency. A programme evaluation was developed that specifies key performance areas (KPA) and used to measure the performance of these programmes. These were linked to actual waste minimisation programmes that were initiated and implemented in each of the study areas.

## Population and data sources

The landfill sites in each of the study areas were selected based on their status of being licensed and permitted according to Chapter 5 of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008). These sites conform to certain practices and standards and comply with national and local legislations. Non-permitted landfill sites and illegal sites were discarded as they are not recorded and the local municipalities have no control over them. They do not comply with national legislations and municipal by-laws. In the Klerksdorp Local Municipality only the Klerksdorp landfill site was selected, in the Carletonville Local Municipality only the Rooipoort Landfill site was selected, in the Witbank Local Municipality only the Ga-Nala and Phola landfill sites were selected and in the Welkom Local Municipality only the Virginia, Henneman, Odendaalsrus and Welkom landfill sites were selected. Each local municipality was found to have its own programmes in place but the more common characteristics were selected for the design of a standard table used in the evaluation of these programmes. Data for this subject matter was derived from the waste directorates of each study area. This was further reinforced with data obtained from: the Integrated Development Plan (IDP); the Integrated Waste Management Plan (IWMP); Annual Reports (AR); Local Economic Development Plan (LEDP) and waste management plans of the respective directorates.

## Results and discussions

### *Financial management strategies programmes (FMS programmes)*

Financial management strategies are programmes that have a lot of capital injected into them and are usually long term financial commitments. A series of processes are involved in authorising such projects and they benefit entire regions. They are commitments usually undertaken at higher command levels. Table 1 shows the most significant financial management strategies programmes that to date have been identified for all the four municipalities. Firstly is the on-going review of the computerised financial system. The integration of such a computerised systems and the purchase of the required hardware and software within the local municipality ensures that captured information is accurate, relevant



and prompt. This will in turn will facilitate the smooth running and effective management of the municipality. Second is the upgrading of the “Venus” software that is being currently used at the municipalities, to the “solar” software and this will greatly improve the operating systems. This software is used to generate the required job cards and improve responses in tackling outstanding issues. Thirdly is the development of a generally recognised accounting practices (GRAP) compliant and medium term revenue expenditure framework (MTREF) budget. These programmes are also aimed at reviewing and updating asset, budget and accounting policies and procedures.

The objectives of such programmes as indicated in Table 1 will be to regularly ensure that the financial and other staff members receive the required training they require to ensure a cost effective and efficient service to the municipality and its customers. It will improve budgetary controls and timeline of financial data. Building capacity of the budget and treasury office to ensure that financial information for reporting purposes is generated timeously. It will also include the monitoring and reporting on budget variances. It also provides for the development and implementation of a debt capacity policy. This policy will ensure that any

loan or debt taken by the municipality will be done in responsible manner and that the repayment and servicing of such debt will be affordable. It can be depicted from Table 1 that Klerksdorp, Witbank and Welkom have committed R1.7 million in developing and renewing their financial systems. This will enable faster responses to job cards. These areas have also committed R3 million for a development of a generally recognised accounting practices compliance and a medium term revenue expenditure revenue medium term expenditure (MTREF) budget. The areas of Carletonville and Welkom have allocated R890 000 to enhance budgetary control and timeline financial data. Klerksdorp has allocated R1.6 million rand to the implementation and development of a debt capacity policy.

The importance of these programmes is that they inject much needed financial capital to improve responses along the waste chain. They address the issue of institutional red tape as challenges are speedily addressed. The implications of such commitments are that response times to immediate challenges are speedily resolved resulting in an improved service delivery and a decrease in waste backlogs.

**Table 1:** Financial management strategies programme

Input	Key Performance Area (KPA)	Value (R 000')	Outcome
Klerksdorp; Witbank & Welkom Initiated Programmes	Review of the computerised financial system	R 1.7M	• Smooth running and effective waste management.
	Development of generally recognised accounting practices compliant and medium term revenue expenditure revenue budget	R3M	• Ensures financial and other staff members receive required training. • Ensures a cost effective and efficient service to the municipality and its customers.
Carletonville & Welkom	Enhance budgetary controls and timeline of financial data	R890'	• Ensures that financial information for reporting purposes is generated timeously.
Klerks Dsorp	The development and implementation of a debt capacity policy	R1.6'	• Repayment and servicing of such debt will be affordable.

*Asset management strategies programmes (AMS programmes)*

These are programmes that are focused in the improvement of fixed and movable assets such as the vehicles used in the waste directorates for waste collection. The goal is to ensure that sufficient back-up collection equipment are available at all times as well as supporting equipment for the street cleansing service, illegal dumping service and for landfill. The need to ensure the availability of collection equipment will however need to be addressed by the actions of the relevant local municipality. The local municipalities can now purchase and maintain their own landfill equipment to a minimum that includes a garbage disposal vehicle, waster cart, and tipper truck and front end loader. Table 2 tabulates the financial commitment in ensuring that assets utilised along the waste chain are well maintained.

The Klerksdorp, Witbank, Welkom and Carletonville municipalities have financially committed to the application of an integrated asset management system and the re-assessment and updating of an asset and risk insurance protocol and allocations to repairs and maintenance of the existing infrastructure. The equipment currently on site is not adequate and is difficult to maintain due to procurement procedures. Landfill equipment should not be out of commission for longer than two days since the landfill site is operated on a

daily basis whilst waste volumes are continually increasing over time. All indications are that outsourcing the operation of the landfill is more cost effective and that the site will be better managed from an operational point of view. There are various examples where municipal landfills are successfully operated by private contractors. The following are some of the more significant programmes that have been identified: Implementation of an integrated asset management system; Identification and implementation of a suitable integrated asset management system. This will also include the capture of all assets into a single system, the maintenance of this system and the production of a complete asset register in terms of generally recognised accounting practice document 17 and 102 and any other accounting standards requirements; Reviewing and updating of asset and risk insurance protocols and renewing the insurance portfolios. Risk identification in conjunction with insurers and departmental heads. Re-assessing of existing insurance portfolio and the renewal of the insurance policy as per the renewal terms; Repairing and maintaining of existing infrastructural assets should be prioritised since an uncontrolled increase in renewal infrastructure backlogs will negatively impact on the financial sustainability and the reliability and quality of municipal services. Adequate budget provision for asset maintenance over its useful life and the maintenance of assets according to an

**Table 2:** Asset management strategies and programmes

	Input	Key Performance Areas (KPA)	Value (R'000)	Outcome
Klerksdorp	implementation of an integrated asset management system	Investigation, identification and implementation of a suitable integrated asset management system.	R 895 000	Capture of all assets into a system, the maintenance of this system and the production of a complete register
Witbank	Re-assess and update of asset and risk insurance protocol and the renewal of the insurance portfolio	Entails the identification of risk in partnership with insurers and head of departments.	R 1. 5M	Incorporates the review of the existing insurance portfolios and the reformations of the insurance policy as per the renewal terms,
Carletonville And Welkom	Allocation to repairs and maintenance and the renewal of existing infrastructure assets	Uncontrolled increase in renewal infrastructure backlogs will negatively impact on the financial sustainability, reliability and quality of municipal services	R 650 M	Adequate budget provision for asset maintenance over its useful life. Maintenance of assets according to an infrastructural asset and maintenance plan
Klerksdorp	Replacement and renewal of aging vehicles and equipment	Ensure on-going health and municipal infrastructure	R 750M	Ensuring all asset owned and controlled are insured except where specifically excluded by policy

infrastructural asset maintenance plan, Maintain a system of internal control of assets to safeguard them, Replacement and the renewal of aging assets according to replacement programme to ensure the on-going health and municipal infrastructure and ensuring all assets owned and controlled are insured except where specifically excluded by policy.

#### *Other programmes (OP's)*

The following waste minimisation programmes as depicted in Figure 1 have been identified throughout the study areas and presented. These programmes are continuous programmes. They have no expiry date attached. All that is required is for them to be upgraded as regularly as possible by the responsible personnel of the waste directorates.

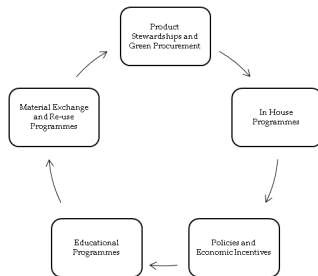


Fig. 1: Other types of waste minimisation programmes

#### *In-house Programmes*

These programmes encourage governmental agencies and solid waste departments to reduce waste generation following the cred of practice what you want to preach. Valuable lessons can be learnt with such in-house programmes initiatives about day to day practicalities and the challenge around generating less waste in the first place. In-house programmes facilitate the economic and policy incentives that require or encourage consumers and businesses to practice source reduction. Such programmes are necessary to ensure success of waste minimisation programmes. Residential, commercial and industrial educational programs are packages suited for in-house programmes that increase public awareness and participation in source reduction programmes. Educational and on-site business and industry assistance programmes advise businesses how to use materials more efficiently and reduce waste generation. The areas

in the study sites all have in-house programme.

#### *Policies and economic incentives*

The policies and economic incentives involves the development of an environmental management corporate agreement with the respective local industry and association to develop targets for recycling of products and waste reduction to landfill. They hold manufacturers responsible for their products throughout their life-cycle. Local government can press for extended producer responsibility at the state and national levels. If goals are not met, the responsible or concerned will push for institution of a regulatory framework. Local government can pass producer responsibility resolutions calling on producers to share the responsibility for their products and on state and national legislatures to shift the burden of managing discarded products and packaging from local governments to the producers of those products. To facilitate such programmes, local government may need to pass local ordinances banning use and/or sale of certain types of products and packaging that cannot be reused, repaired, recycled, or composted. It was observed that the Klerksdorp, Witbank and Carletonville areas have put emphasise on such programmes whereas Carletonville has none.

#### *Educational programmes (EP's)*

Educational programmes and outreach are very important. Educational and technical assistance programs provide residents and businesses with information about 'how' and 'why' to reduce, reuse, recycle, and compost. Public information campaigns which allow consumers to make smart choices when making purchases are effective options. Public education campaigns can also highlight the environmental and economic benefits of preventing, reusing, and recycling discards and connect the role these activities play in moving toward a sustainable economy. It is proven time and time again that money spent on education to promote savings and raising awareness of environmental issues, although seeming like a significant cost, can yields significant results in waste minimisation. The local municipalities have put continuous educational programmes in place. For instance in Klerksdorp, posters are put up and waste information published in the *Lentswe* newspaper and the local radio station. In Witbank the focus is on schools and regular awareness



campaigns are initiated. For the Welkom and Carletonville local municipalities signs and posters are established in key areas.

#### *Material exchange and re-use programmes (MERP's)*

This is initiated by establishing a materials reuse program to take unwanted but reusable materials and making them available to non-profit organisation, businesses and private individuals. Material can come from anyone in the area. The advantages of such programmes are that the materials are both cost effective and environmentally beneficial. For business advantages they include: Avoidance of paying disposal cost; Free up valuable space; Receive a tax rebate; Receive cash; Use less expensive material and packaging than buying new ones; Improves the corporate images of the respective organisations or company.

#### *Product stewardships and green procurement programmes*

Product stewardship and green procurement is the act of minimising the health, safety, environmental and social impacts of a product and its packaging throughout all lifecycle stages, while also maximising economic benefits. The manufacturer, or producer of the product has the greatest ability to minimise adverse impacts, but other stakeholders, such as suppliers, retailers, and consumers, also play a role. Stewardship can be either voluntary or required by law. It incorporates human health and environmental concerns into the search for high quality products and services at competitive prices.

#### **Key findings**

On the basis of these results, the following findings are specified:

- The selected study areas do not seem to have precise and clear programmes that are solely and specifically aimed at minimising waste. Instead the financial management and asset management strategies are initiated to overhaul the entire out-dated municipal systems. As a result one of the drawbacks is that the waste management systems indirectly benefit although these are not direct programmes aimed at the waste management systems.
- Observations suggest that suitably qualified persons should manage in-house programmes

and other programmes as these have a major impact in educating people about waste minimisation.

- The organisational set up of local municipalities does not give adequate space and autonomy to the waste directorate. This has an adverse effect on the recruitment, retention and development of specialist skills.
- Waste management does not receive adequate budgetary support from local municipalities and, this constrains the ability of waste directorates to up-grade current systems and to improve their record of service delivery.
- The status of operational equipment and vehicles at local municipality level indicates serious problems of maintenance. These problems relate to red-tape in the procurement systems for parts and spares and the low priority given to the recruitment of full time mechanics at municipal engineering workshops.
- Waste minimisation is a critical element of long-term government goals to protect the environment; yet, it does not receive much attention from senior management across local municipalities.

#### **Conclusion**

The findings indicate that attainable, viable and practicable waste minimisation and recycling programmes and initiatives are important and should be developed and implemented within the local municipalities. These functions and aspects can be outsourced, but it is envisaged that people be appointed within the areas to assist with the development of programmes and campaigns since they will be directly involved in the daily issues of waste management. It is also proposed that the local municipalities establish partnerships with contractors for the establishment of buy-back centres. Separation at source should also be investigated to establish its feasibility. Thereafter, pilot projects should be initiated in certain suburbs of the municipality and progressively extend it to the other suburbs. There is no single best approach but instead a variety of approaches are needed to reduce waste generation. Educational initiatives, at-home composting, unit-based pricing, and materials exchange and reuse programs are the most common waste minimisation programmes practiced in general. However, a growing number of local governments are expanding their

programs to include on-site technical assistance to businesses, economic and policy incentives and in-house source reduction policies. Spending money to change the way the community thinks so that waste minimisation becomes a voluntary way of life for everyone always works out cheaper than money spent to enforce such practices on an ignorant community.

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