

**THE ROLES OF GOVERNMENT, THE PRIVATE SECTOR, AND
RESIDENTS IN SOLID WASTE MANAGEMENT: LESSONS FROM
A CASE STUDY IN GREATER HOBART LOCAL GOVERNMENT
AREAS, TASMANIA**

by

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STATEMENT

This thesis contains no material which has been accepted for the award of any other higher degree or graduate diploma in any tertiary institution and, to the best of the candidate's knowledge and belief, the thesis contains no material previously published or written by another person, except when due reference is made in the text of the thesis.

Signed *C. Chayabutra*

ABSTRACT

This thesis examines the various means of improving local government solid waste management services. Solid waste management is now a major environmental policy challenge throughout the world and one in which the role of local government is both interesting and important. Factors at many levels conspire to expand and add new responsibilities at this level. The United Nations Conference on Environment and Development in 1992, for example, placed a heavy emphasis on the role of local political structures and in Australia local authorities are being increasingly asked to shoulder a greater responsibility in environmental management.

General conditions and issues of local government involvement in environmental management and solid waste management are discussed, followed by particular reference to the State of Tasmania, in Australia. A brief description of municipal solid waste services in the author's own country, Thailand, is also given. A supplementary objective of the thesis is to investigate the degree to which strategies and methods employed in Tasmania have wider applicability, in particular to Thailand. With privatisation of public services now common part of policy in many parts of the world, the issue of privatisation of solid waste management services is highly germane to this thesis. Factors and principles relevant to the privatisation of public services are therefore discussed.

A case study of solid waste management in the Greater Hobart Area, in southern Tasmania, takes a multi-sectoral approach, focussing on the State Government as the highest responsible authority in the region, local government as the immediate regulator and provider of services, the private sector as a (contract) provider in some parts of the region, and local residents as both producers of waste and consumers of solid waste services. Study methods used include structured interviews with State and local government officials (in five local government areas), and two different questionnaires, sent to private companies and five hundred households in the region respectively.

Major findings draw attention to the improvements which can be achieved through waste minimisation programs when all tiers of government exercise their responsibilities and cooperate with each other. The public in the Greater Hobart Area have also responded positively. The thesis finds that private contractors can be more cost effective without any apparent loss of service quality, but notes that each situation where the private sector could be involved needs individual appraisal. Lessons from the Tasmanian experience are potentially applicable elsewhere, particularly with regard to a cooperative model for seeking improvement, but are also relevant to policy makers and managers in Tasmania itself.

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CHAPTER 1. INTRODUCTION

Local governments face difficult situations in responding to the management and financing of urban infrastructure and services. The latter includes solid waste management, one of the main environmental concerns of local government. In Australia, the awareness that local development and services ought to be more environmentally sustainable is increasing at the same time as the Federal and State Governments' funds to local authorities are being reduced. This has provided the need for new methods which increase the efficiency of local government environmental and economic management.

A method commonly advocated to achieve these goals is to contract public services out to the private sector. The author's interest in the thesis topic arose from involvement in a pilot project focussed on the possibility of improving local government services in Thailand through privatisation. The pilot study was sponsored by the United Nations Centre for Human Settlements (Habitat), and the Office for Urban Development, Department of Local Administration (Thailand), in an attempt to strengthen the role and improve the performance of municipal government. The objectives of the project were to

- 1) improve the efficiency and cost-effectiveness of local government services;
- 2) allow financial responsibility for a larger proportion of activities to be devolved to municipalities; and
- 3) develop a framework that engendered greater private sector participation in municipal activities (Coopers and Lybrand 1991).

The author became interested in applying these principles to the area of solid waste management, and the possibility of investigating the ways that local governments adapt to the challenges and set about solving new problems. An opportunity arose for case study work in southern Tasmania, Australia. The results of the study, comprising the empirical core of this thesis, are intended to be useful in their own right in Tasmania. It was also hoped they may prove relevant elsewhere, including Thailand.

The general aims of the thesis are to examine the role of Tasmanian municipal authorities in solid waste management, including policy and operations, and to relate these to the broader policy and regulatory framework set by other tiers of government, particularly the State Government. Tasmanian municipalities provide useful case studies because local government in the State is currently faced with significant changes to State legislation. The implications at the local level are numerous, and include wider environmental responsibilities in general, and a requirement to relate local plans to sustainable development.

Tasmanian local government experience in privatisation programs, though limited, is predominantly in the field of solid waste management. Privatisation has become an increasingly important phenomenon worldwide, with the most well-known being the precedents set by the British Government under Margaret Thatcher. Privatisation policy has since become an important political priority in many countries, especially in those with economics constrained by the nature of their limited resources (Hughes 1990). In countries such as Australia, the better known private sector involvement programs are those that pertain to the national or state levels. There are, however, many instances of privatisation operating at the local level. As with the issue of privatisation of Commonwealth utilities and functions, the policy of shifting to increased reliance on the private sector at the local government level is associated with significant debate over its applicability and the implications for the environmental aspects of services.

1.1 Study objectives

The objectives of this thesis are to

- 1 explore in general the role of local government in environmental management in a period of rapid and substantial change;
- 2 study the operational aspects of solid waste management by local government at a general level, and to describe how they are performed in Thailand and Tasmania;
- 3 discuss privatisation of public sector services at the theoretical level, with a view to gaining a critical perspective on its application;
- 4 explore the Tasmanian State policy and regulatory framework for local government solid waste management, and the role this plays in encouraging environmental improvement at the local government level;
5. study in some detail the solid waste management programs of a number of Tasmanian local governments, in order to determine their responsiveness to the State, and to their own policy, regulatory, and administrative arrangements; and investigate aspects of their performance in terms of efficiency, cost effectiveness, and private contracts;
6. draw conclusions about performance from the case studies of local government areas, and to suggest lessons of wider applicability, including those relevant to Thailand.

1.2 Outline of the thesis

Chapter 2 details environmental management by local government in Australia, to provide an account of the changing situation and the new pressures faced by these governments. It also uses the wider literature to illustrate the complexities involved. By way of background, local environmental management issues in Tasmania are also described.

Chapter 3 explains the processes involved in solid waste operations at the local government level, providing the context of the investigation. These processes include collection, transport, treatment, and disposal systems. Associated environmental problems are noted, as are some of the economic aspects. Descriptions of general conditions applying to solid waste management in Thailand and Tasmania follow. In addition, the policy framework set by the Tasmanian Government is treated in detail, and some of the differences between Thailand and Tasmania are discussed.

In Chapter 4, the broader aspects of privatisation of public sector services are presented. The chapter includes a classification of various types of privatisation, relevant economic theories, and key advantages and disadvantages of each type of privatisation.

The case studies of solid waste management in southern Tasmania are reported in Chapter 5. These cover five local governments. Perspectives from the private sector companies which provide some services are also given. Chapter 6 continues with case study research results, but from the perspective of the consumers of services, the residents of the study area. Information collected on attitudes, opinions, and practices related to solid waste services, obtained through household questionnaires, is presented and discussed.

Finally, Chapter 7 draws together the conclusions from the research, particularly those from the case studies of the different stakeholders in solid waste services. Recommendations aimed at assisting local governments in the management of solid waste services are provided, including the major waste minimisation lessons that can be learned from Tasmania.

1.3 Study area

Five municipalities constituted the study area. These were the local government areas administered by Hobart City Council (HCC), Glenorchy City Council (GCC), Clarence City Council (CCC), Kingborough Municipal Council (KMC), and Brighton Municipal Council (BMC). The combined area has been termed the 'Greater Hobart Area' for the purposes of this study.

CHAPTER 2. AUSTRALIAN LOCAL ENVIRONMENTAL MANAGEMENT

2.1 Introduction

In recent years, there has been increasing concern about the relationship between development and the environment (Furze 1992). Australia is now at a stage where the environmental implications of roads, buildings, other infrastructure, and all kinds of development are being questioned, and there are new 'quality of life' concerns (Keen and Mercer 1993). Environmental management has become a major focus for ideas on development, particularly within the context of sustainable development.

Environmental management in local government can be described as all the policies, plans, programs, actions, and ongoing activities that have an inbuilt environmental orientation (Tasque 1991). This means all activities of local government have to be considered in an environmentally sound framework to ensure that ecosystems are a priority and are not degraded by human activities.

In this chapter, a general view of environmental policy is briefly reported, followed by local environmental policy and planning, and the associated problems. Questions of quality, performance measurement, and standards in relation to environmental management are also reported.

2.2 International and Australian national frameworks for local government action

Both international environmental initiatives and Australian national environmental policies are mainly concerned in environmental change as a result from human activities, for example the loss of biodiversity, climate change, and deforestation (Tasque 1992). A landmark international environmental conference, the United Nations Conference on the Human Environment in Stockholm in 1972, focused largely on the relationships between expanding human population and the biosphere. The World Conservation Strategy (1980) introduced the term 'Sustainable Development' to describe the need to balance economic development with the impact of human activities on the environment, sustaining resources for future generations and maintaining and improving the quality of the environment. Such a need was emphasised in Australia (Dept Home Affairs & Environment 1984) and conservation strategies were established in some Australian states. In 1987 the 'Brundtland report' introduced *Our Common Future* as a theme for

global environmental policy (World Commission on Environment and Development 1987). The 1992 Earth Summit at Rio de Janeiro was a call for action and for legally binding conventions on a global scale, through such mechanisms as the Convention on Climate Change, the Convention on Biological Diversity, the Rio Declaration, and Agenda 21 (Brien 1993).

Australian environmental policy followed international initiatives for Ecologically Sustainable Development (ESD). As the definition of ESD was not clear, the Australian government introduced its own in 1990, namely, "using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased" (Ecologically Sustainable Development Steering Committee 1992).

Consequently, in 1992 a number of environmental policies were established. These include the Inter-Governmental Agreement on the Environment (IGAE), the National Greenhouse Response Strategy (NGRS), and the National Strategy for Ecologically Sustainable Development (NSED). Australian local government, which acts within the framework set by the Federal and, principally, the respective state governments, is now being increasingly charged with incorporating such environmental policies into local environmental management.

The Earth Summit proposed an environmental policy for local government to support its 'Local Agenda 21' in Chapter 28 (Johnson 1993). This included activities in which local authorities should provide local environmental programs, policy, law, and regulations. Local government is closest to the people, it was suggested, and can play a vital role in educating, mobilizing and responding to the public and is best placed to promote sustainable development.

Some Victorian local governments, encouraged by the State Government, have established a Local Conservation Strategy which provides a route to aim for a sustainable, quality lifestyle for present and future generations (Fendley, Westcott, and Brooks 1992). Under this strategy local government and communities are encouraged to take account of their environment so that decision-making is always concerned with issues of environmental quality as well as economic development.

2.3 Australian local government responsibility

Local government in Australia has, principally, a three-fold role: (1) to provide services to local communities, (2) to maintain the instruments of democratic self-government, and (3)

to develop community resources (Power, Wettenhall, and Halligan 1981). Within this framework, local councils have primary responsibility for the regulation of land-use and development. According to Cutts and Osborn (1989), approximately 128 services are provided by local government. These can be divided into public works and services, such as roads, water supply, and sewerage; recreational facilities and services including parks, and gardens; and community facilities and services, including the provision of some community buildings and programs, and removal of solid and liquid waste. In the past, local government in Australia, on the whole, has not seen these roles from an environmental perspective but changes are now occurring. Many of the changes are being initiated at federal or state level but require implementation at the local level.

2.4 Local government and the environment

Local councils already have responsibility for matters which are related both directly and indirectly to the physical environment. The growth of population and technologies causes major changes in the use of natural resources, which can effect environmental quality. Local government has an important role to play in balancing development with the protection of the environment. There are many direct and indirect environmental activities at the local level, including local conservation strategies, Landcare, pollution control and monitoring, heritage protection, tree planting, coastal management, flora and fauna protection, recycling, solid and liquid waste management, urban preservation, energy management, natural area enhancement and protection, bushfire management, environmental impact assessment, urban improvement, traffic management, catchment management, wetlands management, and environmental education (Tasque 1992).

Although these activities are carried out at a local level, they are not all controlled by local government. The degree of authority varies from state to state depending on state laws. Some of the activities, such as Landcare, are Federal Government initiatives which require the involvement and interaction of local government and community groups.

In many instances there is overlap between the responsibilities of state government departments and local government, which can cause conflict or uncertainty. As the concept of sustainable development is being increasingly integrated into legislation, policy, and practice at all levels of government, some of these problems of overlap are being addressed. The new Resource Management and Planning System in Tasmania (outlined in Section 2.6), for example, enshrines the sustainable development concept at both State and local government levels.

At present, there are about 900 local governments in Australia. They are important for environmental management, for example, through land-use planning, development approvals, and development control (Commonwealth Environment Protection Agency undated). Urban development and waste management are two of the most challenging areas for which local government have responsibility as both can create major environmental damage.

Waste management is one of the main environmental concerns of local government, especially intractable waste which causes serious damage to ecosystems. Waste management includes such services as sanitary services, sewerage, and garbage collection and disposal. According to the Committee on Solid Wastes, American Public Works Association (1966), factors relevant to relationships between solid waste management operations and the environment include the following: public health factors such as effects on air quality, and potential for transmission of disease vectors; economic factors such as the availability and cost of land to the community, the volume of wastes that must be dealt with, the market for recyclable materials, indirect economic effects, and the partitioning of costs; laws and regulations and jurisdictional questions; and the need for long term environmental planning for solid waste management.

It is generally accepted that urban development needs tighter controls, and plans for development which do not degrade the environment. This includes facilities for residents in the local community such as drainage, water supply, and community services like health care and recreation facilities.

The environment has to be improved or maintained for a better quality of life, as well as for a more efficient use of resources. Moreover, local government has to improve or replace infrastructure and facilities of inferior quality. For example, local authorities in the Hobart area were required by the Tasmanian Government to upgrade all sewage treatment plants to secondary treatment by the June 1994. This puts pressure on local government and generates many internal and external problems. Policy in local government needs support from better finance and management infrastructure, but in practice this does not always happen. Local government has to adjust its own policies in response.

2.5 Problems of local environmental management

Local government faces the prospect of placing a new priority on policy dealing with environmental problems due to its need to be more immediately accountable to the community. New laws and the formulation and implementation of new policy,

procedures, and administrative arrangements for the environment are increasingly required in practical ways to control environmental degradation. In the past, the Commonwealth *Local Government Act* 1919 and the Commonwealth *Public Health Act* 1902 were the basis of environmental protection, but little emphasis was placed on the environment and few considerations for its protection were found in planning policy. After the alert to environmental damage in the late 1960s and during the 1970s, regulations to control water, noise, and air pollution were established, mainly through Environmental Protection Acts.

As local government relies on the framework of federal grants and regulations and on state legislation, local environmental policy is faced with the difficult task of following policy, at two higher tiers of government in the context of the problems of each locality. Both Federal and State governments have tended to have unclear planning due to the scale of the problems and the extensive spread of pollutants in the environment. Local government, which has little or no power of its own, needs to develop a tangible environmental policy that can provide for ESD and good local environmental management (Tasque 1992). The problems of environmental management in local government can be classified under three headings: policy, finance, and management.

Local government planning policies also vary according to how important each local government considers environmental planning. These can differ in each state according to state legislation and the degree of local government authority. For example, Queensland local government has a general competence power (provided by the *Local Government Act* 1936 [Queensland]) to set the framework for infrastructure, whereas in other states, local governments have power under many separate pieces of state legislation (Cutts and Osborn 1989).

The growing awareness of the need to reduce harmful impacts on the environment at local level is moderated by funding and economic management systems. Local government finance during the 1980s faced limitations from declining sources of funds from borrowing, the decreasing profitability of public enterprise, and cuts in grants from the national level due to the economic recession (Office for Local Government 1988). Although grants have been increased in the early 1990s, they have not been enough to cover increasing demands for services, rising costs, and a limited revenue base. This makes the handling by local government of the federal and state policies on the environment more difficult. The cost of implementing programs to protect environmental quality is often seen as detracting from local economic growth.

Local government management has responded by calling for greater attention to more efficient, equitable, innovative and accountable administration (Office for Local

Government 1988). A system of management which includes corporate management programs and organization design and evaluation is increasingly being established to increase managerial flexibility and accountability. In many agencies, environmental management faces strong institutional pressures favouring growth and development. Moreover, local government services are normally designed to deal with development rather than the environment (Hall 1990). Local government is called upon to significantly increase its role in planning and management by moving towards more environmentally sustainable development, and by improving its capacity in finance and management.

Despite the fact that the Australian Government has established the National Strategy for Ecologically Sustainable Development in order to clarify the definition, goals, objectives and guidelines of ESD, individuals such as politicians, economists and local communities have a different understanding of ESD in relation to many issues. Along with such complexities and new challenges, local government is considering new strategies on a whole range of fronts, for example, privatisation of services aimed at improving economic efficiency. The following three sub-sections, on the quality of local government services, measurement of environmental performance, and pollution control standards, give added insight into the kinds of issues local government is becoming embroiled in as its environmental responsibilities increase.

2.5.1 Local government service quality

After World War II, public concern about the quality of public services gained momentum within the civil rights and anti-poverty movements. Questions about pollution, urban blight, crime, and uncontrolled urban growth were raised. Local governments responded to these by improving their services, and this resulted in increased costs and taxes. At the same time, local government generally lacked systems to measure the quality of life and rank the priority of their services.

Total Quality Management (TQM), mainly used in the private sector, has recently been discussed for application in the public sector (Bunning 1992). However, there are some major concerns about the different purposes of these activities and services. Three differences between the private and public sector are that many public services show intangible as well as tangible benefits, they have higher labour costs, and the production and consumption of many services are inseparable (Bunning 1992). The purpose of measuring the quality of public services is to improve their productivity and their effectiveness. Measuring these has both direct and indirect benefits in that it can indicate the problems, provide feedback, set the priorities of funding and labour, help management, and involve the community in government activities (Hatry 1989). Local

government is not used to measuring its own performance, however, and the need to do so is an added pressure at a time of shrinking funds.

2.5.2 Environmental performance measurement

Interest in the measurement of environmental performance has increased in parallel with interest in sustainable development and the growth of public concern in the environment (OECD 1991a). Environmental indicators as measuring tools can integrate environmental and economic decision making more systematically and effectively as a means of contributing to sustainable development (OECD 1991a). Government agencies and program managers have to set suitable environmental indicators, and ensure that regular monitoring and implementation will be accountable and effective for ESD (Ecologically Sustainable Development Steering Committee 1992).

In general, environmental performance is measured on the '3Es' of economy, efficiency and effectiveness, and production is measured on input, output, and outcome. Beeton (1988) describes 5 major forms of comparison for performance measurement.

- 1) Targets: the analysis of performance against the achievement of policy or budget targets.
- 2) Time-series: comparison with the historical record of the same organisation.
- 3) Comparable organisational units: a cross-sectional comparison with other units of the same service.
- 4) External comparison: comparison with other organisations, both in the private and public sectors.
- 5) Normative models of performance built upon both rational argument and professional judgement concerning expected absolute standards.

The OECD (1991a) introduced environmental indicators to compare performance among OECD countries. In this way environmental performance can be used as environmental information. Indicators can be used as guides to reduce pollution and to improve the standard of environmental quality in international policies, and these can also apply at national and local levels.

According to the OECD (1991a), three types of environmental indicators are

- 1) the measurement of environmental performance with respect to the level and changes in the level of environmental quality in relation to national policies and inter-government agreements;
- 2) the integration of environmental concerns in sectoral policies; and

- 3) the integration of environmental concerns in economic policies more generally through environmental accounting, particularly at the macro level.

However, the measurement of environmental performance is difficult due to measurement processes and priorities. Day and Klein (1987) noted three characteristics of services which make environmental performance measurement difficult. These are heterogeneity (the differences between largely single-product services and multi-product services), complexity (difficult to measure different skills in particular tasks), and uncertainty (objectives of services). Moreover, Beeton (1988) noted, there is neither a standard technique for making performance comparisons nor an appropriate method of measurement involving standardising for external factors. However, he claims that the choice of precise indicators must be based on reasons and numerical indicators should be backed up by qualitative judgements. Again, these are difficult issues which are part and parcel of the new challenges that local government is being called upon to address.

2.5.3 Standards of pollution control

Environmental managers and regulators at all levels can formulate and enforce standards of pollution control through a variety of policy instruments. The two principal approaches are regulation and economic strategies.

The regulatory approach generally requires a government to set health or ecology-based ambient environmental levels, and to specify the standards or amounts of pollutants that can be discharged (Bernstein 1991). Government agencies may use pollution abatement or noise control notices (Bates 1987). Regulatory mechanisms generally can be divided into (1) standards, (2) permits and licences, and (3) land and water use controls.

According to Fisher (1993) and Bernstein (1991), there are many different types of standards for different circumstances. These include

- | | |
|---------------------------|---|
| - ambient standards | - how much polluting material may be absorbed by the environment; |
| - discharge standards | - how much polluting material may be allowed to enter the environment; |
| - performance standards | - an indication of performance measurement on pollution; |
| - technological standards | - indicating specific technology that must be used to comply with environmental laws and regulations; |
| - product standards | - how much pollutant per unit of product output; |
| - process standards | - limits of pollution emission associated with specific manufacturing processes. |

However, in practice, it is difficult to identify and enforce appropriate environmental standards in advance to suit different kinds of developments.

The second regulatory mechanism is that of permits and licences. Governments may require the fulfilment of specific conditions such as compliance with a code of practice (Bernstein 1991). For example, in the *Environmental Protection Act 1973* (Tasmania) in s23, the operation of some activities listed in the regulations requires premises to be licensed.

The final mechanism of regulatory policy is land and water-use control. Land-use control normally is a principal tool of local government, whereas water use is controlled by state or federal governments. Zoning is commonly used to define allowable uses of land for different purposes such as residential and industrial uses.

Economic tools are another mechanism for environmental managers and regulators. Various kinds of economic mechanisms have been adopted in recent years. As Bernstein (1991) noted, these include pollution charges (such as effluent/emission charges, user charges, product charges, and administrative charges), market creation (permits or liability insurance), subsidies, deposit and refund systems, and enforcement incentives (such as non-compliance fees, performance bonds, and liability assignment).

Aspects of pollution control are another area of expanded roles for local government. Under Tasmania's new *Environmental Management and Pollution Control Act 1994*, for example, the granting of necessary permits which involve setting appropriate standards for level 1 activities (applying say, to small industries), will become the responsibility of local government.

2.6 Local government and environmental management in Tasmania

2.6.1 Environmental policy

In the past, Tasmanian State environmental policies have applied to local government services through the *Environmental Protection Act 1973* and *Local Government Act 1962*. However, there were some significant shortcomings in the legislation such as inflexible regulatory standards and little incentive to improve environmental performance (Bingham 1993). The *Environment Protection Act 1973* also suffered because of the need for development approval from multiple authorities. A new package of environmental planning and management legislation was passed in 1993/94 in an attempt

to integrate care for the environment into all aspects of development, at the same time streamlining development approval processes. This includes five major Acts:

State Policies and Projects Act 1993;
Land Use Planning and Approvals Act 1993;
Resource Management and Planning Approval Tribunal Act 1993;
Land Use Planning and Approval (Consequential and Miscellaneous Amendments) Act 1993; and
Approvals (Deadlines) Act 1993.

This Land Use Planning and Approval package, otherwise known as the Resource Management and Planning System, has been designed to integrate resource management systems in Tasmania. The Acts have more flexible regulatory standards and provide more incentive and encouragement towards improved environmental practices and new developments (Bingham undated).

In addition, the new *Environmental Management and Pollution Control Act 1994* aims to improve environmental outcomes and provide new and more effective enforcement tools in environmental standards. This Act has just been passed and is expected to be implemented from January 1, 1995.

The Tasmanian State Government describes 'sustainable development' in the Act (in Schedule 1, Part 1) as "managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety while -

- a) sustaining the potential of natural and physical resources to meet the reasonable needs of future generations; and
- b) safeguarding the life-supporting capacity of air, water, soil and ecosystems; and
- c) avoiding, remedying or mitigating any adverse effects of activities on the environment".

The new legislative package is intended to integrate land-use planning and environmental management concerns far more than previously. All the new laws enshrine the sustainable development concept as defined above.

There is also a new *Local Government Act 1994*, also integrated with other components of the legislative reforms. Local government is generally given far wider environmental responsibilities and, for the first time, is required to develop strategic plans (beginning in

1994, on a five yearly basis). Such plans must be in accord with any State policies that may be promulgated, and must incorporate the sustainable development principles.

2.6.2 Local government change

Local government authorities have been amalgamated from 46 to 29 councils since 1993. This policy is to strengthen the councils and increase the ability and capacity of local government to accept the greater responsibilities within each municipal unit, and collectively, as a municipal union (Local Government Advisory Board 1991a). The reform plans devised a new municipal structure according to three principal categories; (a) geographic, social, and community of interest factors; (b) economic/ financial independence, viability, and diversity; and (c) planning and management capability (Local Government Advisory Board 1991a). Within the new arrangements, local government is intended to be able to effectively provide the services and programs needed by the community (Local Government Advisory Board 1991b).

2.6.3 Local government finance

The existing source of local government finance is primarily from the levying of various charges and fees for service activities and trading activities. Records are based on the system of Standardised Local Government Finance Statistics.

Local government revenue income is classified by the Australian Bureau of Statistics according to four major sources : (1) taxes, fees and fines, (2) property income, (3) grants, and (4) business operations and surplus such as electricity and water supply. Table 2.1 and 2.2 show the income and expenditure of local government in Tasmania.

TABLE 2.1 Income of local governments in Tasmania (\$ million)

Note: Percentages are rounded.

	1986-87		1987-88		1988-89		1989-90		1990-91		1991-92	
	(%)		(%)		(%)		(%)		(%)		(%)	
-Taxes, Fees, and Fines	77	50	86	49	94	52	109	53	117	53	124	51
-Net operating surplus	24	16	33	19	29	16	34	17	37	17	40	16
-Property income & other revenue	15	10	20	12	34	12	21	10	15	7	16	7
-Grants received	37	24	35	20	36	20	42	20	50	23	65	27
Total	153		174		181		206		220		244	

Source: Australian Bureau of Statistics 1994 (Catalogue No. 5501. 6).

Taxes are a major income for local government. The highest source of revenue for many years has been taxes, fees, and fines, at about 50%. Grants from other governments were the next most important revenue source (about 20%). These grants were decreased in the late 1980s (19% in 1988-89), but have increased in 1990s (27% in 1991-92). The net operating surplus from public enterprise is the third major source around 16%. Property income and other revenue is the smallest single source. This source has been decreasing over the last four years in relative terms.

Major expenditures by Tasmanian local government in 1986-87 were transport and communications, general public services, and recreation and cultural expenses (23, 20, and 17% respectively), whereas the low expenditures were public order and safety, housing and community development, and mining, manufacturing and construction (1%). A large increase in housing and community development from one to seven million dollars (1-5%) has occurred. The budget for sanitation and protection of the environment, which includes solid waste management, has remained fairly steady, but with a modest increase in 1991-92.

TABLE 2.2 Expenditure of local governments in Tasmania (\$ million)

Note: Percentages are rounded.

	1986-87		1987-88		1988-89		1989-90		1990-91		1991-92	
	(%)		(%)		(%)		(%)		(%)		(%)	
General public services	21	20	24	22	25	21	26	19	29	21	34	23
Public order and safety	1	1	1	1	1	1	2	1	2	1	2	1
Health	2	2	2	2	3	3	3	2	3	2	4	3
Social security & Welfare	3	3	3	3	4	3	5	4	7	5	7	5
Housing & community development	1	1	2	2	2	2	4	3	5	4	7	5
Sanitation & protection of the environment	8	8	9	8	8	7	10	7	11	8	13	9
Other community amenities	4	4	4	4	4	3	4	3	5	4	5	3
Recreation and culture	18	17	19	17	20	17	24	18	23	16	22	15
Mining, manufacturing and construction	1	1	1	1	2	2	2	1	2	1	2	1
Transport & communications	24	23	25	23	28	24	30	22	28	20	31	20
Other purposes	19	18	21	19	22	18	24	18	22	16	20	13
Total	104		111		119		135		140		151	

Source: Australian Bureau of Statistics 1994 (Catalogue No. 5501.6).

2.7 Conclusion

There has been a significant increase in environmental awareness, resulting in charges at all levels of government, and greater attempts are being made to preserve environmental quality. Environmental management by local governments plays an important role in urban development and waste management. Problems have arisen from unclear policy, inefficient economic arrangements, and inappropriate management. At the same time, the situation is one of a need for major adaptations by local government to cope with new responsibilities and the challenges they entail.

In Tasmania, the small population and consequent small tax base has led to amalgamation of councils. Thus, local government in Tasmania has had to face, and continues to face, enormous changes. This may result in great stress, but also create opportunities for new initiatives. Councils are looking for ways to increase their efficiency, while still providing quality services to the community. It is an opportune time to focus on the provision of local government infrastructure and services. In this thesis, solid waste management services are singled out because of their relevance to environmental quality. The next chapter deals in more detail with the issues of solid waste management and local government responsibility.

CHAPTER 3. SOLID WASTE MANAGEMENT AND LOCAL GOVERNMENT

3.1 Introduction

Waste disposal is a major environmental problem facing local governments. The tremendous increase in solid wastes, difficulties of disposal, and the lack of funds are most significant for solid waste management planning.

According to Nathanson (1986), solid waste management encompasses planning, design, construction, and operation of facilities for collecting, transporting, processing, and disposing of waste materials. In this chapter, the generally applicable processes of collection, transport, treatment and disposal systems are presented. Questions of the economics of solid waste management are included. Solid waste management operations in Thailand and Tasmania and the differences between them are also covered.

3.1.1 Solid and hazardous waste

Solid waste can be grouped in several different ways according to waste generation, source and quantities, and waste characteristics (Nathanson 1986). For example, solid waste can be classified as: solid and hazardous waste; residential, commercial, and industrial waste; municipal waste, agricultural waste, mining waste, and construction debris. This study deals with municipal solid waste only.

Municipal solid waste

Municipal solid waste is derived from various sources. It includes household waste, commercial refuse, institutional refuse, street sweepings, construction debris, and some industrial waste. Ordinarily, municipal solid waste is not considered dangerous unless large quantities of dangerous materials are generated by chemical manufacturers or industries (Nathanson 1986). Municipal solid waste is mostly garbage (containing putrescible or decomposable waste such as food waste), rubbish (non putrescible materials such as glass, paper, and rubber), and trash (bulky waste materials such as old mattresses, television sets, and refrigerators).

Hazardous waste

Hazardous wastes differ from other solid wastes in form as well as in behaviour (Nathanson 1986). They are often generated in liquid form, but they may occur as solids, sludges, or gases. On the basis of their properties, there are four primary groups according to toxicity, reactivity, ignitability, and corrosivity. Two additional types include infectious and radioactive wastes.

There is no doubt that improper disposal of intractable waste poses a threat to public health and causes environmental damage. Some are harmless to humans but can damage the environment, for example, chlorofluoro carbons (CFCs) and halons that cause ozone depletion. Some are quite safe when stored or transported but detrimental to health if they enter the food chain as polychlorinated biphenyls (PCBs). Some present no problem in small quantities but cause major problems if people are exposed to them for long periods of time, for example, organochlorine pesticides (OCPs) (Selinger *et al.* 1992). Generally state government authorities deal directly with these wastes.

3.2 Solid waste management

Solid waste management can be divided into collection and transport, and treatment and disposal. Collection and transport are carried out either by public or private operators. Treatment and disposal are mainly public operations at this stage in Tasmania. In some parts of Australia all aspects of solid waste management are being privatised.

3.2.1 Collection and transport

In Australia the collection of household waste is normally by municipal management or by private contract, whereas commercial and industrial waste collection, especially liquid and hazardous waste, is by private collection.

The objective of solid waste collection is to transport household wastes to a disposal site or processing site at minimum cost. The method of collection, the type and number of vehicles used, and the extent of labour employed are important factors in a waste collection system. The environmental effects of collection relate to careful planning and practices. This involves administrative decisions on type of collection operations, vehicles, routing, and type of bins.

Solid waste collection is generally a local municipal service provided to residents. Sometimes the collection service is undertaken by private companies which may be under

municipal contract or contract with individual home owners. The collection service levels, frequency of routine collection, and the type of service offered to the customer vary depending on the citizen expectations and the municipal budget (Corbitt 1990). The different institutional arrangements found can be grouped into four types. The local authority manages the entire system (municipal); private companies bid for contracts to manage all or part of the system (private contract); private operators bid for contracts with individual householders (private collection); and private operators are awarded monopolistic franchise over an entire area (franchise). The advantages and disadvantages of these public and private institutional arrangements are shown in Table. 3.1.

TABLE 3.1 Advantages and disadvantages of public-private institutional arrangements

Alternative	Advantages	Disadvantages
Municipal	Tax-free Non profit Municipality has administrative control	Monopolistic Limited incentive to improve efficiency Solid waste management often low priority in budget
Contract	Competitive bidding helps keep price down	Danger of collusion in bidding Public agency must regulate contractors
Private collection	Competition may reduce costs Self-financing	No public administrative control Danger of collusion among haulers
Franchise	Self-financing	No public administrative control Monopolistic, can lead to high prices

Source: Adapted from Corbitt (1990).

The methods of collection are generally kerbside collection and backyard or door to door collection. Kerbside collection requires the residents to place bins, bags, or other containers of waste at the kerbside on the collection day. Backyard or door to door collection requires the collection crew to pick up the waste container and return it after emptying the waste.

Two other methods are available: communal and block collection (United Nations Centre for Human Settlements [Habitat] 1991). For communal collection, the municipality

provides large containers for households, and refuse collection vehicles visit these sites at frequent intervals. In block collection the collection vehicles travel along the route and stop at select locations. A signal, such as the sound of the truck horn, lets householders know that they can dispose of their rubbish.

The type of collection service provided often depends on the local situation. Kerbside collection is easy for the operator. As it takes less time than door to door collection, it costs less. However, kerbside collection often results in litter being left where bags have been ripped or interfered with by animals.

Communal collection is mainly used in areas in Australia that are some distance away from main population centres and local government infrastructure. This type of collection can be expensive for the operator because of the long distances travelled and the time involved. Time is saved by the small number of pick up points when the destination is reached. In developing countries, communal collection is sometimes used as a means of solid waste collection. Communal collection is cheaper for the operator because garbage is in a central location and requires only a few pick ups. This type of service is not convenient for residents as they have to transport their garbage to the central location.

The block collection employed in Mexico and Burma (United Nations Centre for Human Settlements [Habitat] 1991) is not commonly used. The disadvantage of this system is that there has to be someone at home when the garbage truck comes. It is inconvenient and has the potential to be highly inefficient.

The size and type of vehicle and the volume of the body must be appropriate to the task and the required efficiency, depending on the factors of road conditions, width of streets, haulage distance, waste characteristics, and the method and frequency of waste collection (United Nations Centre for Human Settlements [Habitat] 1991). Rear and side loading is suitable for residential collection while front loading vehicles are mostly used for large amounts of waste, as for commercial bulk containers. Compactor trucks can increase the loading capacity. The faster the turn-round time, the more loads can be carried and, hence, the fewer vehicles required. As specialised vehicles are required, the cost is sometimes too great for small local governments. In this case a private operator is likely to be contracted to carry out the collection.

Garbage trucks have various environmental impacts. Air pollution can be caused by exhaust emissions, as trucks move slowly in a stop/start manner. Noise is likely to be noticed if collection takes place at night. Leakage from waste containing moisture can occur during transport, causing odour problems. Noise pollution can be largely

overcome by collection during the day. An appropriate technology for garbage trucks is necessary to reduce the environmental impacts.

Efficient routing systems increase vehicle productivity, reduce costs, and save time. Design of collection routes involves defining the collection area and assigning a disposal site. It must also balance the use of vehicles by zones and daily routing.

In some areas, disposal sites are a long way from the collection area, which can cause time and operating costs. Transferring waste from one vehicle to another, more energy-efficient vehicle, reduces operating costs and keeps the off-route time of collection vehicles to a minimum. At the transfer station, the waste from collection trucks is loaded directly or indirectly (load to storage pit or platform) to larger transport vehicles. This can be a trailer truck, container train, or ship, to transport the waste to the processing or disposal location. The benefit of transfer stations is that landfill sites can be well away from high population areas.

3.2.2 Treatment and disposal

Solid waste may be treated or processed before final disposal. The most common method of disposal is landfill. Other methods are composting, recycling, and incineration. The advantages and disadvantages are shown in Table 3.2.

TABLE 3.2 The advantages and disadvantages of the main waste treatment and disposal methods

System	Advantages	Disadvantages
Landfill	low cost operation high operational reliability flexible	requires suitable site less benefit from waste
-with compacting and/ or shredding	reduces cover material and site	higher cost than normal
Composting	reclamation of about 50%	commercial outlets required
Incineration	sterilisation and significant reduction of waste to tip	high cost
-with energy recovery	overall cost reduced	requires high volume of waste
Recycling	reduced waste to tip reduced resource demand	temporary disposal may raise indirect costs

Source: Adapted from Commission of the European Communities (1982).

Landfill

Three landfill types are open dumping, sanitary landfill, and secure landfill. Landfilling is the most economic solid waste disposal method but there are problems in finding suitable landfill sites. In the past, most landfilling was open dumping with a low cost, but has resulted in a lot of pollution. The more recent method of sanitary landfill involves separate disposal of appropriate wastes at an approved site. This is in accordance with a preconceived plan, by dumping, compacting, and covering with soil in a way that protects the environment (Department of Environment and Land Management 1994). However, some hazardous wastes are treated in secure landfill, which is designed to receive and confine hazardous waste to prevent detrimental effects on the environment (Department of Environment and Land Management 1994).

Composting

Composting is the process of biodegradation of organic waste. At larger scales it involves separating out the organic decomposable material from waste, shredding or pulverising it to reduce its particle size, and digesting it through a windrow method. For market purposes, the compost is upgraded by drying, screening, or pelletising. The basic environmental problems of the composting process are odours, disease vectors, noise from grinders, and the survival of pathogens (Head 1992).

Composting by individual households in suburban areas can be carried out successfully with less chance of contamination than at landfill sites. Enclosed containers can reduce odour, vermin and insect infection. Removal of putrescibles from the waste stream can reduce the weekly weight of household garbage approximately by 42% and the volume by 10% (Dowson 1991). However, this only applies to suburban areas where space is available in gardens. In areas of high density population, individual composting may not be possible.

Incineration

Properly designed solid waste incinerators operating under suitable temperatures and conditions can reduce the volume and weight of the solid waste considerably while simultaneously generating either heat for neighbourhood space heating or electricity (Nathanson 1986).

Incineration has been an alternative way to solve the problem of large amounts of waste, especially hazardous waste in developed countries. Incineration is the only suitable technique for intractable wastes at present and it has been gradually attaining better

efficiency and less emission of toxic residues. The problems in design and operation of such facilities of incineration processes are maintenance of good combustion conditions and achieving proper treatment of emissions. The main environmental problems of incineration are air pollution, intractable wastes, residue and fly ash.

Recycling

Recycling is a process of reclamation and reuse of discarded materials. The success of recycling requires a system of source separation and careful handling (Pollock 1987). It is necessary to distinguish between quantities and qualities of materials. Recyclables are less valuable when contaminated. For example, paper mixed with organic waste, contaminated glass and metal, and organic waste mixed with inorganic matter are more expensive to process and therefore do not command a good market price. As Pollock (1987) noted, the cleanest secondary materials always command the highest prices and value. Although most waste can be recycled, some materials such as paper and cardboard, metal, glass, plastic bottles, cans, clothing, and rubber are most commonly recycled.

The benefits of recycling are to use less energy, create less pollution, and to conserve resources. This should be successful with careful planning and practice of source separation, collection, transport, and market methods. The economics of recycling depends largely on the availability of markets for recovery products and the cost of operating the recycling program (Pollock 1987).

The environmental impacts of treatment and disposal depend on each method and technology. Air pollution, smoke and odour generation, attraction of pests, and land and ground water contamination are the main environmental effects of treatment and disposal.

3.3 Economics of solid waste management

There are many different sources of funds for solid waste management, such as general property taxes, separate property taxes, service charge fees, can or container rental charges, special assessment, and miscellaneous revenue (Committee on Solid Wastes, American Public Works Association 1966). The rate bases for solid waste management through property tax are generally estimated by combining two or three different measures. These can be measured by uniform charges for each service, number of rooms, dwelling, units or apartments, frequency and service provided, size and numbers of containers, and others. Service charge rates for residential properties can be based on number and size of containers, collection method, and frequency of collection, whereas

commercial rates can be based on quantity, frequency of collection, kind of business, square footage or flat rate, and large container services.

The success of financing solid waste management operations depends on how municipalities collect service charges. Each municipality uses different devices and methods to collect charges regularly and to enforce the payment of delinquent accounts (Committee on Solid Wastes, American Public Works Association 1966). Payment for solid waste management can be collected monthly or yearly. Some municipalities bill separately for the services, while others include all services in the general tax revenue.

Generally, solid waste management in Australia has been funded by general tax revenues collected by local government. Some municipalities use a special assessment or specific tax to fund solid waste services (Evatt Research Centre 1989). In Thailand, solid waste management is funded by monthly fees collected from residents by local government.

3.3.1 Charges

Local authorities may apply charges on the provision of solid waste management services to cover service costs and to finance improvements in service delivery. There are three types of charges for solid waste management: user charges, disposal charges, and product charges (Bernstein 1991).

User charges are based on the volume of waste collected. They are calculated to cover total expenditures of collection and treatment of solid waste. For example, garbage is limited by volume and the amount of bags for disposal. This is effective in reducing the volume of solid waste, but problems on disagreements over the charge base, cost monitoring, and billing have arisen (Bernstein 1991).

Disposal charges (or tip fees) are levied on disposal of waste. Charge rates depend on type of waste, volume, and method of disposal. For example, hazardous waste needs secure landfill which is expensive, because it is necessary to prevent environmental damage. Generally, municipal fees are calculated by volume capacity of type of vehicle, such as small or large truck, and type of waste, such as chemical waste or domestic waste.

Product charges mostly apply to non-returnable containers. Special taxes, charges, or fees on consumers are levied on products in order to cover the cost of collection and disposal of product and packaging (OECD 1981). This has been supported by deposit-refund systems (special charge when purchased and refund when returned) to encourage

recycling and prevent pollution. However, this system relies considerably on stringent direct regulation by government (Bernstein 1991).

3.4 Solid waste management in Thailand

Thailand faces many environmental problems. One of the most serious is that of solid wastes. The tremendous increase in solid waste, insufficient land for disposal, and the lack of funds are the most significant and major aspects of this problem. The work of managing, collecting, and disposal of waste is difficult and costly, and very little revenue is received in return.

In Thailand, especially in urban areas, most solid wastes are collected through the public services provided by municipalities, but unfortunately the vehicles used are non-compacting types and the waste requires a larger area for disposal. Although some businesses have started recycling their own products such as paper and bottles, it does not contribute much to reducing the waste stream. Up to 17.5% of the solid wastes in Bangkok are used for fertilizer (Thailand Development Research Institute 1987). Most of the solid wastes are wet because of the high proportion of food and liquid, and they are normally dumped in open spaces and occasionally burned in the open air.

The problems of solid waste in Thailand stem from several causes. In urban areas, each municipality has financial problems in managing solid wastes. Tax-collection systems are inadequate and poorly administered and insufficient funds are provided to maintain an adequate level of service. The revenue received from the waste fees does not equal expenditure. As the Thailand Development Research Institute (1987) noted, only 10% of the costs of solid waste management were covered by the direct user charge. The situation has now changed, using improved technologies and administration (including computerisation of charging records), so that cost recovery is now in the order of 65-70%. Municipalities have to ask for support from central government. Household collection charges in Thailand are still low, whereas expenditure is relatively high and includes workers' salaries, fuel, vehicle and equipment maintenance. The ability to service imported technologically advanced equipment is rare and costly. The collection vehicles which have been used for the past 10 years are normally obsolescent. Repairs and maintenance are difficult as some spare parts are no longer available. The containers on collection vehicles can only be used for three or four years because wet wastes speed up the rate of rust. This is another reason why councils prefer to use non-compacting instead of compacting vehicles.

Garbage disposal is another severe problem. Ninety-five percent of waste is dumped in open spaces. This encourages the invasion of rats, flies, and other animals which cause infectious and contagious diseases. Moreover, the wastes cause air and water pollution since toxic chemicals and pathogenic wastes often contaminate domestic solid wastes. These wastes, when dumped, stored in open areas, and subject to the weather, can cause water pollution due to their high organic leachate content. As a result, each municipality burns wastes in the dry season to control disease vectors and reduce volumes. Insecticides are also sprayed on sites.

The government has tried to encourage some policies like sanitary landfill, but it is difficult to find appropriate land. In addition, the local residents have to agree before any area can be used. Though some administrators have suggested using incinerators instead, wet wastes would result in high investment costs, high energy requirements, and more polluted air. In addition, the wastes can only be reduced in this way to 60% of their original bulk. Because of this, incineration is less appropriate than sanitary landfill which still has to be employed anyway.

Health risks are another problem. Some garbage is thrown carelessly by people in public places and this requires workers to clear it up. Exposure to garbage results in an increased incidence of skin diseases and other illnesses.

All community waste is managed under the *Municipality Act* of 1953 and the *Public Health Act* of 1941 and later amendments. These Acts briefly state that local administrations have full responsibility for developing ordinances for regulating solid waste management, providing communal solid waste containers as necessary, providing collection and transportation of solid waste, and collecting fees (Thailand Development Research Institute 1987). The local administrations are also empowered to plan and manage some or all of these operations through private contract. Some further discussion of privatisation in Thailand is in Section 4.4.

3.5 Solid waste management in Tasmania

The Department of Environment and Land Management is the principle regulator of solid waste in Tasmania. The following information on State solid waste management policy is derived from a structured interview with an official of that Department (see Chapter 5, Section 5.2 for method and Appendix 2, pp.109-112 for specific questions) and from policy documents. These sources of information were used to provide a description of the framework within which local governments in Tasmania operate.

The Department of Environment and Land Management policy document (DELM 1994), gives the two primary goals of solid waste management as (i) to promote environmentally and economically feasible waste minimisation and resource recovery, and (ii) to protect the environment from effects arising from landfills receiving municipal and hazardous wastes (the executive summary of the report is reproduced in Appendix 1, pp. 108-110). Waste minimisation is, for ethical and economic reasons, the 'first and preferred' management strategy (p. 7). The three means of achieving this are given as the 'three Rs' (reduce, reuse, recycle) and the variety of tools employed are described and include the encouragement of reduction, cooperative establishment of targets with industry for reducing packaging, the encouragement of household composting, the encouragement of a user pays principle (refuse site entrance fees, volume limits household garbage collection), public awareness and education campaigns, assistance with industry in the development of long term markets for recycled materials, the encouragement of municipal kerbside recycling collection, and support for a system of deposits.

The dual purposes of the second strategy, energy recovery by either the collection of methane from landfills or from refuse incineration, are also given as avoiding resource wastage and reducing solid waste management costs, while the third strategy of ensuring that disposal is safe and secure involves setting criteria for the selection of refuse sites, the rationalisation of refuse sites, and the rehabilitation of these sites.

The *Environmental Management and Pollution Control Act* 1994, which is to replace the *Environment Protection Act* 1973, includes the capacity for investigation of small disposal sites, provides a greater capacity for enforcement of the regulations, and increases the penalties for breaches. The Act's aim is 'to control the generation, storage, collection, transportation, treatment and disposal of waste with a view to reducing, minimising and where practicable eliminating harm to the environment' (p. 70).

The State Government controls the transport and disposal of solid waste, but not specifically its collection. This is not the case with hazardous waste collection which falls within terms of the *Environment Protection Act* 1973, the *Local Government Act* 1993, the *Groundwater Act* 1985, the *Public Health Act* 1962 and the *Local Government (Buildings and Miscellaneous Provisions) Act* (Bogus *et al.* 1993). A licence is required for any person who operates services related to hazardous waste and disposal operations. Standards for the disposal, collection and the transport of hazardous waste are set under the *Environment Protection Act* 1973 (s.36a) and the *Local Government (Buildings and Miscellaneous Provisions) Act*. Transfer stations, however, are exempt from licencing, although these require registration and inspection by a State government agency once every five years. The collection of household solid waste is controlled by each local council rather than by State government. However, local governments are required to

provide an environmental report each year. At the disposal site, the State Government normally makes an inspection every half year. These include a quarterly evaluation of leachate by local councils. Factors inspected by State Government officers generally include signs, erosion, adequate roading, filling material, leachate within landfill boundaries, and recycling depots.

The Department of Transport and Works controls waste transport under the *Traffic Act* 1925 and the Department of Environment and Land Management under the *Environment Protection Act* 1973. Vehicles are required to meet standards and operators require appropriate licences and business licence.

The policies on solid waste management differ amongst councils. For example, the Hobart City Council and Clarence City Council manage their own operations in both waste collection and landfill, whereas Glenorchy City Council and Kingborough Municipal Council have private contractors for collection services. Brighton has no landfill operation, and uses a private contractor to collect and transfer waste to Glenorchy tip site. In Kingborough and Brighton, kerbside recycling collection services are carried out by private contractors.

According to the Department of Environment and Land Management (1993), the number of houses in Tasmania is about 162,000, with garbage collection services covering 136,000 or approximately 84%. Tasmanians dispose of about 420,000 tonnes of garbage per year, or about 0.8 tonnes or 1 m³ per person per year (Department of Environment and Land Management 1993).

Waste management practice in Tasmania, like most other Australian states, is generally limited to landfill. However, landfill operators have to deal with new solid waste policy in Tasmania, which proposes small refuse disposal landfills be substituted with waste transfer stations. In 1990 there were about 150 landfill sites. These were reduced to 125 and 17 transfer stations in 1993 (Department of Environment and Land Management 1993). According to the Department of Environment and Land Management (1993), most councils wanted to maintain the status quo in regard to their refuse disposal landfill sites, while 20% were wanting to move from a landfill site to a waste transfer station. Only 6% were likely to close refuse disposal landfill sites in the next 5 years (Department of Environment and Land Management 1993). The latest figures are 100 landfill sites and 42 transfer stations (Cretney pers. comm. 1994).

A survey of councils also indicated that only 25% regularly monitored the amount of waste going to landfill and this made it difficult to assess the life of the landfill (Department of Environment and Land Management 1993). Assessment by State

Government officers suggested that 50% of landfill sites will fill over the next 10 years (Department of Environment and Land Management 1993).

Only three Tasmanian councils limit the amount to two bags. Generally, councils do not limit the number of household receptacles put out for kerbside collection (Department of Environment and Land Management 1993). Disposal charge fees at tips were introduced in 1991, with nine councils operating them in 1992 (Department of Environment and Land Management 1993).

There is no record of the number of collectors operating in Tasmania, but data from the Auditor-General (Bogus *et al.* 1993) showed that about 45 private companies have a licence for hazardous waste operation in Tasmania.

According to a Tasmanian solid waste management survey (Department of Environment and Land Management 1993), there are collection points for recyclable materials at about 150 depots throughout Tasmania. These include about 22 councils which operate drop off depots. Municipal depots often only collect one type of recyclable material. There are 28 glass collection depots, 26 for aluminium cans, and only one for tyres, and scrap metals.

In 1990, the Tasmanian Recycling and Litter Awareness Council (TRALAC), funded by the Litter Research Association of Tasmania, the State Government, and the Municipal Association of Tasmania, undertook a pilot project on kerbside recycling. This project covered five municipalities, Glenorchy, Brighton, Burnie, Kentish, and New Norfolk. The programs had some success in increasing the recovery of recyclables but were at best only marginally viable economically (Cretney 1991).

More councils are introducing kerbside recycling, although the range of recyclables in Tasmania is more limited than on the mainland of Australia because the cost of freight makes collecting some recyclables economically non-viable. Recyclables most commonly collected in Tasmania are PET and HDPE food and beverage containers, aluminum cans, glass, and office paper. Newspaper and cardboard are no longer being collected, although investigations are currently underway with the aim of recycling both by the end of 1994.

The Auditor-General Special Report No.5 (Bogus *et al.* 1993) discussed many aspects of municipal solid waste management practice in Tasmania, and reflects the great amount of work to be done, despite improvements. Important aspects discussed included the following.

- (i) Some municipalities do not recover solid waste management operating costs. This may be due to differences in the calculation of establishment costs as depreciation, and the formulation of the combination of actual and estimated expenses and revenues.
- (ii) The measurement of performance is inadequate. Each municipality has different methods of collecting and measuring wastes. Solid waste expenditure and revenue data, cost per tonne, garbage collection costs per capita, and the breakdown of the sources of solid waste revenue and expenditure differ in each municipality. Any comparison of performance measurements is not therefore correct. For example, some municipalities measure wastes by weight (as tonnes) while others measure by volume (as cubic metres).
- (iii) Some municipalities have to breach their licence conditions due to the costs of operation and the rationalisation of refuse sites.
- (iv) There are few municipalities with strategic planning for specific sites.
- (v) Recycling policy is not encouraged due to limited budgets. The municipal administrators do not pay attention to recycling policy because of the high operational costs of recycling.
- (vi) Although municipal administrators recognise the user pays principle, few such schemes are planned and encouraged.

3.6 Differences between Thailand and Tasmania in solid waste management

3.6.1 Laws and regulations

The laws in Thailand demand that people have a right to dispose of their waste. Fees are charged by municipalities to cover costs of solid waste management (Suwarnarat and Luanratana 1993). Thailand applies a direct user charge, but this cannot be set at a high rate because of the low income of the residents. In contrast, Tasmania charges through a property rating system, and this charge rate can be calculated by reference to actual costs of operation.

Generally, there is no limit on the number of bags put out for disposal in Thailand. In Tasmania some councils apply limitations, as noted earlier.

In Tasmania, private contracts can be arranged directly through existing local government powers while in Thailand, local government must ask permission from central government for contracts that are more than three years under the *Procurement of Local Government Organisation* 1989 (Office for Urban Development 1992).

Landfill in Tasmania requires approval from Department of Environment and Land Management, the Department of Mines, and the Minister for Local Government whereas in Thailand special regulation requires approval from the local community.

3.6.2 Operations

Both household and commercial collection are mainly managed by local governments in Thailand, with the exception of hazardous waste which is collected by private companies. In contrast, commercial and industrial waste collection in Australia is normally run by private operators. Much waste in Thailand is deposited in public bins. In Thailand a much larger portion of waste is organic and consequently moisture content (over 60%) is much higher than in Tasmania. Kerbside collection is used both in Thailand and Tasmania, but in Thailand large bins are always left at the kerbside to serve the greater density and numbers of people. There is no standard for bin types in Thailand. Normally, in public spaces, councils use 200 litre bins which are difficult to handle when full.

There is no kerbside recycling collection in Thailand, but in Bangkok some collectors sort some recyclable materials during regular waste collection. There are some private operations buying recyclable items directly from households, which normally operate only in the Bangkok metropolitan area, whereas Tasmanian residents bring recyclables to centres or, in a few municipalities, leave some out for kerbside collection.

In Thailand there is generally a lower level of technology for solid waste collection. For example, only a few councils have compactor vehicles. They generally use side loading vehicles which have less capacity and require several operators.

About 95% of local governments in Thailand use open landfill, whereas Australia has a standard requiring the use of sanitary landfills in urban areas. Due to the limited space, fire is sometimes used to save landfill space in Thailand, whereas its use is prohibited in Tasmania.

3.6.3 Financial management

Australia uses property tax to fund waste management, while Thailand uses separate collection fees. This has an effect on the ability to collect fees. In Thailand, the system is that the officials from local councils visit each household to collect fees every month, while in Tasmania residents are billed once a year and they can pay once or by instalments either directly to the local council or to agents. This system can save greatly on labour costs. Thailand usually only manages to collect 60-70% of total service fees, with the

income covering the operation of services for only three to four months of the year. In Australia, replacement costs are not recovered but operational costs usually are.

3.7 Conclusion

To conclude, solid waste management is a significant cost for local government. It can be divided into collection, transport, treatment, and disposal. In Thailand, collection is the most costly component of management, equal to about 75-80% of the solid waste budget. Efficient collection practices, institutional arrangements, and techniques are thus important not only for environmental quality but also for economic reasons. However, it has been shown, as in the case of Thailand, that the full cost of solid waste management cannot always be carried by the community. For efficient and environmentally sound solid waste management to occur in Thailand, it seems the operations would need to be subsidised by central government.

Treatment and disposal management methods are landfill, composting, incineration, and recycling. Large scale recycling and composting are relatively new activities in solid waste management in Australia. The recent National Waste Minimisation and Recycling Strategy (Commonwealth Environment Protection Agency, undated), which has a target to reduce waste in Australia by 50% by the year 2000, forces state and local governments and industries to explore the potential for recycling both from economic and environmental points of view. Financial solid waste instruments, such as user charges, disposal charges, and product charges are means of improving the economic efficiency of services. In order to increase efficiency and cost effectiveness, such factors as the relationships between the public and private sectors, and the levels of equipment and technology applied to vehicles, routing, and waste transfer, are necessary. Factors relevant to the potential for privatisation of services are discussed in the next chapter.

CHAPTER 4. PRIVATE SECTOR INVOLVEMENT IN LOCAL GOVERNMENT SERVICES

4.1 Introduction

Local governments all around the world now face a difficult situation in response to the management and financing of the provision of urban infrastructure. Because of economic constraints, national governments have in general reduced funding allocations to local government. Therefore the need for local government to find new methods to improve economic efficiency and effectiveness is increasing. One method that local governments are now tentatively adopting is to involve the private sector in government services. Recently, local governments have implemented privatisation programs for various kinds of activity. These include solid waste management, infrastructure services, and social welfare and recreation.

Privatisation of government services is now a worldwide phenomenon, having been introduced as a major way of managing public enterprise during the 1980s. Over 1,500 privatisation programmes, involving around \$200 billion worth of assets have taken place in over 75 countries (Odle 1993).

The reasons for involving the private sector in government services vary from country to country, as do the styles of privatisation. General reasons can be listed as follows:

- 1) to improve the efficiency and finance of government activities which can reduce borrowing, taxation and money demands through competition, deregulation, or privatisation;
- 2) to increase public responsibility for infrastructure need and related services that can benefit the people; and
- 3) to improve the effectiveness and quality of government activities.

There are both direct and indirect benefits from involving the private sector in government activities. However, some problems have been identified in the private sector, including corruption, incentives to reduce the quality of service, increased chances of service interruption, and the possibility of reducing the access of disadvantaged people to services (Allen *et al.* 1989).

The theory of privatisation is explored here, followed by discussion of forms of privatisation. Lessons from other countries and the key factors for successful

privatisation programs are presented. The advantages and disadvantages of privatisation are also explained.

4.2 Theoretical perspectives on privatisation

Privatisation normally means the sale or transfer of public services to the private sector, which may change the patterns of ownership, decision-making processes, and profit outcomes. This change in allocation of property rights will lead to a different structure of incentives for management, managerial behaviour, and the performance of the service provided (Vickers and Yarrow 1988).

The private sector aims to maximise profit under market conditions. However, the public sector aims to provide welfare as well as profit, and, being in a monopoly position, is self-controlled. Privatisation is the process of using the benefits of private sector market mechanisms to improve on the aims of the public sector. According to Hartley and Parker (1991, pp. 11-12), the objectives of privatisation are that "consumers are expected to benefit from the introduction or extension of market forces reflected in the profit motive, rivalry, more choice, greater efficiency and innovation".

According to Vickers and Yarrow (1988), there are three major aspects of the economic effects of privatisation. These are:

- 1) the effect of different types of ownership for managerial structures and enterprise performance;
- 2) the influence of competition on company behaviour; and
- 3) a need for regulatory policy to influence private sector behaviour, for example, by establishing an appropriate incentive system to guide or constrain economic decisions.

Discussion of these aspects follows below.

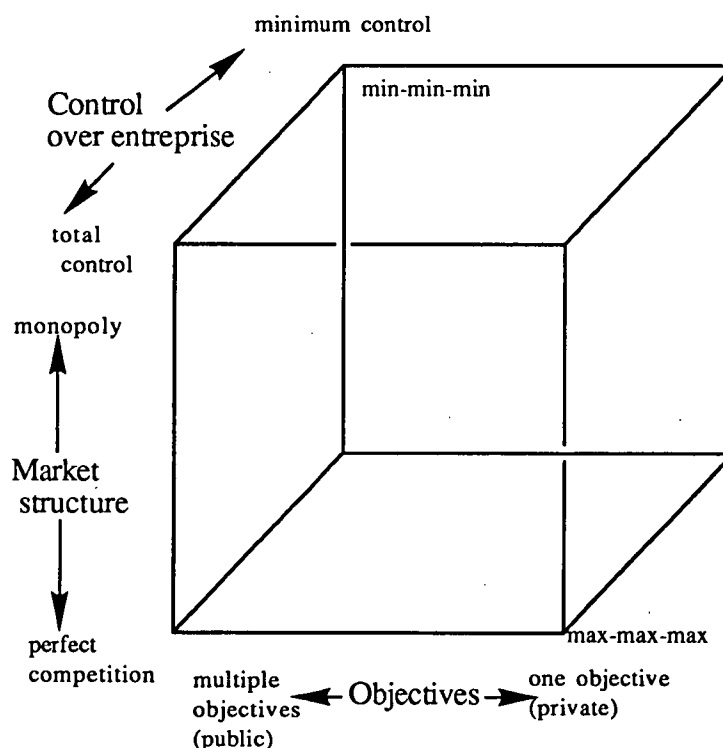
4.2.1 The different types of ownership

Ownership in the private and public sector provides an important incentive for owners to improve their ability to monitor managers. The decision-making on property rights (the right to use, control, and obtain benefits from a good or service) of the private sector are clearly defined both in the objectives and the control over enterprise, whereas the rights on decision-making of the public sector are diffused and uncertain. The objectives of the public sector involve multi-goals and the authority to control enterprise depends on

government policies. The economic assumption is that the efficiency and effectiveness of the private sector will be greater than that of the public sector. This is also supported by public choice theories which state that policies are arranged in the interest of politicians and state bureaucrats rather than in the public interest or according to the will of the people (Hartley and Parker 1991).

The differences between the private and public sectors can be analysed within the parameters of the level of control over enterprise, the nature of market structure, and the number of objectives. These have been represented diagrammatically by Hartley and Parker (1991), as in Figure 4.1.

FIGURE 4.1 The cube model of privatisation



Source: Hartley and Parker 1991, p. 23.

This cube model describes the relationships amongst objectives, control over the enterprise, and market structure. The simpler the objectives, the more absolute the control over the enterprise, and the more perfect the competition, the more the benefits are maximised. Each of these factors is discussed in turn below.

- 1) Objectives. The owners of a private firm are interested in profit maximisation (one goal) so there is no uncertainty about the relative weight of various objectives, whereas the government is interested in at least two goals: high consumer welfare, but not too high a deficit of enterprise. Moreover, maximisation of votes and avoiding vote loss can make the objectives of government unclear and uncertain. A

government must weigh consumer welfare against costs, and it risks a finance deficit and loss of efficiency if it opts for a stronger emphasis on welfare.

- 2) Control over enterprise. The activities of authorities that control external and internal organisations can reduce marginal costs. For example, private organisations may or may not have special members on their boards to exercise particular (external) control of activities increasing from regular (internal) control, while public organisations must be subject to scrutiny from special government commissions or by government representatives to check the performance of public management (Hartley and Parker 1991).
- 3) According to Beesley and Littlechild (1983), competition is one (if not the most) important tool of market structure for maximising consumer benefits, and for limiting monopoly power. Competitive markets will eliminate waste and production inefficiency (Gwartney and Strop 1990). Due to the effects of competition, companies have to reduce costs and increase their efficiency for survival, whereas monopolies will limit the options available to consumers, resulting in allocative inefficiencies.

The cube model in Figure 4.1 was tested for ten organisations in the UK. The results provide general but not universal support for this model (Hartley and Ott 1991).

4.2.2 The influence of competition on the private and public sector

Gwartney and Strop (1990) put forward four models of market structure: (1) pure competition, (2) monopoly, (3) monopolistic competition, and (4) oligopoly.

- 1) Pure competition is where a large number of small firms are producing a homogeneous product in an industry (market area) that permits complete freedom of entry and exit.
- 2) Pure monopoly exists where there are (a) high barriers to entry and (b) a single seller of a well-defined product for which there are no good substitutes.
- 3) Monopolistic competition exists where there is (a) an interdependence among firms, (b) low barriers to entry into and exit from the market, and (c) there are a substantial number of independent, rival firms.

- 4) Oligopolistic competition exists where there is (a) an interdependence among firms, (b) there are substantial economies of scale that result in only a small number of firms in the industry, and (c) there are significant barriers to entry. Oligopolists may produce either homogeneous or differentiated products.

All four kinds of market mechanism are important to both the private and public sector for the purposes of efficiency and community welfare.

According to Gwartney and Strop (1990), economists often argue that pure competition leads to ideal economic efficiency because average costs of production are minimised, and output is expanded to the level at which the consumer's evaluation of an additional unit of a good is just equal to its marginal cost. Monopoly, however, has been criticised because (a) it severely limits the role of demand in the market for a good and thus limits consumers' 'control' over the producer; (b) the unregulated monopolist produces too little output and charges a price in excess of the marginal cost; (c) profits are less able to stimulate new entry, which would expand the supply of the product until price declined to the level of average production costs; and (d) legal monopoly encourages rent-seeking activity (Gwartney and Strop, 1990).

The efficiency of market organisation is dependent on competitive markets, and well defined private property rights. Competition is a productive resource and prevents sellers from charging exorbitant prices to producers, and buyers from taking advantage of the owners of productive resources (Gwartney and Strop, 1990). Because competition controls the power of sellers and buyers, sellers, having an incentive to maximise their profit, can gain from collusive action.

4.2.3 Regulatory policy

Regulatory policy is a system for guiding and constraining economic decision-making in the competitive process. There are five major concerns in regulating privatisation (Vickers and Yarrow 1988).

(1) Investment problems

Regulatory policy has major effects on investment behaviour. A lack of information for determining the firm's price and other policies will cause investment problems. The rate-of-return regulation which helps to solve investment problems will allow a 'fair' rate of return on capital investments. However, though rate-of-return regulation is added, investment problems can create a fear of unfair future regulation.

(2) Asymmetric information

The asymmetry of information, that is, the lack of knowledge by the regulator about economic and market conditions affecting the private sector, causes inefficiency which is detrimental to both the consumers and the regulator's objectives. However, Baron and Myerson (1982) suggest that the government cannot observe costs since it gives more weight to consumer interests than to producer interests. The optimum cost compromise must be included in regulatory schemes to avoid unpleasant results (Vickers and Yarrow, 1988).

(3) Multi-product regulation

There are many costs which are shared between various types of firms. The profit-maximising firm can be induced to adopt a desirable pricing structure when regulation takes the simple form of a limit on a suitable weighted average of the prices of the firm's various products (Vickers and Yarrow 1988). The average price constraint encourages the firm to undercut its rivals in the competitive business by allowing the costs to be recouped.

(4) Collusion and capture between regulators and firms

There are various pressures that filter through into regulatory policies. Each interest group pressures to gain the prices that are of most benefit to them. The factors of contract conditions and the effects of such activities as lobbying will mask the appropriate prices. Collusion and capture will create substantial entry threats in privatisation programs (Vickers and Yarrow 1988).

(5) Relationship between regulation and competition

The relationship between competition and regulation can be described using three different factors: franchise, yardstick competition, and regulatory competition. Franchising has many features which provide an attractive combination of competition and efficiency without the burden of regulation. Because prices are set by competition, some activities with a high risk of collusion are not suitable for this method. Yardstick competition, a set of standard costs set by making a comparison between activities, is a method of promoting competition between indirect and direct regulatory mechanisms. Regulatory competition is designed for firms to enter, and enhances the potential for competition.

4.2.4 Cost and benefits of privatisation

Questions about what should be privatised and at what price are raised when privatisation is suggested. There is also the issue of how privatisation should be evaluated. John, Tandon, and Vogelsang (1991) proposed a system for assessing the privatisation process by looking at (i) three values: social value under government operation, social value under private operation, and the private value under private operation; (ii) two parameters of welfare weights: the shadow multiplier on government revenue and the shadow multiplier on private funds; and (iii) three prices: the government's minimum selling price, the maximum buying price of the private interest, and the actual sale price.

Gayle and Goodrich (1990) established a methodology to look at the evaluation of privatisation according to two major outcomes: value added and efficiency. A value added test is necessary to see the effects of privatisation on the economy. Net value added is the value of the output minus the value of current material inputs and services purchased from outside the enterprise minus investment outlays (Gayle and Goodrich 1990). The efficiency of privatisation is determined by assessing whether the economic (social internal) rate of return of privatisation exceeds or is equal to the rate of return that reflects the opportunity cost of capital. This system was used in Honduras in 1986, but the action is more likely to rely on political decisions rather than economic considerations (Gayle and Goodrich 1990).

To sum up, ownership has an influence on the firms' decision-making and behaviour. Competition is at the heart of privatisation since it is supposed to improve efficiency and cost effectiveness, and regulation mechanisms are necessary in the competition process. The success of privatisation programs depends a great deal on how competition and regulation work. Cost benefits and evaluation systems for privatisation programs are available.

Theoretical discussions of privatisation assume an ideal world where the market is the internal regulating force. Externalities such as government policies and environmental concerns are not generally taken into consideration sufficiently.

4.3 **Forms of private sector involvement**

According to the OECD (1991b), there are six common forms of involvement by the private sector worldwide.

1. Specially negotiated contributions

This only entails the provision of finance, with management and investment remaining with public authorities. Success here depends on the public acceptability of benefits to the developer.

2. Establishment of joint public-private organisations

Such organisations are charged with responsibility for particular components of the urban infrastructure, or organisations are given responsibility for the development of a particular parcel of land. At the same time, joint organisations may take responsibility only for managing infrastructure, or financing, or strategic policy and planning, or any of these.

3. Formal joint-venturing

Joint ventures differ from joint organisation in the degree of exposure to risk carried by the public sector. With equal equity partners, both public and private sectors stand to win and lose together.

4. Contracting out

This system is the most successful in private involvement due to precisely defined jobs and operations.

5. Granting of concessions

This involves the transfer of management and finance, and sometimes refers to franchising, or to the construction, operation, and management of infrastructure for a fixed time before assets revert to the public sector.

6. Privatisation

This usually means the sale or transfer of public activities to the private sector. It enables the transfer of risk to the private sector and improves the detection of investment opportunity. However, the private sector often sees a need to be totally free from control and regulation.

4.4 Examples of privatisation

Privatisation programs are in progress in both developed countries and less developed countries. The UK experiences are the most extensive. Local government privatisation experiences are discussed where available. It is likely that aspects of privatisation experience at state level are also relevant at the local level.

United Kingdom

Most papers on privatisation discuss the situation in UK, since it was the first country to adopt privatisation in a major way. The UK national privatisation program has developed since 1979 when the Thatcher government came to power. At least 12 major companies (Abelson 1987) and 700,000 workers in different industry sectors have been privatised (Grimstone 1990). These include the sale of 51% of British Telecom, 100% of Cable and Wireless and the National Freight Corporation, and the sale of part of British Steel, British Rail and British Leyland (Abelson 1987). This has led to a large expansion in the number of shareholders, billions of pounds have been raised, and it has increased the capacity of the British government budget (Vickers & Yarrow 1988). The success of the British program has given a tremendous push to privatisation world-wide.

Privatisation in local government began with the *Local Government Planning and Land Act* 1980 which introduced the market principle in building and highway construction and maintenance (Harrison 1993). Local authorities had to bid if they wanted to use their own labour. In 1985 competition and deregulation were introduced for public transport, and the *Local Government Act* 1988 introduced competitive tendering and internal trading for refuse collection, street cleaning, building cleaning, catering, vehicle maintenance, and grounds maintenance. This process was tightened to remove any anti-competitive and non-commercial regulations. Moreover, government has recently proposed 'competing for quality' to encourage more competitive tendering in other local government services (Harrison 1993).

United States

Since Californian voters passed Proposition 13 in 1978 containing the size of the State budget, the privatisation program has increased rapidly throughout State and local government services in the United States (Hatry 1989). As Gayle and Goodrich (1990) noted, 80% of cities and counties presently use or plan to use private companies to provide such services as building, vehicle, and street maintenance. Privatisation has had mixed success. For example, in New York City, private buses cost 10% less per hour to operate than their public counterparts (Gayle and Goodrich 1990). In the States of Arizona, Florida, New Mexico, Tennessee, and Texas, Rural Metro Services, a private fire-fighter and paramedic concern, has generated cost savings approximating 25% of the comparable public-sector service (Gayle and Goodrich 1990). As Hatry (1989) has noted, some potential advantages of the privatisation programs are less red tape and bureaucracy, more competition, and lower unit costs. In 1972, the privately owned rail company AMTRAK abandoned their passenger service because of persistent financial losses and the belief that it could never be made profitable (Utt 1991).

According to Corbitt (1990), there are 2531 separate solid waste management arrangements in the 2052 cities in the nation. Some large cities are divided into a number of districts. The form of institutional arrangements discussed in Section 3.2.1 (Table 3.1) are found across the country. About 30% are managed by the municipal authority, 30.9% use private collection services, 16.6% have private contracts, and 6.5% are franchised (Corbitt 1990). In general, councils which have populations greater than 50,000 people prefer to manage their own operation while councils with less than 50,000 people prefer to use either contract, franchise, or private collection.

Canada

According to Smith (1990), the Canadian privatisation programme has unique conditions and circumstances. The history and geography of Canada have interacted to develop a particular mix of government holdings, due to special concerns about foreign ownership and distinct emotional associations of government ownership with national symbols and national pride. By the end of 1988, 18 public enterprises such as Air Canada and Camero, representing \$1.57 billion, had been privatised. Most privatisation programs have been a success in terms of financial improvement, with some exceptions such as Route Canada, a company which was declared bankrupt.

Thailand

The sixth and seventh National and Social Development Plans in Thailand contain policies that encourage the improvement in performance of local government. One method is to promote private sector involvement in the provision of government services, especially the delivery of services such as solid waste management (Coopers & Lybrand 1991). Although local government has experience with private sector contracts covering goods and construction, very few municipalities have experience in service delivery contracts. These contracts tend to be largely informal, have limited regulations, and encourage monopolies by having single companies providing the whole range of services to one municipality. A pilot study, Private Sector Involvement in Municipal Services (Coopers & Lybrand 1991) introduced in three municipalities in 1991 aimed to develop more suitable regulations and practices to make private sector involvement more viable. The project was to identify the scope of private sector involvement, prepare legal and tender documents on private contracts, and produce a manual for guiding local government when contracting with the private sector. A manual was provided in 1992 (United Nations Centre for Human Settlements [Habitat] and Office for Urban Development, Department of Local Administration, Royal Thai Government 1992).

Australia

According to the Labour administration in the Australian Federal Government, privatisation has been limited due to pressure from the Labor Party caucus, the Party nationally and the labour movement (Gruen and Grattan 1993). At the 1988 national ALP conference, then Prime Minister Hawke tried to change the ban on selling off government assets, but could get only a committee to review the funding of Australian Airlines and Qantas (Gruen and Grattan 1993). After the successful come-back of the Hawke government, policy was aimed at partial privatisation. A 30% share of the Commonwealth Bank was privatised. Qantas and Australian Airlines were also in line for privatisation (Wanna, O'Faircheallaigh, and Weller 1992). Wanna, O'Faircheallaigh, and Weller (1992) report that the opposition Liberal Party declared themselves strong on the rhetoric of privatisation. An umbrella concept of the Liberal 'Fightback!' document was an extensive program of privatisation to increase governmental and economic efficiency (Gerritsen and Albin 1992). 'Fightback' claimed that the Liberal policy of asset sales in their privatisation programme would save \$1.328 billion in public debt interest charges, equivalent to about one-third of all projected portfolio savings. However, Gerritsen and Albin (1992) suggest that the asset sales were not warranted, and the necessity for holistic analysis of privatisation on a case-by-case basis should be considered. On a State level, Liberal governments such as the Greiner government in NSW had adverse experiences with limited privatisation due to finding its implementation more problematical than the economic benefits (Wanna, O'Faircheallaigh, and Weller 1992).

Generally, local privatisation in Australia has two major forms: assets sales and contracting out. According to the Australian Chamber of Commerce (1988), about 70 councils sold assets between 1978 and 1988. Most of the sales were land, hospitals and medical facilities, and housing. Contracting dealt mainly with road construction and maintenance, and household garbage collection.

The Evatt Research Centre (1989) found no general consensus in Australian municipalities about the value of contracting out for economic services and infrastructure provision. Economies of scale in Australian local government are not large enough for competition, and reasons for the operation differ from the UK. Moreover, Australian local councils have to consider a number of variables related to expenditure, such as population density, distance between houses, and the terrain of the municipality.

4.5 Lessons from privatisation programs

Lessons can be learned from privatisation programmes. Some are discussed below.

(1) Different methods of privatisation will be appropriate in different circumstances

Pirie (1985) lists 22 methods of privatisation ranging from a selling of the whole concern on the open market to a partial sale to employees who then have transferable rights. Different methods are appropriate for different circumstances (Albon 1986). For example, the operation of monopoly services such as roads and waterways that cannot be sold can be contracted. State government's role in privatisation is generally by selling off assets, while local government privatisation is mainly concerned with contracting services out.

(2) Awareness of sale price and the use of proceeds of sale

Marketisation and liberalisation have their own processes and stimulate awareness of setting an adequate price and capacity limits for the private sector. High prices, too high standards, and over-large services can limit the number of contractors. This can increase the monopoly of the contractor which can reduce quality of services and revenue to the government.

(3) Monopoly competition

There are some lessons that can be learned from the British experience (Albon 1986). For example, privatisation can lead to large private monopolies with long term contracts, as can be seen with the privatisation of British Telecom. There is a general agreement that too little competition was allowed in this case, and the monopoly contract was given for too long a period of time. Privatisation is appropriate where private ownership can operate independently, such as in the examples of reasonably competitive industries like Amersham, Associated British Ports, British Aerospace, and British Petroleum. On the other hand, there was little to gain from privatising commercial activities at British Airports Authority airports where the important decisions regarding traffic activities were still controlled by government through its environmental and civil aviation policies (Vickers and Yarrow 1988).

(4) Political constraints

It is likely that the momentum to change from public to private operation in local government is coming from political pressure by central government, seen in such actions as cutting grants and introducing privatisation programs in the UK and in Australia during the 1980s. It has also been suggested that the main purpose of privatisation in the UK has been to reduce union power as well as save money (Aulich and Reynolds 1993).

(5) The meaning of privatisation

The meaning of the word 'privatisation' has taken on negative connotations for public workers. Privatisation is strongly opposed by public sector unions on the grounds that it leads to job losses, whereas often most workers are retained and only change their status from public to private employees. Privatisation is also narrowly perceived as the sale of public services to the private sector rather than a process of involving the private sector to improve services.

4.6 Key factors in privatisation programs

Several key factors emerge that appear necessary for success in private sector involvement in government activities.

1. Ability of governments to attract sufficient contractors to ensure adequate competition

A key factor of success in privatisation is competition which is important for maximizing consumer benefits and limiting monopoly power (Beesley and Littlechild 1983). Adequate competition can increase the standard of services, reduce the cost, and improve efficiency.

2. The role and regulation of government in allowing the private sector into government activities

Many private sector organisations are particularly concerned with the difficult and complex role of regulations that interfere with the management of the private sector. Flexibility and a precise legal framework are important for a privatisation program.

3. Motivation and desire in both public and private sector

Moving employees from the public sector to the private sector as a result of privatisation is not necessarily a smooth operation, as some reduction in jobs can occur and jobs that were permanent often become contract-based. Providing adequate employment opportunities is a major consideration of government (Coopers & Lybrand 1991).

4. An appropriate tender document, which includes tender evaluation and contract monitoring

The tender document is an important instrument in managing the private sector in government services. Problems will arise throughout the contract if there are differences in approaches to management between the contractor and the specifications of the tender document.

5. Understanding the process and complexity of privatisation

There are some concerns about the working process which both participants should pay attention to, especially the fixed times and goals of contracts. Moreover, misunderstanding of the process of privatisation can cause poor management and conflict. Lack of careful planning and management can cause poor services, increased costs, and an unsuccessful privatisation program.

4.7 Arguments for and against privatisation

The advantages and disadvantages of using the private sector in government activities vary considerably from country to country due to different political systems, bureaucratic structures, and economic conditions. Arguments for and against privatisation must be considered within these different national contexts.

4.7.1 Arguments for privatisation

1. Reducing the cost and size of the public sector

This can influence macro and micro economic reform, and benefit society (Australian Council of Social Service [ACOSS] 1989). As competition influences market structure, the private sector can reduce costs for the same standard of services.

2. Improving service quality and technology

The private sector can fill the gaps where the government is unable to provide all services. It can also meet demands beyond current capacity, and provide more choices. Some advanced technologies can be used immediately rather than waiting for government decision-making and finance.

3. Improving management

The private sector has greater freedom in decision-making. It reduces the size of the responsibility of the government.

4. Increasing revenue

Some municipalities may have difficulties in collecting and increasing revenue. The private sector has a strong financial incentive to find appropriate methods.

In addition, there is a public perception that the private sector is able to provide better services because there is less 'red tape' when dealing with private companies than when dealing with governments.

4.7.2 The arguments against privatisation

There are some arguments against privatisation, especially from union organisations and public employees.

1. According to ACOSS (1989), the arguments against privatisation can be divided into macro and micro dimensions. The macro arguments are those concerned with the shifting of the production of services and the subsequent impact, particularly with regard to equity. The micro arguments are those concerned with the impact of privatisation on the non-government sector and the quality of services that are provided.
2. Due to the complexity and limitations of the privatisation process, it must be ensured that (a) the bidding is competitive, (b) contractors are capable, (c) contractors are properly regulated, and (d) contractors are well managed by government (Coopers & Lybrand 1991). There are arguments that privatisation cannot satisfy all these requirements. Moreover, due to privatisation programs being managed by the public sector, the private sector's view is that privatisation will not be fair to them.

3. Because of its responsibility for public services, public sector reform should enhance its own ability to meet its goals rather than introduce inappropriate private sector models into a totally different environment (Labour Research Centre 1990)
4. According to the Evatt Research Centre (1989), the philosophy of privatisation ignores the positive role and methods of the public sector in combating social inequality and creating otherwise lost economic and social opportunities.
5. According to Aulich and Reynolds (1993), there are many arguments against privatisation. Vining and Weimer (1990) had a different angle on decision-making in the contestability of supply and ownership. For example, where there are less opportunities for competition such as in remote areas, public operations are more likely to save costs than private. Howard (1989) argued that there is no measurable difference in efficiency and performance between the public and private sectors. The difference is in regulation rather than ownership. Aulich and Reynolds (1993) suggest that most of the debate on privatisation is focussed on economic and financial issues rather than on management. This seems to be misleading in light of the benefits private sector involvement can have in local government services.

4.8 Conclusion

Although most information in this review deals with state government services, it indicates the general trend of arguments for and against privatisation which can be applied at the local level.

To sum up, major developed countries have had private sector involvement in public services since the 1980s. Different methods of private sector involvement are found in different circumstances. The success or failure relies on careful understanding of the privatisation process in its planning and management. This includes adequate competition, flexibility of regulation, motivation, appropriate tendering mechanisms, and understanding the processes and complexity of privatisation. The issues are far from simple, and it is doubtful whether many local governments have the experience to take them into account fully.

CHAPTER 5. CASE STUDIES OF SOLID WASTE MANAGEMENT IN SOUTHERN TASMANIA

5.1 Aim of the case studies

This chapter examines solid waste management in the Greater Hobart Area. For the purposes of this study Greater Hobart is defined as those local government areas contiguous with the capital city Hobart and those with substantial suburban areas that are part of the southern Tasmanian conurbation associated with Hobart. These are the municipalities of Hobart, Clarence, Glenorchy, Kingborough, and Brighton (Figure 5.1)¹. The five municipalities comprise a logical case study unit not only because they constitute in aggregate the major portion of the southern urban population, but also because they are increasingly planning joint solid waste management activities. Agreement has been reached between these municipalities to progressively share waste disposal sites. As the disposal site in one municipality is exhausted, waste may be transferred to the nearest available disposal site in one of the other four. Ultimately, the five councils will share a single waste disposal site². This strengthens their common interest in waste minimisation.

All five municipalities are relatively small, four having populations in the 'provincial city' class (population 25,000-50,000), and one in the 'small city' class (population 10,000-25,000) (Cutts and Osborn 1989).

The aim of the case study approach used is to examine the organisation of solid waste management at the local level from the perspective of all major players: the State, local governments, the private sector, and the residents. The State sets the policy/regulatory framework while local government is responsible for developing specific policies, putting these into practice, and ensuring that solid waste management at the local level meets the requisite State environmental standards. Local governments are also involved in their capacities as managers of refuse disposal sites (tips), and as providers of solid waste collection services. The private sector is contracted to local government in some municipalities. These private sector companies provide solid waste collection services both directly to industry, businesses, and households, and indirectly to households through contracts with local councils.

¹ The Australia Bureau of Statistics (ABS) groups Hobart, Glenorchy, and Brighton together with the predominantly urban parts of Kingborough, New Norfolk, and Sorell into a single urban block (the Greater Hobart Statistical Division). As this study is concerned with local government units as whole entities, the ABS defined area was considered inappropriate for this study.

² The location of this site has not yet been finalised.

This chapter focuses on the five local government areas to provide a description of solid waste management in each, and to examine the roles of local governments and the private sector. The findings on State policy and regulation are reported in Chapter 3 (Section 3.5), covering solid waste management in Tasmania in general. In the current chapter, solid waste management in the local government areas is compared in term of policies, private sector involvement, and the ultimate efficiencies of the operations. The following chapter extends the case studies by shifting the focus to the consumer, through a household survey that examines waste disposal practices, attitudes, and satisfaction with services at the household level.

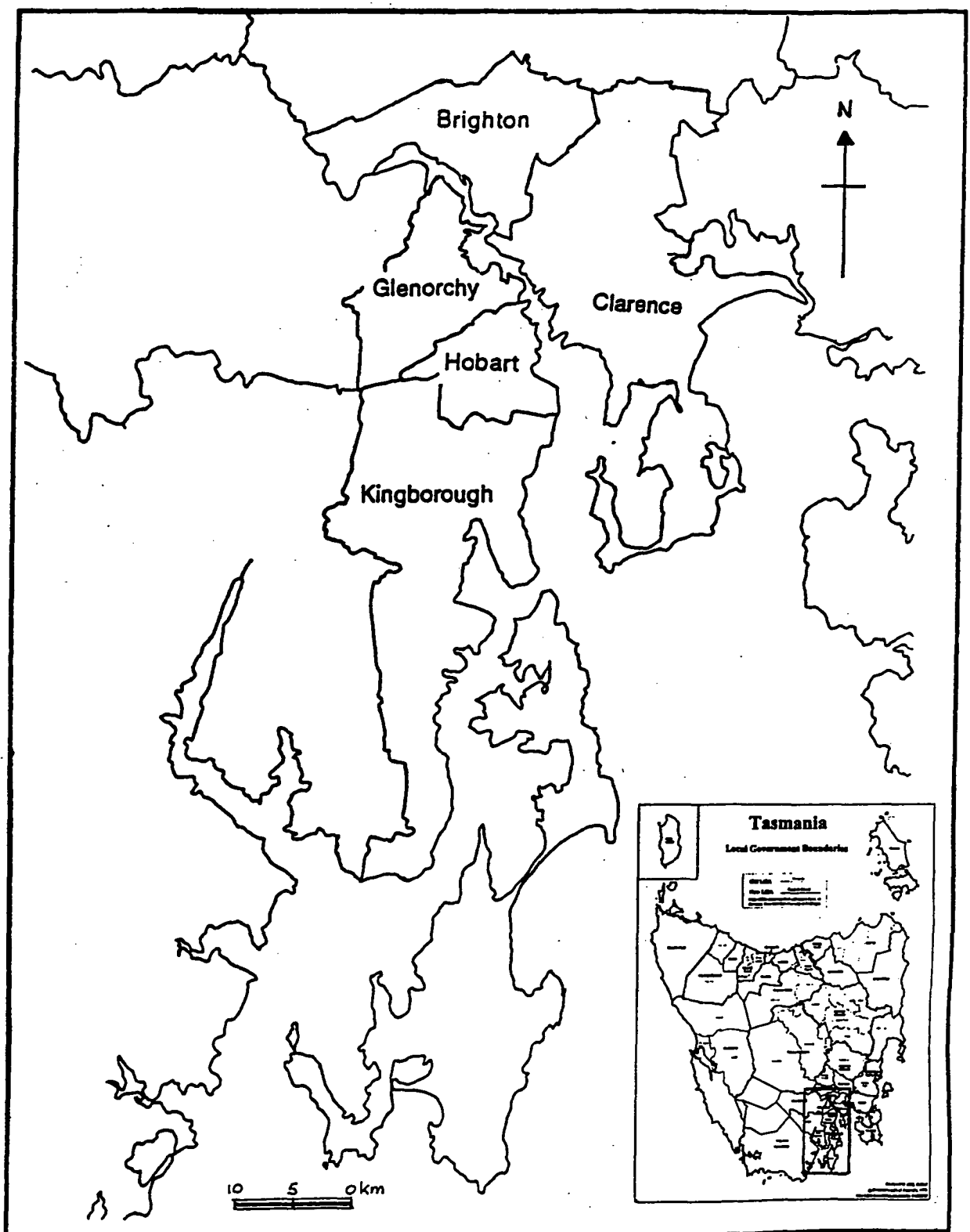
5.2 Methodology

The intention was to obtain a comprehensive overview of solid waste management in the State by interviewing key persons responsible for waste management services at all levels in order to obtain information on policies, the process of policy formulation, and management practices and associated problems, as well as financial details of solid waste management. Interview forms for the State Government officials and for local government officials are shown in Appendix 2, pp. 111-112 and Appendix 3, pp. 113-117 respectively. In practice, the first stage was that interview question forms were sent to the relevant State Government agency and to the councils in advance, written responses to most questions were given by the relevant officials, and the forms were returned. Some difficulties were encountered, however. Three of the councils returned the questionnaire promptly (within four weeks). The response from one council was delayed, however, as the person concerned was absent for a fortnight. The delay of over two months by the fifth council required repeated contacts and was problematical in terms of research deadlines.

Once the survey forms had been returned, follow-up interviews were used to complete partial responses, obtain further information, and clarify any uncertainties. Interview times ranged from one and a half to two hours. The author was accompanied at each interview by an English language tutor to assist if difficulties in understanding arose.

Questionnaires were also sent to managers of private firms engaged in solid waste management in the Greater Hobart Area in order to determine the views of the private sector on current policies and management practices. Appendix 4, pp. 118-119, is a copy of the questionnaire.

FIGURE 5.1 Map of the five municipalities comprising the thesis study area



Source: Adapted from Australian Bureau of Statistics (1994), and Dept of Environment and Land Management (Tasmania) Photomap

5.3 Solid waste management at the State Government level

Solid waste management by the five local governments is steered by the overarching State Government policy and legislation. Most of the information obtained from the questionnaire and interviews with State Government officials was presented in Sections 2.6 and 3.5.

The Department of Environment and Land Management policy is to support the national targets for reduction in solid waste (15% reduction by 1993, 25% by 1995, and 50% by 2000) set by the Australian and New Zealand Environment and Conservation Council (ANZECC) in 1991 (Department of Environment and Land Management 1994). Its role is to actively encourage and assist local government bodies in meeting these goals. As an example, the Department of Environment and Land Management policy is to promote local government kerbside collection schemes in areas where garbage collection services operate in order to reduce the quantities of solid waste going into landfill disposal sites (Department of Environment and Land Management 1994).

5.4 Solid waste management by the five local government authorities

The following accounts of solid waste management in each of the local government areas represent the interview results, augmented with some published information.

5.4.1 City of Hobart

Description

Hobart is the State's capital city and lies on the western shore of the Derwent estuary, nestled beneath Mount Wellington. With an area of 80 km² and a population of 47,100 (21,000 households) it has the most concentrated and established urban infrastructure of the five municipalities examined in this study. The Hobart City Council (HCC) has responsibility for the collection of all household, and some commercial, solid wastes within its area as well as the disposal of these wastes. It also has a responsibility for rehabilitating expired disposal sites (tips).

Policies

Solid waste management is the responsibility of the Council's Engineering Division. Until 1989 the only waste minimisation policy in effect was the limit on the quantity of refuse that households could put out for collection [two containers of capacity 2.5 ft³ per week, in accordance with By-law 140 1971]. A more aggressive approach to waste minimisation began in 1989, starting with the promotion of community awareness of the need (Liew 1994). This was prompted primarily by the recognition on the part of the HCC Engineers Department of the need to extend the life of the existing disposal site. Subsequent waste minimisation strategies adopted by the HCC included the introduction of a recycling centre in 1989 (Plate 1, p. 54), a feasibility study on kerbside collection and the introduction of confidential paper shredding in 1990, and the introduction of office paper recycling in 1991. A user-pays policy for the collection of commercial waste in the Central Business District (CBD) was introduced in 1992, together with a strategy to use landfill gas, vegetation waste, and the encouragement of household composting. Mulching of organic waste (Plate 2, p. 54) and the trialling of worm farming at the McRobies Gully disposal site were also initiated in 1994 (Plate 3, p. 55). While the latter project soon proved to be technically successful, it has not proved to be a cost effective strategy to date. Recycling depots were also placed in the Central Business District (CBD). Public education programs to encourage waste minimisation were initiated in 1993, and a kerbside recycling collection service began in August 1994 (Liew 1994). It was reported that in the first week of its operation, over 60% of households participated (ABC Radio National, 6 September 1994). Tip entrance charges were introduced in May 1991 to encourage recycling and waste minimisation, protect resources, and prolong tip life (Liew 1994). This was supported by a concession of \$1 to those patrons of the refuse disposal site who dropped material at the recycling centre before entering the tip.

Disposal

The HCC operates a sanitary landfill at McRobies Gully, 4 km from the city centre (Plate 4, p. 55). The quantity of household waste entering the disposal site each year amounts to 30,000 m³ (25,000 m³ after compaction). Commercial waste adds a further 60,000 m³ (50,000 m³ compacted) per year and coverfill for the operation amounts to 30,000 m³ (25,000 m³ compacted). At a rate of fill of 100,000 m³/year, the estimated remaining life of the tip is over 30 years (beyond 2025).



PLATE 1. Recycling centre, McRobies Gully disposal site, Hobart.



PLATE 2. Mulched (plant) waste for sale, McRobies Gully disposal site, Hobart.

recycling?



PLATE 3. Worm farming, McRobies Gully disposal site, Hobart.



PLATE 4. Landfill tip face, McRobies Gully disposal site, Hobart.

Collection

The HCC's collection service covers all households within the municipality. Households are permitted to put out for collection two containers per week. The HCC household collection service operates three compactor vehicles and one small conventional truck from 6 am to 3 pm every weekday (the HCC switched from a night-time to a day-time service in 1991). Prior to 1992, the HCC also collected all commercial solid waste. The system proved unsatisfactory, however, for a number of reasons. The large volumes of waste in the CBD caused obstructions to pedestrians during peak periods and also represented a vandal/fire risk if not collected quickly. New arrangements were made in an attempt to overcome these problems. Due to lack of cooperation on the part of the commercial businesses involved, the HCC abandoned the service altogether in 1992 and the responsibility for waste removal fell back on to the individual business. As a consequence, these businesses now use private firms to collect their waste.

The HCC introduced a household kerbside recycling service in late August 1994. This service operates on the same day as the refuse collection service.

Policy on privatisation

Other than the salvage operation at the disposal site (which began in June 1993) and the collection of waste from the CBD, there is no private sector involvement in solid waste management in Hobart. A recycling centre at the disposal site was privately operated until 1985, but reverted to being a Council-run operation when the venture became less profitable. Current HCC policy is to retain maximum control of solid waste management. The reason for this policy is the Engineering Division's view that, for waste minimisation to be successful, a high degree of flexibility is required at this stage.

Financial details

The annual HCC expenditure on solid waste management is approximately \$500,000 for collection, \$545,000 for operation of the tip, and \$614,000 for other areas of expenditure (including mechanised street sweeping and manual street cleaning). The projected cost for kerbside recycling is in the vicinity of \$200,000 per year and an income of about \$80,000 is expected. Kerbside recycling is therefore predicted to require subsidisation through an extra levy in rates (about \$10 per household per year). The current average household annual charge for solid waste management is about \$42 per household (information supplied by HCC).

5.4.2 City of Glenorchy

Description

The City of Glenorchy lies immediately to the north of the capital city Hobart. It has a predominantly urban and industrial mix with a population of approximately 42,000 (18,800 households) and an area of 121 km². Glenorchy City Council (GCC) has responsibility for most household waste collection and the collection of commercial waste for those businesses located along the major thoroughfare through the city (these commercial wastes are collected six days a week). It also operates the disposal site.

Policy

Responsibility for solid waste management in the municipality rests with the GCC Health Division under By-Law 193 [Refuse Collection and Refuse Disposal Area] which regulates the disposal of domestic waste, conveyance, off loading at the disposal site, hours of operation, tipping charges, the lighting of fires, scavenging and recycling, and penalties for breaches of the regulations.

A waste minimisation strategy was adopted in 1991 with the introduction of tip entrance fees. This has since become a major source of revenue income, accounting for 45% of total revenue raised from solid waste management in Glenorchy in 1993. The Council now plans to increase charges for commercial tip users by restructuring entrance fees to more closely reflect the actual volume of waste deposited (*Community Express* 8 June 1994, p. 4).

Disposal

The GCC operates a sanitary landfill at the Jackson Street site (approximately 4 km from the city centre). The annual quantity of refuse disposed of at the site is estimated to be 72,000 tonnes (29,000 tonnes of household wastes, 21,500 tonnes of commercial waste, and 21,500 tonnes of industrial waste). It also includes 8,000 tonnes per year of waste brought in from the Brighton municipality. It is estimated that with the fill rate of 72,000 tonnes per year the life of the landfill site is about another 19 years (until 2013). This may be extended, however, by the recent introduction of compactor equipment.

Collection

About 95% of households in the municipality are provided with a collection service. These households are permitted to put out two large receptacles of refuse for collection

per week. A day time collection service uses two compactor trucks (19 m³ and 15 m³ capacity) and operates six days per week (Monday till Saturday).

Policy on privatisation

The GCC has the longest history of private sector involvement in the provision of the solid waste management services in the five municipalities covered in this survey. Private contractors have been employed to collect household wastes in the city since 1975. Private contractors are also now used to run the recycling depot, the mulching operation, and the salvage collection at the disposal site. A separate private salvage contractor also operates a second hand shop (the 'Tip Shop') supplied with articles collected from the tip (Plate 5, p. 59). Current GCC policy in this regard is to contract out services to the private sector wherever the provision of that service by the Council would require significant investment in either plant or machinery. That is, it is a policy driven by the GCC strategy of minimising capital expenditure.

Financial details

Expenditure on solid waste by the GCC for 1993 was \$1,032,343. This was offset by an income of \$772,751. The breakdown of expenditure was \$390,000 for collection and \$568,420 for tip operation. The average annual household charge for solid waste management was about \$33 in 1993.

5.4.3 City of Clarence

Description

The City of Clarence is located on the eastern shore of the Derwent estuary directly adjacent to Hobart. It has an estimated population of about 52,000 (about 17,000 households) and an area of 386 km² (the city's area increased from 251km² in 1993 after changes to municipal boundaries). The municipality has little industry and a relatively small commercial structure. It is predominantly a residential/rural municipality with a major residential area in the Lindisfarne/ Rosny/ Bellerive/ Howrah belt and smaller residential pockets interspersed by relatively large distances. Clarence City Council (CCC) has responsibility for household waste collection in most of these residential areas, some commercial waste, and operation of the Lauderdale refuse disposal site (landfill).



PLATE 5. 'Tip Shop' run by private salvage operators, Jackson street disposal site, Glenorchy.



PLATE 6. Landfill tip face, Barretta disposal site, Kingborough.

Policy

The CCC's Engineering Division is responsible for solid waste management in the city. The relevant local regulation is By-Law 82, for controlling solid waste collection and disposal. The regulation allows residents to put out two large receptacle bags (or the equivalent) per week.

Waste minimisation policies were introduced in the early 1990s, starting with the introduction of tip entrance fees and the opening of recycling depots. The ultimate goal of the waste minimisation strategy, as is the case elsewhere, is to extend the life of the disposal site. A problem currently associated with the recycling depot at the Lauderdale site is that it is located beyond the main entrance and fee station. The Council is considering reconstruction to render the depot accessible without needing to pass through the toll gate. The Clarence Council is currently considering introducing a kerbside recycling service but maintains that it should be introduced only if the costs involved are justified by the environmental benefits (*Community Express* 14 September 1994, p. 4).

Disposal

The CCC operates a sanitary landfill at Lauderdale landfill site (approximately 10 km south of the Clarence business centre). About 17,000 tonnes of household waste are deposited at the site each year.

The landfill operation at Lauderdale has been the subject of much debate and the focus of numerous investigations over recent years. At issue is the question of whether the present site is suitable as a refuse disposal area. Because of its location in a flat marshy area there is concern over leachate and other pollution. Some leachate has been found to be entering the water table (Bakker, Niuatui, and Rees 1991). As a consequence, the disposal of hazardous waste is not permitted at the site. Moreover, the proximity of the Lauderdale tip to urban areas poses a risk to these residents by both groundwater contamination and disease carriers such as rodents and insects.

The view of the Clarence Council is that the clay base of the site renders it possible to construct a retaining wall and thus block seepage of the leachate. Such a project would, however, involve considerable expenditure and the CCC would only consider construction if guaranteed a 20 year licence for the site by Department of Environment and Land Management. The alternative strategy is to build a solid waste transfer station and transport the waste to the closest disposal site available in neighbouring municipalities in the Greater Hobart area.

According to the officials interviewed, the costs of investigating and monitoring the disposal site have added significantly to expenditures related to the site in recent years.

Collection

The household collection service covers a relatively small portion of the total area of the municipality, concentrated on the more built-up areas of the city (Risdon Vale, Geilston Bay, Lindisfarne, Rose Bay, Montagu Bay, Linwood, Bellerive, Clarendon Vale, Cremorne, Warrane, Mornington, Howrah, Eastwood, Tranmere, Rokeby, Cambridge, Seven Mile Beach, and Lauderdale). Over 80% of households in the municipality receive a collection service. The small residential enclaves of Opposum Bay and South Arm are the two major residential areas without this service and, in these areas, the CCC provides large containers (transfer stations) for disposal of household waste. These are replaced on a weekly basis. The Council operates two compactor vehicles (with a third vehicle kept in reserve) which operate from midnight onward, five days a week. Both the collection service and the tip site are Council operated.

Policy on privatisation

The CCC has no formal policy on the private sector in solid waste management. Private sector involvement is currently limited to the collection of recyclable materials at the recycling stations at Lauderdale and Mornington.

Financial details

The revenue generated from solid waste management in the city was \$1,064,400 and expenditure \$1,079,031 in 1992-93. The charge contained in the annual property rates for those households receiving the collection service increased from \$42 in 1989-1990 to \$48 in 1990-91, but was reduced to \$47 in 1991-92. The breakdown of costs in 1992-93 was \$33.75 per household for the collection service, and \$16 per household for management of the disposal site.

5.4.4 Municipality of Kingborough

Description

Kingborough is a rural/ residential municipality located to the south of Hobart. As in the case of Clarence, it has some urban areas but also large tracts of rural land and bushland. Bruny Island was amalgamated with Kingborough Municipal Council (KMC) in 1993,

increasing the municipality's area from 262 km² to 720 km². The population of Kingborough municipality now stands at about 24,328 (12,100 households).

Policy

The KMC's Engineering Division is responsible for solid waste management in the area under By-Law No. 77 (Disposal of refuse for the purpose of regulating and controlling and setting fees and charges at refuse disposal site) and By-Law No. 82 (Domestic Kerbside Recycling [1993] for controlling the removal of domestic recycling items using a kerbside collection service). The Council collects household waste in the urban area and some commercial wastes, operates a landfill disposal site at Barretta (6 km south of Kingston), and is engaged in some recycling activity.

Disposal

The Kingborough refuse disposal site and recycling depot are operated by the Council. The Barretta refuse disposal site receives about 26,000 m³ each year (approximately 6,000 m³ is estimated to be from the household sector) (Plate 6, p. 59). The longevity of Barretta is estimated to be beyond 2001. The Council, however, intends to apply for a longer licence period and plans to extend the landfill site. Tip entrance fees are reduced by \$1 for those users depositing materials at the recycling depot at the landfill site (Plate 7, p. 63).

Residents on Bruny Island have continued to use local landfill sites on the island since amalgamation with Kingborough. No fees apply for the use of these sites.

Collection

Just over half of the households in the municipality (7,200 out of 12,100) have a collection service. These households are permitted to put out two large containers of waste for collection per week. The collection service covers the more urban components of the municipality (Taroona, Kingston, Blackmans Bay, Howden, Margate, Electrona, and Snug). Collection is over four days of the week. The collection service is considered to be relatively costly due to the linear nature of the urban development and the relatively large distance between the refuse disposal site and the points of collection.

Policy on privatisation

The KMC put the household collection service out to tender more than 10 years ago. The company with the current collection contract is part of a family business connected to a



PLATE 7. Notice of tip fees at entrance to Barretta disposal site, Kingborough.



PLATE 8. Sorted items at recycling centre, Bridgewater, Brighton.

prominent land owner/councillor. A kerbside recycling service, introduced in 1993, operates on the same day using a separate contractor. Vegetation mulching at the Barretta disposal site is also carried out by the private sector. These decisions to use private sector services have been on an ad hoc basis as the KMC has no formal policy on privatisation. It has tended, however, to make considerable use of the private sector.

Financial details

The cost to the KMC of the household refuse collection contract in 1993-94 was about \$150,000, and that of kerbside recycling \$60,000. The estimated total cost of solid waste management in the municipality in 1993-94 was \$668,300. Tip entrance fees raised about \$120,000. The remainder was collected from annual property rates. The component of the annual rates for solid waste management was estimated to be \$54 for households with a collection service (plus \$11 for kerbside recycling). For those households with no collection services the charge was \$13 (covering the cost of tip operation only). The rate which the council pays the contractor with the collection service contract has dropped from 45 cents to about 37-38 cents per household per week over the past three years. This reduction in cost to the council is likely to have been a direct consequence of the increasing competition in the area of solid waste management in recent years. New companies have entered the field and established companies have aggressively attempted to extend their activities.

5.4.5 Municipality of Brighton

Description

Redistribution of municipal boundaries in 1993 excised a large rural component from Brighton, reducing its area from 441 km² to 171 km². It has now become a major and rapidly growing satellite urban area. This has been mainly the result of public housing development that began in the 1970s. The current population is 11,700 (3,500 houses). Unemployment in the area is high and many households have relatively low incomes.

Policy

Solid waste management is the responsibility of the Brighton Municipal Council (BMC) Health Division, including the collection of household wastes, operation of the transfer station, and recycling activities. The Health Division undertakes these tasks under By-Law No. 78 (Refuse and Recycling 1993). In accord with Brighton Council's submission to the State Government recycling award (Brighton Council 1994), the

municipality has either already initiated or plans to re-introduce kerbside recycling, reduce household garbage, open a recycling drop-off and sorting centre (Plate 8, p. 63), acquire a mobile chipper (Plate 9, p. 66), introduce waste disposal fees, construct a covered dump pit, encourage use of household compost bins (Plate 10, p. 66), regulate the disposal of car bodies, increase public awareness of the need for solid waste management, and collect comprehensive data on all facets of solid waste management in the area. The Council has therefore indicated a serious commitment to minimising solid waste. As part of this policy, the quantity of refuse households are permitted to put out for collection each week has been reduced to one (large) bag (Plate 11, p. 67), and a transfer station entrance fee of \$2 per vehicle (automated) has been imposed. The motive behind BMC's strong support for recycling and waste minimisation is to reduce the high cost of solid waste management in the municipality that results from not having a local disposal site, and the need to transfer all waste to a neighbouring municipality. Although not a part of this policy, a make-shift second-hand shop has been unofficially opened at the transfer station by the staff there (Plate 12, p. 67). Its primary intent is to provide a small supplementary income for these workers, and the BMC has chosen to 'look the other way', regarding it as a small (unofficial) contribution to waste minimisation.

Disposal

Brighton was the first of the five municipalities in the Greater Hobart area to close its refuse disposal site (1986) and transfer all solid waste to one of the neighbouring municipalities. It currently transports all this waste to the Glenorchy disposal site (15 km from Brighton). This has provided a large incentive to encourage waste minimisation in the area. A single transfer station at Brighton serves the community and is used by those with no collection service and those with excess waste or vegetation waste (Plate 13, p. 68). Initial costs of construction, including a shelter to protect both workers and patrons from the elements and a well constructed access road, have been relatively high. A \$2 entrance fee applies and is controlled by a coin-operated gate as a labour-saving measure.

Collection

About 3,200 houses (86%) in the municipality are provided with a collection service which uses compactor vehicles. Kerbside recycling collection began in 1993 (using a small conventional truck and trailer) for those households with a waste collection service.

Policy on privatisation

Although the BMC has no formally enunciated policy on privatisation, it has opted to use private contractors for both collection of household waste and kerbside recycling, as well



PLATE 9. Mobile
chipper, Brighton.



PLATE 10. Compost
bins and recycling
container, Brighton.



PLATE 11. Household refuse and recycling put out for collection, Brighton.



PLATE 12. Unofficial second-hand shop run by council staff at Brighton transfer station.



PLATE 13. Transfer station, Brighton.



PLATE 14. Trashpacks and Wheelie Bins, two types of containers made available to households by private firms.

as transferring waste from the transfer station to the Glenorchy refuse site. The reasons for engaging the private sector for these tasks stems from the municipality's relatively small population, which mitigates against capital investment in equipment such as compactor trucks that are not used on a full-time basis. The only facet of solid waste management which the council is directly engaged in is the sorting and sale of recyclable materials delivered to the transfer station.

Financial details

Due to the recent shift in responsibility for solid waste management from the BMC Engineering Division to the Health Division, information on revenue and expenditure for solid waste management in Brighton was not available at the time the survey was conducted.

5.5 Comparison of solid waste management policies and practices

This section compares solid waste management in the five municipalities in more detail. The pertinent features of solid waste management in each of the five local government areas is summarised in Table 5.2.

5.5.1 Waste minimisation strategies

1. Landfill operations

The characteristics of the disposal and landfill operations of each of the municipalities are presented in Table 5.1

TABLE 5.1 Characteristics of disposal and landfill operations (volumes in m³/year)

Identify	HCC	CCC	GCC	KMC	BMC
Tip site	McRobies Gully (RDS)	Lauderdale (RDS)	Jackson St. (RDS)	Margate (RDS)	Bridgewater (WTS)
Operation	public	public	public	public	public
Household	25,000	17,000	29,000	5,000	8,000
Commercial/Industrial	50,000		21,500/21,500	20,000	
Amount	100,000	17,000	72,000	25,000	8,000
Year tip full	2025	2002 or 14	2013	2001	not applicable

RDS = Refuse Disposal Sites

WTS = Waste Transfer Station

TABLE 5.2 Summary of waste management practices in the Greater Hobart Area

	Local government				
	HCC	CCC	GCC	KMC	BMC
Area (km ² .)	80	386	121	720	171
Population	47,100	52,000	42,000	24,328	11,700
Households	21,000	17,000	18,800	12,100	3,500
Collection service area	all	part	all	part	part
Management					
Collection	public	public	private	private	private
Kerbside recycling	Aug 1994			Private/Oct 1993	Private/Oct 1993
Recycling depots	public	private	private	public/private	public
Collection					
Frequency /wk	1	1	1	1	1
Limit bag /wk	2	2	2	2 (old 1)	1 (old 2)
Waste minimisation policies					
Year initiated	1989	1991	1991	1991	1991
Compost bin	yes	yes	yes	-	yes
Chippers/shredders	yes	-	yes	yes	yes
Year tip charge initiated	1991	1991	1991	1991	1993
Education program	yes	yes	yes	yes	yes
Recycling/reuse	yes	yes	yes	yes	yes
No of drop off depots	5	2	1	2	1
Year kerbside recycling introduced	1994	-	90-91	1993	90-91, 1993
Energy & recovery	yes	-	yes	-	-
Collection					
No. of trucks	3 (1 spare)	2(1 spare)	2	1	1
No. days collect	5	5	6	4	2
Time of operation	day time	night time	day time	day time	day time
Personnel/ truck	3	2	2-3	2-3	2-3
Disposal site					
	McRobies Gully	Lauderdale	Jackson St.	Margate (Barretta)	Bridgewater (trans station)
Household (t/y)	25,000	17,000	29,000	5,000	8,000
Total (m ³ /y)	100,000	17,000	72,000	25,000	8,000
Longevity	2025	2002 or 14	2013	2001	nil
Tip charge	dependent on type of vehicles	dependent on type of vehicles	dependent on type of vehicles	dependent on type of vehicles	\$2 for normal \$10 or more for truck
Recycling concession	yes (\$1)	no	no	yes (\$1)	no

Source of information: Questionnaire and interviews with local government officials

Landfill is the only method of disposal used by the four municipalities with disposal sites. In every instance the operation is publicly owned and operated (by the local council). Hobart has the greatest quantity of waste to dispose of but also has the landfill site with the greatest capacity and expected longevity, until 2025.

2. Quantity of waste/household collected

Substantial variation exists between the municipalities in terms of the degree to which policies on waste minimisation are enforced. Hobart, for example, has not only limited the amount of household waste permitted for collection to two containers per week, but enforces this by instructing collection crews to pick up no more than this limit. Households which put out greater quantities are left with the excess and notified that they have exceeded the limit. This policy initially created resentment and misunderstanding on the part of some residents. Similarly, in Glenorchy the private contractor has exerted contractual rights and refused to collect more than the quantity stipulated under the conditions in the contract. In some instances, rubbish bags were not collected as the number exceeded this limit, resulting in complaints to the GCC. In both instances, these problems now appear to be diminishing as residents have increasingly accepted or resigned themselves to the limit.

Brighton Council has the strongest policy in this regard. The amount of rubbish permitted for collection was reduced from two to one container per week in October 1993. Initial resistance to this policy was strong, but is likely to have decreased with the recent introduction of kerbside recycling.

Kingborough Municipality, which is currently running a kerbside recycling scheme, is considering the option of reducing the quantity of refuse households are permitted to put out for collection.

3. Collection of commercial waste

In 1992, the HCC introduced the user pays principle for the collection of refuse within the CBD, and reduced the frequency of the services from seven to one per week. This forced the firms concerned to engage private contractors to remove the greater portion of their refuse. It has since been estimated that this change saved the HCC approximately \$300,000 per annum (Liew 1994; *Community Express* 30 May 1989). It is therefore possible that the same approach, if adopted by other municipalities, would similarly reduce the costs of services. It is not known what effect this had on the total amount of waste disposed of by businesses in the Hobart CBD.

4. Reducing organic waste

A waste minimisation strategy common to all five municipalities is the use of chippers/shredders to generate organic mulch from green waste dropped at disposal sites. Hobart and Glenorchy Councils have also actively encouraged home composting by making available subsidised compost bins. The other municipalities have negotiated discount prices for compost bins through local retailers.

The Tasmanian Recycling and Litter Awareness Council (Dowson 1991), conducted a study on domestic waste composition and found that about 42% (by weight) of the average household garbage in Hobart region is putrescible and could be eliminated from the waste stream via composting. Composting is therefore a potentially fruitful waste minimisation strategy for all councils. It has the added benefit of providing organic fertilizers for household gardens.

All five municipalities have recognised the benefits of this strategy and now actively encourage residents to compost organic waste. This is done by either providing subsidised compost bins or by negotiating discount prices for compost bins. All of the councils now mulch green waste at the disposal site, and Hobart sells approximately 10,000 to 12,000 cubic metres of mulch per year (Liew 1994).

Increased composting of paper could be a partial solution to the recent cessation of collecting newsprint for recycling in Tasmania. There is a limit, however, to the amount of paper waste that can be composted by households. Furthermore, some inks and chemicals in paper can affect plants and ecosystems.

5. Tip entrance fees

Another major strategy used by all five councils to minimise waste has been the introduction of tip entrance charges. This is broadly recognised as one of the most effective means of minimising the volume of rubbish entering a disposal site. The four municipalities operating refuse disposal sites introduced such user pay schemes in 1991. Brighton does not have a disposal site, and therefore could not introduce such fees. Because it transfers its waste to the Glenorchy disposal site, the Council itself pays this fee to the Glenorchy Council. To partially offset these costs, Brighton introduced fees for its own transfer station in 1993, and the amount of rubbish deposited at the station subsequently decreased by a significant amount. Reductions in tip fees for those vehicles using recycling depots at the refuse sites have been introduced in only Hobart and Kingborough.

6. Recycling and reuse

Recycling and reuse have been actively encouraged in all five municipalities. The major vehicle for promoting recycling and reuse has been the introduction of kerbside recycling programs and the establishment of recycling centres and depots. Each of the municipalities has used a mixture of these strategies to encourage recycling. Hobart and Glenorchy, with their sizeable commercial and industrial sectors, also engage in collecting office waste for recycling. The paper is shipped interstate for processing.

Recycling programs not only help to reduce waste but also extend the life of resources. All five municipalities have introduced recycling programs in some form (Table 5.3).

TABLE 5.3 Recycling activities

Recycling	HCC	CCC	GCC	KMC	BMC
Kerbside	July 94	-	*	priv/Oct93	priv/Oct93*
Depot	public	private	private	public	public
Public places	yes	yes	yes		

* Pilot kerbside recycling programs operated in Glenorchy and Brighton from November 1990 to October 1991. Although the Tasmanian Recycling and Litter Awareness Council claimed that both programs were successful (Cretney 1991), only Brighton, with some support from the State Government, has re-introduced the program. The Glenorchy program has ceased due to the low participation of residents.

All five councils have provided recycling depots at tip sites. Also small recycling depots, from which the material is collected and taken to larger recycling depots for sorting, have been erected in the business areas of Hobart and Glenorchy. A satellite recycling depot has also been provided in Mornington in the Clarence Municipality due to the relatively large distances of some suburban areas in the municipality from the major recycling depot at the Lauderdale disposal site. A similar satellite depot has been operating at Tea Tree in the Brighton municipality, but abuse has led to recent consideration of closing this facility. Recycling depots at council disposal sites are council-operated in Hobart, Brighton, and Kingborough. In Glenorchy and Clarence, private contractors run the schemes. Kingborough and Brighton have operated kerbside recycling collection programs since October 1993 and Hobart followed suit in August 1994. Glenorchy conducted a pilot program in 1990-1991, but abandoned it due to low participation rates. The GCC is now considering re-employing the program on the assumption that it may be more successful, as residents are now more aware of and concerned about environmental issues. No kerbside recycling operations have been introduced in the Clarence area to date, and no definite plans exist to do so.

According to a Hobart Council official, recycling depots located in the CBD receive low use compared to the recycling depot at the refuse disposal site. Most recycling by

householders, prior to kerbside recycling, was at the latter site. In general it has been noted that where kerbside recycling has been made available, interest in recycling has increased. Pathmanathan (1992) has reported that kerbside programs are more cost effective and far more efficient than drop off centres (depots).

7. Other solid waste management policies

The collection of landfill gas (methane) from disposal sites to generate energy is another initiative recommended in the State Government policy. Economic viability limits such projects to relatively large disposal sites (those serving a population of at least 50,000). As the Lauderdale landfill site in the CCC has proved unsuitable for methane extraction, it is an option available to only Hobart and Glenorchy. The HCC is in the process of establishing such a scheme, while Glenorchy is investigating the possibility.

5.6 The relative efficiency of solid waste management

5.6.1 Collection and transport

The following sections compare the efficiency of the collection services. Details of the collection services in each of the five local governments are shown in Table 5.4.

TABLE 5.4 Solid waste management collection and transport

Local Council	HCC	CCC	GCC	KMC	BMC
Collection	public	public	private	private	private
Service area	all	part	all	part	part
Population	47,100	52,000	42,000	24,328	11,700
Households	21,000	15,600 (18,300)	18,000	7,200 (11,000)	3,200 (3,700)
Collect/ week	1	1	1	1	1
Bag limit	2	2	2	2 #	1 *
No. of trucks	3 (1 spare)	2(1 spare)	2	1	1
No. days collect	5	5	6	4	2
No. of houses/ truck/ day	1,400	1,560	1,567	1,800	1,600

Source: From interviews with local government officials.

Prior to 1987 the KMC imposed a one bag limit * In 1993 the BMC imposed a one bag limit

Figures in brackets are total municipal populations including those without collection service.

The major difference between the municipal collection services is the scale of the operation. The HCC, with the largest number of households, is better placed to invest in equipment (trucks). For Brighton, with the smallest population, a lower economy of

scale renders investment in such equipment less cost effective and the use of private collection services a more attractive option.

As a measure of efficiency of the collection service, the number of houses serviced per truck per working day was used. The HCC was found to have the lowest efficiency factor (1,400 houses per truck per day) despite the fact that it has the smallest collection area (80 km²), the most concentrated service area, and the shortest distances between points of collection and the disposal site. The KMC was found to have the highest efficiency factor (1,800 houses per truck per day), which may suggest that private contract collection services are more efficient than public collection services. This result would agree with the finding of Fernandez (1993). His survey of six Asian cities in 1988 indicated that private contractors were associated with high vehicle efficiency expressed in tonnes per vehicles per day. On the other hand, the efficiency of the private service in Glenorchy is marginally lower than the public service in Clarence. The large differences between the councils in such parameters as the time of collection services (and consequent effects of traffic congestion during operations), and urban concentrations will also have an impact on efficiency as measured in this way.

5.6.2 Financial efficiency

According to McReynolds (Australian Bureau of Statistics 1994), total funds allocated to local governments in Tasmania for the financial year 1992-93 amounted to \$218,821,000. The two major areas of expenditure were (i) general administration (19%) and (ii) roads and bridges (28%). Total local government expenditure on environmental protection³, including solid waste management, was approximately \$17,319,000, or about 8% of the total expenditure. Household garbage collection constitutes part of the environmental protection budget.

The total budgets, the environmental protection budget, and the household garbage operation expenditure are displayed in Table 5.5 for each of the five municipalities.

Expenditure on environmental protection schemes in the five municipalities varied from 6.36% to 9.5% of the total budget in 1992-93. Kingborough has a relatively low expenditure on environmental protection (6.36%), and about two-thirds of this budget goes toward household garbage collection. Hobart, Clarence, and Glenorchy all had expenditures on environmental protection that amounted to between 8 and 8.6% of total

³ The Australian Bureau of Statistics (1994) does not define the activities included in the category of 'environment protection', but from examination of expenditure in this area it appears that solid waste management is the major activity.

TABLE 5.5 Comparison of budgets (1992-93)

	HCC	CCC	GCC	KMC	BMC
Total expenditure \$(,000) ¹	27,954	15,359	16,442	9,072	3,568
Protect environment \$(,000) ¹	2,260	1,300	1,419	577	339
% of total	8.08	8.46	8.6	6.36	9.5
House garbage \$(,000) ²	1,181	1,195.2	419.7	380.4	302.7
% of total ²	4.2	7.7	2.5	4.2	8.5

Sources: (1) ABS 1994 Cat. No. 5501.6 (Table 11) (2) ABS (1994) Unpublished data

Note: Garbage disposal included in 'Protect environment' figure.

budget. Brighton Council expenditure on environmental protection as a portion of the total budget was highest (9.5%). It was also the local government which spent the highest proportion of its total budget on household garbage collection (8.5%). This is likely to be due to the high infrastructure cost associated with the recent construction of the transfer station at Bridgewater, and the cost associated with transporting waste to Glenorchy. Hobart and Clarence allocated between 2.5 and 4.2% of their budgets to household refuse collection. Clarence, however, spent a greater portion of its budget on household garbage operations (7.7%). This may be due to new management arrangements at its tip site (see Section 5.4.3). Glenorchy has an inordinately low expenditure on its household garbage scheme (2.5% of total budget). The high income obtained by the GCC from tip entrance charges (Table 5.6) probably accounts for this low expenditure. There appears to be no clear link between expenditure on environmental protection (as a percent of total expenditure) or on household refuse collection and whether the service is carried out by the public or private sectors.

5.6.3 Income and expenditure

The income and expenditure for the financial year 1992-93 for the five councils was obtained from the Auditor-General's Special Report No. 5 (Bogus *et al* 1993) and supplemented by information obtained in the interviews with municipal officials (see Table 5.6). Most solid waste management income was generated from charges at tip sites and from household rates. The latter include charges for collection services and tip operation. Kingborough and Brighton had expenditures for kerbside recycling operations on top of those for refuse collection and operation of the refuse site.

TABLE 5.6 Income and expenditure (financial year 1992-93) (in dollars)

	HCC	CCC	GCC	KMC	BMC
Income and expenditure ¹					
Tip charges	290,000	160,000	425,236	0 (120,000 ²)	no data
Rates charges	1,568,533	904,440	544,596	541,979	347,495
Others	55,000	0	0	1,300	1,600
Total income	1,913,533	1,064,400	969,832	543,279	349,095
Total expenditure	1,943,020	1,079,031	1,090,511	498,974	347,669
Surplus/deficit (%)	-1.5	-1.4	-11.1	8.9	0.4
Operation expenditure ²					
Refuse collection	500,000	N/A	390,000	150,000	50,000
Kerb recycling	(200,000)	no operate	no operate	60,000	25-30,000
Tip operation	545,000	N/A	568,420	428,300	no data

Sources: (1) Auditor-General special report No. 5 (Bogus *et al.* 1993)
(2) interviews with local government officials

* Data based on responses provided by local government officials. Where no response has been provided data from the Auditor-General has been used.

In 1992-93, Glenorchy had the largest solid waste management deficit and Kingborough the highest profit. Brighton's deficit was relatively small, as were those of both Hobart and Clarence.

Income from tip charges reduces the income required from household rates to balance expenditures. Glenorchy obtained its greatest income in solid waste management from this source (45% of the total expenditure) while other councils obtained only 15-25% of the total expenditure from tip fees (Table 5.7). The municipality with the highest average charge embedded in the annual household rates for solid waste management was Kingborough (\$54), and the local government with the lowest average charge was Glenorchy (\$33).

The expenditure per household for collection was calculated from the total expenditure on household garbage collection (Table 5.7) and the number of houses serviced (Table 5.1). Brighton, Kingborough, and Glenorchy spent less per household than did Hobart. The first three listed use the private sector to collect household refuse, and the latter is a publicly operated service.

The high household charges for solid waste management in Kingborough go a long way to explain the relatively large solid waste management surplus in that municipality (Table 5.6). Similarly, the low household charges in Glenorchy account for the large deficits in that city's solid waste management budget.

TABLE 5.7 Comparative financial efficiency of solid waste management

Note: Figures in brackets are the annual fees (\$) for kerbside recycling.

	HCC	CCC	GCC	KMC	BMC
Comparative efficiency					
Tip fee income (as % of total)	15	15	44	22	no data
Av. solid waste management charge/household (\$)	42(10)	49*	33	54 (11)	45-50 (10)
Expenditure on collection/household (\$)	23	not available	21.6	20.8	15.6

Source: From interviews with local government officials.

* In the survey the CCC gave the charge per household for solid waste management as \$33.75. This however did not include the cost of the tip operation. According to community information leaflets, average household charge in Clarence in 1989-92 was \$42, 48.5, and 47.7 respectively.

5.7 Private operator perspectives

The role of the private sector in the provision of solid waste management services within these local government areas, the extent to which such private sector involvement is encouraged, the degree to which it is used, the reasons behind these decisions and the views of the private firms involved in the provision of solid waste services are all pertinent to the discussion of solid waste management in local government areas.

The private sector is directly involved in both commercial and industrial solid waste collection. It is also involved in household sector solid waste collection both through contracts with local councils and the provision of services on top of those provided by them. Three of the five councils in this study (Glenorchy, Kingborough, and Brighton) use private contractors to collect household refuse. There is no private sector involvement, however, in landfill operations in any of the five municipalities studied here (there is little private involvement in the operation of tip sites in Tasmania other than those associated with large industries that operate disposal sites on freehold land).

The contracts for household collection services vary in terms of their specified obligations, such as the length of the contract and details of conditions. Glenorchy offers a relatively long term contract (five years), while Brighton and Kingborough offer relatively short term contracts (one and two years respectively). The length of the contract may have an influence on both investment and the quality of the services provided.

The major advantage for a local council of tendering out local government services such as solid waste collection is that the need for capital expenditure on equipment is avoided. Private firms may also be able to capture efficiencies unavailable to local governments and therefore be able to offer services at a cheaper cost. Some would argue that the private sector is inherently more efficient as it is driven by the profit motive. A major assumption behind this argument is that competition between firms drives down tenders for provision of services to local governments. This only holds true, however, if the market is truly competitive. Tasmania's small size mitigates against such competition as there are few private firms operating in this field in the State. Furthermore, the contractor with the existing contract is better placed as it is likely to be more able to calculate the costs involved.

State Government policy is neutral as to whether or not any part of the solid waste management process is undertaken by the local government themselves or by private sector under contract. Interviews with Department of Environment and Land Management officials indicated that neither Department nor State Government policy sets goals for private sector involvement in solid waste management within the State. Such decisions are regarded as entirely the prerogative of local councils and not the legitimate domain of State policy.

5.7.1 Questionnaire results

Managers of private firms operating waste collection services in the Greater Hobart area were mailed questionnaires in order to obtain information on the nature of their operations and any contracts held with local governments, their degree of satisfaction with such current contractual arrangements, and any perceived problems with collection, landfill or recycling operations (see copy of the questionnaire in Appendix 4, pp. 118-119). Eleven companies were identified from the southern Tasmanian telephone directory (Pacific Waste Management, Hazell Bros, Collex, J&R Trash Packs, Not Junk, Eastside Recycling, Brighton Recyclers, APPM Recycling, Garden Trash Bags, Keith Trash Bags, and Tas Garbage Compactors). One private company (Roadsweep) which did not advertise in the telephone directory was also contacted. All 12 companies were telephoned a fortnight after mailout to ensure that the questionnaire had been received and as a prompt to complete and return the survey forms.

Only five of the twelve companies returned a completed questionnaire, three of which had current contracts with local governments. As the questionnaire survey focused almost exclusively on household sector waste management issue, those companies which concentrated primarily on the commercial sector were probably disinclined to respond.

The three companies holding current contracts with local government councils for the collection of household refuse indicated a high degree of satisfaction with current contracts but expressed a preference for the contracts to be of longer duration. A willingness to be flexible when problems were encountered and disputes arose over the contractual arrangements was also reported.

Most of the five companies were found to be investing in equipment such as compactor vehicles and 'wheelie' bins in order to reduce costs and increase income. The sale or hire of wheelie bins directly to household customers offers a profitable outlet to the company on top of the contract with the local council. The private sector also hires other types of containers to households, such as trashpacks and skips (Plate 14, p. 68).

Private operators regard the regulations governing their operations as acceptable and fair, but express a desire to participate in policy formulation. Their major concerns relating to operations on the ground refer to such pragmatic issues as sharp objects and other items in rubbish bags that pose risks to their employees. They tended to believe, however, that there is room for improvement in relation to the operation of disposal sites. Their main concern in this regard is related to time delays at landfills and access problems in wet weather.

Those companies involved in recycling programs frequently mentioned the perennial problems associated with low rates of return and fluctuating prices for recycled commodities. Because of these problems they argue that the contractual system should not set a fix contractual cost per household for kerbside recycling collection, but instead adjust the price according to the market prices for recycled goods.

5.7.2 Treatment and disposal

Private sector operators are frequently involved in recycling programs in the five municipalities. The major recycling activities in which the private sector is involved are kerbside recycling and recycling depots. The kerbside recycling collections are conducted by private companies in two councils, Kingborough and Brighton. The contracts in these two municipalities differ in both concept and practice. A major problem is that contracts tend to be based on the quantity of material received from households rather than the market's demand for the recyclable materials.

In Kingborough, the private company carries out both the collection and marketing of recycled materials, and the amount of money that the KMC pays the contractor is pegged to the selling price of recycled items. If the contractor receives a higher price for

recyclable materials, the Council reduces payments. Conversely, if the contractor receives a lower price, the council is obliged to increase payments.

In Brighton, the contractor is employed to carry out only the collection of recyclable materials from households. The Council runs its own recycling centre and markets the recyclable items. In this case, the Council bears the full risks associated with fluctuating prices for recycled commodities.

Recycling depots are generally the investment of municipalities, although some operations are run by private contractors. Lack of private sector interest in these depots may stem from the fact that they are relatively labour intensive and provide low returns. Those recycling depots run by agencies other than local governments are generally operated by unemployed groups or on a voluntary basis.

5.8 Community involvement in solid waste management

Numerous non-government organisations and community groups are involved in recycling activities in Tasmania, especially in the Hobart region. The Litter & Recycling Research Association (LRRA) is an industry organisation which promotes recycling of glass, and aluminium and steel beverage containers. Charitable welfare organisations such as the Salvation Army, Lifeline, St. Vincent de Paul, City Mission and the Red Cross recycle clothing, books, furniture and household goods. The Boy Scouts Association participates in recycling bottles. Small businesses such as the 'Tip Shop' and 'Not Junk' have opened in more recent years and handle all recyclable materials. These organisations have been a major driving force in the promotion of recycling and related activities in the Hobart region.

5.9 Conclusion

There has been an increasing convergence of solid waste management in Hobart, Clarence, Glenorchy, Kingborough, and Brighton as they have been brought into line with the main policies of the State Government. Waste minimisation, recycling, and reuse are all now given a high priority in these local government areas. A variety of strategies have been employed to encourage residents to respond to these policies, the common strategies used by all councils being the imposition of a limit on the amount of waste collected per household, the encouragement of composting, the establishment of recycling depots, and the introduction of entrance fees to disposal sites.

The differences between the councils in terms of the comprehensiveness of their waste minimisation strategies appears to have been motivated in part by the estimated longevity of existing landfill sites. Brighton, for example, is electorally an area where environmental candidates poll poorly in state elections, and yet has a relatively comprehensive waste minimisation program in place. This has been dictated to a large degree by the fact that it no longer has a local landfill disposal site. But it also appears to have been determined by the values of those in whom responsibility for solid waste management has been invested at the local council level. Whether or not this responsibility has been invested in the Engineering or Environmental Health Sections appears to impact less on the extent of the solid waste policy than do the values of the individuals concerned.

The comprehensiveness of waste minimisation programs in place appears to be also determined by a number of other, more pragmatic factors, such as the socioeconomic mix of the community. Because of the small numbers of cases involved it is difficult to tease out the actual roles of each factor separately. Some differences, such as whether or not landfill gas extraction is being explored, are almost purely determined by technical opportunity.

The private sector plays a fairly limited role in local government solid waste management in Tasmania, this being confined in the main to household collection, kerbside collection, salvage operations, and mulching operations. The extent to which the private sector has been engaged in each of the five councils again appears to have been determined by a number of factors. In some instances, such as Glenorchy, the original reasons for reliance on the private sector are no longer known, but the policy now persists to avoid public expenditure on capital equipment. In other cases the current reasons appear to be related largely to the scale of the operation. Both Brighton and Kingborough, which collect household refuse on less than four days per week, rely on the private sector.

With respect to efficiency, the hypothesis that the private sector is the more economically attractive option is tentatively supported. Those municipalities that contract private firms to collect household waste appear to achieve greater technical efficiencies (house/truck/day), and greater financial efficiencies (lower expenditures/household). This does not mean, however, they are necessarily more efficient in a particular situation. The most likely explanation for the greater efficiencies achieved by the private sector is the greater flexibility of the private operation and the ability of the private firms to capture economies of scale as they are not restricted to geopolitical boundaries. This allows them to operate equipment and labour more efficiently.

Finally, with regard to the position of the private contractor, the length of the contract periods is a factor that local governments need to consider carefully. Longer contract periods allow the contractor to increase investment in equipment, thereby ensuring technical efficiency. Shorter contracts, however, enable the contract to be thrown open to renegotiation more frequently and ensure that the system is competitive. With regard to private sector involvement in recycling, it is clear that there is a need to introduce clauses into the contracts that allows the contract fees to be adjustable, depending on changing prices and circumstances. Those councils that had introduced kerbside recycling before this study was under way appeared to be operating the most successful household sector waste minimisation programs.

CHAPTER 6. HOUSEHOLDERS' PERSPECTIVES ON SOLID WASTE MANAGEMENT SERVICES IN SOUTHERN TASMANIA

This chapter examines solid waste management in the five local government areas from the perspective of the community. Solid waste management is reported to be of major environmental concern to the Australian community, with many individuals viewing resources as limited and believing that they should be conserved (Castles 1992). Households, however, generate large quantities of waste. In urban situations, householders must cope with limited storage space so that goods are purchased in small quantities and packaging is therefore greater. How householders behave and how they view the adequacy of solid waste services is an important component of discussion about solid waste management at the local government level. Their perspectives as customers of government, and sometimes of private sector services, provide a way of gaining a more fully balanced view of the quality of the services.

A household survey was used to explore household attitudes, opinions and practices in relation to solid waste services, to elicit information on the ways in which people disposed of their waste, their understanding of solid waste management issues, and their degree of satisfaction with local solid waste services.

6.1 The questionnaire

The questionnaire (see Appendix 5, pp. 120-123) consisted of 16 questions covering three main areas: (i) information on household behaviour relating to solid waste collection, disposal, and use of tip sites; (ii) attitudes towards the efficiency of solid waste services; and (iii) general questions relating to householder knowledge about the services and, their use of solid waste services additional to those provided by local government.

Questions 1 and 2 sought details about the frequency of services and rubbish bin facilities, while Questions 3 to 6 asked for details on the usual means various types of solid waste was disposed by the household. These included the amount of waste disposed of by the household, the type of container normally used as a rubbish bin, the location and distance of the household from the local tip site, and the frequency of household trips to the local tip.

Questions 7 to 8 were used to gauge the satisfaction of householders with local services, and whether they thought service quality had changed in recent years. In some cases, private sector involvement had been introduced during that time. The aim of Questions 9 and 10 was to seek information about any complaints from households regarding the

services, and the kinds of response they received from local government. Questions 11 to 13 solicited some comments on possible improvements to local solid waste services and whether householders were prepared to pay additional costs for these.

Question 14 asked householders to name the agency providing solid waste collection services in their area, while Question 15 asked how often the household engaged private firms to collect rubbish other than that collected in the normal household service. The final question was used to determine the number of people living in the house.

6.2 Questionnaire distribution, collection, and sampling methodology

A 'drop-off, pick up later' questionnaire was distributed to 100 households in each of the five municipalities. The percentage of households sampled in each in this survey thus ranged from 0.47% (Hobart) to 3.12% (Brighton) (percentage of the total number of households in the municipality). Following Hannagan (1982), a binary sampling method was used to select sub-areas in each of the municipalities, and households within these sub-areas to be studied. Using 1:100,000 scale Tasmanian topographic maps, each of the five municipalities was divided into 10 sub areas. Ten dwellings from each of these sub-areas were then selected by random route sampling. This involved the use of starting points in each sub-area, chosen randomly from a 1:25,000 Street Atlas and selecting every fifth house, alternating (left and right) at road junctions. A questionnaire was hand delivered to each of these households.

Respondents were given three options for returning the completed questionnaire. They could (i) return the questionnaire to a collector returning on a specified collection day, (ii) leave the questionnaire outside the front door for collection, or (iii) use the 'free post' envelope provided (with instructions to kindly return within one week). Prior to collection, householders were recontacted as a prompt to complete the questionnaire. The major advantage of the first option was that it enabled participants to ask questions and provide further relevant information. Both the first and second options were designed to increase the level of participation in the survey.

6.3 Survey results

Questionnaires were delivered in March 1994. Just over half of the questionnaires were completed and returned (288 out of 500). Response rates varied between municipalities, with the highest rate from Clarence (70%) and the lowest from Brighton (40%).

Comprehensive details of the responses to each question are given in Appendices 6 and 7, pp. 124-126 and 127-139. The more significant of these results are discussed below.

Many respondents in Hobart, Clarence, and Kingborough were from small (single or two-person) households, whereas respondents in Glenorchy and Brighton tended to be from larger (three to five person households). About 80% of respondents had lived in their municipalities for more than three years. All respondents received a weekly collection service.

6.3.1 Means of disposal of solid waste

The means by which householders disposed of five major wastes (glass, plastic bottles, paper, cans, and food waste) was found to vary considerably between municipalities. In each of the tables below covering these waste types, the 'mix with other waste' category indicates the material was put out for the regular garbage collection. Glass was recycled by only 44.3% of households in Clarence, but by 86.2% in Kingborough. Low rates of household recycling in Clarence and Glenorchy were likely to be attributable to the absence of kerbside recycling. Household recycling in Hobart (60.6%) was surprisingly high given that the survey was conducted prior to the introduction of the kerbside recycling program in 1994.

TABLE 6.1 Household disposal of glass

Options	HCC	CCC	GCC	KMC	BMC	All (av.)
Mix with other waste (%)	33.3	45.7	50	10.3	17.5	32
Recycle (%)	60.6	44.3	48.2	86.2	80	62
Other (%)	3	5.7	0	0	0	2
No answer (%)	3	4.3	1.9	3.5	2.5	3

One-third of Hobart residents (33.3%), approximately half of Glenorchy residents (50%), and just less than half of Clarence residents (45.7%) mixed glass with ordinary garbage. Residents in Kingborough and Brighton recycled glass to a greater degree (86.2% and 80% respectively). Generally, the result indicates the value of kerbside recycling programs by local government.

TABLE 6.2 Household disposal of all types of plastic bottles

Options	HCC	CCC	GCC	KMC	BMC	All (av.)
Mix with other waste (%)	60.6	54.2	44.4	10.3	10	38.9
Recycle (%)	30.3	35.7	46.3	86.2	82.5	53.1
Other (%)	6.1	2.9	3.7	1.7	7.5	4.1
No answer (%)	3	7.1	5.6	1.7	0	3.8

The majority of residents in Hobart (60.6%) and about half of those in Clarence (54.2%) disposed of plastic bottles by mixing these with ordinary garbage, whereas the majority of residents in Kingborough (86.2%) and Brighton (82.5%) reported that they recycled plastic bottles. The percentages of households in Kingborough and Brighton recycling plastic bottles are almost identical as those for glass recycling. The figures above also indicate that where there is no kerbside recycling service, glass recycling occurs to a far greater extent than does the recycling of plastic bottles. In Hobart, for example, 60.6% recycled glass but only 30.3% recycled plastic bottles. The collection of bottles by the Boy Scouts Association as well as individual hotels probably accounts for this difference in behaviour.

TABLE 6.3 Household disposal of paper

Options	HCC	CCC	GCC	KMC	BMC	All (av.)
Mix with other waste (%)	45.5	40	42.6	43.1	15	38.9
Recycle (%)	25.8	18.5	9.3	27.6	50	24.7
Burn (%)	10.6	18.5	18.5	6.9	17.5	14.2
Other (%)	13.6	11.4	14.8	15.5	15	13.9
No answer (%)	4.6	11.4	14.8	6.9	2.5	8.3

In most municipalities, about 40% of residents disposed of paper by mixing it with ordinary garbage, but only 15% of households in Brighton disposed of paper in this fashion. Given that newspaper recycling in Tasmania collapsed in late 1993, the reason for the high rate of paper recycling by households in Brighton is somewhat of a mystery. Additional information obtained from respondents indicated that less than fifteen percent of households reported that they burned their paper, especially in winter. A small percentage of residents in Hobart, Glenorchy, Clarence, and Kingborough used paper for composting. For this reason, fewer households in areas without a kerbside collection service mixed paper with other household refuse than mixed plastic bottles. In

Kingborough, a greater number of households mixed paper with waste than mixed plastic bottles.

TABLE 6.4 Household disposal of cans

Options	HCC	CCC	GCC	KMC	BMC	All (av.)
Mix with other waste (%)	68.2	75.7	63	48.3	20	58.3
Recycle (%)	16.7	15.7	25.9	43.1	75	31.6
Other (%)	9.1	0	3.7	3.5	2.5	3.8
No answer (%)	6.1	8.6	7.4	5.2	2.5	6.3

Less than 26% of households in Hobart, Glenorchy, and Clarence recycled aluminium and steel cans. Almost half or more of households in Kingborough (43%), and three quarters of households in Brighton (75%) recycled their cans. The large difference in the proportion of households recycling cans in the two municipalities with kerbside recycling (Kingborough and Brighton) can not be accounted for.

TABLE 6.5 Household disposal of organic (food) waste

Options	HCC	CCC	GCC	KMC	BMC	All (av.)
Mix with other waste (%)	37.9	42.9	50	46.6	42.5	43.8
Compost (%)	50	40	36.9	43.1	45	43
Other (%)	7.6	7.1	7.4	10.3	10	8.2
No answer (%)	4.6	10	5.6	0	2.5	4.9

Two primary methods of disposing of food wastes in all five municipalities were by mixing this with ordinary garbage for collection and by composting it, with about equal proportion of households using either methods. About 8% of residents reported using other methods (mostly as food for animals).

The local government area with the highest participation rate in composting was found to be Hobart (50%). Clarence, Kingborough and Brighton had participation rates around 40%, while Glenorchy had the lowest participation rate (35%). The availability of subsidised compost bins alone does not appear to lead to higher rates of composting. Subsidised compost bins are available in both Hobart and Glenorchy but the rate of household composting in Hobart (50%) is far greater than in Glenorchy (36.9%).

Table 6.6 shows the number of householders in the five municipalities who participated in recycling of all kinds.

TABLE 6.6 The percentage of households recycling in the five council areas

Material	HCC	CCC	GCC	KMC	BMC	All (av.)
The % of households that engage in no recycling	14.2	18	28.8	6	3.2	15.1
The % of households recycling all materials	47.58	41.58	42.26	65.6	82.5	52.76

The highest rates of recycling were found to occur in Brighton (82%) and Kingborough (66%), with lower rates in Hobart (48%), Clarence (42%) and Glenorchy (42%). Table 6.6 indicates that the kerbside recycling programs operated in Brighton and Kingborough are effective in increasing recycling activity. The survey was carried out before Hobart introduced its kerbside recycling service.

6.3.2 Type of container used for refuse disposal

Just over half of the residents (55%) in all five municipalities used large plastic rubbish bags as refuse containers. Eighty percent of households used either small or large plastic bags and only 17% used a plastic or metal bin. Only 1.5% of households used wheelie bins. The average quantities of refuse put out for collection each week was equivalent to 1.3 large bags per household.

6.3.3 Use of private collection services

Most households (78%) with excess waste took this to their local tip themselves. The majority used the disposal sites in their municipality but a small proportion of household in Kingborough and Clarence reported using a disposal site in a neighbouring council area (5 and 4% respectively). Trips to the disposal sites were relatively infrequent, six to twelve trips per year representing the most frequent level of usage. Almost 30% of households made use of a private firm to remove excess waste at least once a year. The use of private firms to collect household waste was found to be marginally higher in Clarence (33%). The use of private firms for this purpose was also most frequent in this municipality.

6.3.4 Satisfaction with collection services

In Chapter 5, a number of measures of efficiency of local government solid waste services were looked at. Another measure of the efficiency of the solid waste management is householder satisfaction. Levels of satisfaction of householders in each of the five municipalities are shown in Table 6.7.

TABLE 6.7 Consumer satisfaction with solid waste collection services

	HCC public	CCC public	GCC private	KMC private	BMC private	All (av.)	Av. public	Av. private
Satisfied (%)	50	65.71	77.78	86.21	65	68.40	57.86	76.33
Not satisfied (%)	46.97	31.43	16.67	10.34	32.5	23.81	29.78	19.84

The percentage of residents satisfied with their collection service was found to be highest in the Kingborough Municipality (86%) and the lowest in Hobart (50%). The municipality with the highest dissatisfaction, however, was Hobart (46.97%). High dissatisfaction in Brighton was probably linked to the limit of one bag/bin per household as these residents indicated resentment about the one bag limit on household waste. This has been a major bone of contention in the area. The results indicate that householders in the councils where collection services are undertaken by private contractors tend to have higher levels of satisfaction with the collection services than do those in municipalities where the collection is a publicly operated service. This could indicate that the private sector provides better services. However, households in municipalities with kerbside recycling collection services also tended to be more satisfied with the collection service, and this may be a major source of their positive responses. In Kingborough where a kerbside recycling service was introduced in 1993, 45% of the respondents thought that the collection service had improved. Many householders in Hobart, particularly, reported that the lack of a kerbside recycling collection service was their major grievance. In Brighton, where a kerbside recycling collection service was introduced in 1993 simultaneously with a reduction in the amount of household waste that would be collected, the response was mixed. Twenty percent of householders considered that they had been an overall improvement, 27.5% that there had been no change, and 32.5% that the quality of the service had deteriorated.

Other sources of dissatisfaction can be gleaned from householders' suggestions for improving the solid waste collection services in their area. These were numerous, the four most common suggestions being:

- (1) introduction of kerbside recycling collection services where these did not exist;
- (2) day-time collection where night-time collection services were used;
- (3) council-provided rubbish bins; and
- (4) an increased number of annual clean-ups¹ (minimum of two).

The majority of respondents considered the quality of the collection service unchanged over the previous three years. That is, they considered that the present service was as satisfactory or unsatisfactory as it was three years ago. In the case of some municipalities where these have been substantial changes, this result was somewhat surprising. In Hobart and Glenorchy, for example, the service was changed from a night time to a day time operation in 1991 and yet residents in these areas appear to remain comparatively dissatisfied with the service and discount it as an improvement.

The vast majority of respondents were aware that the disposal site in their area was owned and operated by their local council, but there were differences between the municipalities in terms of who was thought to carry out the collection service. In Hobart and Clarence, there was little confusion, almost all residents being cognizant of the fact that this was a publicly operated service. In Kingborough, however, 26% mistakenly believed that collection was carried out by the local council, while in Glenorchy the figure was 50% and in Brighton 45%. When these differences are linked to householder satisfaction with the collection service, the results are informative. It suggests, on the one hand, that if higher satisfaction is related to the operation of the services by the private sector, the householder tends to report a higher degree of satisfaction even if unaware of the fact that the service is carried out by a private firm. This would suggest that the benefits of using the private sector were real rather than perceived. The very high correlation, however, between the proportion of households that *think* that the collection service is run by their local council and the proportion of households which reported they are satisfied with the collection services (Spearman rank correlation coefficient $R = 0.822$, $0.02 < P < 0.05$) raises the alternative possibility that householders are more likely to prejudge the service negatively if they believe that the service is operated by the council.

Despite the low reported levels of dissatisfaction in some municipalities, this did not translate into increased numbers of householders contacting the council about the collection services. The proportion of householders making such contact was highest in Kingborough (12%) and lowest in Clarence (6%). The reason for contact varied from one council to the other. Recent changes in collection services appeared to be associated with higher rates of contact. Very few respondents indicated that the purpose of their contact was to make a complaint

¹ All five of the local councils in this study conducted special clean-ups once a year. On these occasions householders were not limited in the quantities of refuse that they could put out for collection. The only limitation was that any item put out could be lifted by two men.

about the service, but those that did indicated that they were dissatisfied with the response they received from their council.

At the individual level, perhaps not surprisingly, most residents in all municipalities considered that the present costs of collection services were sufficiently high. Just over 20% of all residents indicated, however, that they were willing to pay more to reduce their frequency of tip visits either by the introduction of a kerbside recycling collection or by increasing the amount that could be put out for collection.

From the community's perspectives, many householders expressed serious concern over the exhaustion of landfill space, and a perceived lack of awareness about the need for recycling and composting. Kerbside recycling collection was considered to be a fruitful method of encouraging recycling. Most householders were cognizant of the environmental benefits of these activities. This conflicted, however, in some cases with a resistance to those waste minimisation policies that limited the quantity of rubbish for collection as this policy was seen to increase the cost of waste disposal to the household.

6.4 Conclusion

Although there is an overriding similarity of solid waste management policy in the five municipalities as a consequence of overarching State policies in this area, Chapter 5 indicated that the municipalities are distinguished by significant differences in the strategies that they have implemented to achieve these broad goals. The major point of interest in this chapter was the extent to which these policies and practices have resulted in differences in householders' behaviour and attitudes toward solid waste issues in general, and local government solid waste management in particular.

More than 50% of households returning the questionnaire were involved in recycling, with glass (65%) and plastic bottles (57%) being the major recyclable materials. The greatest determinant of the participation rate of householders in recycling was clearly the existence of kerbside recycling programs, participation rates in those areas where such programmes operated being far higher. In general, householders were found to be concerned about reducing waste and recycling in their area, and to be willing to support recycling programs, particularly where this involved minimum inconvenience. High rates of participation in composting food wastes (42% on average) indicated relatively high levels of awareness on the part of individuals.

A finding of particular interest was that many householders appear to be willing to pay more for improved services, especially for the benefits of kerbside recycling. A reduction

in the amount of waste that could be disposed of through the conventional collection service represents a more regulatory approach to waste minimisation, and one that impacts on the convenience of the householder. Not surprisingly, it was found that this approach generated considerable resistance. The fact that the most stringent limit in this regard had been imposed in an area with a high average household occupancy rate may have exacerbated the reaction to it and it is probable that the resistance to such a policy may be less if introduced in other areas.

While the level of support for household sector waste minimisation was in general relatively high, and higher in those areas with more aggressive waste minimisation programs, there was considerable variation in household participation rates. Households in Hobart, for example, appear to participate in composting to a significantly higher rate (50%) than do households in Glenorchy (37%), although both councils encourage composting and provide subsidised compost bins. Explanations for this could be differences in the environmental attitudes of the residents in these areas, differences in the degree of promotional encouragement of home composting, or better advertising of the availability of compost bins.

A more curious finding was the variation in proportions of households in those areas with kerbside recycling programs and the same number of recycling depots. The proportion of households which reported that they recycled cans and paper was almost twice as high in Brighton as it was in Kingborough. A possible explanation for this difference is that a large number of residents in Brighton may be unaware that steel cans and paper are not accepted in the kerbside recycling collection and so dispose of these items incorrectly through this means.

Furthermore, the introduction of kerbside recycling collection is likely to be variable in terms of its impact. In Hobart, 61% of households recycled glass in the absence of a kerbside recycling scheme. This is most likely due to the fact that there are more outlets for glass recycling already established in Hobart. Hotels and community organisations such as the Scouts frequently have glass collection depots in the Hobart area. The implication is that kerbside recycling programmes, if introduced in Clarence and Glenorchy where participation in glass recycling is currently relatively low (44 and 48% respectively), may increase glass recycling by a greater margin than it would if introduced in Hobart.

The substantial variation in householders' satisfaction with solid waste collection services between municipalities appears to be related to a number of factors. Again, the hypothesis that the private sector is associated with greater quality of service, as measured by greater consumer satisfaction, is tentatively supported. Satisfaction levels were found

to be higher in those areas where the private sector was employed to carry out the household refuse collection service. At least two factors confounded this situation. Firstly, higher satisfaction levels may have been associated to some degree with kerbside recycling collection programs. The low satisfaction levels in Brighton despite the existence of a kerbside recycling collection program could be explained by the stringent limit on the quantity of refuse that would be collected per household. This left Glenorchy as the only area in which there was no kerbside collection service but in which a private contractor was used to collect household refuse. Relatively high satisfaction levels reported in this area therefore serve as the major indication that the private sector is associated with greater quality of services.

If greater satisfaction levels are in reality associated with the use of private contractors to collect refuse, a more vexing question is why this should be the case. The differences in reported satisfaction levels do not appear to translate into differences in the number of complaints made to the local councils over the collection service. It may be that the reasons behind reported satisfaction levels have less to do with how the service is carried out and more to do with who is thought to carry out the service. The results suggest that householders may report greater dissatisfaction if they think that the collection service is carried out by the public sector. This may be rooted in a popular belief that publicly operated services are inherently inefficient.

In summing up a few important comments should be made about the limitations of the household survey. The usual cautionary caveats associated with interpreting survey questionnaire results are in this study exacerbated by the small sample size (100 households in each municipal area, ranging from 0.47% to 3.12% of households in the area), and the relatively low response rates (between 40% and 70% with an average of 57.6%). The results of the survey therefore have to be treated with caution. Some anomalies in the survey results could probably be put down to the small sample size and low response rates. The inordinately high rates of paper and can recycling found in Brighton (pp. 87 and 88), for example, could probably be explained by the fact that response rates in that municipality were low. If only those active in recycling responded this would have inflated the figures for that area. Also, as noted above, the whole area of solid waste management in these local government areas was in a state of considerable flux during the time the study was undertaken and this may have impacted on the responses, adding a further element of uncertainty. As a result of these limitations any conclusions drawn, such as the statement that the private sector is more efficient than the public sector at providing solid waste services, must be regarded highly tentative.

CHAPTER 7. CONCLUSIONS

The thesis research was undertaken during a period of substantial transition in Tasmania, at a time when new challenges and responsibilities were presented to local governments. Reformed State Government legislation was significantly raising the required environmental standards in many areas, including those which are traditionally the domain of local governments, such as sewage treatment and solid waste disposal. Demands for improved environmental quality required in some instances considerable capital outlays on the part of local governments at a time when recession dictated a policy of fiscal restraint and a reluctance to offset these increased costs by increasing property rates. The net outcome was, therefore, an effort to improve the economic performance of local governments.

As part of this strategy, structural changes at the macro level were set in train which involved amalgamation of some Tasmanian local governments and alterations of boundaries between others. As part of the new State legislative package known as the Resource Management and Planning System, substantial reviews of policy and practice in the provision of services to the community were set in train. For example, local governments are required to produce strategy plans in 1995, to be revised after that at five-yearly intervals, taking into account the objectives of the new legislation, including sustainable development.

The thesis singled out solid waste management as one area which is a major concern for local government, and one in which changes are occurring in response to conservation imperatives to be less wasteful in the use of the earth's resources, and less damaging to the environment. The purpose of the study was to examine the ways in which solid waste management policy and practice are changing, and how successful they are in meeting the new expectations of the community and requirements for economic efficiency. By comparing a number of local governments it sought to determine which strategies appear to be more successful. It also served as a preliminary investigation of the popular hypothesis that increased reliance on the private sector to provide these services automatically increases economic efficiency.

The thesis provides an account of the kinds of changes and stresses to which local government is being increasingly subjected, particularly in Tasmania. The new integrated legislative package covering land-use planning, environmental management and pollution control, and local government itself (*Local Government Act 1993*), was being introduced virtually simultaneously with local government amalgamations targetted at the rationalisation of resources and expenditure. Expectations were also being raised, not only in terms of environmental standards demanded by the State, but in terms of wider,

overarching new initiatives such as the National Waste Minimisation and Recycling Strategy.

Despite the new intentions and the new hopes, local government was often confronted with increasing amounts of solid waste and increasing disposal problems, resulting in problems in finding satisfactory landfill sites. These are especially true for the more crowded members of the world community, like Thailand. Tasmania's problems are comparatively small, but its experience might still be of use for such countries. The Tasmanian experience, borne out at least in the local government areas covered in the thesis case studies, demonstrates how leadership by higher tiers of government can be effective. It was, first, the Federal Government which enunciated the National Waste Minimisation and Recycling Strategy and, secondly, the State Government which incorporated the strategy measures into its own policies. Local government, in turn, has begun to respond to the targets for reduction of landfill disposal by introducing initiatives such as kerbside recycling and by levying charges on tip users. In principle the latter is a step towards offering a disincentive to the householder to make personal trips to the tip, although such charges are very low at present in southern Tasmania.

Recycling is becoming a strong feature of solid waste management in southern Tasmania, as the case studies show. This is occurring despite the fact that economies of scale are very poor. Tasmania has a relatively low population at low densities, as well as a small economy. Thailand is at the opposite end of the spectrum with regard to these factors, and they could work in favour of reducing existing levels of solid waste through more recycling. But leadership and initiative in government are required as well as economies of scale, and it is in this regard that Tasmania has an advantage.

It is, however, important to keep in mind the significant differences between Tasmania and Thailand. Thailand's climate is hot and humid. Organic wastes ferment quickly, and disposal must be within 48 hours. In Tasmania's cold and drier climate, disposal can be weekly. Thailand is four times larger than Tasmania, but its population is 100 times larger. Thailand is a developing country with low average income. Thai people could not pay as much for waste disposal as Tasmanians do. Further, Tasmania is in a better situation, in that its strong environmental movement has exerted pressure since the 1970s, and government has had to respond with a recognition of the need to plan for environmental problems. Thailand has only just begun to note its environmental issues.

The thesis shows that, in Tasmania, the State has also taken steps to improve management and address environmental quality issues through such measures as the consolidation of landfill operations. The State undertakes monitoring of tip sites on a regular basis, and the decrease in the number of landfill sites should enhance this process.

It is noted that the State asks for the cooperation of local government in the monitoring process, through regular reports from the councils. The shared responsibilities can be regarded as a partnership model which, no doubt, has the potential for further improvements which may in turn improve solid waste management. Local governments also show the usefulness of organisational mechanisms amongst themselves in cooperation with the State, with the Local Government Association's 1993 publication of a guide for councils on implementing State initiatives. There is an additional case, however, for the State not to restrict itself to policy maker and auditor, but to take more of a role in providing support with administrative and financial management, as well as assistance in the application of new techniques and technology, at least through research and the distribution of information.

The thesis showed that private sector involvement in Tasmania is limited, and restricted to contractual arrangements only. The case studies provided limited support for the view that the private sector can be more efficient and, consequently, cost effective, in these circumstances. At the same time, neither the State nor local governments themselves had clear policies on the private sector, and there is a case for further local comparative research of public versus private operations, and the provision of State guidelines. Thailand's experience in providing a manual to guide contracting processes may offer a useful model. In some areas of operational management, Tasmanian regulatory processes need improvement, with a lack of specific laws and regulations controlling the collection of household waste. For example, regulations covering the transport of waste need strengthening. Some vehicles are not required to cover their load to prevent waste being blown about during transit. The need for careful regulation applies equally to the public and private sectors, but if there is expansion of private sector services, the need for better government supervisory roles may increase.

The literature from elsewhere indicated that governments need to keep a watch on the wider implications of privatisation. Social and environmental effects, for example, need to be factored into arrangements, not merely the economics of operations. From the point of view of contractors themselves in Tasmania, the major concern, apart from the fundamental question of length of contracts and certainty, was regulation by government to protect their own collection employees from the hazardous materials which can be present in household wastes.

The local government case studies show how waste minimisation is now given a firm priority in southern Tasmania, in line with State policies. Common strategies used by councils are the imposition of a limit on the amount of waste collected per household, the encouragement of composting, the establishment of recycling depots, and the introduction of entrance fees to disposal sites. There are significant and interesting differences in the

strategies adopted by the five southern Tasmanian councils, some of which provide useful examples for consideration elsewhere. The severe policy on limitation of rubbish bags in the Brighton Municipality is challenging, for example, as it created resistance from residents but has direct benefits for waste minimisation. The policy of encouraging household compost bins is another program designed to reduce the amount of waste going to landfill, with a return benefit to the environment in the form of fertilizer. Such a program is already useful in Thailand, where putrescibles account for a major component of household waste. The most fruitful programs in southern Tasmania appear to be kerbside recycling collections, in terms of getting people involved in recycling and at the same time minimising waste going to landfill.

Nevertheless, there is a need for government at both State and local levels, at least in Tasmania, to maintain educational programs which further encourage householders. It is likely that greater promotion and education could increase householder participation in composting in general, for example, and in particular in places like Glenorchy where rates of involvement are relatively low, despite the availability of direct assistance to householders. The household survey showed that people are sympathetic to the need to reduce waste in favour of recycling and reuse, yet they did not know some of the basic arrangements for solid waste management in their locality, such as who were the immediate providers of services. Information is an important tool for improvement. It could also have the benefit of empowering the population so that the public is more likely to maintain pressure on governments to look continually towards improvement. The new Tasmanian State legislation is potentially helpful in this regard, as it provides citizens with avenues for demanding adherence by the government itself to the legislative provisions, and thus for making government more accountable.

Financial arrangements amongst the councils are probably more of local rather than wider interest. For example, costs recovered from property rates in Glenorchy do not appear to be commensurate with expenditure on household waste management. Estimates of aspects of comparative efficiency are hampered in Tasmania by lack of uniform accounting. For example, there is no ready standard by which to measure the total amount of waste disposed of each year in Tasmania. Councils estimate waste using different methods and scales. Brighton, for example, estimates household waste by volume while the same material coming from the Brighton transfer station to Glenorchy tip site is calculated by Glenorchy City Council by weight. A standard system of waste estimation for all councils in Tasmania would be an improvement that would also help in the overall estimation of both the State's problems and the effectiveness of its positive efforts.

The inter-council variations in policies and practices in southern Tasmania resulted in differences in householders' behaviour and attitudes toward solid waste issues in general, and local government solid waste management in particular. Householders were found to be concerned in general about reducing waste and recycling in their area, and to support schemes which allowed them to more easily engage in recycling activities at the individual level. Their willingness to engage in waste minimisation programs, however, has certain bounds related to convenience, but extends to the possibility that environmental improvement is important enough to them to pay for it. The substantial variation that was found to exist amongst local government areas in terms of householders' satisfaction with solid waste collection services appears to be related to a number of factors and is difficult to account for. In areas where both kerbside recycling services were offered and where private firms were employed to carry out collection services, reported satisfaction levels were highest.

Overall, perhaps the most significant feature of the thesis is the extent to which it shows the importance of obtaining perspectives from all those involved in solid waste management: governments at all pertinent levels, the residents, and the private sector where it provides services. The thesis results support the view that the prospects for improvement in solid waste management will be enhanced if emphasis is placed on strengthening the relationships between all sectors and achieving cooperation amongst them.

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APPENDIX 1 TASMANIAN GOVERNMENT SOLID WASTE MANAGEMENT POLICY

(Source: Department of Environment and Land Management 1994)

GOALS

To promote environmentally and economically feasible waste minimisation and resource recovery.

To protect the environment from effects arising from landfills receiving municipal and hazardous wastes.

WASTE MINIMISATION

Manufacturing and processing industries will be encouraged to adopt clean production technology.

Industry, State and Local Governments will support the Environmental Choice Program or a national program with similar aims.

The State Government will implement and monitor the National Packaging Guidelines.

State Government and municipal Councils will set an example to the community at large by practising waste minimisation and recycling measures in their own places and establishing procurement policies for recycled materials.

Tasmania will introduce a Municipal Waste Minimisation Grants Program.

Municipal Councils with the administrative support of the State Government will encourage home composting and introduce chippers/ shredders at tip sites. Compost facilities for use by industry will be encouraged.

Municipal Councils will charge for waste collection by volume (eg bag limit) at the kerbside.

The Litter Act will be reviewed and strengthened as deemed appropriate.

Education programs and public promotion will be increased so as to facilitate changing attitudes and behavioural patterns.

RECYCLING AND REUSE

State Industry Waste Minimisation & Recycling Plans will continue to be developed to guarantee markets for recyclable materials. Multi material sorting facilities will be developed as part of these plans.

The Government proposes to adopt the national target set by ANZECC for reduction in waste going to landfill (measure as weight per capita) as follows: 1993 15% reduction, 1995 25% reduction, and 2000 50% reduction.

Performance material targets for recycling in Tasmania have been set for 1995 in line with the national targets. Due to the relatively decentralised nature of Tasmania the national target of 90% participation rate for kerbside recycling is noted only.

Municipalities, State Government and Industry will be responsible for the provision of public education and information.

A Council Recycling Rebate Scheme will be introduced.

A voluntary manufacturing levy will be put in place by all industry groups to assist in providing funds for improving the recycling infrastructure.

The packaging industry and Local Government will assist in providing receptacles; they will ensure reliable markets are found for recyclables; and ensure the construction and regular maintenance of recycling drop off depots.

Where garbage collection services operate, kerbside collection of recyclables are recommended by 1995.

Recycling in public places will be encouraged. The packaging industry will assist with receptacles and Municipal Councils and State governments will assist by providing locations. Education and promotion is essential for the success of the program. All facilities will have colour coded bins and signs.

ENERGY RECOVERY

All level 2 sites with the suggested criteria for gas recovery are to be investigated for their potential to extract landfill gas and all level 3 sites shall have gas collection and treatment facilities installed.

Consideration will be given to the appropriateness of incineration technology for Tasmania.

SAFE & SECURE DISPOSAL

Improved environmental management of disposal sites shall be achieved by complying with landfill development and operating standards or by other such agreements.

Landfill site selection criteria will be included in the development and operating standards for implementation.

The waste disposal site classification system will be implemented.

Municipal Waste Management Plans will be developed and implemented.

Fees determined by each managing authority shall be implemented on a user pays basis for all level 2 and 3 disposal sites and at staffed level 1 sites.

A waste disposal fee replacing environmental licence fees for refuse disposal sites will be introduced. This fee will be used for waste minimisation and recycling initiatives administered by the Waste Management Advisory Committee.

Recognised training courses will be introduced for disposal site operators.

REHABILITATION & FUTURE USE

Site rehabilitation shall be carried out in accordance with the landfill development and operating standards.

The reuse of completed disposal sites shall be dealt with in a document on contaminated sites.

APPENDIX 2 QUESTIONS (INTERVIEW) FOR STATE GOVERNMENT OFFICIALS

1. What State environmental policies apply to the full range of local government services?
2. Are there any differences in policy according to whether private contractors provide services?
3. What permits or licences are needed for services?
4. How do private contractors providing services obtain a permit or licence?
5. Are there environmental standards for each kind of service?
6. What State Acts govern solid waste collection and disposal (all kinds of waste, eg., household, industrial, and commercial)?
- 7a. What standards apply to solid waste collection and disposal (all kinds of waste) including recycling?
- 7b. Are there particular standards that apply to household rubbish collection and disposal?
- 7c. Are the standards adequate in respect of their scope, and the levels at which they are set?
8. What kind of monitoring or other action do you undertake to establish whether the standards are being met?
 - a. for all local government services
 - b. for solid waste management in particular
- 9a. Are there environmental audits for solid waste services?
- 9b. What methodology do you use for audits, and how often are they carried out?
10. Does the State research and plan for new systems of solid waste management, applicable, for example, to collection, operation of tips, and recycling?
11. What are the most common problems of solid waste disposal in Tasmania relative to environmental standards?
12. What procedures are in place to cope with a breach of environmental standards?
- 13a. Does the State have any direct dealing with the private sector in relation to solid waste management?

- 13b. How does the State manage or control the private sector for solid waste management?
- 13c. If there are problems in controlling the private sector, does the State take any action?
- 14. Do your records or your observations give an indication of any changes in environmental quality when privatisation of solid waste management services was introduced? Please give details.
- 15. Are there any State policies on the privatisation of local government services?
- 16. What do you (the interviewee) think about policy and the regulation of the private sector's involvement in local government services, particularly solid waste services, in regard to environmental quality?

**APPENDIX 3 INTERVIEW FORM QUESTIONS FOR LOCAL GOVERNMENT
OFFICIALS**

Hobart City Council,

Glenorchy City Council,

Clarence City Council,

Kingborough Municipal Council

Brighton Municipal Council.

1 Policy

1. What is the municipal role in solid waste management?
2. What regulations does the city/municipality have in place for solid waste management?
3. Are there any written environmental policies for solid waste management in this city/municipality?
4. What standards apply to solid waste collection and disposal (all kinds of waste, e.g., household, industrial, and commercial), including recycling services?
5. Are there particular standards that apply to household rubbish collection and disposal?
6. Are the standards adequate in respect of their scope, and the levels at which they are set?
7. What kind of monitoring or other action do you undertake to establish whether the standards are being met for solid waste management?
8. Are there environmental audits for solid waste services?
9. What methodology do you use for audits, and how often are they carried out?
10. Are there any municipal policies regarding privatisation of
 - a) local government services in general?
 - b) solid waste management?

2 Management

2 (a) In general

1. What overall range of waste management services do you provide? E.g., for collection, disposal, transfer, recycling.

2. Please tell me the following characteristics of household waste services: type of collection system, transport, disposal and/ or recycling, collection frequency, time of operation, and who actually carries out the collection services?
- 3a. What is the area (sq.km.) of the municipality?
- 3b. Do kerbside household collection services cover all or part of city/ municipal area?
- 3c. What percentage of the area is covered?
- 4a. What is the population and the number of households in your city/ municipality?
- 4b. How many households (and people, if you have a figure) have a kerbside or door to door collection?
- 5a. What kinds of rubbish can householders put out for normal collection services?
- 5b. Do you specify containers, and what kind of container?
- 5c. How many containers can be put out for collection?
- 5d. Who provides the containers?
6. What is the quantity of household, commercial, and industrial solid wastes you dispose of each year? Please give added details if some solid wastes come from outside this city/ municipality.
7. How many employees are involved in collection, tip site, and recycling services?
8. How do you dispose of solid wastes?
9. Is the city/ municipality introducing new technologies for household solid waste services?
10. What procedures are in place to cope with environmental problems?
11. In this city/ municipality, what are the environmental effects of household solid waste collection, transport, and disposal?
- 12a Does the city/ municipality provide promotional/ educational material on solid waste disposal to local residents?
- 12b If yes, have there been any tangible results from such promotion/ education?
13. What are the differences amongst commercial, industrial, and household collection services, for example, with respect to collection equipment, frequency, hours of operation, and type of collection service (kerbside or door to door)?
14. Do industries implement their own services? If yes, please give details.

2 (b) Private sector involvement

1. What local government services have been privatised? Please list
2. Are you currently using any private contractors to provide waste management services? Please specify what kinds of services and what companies are providing them.
3. If yes, when was the first private service contract for solid waste collection let?
4. What is the process for letting contracts? Is there usually competition for the contracts?
5. Would it be possible to have a copy of a tender application form and a contract form?
6. What kinds of system does the city/ municipality have for managing privatised waste collection services?
7. Have you had any problems with private contracts?
8. What kind of solution do you use: negotiated, court, or penalty?
9. Do your records or your observations give an indication of any changes in environmental quality when privatisation of solid waste management services was introduced? Please give details.
10. What generally do you think about these contracts? Have they benefited the city/ municipality or not? In particular, what are the advantages and disadvantages of contracts?
11. Have you at any time changed back to using council employees instead of private sector contracts? If yes, why?
12. What do you plan for the future for private sector involvement in solid waste management services?

3 Financial Information

1. What kind of system is used for collecting municipal financial information?
2. Can you provide financial information - revenue (e.g., tax, fee, fine), expenditure (operating, maintenance, depreciation, etc.), profit or loss for solid waste

management? Please indicate whether cost separation for different phases of services are available.

3. How do you collect service fees? From whom?
4. How are the fees calculated (different rates for houses, flats, restaurants, for example)?
5. Are there gate charges for tip sites? Please give details.
6. Which aspects of solid waste services pose the greatest financial problems for the city/ municipality?
7. Are there any particular problems with private contracts?
8. Do waste service companies pay to use city/ municipal disposal sites? Under what conditions?
9. What is the cost to the city/ municipality of privately provided solid waste collection services? Please give details if possible.

Questions on recycling projects

- 1a. What type of recycling services do you provide for household wastes?
- 1b. If you provide kerbside collection, how often?
- 1c. When were recycling services introduced?
2. Do you provide (a) recycling bags or bins?
 (b) drop off centres?
3. What proportion of households participate in recycling activities?
4. Is recycling successful or not? why?
5. What was the quantity of materials collected for recycling during 1992-3?
6. What, if any, income was generated in 1992-3?
7. How many drop-off centres do you operate?
8. To what extent has the use of drop-off centres reduced the quantities of material disposed of in landfill sites?
9. What are the major problems, if any, with recycling program?
10. What are your reasons for having a recycling program?
11. What are your future recycling plans and when they will be implemented?

Questions for tip site managers

1. Are there any problems during operations?
2. Do any other councils or do private companies use this tip site for disposal? Please give details.
3. What type of vehicles and equipment do you used at this tip site?
- 4a. What is the capacity of the tip site (tonnes or volume)?
- 4b. What tonnage or volume of waste do you dispose by landfill each year?
- 4c. What year will the landfill be full?

Questions for collection vehicle staff.

1. What are the main problems with collecting household garbage?
2. What safety and health precautions do you take during collection? Please give details.
3. Are there any accidents during operations?
4. Have you changed from being either a local council or private company worker? If so, have your conditions and the type of work you do improved? Please give details.

APPENDIX 4 QUESTIONS FROM THE QUESTIONNAIRE TO THE PRIVATE SECTOR

Questionnaire for private contractors (Chatchawan Chayabutra)

Aim: to study how private contractors manage services (including operational problems and their solutions), and their relationship with local authorities where relevant.

Please answer questions in those sections that apply to your business

General operational and contractual questions

1. What kinds of household waste management services do your company provide?

(.....) Collection (.....) Disposal

(.....) Transfer (.....) Recycling

(.....) Other (please specify).

2. Please briefly describe the services you provide. Details could cover, for example, kind of collection service; how the service is initiated; frequency of service.

If you have a service contract with Local Government, please answer all questions. If not, please go to question 8.

3. Are you satisfied with the tendering process for contracts?

4. What steps do you take when Council representatives complain about a service subject to contract?

5. Can you usually resolve such service contract problems (if any) to your satisfaction?

6. When your staff collect a bin, do you limit amounts of waste collected to the specifications in your contract document ?

7. Do you want to renew your contract when it expires?

8. Do you have any plans either for providing Local Government services, or adding to those you already provide? (...)Yes (...) No Please give some details if possible.

9. Do you have plans to expand your collection area in future?

10. Generally speaking, what are your future plans in relation to solid waste management services?

11. Can you give some indication of the financial viability of your services?
12. Are you satisfied with the environmental regulations imposed by government on your operations? Please give some details.

Question about collection services

13. What are your major concerns in collecting household garbage? Please give some details of any problems during operations.

Questions about tip site management

14. Do you operate a tip site yourself, or do you use a Local Government tip?
15. What, if any, are the main kinds of problems with tip sites?
16. Do you have plans for improving tip site operations? Please give some details.

Questions about recycling projects

17. What are your reasons for having a recycling program?
18. Have recycling programs had any effects on the services you provide? Please give some details.
19. Do you have future recycling plans? Please give some details.

APPENDIX 5 QUESTIONNAIRE TO LOCAL RESIDENTS

Municipality/
City council.....
Suburb.....

Questionnaire to residents about rubbish collection and disposal.

Please take 5 minutes or so of your time to fill out this questionnaire. For many of the questions, all you need to do is to put a √ in the space (.....) next to the answer you choose, and/or write in the other spaces provided. For some questions, you may put a √ in more than one space. Thank you very much.

1. How many times a week is the normal rubbish collection service from your household?

- (.....) not at all
- (.....) less than once
- (.....) once
- (.....) more than once

2. Does the collection service provide rubbish bins for those houses who want them?

- Yes (.....)
- No (.....)
- I don't know (.....)

Questions about disposal

3. How do you usually dispose of waste?

	Glass	Plastic bottles	Paper	Cans	Food waste
Mix with ordinary garbage	(....)	(....)	(....)	(....)	(....)
Compost	(....)	(....)	(....)	(....)	(....)
Separate for recycling	(....)	(....)	(....)	(....)	(....)
Burn	(....)	(....)	(....)	(....)	(....)
Other (specify).....					
.....					
.....					

4. How much rubbish that is not for recycling do you usually put out for each collection?

	plastic bag (small) eg. shopping bag	plastic bag (large) eg. rubbish bag	plastic or metal bin	wheelie bin	other
half full	(.....)	(.....)	(.....)	(.....)	(.....)
one full	(.....)	(.....)	(.....)	(.....)	(.....)
two full	(.....)	(.....)	(.....)	(.....)	(.....)
more than two	(.....)	(.....)	(.....)	(.....)	(.....)

Questions about tip sites, satisfaction, and possible service improvement.

5. a. Where is your local rubbish tip site?.....
b. How far is it from your house?.....

6. How often do you make a trip to the tip?
(.....) Once per week or more
(.....) Once every one or two months
(.....) Once every three to six months
(.....) Once per year
(.....) Never
(.....) other (specify).....

7. Are you satisfied with the rubbish/ solid waste collection and disposal service?
Yes (.....)
No (.....)

Why?
.....
.....
.....
.....

8. a. Have you lived in this municipality for more than 3 years?
Yes (.....)
No (.....)
b. If yes, what do you think of the door to door rubbish collection service compared with 3 years ago?
(.....) better than 3 years ago
(.....) the same as 3 years ago
(.....) worse than 3 years ago

Please give reasons for your opinion :

.....

.....

.....

.....

.....

9. Have you contacted your local government or council about rubbish collection/ disposal in the last 12 months?

Yes (.....)

No (.....)

Please give details of the reasons for your most recent contact:

.....

.....

.....

.....

.....

10. If you have made a complaint, what has been the council's reply?

.....

.....

.....

.....

.....

11. What practical improvements could you suggest for the collection and disposal service?

.....

.....

.....

.....

.....

12. Would you be prepared to pay more for an improved collection service?

Yes (.....)

No (.....)

Why?.....

13. What do you think is the most serious issue of rubbish collection/ disposal facing your local area today?

.....
.....
.....
.....
.....

Extra questions about rubbish collection services.

14. Who carries out the following rubbish services in your area?

a. normal collection (.....) private contractor
 (.....) local council
 (.....) do it myself
 (.....) I don't know

b. tip site (.....) private contractor
 (.....) local council
 (.....) I don't know

c. recycling (.....) private contractor
 (.....) local council
 (.....) I don't know

15. How often do you get contractors for rubbish that cannot be picked up in the normal collection?

(.....) Once per week or more
(.....) Once every one or two months
(.....) Once every three to six months
(.....) Once per year
(.....) Never
(.....) other

(specify).....

16. Finally, how many people live in your house/flat?

(.....) 1-2
(.....) 3-5
(.....) more than 5

Your opinions are very valuable to this survey. Thank you for your time.

APPENDIX 6 HOUSEHOLD QUESTIONNAIRE RESULTS DATA

Raw scores and percentages for all questions are given (except open-ended Questions 5,10,11, and 13 and open-ended parts of Questions 7,8,9, and 12).

Questions	Options	Total	% all	Hobart	%Hobart	Glenorchy	%Glenorchy	Clarence	%Clarence	Kingb'gh	%Kingb'gh	Brighton	%Brighton
q1	Not at all	0	0	0	0	0	0	0	0	0	0	0	0
Frequency of collection	Less than once	0	0	0	0	0	0	0	0	0	0	0	0
	Once a week	288	100.00	66	100.00	54	100.00	70	100.00	58	100.00	40	100.00
	More than once	0	0	0	0	0	0	0	0	0	0	0	0
q2	Yes	25	8.68	0	0.00	1	1.85	0	0.00	20	34.48	4	10.00
Bin Provided	No	211	73.26	58	87.88	38	70.37	56	80.00	29	50.00	30	75.00
	I don't know	50	17.36	8	12.12	14	25.93	14	20.00	9	15.52	5	12.50
	No answer	2	0.69	0	0.00	1	1.85	0	0.00	0	0.00	1	2.50
q3a	Mix waste	94	32.64	22	33.33	27	50.00	32	45.71	6	10.34	7	17.50
Glass	Compost	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Recycle	179	62.15	40	60.61	26	48.15	31	44.29	50	86.21	32	80.00
	Burn	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Others	6	2.08	2	3.03	0	0.00	4	5.71	0	0.00	0	0.00
	No answer	9	3.13	2	3.03	1	1.85	3	4.29	2	3.45	1	2.50
q3b	Mix waste	112	38.89	40	60.61	24	44.44	38	54.29	6	10.34	4	10.00
Bottles	Compost	0	0.00		0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Recycle	153	53.13	20	30.30	25	46.30	25	35.71	50	86.21	33	82.50
	Burn	4	1.39	2	3.03	1	1.85	0	0.00	0	0.00	1	2.50
	Others	8	2.78	2	3.03	1	1.85	2	2.86	1	1.72	2	5.00
	No answer	11	3.82	2	3.03	3	5.56	5	7.14	1	1.72	0	0.00
q3c	Mix waste	112	38.89	30	45.45	23	42.59	28	40.00	25	43.10	6	15.00
Paper	Compost	7	2.43	2	3.03	1	1.85	3	4.29	1	1.72	0	0.00
	Recycle	64	22.22	15	22.73	4	7.41	10	14.29	15	25.86	20	50.00
	Burn	41	14.24	7	10.61	10	18.52	13	18.57	4	6.90	7	17.50
	Others	40	13.89	9	13.64	8	14.81	8	11.43	9	15.52	6	15.00
	No answer	24	8.33	3	4.55	8	14.81	8	11.43	4	6.90	1	2.50
q3d	Mix waste	168	58.33	45	68.18	34	62.96	53	75.71	28	48.28	8	20.00
Cans	Recycle	91	31.60	11	16.67	14	25.93	11	15.71	25	43.10	30	75.00
	Others	11	3.82	6	9.09	2	3.70	0	0.00	2	3.45	1	2.50
	No answer	18	6.25	4	6.06	4	7.41	6	8.57	3	5.17	1	2.50
q3e	Mix waste	126	43.75	25	37.88	27	50.00	30	42.86	27	46.55	17	42.50
Food waste	Compost	121	42.01	33	50.00	19	35.19	28	40.00	25	43.10	16	40.00
	Recycle	3	1.04	0	0.00	1	1.85	0	0.00	0	0.00	2	5.00
	Burn	1	0.35	1	1.52	0	0.00	0	0.00	0	0.00	0	0.00
	Others	23	7.99	4	6.06	4	7.41	5	7.14	6	10.34	4	10.00
	No answer	14	4.86	3	4.55	3	5.56	7	10.00	0	0.00	1	2.50

Questions	Options	Total	% all	Hobart	%Hobart	Glenorchy	%Glenorchy	Clarence	%Clarence	Kingb'gh	%Kingb'gh	Brighton	%Brighton
q4a	Half	9	3.13	3	4.55	1	1.85	1	1.43	4	6.90	0	0.00
Small bag	One full	13	4.51	5	7.58	3	5.56	4	5.71	1	1.72	0	0.00
	Two full	55	19.10	6	9.09	6	11.11	2	2.86	1	1.72	40	100.00
	More than two	7	2.43	3	4.55	2	3.70	2	2.86	0	0.00	0	0.00
q4b	Half	19	6.60	4	6.06	3	5.56	7	10.00	2	3.45	3	7.50
Large bag	One full	111	38.54	21	31.82	15	27.78	21	30.00	31	53.45	23	57.50
	Two full	51	17.71	4	6.06	21	38.89	12	17.14	14	24.14	0	0.00
	More than two	4	1.39	2	3.03	1	1.85	1	1.43	0	0.00	0	0.00
q4c	Half	9	3.13	0	0.00	1	1.85	4	5.71	2	3.45	2	5.00
Bin	One full	36	12.50	12	18.18	3	5.56	14	20.00	1	1.72	6	15.00
	Two full	11	3.82	6	9.09	1	1.85	4	5.71	0	0.00	0	0.00
	More than two	1	0.35	1	1.52	0	0.00	0	0.00	0	0.00	0	0.00
q4d	Half	1	0.35	1	1.52	0	0.00	0	0.00	0	0.00	0	0.00
Wheellie	One full	6	2.08	1	1.52	0	0.00	2	2.86	3	5.17	0	0.00
q4e	Half	2	0.69	2	3.03	0	0.00	0	0.00	0	0.00	0	0.00
Others	One full	3	1.04	1	1.52	0	0.00	1	1.43	1	1.72	0	0.00
q6	Once a week	15	5.21	1	1.52	2	3.70	2	2.86	2	3.45	8	20.00
Go to tip	Once 1-2 mths	91	31.60	10	15.15	23	42.59	20	28.57	19	32.76	19	47.50
	Once 3-6 mths	89	30.90	28	42.42	15	27.78	17	24.29	20	34.48	9	22.50
	Once a year	30	10.42	10	15.15	5	9.26	7	10.00	8	13.79	0	0.00
	Never	47	16.32	12	18.18	7	12.96	19	27.14	7	12.07	2	5.00
	Others	14	4.86	3	4.55	2	3.70	5	7.14	2	3.45	2	5.00
	No answer	2	0.69	2	3.03	0	0.00	0	0.00	0	0.00	0	0.00
q7	Yes	197	68.40	33	50.00	42	77.78	46	65.71	50	86.21	26	65.00
Satisfied	No	81	28.13	31	46.97	9	16.67	22	31.43	6	10.34	13	32.50
	Others	2	0.69	1	1.52		0.00	1	1.43	0	0.00	0	0.00
	No answer	8	2.78	1	1.52	3	5.56	1	1.43	2	3.45	1	2.50
q8a	Yes	242	84.03	53	80.30	46	85.19	63	90.00	47	81.03	33	82.50
Live >3 yrs	No	45	15.63	13	19.70	7	12.96	7	10.00	11	18.97	7	17.50
	No answer	1	0.35	0	0.00	1	1.85	0	0.00	0	0.00	0	0.00
q8b	Better	47	16.32	3	4.55	7	12.96	3	4.29	26	44.83	8	20.00
Service quality	Same	172	59.72	46	69.70	37	68.52	59	84.29	19	32.76	11	27.50
	Worse	22	7.64	3	4.55	5	9.26	0	0.00	1	1.72	13	32.50
	Others	3	1.04	2	3.03	0	0.00	0	0.00		0.00	1	2.50
	No answer	44	15.28	12	18.18	5	9.26	8	11.43	12	20.69	7	17.50

Questions	Options	Total	% all	Hobart	%Hobart	Glenorchy	%Glenorchy	Clarence	%Clarence	Kingb'gh	%Kingb'gh	Brighton	%Brighton
q9	Yes	24	8.33	5	7.58	4	7.41	4	5.71	7	12.07	4	10.00
Contact with council	No	263	91.32	61	92.42	50	92.59	65	92.86	51	87.93	36	90.00
	No answer	1	0.35	0	0.00	0	0.00	1	1.43	0	0.00	0	0.00
q12	Yes	60	20.83	17	25.76	12	22.22	18	25.71	6	10.34	7	17.50
Willing to pay more	No	210	72.92	47	71.21	39	72.22	45	64.29	50	86.21	29	72.50
	No answer	18	6.25	2	3.03	3	5.56	7	10.00	2	3.45	4	10.00
q14a	Private	71	24.65	1	1.52	20	37.04	2	2.86	39	67.24	9	22.50
Collection service	Council	179	62.15	59	89.39	27	50.00	60	85.71	15	25.86	18	45.00
operator	Don't know	25	8.68	3	4.55	5	9.26	6	8.57	3	5.17	8	20.00
	Others	11	3.82	2	3.03	2	3.70	1	1.43	1	1.72	5	12.50
	No answer	2	0.69	1	1.52	0	0.00	1	1.43	0	0.00	0	0.00
q14b	Private	10	3.47	3	4.55	2	3.70	0	0.00	2	3.45	3	7.50
Tip site operator	Council	214	74.31	50	75.76	42	77.78	55	78.57	42	72.41	25	62.50
	Don't know	43	14.93	8	12.12	6	11.11	10	14.29	11	18.97	8	20.00
	Others	6	2.08	2	3.03	1	1.85	0	0.00		0.00	3	7.50
	No answer	15	5.21	3	4.55	3	5.56	5	7.14	3	5.17	1	2.50
q14c	Private	71	24.65	4	6.06	18	33.33	9	12.86	32	55.17	8	20.00
Recycling operator	Council	91	31.60	28	42.42	9	16.67	25	35.71	14	24.14	15	37.50
	Don't know	91	31.60	23	34.85	22	40.74	22	31.43	10	17.24	14	35.00
	Others	13	4.51	4	6.06	3	5.56	3	4.29	1	1.72	2	5.00
	No answer	22	7.64	7	10.61	2	3.70	11	15.71	1	1.72	1	2.50
q15	Once a week	9	3.13	1	1.52	2	3.70	0	0.00	1	1.72	5	12.50
Extra collection	Once 1-2 mths	17	5.90	4	6.06	3	5.56	8	11.43	1	1.72	1	2.50
	Once 3-6 mths	10	3.47	5	7.58	0	0.00	2	2.86	2	3.45	1	2.50
	Once a year	48	16.67	8	12.12	10	18.52	13	18.57	13	22.41	4	10.00
	Never	174	60.42	41	62.12	35	64.81	37	52.86	35	60.34	26	65.00
	Others	21	7.29	3	4.55	2	3.70	7	10.00	6	10.34	3	7.50
	No answer	9	3.13	4	6.06	2	3.70	3	4.29	0	0.00	0	0.00
q16	1-2 people	142	49.31	33	50.00	22	40.74	44	62.86	28	48.28	15	37.50
Household numbers	3-5 people	129	44.79	29	43.94	30	55.56	24	34.29	25	43.10	21	52.50
	More than 5	16	5.56	4	6.06	2	3.70	1	1.43	5	8.62	4	10.00
	No answer	1	0.35	0	0.00	0	0.00	1	1.43	0	0.00	0	0.00

APPENDIX 7 SUMMARY OF HOUSEHOLD SURVEY RESULTS

The questionnaire included 16 questions divided into three main groups: (i) solid waste collection, disposal, and some aspects of household tip site use, (ii) the efficiency of service and the possibility of service improvements, and (iii) general questions on who carries out waste services, frequency of using extra services, and number of persons in participating households.

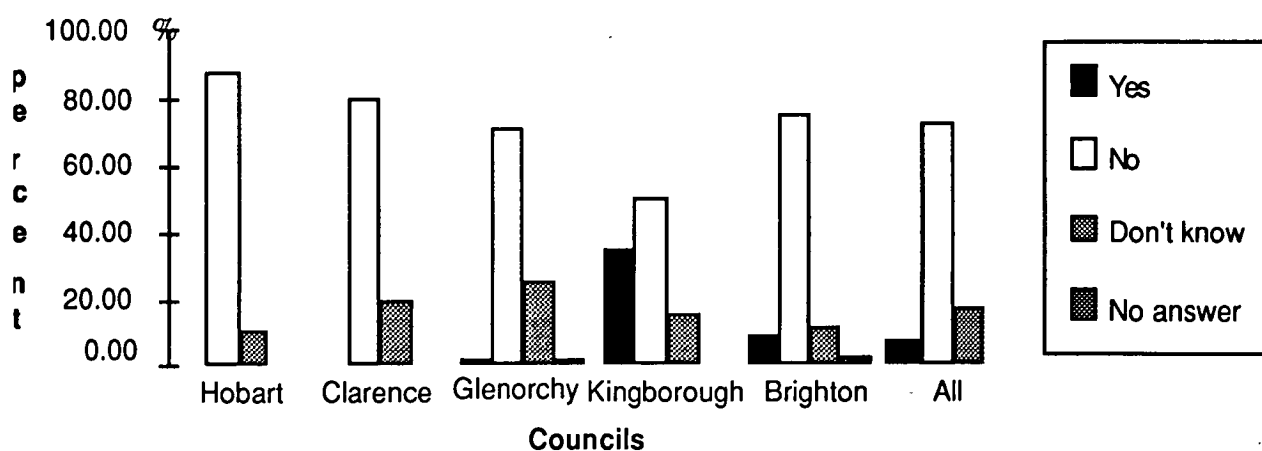
There were 288 questionnaires returned, comprising 66 from Hobart, Glenorchy 54, Clarence 70, Kingborough 58, and Brighton 40. Clarence had the highest rate of response at 24% of total questionnaires returned, whereas Brighton had the lowest rate at 14% of the total.

(i) Solid waste collection, disposal, and some aspects of household use of tip sites.

Question 1 How many times a week is the normal rubbish collection service from your household?

All respondents indicated that they received a weekly collection service. All the households in the survey were within kerbside collection service areas.

Question 2 Does the collection service provide rubbish bins for those houses who want them?

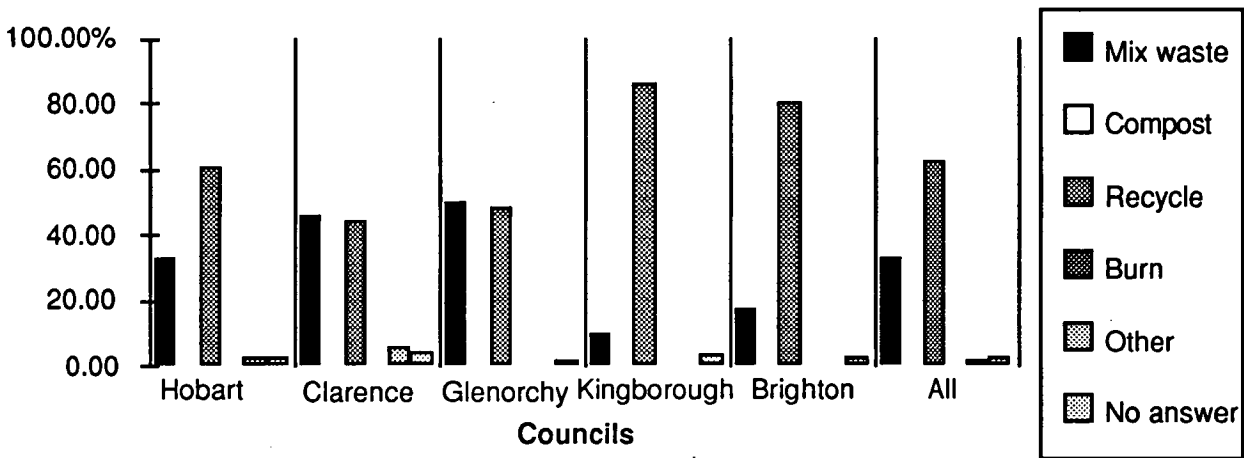


No residents in Hobart or Clarence, where the collection service is carried out by Councils, thought that bins were available, whereas 2% in Glenorchy, 35% in Kingborough, and 10% in Brighton thought they were available. Where the collection

service is carried out by a private contractor, residents know a rubbish bin is provided (either for hire or sale) for people who want one.

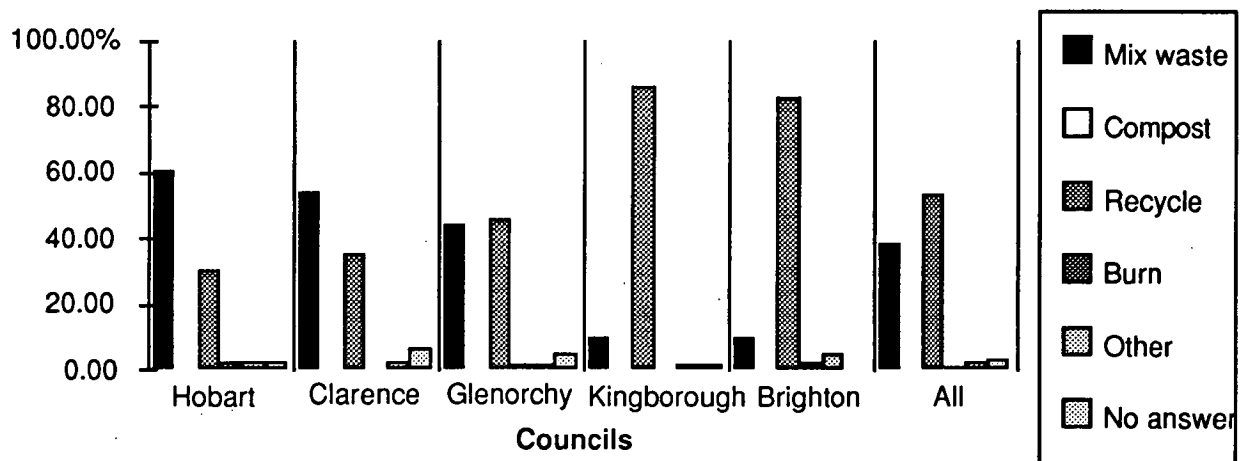
Question 3 How do you usually dispose of glass, plastic bottles, paper, cans, and food waste?

Glass



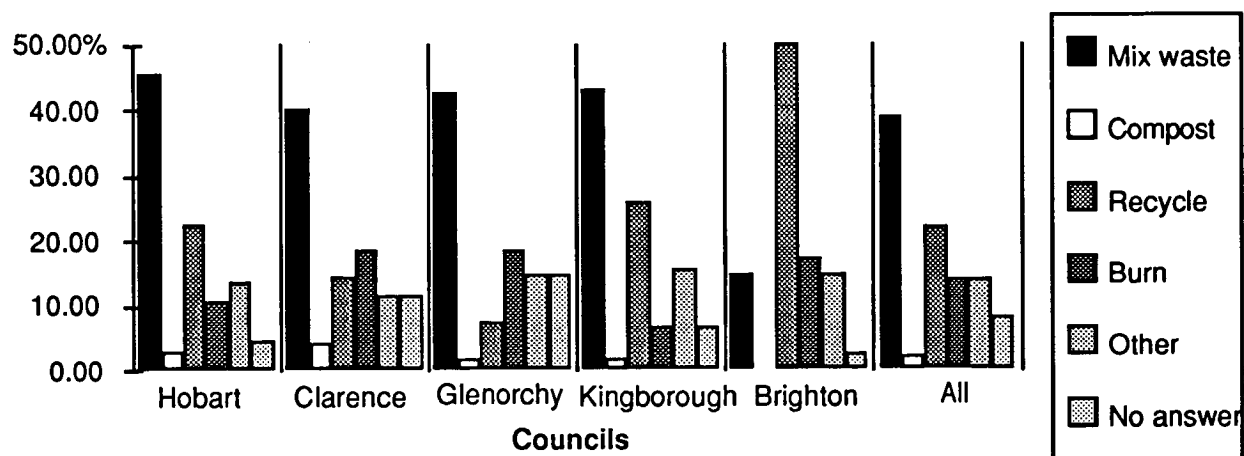
About one-third of Hobart residents (33.3%) mix glass waste with ordinary garbage. Approximately half Glenorchy (50%) and Clarence (45.7%) residents mix glass with ordinary garbage as well, whereas Kingborough and Brighton residents mostly recycle their glass, at rates of 86.2% and 80% respectively. This is presumably linked with the provision of a kerbside recycling service.

Plastic bottles



The majority of residents in Hobart (60.6%) and Clarence (54.2%) dispose of plastic bottles by mixing with ordinary garbage, whereas the majority of residents in Kingborough (86.2%) and Brighton (82.5%) recycle their plastic bottles.

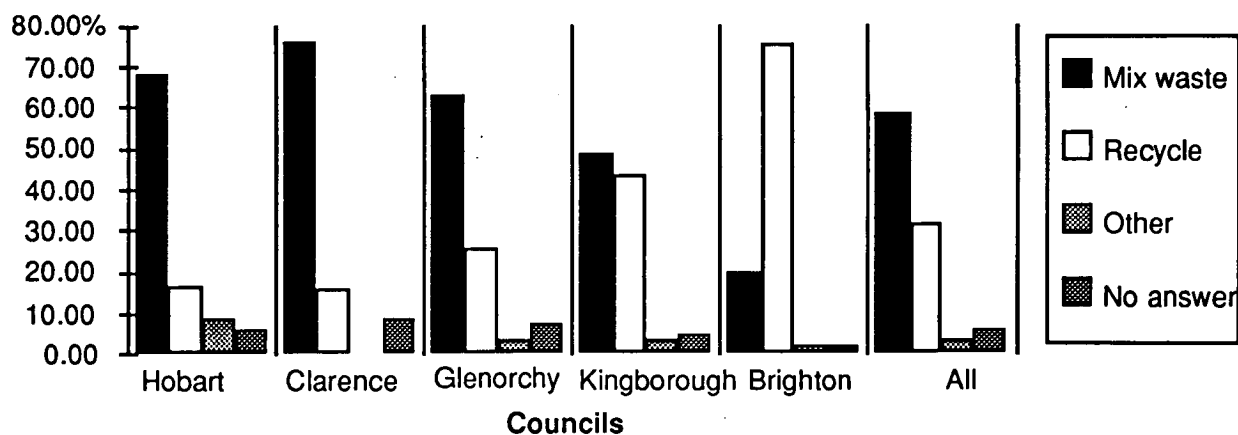
Paper



About 40% of residents in all councils in the Hobart region (except Brighton at 20%) dispose of paper by mixing it with ordinary garbage. 10-20% of people in all municipalities burn paper. Some use it to light winter fires. There are some residents in Hobart, Glenorchy, Clarence, and Kingborough who use paper for compost.

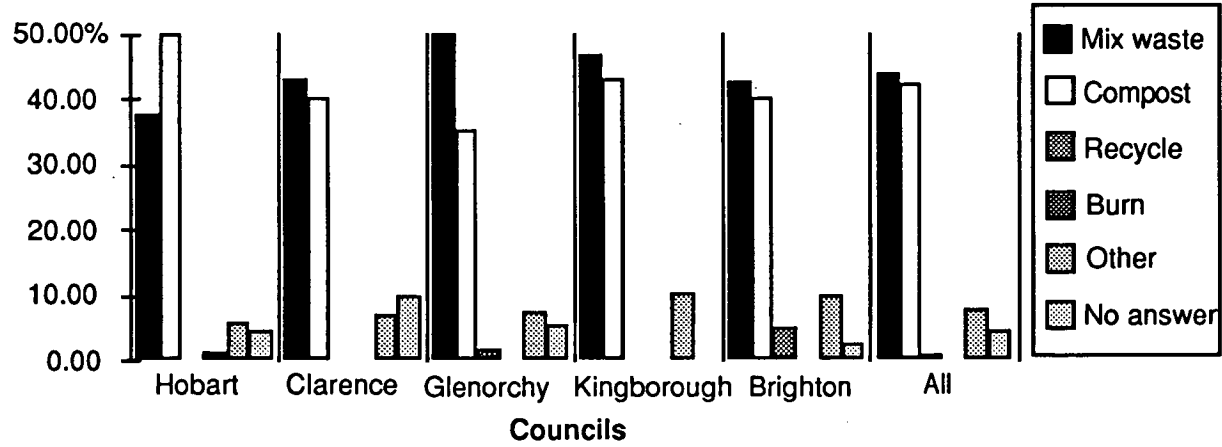
The rate of 'Other' responses is high because many residents answer more than one choice. Some residents said they used to recycle paper until the councils stopped collecting it. So they changed their habits and mix paper with ordinary garbage.

Cans



More than 60% of respondents in Hobart, Glenorchy, and Clarence mix cans with ordinary garbage, whereas about half or more recycle them in Kingborough and Brighton.

Food waste



Two major methods for the disposal of food waste in all areas are by mixing with ordinary garbage, and by composting. About 10% of residents used other methods or gave no answer. Some give food wastes to their pets.

One probable reason that more residents in Kingborough and Brighton separate more recyclable materials is that their municipalities operate kerbside recycling collection schemes.

TABLE A7.1 Items recycled by residents: number of households

	Hobart	Clarence	Glenorchy	Kingborough	Brighton	Total
Glass	41	32	25	43	27	168
Plastic	23	25	27	43	29	147
Paper	33	29	21	28	27	138
Cans	15	10	14	23	26	88
Food waste	38	31	23	27	19	138
No recycle	9	11	15	3	1	
Total respondents	63	61	52	50	31	

TABLE A7.2 Items recycled by residents: percentage of households

	Hobart	Clarence	Glenorchy	Kingborough	Brighton	Total
Glass	65	52.4	48	86	87	65.3
Plastic	36.5	40.9	51.9	86	93.5	57.1
Paper	52.3	47.5	40.3	56	87	53.6
Cans	23.8	16.3	26.9	46	83.8	34.2
Food waste	60.3	50.8	44.2	54	61.2	53.6
No recycle	14.2	18	28.8	6	3.2	15.1
% Total respondents	47.58	41.58	42.26	65.6	82.5	52.76

Totals do not equal sums of figures in columns because respondents were answering for each category of waste and people gave no answer for some categories.

Five major recycled materials, glass, plastic bottles, paper, cans, and food waste, were studied. The highest recycled material is glass (65.3%), followed by plastic bottles (57.1%), paper (53.6%), and food waste (53.6%). The lowest recycled material is cans (34.2%). This is consistent with Australian Bureau of Statistics figures that glass is the most recycled item and cans are the lowest in Tasmania (Castles 1992, p. 4).

The highest percentage of recycled items was plastic bottles in Brighton. Brighton people also recycled in general at the highest rate (82.5%).

Glenorchy residents participate in recycling the least (28.8%), and the city shows the second lowest rate among the five municipalities for recycling in general (42.26%).

Brighton and Kingborough probably have high rates because these Councils offer both kerbside pick-up and drop off facilities. Kerbside recycling is a convenience factor that increases the number of households participating in recycling programs.

TABLE A7.3 Items recycled by household type: number of households

People per house	Glass	Plastic bottles	Paper	Cans	Food waste	Total
1-2	84	70	56	36	68	126
3-5	72	68	69	45	59	119
>5	8	8	7	4	7	12
Total	164	146	132	85	134	257

TABLE A7.4 Items recycled by household type: percentage of households

People per house	Glass	Plastic bottles	Paper	Cans	Food waste
1-2	66.6	55.5	44.4	28.5	53.9
3-5	60.5	57.1	57.9	37.8	49.5
>5	66.6	66.6	58.3	33.3	58.3
Total	63.8	56.8	51.3	33	52.1

Question 4. How much rubbish that is not for recycling do you usually put out for each collection?

TABLE A7.5 Type of rubbish containers and amount put out for collection by households

	Plastic bag (small) eg. shopping bag	Plastic bag (large) eg. rubbish bag	Plastic or metal bin	Wheelie bin	Other
Half full	9	19	9	1	2
One full	13	111	36	6	3
Two full	55	51	11	-	-
More than two	7	4	1	-	-
Total(avg.)	84(25%)	185(55%)	57(17%)	7 (1.5%)	5(1.5%)

The data from the survey shows that a majority of residents (55%) use large garbage bags for rubbish. 25% use small bags, 17% bins, and 1.5% wheelie bins. The average amount of waste is 1.3 large bags per household per week (Hobart 1.3, Glenorchy 1.4, Clarence 1.2, Kingborough 1.25, and Brighton 1.25).

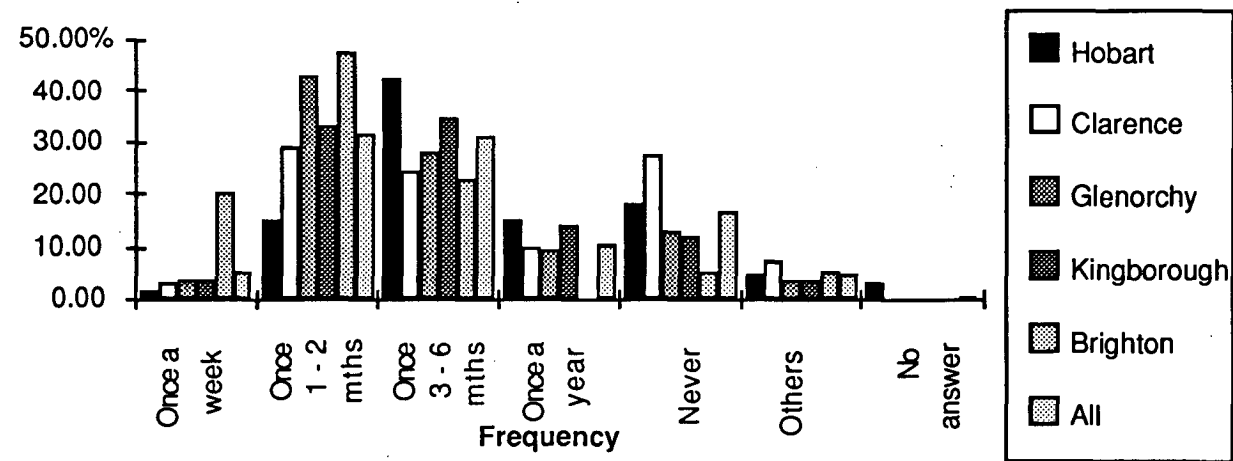
Question 5a. Where is your local rubbish tip site?

The numbers of people who knew the locality of their local tip were 60 from Hobart, Glenorchy 50, Clarence 66, Kingborough 56, and Brighton 38. The majority of residents (95%) use their local tip. However, some residents from Kingborough (5%) and Clarence (4%) use other tip sites, such as those at Hobart and Glenorchy, since they are more convenient for them than their local tip

Question 5b. How far is the tip site from your house?

The answers indicate that the tip sites in Hobart, Glenorchy, and Brighton, are 1-5, 2-15, and 2-10 kilometres respectively from households, and are generally much closer to residents than those at Kingborough and Clarence which are 5-20 and 5-40 kilometres respectively. This correlates with the frequency of residents, tip visits in Question 6.

Question 6. How often do you make a trip to the tip?

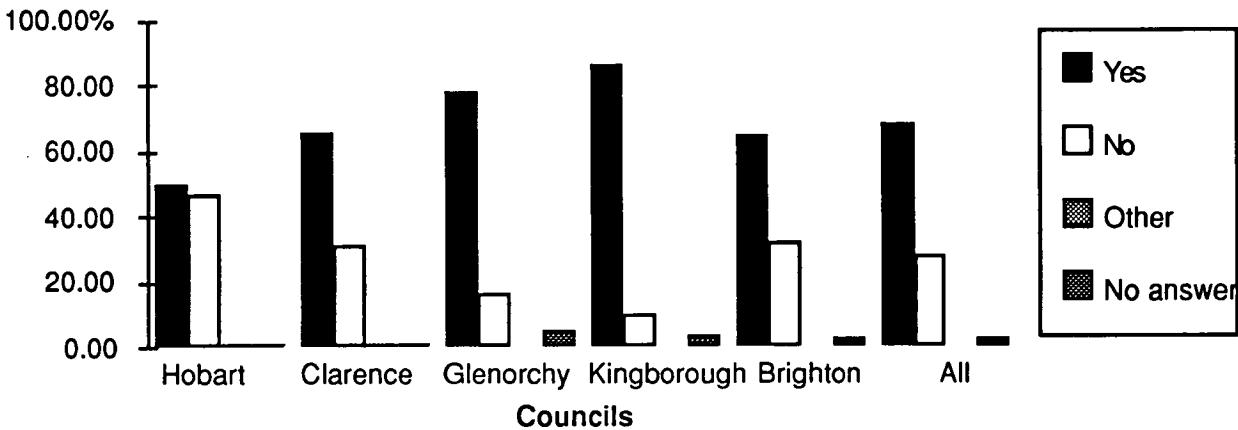


Most residents in the Hobart region visit a tip site every 1-2 months. Some residents in Brighton go to a tip site (transfer station) more frequently. This may be because their local council has limited household waste to only one bag per house per week.

As a general trend, the closer residents live to a tip the more frequently they use the tip.

(ii) The efficiency of service and the possibility of service improvements.

Question 7. Are you satisfied with the rubbish/ solid waste collection and disposal service? Why?

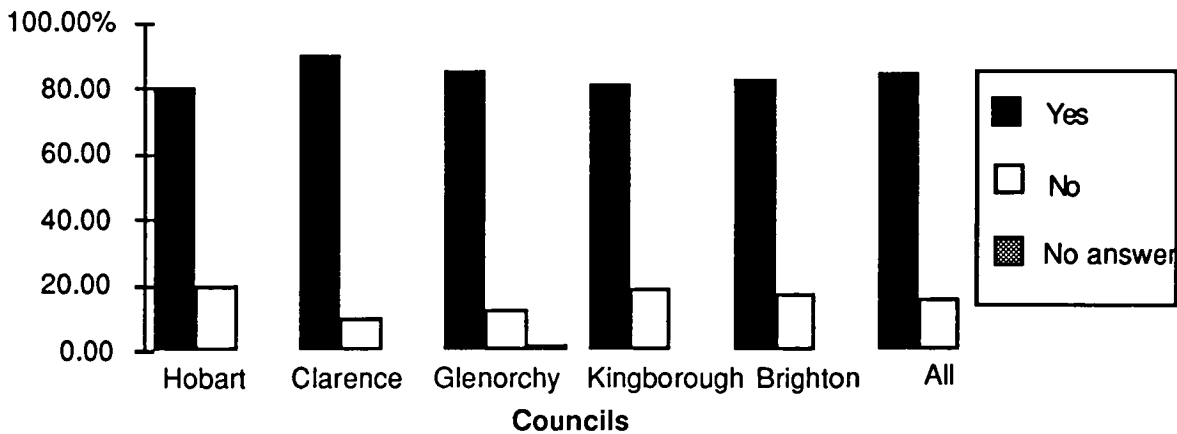


The levels of satisfaction and dissatisfaction in Hobart are nearly equivalent whereas, in other areas, higher proportions of residents are satisfied with services.

The stated reasons for indicating satisfaction in Hobart and Clarence are that the service has remained consistent, whereas in Kingborough and Brighton, the operation of new kerbside recycling programs is cited. In Glenorchy, some residents are satisfied with a collection time change from night to daytime. The main reason for dissatisfaction in Brighton is the changed limit of rubbish bags from two bags to only one bag.

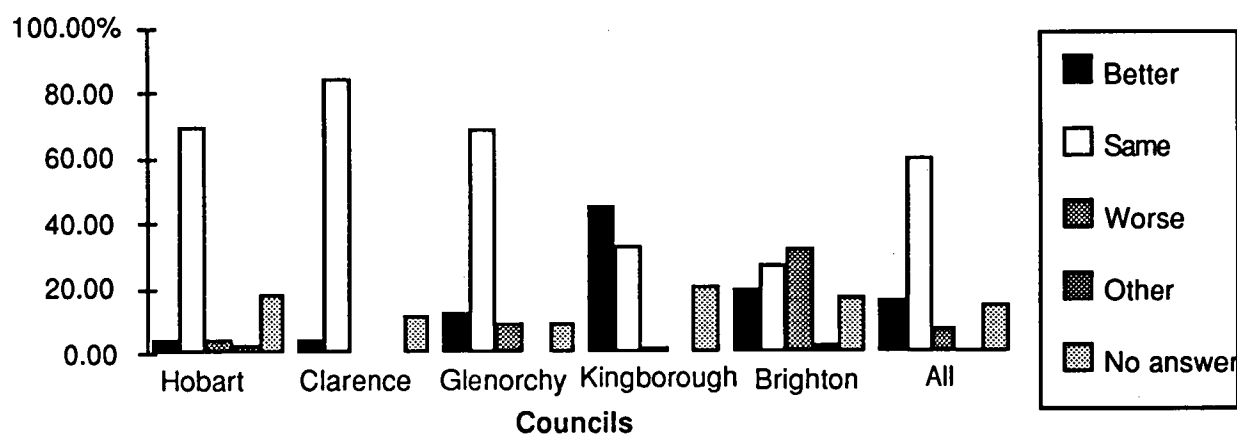
Generally, people showed more satisfaction in areas serviced by private contractors (Glenorchy 78%, Kingborough 86% and Brighton 65%) compared to those served by councils (Hobart 50% and Clarence 66%).

Question 8.a. Have you lived in this municipality for more than 3 years?



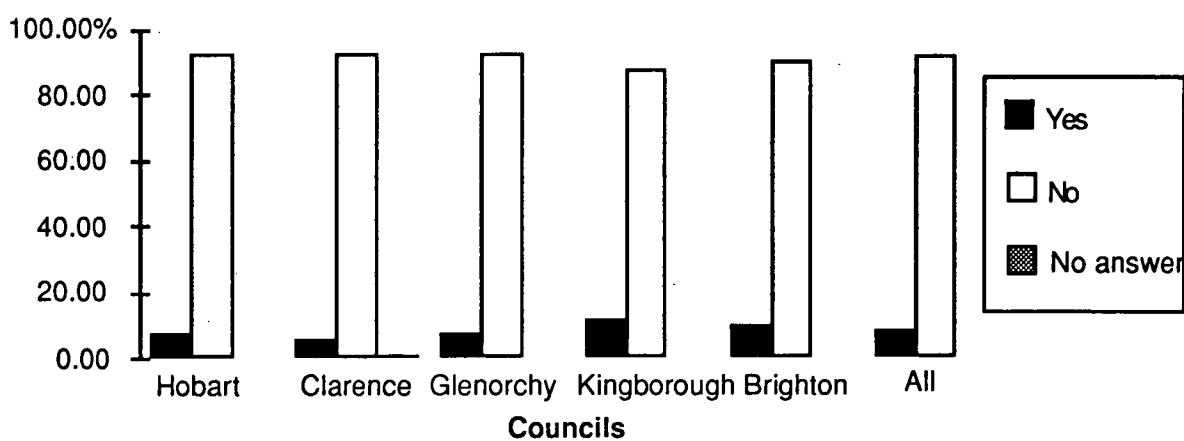
The data shows that most residents (80%) have lived in their present local government area for more than 3 years.

Question 8b. If yes, what do you think of the door to door rubbish collection service compared with 3 years ago?



In Hobart, Glenorchy, and Clarence, the collection services were viewed as the same as three years ago, whereas in Kingborough there was an improvement seen. Only Brighton residents thought the collection service was worse than three years ago. This may be due to the Council's limit on the number of rubbish containers. Significantly, perhaps, most Brighton residents who were unhappy occupied homes with over three inhabitants.

Question 9. Have you contacted your local government or council about rubbish collection/ disposal in the last 12 months? Give reasons for your most recent contact.



There were few contacts in all municipalities (on average 8% of residents). Most contacts concerned the end of newspaper recycling and complaints about changing the limit on rubbish containers.

In Hobart, some complaints were in connection with wind blown waste in the streets, and some about bin loss or damage. In Glenorchy, some residents did not know about the changed time of collection from night to day, and some asked for kerbside recycling. In Clarence, some residents in Lauderdale complained about smell and increasing numbers of rats. In Kingborough, some residents asked for more details about their new kerbside recycling system. In Brighton, most complained about changing the limit on rubbish bags, and also the facilities at the transfer station.

Question 10. If you have made a complaint, what has been the council's reply?

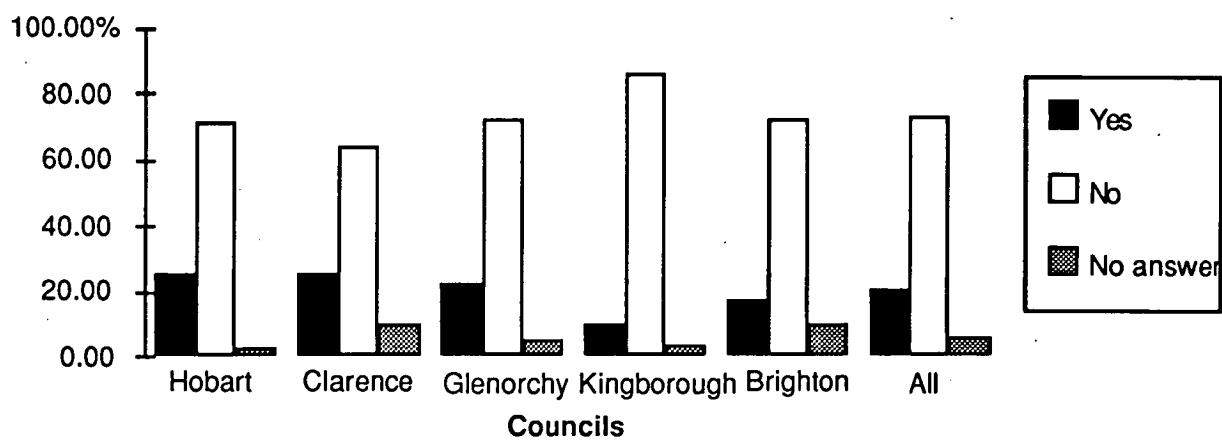
Very few respondents answered this question. Most of those who did said they were not satisfied.

Question 11. What practical improvements could you suggest for the collection and disposal service?

There were many suggestions for improving the solid waste collection services. These included the following:

- (1) Most people want kerbside recycling.
- (2) They prefer daytime collection to collection at night.
- (3) Councils should provide bins without extra charge.
- (4) Councils should have at least two annual clean-ups to deal with garbage that cannot be put out for normal collection.

Question 12. Would you be prepared to pay more for an improved collection service? Why?



Most residents in all areas say that they are paying enough through council rates for collection services. However, 10-20% of all residents are willing to pay more if they can reduce their frequency of tip visits, or if kerbside recycling is introduced or improved.

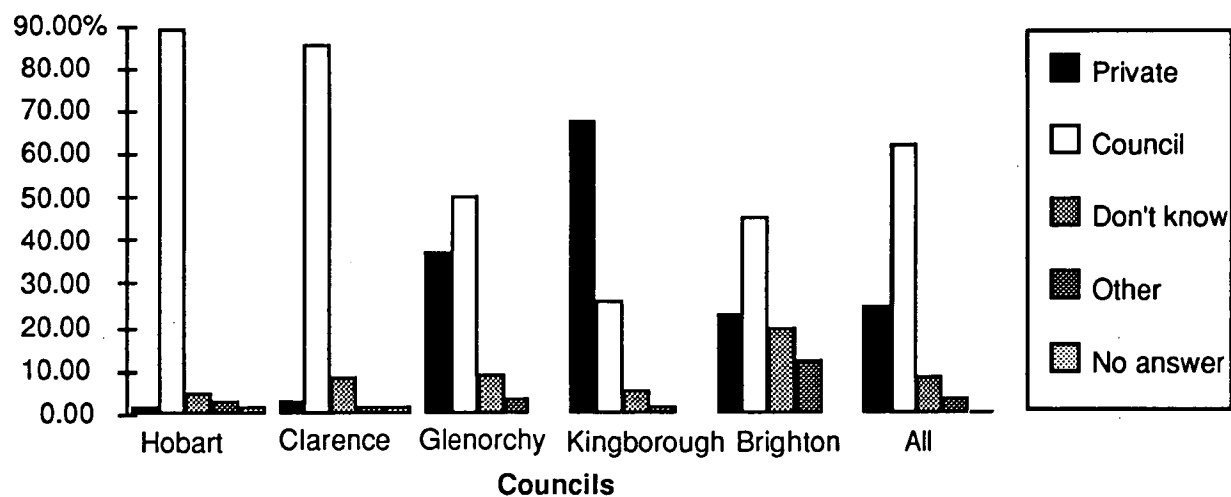
Question 13. What do you think is the most serious issue of rubbish collection/disposal facing your local area today?

Most answers were similar to the answers in Question 11, but some people are seriously concerned about exhaustion of landfill space, and about people who are not aware of recycling, including composting organic waste.

(iii) Questions on who carries out waste services, frequency of using extra services, and numbers of residents/household.

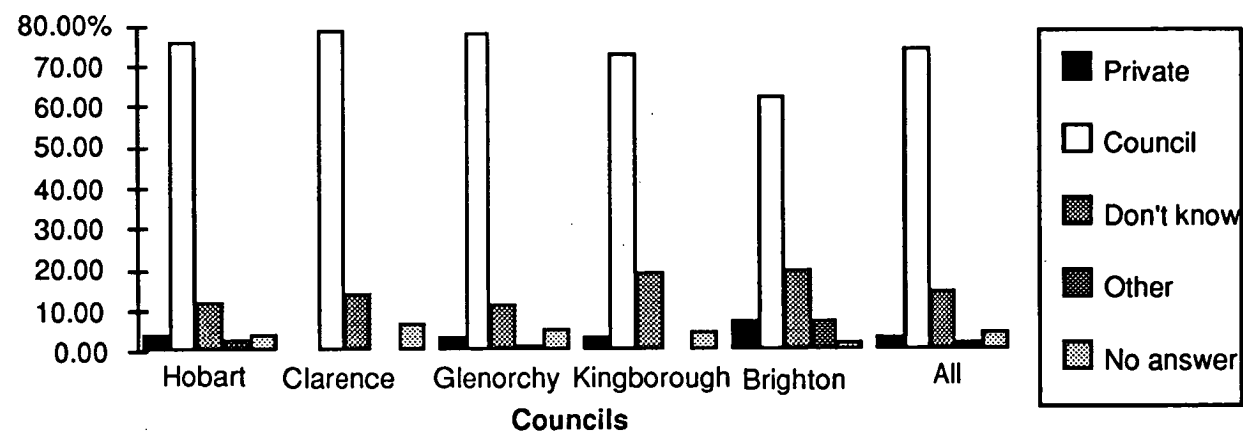
Question 14. Who carries out the normal rubbish collection, tip site, and recycling collection services in your area?

Normal collection service



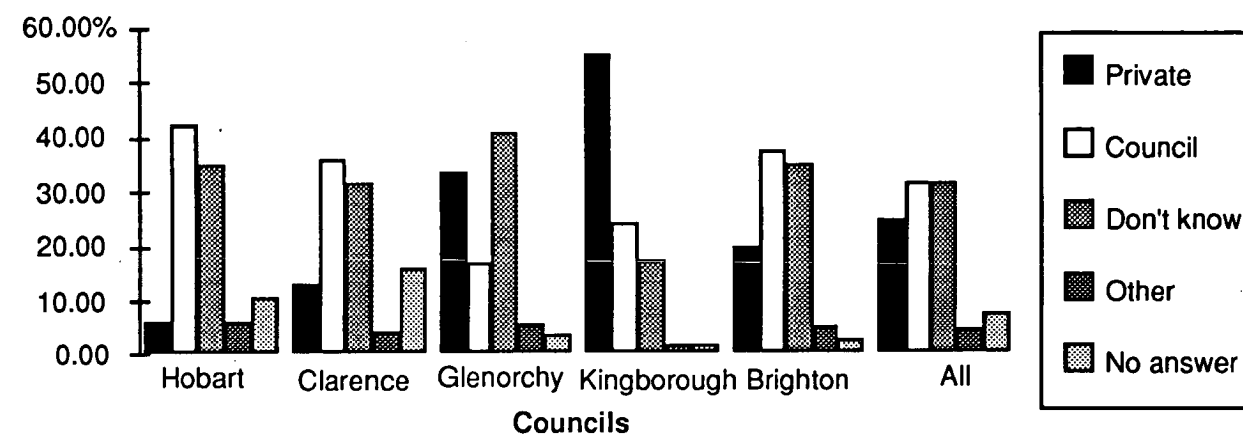
The percentage of correct answers in Hobart, Clarence, and Kingborough was more than 70%. However, residents in Glenorchy and Brighton are more confused about who actually carries out their normal rubbish collection service.

Tip site



Most respondents answered this question correctly. Due to the introduction of collection fees, however, some people believe their local tip site is operated by a private company.

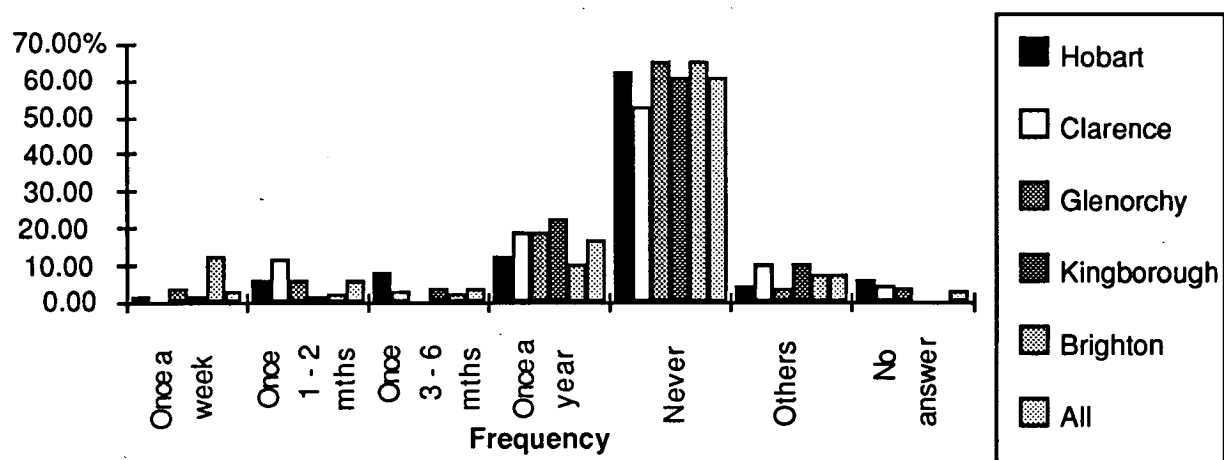
Recycling



Most respondents in all areas except Kingborough do not know or are confused about who is actually carry out the recycling scheme.

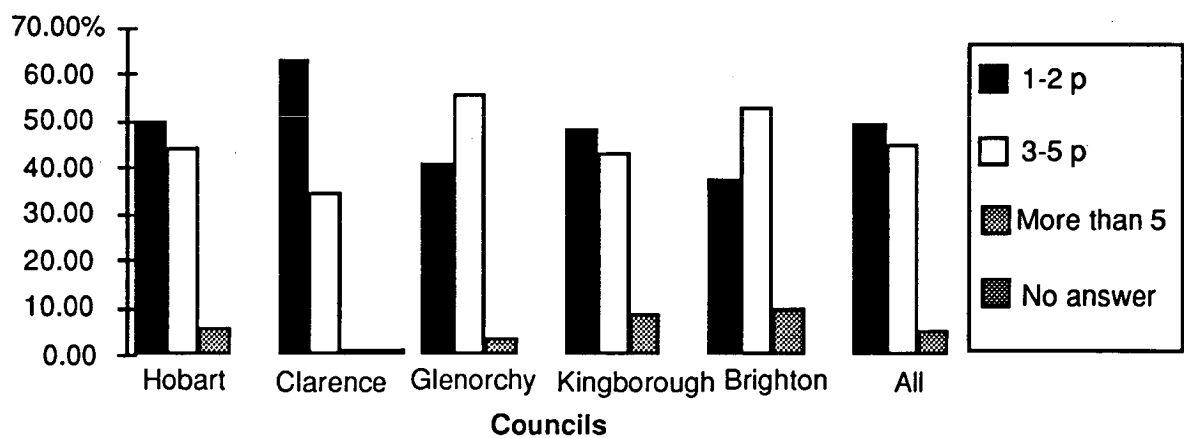
To sum up, the majority of residents in every council area except Kingborough think that solid waste collection and disposal is the responsibility of their local council.

Question 15. How often do you get contractors for rubbish that cannot be picked up in the normal collection?



The majority of households (60%) buy no extra collection services. About 10-15% have an extra collection once a year. It is interesting that some residents in Clarence (11%) and Brighton (12.5%) buy extra services for collection once every one to two months, and once a week respectively.

Question 16. How many people live in your house/flat?



Most respondents in Hobart, Clarence, and Kingborough (50, 62, and 48% respectively) live alone or in a two-person household, whereas those in Glenorchy (55.5%) and Brighton (52.5%) mostly live in a house of between three and five persons. Very few households (about 6% in all areas) consist of more than five people.