Submission to the Productivity Commission Inquiry into Waste Generation and Resource Efficiency

Local Government Association of Tasmania

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1. Introduction

The Local Government Association of Tasmania (LGAT) is the peak body for the 29 councils that make up Local Government in Tasmania. LGAT is the voice of Local Government to other governments, interested stakeholders and the wider community. The Association develops and advocates policy positions on behalf of its member Councils. It is concerned with helping Councils to develop waste management practices that realistically reflect community expectations and capacity to pay.

As a community leader, policy maker and service provider, Local Government has a role to play in working with communities to encourage waste management practices that are consistent with their desire to live more sustainably. But this is not solely the responsibility of Local Government. There is certainly a need for policy interventions by the other spheres of government that will improve the ability of Local Government to provide good waste management services and which will help communities to adopt sustainable practices. Incentives or regulatory measures to encourage product stewardship schemes, the removal of institutional and regulatory barriers and public education are some areas where governments can work with producers, manufacturers, importers and consumers to come to terms with their waste management disposal obligations.

This submission can only touch briefly on some of the waste management issues of relevance to Local Government in the context of this Inquiry but is aware other Local Government Associations have provided more detailed submissions. In most cases the issues raised in these submissions are relevant also to Tasmanian Local Government, although perhaps as a small island state, some of problems concerning the location of markets for sustainable resource recovery, economies of scale and transportation costs, could be considered to be more acutely felt. That said, the LGAT submission attempts to address the central issues raised in the Inquiry's Terms of Reference, namely:

What are the economic, environmental and social costs and benefits of waste and waste-related activities?

What are the market failures (including externalities) associated with the generation and disposal of waste?

What strategies should be adopted by government and industry to improve economic, environmental and social outcomes in regard to waste and its management?

Within these broad issues, the submission briefly discusses data collection and performance monitoring; sustainable resource recovery; extended producer responsibility; and public education.

Note: The Association recently produced a study on alternative methods of green waste disposal. The findings of this study, while specifically concerned with green waste, highlight some of the problems Tasmania faces in relation to waste

management generally, particularly in the context of markets and economies of scale. A copy of this study is attached at Appendix 1.

2. Economic, Environmental and Social Impacts on Local Government of Waste Management

Waste management is a significant and often politically divisive issue for Local Government.

The nature of municipal waste has changed dramatically in ways that were not envisaged by the original architects of Local Government waste management systems. There is now a much greater burden placed on Local Government as it attempts to keep pace with escalating government regulation and community expectations in relation to sustainability and the desire for better environmental standards. The growing emphasis on issues such as recycling and resource recovery, effective data collection and measurement, better landfill management and collection of hazardous wastes, coupled with the regulatory imperatives and environmental protection measures developed in response to rising community expectations, are not without their costs. Indeed, municipal waste continues to grow and the cost of waste management services continues to increase. As the major waste management service provider in local communities Local Government is feeling the pressure economically, environmentally and politically.

Paradoxically, the community's demand for improved environmental standards is not necessarily reflected in social trends and patterns of consumption, which are increasing in scale and diversity. Indeed, given the high levels of waste produced in this country, it appears that the costs of disposal are having little impact on the consumption patterns of Australians. This obviously presents Local Government with a dichotomy that is difficult to negotiate both practically and politically. It also underscores the fact that waste issues are inextricably linked to broader social, economic and environmental questions. As such they clearly cannot be solved by Local Government in isolation.

There is certainly a role for the other two spheres of government to invest more heavily in policy development that can help relieve Local Government of some of these pressures. This includes putting in place effective measures, both regulatory and incentive based, to encourage the generators of waste to take more responsibility for what they produce and discard.

3. Data Collection – Performance Monitoring

As outlined in the Inquiry's discussion paper, there are significant gaps in our knowledge of the quantity and type of waste disposed and reprocessed which limits our ability to measure the amount of waste generated each year and thus make meaningful comparisons that will allow effective policy development, implementation and evaluation. Clearly we need a better picture of where all the waste and recycling streams are going so Local Government can get its priorities right in terms of setting targets and performance indicators and monitoring outcomes.

In Tasmania's case while Councils have embraced in principle the Australian standard waste categorization methodology there continue to be problems in implementing effective waste categorization systems. Any capacity for Local Government to measure waste streams is still deficient due to the number of

unstaffed disposal sites around the State and lack of appropriate technology and infrastructure such as weighbridges and software. An injection of capital will be required to bring the whole sector up to the required standard to enable effective measurement and categorization to occur. It is considered that this will require the cooperation of both government and private sector players.

More reliable data on consumption, recycling and disposal patterns and the environmental impacts of those things would greatly assist in establishing clear priorities and measuring policy outcomes and there is a need for intervention to facilitate improvements in this area.

4. Sustainable Resource Recovery

Local Government in Tasmania remains strongly committed to economically, environmentally and socially sustainable recycling schemes.

Much emphasis has been placed on the principle of 'zero waste'. But, as the Productivity Inquiry Discussion Paper asks "…is it economically, socially and environmentally sensible to aspire to minimising or even eliminating waste to landfill if that were to create other social and environmental problems or only be achievable at great cost?" This is a good question!

While Tasmanian Local Government continues to pursue waste minimization it must be acknowledged that there are barriers to the sustainable achievement of 'zero waste', particularly given the State's relative isolation, island status, absence of economies of scale and prohibitive transport costs, all of which present challenges for optimal recycling and waste disposal methods. Indeed, there is now a strong focus by Local Government on sustainable resource recovery rather than the reduction of waste to landfill which accords with the idea that it is the value of resources recovered that is significant, rather than the quantity of waste being diverted from landfill. There has been some progress in this area. For example a recent survey conducted by the Southern Waste Strategy Authority indicates that overall kerbside recycling yields in metropolitan Hobart have improved by 15% over the past three years.

In the same context, the Association has recently become a signatory to the National Packaging Covenant (NPC) which seeks to establish a framework based on the principle of shared responsibility for the effective lifecycle management of packaging and paper products, including their recovery and utilization, and to establish a collaborative approach to implementing cost effective collection systems, including kerbside recycling and away from home recovery and reuse schemes. As a signatory to the Covenant, the Association recognises that a cooperative approach between industry and all spheres of government is essential to achieving national consistency in the lifecycle management of packaging and paper and the implementation of sustainable kerbside and away from home recycling systems. The emphasis on effective kerbside and other forms of recycling is critical as their purpose is to divert waste from landfill and promote the use of recycled products by optimizing the amount, quality and value of materials recovered from the household waste stream.

It is hoped that the Association's signatory status and participation in NPC processes will increase the capacity of Tasmanian Local Government to access funding and expertise to implement and/or enhance effective recycling and reuse schemes and ensure greater collaboration on recycling targets. Two regional authorities, Southern

Waste Strategy Authority and Northern Tasmania Development, are also signatories as are several Councils.

5. Extended Producer Responsibility

The National Packaging Covenant, and other fledgling product stewardship schemes notwithstanding, the current focus of waste management practices remains largely on managing the waste that has already been produced and there is a need for policy to shift much further in the direction of waste avoidance.

It has been encouraging to note the growing emphasis by government on the principle of extended producer responsibility (EPR), or product stewardship, which has the potential to play a much stronger role in supporting kerbside recycling in the future. From Local Government's perspectively there is certainly a need to broaden the range of product and service wastes that are addressed through current schemes. For instance, Tasmania lacks the capacity to deal with major waste streams such as construction waste due to its isolation, economies of scale and prohibitive transport costs. There is also a vast untapped potential for future resource recovery in the area of commercial and industrial waste.

Product stewardship recognises that manufacturers, importers, governments and consumers have shared responsibilities for the products they produce, handle, sell and consume. This may require significant shifts in the way products are designed, supplied and managed to incorporate end of life recovery. It is noted that in addition to the NPC, the Australian Government, through the Department of Environment and Heritage, has been exploring a range of product stewardship models including co-regulatory frameworks in the broad area of automotive waste (including tyres), oil recycling and the plastics and electrics industries.

Local Government is of the view that the Australian Government needs to continue to take a lead role in initiating further EPR and/or product stewardship schemes, using a range of approaches including co-regulation.

6. Public Education

The issues raised above all demonstrate the need for increased public education that encourages all sections of society to recognize they bear some responsibility for the management of their own wastes and that this is not solely the preserve of Local Government. In particular consumer decision making needs to be more strongly informed by disposal consequences and manufacturers and importers of products with especially problematic waste profiles must be encouraged to recognize the impacts of production patterns and assist with financing waste disposal measures and, more importantly, to begin to change their practices. There is clearly a significant role for all spheres of government to work with producers to help communities come to terms with their waste disposal obligations.

GREEN WASTE STUDY

MAY 2005
Version 1

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1 Executive Summary

In response to DPIWE's decision to ban the burning of green waste by Tasmanian Councils, a LGAT motion was passed in May 2004 requesting the Association to liaise with the State Government to develop a policy for green waste disposal.

Following representations by LGAT, the Director of Environmental Management agreed to an interim arrangement permitting the limited burning of green waste in accordance with specified guidelines and contingent upon completion of a desktop study into alternative methods of disposal.

This study explores two main themes. First, it examines the policy context within which green waste management options in Tasmania can be considered. Specifically, it discusses national and state policy documents, relevant Tasmanian legislation, regional waste management frameworks and the principles of economically sustainable development. Second, it identifies and considers four possible alternatives for the disposal of green waste: landfilling, composting, chipping and incineration for the purposes of energy renewal.

1.1 The Policy Context

While there was substantial policy work conducted at the national level during the 1990s which sought to address the management of green waste in Australia, little has occurred since 2000. The most notable recent policy documents were the Australian and New Zealand Environment Conservation Council (ANZECC)'s 1998 *Green and Organic Waste Management Strategy,* which established a set of principles aimed at achieving a 50% reduction of green waste going to landfill by 2000; and the Department of Environment and Heritage's 1999 *Organics Market Development Strategy,* which sought to build on the principles articulated in the ANZECC strategy.

Importantly, the 1999 *Organics Market Development Strategy* noted that the development of a viable recycled organics industry in Tasmania was severely hampered by its relatively low population and small quantities of organic waste, which did not yield the advantages of economies of scale present in some other jurisdictions. This is a critical point with continuing relevance to the current debate.

Similarly, there is an apparent lack of policy direction in relation to green waste management at the State level. Recent developments in waste management policy in Tasmania have been the *Controlling Waste: 6 Point Action Plan,* which provides a strategic framework for the management of controlled wastes, and the formation of a High Level Officials Group (HLOG), which replaced the Tasmanian Waste Advisory Group and more latterly the Waste Management Taskforce. The HLOG comprises representatives of State and Local Government and primarily aims to pursue the establishment of regional waste strategies, particularly in the North and North West of the State.

While there are currently no policy tools to address green waste management at the State level, the *6 Point Action Plan* demonstrates what can be achieved in waste management policy and the HLOG provides a forum through which policy options could be explored.

1.2 The Four Options

1.2.1 Landfilling

Given the diminishing scope for expanding landfill capacity and the environmental problems surrounding sites, landfilling does not present a viable long-term option for the disposal of green waste. Indeed, key national, state and regional policy pronouncements clearly recommend that waste in general, and green waste specifically, should be diverted from landfill. At least 3 Australian states have imposed bans on the dumping of green waste at landfill sites.

1.2.2 Composting

Prima facie, composting presents a viable long-term option for the management of green waste. There are clear environmental benefits that accrue from composting, including the reduction of waste to landfill and there are potential economic benefits to be realized. Critical to the success of any composting operation, however, is the quality or purity of the organic material produced and significant financial outlays are required to establish the composting infrastructure with the capacity to deliver high grade product. Research indicates that for the economic and environmental benefits to be fully realized composting needs to function as a manufacturing process capable of producing a high quality, useful and commercially viable product. Rather

than a waste management strategy this then becomes a business matter concerned with penetrating markets that are highly competitive and subject to wide seasonal fluctuations.

While composting presents a sustainable, long-term alternative to the more traditional forms of green waste disposal it cannot in isolation be a complete waste disposal solution, and the considerable resources required to develop the necessary infrastructure (potentially in the millions of dollars) are likely to be prohibitive particularly given the absence of economies of scale in Tasmania. Nevertheless, it is an option that should be given further consideration, in conjunction with chipping, as part of an integrated approach to green waste management in the State.

1.2.3 Chipping

Ostensibly, chipping, sometimes referred to as mulching or shredding, is an effective and reasonably cost effective method of dealing with green waste. Not only does it reduce the mass and volume of waste going to landfill, it also constitutes the first step in any larger-scale composting operation. But similar to composting the quality and purity of the material dictates the usability and consequently the marketability of the end product. To be more than simply waste disposal methods and realise their potential for waste diversion, chipping and composting need to be considered as an integrated manufacturing process capable of producing a high quality recycled organic product.

The financial outlays for chipping are less onerous than those required to establish an effective composting infrastructure and there is a range of technology that would be appropriate for the level of chipping required by Tasmanian Local Government. One option would be to adopt a regional approach – either purchasing equipment for use by a group of councils within a region or by subcontracting. A comparable regional approach is being implemented with some success in Western Australia at a cost of approximately $5 per household (including collection costs).

1.2.4 Incineration for Energy Recovery

An Australian Company, Green Pacific Energy (GPE) has adopted recent incineration-style technology to recover energy from green waste and aims to

develop renewable energy generating plants across Australia. It has one plant operational in Queensland and plans to open another at Bell Bay in Tasmania in 2006, with a further two to follow at Huonville and Boyer. To ensure viability a plant requires approximately 130,000 tonnes of green waste per year. The major costs to Councils are likely to be transport costs or gate fees. While still in the formative stages, the progress of the GPE development should be closely monitored as a future long-term, clean policy solution for green waste management. Into the future it may be possible for Councils and GPE to engage in negotiations to establish a formal agreement in relation to green waste disposal and the Company has indicated a willingness to work with Local Government towards this end.

1.3 Towards a Policy Framework

This study concludes there is an apparent need for high-level policy development in relation to green waste management to occur in Tasmania. Developing an effective strategy is contingent upon a number of crucial factors and relies on leadership, cooperation and a concerted effort across government.

The State Government's Six Point Action Plan demonstrates what can be achieved in terms of waste management strategies and the formation of the High Level Officials Group provides the State with an opportunity for a body with both the authority and the expertise to initiate and influence such policy development. The management of green waste is likely to be an enduring issue and as such demands responsibility across both State and Local Governments. Removing traditional modes of green waste disposal (burning) needs to be matched by a commitment on the part of the State Government to work with Local Government to explore viable alternative disposal options.

Clearly, none of the options outlined in this study presents a satisfactory short-term solution to the current problems experienced particularly by rural councils in disposing of green waste and it is suggested that the Association work with the State Government to develop an appropriate regime under which the restricted burning of green waste can continue to occur under the guidance of the Tasmanian Fire Service.

2 Introduction

2.1 Purpose

The purpose of this study is to conduct a desktop assessment of various options for green waste disposal that might be applicable to Local Government in Tasmania with a view to facilitating the development of a comprehensive statewide approach. As well it will serve to inform the decision on whether a more detailed cost-benefit analysis of the issue is required.

The findings of the study are not intended to be definitive or complete, but rather present a 'snapshot' of green waste management concerns, issues and actions that may be relevant to Tasmanian Local Government. They are presented in good faith to facilitate a better understanding of the issues and a more coordinated statewide response to green waste disposal practices.

2.2 Background

The May 2004 Local Government Association of Tasmania (LGAT) General Meeting passed the following resolution:

> *That the LGAT liaise with the State Government on developing a policy for the preferred disposal of green waste taking into account the economic, social and environmental costs associated with the various options to dispose of the product.*

The resolution arose in response to the Tasmanian Department of Primary Industries, Water and the Environment (DPIWE)'s proposal to ban the burning of green waste for all Councils throughout Tasmania. The rationale behind DPIWE's proposal stems from the State Government's commitments to reducing greenhouse gasses, and accordingly the disposal of green waste through burning is not a preferred option.

Information sought by LGAT from Councils in relation to green waste indicates that Councils across the state have differing green waste demands, and dispose of green waste using various methods. (See Appendix 1) Only two larger Councils responded to the LGAT's request for information and both indicated that they did not need to burn green waste.

While a further three Councils indicated that they did not need to burn green waste, the remaining 10 Councils indicated a need to conduct some sort of burning of green waste, with varying degrees of frequency. Three Councils, all located in rural areas and with small populations, indicated a need to burn green waste approximately every two months. These statistics suggest that DPIWE's proposed ban on the burning of green waste will primarily impact on Tasmania's smaller, rural Councils.

In recognition of these complexities, LGAT held discussions with the Director of Environmental Management and secured an interim arrangement that permits the burning of green waste if conducted in strict accordance with specified guidelines and only for a strictly limited time period. (See Appendix 2) The interim arrangement was also contingent upon the completion of this study and there is the option for it to be extended a further six months until December 2005 if further research is warranted.

2.3 Aims and Objectives

This study aims to investigate alternative methods of green waste disposal for possible application by Local Government in Tasmania.

It has four principle objectives:

1. to define the term 'green waste';
2. to conduct a literature review of relevant information pertaining to green waste issues;
3. to obtain information from individuals who have appropriate experience in, and relevant knowledge of, green waste issues; and
4. to present various options for the disposal of green waste.

2.4 Methodology

Given the desktop nature of the study a qualitative research methodology was adopted. This included data collection through a comprehensive review of relevant literature as well as consultation with, and dialogue between, key stakeholders, whose experience and knowledge provide useful insights into the study area.

Searches for relevant literature were undertaken at the Hobart libraries of UTas, DPIWE, Forestry Tasmania and the State Library of Tasmania. The sources of

published literature included books, journal articles, newspaper articles, media releases, legislation, parliamentary reports and departmental guidelines. Unpublished documents were also obtained from searches of the Internet as well as the abovementioned libraries. These documents came in the form of letters, emails, memos, minutes of meetings as well as organisations' homepages (such as the Waste Management Association of Australia and the Western Australian Waste Management Board).

Key stakeholders consulted included policy officers from other State Local Government Associations and representatives from various waste-related organisations such as the Waste Management Association of Australia and Eco Recycle Victoria, state and federal government departments, local councils and shires, regional authorities and industry.

2.5 Scope

The study comprises four main topic areas:

- **Green Waste Defined**
  To enhance clarity and consistency a definition of green waste is adopted and used throughout the study.

- **The Policy Context**
  Discusses the policy framework which might influence the development of a green waste strategy. Specifically it considers National and State policy documents, relevant Tasmanian legislation and key principles of ecologically sustainable development.

- **Options**
  Identifies four possible alternatives for the disposal of green waste: landfilling, composting, chipping and incineration for the purposes of energy renewal.

- **Conclusions**
  Reflects on the foregoing discussions and provides some suggestions and conclusions.

3 Green Waste Defined

It is difficult to define the term 'green waste' and the terms 'organic waste,' and 'green organics' are often used interchangeably with 'green waste' in the relevant literature.

Green waste has been classified as part of the 'organic waste stream' (also referred to as 'putrescible waste stream')[1] (Senate Standing Committee, 1994: 39) and as part of the 'compostable waste stream', which also includes food wastes. (Bakker et al, 1993: 37) A broader definition suggests that green waste includes all food wastes, vegetative wastes from land clearing and pruning operations, biosolids produced from the treatment of liquid wastes, garden wastes and some agricultural and forestry wastes, including organic material that results from an industrial process (bark and saw dust from sawmilling for example) as part of green waste if they are normally disposed of to landfill or incinerated. (ANZECC, 1998: 1)

This study has adopted a narrower definition taken from a Western Australian Department of Environmental Protection Discussion Paper (1997) which defines green waste to include:

> garden clippings, leaves, grass clippings, plants, tree prunings, tree loppings, branches, large trees and stumps arising from domestic and Council activities.

This provides a clear and concise definition which incorporates the two key sources producing green waste. Although some definitions may separate green waste produced from household activities (such as maintaining a garden) from green waste produced by Council activities (such as maintaining a park), for the purposes of this study and in the interests of formulating a comprehensive statewide strategy, it was considered appropriate to incorporate both waste-producing activities.

Note that the definition does not include other materials that are often placed in the organic, putrescible, compostable or green waste stream, for example food wastes, already composted or mulched green waste, putrescible wastes, sludges or manures.

4 The Policy Context

[1] Putrescible wastes are wastes that will decompose readily under microbial attack and include green waste, food waste, paper, biosolids, manures and sludges.

4.1 Generally

Australia sends over 21 million tonnes of waste to landfill each year (Department of Environment and Heritage, 2005)[2] and waste management is becoming a more significant issue with problems like depletion of resources, increased disposal costs, contamination of the environment as well as a continual depletion of available landfill space. There is general community concern that current consumption levels are not ecologically sustainable without efficient use of resources, and effective waste minimisation strategies (Senate Standing Committee on Environment Recreation and the Arts, 1994: 1). As a result there is increasing pressure, driven largely by community expectation and government policy, to better manage and reduce waste across Australia.

A number of national, state and regional policy documents exist in relation to waste management in Australia and Tasmania, and an investigation into green waste issues needs to consider this policy framework, key features of which are discussed below.

4.2 National Policy Context

4.2.1 Australian and New Zealand Environment Conservation Council (ANZECC)

During the 1990s ANZECC produced a number of policy documents and strategies aimed at addressing waste generation, disposal and management. In 1992 it published a *National Waste Minimisation and Recycling Strategy* that proposed a target of 50% reduction in wastes to landfill by 2000, and a 20% reduction in putrescible waste to landfill by 1995. All States, including Tasmania, agreed to the 50% reduction. At a 1995 meeting of the ANZECC Industry Waste Reduction Agreements Task Force it was agreed to further develop the national waste reduction framework for green and organic wastes. The next and final installment came in 1998 when ANZECC released its *Green and Organic Waste Management Strategy for Australia*.

The 1998 policy document was considered to be a significant part of the original 1992 *National Waste Minimisation and Recycling Strategy* and as such was intended to help

[2] 21 million tonnes of waste to landfill also equates to around one tonne of waste per person, per year to landfill.

Australia meet its goal of reducing waste going to landfill by 50%. The 1998 document also had a broader role: to aid in developing policies and practices that will ensure waste reduction at source, and to ensure that the principles of reuse and recycling of wastes become part of Australia's environmental protection 'ethic'. Importantly, the 1998 document was intended to provide general policy direction and support for 'action strategies that are being developed by each jurisdiction'. (ANZECC, 1998: 1)

The 1998 Strategy recognized that the national effort to reduce waste to landfill by 50% by 2000 would only be successful if there was significant progress in areas such as green waste. Thus the 'primary aim of the strategy' was to achieve a 50% reduction of green waste going to landfill by the year 2000. (ANZECC, 1998: 2) In order to achieve that goal the Strategy developed a number of key principles, including:

- A commitment to exclude disposal of garden waste to landfill.
- A commitment from all spheres of Government and industry to promote source separation. [3]
- Support for the development of consistent standards for all green products produced.
- A commitment to supporting the development of competitive and sustainable markets for products made from green and organic wastes.
- A commitment to allocating clear responsibilities to all parties involved in green waste management in each jurisdiction.
- A commitment to developing clear environmental management guidelines for green/organic waste reprocessing sites. (ANZECC, 1998: 7-8)

Despite the establishment of these key principles and the various ANZECC strategies, there is little evidence that the goals of reducing general and green waste going to landfill by 50% by the year 2000 have been achieved. The Australian Bureau of Statistics (2005) reports:

> in 1992 a national target of 50% waste reduction by the year 2000 was adopted by ANZECC; concurrently, all states and territories set ambitious waste minimisation goals to meet or exceed national targets. Available

[3] Source separation can be defined as the segregation of specific materials or components of a waste stream at the point of generation for separate management.

> information indicates that although waste reduction has occurred, mostly through recycling, the original targets have not been met by states and territories.

It is clear, however, that the ANZECC documents 'filtered down' and influenced other jurisdictions in the establishment of their own waste management strategies. (See Department of Environmental Protection, 1997)

In June 2001 the Council of Heads of Australian Government (COAG) established the Environment Protection and Heritage Council (EPHC). The EPHC incorporates those environmental protection components of ANZECC as well as the National Environment Protection Council. Significantly, waste management is listed as a priority for the EPHC, however, no projects have been completed in the area.

4.2.2 Department of Environment and Heritage

The ANZECC documents influenced strategies developed by the Department of Environment and Heritage (the DEH), which is the Commonwealth agency responsible for waste management. The DEH is addressing waste management through agreements and strategies aimed at reducing waste by encouraging material efficiency, reducing the generation of waste or enabling the recovery and reuse of discarded material. It is in this latter area that the Department has been most active with respect to green waste.

In 1999 the Department developed an *Organics Market Development Strategy* to support the ANZECC's 1998 *Green and Organic Waste Management Strategy for Australia.* It aimed to provide national strategic benefit in waste management practices for organic wastes and to this end investigated the status of the organics industry in Australia, with a view to supporting and further developing 'a competitive and sustainable market for products made from green and organic wastes'. This accords with the key principles outlined above and in ANZECC's 1998 strategy.

As part of that strategy the DEH investigated issues affecting the recycled organics industry in each State. In relation to Tasmania the Department noted that:

> Tasmania's relatively low population and small quantities of organic waste produced have inhibited development of the recycled organics industry in the State. Advantages of economies of scale do not exist, contributing to unviable costs for collection and processing of recycled organics. (Meinhardt, 1999: 33)

The Department also conducted a *Survey of Federal, State and Territory Waste Management Arrangements* in 2000. Although the research focused primarily on the construction and development waste stream it came to a similar conclusion as the *Organics Market Development Strategy*: that insufficient funding prohibits the development of effective and efficient waste reduction strategies.

The most recent policy tool in the waste management area is the 1999 National Packaging Covenant (NPC) which was adopted by members of the packaging supply chain, the Federal and State Governments and Territories and Local Government. The NPC includes a cooperative partnership arrangement that aims to establish the principle of shared responsibility, for the effective lifecycle management of packaging and paper products. There is also a National Environmental Protection Measure (NEPM), which is intended to create a regulatory safety net that penalizes those players who do not join the NPC. The NPC is currently being reviewed with view to extending its operation for a further 5 years, in which case the NEPM will also be extended.

Another emerging waste management policy principle is that of Extended Producer Responsibility (EPR). Whereas as the NPC arrangements relate to packaging, in its simplest form EPR refers to the contribution of product and service producers to the management of the waste arising from their activities. EPR is in its infancy in Australia, with a scheme for tyres being discussed at a national level. The SWSA suggests that EPR will have an increasing role in supporting kerbside recycling in the future (SWSA, 2005: 10).

Although the NPC and EPR are significant policy tools in terms of addressing specific waste management issues, they also highlight the national policy vacuum in relation to green waste. It appears there has been a hiatus in policy relevant to green waste since the year 2000, and an absence of recent activity suggests this situation is not likely to change in the near future.

4.3 Tasmanian Policy Context[4]

4.3.1 Resource Management and Planning System

The Tasmanian Resource Management and Planning System (RMPS) provides the overall framework for environmental management and land use development planning in Tasmania. It has the following set of objectives, which are intended to inform all decisions made under the suite of legislation that comprises the RMPS as well as any State policies that are made in relation to environmental management or land use planning:

- to promote the sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity;
- to prevent environmental degradation and adverse risks to human and ecosystem health by promoting pollution prevention, clean production technology, reuse and recycling of materials and waste minimization programmes;
- to allocate the costs of environmental protection and restoration equitably and in a manner that encourages responsible use of, and reduces harm to, the environment, with polluters bearing the appropriate share of the costs that arise from their activities; and
- to control the generation, storage, collection, transportation, treatment and disposal of waste with a view to reducing, minimizing and, where practicable, eliminating harm to the environment.

The primary legislative instruments under the RMPS that influence waste management are the *Land Use Planning and Approvals Act 1993* (LUPAA) and the *Environmental Management and Pollution Control Act 1994* (EMPCA). The linkages between LUPAA and EMPCA are crucial to the implementation of a coordinated approach to waste management in the absence of any specific waste minimisation legislation in Tasmania.

4.3.2 Statewide Partnership Agreement on Waste Management and the Six Point Action Plan on Controlled Waste

[4] Much of what follows is drawn from a regional waste management audit prepared for the Cradle Coast Authority in 2004. (GHD, 2004).

In October 2000 Local Government Association of Tasmania and the State Government signed the *Statewide Partnership on Waste Management*. This Agreement outlined the framework and processes for addressing agreed priorities for waste management across Tasmania and identified the following key objectives:

- a commitment to the 50% reduction in waste to landfill by 2005;
- working cooperatively to achieve this reduction target as well as avoiding or minimizing adverse impacts on the environment and community; and
- a partnership to developing an integrated approach to local, regional and Statewide waste management.

A number of core strategies were identified to achieve these objectives, which can be summarized as follows: avoidance of the production of waste; reductions in the quantity of waste for disposal; the safe management and disposal of wastes; and raising public awareness on the benefits of waste avoidance, waste reduction and reuse and recycling.

In 2004, however, the Agreement was superseded by *Controlling Waste: A Six-Point Action Plan for Managing Controlled Waste 2004 – 05*. The Action Plan provides a more strategic approach to Statewide arrangements for waste management, but only in relation to controlled wastes. Controlled wastes are defined in the Action Plan as those that exhibit toxicity, chemical or biological reactivity, environmental persistence, or the ability to bio-accumulate or enter the food chain.

Significantly, the Action Plan does not address green waste as green waste does not constitute controlled waste. Nevertheless, the Action Plan demonstrates what can be achieved in relation to waste management policy and could perhaps serve as a model for green waste management.

4.3.3 Other Policies

Tasmania also has a Solid Waste Management Policy established in 1994 as well as a policy on Recycling of Organic Wastes established in 1996. Both policies are relatively outdated, and limited in scope. The 1996 policy in particular only relates to the composting of organic (and primarily agricultural) wastes. With the Six-Point Action Plan demonstrating what can be achieved in waste management, it may be worth considering updating these policies.

It is worth noting that the Joint Standing Committee on Environment, Resources and Development is currently conducting a Parliamentary Inquiry on Waste Management in Tasmania. The aim of the Inquiry is to investigate and make recommendations to the Government concerning domestic, industrial and hazardous waste management. At the time of writing, public hearings were being conducted.

4.3.4 Tasmanian Waste Advisory Committee, Waste Management Taskforce and the High Level Officials Group

The Tasmanian Waste Advisory Committee (TWAC) was established through the Statewide Partnership Agreement and had representatives from State and Local Government, industry and community. It examined and made recommendations on a number of waste related issues. To oversee the implementation of the TWAC recommendations, a Waste Management Taskforce was established in May 2002 with representatives from State and Local Government. Its objective was to provide a forum for communication between the responsible State and regional organizations, as well as improve coordination and progress matters where action or funding requires a Statewide approach.

Both these bodies are now disbanded and have been replaced by a High Level Officials Group. This Group, formed in 2004 and consisting of representatives from Local and State Government, aims to pursue the establishment of regional waste strategies, primarily in the North and North-West of the State (SWSA, 2005: 13).

4.3.5 Regional Waste Management Structures

4.3.5.1 Southern Waste Strategy Authority

The Southern Waste Strategy Authority (SWSA) was established in 2001 to facilitate integrated regional waste management planning in Southern Tasmania and implement the Southern Waste Management Strategy. It has twelve member Councils.

In March 2000 the then Southern Waste Strategy Board released a discussion paper entitled *Draft Waste Management Strategy for Southern Tasmania* which identified 2 core objectives:

1. achieve a 50% reduction in waste to landfill by volume by 2005 compared to 1990 levels; and
2. avoid or minimize adverse impacts on the environment and community arising from waste management activities.

Three core strategies were defined to meet these objectives: waste avoidance, resource recovery and the responsible management of the residential waste stream.

The strategy is designed to complement regional waste management planning initiatives by providing the broad policy framework and strategic direction and emphasizes a cooperative relationship between government, councils, industry and the community based on shared responsibility for the waste stream. It identifies the following mechanisms to assist in achieving the targets:

- Awareness and education with government, councils, industry and the community.
- Coordination and cooperation between all waste management stakeholders.
- Legislative reform particularly amending the *Environmental Management and Pollution Control Act* 1994 to specifically integrate provisions for waste minimization and shared responsibility for waste avoidance.
- Data collection and performance review guidelines, based on National Waste Stream Analysis and Reporting Protocol.

Significantly, green waste is not mentioned specifically. Rather it is subsumed within other identified waste streams, including domestic wastes, private traffic (self haul) and other council wastes. Within the 70 recommendations made by the SWSA, there is some reference to kerbside recycling for 'organic material' and an emphasis (especially in the low density rural fringe) on developing infrastructure to enable processing and recycling of organic material.

The SWSA has since reviewed its activities and prepared a draft document entitled 'Southern Waste Strategy Authority: The Next Five Years'. This document recommends the SWSA changes the emphasis of its objectives and strategies from the reduction of waste to landfill to the sustainable recovery of resources. This is in line with the idea that it is the value of resources recovered that is significant, rather than the quantity of waste being diverted from landfill.

It is also worth noting that the SWSA held a workshop on green organics in 2004 and has produced a brief discussion paper on guidelines for the burning of green waste in conjunction with LGAT.

4.3.5.2 Cradle Coast Authority/State Government Partnership Agreement

In 2002 the need for a regional waste management strategy for northwest Tasmania was confirmed through a commitment in the State Government and Cradle Coast Authority Partnership Agreement. The Cradle Coast Authority commissioned a regional waste management audit in June 2004 as one of the first actions arising from that Agreement. The audit intended to provide a better understanding of the current status of waste management policies and future strategies within the Cradle Coast Authority's jurisdiction.

The audit suggested establishing a regional waste management strategy group to assist the Cradle Coast Authority in relation to waste management issues, as well as addressing key legislative and policy instruments at a regional level. The audit's conclusion was that:

> Overall, the existing waste management arrangements in the Cradle Coast area appear to be providing good outcomes for member Councils, yet there is a great opportunity to better coordinate activity at the regional level through the creation of a waste management strategy group (GHD, 2004: 1).

4.4 Applying Ecologically Sustainable Development Principles to Waste Management

Ecological Sustainable Development is defined as a pattern of development that improves the total quality of life, both now and in the future, in a way that preserves the ecological processes on which life depends (*Intergovernmental Agreement on the Environment*, 1992). In 1992 under the *Inter-governmental Agreement on the Environment* all governments in Australia agreed to adopt the following principles of ESD:

- Intragenerational equity;
- Intergenerational equity;

- Biodiversity;
- Precautionary Principle; and
- Polluter Pays Principle. [5]

These 5 principles are core environmental management considerations, and any green waste strategy would be expected to take these into account.

5 Options

5.1 Landfill

More than 90% of all solid waste generated in Australia is disposed of to landfill. At current rates of disposal Australia's metropolitan landfills will have reached capacity within approximately 10 years. (Keep Australia Beautiful, 1997: 80) In Southern Tasmania alone, the estimated quantity of wastes disposed to landfill is 274,000 tonnes per year (Southern Waste Strategy Board, 2000: 1). The increasing community resistance to the establishment of new landfills adjacent to residential areas and the rising costs of siting new facilities means the scope of expanding landfill capacity to meet expected demand is restricted.

In addition, there are well-documented environmental problems surrounding landfills (See Senate Standing Committee on Environment, Recreation and the Arts, 1994: 100-109). These problems are not restricted to poorly managed landfill sites and can persist after a site has been closed and rehabilitated. They include:

- Groundwater and surface water pollution through contaminated liquid seeping from lower levels of the landfill site (leachate). This leachate can contain nutrients, heavy metals such as lead and residual chemicals such as pesticides.
- Release of green house gasses (methane and carbon dioxide) through decomposition of materials in the landfill.

[5] The Polluter Pays Principle is not generally recognised as a principle of ESD but it is intricately linked to it, it is an important principle within environmental management more generally and it has specific relevance in the waste management context. If waste management is going to accord with the abovementioned principles of ESD, then an attitudinal shift is required across the community, government and industry. Such an attitudinal shift demands an acceptance by individuals of the cost of environmental impacts they cause, and this is the essence of the Polluter Pays Principle.

- Odours and litter while the site is in operation.
- Noise and traffic congestion related to public use of the site and its operation.
- Disease transmission by pests such as rodents, birds, flies and cockroaches.
- Loss of resources when materials, which may be reusable or recyclable, are buried.

Despite the problems surrounding landfill, it is likely that for solid waste it will remain the most appropriate method of waste disposal. The Keep Australia Beautiful National Association (KABNA) (1997:80) notes that the current state of technology and the comparative cost of alternative methods to landfill indicate that well-managed and approved landfill sites still have a place in modern waste management. KABNA recommend, however, that the cost associated with dumping waste at a landfill accurately reflect the actual cost (environmental, economic and social) on society, reflecting principles of ESD as well as triple bottom line considerations. Increasing prices for disposal at landfill provides dual benefits in that it creates extra revenue that can be returned to waste management, and it also works as an incentive to find alternative methods of waste disposal.

It is interesting to note two interstate landfill levy experiences. In West Australia a landfill levy has been introduced in metropolitan areas.[6] An individual who disposes of waste at a landfill site is charged an additional fee ($6/tonne for waste to putrescible landfill and $3/cubic metre for waste to inert landfill) and half of the money received from the levy is returned to Local Government to be utilised for further waste management activities. A recent review of the Western Australia levy indicated, however, that stakeholders had major concerns regarding the transparency of the system (Waste Management Board, 2004: 12) and there are rumoured moves to wind back the amount of money being returned to Local Government (Bovill, 2004). [7]

In Victoria, the landfill levy is used exclusively for environment protection activities by various bodies, including Eco Recycle Victoria (ERV). ERV seeks to meet the

[6] Western Australia introduced a levy on waste to landfill in 1998. The levy was introduced through an Act of Parliament and is established and implemented through the *Environmental Protection Act 1986* (WA).

[7] Note that in New South Wales the State Government has already begun to wind back the amount of money Local Government receives from the State imposed landfill levy. In response Local Government has threatened to simply stop paying the landfill levy (Poole, 2005:28-29).

challenge of reducing waste through the creation of long-term and practical solutions. It is entirely funded through the Victorian landfill levy, which saw ERV receive $13 million in 2004. Since its inception in 1996 ERV has helped in successfully diverting 16.5 million tonnes of resources from Victorian landfills as well as investing approximately $13 million in over 220 infrastructure projects throughout Victoria.

Landfill, however, does not present a viable long-term option for the disposal of green waste. Key national, state and regional policy arrangements clearly articulate that waste in general, and green waste specifically, should be diverted from landfill. New South Wales, Queensland and South Australia have imposed bans on the dumping of green waste at landfill sites as have other countries. [8]

5.2 Composting

Composting is the oldest and the most natural form of recycling organic material. It can be defined as the aerobic (oxygen requiring) biological decomposition of organic waste to yield a stable, hygienic material that is beneficial to soil and plant growth. (Manser & Keeling, 1996: 141) In simple terms, natural biological processes breakdown the organic material in the presence of air to form 'stable' or 'mature' compost. By stabilizing the organic material pathogens and weed seeds are reduced. The process is accelerated by promoting elevated temperatures and maintaining moist and aerobic conditions within the composting mass.

Composting can be undertaken on a range of levels: from home composting units through to community schemes up to large centralized sites that can handle thousands of tonnes of material each year. Moreover, the composting process can take a number of different forms. Traditional open systems, such as windrow composting, simply require piles of the compostable material to be subjected to aerobic decomposition. (Manser & Keeling, 1996: 147-198) The piles must be aerated, and this can be achieved either manually or mechanically. Green waste is particularly suited to such simple forms of composting. Nevertheless, depending on the nature of the green waste to be composted supplementary material may be required to ensure effective decomposition. There is also increased chance of

[8] France , for example, banned the dumping of green waste at landfill as of 2002. (See Kulik, 1996).

nuisance problems, such as odour and dust, given the relatively uncontrolled nature of the process.

More sophisticated decomposition plants enable a more controlled compost process to be undertaken, and allow composting to occur on a much larger scale. Aerobic decomposition plants, such as static digesters, tunnel composters or drum composters, allow the naturally occurring biological modification to the chemical and physical structure of organic materials in the presence of oxygen. (Manser & Keeling, 1996: 199-236) The essential difference to windrows is the enclosed nature of aerobic decomposition plants. Aerobic decomposition plants, like traditional open composting systems, are also well suited to composting green waste.

As well, there are anaerobic decomposition plants that also use enclosed systems. (Manser & Keeling, 1996: 236-242) The process relies on the naturally occurring biological phenomenon that modifies the chemical and physical structure of organic materials, but in the absence of oxygen. This style of composting is usually employed for organic waste such as sewage or sludge.

Stable or mature compost has a variety of uses depending on the quality of the product. Low quality compost (which usually comes from mixed waste and may be contaminated with heavy metals, normal metal, plastic or glass) can be used primarily at landfill for site restoration and regeneration or as a form of landfill cover. Poor quality compost cannot be used in public spaces or sold as a recycled product.

In contrast, high quality compost, which often has little or no contamination, has a much wider array of potential uses. The composting process produces a product suitable for use as a soil conditioner, as a high quality plant-growth medium, as a peat-substitute or as a soil fertilizer. As such, it is used by those in the horticultural industry, by those practicing intensive and non-intensive agriculture as well by the general public. Significantly, uncontaminated green waste provides an excellent source for high-quality compost.

There are also numerous benefits that arise from the composting process (Department of Environment and Land Management, 1996). In terms of social benefits composting helps to achieve waste disposal strategies. Composting provides

an opportunity to reduce the volume and mass of waste going to landfill by 70% and 50% respectively (Manser & Keeling, 1996: 142). In the UK almost 70% of waste is expected to be diverted from landfill by 2010 and the successful achievement of this target will rely largely on the composting process (SITA, 2004).

In economic terms, reduced levels of waste going to landfill means a reduction in landfill management costs and related environmental costs. Composting (on larger scales) provides significant employment opportunities and compost as a product has the potential to reduce reliance on imported fertilizers.

The largest benefits that arise from the composting process, however, are environmentally related. When compost is added to soil it improves its structure, it increases its biological activity, it returns organic material and increases the nutrient assimilation capacity of the soil which maintains fertility and productivity. Composting has been shown to reduce the emission of harmful greenhouse gasses, such as methane, reduce reliance on scarce natural resources like peat and reduce he amount of pollutants going to landfill.

In an agricultural context, compost has excellent long-term benefits, especially in relation to water retention and conservation.[9] Moreover, composting helps to minimize and reduce leachate problems that arise at landfills and by diverting compostable material from landfill, the life of landfill sites can be significantly increased.

There are disadvantages associated with the composting process including odour, dust and other general nuisance problems, contamination and associated pollution as well as some health and safety risks. The main disadvantage is, however, the significant financial outlay required to establish an effective, high-quality large-scale composting plant. Anecdotal evidence suggests that establishing the required infrastructure can amount to an investment well into the millions of dollars (Reid, 2005). Accordingly, the viability of composting as a process in financial terms is less easily determined than its undoubted environmental benefits.

[9] For more information visit Composting Australia at http://www.wmaa.asn.au/ca/home.html.

Given the significant financial implications of establishing a composting facility, considerable research and planning would be required before any decision is made on whether to pursue this option. The literature provides a plethora of examples of the kinds of considerations that need to be taken into account and a number of these have been listed in Appendix 3, along with a possible Waste Minimisation Plan specifically dealing with composting and the relevant Australian Standard for compost products. What is essentially required is careful consideration of the likely viability of a composting operation, including comprehensive statewide market research. Although composting can be used primarily as a waste disposal method, if it is to fulfill its potential and achieve those social and environmental benefits outlined above, composting must be put into operation as a manufacturing process capable of producing a high-quality, useful and commercially viable product.

As Manser and Keeling (1996: 141) point out when considering a waste management strategy that involves compost operations, the strategy is necessarily divorced from environmental considerations (that is everyone knows it is environmentally sound), because it takes the waste disposal operator out of the service sector and firmly into the manufacturing and marketing sector. There he faces all the constraints of market forces, consumer demand and product quality. The question is no longer how to dispose of the waste. It is not even how to acquire the technology because this can be relatively easily purchased if you have the money. Instead it is how to run a business that manufactures a very high-volume, low-value product and must seek penetration into a market that is highly competitive, discerning and subject to wide seasonal fluctuations

In summary, composting presents a sustainable, long-term alternative to the more traditional forms of green waste disposal, such as burning and landfill. It is important to note, however, composting can never be a complete waste disposal solution on its own, and the considerable resources required for its implementation and development may be prohibitive. Although a widely practiced waste management method internationally[10], composting cannot provide an immediate solution for Tasmanian Local Government but it is an option that should be given further consideration.

[10] Composting is implemented widely across Europe, the UK, New Zealand and the USA.

5.3 Chipping/Shredding/Mulching

Chipping is a relatively common process relying on specialised equipment to reduce green waste to woodchip particles of varying sizes. Also referred to as shredding, grinding or mulching, there is a broad range of equipment that exists with the capacity to treat green waste from small bushes to large trees, stumps and even power poles. Given the bulky nature of green waste, chipping provides an efficient and effective method of reducing both the mass and volume of waste going to landfill and can be used to rehabilitate old landfill sites and as a soil conditioner, fertiliser or mulch.

Chipping green waste is also the first step in any larger-scale composting operation. As such many of the environmental, social and economic benefits previously outlined in relation to composting apply to chipping. Important advantages include the potential to divert waste from landfill and the associated ability to reduce landfill pollution and extend the lifetime of a landfill site. Chipping also enhances the quality of the soil in a similar manner to compost as well as reducing the level of green house gasses being emitted into the atmosphere.

While there are some problems associated with the chipping process, such as noise, dust and some health and safety issues, [11] these are less acute than those associated with composting. Perhaps the biggest challenge for chipping is the quality of the end product. Again, similar to composting, the quality or purity of the incoming material dictates the marketability and extent to which chipped green waste can be sold to, and used by, the general public. Low quality chipped green waste has relatively little scope for reuse, and in some instances will end up being a waste product because it has no economic value (Wright, 2005). Accordingly, if chipping is to be more than just a waste disposal method and achieve its potential for waste diversion, it must be seen as a manufacturing process, producing a high quality recycled organic product.

The financial outlays for the specialised equipment required to chip green waste is considerably less than that needed to establish an effective composting

[11] See for example *The Advocate*, 16-02-05, p. 8 article entitled 'Teen's Arm Shredded'. States that 'a teenager had the flesh ripped of his arms when he was caught in a tree-shredding machine…'. This emphasises the need for strict adherence to occupational health and safety requirements, as well as the need for appropriate training.

infrastructure. There is a range of technology that would be appropriate for the level of chipping required by Tasmanian Local Government. Three varieties are outlined below; they differ in price and have varying advantages and disadvantages (Cowlie, 2005):

- Brush Chipper: Suited to high volumes of organic material particularly land clearing; able to process material up to 91 centimetres in diameter; high-level productivity with 250 horsepower diesel engine; highly portable. Cost: $150, 000.
- Tub Grinder: Large, powerful and efficient. Suited to large land clearing operations and organic/wood processing facilities, able to process material up to 3.4 meters in diameter; less portable but higher productivity with 1000 horsepower engine, specially designed clutch, microprocessor and built in torque-limiting. Cost: $1 million.
- Horizontal Grinder: Latest technology, suitable for large scale reduction and recycling of green waste and storm debris. Able to process the broadest range of green waste material including hardwood, regrind and pallets. Cost: $600,000.[12]

The basic brush chipper still represents a large financial outlay, and is probably beyond the means of most Tasmanian Councils, especially those smaller rural ones for whom green waste disposal is a significant issue. An option is to adopt a regional approach, managed by bodies such as the Southern Waste Strategy Authority and the Cradle Coast Authority.[13] The chipping equipment could be purchased through a cooperative arrangement between a number of different regionally proximate Councils. Depending on the style of equipment purchased, the chipper could be moved around on a demand basis frequently (for instance on a weekly basis) or regularly (for instance on a quarterly basis) servicing those Councils within the region.

A comparable approach is being implemented with success in Western Australia (Reid, 2005). A metropolitan council with 18, 600 rateable properties subcontracts the

[12] As a result of its ability to process a broad range of green waste material and its moderate cost, this machines is recommended as the most suitable for Tasmanian Local Government purposes (Cowlie, 2005).

[13] It is acknowledged that a regional approach may present some difficulties given that regional authorities do not exist for all Tasmanian regions.

collection and sorting of green waste to a private company. That company uses a compaction truck to transfer the waste to a regional council waste transfer station, which is a cooperative of six councils. At the regional council waste transfer station material from all six councils is chipped, shredded and transformed into mulch. Each of the six councils is then entitled to take back a proportion of the end product. This process has an operating cost of five dollars per household, per collection for each of the six participating councils. For the metropolitan council with 18,600 rateable properties this amounts to a cost of over $90, 000 to process green waste per collection.

There is one non-metropolitan Tasmanian council that chips green waste, which is delivered to either of its two waste transfer stations, although it does not provide a collection service. The chipping is subcontracted out to Collex Waste Management, who treats the waste at a cost of approximately $12 per cubic meter of chips produced. The Council has indicated that chipping is conducted up to six times per year (or more if there is a demand) and that approximately 2700 cubic meters of chips are produced, at a cost of over $30, 000 (Wright, 2005).

Collex Waste Management provides this chipping service for a number of other councils around Tasmania (particularly metropolitan councils) and indicated it would be prepared to extend the service on a Statewide basis (Collex Waste Management, 2005). The pricing structure would be similar to that outlined above, although it may be possible for Councils to negotiate a bulk arrangement.

Chipping is an efficient and cost-effective method to deal with green waste. The options discussed above provide an immediate opportunity for Local Government in Tasmania to address the issue, and move towards a sustainable resolution. Chipping, however, provides more than just a short-term option. As an integral part of the composting process, chipping could be the first step in the implementation of a composting operation. This approach would provide an effective solution to the green waste issue, both long and short term and in relation to environmental, economic and social considerations.

5.4 Incineration – Energy Recovery

Incineration is a form of burning green waste, and is a method of disposal adopted widely internationally (Kirby, 2004). There are health and environmental concerns associated with incineration, leading some countries, such as the US, to steer away from incineration as a waste disposal option. Some research suggests, however, that recent technology has reduced the amount of emission (such as dioxins) caused by incineration(Environment Agency (UK), 2004).

An Australian company, Green Pacific Energy (GPE), is adopting recent incineration-style technology to recover energy from green waste (GPE, 2004). GPE's business goal is to design, build and manage renewable energy generating plants across Australia. So far it has one plant operational in Queensland. The plant will use green waste as fuel to generate electricity. GPE maintain that the process is relatively simple and the technology is well proven (2004: A2). By using green waste that would otherwise have become landfill to produce electricity, GPE claims its power generation is environmentally friendly and cost-effective.

The GPE process is a simple and efficient method of producing green energy. The power plants take green waste from a variety of sources (including Local Governments) and feed it into a large combuster, which operates at an extremely high temperature. The heat creates steam, which turns a turbine and generates electricity. The innovative engineering involved in this renewable energy generation process is the Fluidised Bed Combustion (FBC) technology. GPE use FBC technology to combust green waste at peak temperatures to produce power efficiently and with minimum harmful emissions. As a result, GPE is able to generate electricity in a clean and environmentally friendly way. GPE research suggests the market for this energy is strong, and it claims to already have committed buyers for 10 years of energy output (GPE, 2004: A2).

On 19 November 2003, GPE completed Australia's first ever green waste to energy power plant at Stapylton, Queensland. The plant has a turbine capacity of 5 mega watts and all electricity is being transmitted through the national grid to power households around Queensland. In Tasmania, a plant at Bell Bay is set to open within 16 months. Offering a turbine capacity of 20 mega watts, it will also provide power to households around Tasmania. There are two other plants set for development in Tasmania, one in Huonville and the other in Boyer, but these are still in the formative

stages. The cost associated with using GPE technology is dependent upon the amount of green waste being deposited on site. Indications from the GPE Managing Director suggest that for a renewable energy plant to be financially viable it needs to process approximately 130, 000 tonnes of green waste per year (Gan, 2005).

GPE is particularly supportive of establishing partnerships with Local Government (GPE, 2005). It recognizes that green waste is a significant policy issue and suggests that supporting green waste-to-energy generation will enable councils to develop sustainable policy solutions for the management of green waste. GPE maintain that a diverse range of management options are required to deal with the green waste issue, and that the current main options (composting/chipping/landfilling) are not sufficiently diverse or reliable as sustainable, long term solutions. According to GPE 'our green waste-to-energy generation represents a clean, secure, long term, low risk policy solution for green waste management' (GPE, 2005: 5). Importantly, GPE has indicated it is prepared to work closely with Councils to support and promote their policies and aid in the education of the general public in relation to sustainable green waste management (GPE, 2005: 9).

6 Summary

6.1 Reflections

Green waste disposal is an issue that is demanding more attention. While waste management generally has assumed significant importance as an environmental policy issue on an international, national, state and local level, green waste has not achieved a similar status. With increasing environmental pressures, community concerns and improved technology, however, more attention needs to be focused on this area and the potential benefits that effective and efficient green waste management can deliver. On a national level there is an apparent vacuum in green waste management policy direction since the 1998 ANZECC document and year 2000 waste reduction target.

At a State level, the *Six-Point Action Plan for Controlled Waste* demonstrates what can be achieved in terms of establishing a policy direction for specific aspects of waste management (in this case controlled wastes). Such an Action Plan could serve as a

policy model for addressing green waste management, especially in the face of the State Government's impending ban on burning and the move to divert significant amounts of waste from landfill. Removing traditional modes of green waste disposal should be matched by a commitment on the part of the State Government to work with Local Government to explore alternative and viable disposal options.

A working partnership needs to be developed between the two tiers of government in order to develop realistic alternatives. It is problematic for the State Government to simultaneously impose on Local Government a ban on a particular method of green waste disposal and devolve responsibility for the establishment of a sustainable solution to green waste management in the State.

The continued development of regional-based approaches to waste management is also important. South Australia has developed Regional Local Government Waste Groups in order to best meet emerging waste management challenges. The South Australian Local Government Waste Committee (2003:4) reports that in addition to the significant financial and service delivery benefits that are derived from a regional approach, such an approach delivers a broader perspective on waste management and allows Councils to deal with issues that benefit from a broader rather than single Council perspective more effectively. There is no reason why Tasmania could not follow a similar path to South Australia and implement regionally-based composting, chipping and energy recovering programs in the future.

Clearly green waste management demands a concerted and coordinated effort from the community, government and industry to ensure a sustainable and achievable approach is adopted. As the Bureau of Industry Economics (1993: 1) noted:

> a feature of [green] waste management is that responsibility ramifies through all levels of government, commonwealth, state and local, and coordination and cooperation between government is fundamental to the development of sensible waste management policies.

The community and Local Government have an important role to play in green waste management. Local Government, as a community leader, policy maker and service provider has the ability to be influential in terms of green waste management, particularly through incentives to reduce waste and increased public education

programs. Importantly, Local Government needs to stay informed about how best to manage and reduce waste in general, and green waste in particular.

In terms of the community, Eco Recycle Victoria has noted that while many people are concerned about the environmental impacts of waste disposal, only the most committed take action to reduce their individual impact or take an active role in waste management (Zero Waste SA, 2005: p. 16). It is important that the Tasmanian community, as a significant contributor of green waste, realizes that individuals have a responsibility for avoiding, reducing and recycling green waste materials. It is recognized that engendering a greater sense of individual and community responsibility for avoiding, reducing, re-using, recycling and managing (green) waste requires considerable public education and a focus on 'fostering sustainable behaviour' (Zero Waste SA, 2005: p. 16).

6.2 Some Suggestions

The primary aim of this study was to investigate alternative methods of green waste disposal for possible application by Local Government in Tasmania, Australia. The study identifies three main options.

The first was composting, which presents a viable long-term option for the management of green waste disposal. Councils such as Brisbane City Council in Queensland (Ricketts, 2005) and Concord (Local Government Focus, 1998) and Yass Valley (Yass Valley Council, 2004) Council's in New South Wales, as well as municipal Councils in New Zealand (Lewis, 2005) all successfully operate composting facilities. Critical to the success of any composting operation, however, is the quality or purity of organic material to be used as compost. There are also significant financial outlays (potentially in the tens of millions of dollars) to develop the required infrastructure, and this may well be a prohibitive factor when considering adopting composting as a green waste disposal option.

The second alternative presented was chipping, which also suffers from contamination issues similar to composting. If chipping and composting are to be more than just a green waste disposal option, there is a need to produce a high quality product that can be sold to the general public. Importantly, however, this will

not occur without considerable market research and incentives to develop recycled organic markets in Tasmania (Meinhardt (Vic), 1999). Chipping was presented as the most appropriate short-term option, with the potential for it to be part of a long-term integrated composting process. As mentioned above a regional approach to chipping may be a viable option through the purchase of appropriate chipping machinery.

The final option was the green waste-to-energy operation to be undertaken by GPE. A renewable energy plant is set to open in Bell Bay, Tasmania within 16 months. The progress of this development must be closely monitored. Into the future it may be possible for Councils and GPE to engage in negotiations to establish a formal agreement in relation to green waste disposal.

6.3 Conclusions

Developing an effective Statewide strategy on green waste disposal is contingent upon a number of crucial factors and relies on leadership, cooperation and a concerted effort across all tiers of government.

There is an apparent need for high-level policy development to occur in Tasmania. The Six Point Action Plan demonstrates exactly what can be achieved in terms of waste management strategies and the formation of the High Level Officials Group provides the State with an excellent opportunity for a body with both the authority and the expertise to initiate and influence such policy development. It should be recognised that green waste management is an issue of growing importance and increasing significance and as such demands responsibility across both State and Local Governments.

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Appendix 1
Green Waste Disposal Data

	Launceston	Waratah-Wynyard	Meander Valley	Southern Midlands	Central Highlands	Glenorchy	Latrobe
1. What are the major causes of green waste in your Council area?	Garden refuse and site clearing for domestic housing developments	Tree pruning	Domestic and occasional clearing of very large trees	Mainly garden refuse, tree trimming/pruning	Mainly garden refuse, tree trimming/pruning, Major shack site projecte	General household source	Subdivision works, council maintenance, capital works, commercial contractors, general household green waste
2. Approximately, how much green waste does your Council area produce per annum?	13, 000 tonnes p/a	1, 000 cubic metres p/a	975 (loose) cubic metres p/a	Unsure at this time	Unspecified large amount	6, 400 cubic metres	70, 000 - 100, 000 cubic metres (rough approx.)
3. How significant is the stockpile of green waste in your Council area?	/	No significant stockpiles - dispose regularly	1, 000 cubic metres	Large	Significant - as a result of burning ban have had to transport green waste from 13 WTS to Hamilton landfill (costly)	Not a problem	Significant - currently real problem
4. How often does your council need to conduct a burn-off of green waste?	All green waste is disposed of to landfill	3 per annum	Rarely - but currently need one	Approximately every 2 months	Approximately every 2 months	All green waste is shredded and composted	Licensing conditions don't allow burning. Green waste is mulched annually. But expensive and would like to conduct occasional offsite burn.

Circular Head	West Tamar	Dorset	George Town	Derwent Valley	Flinders	Huon Valley
General domestic garden waste, some larger landscape works	Household green waste and from council works	Domestic causes (trimming/pruning)	Street tree trimming and weeds	Yard waste from households	Trees cleaned up on vacant blocks and garden pruning & trimming	Garden waste and private land clearing
1, 000 cubic metres every six months	2, 500 cubic metres p/a	1, 500 cubic metres (approx.)	10, 000 cubic metres	1800 cubic metres	Approx. 200 tonnes	2,000 cubic metres per annum after mulching
Significant. Reaches 2, 000 cubic metres every 2 3 years	Not significant	Significant (without burning)	Not specified	Average	Moderately significant	4 WTS all with significant stockpiles
Every 2-4 years	Never. All green waste is chipped	Twice a year	Most mulched but need to burn about 1,000 cum per year in 2 burns.	Never	Once a year	3 per each WTS per annum

Appendix 2
Limited Burning Guidelines

18 January 2005

«General_Manager»
«Organisation»
«Address»
«Address2»

To All General Managers

Guidelines for the Limited Burning of Green Waste

Further to my letter dated 10 November 2004 I am writing to advise the outcome of discussions with the Department of Primary Industries, Water and Environment (DPIWE) concerning the limited burning of green waste by rural Councils. These discussions were held as a result of the motion passed at the May General Meeting requesting the Association to liaise with the State Government in order to develop a statewide approach to the disposal of green waste given the Department's decision to ban the burning of green waste in Tasmania.

Information recently provided by Councils indicates that several rural Councils have a need to conduct some sort of burning of green waste to deal with problematic stockpiles. The frequency of the need varied considerably from two Councils who suggested they need to conduct a burn every 2 months to several Councils who indicated that a burn would be a rare occurrence or one that was only required every 2 to 4 years.

The Association is of the view that a uniform and consistent approach to green waste disposal is desirable and to that end in house research is being conducted into options for dealing with green waste. In the interim, however, the Director of Environmental Management has advised that, in limited circumstances and for a limited period, the burning of green waste by rural Councils is permissible where no other means of disposal is feasible.

The Director has advised that he will **not** approve any requests to burn green waste at landfill sites and waste transfer stations for the following reasons:

- the potential ignition risk to deposited waste is considered too high;
- past burns at waste facilities have generated significant public complaint, indicating that these facilities are not far enough removed from sensitive receptors; and
- smoke arising from a clean and safe burn at or near a waste facility can still create the perception that garbage or hazardous waste is being burned and that toxic smoke is being released.

Without the approval of the Director, burning at a waste facility may constitute an offence against clause 11 (3) of the *Environmental Management and Pollution Control (Waste Management) Regulations* 2000.

In relation to burns conducted remote from waste facilities, these will be permitted, for a limited period, as long as they are undertaken in strict accordance with the following conditions:

- burning must not be conducted at landfills or waste transfer stations, or in the immediate vicinity thereof;
- burning must be conducted with due regard for fire safety and in accordance with any requirements of the Tasmanian Fire Service (such as the requirement to hold a fire permit during the fire permit period);
- environmental nuisance must not be caused. Where complaints are received by this office, the Director reserves the right to serve an Environmental Infringement Notice or take other enforcement action, if warranted;
- green waste for burning must be free of waste that is not of organic origin; and
- fires must be fully extinguished no longer than 48 hours after ignition.

Please note that this is only an interim arrangement agreed to by the Director while the Association completes its in-house research into options for dealing with green waste. To that end the interim period ends on **30 June 2005**, extendable for a further six months only if the Association requires further studies to be undertaken.

I hope this information is useful and I trust that if you do conduct a burn of green waste you will do so in accordance with the requirements set out above.

If you require further clarification please contact Dr Christine Standish on 6233 5967 or email at christine.standish@lgat.tas.gov.au.

Yours sincerely

Allan Garcia
CHIEF EXECUTIVE OFFICER

APPENDIX 3

Waste Minimisation Plan

The following provides an illustration of a waste minimisation plan that might be implemented by a Council or Councils when considering whether to adopt composting as a method of waste management.

- Council decides to investigate the issue of composting.
- Report prepared to determine Council's present position and the implications with the development of a plan.
- Council decides to develop a plan and establish compost committee.
- Committee undertakes extensive review of:
  - Existing legislation, strategies, policies and programs relevant to composting and waste minimisation;
  - Council's current waste management practices;
  - Where and when compostable wastes are produced;
  - Types and quantities of compostable wastes being produced;
  - Possible composting options.
- Review submitted to Council and approval sought to undertake extensive community consultation.
- Establish priority issues and set target.
- Identify and evaluate composting options suitable for local conditions.
- Develop individual composting programs if appropriate.
- Develop a promotion, awareness and education program for the plan and individual programs.
- Develop a performance evaluation and review program.
- Submit plan to Council for approval and inclusion in Council's work program.
- Implement plan.
- Evaluate programs.
- Review plan performance.

Important Considerations

The following provide an example of the kind of considerations that should be taken into account when deciding whether to adopt composting as a waste management option.

Characteristics of wastes available:

- The proportion of waste that is compostable or can be used in the composting process as a bulking agent.
- What disposal route is available for materials that cannot be processed in to compost.
- What seasonal variations in waste analysis are likely to occur and to what extent will they affect production.
- How the waste will be delivered to and received at the processing facility.
- To what extent will environmental pollution controls affect the capital and running costs of the operation.
- What technology is most suitable for wastes available and the product markets to be targeted.

Market survey:

- What products could be made from the waste available.
- How many similar products are already offered nationally, regionally and locally.
- How much compost would be being created.
- What do the markets themselves require.
- What is the likelihood of other waste contractors or public authorities moving into the same field and to what extent market saturation would be a consequence of their doing so.

Australian Standards

There are specific requirements that compost products much reach to ensure they are of a legally acceptable standard to be sold and used by the public.

Australian Standard 4454 (2003) (AS4454) relates specifically to composts, soil conditioners and mulches. The Standard contains guidelines to provide manufacturers, Local Government bodies, consumers and growers with:

- Minimum requirements for the physical, chemical and biological properties of composts, soil conditioners and mulches; and
- Labelling and marking requirements, in order to facilitate beneficial recycling and use of organic materials with minimal adverse impact o the environment and public health.

The Standards also sets out best practices to assist processors to consistently produce quality composts, soil conditioners and mulches. Appendix P to AS4454 specifies the means of demonstrating compliance with the Standard.

See: Standards Australia (2003). AS 4454—Composts, soil conditioners and mulches. Standards Australia, Sydney, NSW.