Economic instruments for solid waste management in South Africa: Opportunities and constraints

Abbreviated running head: Economic instruments for solid waste management in South Africa

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Abstract

This paper presents results from a survey of waste management authorities aimed at identifying the opportunities and constraints associated with implementing economic instruments (EIs) for solid waste management (SWM) in South Africa (SA). Almost all respondents felt that EIs could lead to reduced waste generation and increased diversion of waste from landfill to recycling, and that they should eventually be implemented in the field of SWM in SA, although opinions varied as to the appropriate timeframe for implementation. The general consensus was that a number of fundamentals had to be in place first, including promulgation of the pending Waste Management Bill, political will, education and awareness, capacity and infrastructure development, cost recovery in waste management practices, and enforcement of existing instruments, such as the Minimum Requirements for landfill design and operation. Furthermore, if and when EIs are implemented, institutional limitations must be taken into account in their selection, design and implementation.

Keywords

Economic instruments; solid waste management; South Africa; product taxes; deposit-refund schemes; quantity-based charges

1 Introduction

Environmental problems, including those related to solid waste management (SWM), have traditionally been addressed using command and control (CAC) regulations, which regulate behaviour directly by prescribing specific legislation and standards which must be achieved, and enforcing compliance through the use of penalties and fines (Perman et al., 2003). By contrast, economic instruments (EIs), such as environmental taxes and subsidies, seek to change behaviour indirectly; by changing the relative prices (and hence incentives) that individuals and businesses face. In the context of SWM, they provide incentives for waste generators (producers and consumers) and service providers to reduce waste generation and to seek alternatives to final disposal to landfill (such as re-use, recycling or recovery[1]) (Inter-American Development Bank, 2003). Examples of EIs that can be used for SWM include product and input taxes, deposit-refund schemes, and quantity-based waste collection charges[2], summarised in Table 1.

EIs have grown in importance in developed countries since the 1980s, where experience has shown that they can be highly effective in achieving environmental objectives, such as reducing waste generation or diverting waste from disposal to recycling, provided that adequate enforcement mechanisms are in place (Forum for Economics and the Environment, 2002; United Nations Environment Program, 2005). There has also been growing interest in the use of such instruments in developing

[1] For convenience, 'recycling' hereafter generally refers to re-use and recovery as well as recycling

[2] We focus on these 3 instruments as they are relatively simple to understand and seem relevant to the South African context. Other EIs that can be used for SWM include subsidies, trading schemes (such as tradable recycling obligations and tradable landfill quotas), and extended producer responsibility. Research regarding implementation of the latter in South Africa is currently underway (Nahman, 2009).

countries, where they appear to have some important advantages over CAC (Pearce and Turner, 1994; Bell and Russell, 2002; Inter-American Development Bank, 2003). These include cost effectiveness, promotion of economic efficiency, incentives for innovation, the potential for self-regulation, and the potential for revenue generation. Revenues can be used in various ways, such as to finance related environmental expenditures (such as improved waste management services in the case of SWM) or policies (such as subsidies), or to reduce distortionary taxes elsewhere in the economy, such as on labour, thereby generating a 'double dividend' (National Treasury, 2006).

Nevertheless, implementation of EIs imposes high administrative demands (Pearce and Turner, 1994; Inter-American Development Bank, 2003) and requires the fulfilment of a number of pre-conditions, These include well-functioning markets (Inter-American Development Bank, 2003); adequate institutional capacity in terms of acquiring relevant information, monitoring compliance and illegal activities, and enforcement (United Nations Environment Program, 2005); and political will, particularly given the likelihood that many EIs (particularly taxes and charges, which may impact negatively on competitiveness and equity) will be politically unpopular. These conditions are unlikely to be fulfilled in many developing countries (Bell and Russell, 2002; Russell and Vaughan, 2003), where CAC mechanisms therefore continue to dominate environmental policy, including SWM. It is therefore important to assess the extent to which these conditions hold in a particular developing country context before considering the implementation of EIs.

This paper presents preliminary results from interviews conducted with municipal waste management authorities in South Africa (SA) aimed at identifying the opportunities and constraints associated with implementing EIs in the solid waste sector, focusing on product and input taxes, quantity-based user fees, and deposit-refund schemes. It is based on a study conducted by the Council for Scientific and Industrial Research (CSIR) during 2007/08 (Nahman and Godfrey, 2008a; b; c). Section 2 describes the South African context, while Section 3 briefly describes the survey methodology. Section 4 presents the results of the interviews, while Section 5 concludes and provides recommendations for further research and for policy.

2 SA context

The diversion of waste from landfill and the associated increase in waste recycled is a national policy objective under the White Paper on Integrated Pollution and Waste Management (Department of Environmental Affairs and Tourism, 2000), the National Waste Management Strategy (Department of Environmental Affairs and Tourism, 1999) (NWMS) and the pending Waste Management Bill (Department of Environmental Affairs and Tourism, 2006). International experience has shown that such objectives can be achieved through the use of EIs.

The NWMS invokes the Polluter Pays Principle (PPP). In the context of solid waste management, the PPP implies that all waste generators, including households and companies, are responsible for paying the costs associated with the waste they generate. These include not only the direct costs associated with the safe collection, treatment and disposal of waste; but also the external costs (externalities) of waste

generation and disposal, such as health and environmental damages (Department of Environmental Affairs and Tourism, 1999).

The NWMS states that the PPP can be implemented either through command and control regulations, or economic instruments. However, although taxes and charges exist in the transport, energy, water and waste management sectors, CAC mechanisms still dominate environmental policy in SA, including SWM, with government relying on public provision of waste management services and regulatory instruments to deal with the problems arising from waste generation and disposal (Pearce and Turner, 1994; National Treasury, 2006; Godfrey and Nahman, 2007; 2008).

Currently, the only product tax in SA with explicit environmental objectives is the plastic bag levy, although there is also a proposed levy on tyres and potential for the expansion of product taxes to such items as packaging, batteries, and electronic equipment (National Treasury, 2006). There are also a number of industry-initiated buy-back and deposit-refund schemes in SA, relating largely to glass and plastic beverage containers and steel beverage cans (see Nahman, 2009, forthcoming). Again, these can potentially be expanded to include other products (National Treasury, 2006). Finally, charging for waste collection in SA varies widely between municipalities (National Treasury, 2006), so the extent to which municipalities use true quantity-based charging (based on the actual weight or volume of waste generated) is not clear, and indeed is one of the questions investigated in this research.

Even where they exist, EIs in SA tend to be ineffective because they are typically used for cost-recovery or revenue-raising purposes, rather than as incentives for

changing behaviour. There is generally a trade-off between these two outcomes, because taxes that are effective in changing behaviour will erode their own tax base to some extent; while taxes that are effective in raising revenue imply little change in behaviour.

Furthermore, the revenue generated is generally channelled towards general government funds rather than used to finance environmental expenditure. According to the Department of Finance (National Treasury, 2006), earmarked taxes reduce transparency, increase the scope for special interest groups to capture revenue, and create rigidities, resulting in an inappropriate allocation of resources. Treasury therefore does not allow revenue from environmental taxes to be earmarked for environmental expenditures, arguing that government spending decisions should be separated from revenue collection, via the normal fiscal budget process (National Treasury, 2006). Thus, for example, revenue from SA's plastic bag levy has gone into general government funds rather than being used to finance recycling of plastic bags, which was its intended purpose (Gosling, 2006). A compromise may be to use 'soft' or 'partial' earmarking, whereby "revenues will flow via the fiscus with the provision that special consideration be given to fund certain activities but with no fixed commitment to allocate all the revenues from a specific source to such activities" (National Treasury, 2006:105).

3 Materials and methods

The research was guided by the following key questions:

1. What is the current status of solid waste management services among South African municipalities?
2. What is the status quo with respect to charging for waste collection services?
3. Is there a need for EIs to be implemented in the field of SWM in SA?
4. Over what time frame should they be implemented?
5. Which actors (producers, households, municipalities or private waste management companies) and which waste streams should EIs seek to target?
6. Should EIs aim to change incentives or to generate revenue, or both?
7. What should be done with the revenues that are generated, and how should they be channelled toward this use (i.e. full, partial or no earmarking)?
8. What are the opportunities associated with implementing EIs for SWM in SA?
9. What are the constraints?
10. Which specific instruments are likely to be appropriate?

In order to answer these questions, face-to-face and telephonic semi-structured (questionnaire-based) interviews were conducted with representatives from municipalities and private waste management companies across South Africa between October and December 2007.

A total of 18 individuals from 13 municipalities and two private waste management companies were sampled. It is acknowledged that 13 municipalities out of a total of 283 does not provide statistical representation. However, it was not the intention of this study to interview all municipalities, but instead, through purposive sampling, to gauge the opinions of a selected set of key role players in the solid waste industry. The distribution of municipalities and companies interviewed by type and location is

shown in Table 2. Greater emphasis was placed on urban local municipalities, as these typically face the largest volumes of domestic, commercial and industrial waste generation.

Copies of a summary report on economic instruments for SWM (Nahman and Godfrey, 2008c), as well as the survey questionnaire (see Appendix A), were distributed prior to the interviews. Interviewees were encouraged to read the report and begin responding to the questionnaire prior to the interview. During the interview itself, interviewees were presented with a brief summary of the broad instrument categories and the issues involved (depending on their level of prior knowledge), after which semi-structured discussions were held based on the questionnaire. Interviewees were also encouraged to raise other issues not dealt with in the questionnaire. Interviewees were then asked to complete the questionnaire (either during the interview or in their own time if necessary), and to provide information regarding their waste collection tariffs and landfill tipping fees (where applicable). To ensure accuracy in capturing the information provided in the interview, certain interviews were recorded (with permission from the interviewee). Where interviewees did not provide completed questionnaires, the notes and recordings from the interviews were used to complete outstanding questionnaires. In this way, a complete questionnaire was available for each interview. All interviewees were guaranteed confidentiality.

4 Results and discussion

4.1 Status quo with respect to waste management services

Ninety-three percent of the municipalities and private companies interviewed provide domestic waste collection services at the kerbside; while 67% provide communal waste collection services. 93% also provide commercial waste collection services. 87% operate landfill sites, while in another case operation of the landfill site is left to private contractors. 47% provide some type of recycling facility (such as a buy-back centre or transfer station); while a further 20% have a recycling facility in the planning or implementation phase. Finally, other services provided include incineration (in one case), composting, street cleaning, and removal of illegally dumped waste.

4.2 Status quo with respect to charging for waste collection services

In terms of charges for waste collection, 7% of the municipalities and companies interviewed do not charge for waste collection at all, 13% use fixed rates, 73% base charges on the number of containers collected and on the frequency of collection, while only 7% use a true quantity-based charge based on the actual weight or volume of waste collected. Of those basing their charges on the number of containers collected, only 18% use a unit of one 85 litre bin; while 82% use a unit of one 240 litre 'wheelie' bin, or between two and four 85 litre bins or bags, or part thereof. These cannot be considered true quantity-based charges in an economic sense, because waste generators are charged the same amount irrespective of how full the bins are, or how many bags (within the prescribed limit) are collected; such that there is still no incentive to reduce waste generation at the margin (Fullerton and Walls, 2007). There have been some proposals for municipalities to move toward a weight-based charging system, although such a system requires fairly sophisticated

equipment and monitoring capabilities that are currently beyond the scope of most municipalities in SA (Coetzee, 2007).

4.3 Opinions regarding the need for EIs for SWM in South Africa

Ninety-four percent of the individuals interviewed felt that EIs should be implemented in the field of SWM in South Africa, with only 6% unsure. However, respondents also acknowledged that much could be gained through other measures, such as privatisation of waste management services, provision of kerbside collection of recyclables, ensuring cost recovery in waste management services (particular in landfill operation), and enforcing existing command and control instruments (such as the Minimum Requirements for landfill design and operation (Department of Water Affairs and Forestry, 1998), without the need to resort to EIs.

For example, while thirty-three percent of respondents saw recycling as the functional responsibility of municipalities, 28% thought that it should be left to private companies, and another 28% believed that both should play a role. Furthermore, seventy-two percent of respondents thought that recyclables should be collected at the kerbside, while 20% thought that this would be ideal but not necessarily realistic. Only 13% were against the idea of kerbside pickup. Of those favouring kerbside pickup, 50% felt that this service should be rendered by private companies, while the other 50% thought that either municipalities or private companies could render the service (depending on costs and on the capacity of the municipality concerned), or that both have an important role to play in providing the service. Many municipalities expressed the view that while they should not be responsible for the actual collection,

they should be responsible for creating an enabling environment within which a kerbside collection service could be rendered by the private sector. Finally, of those in favour of kerbside collection, 75% thought that this should be enforced through legislation.

In addition, 27% of the municipalities and companies interviewed don't charge for entry to the landfill site at all[3]. Furthermore, of those that do charge for landfill disposal, only 45% are able to recover even the direct operational costs of landfill operations, let alone the external costs (e.g. health, social and environmental costs, and costs associated with the scarcity of landfill airspace)[4]. Landfill charges are generally set at levels too low to cover operational costs, such that there is no incentive to seek alternatives to landfill disposal (such as recycling).

Thus, simply increasing landfill charges to reflect operational costs would go a long way toward providing an incentive to seek alternative options, making recycling and reuse a naturally attractive alternative. Thereafter, if necessary, external costs could be addressed, perhaps by means of an environmental tax on landfill disposal. However, such an approach needs to be combined with education and awareness campaigns, as well as increased monitoring, to mitigate the resultant risk of increased illegal dumping

4.4 Time frame over which EIs should be implemented

[3] This figure would be significantly higher if more rural municipalities were included in the sample, since many of these municipalities do not charge for disposal due to infrastructure or capacity limitations, and fear of increased illegal dumping.

[4] Indeed, none of the municipalities interviewed claimed to cover external costs in their waste collection or disposal fees, although one claimed to be looking into this issue.

Opinion varied as to the time frame over which EIs should be implemented. 61% of respondents felt that at least some instruments, or some aspects of economic instruments, could be implemented over the short term (0-5 years), with only 33% arguing that EIs should only be implemented in the medium term (5-10 years); and only 6% arguing that they should only be implemented in the long term (over 10 years). 22% of respondents argued that different EIs, or different aspects of EIs, should be implemented over different time frames. This result reflects the urgency of the need to address recycling in South Africa, together with the reality of the constraints facing local government with respect to waste management.

4.5 Target for economic instruments

Respondents were also asked who they believe should feel the impact of EIs in SA; i.e. whose incentives (and hence behaviour) should be changed. Respondents were given the choice to select more than one option. Seventy-eight percent of respondents felt that households should bear some of the burden of EIs; while 89% believed that producers should bear some of the burden, since they are ultimately responsible for producing waste. Forty-four percent of respondents felt that private waste companies should bear some of the burden, and similarly for municipalities.

In terms of which waste streams should be targeted through EIs, 83% of respondents thought that one or more of the various waste streams associated with domestic waste were important targets for EIs. More specifically, 67% highlighted recyclables (paper, plastic, glass and metal), 50% construction and demolition waste, and 33% organic wastes as important waste streams to target. Similarly, 83% saw industrial

waste as an important target; while 56% believed that hazardous waste should be targeted, with 17% specifically mentioning electronic waste.

4.6 Purpose of economic instruments: Change behaviour or generate revenue?

All respondents thought that EIs could be effective in achieving some reduction in waste generation or in diverting waste from landfill to recycling. However, only 33% thought that EIs should be implemented with the sole purpose of achieving these outcomes. 11% saw income generation as an important secondary benefit; while 44% saw the two outcomes (changing behaviour and generating income) as equally important. Only 6% thought that income generation should be the main purpose of EIs, while 6% were unsure.

4.7 How revenue should be used

Ninety-four percent of respondents thought that revenue should be reinvested back into waste management activities, or as a second option used to finance complementary waste management policies such as subsidies. The incorporation of income into overall government revenue, or the use thereof to reduce other taxes elsewhere in the economy, were least preferred options. Furthermore, in terms of how revenues should be channelled back toward waste management, seventy-two percent of respondents preferred full earmarking of funds, with 17% preferring partial earmarking, and 11% unsure.

All respondents believed full earmarking to be beneficial to improved SWM, in that it would ensure that revenue is used in the manner intended (e.g. for recycling in the case of the plastic bag levy). In particular, it would allow for improved service delivery and efficiency, increasing capacity, upgrading infrastructure, increased ability to recover costs, prioritisation of waste management activities, and increased enforcement and environmental reporting. However, only 55% of respondents claimed that their organisation or department is currently able to earmark revenues generated from waste management; 28% are not; and 17% are only able to do so partially, or some of the time, or were unsure.

4.8 Opportunities associated with implementing EIs for SWM in SA

Respondents saw a variety of opportunities associated with implementing EIs for SWM in SA. As mentioned above, all respondents thought that EIs could reduce waste generation or divert waste from landfill to recycling. Other opportunities mentioned by respondents included

- the potential of EIs to reduce the need for landfill space and prolong the lifespan of landfill sites;
- their potential to stabilise prices of recyclables and thus stimulate and stabilise viable and sustainable markets for recyclables;
- the socio-economic benefits associated with recycling, such as local economic development and the creation of job opportunities in the recycling market;
- improved environmental awareness; skills and technology development;
- the potential to encourage private investment; and

- the potential efficiency gains associated with municipal waste management departments being run more like businesses.

4.9 Constraints to implementing EIs for SWM in SA

A large number of obstacles to the implementation of EIs for SWM in SA were mentioned by respondents. First, closed questions were asked relating to whether SA's policy framework, perceptions regarding the importance of addressing waste management problems, and capacity at national and local government levels, were seen as obstacles (see Table 3). The policy framework was not generally seen as a constraint (row 1); 61% of respondents thought that EIs could be easily integrated into SA's policy framework, at least once the pending Waste Management Bill is enacted, which would provide the necessary enabling legislation or legal framework within which EIs could be added as regulations.

However, 61% of respondents thought that waste was not seen as being of sufficient priority for implementation of EIs (row 2). When asked an open question regarding obstacles to the implementation of EIs, 22% of respondents specifically mentioned lack of political will, while 39% cited lack of education and awareness among the public as to the importance of environmental and waste management. 72% mentioned raising awareness and changing mindsets, e.g. through environmental and waste education or advertising campaigns, as a fundamental precursor to the implementation of EIs, or as being a necessary complement to the implementation of EIs, or even as being a key instrument in its own right.

Finally, lack of capacity at both national and local levels were seen as constraints (rows 3 and 4); although, again, some respondents argued that the Waste Management Bill would provide an enabling environment for enforcement at the national level, or that capacity at the local level could be developed if more funding could be secured.

Other issues raised by respondents included:

- the need to create an enabling environment, including infrastructure (e.g. provision of bags and drop-off centres, or even kerbside pickup, for recyclables);
- the difficulty of monitoring waste generators due to the lack of waste licensing and waste data (e.g. due to lack of a waste information system and of other key data such as waste volumes, landfill life-spans and data on indigents);
- low prices of recyclables, which makes recycling an unattractive alternative;
- the lack of uniformity and stability in the prices of recyclables (and hence in the market for recyclables);
- the costs associated with transport, monitoring and enforcement;
- lack of access to basic waste services;
- difficulties associated with the enforcement of new policies;
- lack of staff (particularly skilled staff), funding, vehicles, and other necessary resources;
- the budgeting process, which makes it difficult for municipal waste management departments to re-invest revenues into improved waste management;
- the complicated nature of these instruments, especially in light of the current inability of many municipalities even to deal with basic billing and cost recovery issues); and

- in some cases, the lack of integrated waste management plans and implementation thereof at the municipal level.

Finally, a number of potential problems were mentioned with regard to specific instruments. In the case of product taxes and quantity-based charges, concerns were raised regarding the impact of such taxes or charges on the poor and on business (and therefore the possibility of resistance to the instruments from communities and businesses); and as to how revenues generated from taxes and charges will be used (e.g. the case of the plastic bag levy). In the case of quantity-based charges specifically, concerns were raised regarding possible incentives for illegal dumping created by such charges; the additional data requirements, complexities and costs associated with monitoring and billing (adequate waste data and monitoring/billing capacity are already severely lacking); and regarding the need to change the mindset that waste services should be free.

4.10 Most appropriate EIs for the SA context

Finally, respondents were asked to rate how effective they believe each of the three EIs would be in reducing waste generation and diverting waste from landfill to recycling. On average, deposit-refund schemes achieved the highest rating, followed by quantity-based charges, and product taxes. Seventy-five percent (75%) of respondents rated deposit-refund schemes as being effective or very effective, while 65% rated quantity-based charges in this way, and 63% product taxes.

5 Conclusions and recommendations

The findings of this study show that implementing economic instruments for solid waste management is a complex issue that must take cognisance of local conditions and needs. In a survey of waste management authorities from municipalities and private companies across South Africa, almost all respondents felt that EIs could lead to reduced waste generation and increased diversion of waste from landfill to recycling, and that they should eventually be implemented in the field of SWM in SA, although opinions varied as to the appropriate timeframe for implementation. The general consensus was that a number of fundamentals had to be in place first, including:

- promulgation of the Waste Management Bill, which will create an enabling environment for enforcement and provide a legal framework within which EIs can be implemented;
- political will (waste management must be seen as a priority at all levels of government);
- education and awareness (waste management must be seen as a priority among business and communities, to encourage waste minimisation and recycling and to enable acceptance of instruments);
- development of capacity at all levels of government (for administration, monitoring and enforcement of instruments and of illegal dumping, and billing for services to enable cost recovery);

- increased access to resources for waste management departments (to allow for development of capacity, recovery of costs, and improved waste management services);
- waste licensing and data (e.g. through a waste information system);
- infrastructure for extension of basic waste services, improvement in existing services, and to enhance the convenience of recycling (e.g. drop-off centres, possibility of kerbside pickup, etc); and
- enforcement of basic waste management practices, including cost recovery, and of existing command and control instruments, such as the Minimum Requirements for landfill design and operation, which would result an increase in landfill charges, making recycling a more attractive option.

Thus, it may not be appropriate to push for sophisticated EIs before these fundamentals are in place. Furthermore, if and when they are implemented, institutional limitations must be taken into account in their selection, design and implementation. In this study, respondents indicated concern with the lack of monitoring and enforcement capacity at municipal level, especially for the billing of waste services and the monitoring of illegal dumping in the case of quantity-based waste collection charges. This implies that simpler instruments that are more easily enforced and that don't create incentives for illegal dumping, e.g. product taxes and deposit-refund schemes, should be preferred over quantity-based charges. Many respondents also raised concerns regarding the negative impacts of taxes and charges on the poor and on business, implying that revenue-providing or revenue-neutral instruments, such as subsidies or deposit-refund schemes, have advantages. At the same time, however, a definite need was expressed for increased funding, such that

revenue-generating instruments like taxes and charges may be important mechanisms. However, concerns were raised regarding the extent to which any revenues generated could actually be re-invested into waste management. All respondents wanted to see revenues reinvested in SWM, and 72% preferred full earmarking as opposed to partial earmarking or no earmarking.

Furthermore, policy should be designed in such a way that instruments are implemented incrementally, beginning with relatively simply instruments and becoming increasingly sophisticated as institutional capacity grows (Pearce and Turner, 1994; Bell and Russell, 2002; Russell and Vaughan, 2003). Components of EIs could be implemented as part of an integrated waste management framework in progressively more institutionally-demanding stages, with the focus on gradually developing capacity (Pearce and Turner, 1994; Bell and Russell, 2002; Russell and Vaughan, 2003). It is also important to develop a culture of compliance whereby compliance becomes the norm and illegal dumping becomes socially unacceptable (Russell and Vaughan, 2003). For example, to start with, it is likely to be easier to place a tax on products at the point of manufacturing or sale, or to monitor waste entering landfill sites or generated by large producers; rather than attempting to monitor the quantity of waste generated by individual households, as well as illegal dumping. It may also be possible to implement deposit-refund schemes, or expand existing schemes to cover other types of products (Bell and Russell, 2002). However, as monitoring capacity and a culture of compliance develops, it will eventually become easier to monitor household waste generation, while (ideally) avoiding having to deal with illegal dumping.

Based on the findings to date, further research is now required regarding the *design* of instruments that take developing country circumstances (including monitoring and enforcement capabilities) into account and that can develop over time as capacity grows. A broader survey of municipalities and private waste companies would also be beneficial to verify the preliminary results obtained to date.

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Appendix A: Questionnaire

The following questions have been drafted to allow persons from government and private waste companies the opportunity to provide their personal opinions on the use of economic instruments in managing waste in South Africa.
This questionnaire is completely confidential

Name: …… **Municipality / Company**: ……

Telephone: …… **Email**: ……

SECTION 1

Status quo with respect to ***waste management services*** (collection, disposal and recycling)

1. Type(s) of waste service rendered by your municipality / company (*multiple can be selected*):

❑ domestic waste collection (kerbside)	❑ domestic waste collection (communal)	❑ recycling facility (buy-back centre / transfer station)
❑ commercial waste collection	❑ landfill site operation	❑ other

If other: ……

2. Do you see recycling as the functional responsibility of the municipality ?	❑ Yes	❑ No

3. Should recyclables be collected at the kerbside (households) ?	❑ Yes	❑ No

4. If yes to Question 3, should kerbside collection of recyclables be rendered by -

❑ the municipality	❑ private waste companies	

5. Should kerbside collection of recyclables be enforced through legislation	❑ Yes	❑ No

SECTION 2

Status quo with respect to charging for ***waste management*** (collection, disposal and recycling)

6. Does your organization currently charge for rendering a waste service?	❑ Yes	❑ No

** Request for information - Please could you provide your current waste collection tariffs and tipping fees*

7. If yes to Question 6, how does your organization currently charge for waste <u>collection</u>?

❑ fixed municipal tariff (rates and taxes)	❑ charge per number of containers serviced
❑ variable municipal tariff (rates and taxes) – varying based on ……	
❑ charge per quantity of waste generated	❑ other

If other: ……

8. Do you recover your full operational costs for waste <u>collection</u> through the charges?	❑ Yes	❑ No

9. How does your organization currently charge for waste disposal?

❑ do not charge for disposal	❑ fixed tipping fee (at landfill)
❑ variable tipping fee (at landfill) – varying based on ……..	
❑ other ……	

If you do not charge for disposal, why not? ……
……
……

10. Do you recover your full operational costs of landfilling through the charges?	❑ Yes	❑ No

11. Do you recover external (social or environmental costs) through the waste charges?	❑ Yes	❑ No

SECTION 3

This section is aimed at capturing opinions on the need for ***economic instruments*** in South Africa

12. Can economic instruments change the way waste is managed in South Africa? i.e. reduce waste generation, reduce disposal and increase recycling	❑ Yes	❑ No

If not, why not ?……
……

13. Should economic instruments be implemented in South Africa?	❑ Yes	❑ No

14. If yes to Question 13, within what timeframe should economic instruments be implemented?	❑ Short-term (0-5 years) - now	❑ Medium-term (5-10 years)	❑ Long-term (+10 years)

15. If yes to Question 13, should economic instruments be implemented in South Africa principally to –

❑ Generate income	❑ Change human behaviour

16. If yes to Question 13, who should feel the effect or impact of economic instruments in South Africa –

❑ general public (consumers, waste generators)	❑ industry (producers)
❑ private waste companies	❑ municipalities

17. If yes to Question 13, what specific waste stream(s) would you want to target with economic instruments?

❑ domestic waste ❑ organic waste (food, garden) ❑ construction & demolition waste (building) ❑ recyclables (paper, plastic, glass, metal)	❑ industrial waste
	❑ hazardous waste
	❑ other ……

18. Do we need to change relative prices of goods and waste services through economic instruments, or is there a 'more natural' way to reduce generation, reduce disposal and increase recycling? ……
……
……

SECTION 4

This section is aimed at capturing opinions on the handling of ***income*** generated from economic instruments

19. There are a number of options for dealing with income generated from EIs (rank from 1-4 in order of preference of how you believe the income generated should be used)

	Income incorporated into overall government revenue
	Income used to offset other e.g. taxes (possible non-environmental) (tax neutral)
	Income reinvested into waste management activities
	Income used to finance other complimentary waste management policies

* Where (1) highest preference, and (4) lowest preference

20. If income is used for a particular purpose (e.g. reinvested in waste activities, finance complementary policies) how do you think it should be allocated?

❑ Full earmarking (sector/organisation has complete control over income generated)	❑ Partial earmarking (sector/organisation applies for funds through normal budget process)

21. Is your organisation able to ring-fence income generated through waste ?	❑ Yes	❑ No

22. Do you believe ring-fencing of income is beneficial to managing waste ?	❑ Yes	❑ No

Why ……..……..…….

……..……

SECTION 5

This section is aimed at capturing opinions on the obstacles and opportunities of implementing ***economic instruments*** in South Africa

23. Does government have the necessary enforcement required to implement economic instruments in South Africa?	❑ Yes	❑ No

24. Can economic instruments be easily integrated into existing policy & practice in SA?	❑ Yes	❑ No

25. Is waste of sufficient priority in South Africa / your municipality to enable implementation of economic instruments?	❑ Yes	❑ No

26. Does your organisation have the required capacity to implement economic instruments?	❑ Yes	❑ No

27. <u>Rate</u> (on a scale of 1-5) how effective you believe the 4 listed economic instruments could be in achieving the overall objectives of reduced waste generation and disposal, and increased recycling, in SA?

Economic Instrument	Overall instrument effectiveness				
	Very well		Neutral		Very poorly
Product / input tax	1	2	3	4	5
Quantity-based charge	1	2	3	4	5
Subsidy / credit	1	2	3	4	5
Deposit-refund	1	2	3	4	5

* Rating scale (1-5) - Where instrument would perform (1) very well, (2) well, (3) neutral, (4) poorly, (5) very poorly

28. What do you see as being some of the obstacles to implementing economic instruments in South Africa?

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29. What do you see as being some of the opportunities of implementing economic instruments in South Africa?

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30. What specific economic instruments are you aware of (either locally or internationally)?

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References

Bell, R. G. and Russell, C., 2002. Environmental policy for developing countries. Issues in Science and Technology, 18(3): 63-70.

Choe, C. and Fraser, I., 1998. The economics of household waste management: A review. The Australian Journal of Agricultural and Resource Economics, 42(3): 269-302.

Coetzee, B., 2007. Personal Communication. Cape Town.

Department of Environmental Affairs and Tourism. 1999. National waste management strategy. Version D. http://www.deat.gov.za/ProjProg/WasteMgmt/waste.html.

Department of Environmental Affairs and Tourism, 2000. White paper on integrated pollution and waste management for South Africa: A policy on pollution prevention, waste minimisation, impact management and remediation. Government Gazette No. 20978. Pretoria.

Department of Environmental Affairs and Tourism. 2006. Draft national environmental management: Waste management bill. www.cameroncross.co.za/modules.php?op=modload&name=Downloads&file=index&req=getit&lid=79

Department of Water Affairs and Forestry, 1998. Waste management series: Minimum requirements for waste disposal by landfill. Department of Water Affairs and Forestry, Pretoria.

Forum for Economics and the Environment. 2002. Training manual for the Forum for Economics and the Environment. http://www.econ4env.co.za/training/training.html.

Fullerton, D. and Walls, M. 2007. Trash Talk. RFF Weekly Policy Commentary, http://www.rff.org/rff/News/Weekly_Policy_Commentary/11_30_07_FullertonWalls_Commentary.cfm.

Godfrey, L. and Nahman, A., 2007. Are developing countries ready for first world waste policy instruments. Eleventh International Waste Management and Landfill Symposium, S. Margherita di Pula, Cagliari, Italy, 1 - 5 October 2007. CISA, Environmental Sanitary Engineering Centre, Italy.

Godfrey, L. and Nahman, A., 2008. Are economic instruments the solution to sustainable waste recycling in South Africa? 9th Bi-ennial Waste Conference, Durban, South Africa, 6-10 October 2008.

Gosling, M. 2006. Plastic bag levy: money for nothing? , http://www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20061108014812809C249725.

Inter-American Development Bank, 2003. Economic instruments for solid waste management: Global review and applications for Latin America and the Caribbean. Washington, D.C. Inter-American Development Bank

Nahman, A., 2009. Extended producer responsibility for packaging waste in South Africa: Current approaches and lessons learned. Forthcoming.

Nahman, A. and Godfrey, L., 2008a. Economic instruments for solid waste management in South Africa: A literature review. CSIR/NRE/RBSD/IR/2008/0049/C. Pretoria. Council for Scientific and Industrial Research

Nahman, A. and Godfrey, L., 2008b. Economic instruments for solid waste management in South Africa: Opportunities and constraints to implementation. CSIR/NRE/RBSD/IR/2008/0046/C. Pretoria. Council for Scientific and Industrial Research

Nahman, A. and Godfrey, L., 2008c. Economic instruments for solid waste management in South Africa: Summary report. CSIR/NRE/RBSD/IR/2008/0050/C. Pretoria. Council for Scientific and Industrial Research

National Treasury, 2006. A framework for considering market-based instruments to support environmental fiscal reform in South Africa. Pretoria. National Treasury

Pearce, D. and Turner, R. K., 1993. Market-based approaches to solid waste management. Resources, Conservation and Recycling, 8: 63-90.

Pearce, D. and Turner, R. K., 1994. Economics and solid waste management in the developing world. CSERGE working paper WM 1994-05. Centre for Social and Economic Research on the Global Environment

Perman, R., Ma, Y., McGilvray, J. and Common, M., 2003. Natural resource and environmental economics. Pearson Education, Harlow.

Reschovsky, J. D. and Stone, S. E., 1994. Market incentives to encourage household waste recycling: Paying for what you throw away. Journal of Policy Analysis and Management, 13(1): 120-139.

Russell, C. S. and Vaughan, W. J., 2003. The choice of pollution control policy instruments in developing countries: Arguments, evidence and suggestions. International Yearbook of Environmental and Resource Economics. Edward Elgar, Cheltenham, U.K. VII.

United Nations Environment Program. 2005. Solid waste management. http://www.unep.or.jp/ietc/Publications/spc/Solid_Waste_Management/index.asp.

Tables

Table 1. Examples of economic instruments for solid waste management

Instrument	Incentives provided	Applications	Implementation
Product & input tax	Increase prices of environmentally significant products or inputs so as to reduce consumption/use thereof, thereby reducing waste generation	Tyres, motor vehicles, batteries (particularly car batteries), non-recyclable containers (plastic, glass, metal and paper; particularly non-returnable beverage containers), non-biodegradable plastic bags (e.g. Ireland, Italy, South Africa), virgin materials (e.g. U.K. Aggregates levy), lubricant oils, and fuels	Generally applied at a state or national government level
Deposit-refund scheme (essentially a product tax combined with a subsidy)	Deposit is paid upon purchase (thereby providing similar incentive effects as product tax) and is refunded upon return of the used product or packaging for recycling or re-use, thereby providing an incentive to return recyclable or reusable items rather than throw them away	Glass and plastic beverage containers and steel beverage cans (various countries, including SA); batteries; tyres, and even cars (e.g. in Sweden and Norway)	Can be implemented by either the private or public sector, or through some form of joint private and public sector partnership
Quantity-based waste collection charges	Put a price on each unit of waste collected for disposal to landfill, so as to provide incentive for the household to reduce the amount of waste generated or put out for collection, and to seek alternatives such as recycling or re-use	Volume or weight-based waste collection charges have been used by some municipalities in Switzerland (and some other European countries), South Korea, the United States, Canada and Australia	Usually applied at the local (municipal) government level

Sources: (Pearce and Turner, 1993; Reschovsky and Stone, 1994; Choe and Fraser, 1998; Forum for Economics and the Environment, 2002; Inter-American Development Bank, 2003; United Nations Environment Program, 2005).

Table 2. Distribution of municipalities/companies interviewed by type and location

Type of municipality/company		Location	
District municipality	13%	Urban	67%
Local municipality	60%	Rural	13%
Metropolitan municipality	13%	Mixed urban/rural	20%
Private company	13%		

Table 3: Obstacles to implementation of economic instruments for SWM in SA

Question	Yes	No	Unsure	Other
Can EIs be easily integrated into the SA policy framework?	39%	22%	17%	When Waste Bill is enacted 22%
Is SWM seen as being of sufficient priority for implementation of EIs?	22%	61%	0%	Not yet but starting to become so 17%
Does government have the necessary enforcement capacity for EIs?	6%	83%	6%	When Waste Bill is enacted 6%
Does your organisation or municipality have the required capacity for EIs?	22%	50%	11%	Not yet but can be developed 17%