



## **Zero Waste SA Explanatory Paper Benefit–Cost Analysis of South Australia’s Waste Strategy 2005-2010**

Waste is damaging to the healthy environment on which our society and economy depend. Wasteful consumption and disposal habits are not sustainable because there are limits to the earth’s natural resources. The extraction, processing, manufacturing and distribution of products all contribute to climate change and biodiversity collapse, which are shaping to be among the greatest challenges facing this and future generations.

The way South Australians deal with the waste generated through their consumption, manufacturing and processing patterns will have a direct bearing on our capacity, and that of future South Australians, to live sustainably. We recognise this as a community and increasingly demand improved waste management and recycling services.

*South Australia’s Waste Strategy 2005–2010*, the State’s first waste strategy, sets out five key objectives for diverting waste from landfill and increasing recycling. *South Australia’s Strategic Plan* also requires that the State reduce waste to landfill by 25% by 2014.

The benefits and costs of these strategies had not been quantified. Therefore Zero Waste SA commissioned a consortium of consultants comprising McLennan Magasanik, BDA and Econsearch to project the likely benefits and costs from implementing the objectives and delivering on the targets of the Waste Strategy.

The consortium was commissioned to determine:

- whether there is a net environmental, social and economic benefit of implementing South Australia’s Waste Strategy 2005-2010
- how Zero Waste SA can improve its net benefit position by adjusting its program and policy mix (e.g. is it better to invest more in education or infrastructure incentive programs?)
- the distribution of benefits and costs (winners and losers) of implementing the Waste Strategy.

The consortium delivered its findings in two reports:

- a summary report briefly outlines the methodology, key findings of the study and implications for South Australia
- a technical report, providing more detail on how the projections and findings were calculated.

This Zero Waste SA explanatory paper aims to introduce the reader, who may not be familiar with economics, to both the findings and limitations associated with this type of study.

## **Language of economics**

The report presents the results of complex economic modelling. Like all economic assessments of this type, a large number of assumptions and data limitations underpin the modelling. The validity of the various assumptions can be disputed and this limitation is discussed in more detail below. The report provides guidance to government policy making and interpretation of the results requires an understanding of the assumptions made.

## **Methodology in brief**

The study uses a material flow model to map waste and material movements including: waste materials generation by sector (e.g. household, commercial, construction and demolition), method of disposal (e.g. landfill, recycling, 'source reduction', illegal dumping) and the destination of recycled products.

The material flow model is then integrated with a financial model that estimates benefits and costs arising from alternative policy settings. The study uses the combined models to analyse a number of policy and program options and for each suite of policies forecasts:

- changes in the volumes of waste generated
- the economic cost to waste generators, handlers and processors and government
- 'upstream' emissions from resource extraction, manufacturing processes (including recycling) and the consumption of goods and services
- 'downstream' emissions from the disposal of wastes to landfill or illegally
- the value and geographical distribution of the benefits or costs to the community.

## **The environmental bottom line**

As the report points out, there is currently no universally supported approach for valuing/aggregating environmental impacts, such as biodiversity and resource conservation, into a dollar value and no mechanism to trade-off economic, environmental and social impacts into a single 'sustainability metric'.

The environmental bottom line is calculated in a two-pronged approach of:

1. providing a conservative economic assessment of the environmental impacts where they impact on wealth (such as emissions that impact on human health).
2. modelling changes in resource and material use in physical terms.

The interpretation of the results must take into consideration the impact of the policy mix on resource savings, not just the financial bottom line.

Note also that the physical and financial results overlap.

## Overview of key findings

- Implementing *South Australia's Waste Strategy* provides a **net economic benefit**. The analysis confirms that it is a good thing – in an economic sense – for South Australia to increase the level of recycling to the target levels outlined in the strategy, even without taking social and broader sustainability issues into consideration.
- Net economic benefits increase significantly for higher values of greenhouse gas emissions (the report assumed a value of \$20/t CO<sub>2</sub> equivalent).
- South Australia is on track to meet the waste strategy targets for commercial and industrial waste and construction and demolition waste but is likely to struggle to meet the municipal solid waste target without further investment in removing food waste from the residual kerbside waste stream.
- Many benefits of implementing the Strategy (e.g. greenhouse abatement and decreasing air emissions) are realised outside of South Australia; most of the costs are incurred within South Australia - however, it is also true in reverse, South Australia benefits from similar efforts elsewhere.

The study also found that Zero Waste SA could improve South Australia's net position by:

- further investments in infrastructure and local reprocessing to help counter the high costs of transporting materials interstate and overseas
- assisting industry to reduce the cost of sorting recyclable materials and removing contamination from recycled material streams.

## Limitations

### Data availability

In any modelling exercise, the results are only as good as the data that feeds the model. Reliable data on waste and recycling is limited but improving with time. As more reliable data becomes available, the accuracy of modelling will improve.

### Discount rates

As consumers, we would no doubt rather receive a \$100 benefit today, than in 10 years time. Economists use discount rates as a method of adjusting benefits and costs over time so that, if done correctly, a \$100 equivalent benefit is worth the same value to us today as it will be in say 10 years time. This study has used a 6% discount rate which is in-line with conventional economic benefit cost assessment (and South Australian Department of Treasury guidelines for benefit cost assessment). However, some would argue that in quantifying environmental benefits over long periods of time, it is appropriate to use a smaller or zero discount rate.

### Valuing the environment

As noted previously, there is currently no universally supported approach for translating environmental impacts into a dollar value and no mechanism to trade-off economic, environmental and social impacts into a single 'sustainability metric'.

While the results provide a good evaluation of the economic impacts of implementing the waste strategy, it does not provide a mechanism for evaluating policies on the basis of environmental outcomes.

## **Policy analysis**

Many of the policies modelled in the report are underpinned by specific assumptions. Whether these assumptions are reasonable could be a matter of some conjecture in relation to the report. The extent to which using a different range of assumptions would lead to different results is also unknown.

In particular, Zero Waste SA believes that the assumptions used to model the following are worthy of some discussion:

- **Bans on materials to landfill**  
In modelling bans of organic material to landfill, the report assumes that this will increase home composting, lead to all metropolitan councils introducing garden waste collection and centralised processing. The high cost estimate used in the report may overstate the costs of banning organic material to landfill and in doing so may prematurely dissuade further consideration of this policy approach.
- **Extended producer responsibility (EPR)**  
The policy modelled examines a 1% reduction in plastics packaging to landfill through source reduction. It could be argued that EPR policy would have an impact much larger than 1% and would be more likely to be targeted at a broader range of materials including problematic and hazardous wastes.
- **Government procurement program**  
The policy modelled examines benefits to a 30% increase in local recycling rates for paper, and brick and rubble. A whole of government procurement program would be more likely to increase quality and demand for recycled materials and hence lead to increased prices for recycled materials.

## **Where to from here and implications for the Waste Strategy**

The study has highlighted the need for Zero Waste SA to consider alternative methods of making decisions that balance economic, social and environmental considerations. A range of other modelling and policy assessment tools can provide information about the impact of policy and program decisions on environmental and economic outcomes, for example lifecycle analysis; multi-criteria analysis; ecological footprint; and resource accounting for sustainable consumption and production. These are areas for further research and analysis that Zero Waste SA wishes to pursue.

While Zero Waste SA is aware of the limitations of the report and its findings the analysis has highlighted that even when intergenerational equity factors such as resource conservation and biodiversity are not taken into consideration, there is still a net benefit in implementing the Waste Strategy. The analysis has also provided useful information on how Zero Waste SA can improve net benefits to South Australia.

Zero Waste SA has already started using the information from this analysis to design better, more targeted programs and policies. The findings will also be used in the review of the Waste Strategy in 2008-09. As emphasis shifts up the waste hierarchy from recycling to resource efficiency, reuse and reducing the amount of waste that we generate, the study has also highlighted the need for Zero Waste SA to consider how to measure success beyond waste to landfill.