REPORT

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Impact of the waste levy on commercial and industrial recycling

Prepared for

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Centre for International Economics
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Executive summary

The Waste and Environment Levy (the levy) is the NSW Government's key economic instrument driving waste avoidance and resource recovery. This report considers the financial impacts that the levy has on waste management for the commercial and industrial (C&I) sector and the ability of the levy to incentivise different forms of collection and particularly source separation. For the purposes of this study we refer to the 'C&I sector' as being the commercial and industrial businesses that generate waste. 'Waste operators' refer to businesses that collect and process waste generated by businesses within the 'C&I sector'.

- **The C&I sector is diverse**

The C&I sector is diverse, comprising businesses and other organisations in different sectors, of different sizes and in different locations. There are currently around 680 000 businesses in NSW. Over 95 per cent of these are small businesses, employing less than 20 people. However, medium to large businesses (those employing more than 20 people) account for about half the employment in NSW (and probably about half the waste generated in the C&I sector).

- **The C&I sector's waste needs are also diverse**

Different businesses in the C&I sector make different materials available for collection, have different abilities to store on-site and different attitudes and awareness of environment sustainability. Aggregate information indicates that just under half of the waste generated by the C&I sector currently goes to landfill. Of this, around half is mixed waste from small to medium enterprises. The amount of material generated per employee in NSW is estimated at 1.6 tonnes.

By material; food, paper and cardboard, plastics, timber and sand/soil/rubble are the largest components of C&I waste to landfill in NSW. Recovery rates by material indicate a very similar pattern of material recovery to the municipal sector.

Currently, many C&I businesses separate their waste prior to collection. No specific data is available across the industry, but informal estimates suggest over half of businesses may currently source separate. It is likely that this figure applies to medium to large businesses, with fewer small businesses source separating their waste due, in part, to limited incentives to do so. There is no information available on the prevalence of source separation across different business types and locations.

- **Most businesses could save financially with separated collection**

Separated collection services are cheaper for most businesses than a single waste service. On average, a separated collection service would be expected to be around

$50 per tonne cheaper, equivalent to a saving of around 20 per cent (table 1). There are also estimated to be savings if C&I waste collectors sorted mixed waste to divert some material away from landfill, although the financial estimates around this are not well tested.

The financial advantage to the C&I sector of separated collection services is largely a result of the waste levy and hence the lower disposal costs possible from recycling materials. That is, the cost of the waste levy is passed through to the end customer (the C&I sector) via their collection charges. Source separated waste allows the collector to avoid (in part) the waste levy which results in a lower collection charge to the end customer. High materials prices are also contributing to the savings possible from source separating materials.

1 **Costs for major C&I options** 2010-11

Supply chain activity	*Single collection service*		*Separated collection service*
	All sent to landfill	*Sorted (dirty MRF)*	
	$/tonne	$/tonne	$/tonne
Collection	80	80	98
Transport	40	40	40
Disposal	150	136	80
Total cost	270	256	218

Note: Disposal is to the next facility – i.e a landfill for a single collection all sent to landfill, dirty MRF for single collection service sorted by a collector and MRF/landfill for a separated collection service.
Source: The CIE.

There is little information on how the price charged to the C&I sector for waste collection differs by business type, size and location. Waste collectors indicated that cost savings were generally larger for businesses in more dense locations. Savings would also be larger for businesses that have more waste that can be recycled. In terms of business scale, smaller businesses may be able to obtain gains of $100 to $500 per year, medium sized businesses might receive gains in the thousands of dollars and large businesses in the tens of thousands of dollars.

Waste costs are a small part of business costs

Even though there is likely to be a reduction in waste collection costs for the C&I sector from source separation there are other factors that may offset this potential gain. Waste costs are not a large part of business costs. Per employee, waste costs are typically around $200-$600 per year and are a small share of industry value added and wages and salaries (table 2).

Because financial savings to businesses from taking on source separation are often small relative to other costs, there is considerable inertia in business decisions. Businesses may also face financial costs to introduce source separation on site (e.g. time and effort to introduce new systems) and inconvenience costs. These costs are not well understood. Stakeholders indicated that few small businesses were

actively seeking to reduce their waste costs, while larger businesses, whose motivation is often not only financial gain but also sustainability metrics, have been more active.

2 **Waste management costs as a share of business costs, by sector**

Sector	*Waste costs per employee*	*Waste costs as a share of industry value added*	*Waste costs as a share of industry wages and salaries*
	$	Per cent	Per cent
Manufacturing	353	0.3	0.7
Wholesale	208	0.2	0.3
Retail	436	1.0	1.6
Transport/Store	609	0.6	1.3
Finance/Insurance	175	0.1	0.1
Property/Business	178	0.2	0.3

Source: See table 6.1.

The impact of a higher levy

A higher levy increases the financial incentives for businesses to source separate and the financial incentives for waste collectors to undertake separation of mixed wastes.

The levy is undoubtedly increasing C&I source separation. Waste collection businesses actively market recycling possibilities as this is the easiest way to save their clients money and improve competitiveness. To date, this activity has generally been to medium and large businesses. Even without any further increases in the levy, increased source separation and recycling from the C&I sector would be expected in the future as there are likely to be lags between financial advantage and action by both waste generating businesses and waste collection businesses.

We expect that under current regulatory arrangements, a higher levy will further encourage large and some medium sized businesses to move towards source separation.

For smaller businesses we expect that the financial gains will not be sufficient to encourage either waste generators or waste collectors to move towards source separation under the current regulations. Waste collectors are not willing to work extensively with these businesses to take up source separation because the costs of doing so are large relatively to the overall costs of waste collection and businesses do not want to sign up to long term contracts. For example, marketing to a new business may cost upwards of $200 for each new customer and perhaps as much for changing behaviour of existing customers. Small waste generators are unlikely to devote management time to considering issues related to a very small part of their costs.

If further source separation is desired for smaller businesses, it would be useful to better understand the internal business costs of source separation and to consider how municipal collection services and requirements might be leveraged to these businesses.

Rather than waste collectors encouraging source separation for small businesses, they are more likely to seek to separate mixed wastes themselves. This appears to be commercially viable at current landfill prices and one facility is currently obtaining development approval. However, there are some significant infrastructure constraints and barriers to investments in expanding processing facilities and the commercial figures and material flows around this model are not well tested. This strategy will become more advantageous as the levy increases and landfill disposal costs rise. We expect that collectors will have to move in this direction if landfill costs (including the levy) continue rising in order to remain competitive. There will also be significant lags of around four years from initial consideration to having such a facility operating. Waste collectors will also need to move away from their current model of building facilities on the basis of long term contracts to take waste from small businesses.

1 Introduction

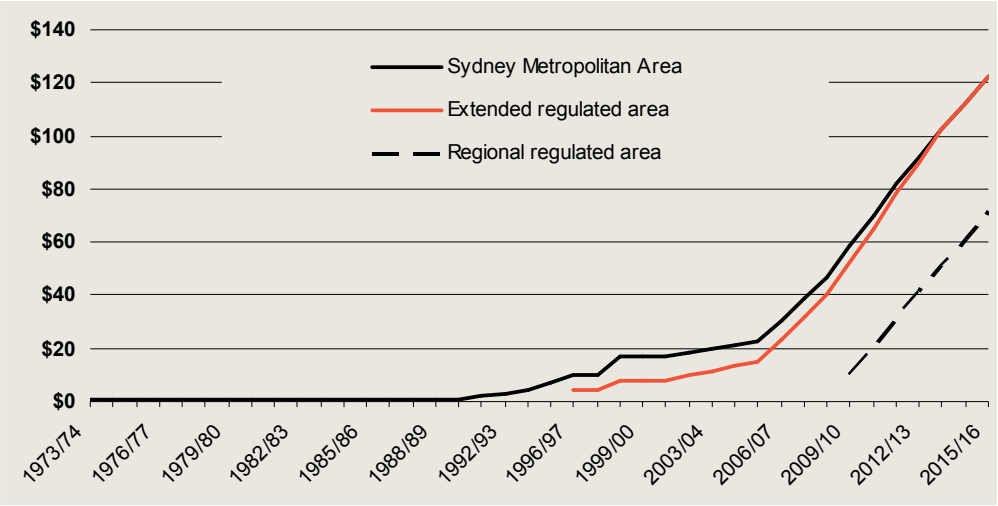
The Waste and Environment Levy (the levy) is the NSW Government's key economic instrument driving waste avoidance and resource recovery. By making waste received at landfills more expensive, the levy provides an economic incentive to reduce waste sent to landfill in NSW, and hence encourage more recovery and recycling.

The levy is paid on all waste received at landfills, including the residual waste sent to landfill by recyclers.

The waste levy

The waste and environment levy was introduced in the Sydney Metropolitan Area (SMA), at $0.51 per tonne in 1971. Since then the levy has grown substantially and is expected to reach around $120 per tonne in 2015-16 (chart 1.1).

1.1 **The amount of the levy**

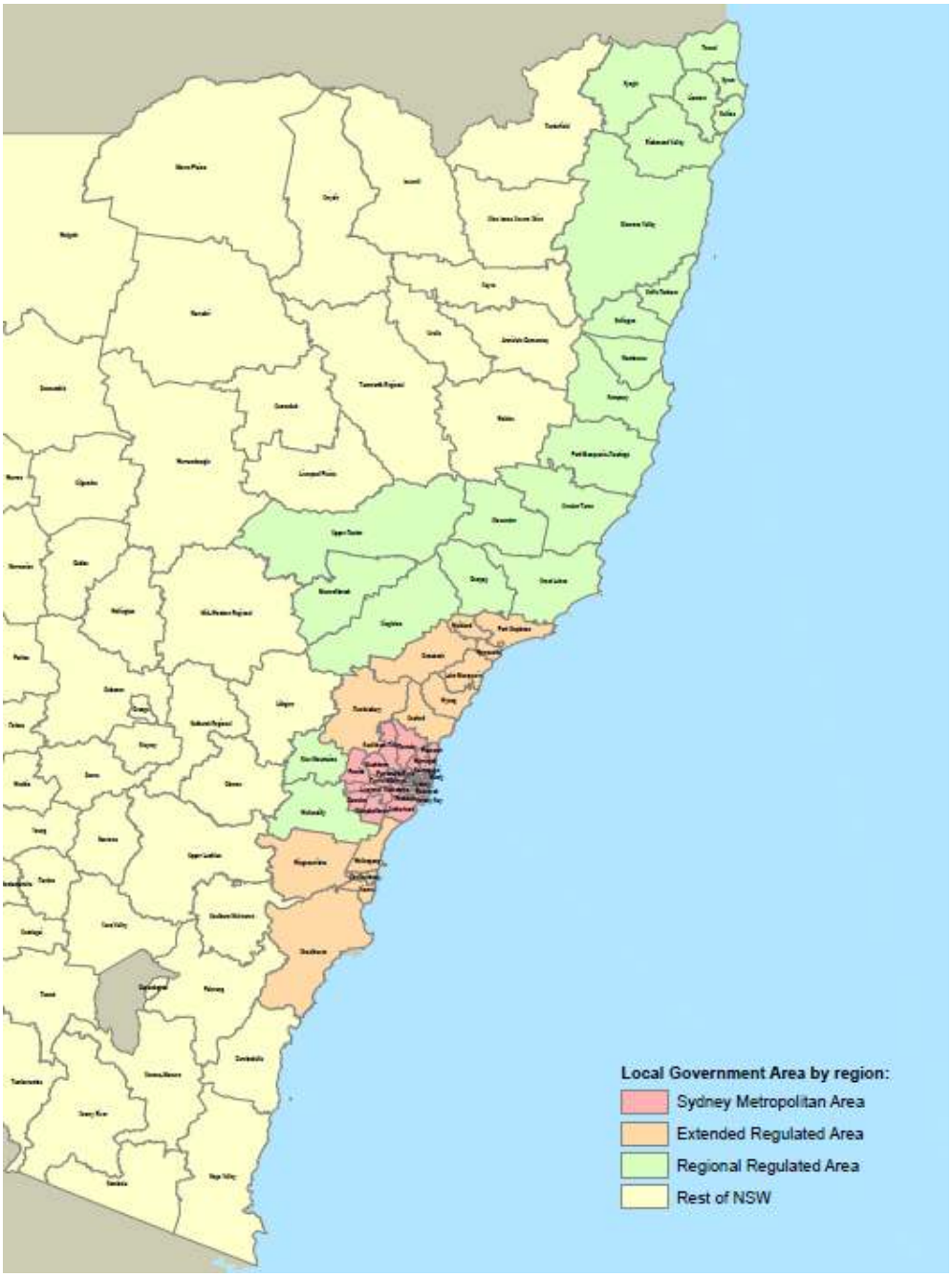


Data source: Office of Environment and Heritage (2011), *Background Paper: Waste and Environment Levy*, May.

The area to which the levy applies has also been widened. In 1996, the Extended Regulated Area (ERA) was introduced and is expected to achieve parity with the SMA rate in 2013-14. In 2009, the Regional Regulated Area (RRA) extended the levy to a further 21 council areas. The RRA is expected to reach $71 per tonne in 2015-16.

Around 4.1 million or 56 per cent of the population of NSW reside in the Sydney Metropolitan Area, while the ERA and RRA cover 19 per cent and 11 per cent of the state's population respectively.[1] This leaves 14 per cent of the NSW population in unregulated areas.

1.2 Levyable areas



Source: NSW Office of Environment and Heritage.

1 ABS 2011, *Regional Population Growth, Australia*, 3218.0, March and CIE calculations.

The NSW Waste and Environment levy is currently higher, and likely to remain higher, than similar levies imposed by interstate neighbours. For instance:

- the Victorian landfill levy is currently just $44 per tonne for urban waste, and $22 to $38.50 per tonne for rural waste; and
- the Queensland waste disposal levy will commence in December 2011 but will exclude municipal solid waste. The levy will commence at $35 per tonne for commercial and industrial and construction and demolition waste.

NSW landfill costs are also higher relative to other states outside of the impact of the levy. Average costs over the landfill sites surveyed in the Sydney region were $195 for a tonne of mixed waste (for 2010-11) and have since increased. The Inside Waste Industry report cites an average landfill disposal cost of $150 per tonne.[2] The Brisbane City Council operates rubbish transfer stations which charge $93 per tonne for mixed waste, while in Melbourne disposing of a tonne of mixed waste would cost around $108. Further, disposing of domestic unsorted waste by an ACT resident currently costs $68.67 per tonne in the ACT. The gap in costs is hence higher than the 2011-12 NSW levy of $82.20 per tonne.

Regulating waste in NSW

The NSW waste regulatory framework was established under the principal legislation of the *Protection of the Environment Act 1997*. The key objective of the Act is to:

> Ensure a healthy and clean environment by regulating pollution and other adverse environmental impacts that may result from waste activities.[3]

The waste regulation programs are designed to mitigate pollution from waste disposal, minimise resource use, ensure appropriate disposal of harmful waste in NSW, and improve resource recovery.

Some features of the current regulatory framework include licensing of landfills (e.g. the types of materials allowed at particular landfills and capacity constraints imposed on these landfills) and penalties for illegal dumping of waste. Education and compliance programs undertaken by the NSW OEH are also aimed at improving waste recovery.[4]

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2 Inside Waste 2011, *Industry Report 2011-12*, p. 88.

3 NSW Office of Environment and Heritage (OEH), http://www.environment.nsw.gov.au/waste/RegulateWaste.htm, Accessed August 2011.

4 Targets for the amount of waste diverted from landfills are in place. However, these targets do not form part of any formal regulatory requirements on operators in the waste industry.

The waste and environment levy is a key tool that forms part of the waste management framework. The levy is primarily intended to drive waste avoidance and resource recovery. It is levied on landfill operators and passed on as a fixed dollar increase (per tonne) to the gate price charged to customers at the landfill for solid waste disposal.

Further discussion of the regulations for disposing of waste in NSW is contained in Attachment A.

The rationale for the levy

Historically landfill has been the cheapest waste management option available. Landfill gate prices have generally (prior to the levy) reflected the private costs of operating the landfills and excluded the broader environmental and social costs associated with the landfills. Social costs include, for example, localised odour impacts and the ongoing maintenance costs associated with closed landfills, or the future reclamation costs of site use.[5] The environmental costs include impacts such as greenhouse gas emissions and leaching of hazardous materials from the site.

Without government intervention the gate price for disposal at landfills would only reflect the private costs of managing the landfill facility. Government intervention, via the introduction of the levy, is a way of incorporating these indirect costs such that the gate price at the landfill reflects the *full* cost of landfill disposal. That is, if the levy can be set at a level that reflects the social and environmental costs then the landfill gate price would reflect the private costs of managing the landfill as well as these other indirect costs associated with it.

The levy is also the mechanism used by Government reflect the community's desire to reduce waste and recycle more material. The inclusion of the levy in the landfill gate price has the effect of increasing the *relative* price of disposing at the landfill compared with alternative waste management options (such as waste avoidance and recycling). By increasing the relative price of landfill disposal it will create an incentive for recyclers to reduce the residual waste stream that is diverted to landfill and, therefore, to face a reduced total disposal to landfill cost.

As a consequence the levy is expected to reduce the amount of waste generated, increase the level of waste that is recycled/reused and reduce the volume of waste being disposed in landfills. Where the levy is set at a level that accurately reflects the environmental and social costs, the amount of waste disposed of at the landfill should reflect the level that is considered to be *socially optimal*.

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5 For further discussion of relevant social and environmental costs see BDA Group 2009, *The full cost of landfill disposed in Australia,* prepared for the Department of Environment, Water, Heritage and the Arts; and Nolan ITU 2004, *National benefits of implementation of UR-3R process: a triple bottom line assessment,* prepared for Global Renewables Limited.

The expected outcomes of the levy include the following.

- Behavioural change by waste generators (e.g. households) to decrease their waste costs which can be achieved by reducing the quantity of waste generated and the quantity of waste disposed at landfill.
- Increasing recycling and resource recovery prior to waste reaching the landfill. As the levy increases, it is expected that more recycling technologies will come on line as these options become commercially viable compared with landfills.[6]
- Increasing resource recovery at the landfill. Under current arrangements owners of a landfill can receive rebates on the levy for materials recycled from the landfill.

While in theory the levy would have these expected outcomes, in practice, there are limitations to fully achieving these objectives. For example, a business that generates waste is often charged the levy through a rate related to volume and frequency of collection. This means that the amount paid by a particular business may not reflect the amount of waste that they are disposing of.[7]

There are also likely to be a range of other factors that may limit the achievement of these outcomes. These include, for example, location of recycling facilities throughout the region and the costs of transporting waste to these recycling facilities compared with landfills.

Further, the response of waste generators and the waste industry to any increases in the levy is not likely to be immediate. That is, it may take some time to adjust behaviours and to increase investments in facilities to recycle the materials.

This project

The NSW OEH has commissioned this study to examine the financial impact of the waste levy on the C&I waste collection industry and particularly the incentive the levy creates for separated collection services for business. This reflects concerns about achieving targets for recovery of C&I materials.

We have also sought to provide initial conclusions as to how some of the barriers to increased recycling in the C&I sector may be overcome. This project does not review the appropriate level of the levy.

Objectives

The objectives of this project are to:

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6 The scheduled increase in the levy is expected to provide investors with greater certainty over a longer period.

7 At the higher level councils should be incentivised to reduce the levy paid through promoting recycling education or investing in recycling infrastructure.

- determine how effective the levy is in providing an incentive for waste collectors servicing commercial and industrial customers to provide a separated collection service;
- assess the relative importance of the levy compared with other key variables which affect waste collectors; and
- identify, rank and (to the extent possible) quantify the barriers, both financial and non-financial, for increasing the provision of separated collection services in the C&I sector.

Stakeholder consultation

The C&I industry consists of a diverse range of operators, in terms of scale of operations as well as the elements of the waste stream with which they are involved.

Our consultation has included the following:

- face to face meetings with Remondis, Veolia and SITA; and
- a workshop of participants in the C&I waste sector, which was held at the Waste Contractors and Recyclers Association (WCRA) head office in Wetherill Park on 27 July 2011. The intention of the workshop was to provide an opportunity for a range of participants (both smaller and larger players in the industry) to express their views. While WCRA provided an opportunity for all members to attend, the attendees included the following companies: VISY, Transpacific Cleanaway, Watts Waste, Remondis, JJ Richards and Sons, and Dimeo Waste Services.

We have also consulted directly with the WCRA.

These initial consultations were followed by discussions with specific participants who indicated a willingness to provide further information. No industry participants were willing to provide detailed data (financial or non-financial) on the number and type of businesses currently using separated collection services and mixed waste only collection, or the costs of servicing particular business types and locations. This largely reflects the diversity across the C&I sector and the resources that waste collectors would need to invest to put together meaningful data.

Industry has assisted in cross-checking important parameters for aggregated analysis.

2 *Framework for assessing the impacts of the levy on C&I recycling*

Decisions on source separation can be viewed as being influenced by the waste generator and the waste collector. The balance of influence in these decisions differs across business types. As a generality:

- for smaller businesses, a waste generator is choosing a recycling/disposal option from a set of possible options put forward by waste collectors. Collectors have the primary role in determining what options are promoted and the prices attached to these options. The market can be considered as being fairly supply driven; while
- for larger businesses, a waste generator is much more involved in the generation of recycling/disposal options. The outcomes are driven more by demand from these types of businesses.

Collectors also have a secondary role in recycling of material outside of source separation. Once material is collected, collectors can obtain financial advantage if they dispose of it to the cheapest option. This may mean sorting waste and diverting materials from landfill in this way.

The choices made by waste generators reflects both price and non-price factors. We categorise price through a measure of costs saved from taking on source separation. That is, potential cost savings is equal to the total cost of a single collection service less the total cost of a separated collection service. The potential cost savings could be shared across waste generators and waste collectors — if all savings are allocated to waste collectors then this represents an upper bound to available cost savings.

Non-price factors include corporate sustainability objectives, site space and convenience. These factors lead to different willingness to pay for separated versus single collection services. In many instances willingness to pay will be negative — i.e. waste generators will need to be compensated for undertaking source separation.

Importantly, there is also likely to be considerable inertia, with businesses not allocating time to make decisions about waste management if possible savings are small.

Options for C&I waste collection

There are three major options considered for C&I waste collections in this report.

1. A regular single (mixed waste) collection service with:
   a) all material sent to landfill; or
   b) all material sent to a facility that subsequently sorts out recyclable materials (a dirty materials recovery facility or dirty MRF).
2. A regular source separated collection service.

This set of options is more simplistic that the diverse activities that actually occur in the C&I sector. In practice, businesses may choose to source separate some materials but not others and use once-off collections (or drop-off) rather than a regular service. For example:

- manufacturing businesses will almost always sort out metals and send this to a metal recycler; and
- office buildings will very likely sort out paper but are less likely to sort out plastics.

Determinants of potential cost savings

The price savings for waste generators from changing a waste management option is at most equal to the costs saved from doing so.

The potential cost savings from moving from a single collection service (option 1A) to a source separated collection service (option 2) will reflect the following cost trade-offs.

- A separated collection service (option 2) increases collection costs but allows for lower disposal costs relative to single collection services.

The potential cost savings from moving from a single collection service all disposed to landfill (option 1A) to a single collection service where the collector undertakes sorting (option 2) will reflect the following cost trade-offs.

- Sorting a single collection service (option 1B) increases processing/sorting costs but reduces disposal costs relative to a single collection service sent to landfill (option 1A).

These cost trade-offs are summarised in table 2.1.

Cost trade-offs are not constant and neither are the prices offered by collectors. In particular:

- collection costs (per tonne) are higher for smaller businesses that are further from disposal sites and in areas where business density is low; and
- the reduction in disposal costs possible from separation or sorting will be higher where a business has a high share of recyclable materials in its waste.

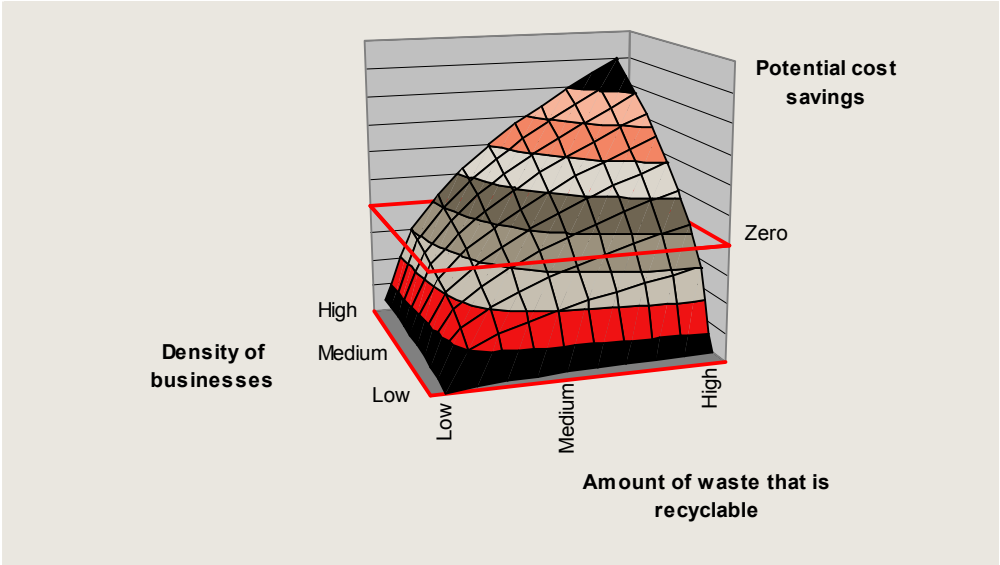
2.1 Cost trade-offs for major C&I options for collectors

Supply chain activity	*Single collection service*		*Separated collection service (option 2)*
	All sent to landfill (option 1A)	*Sorted (option 1B)*	
Collection	Low collection costs	Low collection costs	Highest collection costs
Sorting		High sorting costs	
Disposal	Highest disposal costs	Medium disposal costs	Lower disposal costs

Source: The CIE.

These factors are reflected in the prices that C&I collectors offer businesses for particular services. For example, businesses that have a high share of recyclable waste and are in a dense location are likely to receive greater cost savings from a separated collection services than other businesses (chart 2.2).

2.2 Cost savings for different business types



Note: Chart outlines methodology not actual numbers.
Source: The CIE.

Willingness to pay for different service types

There may be potential cost savings or additional costs from taking up separated collection but this will not be the only determinant of business decisions about what service they take up. Firstly, business inertia will be very important — unless businesses are aware of substantial savings, many will continue with their existing service. This is particularly true for small businesses where limited management time is unlikely to be allocated to saving a few hundred dollars. These circumstances are very similar to electricity decisions, with households and businesses generally only changing where retailers approached them.

Secondly, there may be factors that will be just as important in driving decisions as price. Corporate sustainability is very important for larger businesses, the education sector and NGOs.[8] These sorts of organisations are very likely to be willing to pay a premium (if necessary) for a separated collection service that increases their recycling rate.[9] These businesses may also be motivated to dedicate time to waste management decisions that have only small financial benefit and hence overcome inertia.

The NABERs rating scheme is another possible non-price factor in driving an increased level of recycling amongst larger businesses.[10] However, NABERs ratings for waste are not widely reported by businesses — only two buildings in Australia currently report their NABERs waste rating.[11]

But there may also be factors that work against separated collection services. Businesses may not want the inconvenience of having to sort their waste or may have site capacity constraints and would prefer to use capacity for other purposes. For example, for many businesses speed of disposing of waste is important (such as in a café) and they would want significant financial gains or some other motivation to sort waste. These issues are likely to be more relevant to smaller businesses and means that often these businesses will need a larger reduction in costs before they will sign up to a separated collection service.

Putting this together with the different potential cost savings available for businesses depending on the material composition of their waste, we might expect to see that large businesses are actually willing to pay for separating materials and hence have a greater take up than small businesses who would want to be paid (i.e. willingness to accept compensation) for separating materials (chart 2.3).

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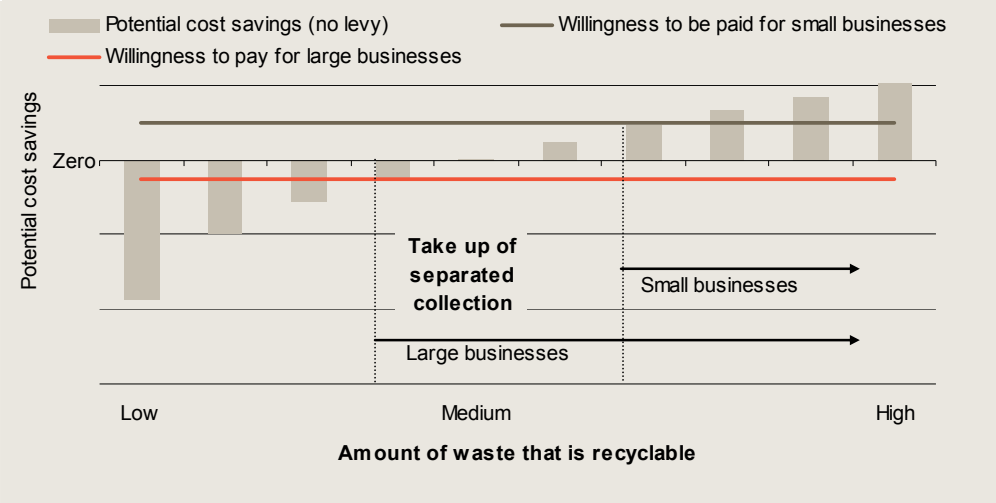
8 In regard to the corporate sector, this could also be in response to the importance of maintaining the 'sustainability image' at a global scale — waste operators consulted, for example, indicated that parent companies located in the US often imposed sustainability goals on their Australian operations.

9 This is also similar to electricity where 'green' electricity offers were a major driver of behavioural change rather than price.

10 NABERS — the National Australian Built Environment Rating System — is a national initiative managed by the NSW Office of Environment and Heritage. NABERs provides a simple indication of how well you are managing these environmental impacts compared with other buildings.

11 NABERS, http://www.nabers.com.au.

2.3 **Willingness to pay or be compensated and potential cost savings**



Source: The CIE.

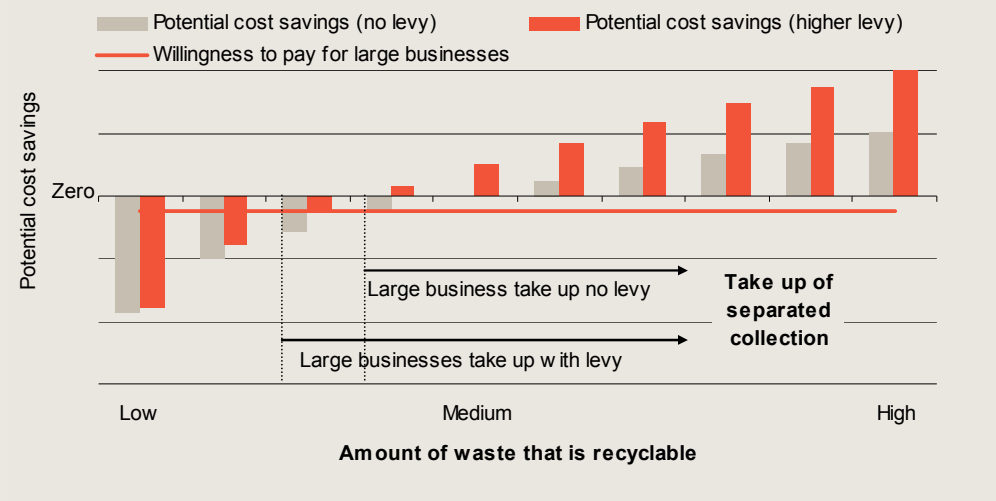
Impact of the levy on C&I decision making

The waste levy changes the relative costs of different types of collection services and hence changes the potential cost savings. A higher waste levy increases the cost of waste disposal across all options but more so for some options than for others. A $10 increase in the waste levy (per tonne of material disposed to landfill) would:

- increase costs of a single collection service disposed to landfill by $10 (per tonne);
- for waste sorted post-collection, increase costs of a single collection service by the residual amount going to landfill times $10, say $6 (per tonne) if a dirty MRF could divert 40 per cent of material away from landfill; and
- increase costs of a separated collection service by the residual amount going to landfill times $10, say $4 (per tonne) if 60 per cent of material was able to be sorted into recyclables.

In terms of the impact of this on decisions, this would increase the cost savings from separated collection and could be expected to lead to greater uptake of C&I source separation (see chart 2.4).

2.4 Impact of the levy on C&I decision-making



Source: The CIE.

The magnitude of the change in behaviour will reflect whether the potential cost savings is a significant driver of business decisions and the proportion of businesses close to the tipping point. Given likely business inertia, it may also depend on the extent to which C&I collectors are able, and have the incentive, to cheaply market alternative options to businesses.

The rest of this report implements this framework to seek to understand the incentives for the C&I sector to recycle and the influence of the levy.

3 *Supply chain for C&I recycling*

This chapter provides an outline of the main activities in the supply chain of the disposal of waste produced by commercial and industrial businesses, the structure of the sector and the main operators.

Activities in the materials recycling supply chain

The waste stream generated by the C&I sector is relatively heterogeneous in nature compared with the municipal and C&D sectors.[12] The diverse nature of this waste stream results in a range of additional activities in the supply chain that are non-existent in the other sectors. The C&I sector, for example, generates a relatively large quantity of liquid waste that is not recycled and often requires specialised treatment prior to disposal. This part of the waste stream is not disposed of at landfills and is not the focus of our study.[13]

For the purpose of this study our focus is on the solid waste stream generated by the C&I sector that has the potential to be recycled or disposed of in landfills. The main activities in this part of the supply chain are similar to those in the municipal waste stream. These include the following.

- Generator — materials are generated as waste, choices can be made to reduce the amount of material generated and to segregate the waste for disposal or recycling.
- Collection — materials are collected from the C&I sector and transported to other parts of the supply chain.
- Transfer stations and scrap yards — materials may be taken to local transfer stations or scrap yards for simple sorting.
- Materials Recovery Facilities — materials may be taken to facilities to sort materials into relevant categories. This is the case for co-mingled recyclables from businesses.
- Additional sorting/recovery, processing and distribution of product to end users.
- Disposal of waste materials to landfills (either directly from generators or as residue from different stages of the recycling process).

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12 The waste stream in the C&D sector, for example, is relatively homogeneous and recyclable materials can be more readily recovered (e.g. metals, bricks, timber, concrete).

13 The food and beverage sector also generates significant quantities of recyclable liquid waste — cooking oils, for example — which are not captured.

Within the C&I sector the pathways that various materials take to go through the supply chain can differ depending on the quality of the material and where it is coming from. For example, paper collected through dedicated office paper bins can go direct to paper mills rather than needing to go through a MRF. However, paper generated by businesses where there are no facilities on-site for separating waste products would typically need to be sent to a MRF for sorting prior to being sent to a paper mill. Similarly, mixed waste materials generated by small industrial sites may be taken directly to landfill whereas mixed waste from larger sites or shopping centres may be taken to 'dirty MRFs' for sorting.

Industry structure

The supply of services to the C&I waste sector is characterised by a wide range of different operators. There are a number of larger companies that operate vertically integrated businesses. There are also a large number of smaller operators that typically operate in one part of the supply chain. Operators may also specialise in collecting waste from particular types of commercial and industrial businesses or in specific regions.

Waste companies typically operate across a number of parts of the sector and do not just focus their operations on the C&I sector. There is also significant diversity in the scale of operations in NSW. Some waste companies may be vertically integrated businesses in other jurisdictions in Australia but only offer collection services in NSW.

Publicly available information on the size and structure of the different businesses is not readily available. The *Inside Waste Industry Report 2011-12*, for example, provides information on the estimated total revenue and number of employees for a range of waste companies.[14] However, it is not possible to disaggregate the C&I component of their waste activities or to isolate activities related to NSW (in the case of larger companies that have activities throughout Australia).

All the companies that we approached for this project were not willing to provide further details of their operations. Therefore, our description below is necessarily qualitative.

Waste collection

The waste collection market is highly competitive. There are a number of major companies that operate in the market. In addition, low barriers to entry allow small operators to enter the market — the main barrier being the initial capital to purchase a truck to transport the waste. There is no accurate record of the number of smaller operators that may be providing waste collection services.

[14] See chapter 9 of the *Inside Waste Industry Report 2011-12*.

Waste collection companies offer both single and dual collection services to commercial and industrial clients. Dual collection requires two trucks to collect the waste and is therefore more costly. Anecdotal evidence suggests that smaller operators typically only offer single collection services to businesses.

The optimal waste collection solution for each client depends on the type of waste they produce. For example, office buildings often separate out paper and cardboard from other waste. Other businesses have separate co-mingled recycling bins. Given the unique needs of each business in the C&I sector, it is difficult to segment the market in a meaningful way. Industry stakeholders suggest different waste collection companies will segment the market differently depending, in part, on the sophistication of their sales and marketing teams.

The larger waste collectors tend to service office buildings and larger customers (e.g. shopping centres). This partly reflects the scale of operation required to service these customers — which may involve collection from multiple sites. Longer term contracts (e.g. two to three years) are typically in place for these services which also tends to discourage participation from smaller waste collectors. Further, these contracts can often relate to a number of buildings sites, where multiple office buildings have a single owner. Therefore, operators need to have sufficient scale to service multiple sites.

For smaller commercial and industrial businesses there are likely to be a range of medium and smaller collectors that provide the necessary services. In this market segment C&I businesses are typically mainly concerned with the price of the collection service offered. Contracts for the collection services may only be in place for several months before being retendered. In this market segment there is less separation of waste materials at source. Therefore, the waste collectors may only need to offer services for transporting the waste directly to landfill.

Processing and recycling facilities

Once the waste is collected the materials can be transported to a number of different types of facilities (depending on the nature of the waste product). The waste could be directly disposed in a landfill facility (discussed below). Alternatively it could be transported to a facility that provides some level of service to recycle the material including:

- transfer stations and MRFs that remove different levels of recyclable materials from the waste stream; and
- recyclers that have larger processing facilities (e.g. metals recyclers, paper recyclers, Alternative Waste Technology plants).

These facilities further along the supply chain are dominated by large privately owned or publicly listed companies. This reflects the large investment required to establish and operate these facilities.

There are a range of medium size and larger players that provide processing and recycling facilities (in addition to collection services).

Landfill facilities

There are a range of landfill facilities located throughout NSW. In the Sydney basin, Newcastle and Wollongong there are several large landfills that can receive putrescible waste (Class 1) as well as landfills (Class 2) that can only receive dry waste. Over the past decade a larger quantity of waste from the C&I sector is being disposed of in the Class 2 landfill facilities due to the gate price difference between two types of landfill.[15]

Operators in the C&I waste sector

It has been difficult to obtain information regarding the specific nature of businesses that operate in the waste supply chain for the C&I sector. Operators consulted were typically not willing to provide further details regarding the nature of their operations. We were not able, for example, to comment on the market share of each of the operators in different parts of the supply chain. This is particularly the case for the smaller operators in the sector which are below the NSW Environment Protection Authority (EPA) threshold levels that trigger the requirement to hold a licence as a waste facility.

Therefore, we have based our understanding on information provided on the operators' websites and supplemented it with more general comments provided as part of the stakeholder consultation.

Broadly speaking, the size of the different operators is reflected in the extent to which they are operating in different parts of the waste supply chain. Smaller operators are typically involved in only the collection part of the waste sector whereas large operators are typically vertically integrated businesses that operate in all parts of the supply chain.[16] However, there are some companies that operate vertically integrated operations in other parts of Australia (or globally) but have relatively small operations in NSW.

JR Richards[17]

JR Richards offers collection services from the C&I sector (in addition to the kerbside collection services for councils). Its operations appear to be focused in large regional

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15 Wright 2009, *Public Review of Landfill Capacity and Demand,* p. 33.

16 These businesses are also typically horizontally integrated businesses that operate in the municipal and C&D sectors.

17 JR Richards and Sons, http://www.jrrichards.com.au/.

centres such as Taree, Port Macquarie, Tamworth, Grafton, Armidale, Forbes and Orange.

JJ Richards[18]

JJ Richards operates in all parts of Australia although its operations are mainly focused in South East Queensland where it has a vertically integrated business that covers collection, processing as well as some disposals.

In NSW its operations largely focus on the collection of waste. It has operations in Sydney, Wollongong and Nowra. It offers a range of different types of collection bins that allow separation at source.[19]

Watts Waste[20]

Watts Waste services include delivering recycling and waste management solutions for a diverse range of clients from residential to commercial and industrial. Its operations extend across NSW and deliver a variety of services including general waste and green organics collection and well as:

- office waste paper collection
- paper and cardboard recycling
- comingled container recycling, and
- shopping centre and volume industrial services.[21]

Remondis Australia[22]

Remondis is part of a multinational corporation that operates through Europe as well as parts of Asia and Australia. Operations in Australia are relatively small at this stage. In NSW it operates predominantly in the Sydney Basin and in Port Macquarie. Remondis only provides waste collection services and offers recycling for both solid and liquid wastes, and most commonly for paper/cardboard, mixed recyclables (bottles, cans, aluminium, glass) and e-waste. It has indicated an interest to establish a waste to energy facility in Sydney at a later stage.

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18 JJ Richards & Sons Pty Ltd, http://www.jjrichards.com.au/recycling.

19 It also offers liquid waste collection services in New South Wales. (e.g. grease trap waste, septic tank waste). J.J. Richards Liquid Waste Solutions operate a grease trap plant in Seven Hills, New South Wales. The facility accepts waste from the Sydney metropolitan area and is fully licensed by the EPA and Sydney Water.

20 Watts Waste, www.wattswaste.com.au.

21 It also offers liquid waste and grease trap servicing.

22 Remondis Australia, http://www.remondis.com.au/en/reau/about-us.

URM Group[23]

The URM Group is now one of Australia's largest privately owned waste and recycling companies. In NSW its operations in the C&I sector are focused mainly on the collection of waste from generators. It provides a range of different types of bins for a wide range of waste streams for any commercial business (e.g. paper service, general waste, comingled service, e-waste).

Dimeo Waste Services

Dimeo's operations are focused on servicing office buildings in the CBD, North Sydney and Parramatta. It also services shopping centres (e.g. Centro Bankstown, and Macquarie Shopping Centre) under longer term contracts. Dimeo Waste also offers office cleaning services that allow it to manage the waste flow from the offices to the large bins that are collected.

Dimeo recently purchased Galloways MRF in Seven Hills which receives C&I waste. Waste paper from office facilities, however, are typically sent directly to paper recyclers. Dimeo appears to currently have a long term relationship with Visy, which is a major user of recycled paper. General and organic waste collected by Dimeo is currently delivered to Veolia's Woodlawn Bioreactor site.

Amcor

Amcor is a publicly listed global packaging company that operates more than 60 manufacturing plants and recycling depots in Australia and New Zealand. Its main operations centre on the receipt of waste paper products from generators and recycling this material into paper products.

Amcor does collect waste paper from the C&I sector (predominantly in larger metropolitan areas in NSW) as feedstock for its paper recycling facilities. It also purchases a significant amount of waste paper from other operators that transport the waste to Amcor's facilities.

Veolia Environmental Services

Veolia has involvement in all aspects. It operates collection of certain types of C&I waste,[24] principally in servicing office blocks in more densely populated areas of Sydney.

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23 United Resource Management, http://www.urmgroup.com.au/.

24 Veolia is also involved in the collection of waste at a municipal council level. The focus is largely on the collection of recyclable materials. It also has involvement in the Construction and Demolition sector as well.

In waste processing, Veolia operates a number of Materials Recovery Facilities which sort recyclable materials — paper, glass, metals and plastics — collected from municipal collections. The recyclable material arrives from collectors (from all sectors) and is sorted using mechanical conveyers and teams of sorters who identify and remove potential contaminants. At this stage, these facilities are only in place in Queensland, Tasmania and South Australia.

In waste disposal, Veolia operates the bioreactor landfill site in Woodlawn (south of Sydney). Waste materials are transported by train from Clyde to the bioreactor.

Visy

Visy is a private company that operates a vertically integrated waste business. It operates collection services for municipal as well as the C&I sector (predominantly larger office spaces). The largest part of its business is focused around its paper and pulp mills which are predominantly used to produce packaging materials.

Visy also operates a material recovery facility at Wetherill Park to assist in supplying itself with paper. This facility predominantly receives waste from the municipal sector although some waste could potentially be received from the C&I sector from time to time.

In addition to sourcing recycled paper Visy also purchases waste paper from other collectors (e.g. Dimeo Waste) as feedstock for its mills.

Transpacific Cleanaway[25]

Transpacific Cleanaway is one of the largest companies operating in the C&I waste sector. It collects waste through a comprehensive fleet of specialised waste collection vehicles, bins, skips and compaction units.

Transpacific owns and operates a number of material recovery facilities (across Australia's metropolitan and regional areas. In NSW it operates MRFs in Moorebank and Greenacre (the Greenacre plant also includes a materials bailing facility).

It also operates landfill, transfer stations and composting facilities in Badgery's Creek and Erskine Park. These facilities only accept dry waste. It also owns AWT facilities (although none in NSW).

SITA

SITA is a large vertically integrated business which is involved in all aspects of the waste stream. In addition to the collection of waste materials it also owns and operates the following.

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[25] Transpacific Industries Group, http://www.transpacific.com.au/content/transpacific-cleanaway.aspx.

- Transfer Stations.
- Resource Recovery Facilities — the Camellia, Wetherill Park and Central Coast facilities are described as servicing the C&I waste sector. The facilities at Chullora, Lucas Heights and Belrose may also receive some C&I waste.
- Advanced Resource Recovery Technologies (Kemps Creek, Port Stephens) — at this stage this is only servicing domestic waste disposal.[26]
- Landfills — the Kemps Creek facility only accepts municipal and industrial non-putrescible waste. The landfill at Jacks Gully (now known as Spring Farm) is predominantly focused on receiving putrescible waste from the municipal sector, although there are also associated resource recovery facilities.

Outside of Sydney, SITA facilities are also operated in Port Stephens, Port Macquarie and Coffs Harbour.

[26] Global Renewables also operates an AWT facility at Eastern Creek in South West Sydney. At this stage it does not accept waste from the C&I sector.

4 The C&I sector and its waste

The C&I sector

The C&I sector covers businesses, government and non-government organisations. It does not cover waste that comes from construction and demolition activities or municipal waste.

Number, size and industry distribution of NSW businesses

There were 680 000 businesses operating in NSW in 2009.[27] Of these, 58 per cent of these businesses were non-employing (i.e. owner operated), while 38 per cent employed between 1 and 19 people, 4 per cent employed between 20 and 199 people and less than 1 per cent employed over 200 people.[28]

Small and medium sized businesses make up a large share of employment in Australia and NSW. In 2008-09, 47.2 per cent of people employed in Australia were employed in small businesses (those that employ fewer than 20 people). These businesses and non-employing businesses together made up over 95 per cent of businesses in NSW (table 4.1).

4.1 **Employment and number of businesses by business size** 2008-09

Business size	*Share of NSW businesses (2008-09)*	*Share of Australian employment (2008-09)*
	Per cent	Per cent
Non-employing businesses	58.4	Na
Employees in businesses employing 0-19 persons	37.6	47.2
Employees in businesses employing 20-199 persons	3.8	23.3
Employees in businesses employing 200 or more persons	0.3	29.5

Sources: ABS, *Small Business in Australia Update 1999-2000*, Cat. no. 1321.0.55.001; ABS, *Counts of Australian Businesses, including Entries and Exits*, June 2007–June 2009, Cat. no. 8165.0; and CIE calculations.

In 2008-09, the greatest number of businesses in NSW was found in the property and business services/ finance and insurance sectors, with construction and wholesale/retail trade also contributing significantly to the business count (chart 4.2).

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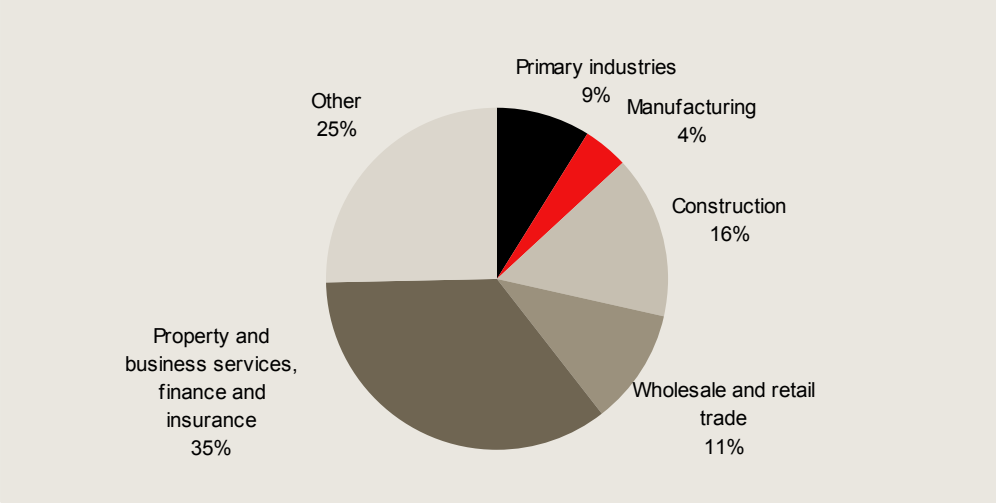
27 Australian Bureau of Statistics (ABS), *Counts of Australian Businesses,* including Entries and Exits, June 2007–June 2009, Cat. no. 8165.0.

28 ABS, *Counts of Australian Businesses, including Entries and Exits*, June 2007–June 2009, Cat. no. 8165.0.

4.2 Number of NSW businesses, by industry 2008-09



Data source: ABS National Regional Profile, New South Wales, 2005-2009, Cat No. 1379.0.55.001.

Within NSW, the health care and social assistance sector employed the largest proportion of people (11.1 per cent) in 2010 (table 4.3). Other significant sectors include retail trade (10.5 per cent), manufacturing (8.8 per cent), construction (8.5 per cent) and professional, scientific and technical services (8.3 per cent).

4.3 Employed persons in NSW, by industry 2010

Sector	*Persons employed*	*Share of total*
	000'	Per cent
Agriculture, Forestry and Fishing	97.5	2.8
Mining	33.6	1.0
Manufacturing	306.1	8.8
Electricity, Gas, Water and Waste Services	40.4	1.2
Construction	292.6	8.5
Wholesale Trade	138.7	4.0
Retail Trade	365.2	10.5
Accommodation and Food Services	248.8	7.2
Transport, Postal and Warehousing	184.8	5.3
Information Media and Telecommunications	82.8	2.4
Financial and Insurance Services	168.9	4.9
Rental, Hiring and Real Estate Services	58.1	1.7
Professional, Scientific and Technical Services	288.9	8.3
Administrative and Support Services	115.2	3.3
Public Administration and Safety	203.8	5.9
Education and Training	249.8	7.2
Health Care and Social Assistance	385.0	11.1
Arts and Recreation Services	56.9	1.6
Other Services	144.8	4.2
Total	3 461.9	100.0

Source: ABS, *Labour Force, Australia,* Detailed, Cat. no. 6291.0.55.003 and CIE calculations.

Population and employment and industry distribution by region

Around 4.1 million or 56 per cent of the population of NSW reside in the Sydney Metropolitan Area, while the ERA and RRA cover 19 per cent and 11 per cent of the state's population respectively.[29] This leaves 14 per cent of the NSW population in unregulated areas (table 4.4).

4.4 Population shares by region

Region	*Share of population*
	Per cent
Sydney Metropolitan Area	56.3
Extended Regulated Area	18.9
Regional Regulated Area	10.8
Unregulated Area	14.0

Source: ABS (2011), *Regional Population Growth, Australia*, Cat. no. 3218.0, and data provided by recyclers.

While it is not possible to aggregate ABS data to the areas of waste levy regulation, it is clear that a similarly large percentage of total employment occurs in the Sydney area (table 4.5). Further, of the industries identified above as employing the greatest proportion of people within NSW, the shares of employment across statistical regions and compared with the total is similar. For instance, 63.8 per cent of NSW's health care and social assistance sector is employed in the Sydney area, while 66.5 per cent of manufacturing workers are located in Sydney and 63.4 per cent and 62.4 per cent of construction and retail trade workers are Sydney-based respectively.

4.5 Employment shares by region 2010

Region	*Total employed*	*Proportion of total*
	'000	Per cent
Sydney Major Statistical Region	2281.3	65.5
Hunter	*306.3*	8.8
Illawarra and South Eastern	*290.7*	8.4
Richmond–Tweed & Mid-North Coast	215.1	6.2
Northern, Far West–North Western and Central West	*252.3*	7.2
Murray–Murrumbidgee	135	3.9
Total NSW	**3 480.80**	100.0

Source: ABS (2011), *NSW State and Regional Indicators*, Cat. no., 13381, DO001 and CIE calculations

[29] ABS 2011, *Regional Population Growth, Australia*, Cat. no. 3218.0, March and CIE calculations.

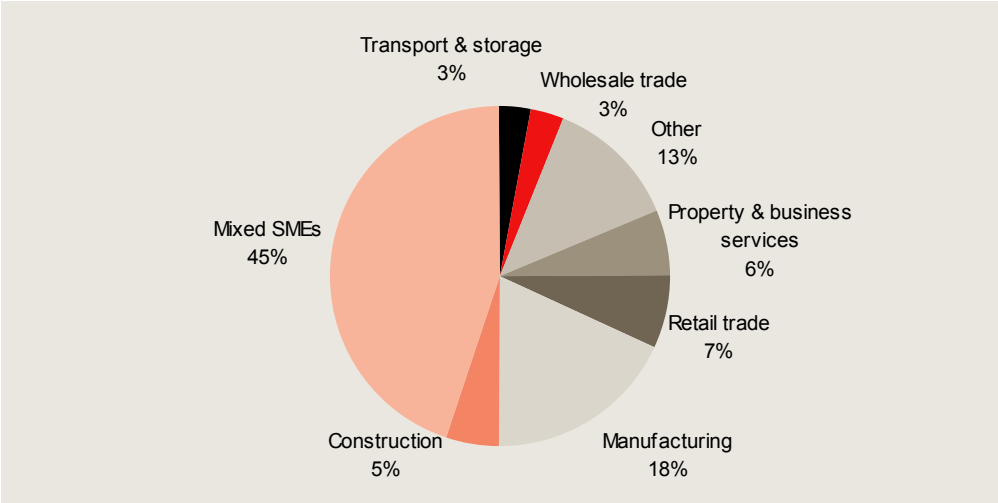
Waste generation in the C&I sector

Main waste producers

The C&I Waste Survey undertaken by the NSW Department of Environment, Climate Change and Water indicates that small and medium sized enterprises are the largest generator of waste to landfill in Sydney, generating 45 per cent of waste to landfill.[30] This category covers all waste for which an industry is not known and may not be a good proxy for small to medium business. Manufacturing (18 per cent), retail trade (7 per cent), property and business services (6 per cent) and construction (5 per cent) also contribute significantly to C&I waste generated in the Sydney area (chart 4.6).

These figures are only for waste to landfill — the generation of waste and recycling rates by sector are not known.

4.6 **Waste generated by industry** Sydney

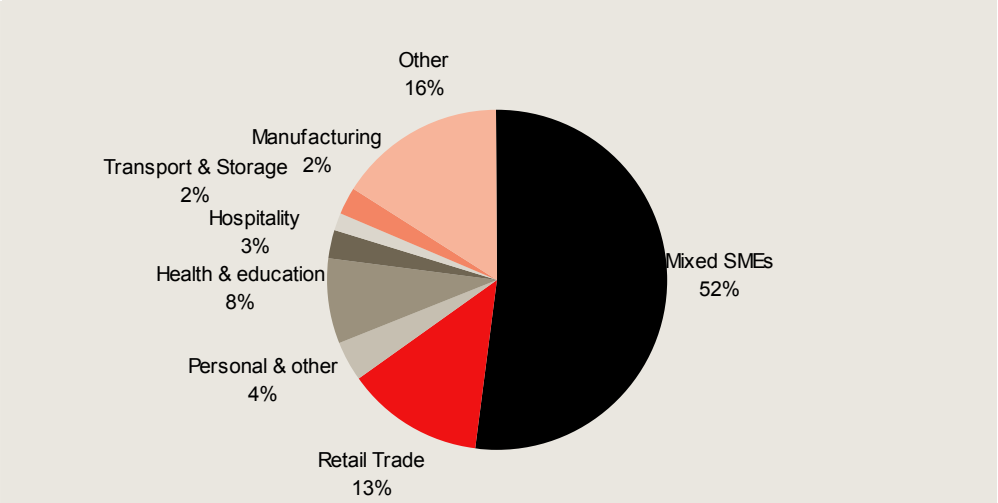


Data source: NSW Department of Environment, Climate Change and Water (2008), *Commercial and industrial waste in Sydney*.

For the Lower Hunter, mixed SMEs are estimated to make up an even higher share of waste to landfills (52 per cent, see chart 4.7).

30 NSW Department of Environment, Climate Change and Water (DECCW) 2008, *Commercial and industrial waste in Sydney*, p. 6.

4.7 **Waste generated by industry** Lower Hunter

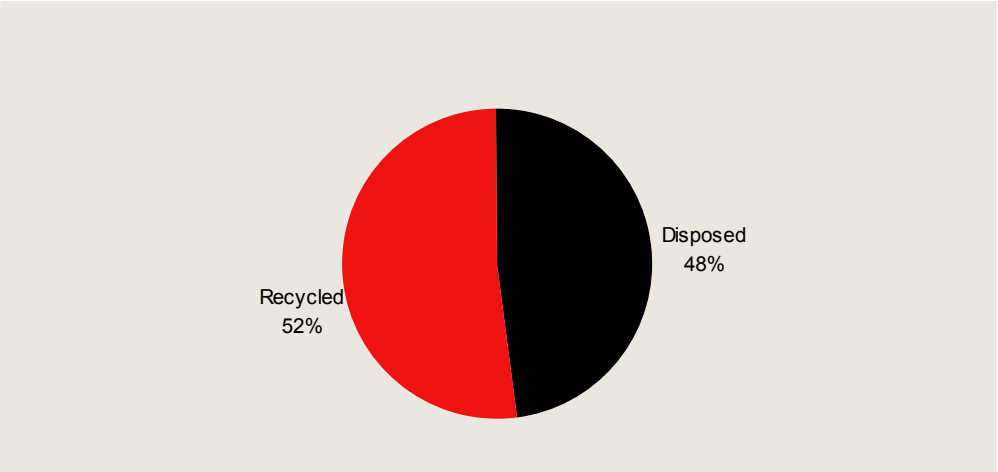


Data source: NSW Department of Environment, Climate Change and Water (2009), *Commercial and industrial waste in the Lower Hunter region.*

C&I recycling rate

The C&I sector makes up about a third of the materials and waste generated in NSW. In 2008-09, the recovery rate for the C&I sector in NSW was 52 per cent (chart 4.8). This compares to recovery rates of 56 per cent for municipal and 73 per cent for construction and demolition waste.

4.8 **Recovery rate for the C&I sector in NSW** 2008-09



Data source: NSW OEH data.

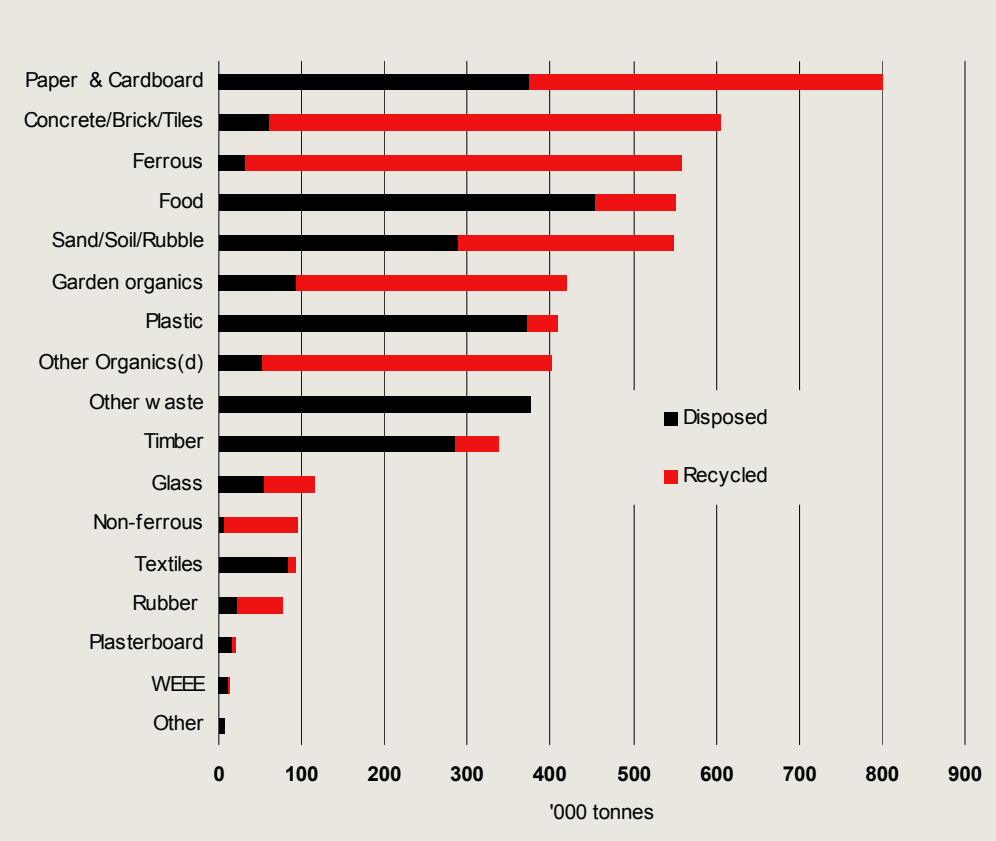
Types of C&I waste received at landfill

The C&I waste stream is diverse and over 80 per cent of waste presented at landfill is mixed loads.

Single material loads (the other components) are mainly made up of contaminated soil (55 per cent) and residues from processing sites (28 per cent). Smaller quantities of non-contaminated soil, glass, hazardous/special material and vegetation are also delivered in single material loads. The proportion of C&I waste that presents as single material loads has decreased to about 14 per cent in the Greater Sydney Region in 2008-09 due to misreporting of contaminated soil being corrected by the Environment Protection and Regulation Group (EPRG). It is unlikely that significant gains can be made by focusing on single material loads.

There are five key components of the mixed C&I waste stream that is disposed to landfill — food, paper and cardboard, plastics, timber and sand/soil/rubble as shown in chart 4.9.

4.9 **C&I waste by material** 2008-09



Data source: Data provided by NSW Office of Environment and Heritage.

Services taken up by businesses

There is no (recent) detailed information available on the type of collection services taken up by businesses by business type, business location, size etc. For example, we are aware of no information on how many businesses (and what type of businesses)

source separate paper, plastics and other materials from their waste stream. This would be valuable information to inform future programs aimed at increasing C&I recycling rates that could be obtained from a survey of businesses.

C&I waste collectors gave varying views about this. One major collector indicated around 60 to 70 per cent of businesses that they service would be undertaking some form of source separation. This is likely to apply to medium to larger businesses.

Recovery by material type

C&I recovery rates vary significantly by material. Estimated recovery rates for particular materials are shown in chart 4.10 for the C&I sector in particular, and across all sectors in NSW (C&I, Construction & Demolition and municipal). In total, the recovery rate from the C&I sector is slightly lower than that across other sectors. The pattern of recovery rates for the C&I sector is very similar to that for recycling as a whole, with recovery rates for plastic, food, timber, plasterboard, textile and electronic equipment (WEEE) all below 20 per cent. In fact, the correlation of C&I recovery rates and total NSW recovery rates is 95 per cent, suggesting that barriers to recovering particular sorts of materials are broader than those impeding recovery in the C&I sector.[31]

In conjunction with the data on industry landfill disposal, generation and views expressed by waste collectors, this suggests that recovery of food and plastic materials from small and medium businesses is an area where substantial increases in recovery rates would make a difference to the ability to meet recycling targets.

Recycling and disposal by region

Recovery rates for recyclable materials are likely to be much higher in the Sydney Metropolitan Area than elsewhere. This reflects the following influences.

- More material is recycled when transport costs to get material to a processing centre are lower. Most processing is undertaken in major centres such as Sydney, Melbourne and Brisbane, making it less costly to transport material from locations close to these centres.
- More material is likely to be recycled where landfill costs are higher. Sydney landfill costs are higher than in regional areas reflecting a higher levy and higher costs outside of the levy.

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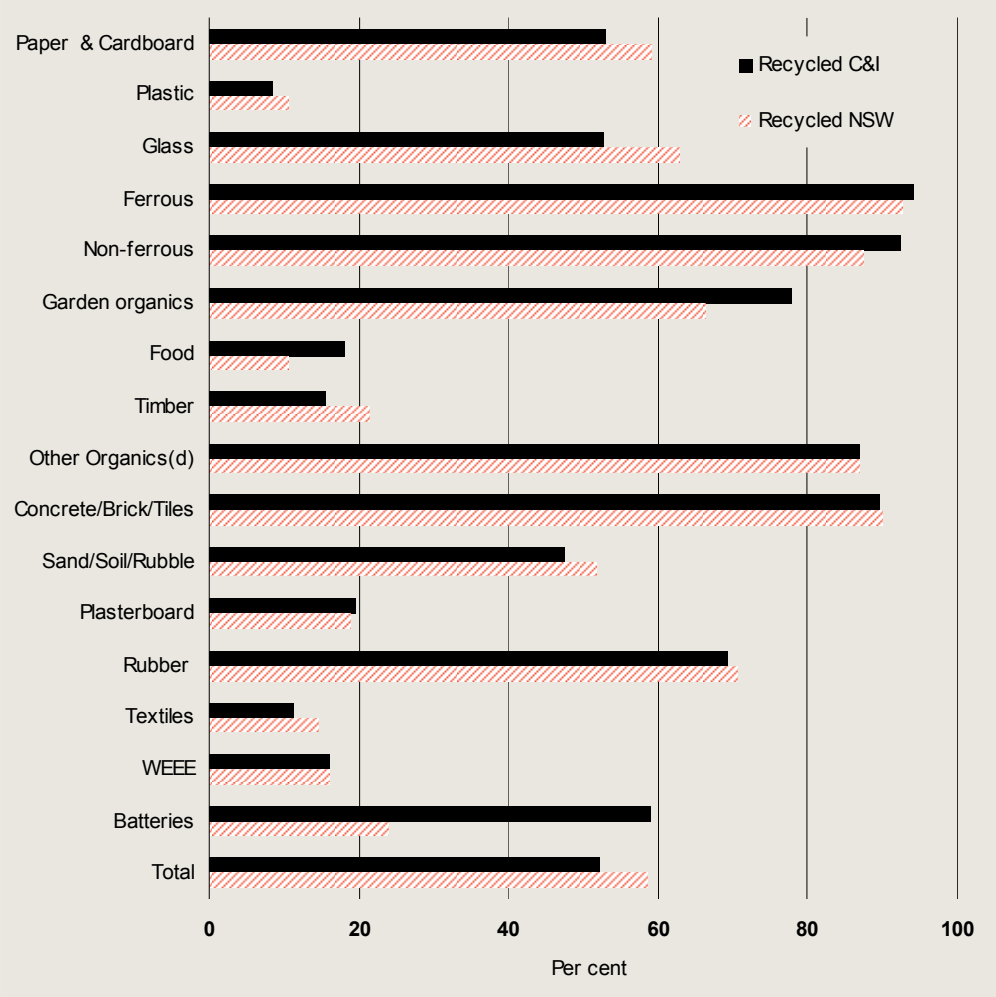
[31] Constructing data on recovery rates by sector requires a number of assumptions that could potentially lead to correlation across sectors. Municipal waste and recycling is directly measured. This is then subtracted from total figures from recycling processors to provide figures for C&I (and C&D if relevant). This method suggests that the correlation of recovery rates between C&I and municipal across material types is not likely to be due to the way that data is constructed.

4.10 **C&I sector and total recovery rates by material**



Data source: NSW OEH data.

Data provided for a previous CIE project for NSW OEH showed that significantly more paper for recycling is from areas where the levy was higher and that were closer to processing centres (table 4.11). This may reflect the impact of the levy, the nature of activity undertaken in NSW or other commercial factors related to transporting waste over longer distances.

4.11 **Recycling of paper and cardboard and population by region**

Region	*Share of population*	*Share of paper and cardboard recycled*	*Recycled share to population share ratio*
	Per cent	Per cent	No.
Sydney Metropolitan Area	56.3	78.0	1.39
Extended Regulated Area	18.9	12.0	0.63
Regional Regulated Area	10.8	5.5	0.51
Unregulated Area	14.0	4.5	0.32

Source: ABS (2011), *Regional Population Growth, Australia*, 3218.0, and data provided by recyclers.

The majority of C&I waste is from the Sydney Metropolitan Area (table 4.12). Interestingly, even though the waste levy is much higher in this area, the C&I waste per capita disposed to landfills is still higher than in other areas. This reflects that more C&I waste is generated per capita in Sydney than elsewhere rather than lower recycling rates.

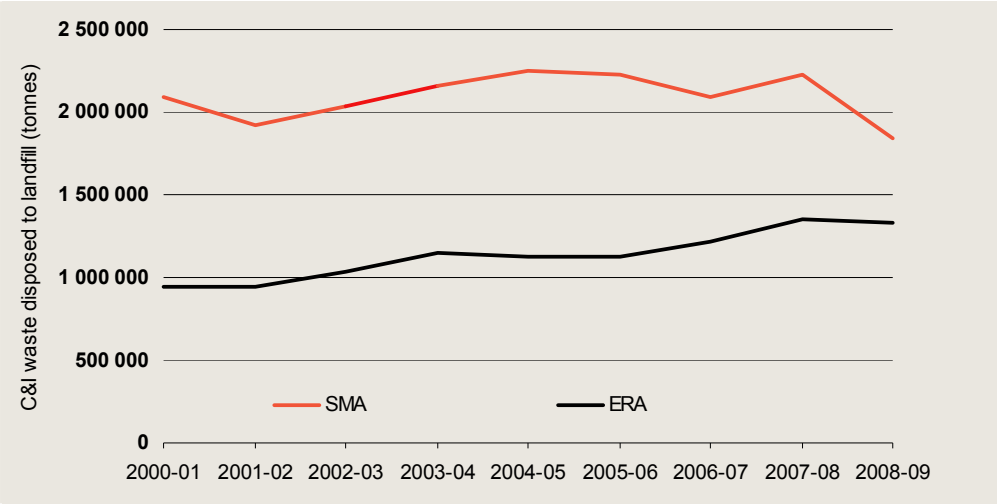
4.12 **Waste disposal by region** 2008-09

Region	*Share of population*	*Waste disposal*	*C&I Waste disposal per capita*
	Per cent	Tonnes	Tonnes
Sydney Metropolitan Area	56.3	1 840 256	0.45
Extended Regulated Area	18.9	357 910	0.26
Regional Regulated Area and unregulated area	24.8	390 469	0.22
Total NSW	100.0	2 588 635	0.36

Source: ABS (2011), *Regional Population Growth, Australia*, 3218.0; data provided by Office of Environment and Heritage.

The amount of C&I waste disposed of to landfills in the Sydney Metropolitan Area and Extended Regulated Area has decreased from levels in 2000-01 (chart 4.13).

4.13 **C&I waste disposed to landfills SMA and ERA**



Data source: NSW Office of Environment and Heritage.

5 *Potential cost savings from different collection services*

Aggregate costs

Aggregate prices offered for collection encompass all the relevant costs for collecting material, transporting it to disposal points and paying disposal charges. The types of costs incorporated into prices are set out in box 5.1. The cost differentials between options are expected to be passed down to waste generators through lower prices.

- A waste collector will offer a waste generator a lower price for taking up a source separated collection service.
  - This is easily identified by the waste generator as long as all collections are undertaken by a single collector.
  - In the case that source separated material is collected separately (or dropped off by the generator itself) then a lower price is likely to be offered as significant reductions in volume reduce required bin size and/or frequency of collection.
- A waste collector will offer a waste generator a lower price if they can find cheaper methods of disposing of collected materials, such as through source separation.

There are some publicly available sources of pricing and cost information. Industry has also provided us with indicative pricing/cost information for different services.

An average break-down of costs across alternative options for collection and disposal are shown in table 5.2 and chart 5.3. On average, collecting waste for landfill would be expected to cost C&I businesses in the order of $270 per tonne based on 2010-11 landfill prices. Source separating would be cheaper at $218 per tonne. Sorting using a dirty MRF would be in between the other two options at $256 per tonne.

5.1 Costs and prices

The prices offered by businesses generally reflect the underlying costs of providing services. Underling costs include:

- operating costs — these are ongoing costs associated with running the business such as fuel and labour. They also include marketing costs;
- depreciation and a return on capital — these are costs related to capital items such as trucks, processing plants and land. The return on capital includes interest payments (a return on debt capital) and a return on equity capital. To be sustainable in the longer term businesses need to be able to cover these capital costs;
- working capital costs — this is a cost reflecting that payments are often received after expenses are incurred and hence a business is required to hold capital to cover this cashflow gap; and
- profit margins — some business receive a margin on top of other costs, particularly businesses that do not have much capital but face substantial risks. Often a profit margin is implicitly incorporated into the required return on capital for a business. A business may earn a profit margin above the required return on capital when the industry is not very competitive or the business can operate at lower costs than their competitors.

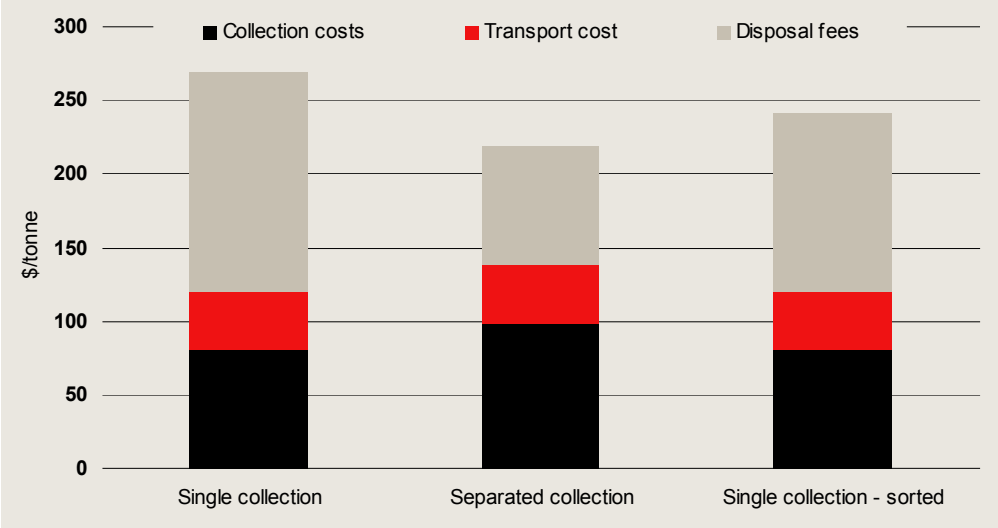
Some business costs, such as corporate overheads, are fixed cost and can be allocated across different services in different ways.

5.2 Costs for major C&I options 2010-11

Supply chain activity	*Single collection service*		*Separated collection service (option 2)*
	All sent to landfill (option 1A)	*Sorted (option 1B)*	
	$/tonne	$/tonne	$/tonne
Collection	80	80	98
Transport	40	40	40
Disposal	150	136	80
Total cost	270	256	218

Notes: Option 1B is estimated on the basis of 30 per cent of materials being diverted away from landfill. Option 2 is estimated on the basis of 50 per cent of materials being diverted away from landfill. Disposal is to the next facility – i.e a landfill for option 1A, dirty MRF for option 1B and MRF/landfill for option 2.
Source: The CIE.

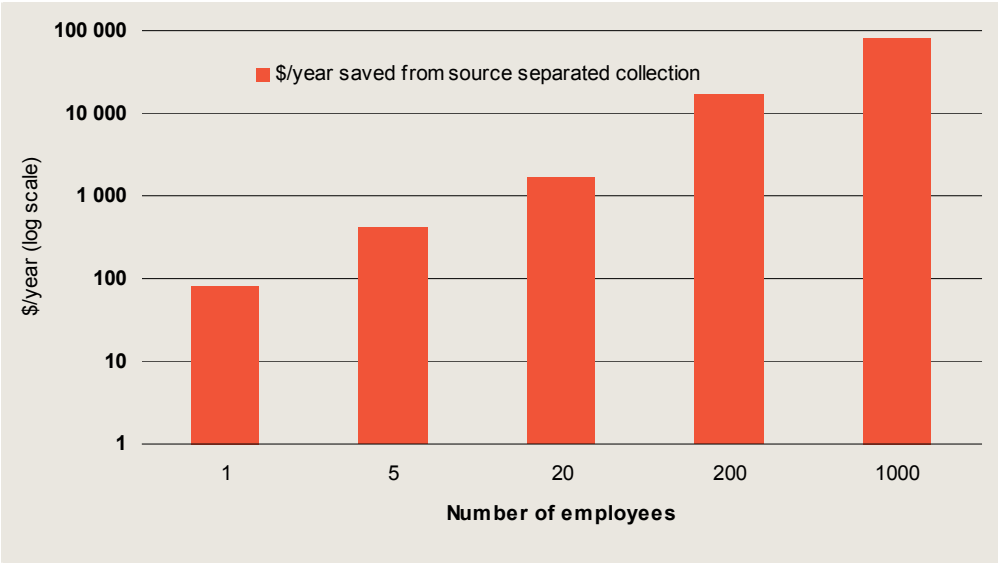
5.3 **Cost breakdown by collection option** 2010-11



Notes: Option 1B is estimated on the basis of 30 per cent of materials being diverted away from landfill. Option 2 is estimated on the basis of 50 per cent of materials being diverted away from landfill.
Data source: The CIE.

The annual cost savings for different sized businesses are shown in chart 5.4. Businesses employing five or fewer people would likely save less than $1000 per year. Medium sized businesses would be looking at savings in the thousands of dollars, while large and very large businesses would expect savings of over $10 000 per year.

5.4 **Cost savings from adopting separated collection by business size** 2010-11



Notes: Option 1B is estimated on the basis of 30 per cent of materials being diverted away from landfill. Option 2 is estimated on the basis of 50 per cent of materials being diverted away from landfill.
Data source: The CIE.

These figures align well with industry cross-checks. Waste collectors indicated that the more than three quarters of businesses would typically spend less than $10 000 per year on waste and that savings from moving to systems offering higher diversion rates could range from 5 per cent to 25 per cent.

The basis for these estimates is set out below.

Cost of dirty MRF

The costs of a dirty MRF have been set out for the ACT by URS.[32] These included:

- operating costs of $35 per tonne;
- capital costs of $10 million with refurbishment after 10 years for $2.5 million; and
- throughput capacity of 100 000 tonnes per annum.

Assuming a required rate of return on capital of 10 per cent (real) and amortisation over 20 years, the cost per input tonne is $11. This gives a total cost of $46 per tonne for a dirty MRF.

A dirty MRF would be expected to divert from 10 per cent to 40 per cent of input materials away from landfill.[33] Industry stakeholders indicated that such a facility would divert 20 percentage points less material than source separation. For the purposes of the above analysis we assume a dirty MRF diverts 30 per cent and source separating diverts 50 per cent of material from landfill.

The dirty MRF gate fee can be determined by the material diverted from landfill, processing costs, landfill disposal costs and prices for separated materials. Using a landfill disposal cost of $150 per tonne, as used throughout the analysis, and an average price of sale of $50 per tonne, the dirty MRF gate fee would be $136 per tonne.

The average price of sale will depend on the materials extracted and their quality. Industry consultations and export data suggest that reasonable quality scrap paper currently sells for $100 per tonne, scrap metal for $250 per tonne and plastics for $500 per tonne. We use $50 per tonne to allow some lee-way for transport costs to deliver materials and allowing materials from a dirty MRF to sell for below prices of clean material.

It should be noted that these financial estimates are not well tested and nor is practical experience with such a facility. Industry groups suggested that such a facility could be viable at a gate fee anywhere from $150 to $250 per tonne. The

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[32] URS 2010, *Supplementary report – economic modelling of waste infrastructure options for the ACT,* pages 5 and 8.

[33] Waste Management and Environment Media, *Inside Waste 2011, Industry report 2011-12*, p. 105.

required gate fee will rise as landfill costs rise as residual material would most likely be disposed to landfill.

Industry also considered that a dirty MRF has additional value from allowing material that would have to go to a class 1 landfill could instead be diverted to a class 2 landfill. This value is not factored into the above analysis.

Collection and transport costs

Discussions with industry and public sources[34] suggest collection and transport costs for the C&I sector in NSW are around $120 per tonne.[35] There are some who contend that these costs do not change for separated collection.[36] Most industry participants expected there to be additional collection costs for C&I businesses that sought to separate their waste. Estimates included:

- a 40 per cent premium on collection costs for separated collection; and
- a 15 per cent premium on collection and transport costs for separated collection.

The latter figure suggests an increase of around $18 per tonne (over and above the collection and transport costs for a single collection) for a source separated collection service. We take this figure as we do not have a good breakdown of collection and transport costs to which to apply the 40 per cent premium.

Disposal costs

Landfill disposal costs vary depending on the type of waste and the contract negotiated by the waste collector. The Industry Report notes a range of $120 to $200 per tonne for landfill disposal for municipal waste and an average of $150 per tonne for C&I waste.[37] This aligns with what we were told by industry.

Note that prices have risen for 2011-12. For example, the price for wet and dry waste delivered to the Eastern Creek landfill not on a contract basis is $224.30 per tonne for 2011-12.

The disposal cost for source separated materials will depend on the material type and degree of separation. We follow the Industry Report with an average $10 per

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34 Waste Management and Environment Media 2011, *Inside Waste 2011, Industry report 2011-12*, p. 90.

35 Note that Inside Waste 2007-08 reported collection and transport costs of only $10-$25 per tonne, (WCS Market Intelligence and Waste Management and Environment Media 2007, *The Blue Book: Australian waste industry 2007-08 industry and market report*, p. 55).

36 For instance, this underlies the estimates in *Inside Waste 2011, Industry report 2011-12*.

37 Waste Management and Environment Media, *Inside Waste 2011, Industry report 2011-12*, pp. 87–88.

tonne disposal cost at C&I recycling facilities.[38] A higher level of separation will see much lower disposal costs. For instance, for paper the disposal rebate can cover the entire transport and collection cost, suggesting a disposal revenue of over $100 per tonne.

The disposal cost for a dirty MRF is $120 per tonne if a 30 per cent recovery rate is achieved as discussed above.

Material flows base case

Different options for collection lead to different amounts of material recovery.

- Single collection with all material disposed to landfill by definition leads to all material being charged landfill disposal rates. Landfills may undertake some sorting of their own.
- Single collection sent to a dirty MRF under the base figures is presumed to lead to a recovery rate of 30 per cent as discussed above.
- Source separation is presumed to lead to a recovery rate of 50 per cent. Industry indicated rates for a dirty MRF would be 20 per cent below what could be achieved from source separation. This figure is likely on the conservative side given that the recycling rate for C&I across NSW is already higher than 50 per cent. We test the implications of this below

Cost savings versus pricing incentives

The cost savings identified above for separated collection services will be able to be passed down to waste generators, thereby providing a price incentive. This is because, even though pricing is often based on volume and frequency, collectors can offer a lower price for customers who take on a separated service from the same collector. This means that there is a clearly observable difference between customers with and without separated collection that can be used as a basis for pricing.

In the case that a customer undertakes occasional tip loads themselves or contracts separately for different material types, collectors will find it more difficult to offer lower prices. This is because they will not be able to monitor whether separation is occurring and pricing based on volume of bins and frequency of collection services will not automatically reward these customers. In this case cost savings would likely be passed on through smaller bins or less frequent collections.

There is a possibility that a business will take on a source separation service to access a cheaper service but then continue to put all waste in a mixed waste bin. It would be up to collectors to monitor these sorts of issues.

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[38] Waste Management and Environment Media 2011, *Inside Waste 2011, Industry report 2011-12*, p. 88.

How effective are collectors as aggregators?

A number of industry groups and others noted the role that councils played in aggregating waste and material for recycling and hence lowering cost. Collectors play a similar role to councils in some respects, in that they take waste from many businesses and can seek to offer these businesses different services to reduce costs. Collectors can also directly aggregate mixed waste and undertake sorting themselves. By doing either of these, collectors may be able to increase their competitiveness in the market.

However, there are also significant differences between collectors and councils.

- Councils have long term rights to charge households for their waste. In contrast, C&I contracts can be short, often under a year, which reduces the incentives for collectors to invest in changes in behaviour or other upfront costs. This is because they may only receive a share of the cost savings generated over a much shorter period of time.
- Councils are not operating in a competitive environment for collecting household waste.[39] Hence they can mandate conditions without households being able to choose an alternative waste collection service. In contrast, C&I collectors will not generally impose changes across their customers. This means that costs of encouraging change are much higher for C&I collectors than for councils because C&I collectors will need to match the needs of each customer. In contrast, councils can mandate changes that may be beneficial to households as a whole but are not beneficial to some households without having to worry about losing these customers.

These differences limit the ability of collectors to play an effective role in changing the behaviour of businesses, largely by increasing the costs of change to collectors. As discussed in the next chapter, collectors would face substantial financial costs if they sought to change the way small waste generators behave.

Sensitivity testing

Much of the story for C&I recycling cannot be conveyed through looking at broad averages. Rather it is the differences across businesses that are important.

The importance of business size for the gains available has been shown above. For medium to large businesses, it is worth spending some time to improve waste systems. For small businesses the scale of the gains means that they are not likely to pay much attention to waste costs.

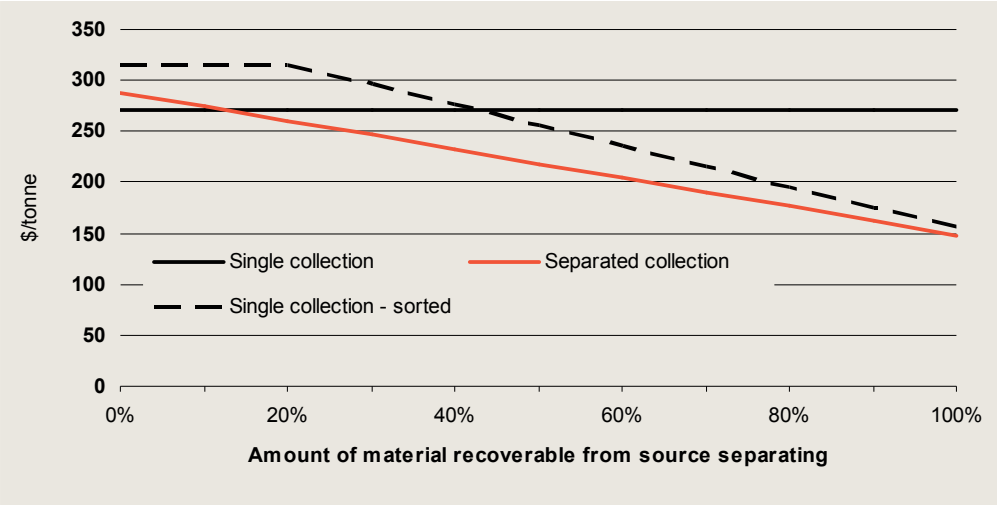
A second key difference across businesses is the materials that they generate for waste or recycling. Chart 5.5 shows pricing of collection and disposal options under

[39] Collectors contracted to councils are operating in a competitive environment.

alternative recyclable materials recovery rates. On the X-axis is the amount of material recoverable from source separating — the amount recoverable from a dirty MRF is assumed to be 20 percentage points below this.

Even at very low levels of recyclable materials there appears to be financial gain from source separating rather than sending a single collection service to landfill. This reflects the much higher disposal costs to landfill.

5.5 **Prices of major options under different recovery rates** 2010-11

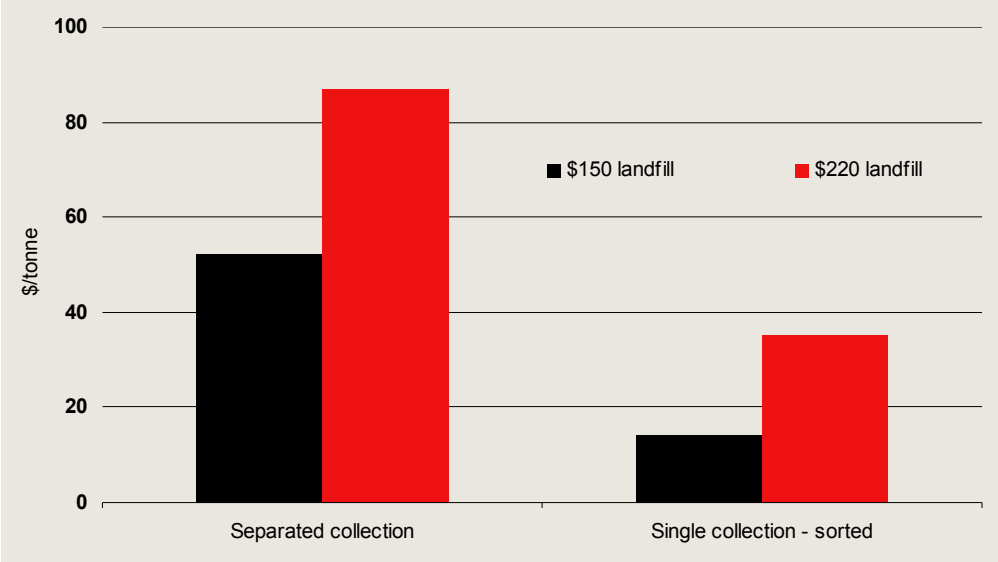


Note: The amount of material recoverable from sorting of single collections is assumed to be 20 percentage points below that recoverable from source separation.
Data source: The CIE.

Industry indicated that most businesses would need to see price reductions of at least 5 per cent before they would switch to a source separated service. A better understanding of the costs to waste generating businesses could provide further information on this. The potential cost savings are greater than this for businesses with material of 20 per cent and over recoverable from source separation.

We can also test the sensitivity of the above analysis to landfill costs, recognising that landfill costs impact on the price of all options. At a landfill price of $220, the per tonne gain from moving to separated collection is over $80 (chart 5.6). The per tonne gain from undertaking sorting of mixed waste is over $30. As a share of waste costs, these are significant cost savings.

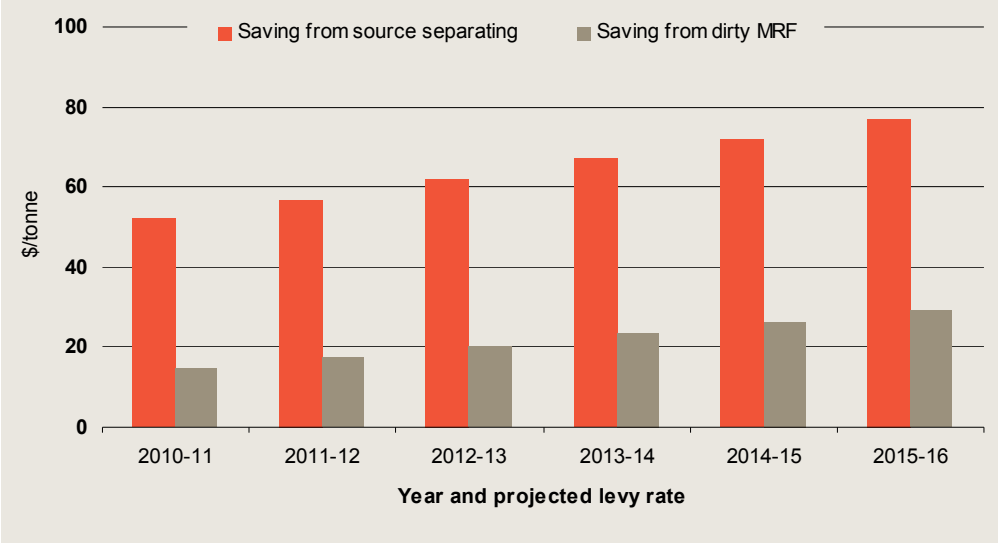
5.6 **Cost savings from changing from single collection to landfill**



Data source: The CIE.

The influence of higher landfill costs can also be tracked through the levy. As the levy rises the gains from source separating and from collectors undertaking sorting of mixed waste are shown in chart 5.7.

5.7 **Cost savings as the levy increases**



Data source: The CIE.

Key points

The above costs and materials flows allow us to generate some broad views about the trade-offs between collection and disposal costs. Most importantly, additional

collection costs from source separation are small relative to avoided landfill disposal costs.

Disposing of material to landfill costs on average $150 per tonne in 2010-11 (more in 2011-12) compared with disposing at a C&I MRF of only $10 per tonne or selling sorted materials such as paper for $100 per tonne. The additional collection costs for source separation at around $20 per tonne are much smaller than the avoided costs of landfill disposal.

The apparent incentive for the C&I waste generators to undertake source separation is not reflected in universal participation rates. This suggests that there are costs that businesses face within their business from source separation, costs for collectors to market change to waste generators and/or a large degree of inertia from waste generating businesses. These issues are considered in detail in the next chapter.

6 *Willingness to pay for separated collection*

The costs of collecting and disposing of waste do not capture the full costs incorporated in the decisions of businesses that generate waste. In some cases, businesses may be willing to pay to take up recycling. This could be the case for businesses that are motivated by corporate sustainability.

More often, businesses appear to need to be paid to take on source separation activities within the business. That is, they will take up recycling only when significant savings in waste disposal costs are available.

In addition, for many businesses, consumer inertia — or a predisposition towards the default option — will exist as waste costs are not a major business cost.

Constraints on willingness to pay for resource recovery

Waste management costs are relatively small

Waste management costs comprise a relatively small proportion of total business costs across major sectors of the economy.

NSW OEH estimates that 5.42 million tonnes of C&I waste were generated in NSW in 2008-09, which equates to around 1.58 tonnes per person employed in the state. Further, NSW C&I waste management costs were estimated at $1112.2 million,[40] which equates to around $325 per employee.

Using ABS estimates of average waste per employee across the different sectors (minus agriculture and mining) to determine relative weights indicates a range of between $175 per employee in the finance/insurance industry and $609 per employee in the transport and storage industry.[41] As a share of total business costs these figures are small.

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40 Waste Management and Environment Media 2011, *Inside Waste, Industry Report 2011-12*, p. 88.

41 These ABS figures are for 2003. We presume that relative waste by industry are relatively stable in using these figures, even though absolute amounts of waste have likely changed substantially.

- As a share of industry value added, waste management costs range from 0.1 per cent for the finance and insurance sector to 1.0 per cent for the retail sector.
- As a share of industry wages and salaries, waste management costs amount to 1.6 per cent for the retail sector and just 0.1 per cent for the finance/insurance sector (table 6.1).

Given that waste management costs constitute a relatively small share of total business costs, businesses may not directly seek to alter their current practices.

6.1 **Waste collection costs as a share of business costs, by sector**

	Waste collection costs per employee	*Waste collection costs as a share of industry value added*	*Waste collection costs as a share of industry wages and salaries*
	$	%	%
Manufacturing	353	0.3	0.7
Wholesale	208	0.2	0.3
Retail	436	1.0	1.6
Transport/Store	609	0.6	1.3
Finance/Insurance	175	0.1	0.1
Property/Business	178	0.2	0.3

Sources: ABS (2004), *Business Waste Survey, Sydney Metropolitan Area*, prepared for Department of Environment and Conservation (NSW), April/May, Waste Management and Environment Media 2011, *Inside Waste Industry Report 2011-12*, ABS Labour Force, Australia, Cat. No. 6202.0, ABS Australian National Accounts: National Income, Expenditure and Product Cat. No. 5206.0, ABS Australian System of National Accounts, Cat. No. 5204.0, Labour Force, Australia, Detailed Cat. No. 6291.0.55.003, ABS NSW State and Regional Indicators, Cat. No. 13381DO001_201012, NSW OEH provided data and CIE calculations.

Consumer inertia — lessons from the retail electricity sector

Consumer inertia is a big part of essential services industries, such as waste and electricity. Consumer inertia means that businesses and household tend to stay with their existing provider even when they are contractually able to change and 'better' offers are available. In the electricity sector, consumer inertia can be easily identified as electricity is a homogeneous product and hence price is the main factor on which electricity retailers can differentiate themselves.

Despite market deregulation and the privatisation of energy retail assets, a high level of consumer 'stickiness' has prevented the full impact of competitive forces from being realised in the NSW electricity sector. In 2008 new entrant retailers had acquired only about 17 per cent of the small- customer market (based on customer numbers) from government owned incumbents in NSW.[42] In 2008-09, 11.5 per cent of small customers changed retailers during 2008-09 in NSW.[43] Many electricity customers remain on regulated tariffs despite available discounts of 5 per cent or more.

[42] Australian Energy Regulator 2009, *State of the energy market 2009*, p. 195.

[43] Australian Energy Regulator 2009, *State of the energy market 2009*, p. 204.

Financial and/or behavioural barriers may prevent retail contestability despite significant benefits to customers from switching to the cheapest retailer in their area. Financial costs incurred by customers may include the time taken to search for the cheapest retailer, the transaction costs borne in transitioning to a new supplier, debt management issues and the costs of any new equipment that needs to be installed.

Non financial barriers that are not directly linking to any cost may include psychological factors. Evidence suggests that when faced with complex choices, businesses and households tend to make no choice or revert to the default option. Even if it is cost effective to change to service providers who could increase the levels of recycling by the business, this predisposition towards the default option may decrease a business' willingness to change.[44]

However, customer churn and competitive activity in the retail electricity market is increasing. This has been attributed to a number of factors that have reduced the search and transaction costs for customers, including:

- door to door sales and marketing campaigns that have raised the profile of switching:
  - After confirming that it did not acquire any assets in the NSW Government's sale of energy retail businesses,[45] AGL Energy launched an 'organic' growth strategy. The company indicated that it would increase its marketing spend to attract another 400 000 to 500 000 customers in NSW within three years. AGL offered NSW residents who switched to AGL savings on their electricity bill of $300 over three years. This followed positive results in adding 42 000 electricity customers in the first half of 2010-11.[46]
  - IPART recently found that the historic average customer acquisition costs were around $213 per customer. For moving existing customers off a regulated tariff costs were $138 to $167 per existing customer transferred between standard and negotiated contracts.[47]
- private and government–operated price comparison websites that have allowed customers to become increasingly proactive in the switching process. For instance,
  - IPART has established the 'My energy offers' website which provides a free electricity and gas on-line price comparison service for residential and small business energy customers.

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44 Inovact Consulting 2010, *Increasing Recycling by Business in the ACT: An analysis of barriers from the perspectives of businesses and waste service providers*, November p. 20.

45 AGL Media Release, *Sale of NSW electricity assets*, 14 December 2010.

46 AGL Media Release, *AGL launches new offer to NSW electricity customers*, 09 March 2011.

47 IPART 2009, *Review of regulated retail tariffs and charges for electricity 2010-2013: Electricity – Final Report and Final Determination*, December, p. 121.

  - Consumer advocacy group *Choice* also operate an electricity retailer comparison website and were paid $60 for ever customer that chose to switch electricity suppliers.
- product differentiation with regard to 'green energy' contracts (i.e. contracts under which a specified proportion of electricity is obtained from renewable energy sources such as solar or wind farms). Around 10 per cent of small business customers surveyed by the Australian Energy Market Commission (AEMC) noted that the offer of green energy contracts was one of the main reasons for having switched to a market contract.[48]

Similarly to the retail electricity market, consumers of waste collection services are likely to show significant inertia in switching to lower cost options. Financial and psychological barriers are likely to be compounded by the relatively small share of waste management costs compared with total business costs. IPART estimates that the average annual electricity bill for NSW business customers was around $2700 in 2011-12.[49] Latest estimates indicate that the average annual waste management bill for NSW business customers is likely around $1600 in 2010-11, although this is highly skewed as there are many small businesses.[50] It is therefore likely that businesses will need to be approached to switch to alternative options despite the potential net financial benefits of doing so.

Productivity losses for business — increased time and money

Waste management costs represent only a very small share of total business costs, making it likely that consumer inertia will prevent many businesses from altering their current waste management practices without prompting. However survey evidence consistently suggests that the largest perceived barriers to recycling by business are related to cost, and most importantly the opportunity cost of time.

- A business survey undertaken by the University of Nebraska found that 53 per cent of small businesses and 62 per cent of large businesses perceived cost to be the main barrier to recycling and reducing waste. Time was also an important consideration with 40 per cent of small businesses and 46 per cent of large businesses citing this barrier.[51]

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48 Wallis Consulting Group 2007, *AEMC Review of Competition in the Gas and Electricity Retail Markets: Consumer Research Report*, October, p. 44.

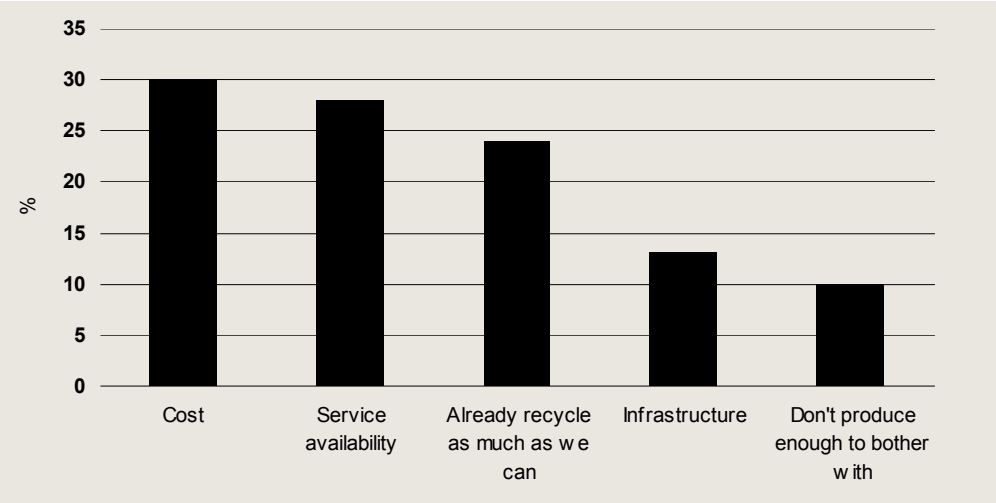
49 Independent Pricing and Regulatory Tribunal 2011, *Changes in regulated electricity retail prices from 1 July 2011*, Final Report, June, p. 12.

50 Based on the estimate of total cost of $1.1 billion from Waste Management and Environment Media 2011, *Inside Waste Industry Report 2011-12*, p. 88 and the number of businesses in Australia.

51 Thompson, E., Pan, M. and Buland, C. 2005, *Estimating Demand for Business Recycling Services in Two Nebraska Cities*, prepared for WasteCap Nebraska and The Nebraska Department of Environmental Quality, December.

- A recent survey of businesses within the Australian Capital Territory also found that monetary and time costs were the most common perceived barrier to C&I recycling (chart 6.2).[52] However, the cost of time was seen as a much larger barrier than monetary costs. Twenty one per cent of businesses saw the cost of time to recycle as a barrier to recycling. This includes factors like 'it takes too much time and effort', 'it is easier to put with general waste', and the inconvenience of separating and sorting recycling. The direct cost or expense of recycling was reported as a barrier to recycling for just 8 per cent of businesses.

6.2 **Principal barriers to recycling — ACT business survey** 2010



Data source: Inovact Consulting (2010), *Increasing Recycling by Business in the ACT: An analysis of barriers from the perspectives of businesses and waste service providers*, November.

Relatively few cost–benefit studies have been conducted on government imposed regulations related to recycling. Despite survey evidence suggesting that time costs to waste generators are a significant barrier to increased business recycling rates, studies have generally focused on quantifying the relevant collection, transport, sorting and processing costs to waste collectors only.[53] However, some cost–benefit studies have attempted to quantify compliance and start-up costs to waste generators.

- A cost benefit analysis undertaken on the Queensland Waste Disposal Levy estimated that waste generators would incur ongoing compliance costs of

[52] Inovact Consulting 2010, *Increasing Recycling by Business in the ACT: An analysis of barriers from the perspectives of businesses and waste service providers*, November p. 19.

[53] See for instance, Covec 2007, *Recycling: Cost Benefit Analysis*, prepared for Ministry for the Environment, April and HF&H Consultants and Cascadia Consulting Group 2010, *Cost Study on Commercial Recycling*, prepared for California Department of Resources Recycling and Recovery, June.

$1.7 million per annum and an initial start-up cost of $2.3 million.[54] It is unclear whether this includes the full productivity cost of compliance with the waste levy.

- A cost–benefit analysis of South Australia's Waste Strategy 2005-10 estimated the opportunity costs to waste generators due to home composting from bans of material to landfill. However, this figure was not able to be individually distinguished. It does not seem that business productivity costs were incorporated specifically into the analysis.[55]

While a US cost benefit study on mandatory container deposit legislation attempted to quantify the time costs to households in returning bottles,[56] a similar study in Australia did assess the additional costs of consumers' time.[57] Greater quantitative analysis on the costs inside NSW businesses of recycling would be useful to better understand the potential for greater source separation.

Lack of recycling services and facilities

Survey evidence suggests that price and productivity considerations are important economic motivators. However, a lack of recycling services and facilities were also found to be important barriers to business recycling. The NSW OEH has noted that,

> Many businesses within the C&I sector receive a single waste collection service. This service collects waste of mixed composition and as there is a lack of infrastructure within the C&I sector to manage mixed wastes, this is a key constraint for increased recycling rates and for achieving the WARR Strategy targets.

The abovementioned survey of ACT firms also suggested that service availability remains a key barrier for commercial and industrial recycling. Twenty eight per cent of businesses surveyed said that a lack of service availability was the largest barrier to recycling.

For a further 13 per cent of businesses, inappropriate onsite facilities are the principal barrier to their business increasing the amount of waste they recycle (chart 6.2). This includes a lack of bins, the variety of bins offered, lack of access to bins, lack of space or storage room and a general lack of facilities or services.[58]

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54 Synergies Economic Consulting 2010, *Cost Benefit Analysis of an Waste Disposal Levy in Queensland*, Final Report, October.

55 BDA Group 2007, *South Australia's Waste Strategy 2005-2010, Ex-ante Benefit Cost Assessment, Volume 2: Technical Report*, prepared for Zero Waste South Australia, September.

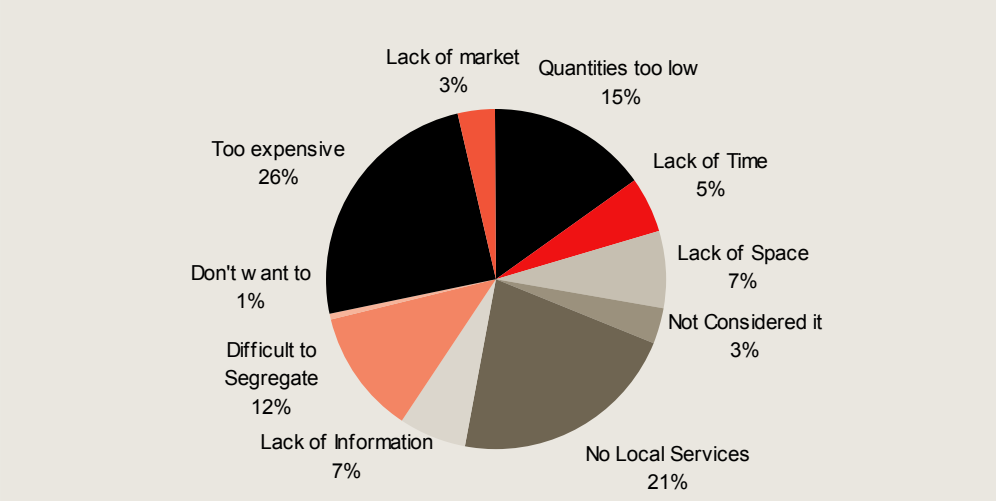
56 Porter, R. 1978, *Social Benefit-Cost Analysis of Mandatory Deposits on Beverage Containers*, University of Michigan, February.

57 Institute for Sustainable Futures 2001, *Independent Review of Container Deposit Legislation in New South Wales*, University of Technology, November.

58 Inovact Consulting 2010, *Increasing Recycling by Business in the ACT: An analysis of barriers from the perspectives of businesses and waste service providers*, November p. 25.

A survey run by Planet Ark in 2008 revealed that a lack of facilities was a major reason provided by business for not recycling.[59] Also, a recent survey of over 1500 Welsh firms found that besides cost (26 per cent), lack of local services was the second most common (21 per cent) perceived barrier to recycling waste. It was also suggested that an internal lack of space for recycling was significant (chart 6.3).

6.3 **Barriers to recycling**



Data source: Scholes, P., Areikin, E., Davey, A. (2009), *Survey of Industrial & Commercial Waste Arisings in Wales*, prepared for Environment Agency Wales, May, p. 49.

Willingness of pay for corporate sustainability

Despite numerous barriers to the uptake of separated collection, a recent international study found that an increasing percentage of companies have sustainability on their corporate agenda.[60] Of the companies surveyed, 62 per cent had a strategy for corporate sustainability, up from just over half in February 2008. Further, companies are increasingly measuring and reporting on their sustainability performance.

Consistent with rising disclosure of corporate social performance generally is increased reporting on waste and recycling in particular. A recent study of 20 large Australian companies[61] found increased reporting on ecological/environmental

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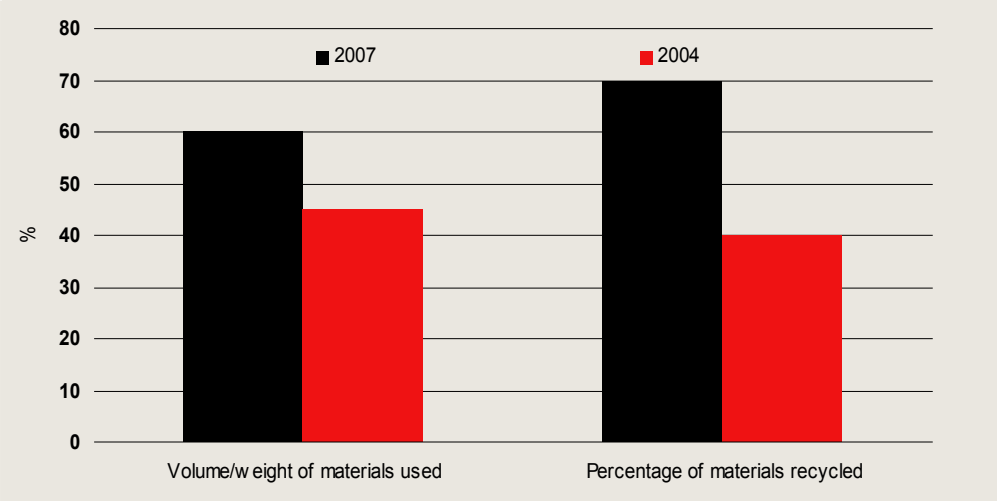
59 Planet Ark and Pollinate 2008, *Barriers and Opportunities for Recycling and Going Green in Small to Medium Businesses*, October p. 9.

60 KPMG International 2011, *Corporate Sustainability: A progress report,* in cooperation with the Economist Intelligence Unit, p. 13.

61 The 20 companies surveyed include: Amcor Ltd., AGL Energy Ltd., BHP Billiton Ltd., Bluescope Steel Ltd., Brambles Ltd., CFS Retail Property Trust, Foster's Group Ltd., Kingsgate Consolidated Ltd., Leighton Ltd., Lihir Ltd., Nufarm Ltd., Orica Ltd., Origin

resource preservation.[62] Specifically, in 2007 12 and 14 companies disclosed the volume or weight of materials used and the percentage of materials recycled respectively. This compares to 9 and 8 companies disclosing this information in 2004 (chart 6.4).

6.4 **Percentage of companies reporting on waste management and recycling**



Data source: Ahulu, H., Kotey, B. and Al Farooque, O. (2010), *Advances in Environmental Reporting among Australian MNEs using GRI Guidelines*, prepared for the 2nd International Conference on Corporate Governance, December, Hyderabad, India.

The trend towards corporate sustainability reporting is being driven by regulatory requirements, corporate brand enhancement and risk management objectives. A survey ran by Planet Ark in 2008 revealed that the following factors were driving large companies to implement recycling initiatives:

- corporate image (81 per cent for businesses with more then 20 employees);
- customer pressure (46 per cent); and
- competitors undertaking similar initiatives (25 per cent).[63]

Enhancing public image has also been found to be the main motivating factor of recycling construction and demolition material in the United States. Cost savings and legal mandates were a distant second and third. [64]

Energy Ltd., Oxiana Ltd., Qantas Airways Ltd., Rio Tinto Ltd., Santos Ltd., Telstra Corp. Ltd., Transfield Services Ltd and Westfarmers Ltd.

62 Ahulu, H. Kotey, B. and Al Farooque, O. 2010, *Advances in Environmental Reporting among Australian MNEs using GRI Guidelines*, prepared for the 2nd International Conference on Corporate Governance, December, Hyderabad, India.

63 Planet Ark and Pollinate 2008, *Barriers and Opportunities for Recycling and Going Green in Small to Medium Businesses*, October, p. 8.

64 Associated General Contractors of America 2004, *Internal Survey*, May–June.

Given the increasing prominence of environmental and waste management reporting by corporates and the broader objectives of these activities, an increased propensity for large businesses to partake in separated waste collection is likely. As stated by the Productivity Commission:[65]

> In some cases, firms will choose to recycle even if it is a more costly option, because of a desire to demonstrate 'green credentials' to the community, or because of the preferences of staff.

Willingness to pay according to business size

The extent to which corporate sustainability goals and other financial factors play a role in the waste generator's recycling decisions will vary according to business size.

- The University of Nebraska found that around 40 per cent of large businesses were willing to pay recycling fees or purchase equipment to recycle, and close to 60 per cent were willing to devote man-hours to recycling. Smaller firms were much less likely to purchase recycling equipment or pay for fees, and were willing to devote man-hours at a rate of about 25 per cent.
- The ACT survey asked respondents if they were willing to voluntarily pay more for waste services to increase the amount of recycling. It was found that large businesses with more than 25 staff were significantly more likely to be willing to pay 50 per cent more than businesses with only 1 to 10 staff.

Waste collectors in NSW indicated that most businesses, even large businesses, wanted to increase recycling and obtain financial gain.

Aside from decreased willingness to pay for recycling services, small businesses are likely to face more constraints in maintaining dual collection systems given an increased proportional demand for space. It is also noted that for many small businesses waste management is disconnected from their operations given that they are located within larger complexes with centralised services. These businesses do not contract services directly and are less likely to have increased recycling over the last five years.[66]

Recycling motivators by business size

The 2008 Planet Arc survey indicated that smaller businesses were more likely to be influenced by the business owner or manager's personal views on the environment (89 per cent for businesses with two to five employees as compared with 62 per cent of businesses with 20 or more employees). As discussed above larger businesses were

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65 Productivity Commission 2006, Waste Management, Inquiry Report No. 38, p. 90.

66 Inovact Consulting 2010, *Increasing Recycling by Business in the ACT: An analysis of barriers from the perspectives of businesses and waste service providers*, November, p. iii.

more likely to be influenced by concerns about corporate image, government regulation and competitor's actions.

The ABS estimates that 57 per cent of businesses in NSW were non-employing in 2007. A further 28 per cent of businesses had between one and four employees. As such, for the vast majority of NSW businesses, the business owner or manager's personal environmental views are likely to be extremely important to observed recycling rates. For these businesses, the decision making process is likely to be more closely aligned to that of households.

7 *Infrastructure constraints*

This chapter discusses some of the views expressed regarding the infrastructure needs of the industry and some barriers to investments in such infrastructure.

Existing capacity constraints

The amount of materials that is recyclable is in general able to be increased through greater source segregation and the use of new methods of recovery. Greater source segregation enables simpler and less expensive processing of the segregated waste, including organics. However, where there is limited scope for further source segregation then increased recycling rates can only be achieved by new facilities that can process this mixed waste stream.

As we have noted earlier, there appears to be limited scope for significant increases in source separation of C&I waste for small businesses. This is largely due to the limited financial incentive for many C&I waste generators to separate their waste at source. Therefore, it appears that additional investments in facilities that can process waste is likely to be a key factor in increasing the proportion of recycled materials from C&I waste.

This view is supported by a number of industry commentators. As one industry commentator recently argued,

> If we are going to get C&I waste under control we need big initiatives: new infrastructure, significant price signals for market investment, price signals that benefit infrastructure operators and real incentives for generators to separate their waste.[67]

The Wright review commissioned by NSW Planning in 2009 also noted that current infrastructure constraints were a key factor that limited further recycling in the C&I sector. In Wright's view, of most importance for the organic components of C&I waste is whether or not AWT capacity will be available to accept C&I waste. In the past AWT's have accepted some level of waste from the C&I sector, however, this is no longer the case. Therefore, unless new AWT facilities are constructed to deal with the putrescibles waste stream from the C&I sector then this material will be sent to landfill.

The second area capacity issues may arise is in MRFs and dirty MRFs.

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[67] Mike Ritchie 2011, *Is education wasted on C&I?*, September, http://www.ben-global.com/Waste/Forum/39.aspx, Accessed 10 October 2011.

- The ability to access MRFs at current prices has been implicitly assumed in considering source separation in chapter 5. Some waste operators indicated that accessing MRF infrastructure for C&I waste was sometimes problematic and that major investment in extra capacity would be required.
- Dirty MRFs have been factored into the option to undertake a single collection and then sort in chapter 5. This infrastructure does not currently exist.

The waste operators that we interviewed for this project also supported the view that capacity constraints in existing processing facilities were a key factor holding back further segregation. Waste operators also noted that there is likely to be a lagged response to the increases in the levy.

- Businesses in the C&I sector can take time to introduce new practices, for example, that encourage separation of waste materials.
- It takes time to establish new facilities (e.g. selection of optimal site, planning approvals, construction time).

There are currently a number of MRFs that accept material from the C&I sector. However, a number of stakeholders considered that there was insufficient MRF capacity to increase C&I separated collection. This infrastructure will take time to roll out regardless of whether the levy continues to increase.

Barriers to additional investments

There is substantial interest from waste collectors in expanding processing facilities to take C&I waste. However, this interest has not resulted in many decisions to invest in these facilities as yet, or decisions to obtain planning approval for new facilities. The only operator that we are aware of that has sought planning approval for a new C&I processing facility is Remondis, which is currently in the process of receiving planning approval to construct a waste processing facility at Cammelia.[68] The proposed facility would be capable of annually processing up to 100 000 tonnes of C&I waste and 50 000 of food and green waste. The facility is not expected to be operational for several years as obtaining approval and construction takes time (and given the need for remediation work on the site).[69]

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68 Remondis, http://www.remondis.com.au/fileadmin/user_upload/remondis_au/downloads/REMONDIS_Recycling_Facility.pdf, Accessed 9 September 2011.

69 The Quarry Pty Ltd (part of the Dial-A-Dump group) received planning approval in 2009 to for a waste processing facility in Eastern Creek. However, this facility is expected to mainly receive waste from the Construction and Demolition sector as well as some green waste. More information on this proposal is available from http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=89.

Secure source of supply

There are a number of possible factors limiting further investments in new processing facilities. One factor noted in the Wright review was the need for long term contracts to support new investments. The review commented that:

> The increasing NSW *Waste and Environment Levy* should quickly propel further growth in (relatively inexpensive) recovery and recycling of *dry* C&I waste. The scope for a large reduction in C&I waste disposal to putrescible landfill however is much less clear. Development of C&I putrescible waste processing infrastructure is contingent on speculative investment in AWT capacity to meet a demand which does not presently exist. And investment must rely on active commercial decisions by business waste generators to have their waste processed rather than sent to landfill.
>
> The *Waste and Environment Levy* increase will progressively pitch the landfill gate price at a level that is sufficiently higher than the AWT gate price to capture the interest of a proportion of putrescible waste generators. However, the current commercial framework for business waste recycling is such that investment by waste processing contractors in facilities for C&I waste processing carries substantial business risks. Such AWT investment would generally need to be made without the benefit of the long term, procurement framework that exists for municipal sector waste processing. Yet demonstrated, continuing demand is required to make these sorts of investment projects bankable. The need for real demand is especially critical in the current economic conditions.
>
> The most likely medium-term outcome, when landfill gate prices increase to parity with AWT gate prices (or beyond) is the development of merchant AWT facilities to serve multiple clients. Such facilities would most likely apply gate fees that incorporate a premium for business risk. [70]

Currently the model that AWTs work to is to build capacity only once long term contracts are in place for that capacity. This restricts the ability of businesses to access capacity because a single business (unlike a council) does not generate enough waste and businesses do not typically want to lock into such long term arrangements, particularly for something that is not a major cost item. An alternative is that collectors contract with AWTs and take the risk on being able to access materials from their customers.

As noted in the Wright review of landfill capacity, it is likely that AWTs will consider alternative models of contracting as the landfill levy becomes higher. The higher the landfill levy the greater the ability of AWTs to be able to earn a return on risks they take to provide services to the C&I sector. Note that existing AWTs have performed poorly financially and that this has made the sector more risk averse than might originally have been the case.

Those waste operators interviewed for this project also supported the view that long term contracts were typically required *prior to* any investment decisions being made. As noted previously, in the C&I sector contracts for the collection of waste were often

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70 Wright Corporate Strategy 2009, *Public Review: Landfill Capacity and Demand,* prepared for NSW Government, March, pp. 6-9.

short term in nature (e.g. often less than one year) for smaller waste generators. Medium term contracts (3 to 5 years) were likely to be more common for larger waste generators such as shopping centres. It is not clear whether investors would be willing to invest in processing facilities without longer term contracts.

One exception to this is likely to be where the investor currently also operates in the waste collection market and, therefore, has a greater control of their supply of waste materials for the facility.[71] Another exception to this may be where an investor does not have to rely on bank borrowings to finance investments[72] — in the current economic environment banks appear to be seeking greater security for borrowings.

Policy and planning uncertainty

The extent to which these facilities will be constructed in the near future is uncertain. Waste operators noted that there was significant uncertainty regarding the extent to which a new government in NSW would remain committed to the waste levy and recycling targets. There was reluctance for operators to make large (irreversible) investments that had the potential to become 'stranded' if government policies changed following the recent NSW election. This political risk is likely to have been a strong deterrent for new investments in the waste sector over the past few years.

Historically, waste operators interviewed argued that there was significant planning uncertainty which imposed additional cost on the investment. The introduction of Part 3A (in 2005) which gave the planning minister consent authority for major projects appears to have alleviated some of this uncertainty for investments in the waste sector.

The recent changes to the planning environment may also result in additional uncertainty. For example, in regards to the new facilities being proposed by Remondis even though the application was made under Part 3A, the application may still be required to be referred to the newly formed Planning Commission for resolution. Further, waste operators generally believed that plans to engage more with local councils could result in a more drawn out (and more costly) approvals process.

Uncertainty regarding the quality of waste stream

The diversity of the waste stream from the C&I sector was also believed to be a factor that has limited further investments in the MRFs and dirty MRFs. Waste operators consulted in this project perceived this diversity as resulting in a higher waste

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71 Remondis' current proposed facility in Cammelia, for example, will be fed predominantly from supply from its waste collection business.

72 VISY, for example, can access finance from its private owners rather than relying on borrowings from financial institutions.

processing cost (per unit of recycled materials) compared with process waste from the household sector. Although as the levy rises in the future it is expected that these facilities are likely to become viable even with a more diverse waste stream.

8 *Impacts of the levy on C&I recycling*

- **Financially, separated collection is generally beneficial for businesses and other organisations in the C&I sector**

Additional collection costs from source separation are likely to be small across most business types and locations. Avoidable disposal costs are large, reflecting the waste levy and high landfill costs, particularly in metropolitan areas. This means that there are typically savings for waste generating businesses from source separating their materials.

- **Financial gains are not large**

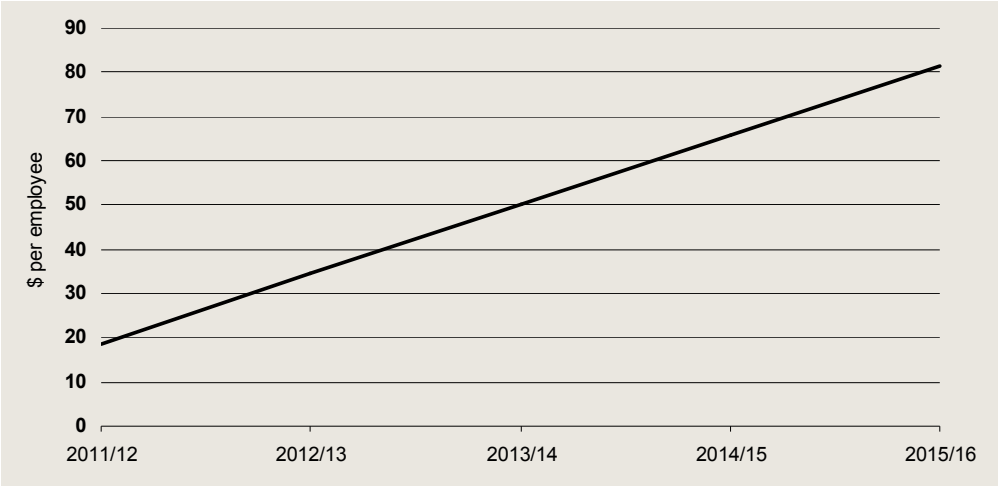
Waste costs are not a major business cost averaging around $325 per employee in NSW. *Reductions* in waste costs available from separated collection are an even smaller amount for businesses. Business scale increases the available gains and makes it worth allocating time to avoid waste costs.

The small scale of costs limits the incentives for businesses to actively seek to reduce their waste disposal to landfill. This implies an important role for waste collectors in encouraging source separation and/or undertaking their own sorting.

- **The increase in the levy will make financial gains larger**

The levy is scheduled to increase by $11.90 per tonne in 2011-12 and by $10 per tonne per year from 2012-13 to 2015-16. Assuming constant levels of waste generation within NSW, this will impose an additional annual average cost to businesses of $173 million over the five years to 2015-16. This equates to $255 per business or $50 per employee per year on average over these five years. The additional costs in 2011-12 would be small at less than $20 per employee, rising to over $80 per employee by 2015-16 (chart 8.1). These additional costs do not represent a substantial increase and are therefore likely to have limited effects on business decision making in the absence of marketing programs by waste collectors.

8.1 **Additional cost to business of scheduled levy increases**



Data sources: ABS, *NSW State and Regional Indicators*; ABS, *National Regional Profile, NSW, 2005-2009*, NSW OEH provided data and CIE calculations.

- **C&I waste collectors are marketing recycling to business**

Waste collectors have a key role in increasing recycling in the C&I sector as they are best placed to aggregate the available financial gains. Waste collectors can act either to market source separation or separate mixed waste collections themselves.

Currently, waste collectors do actively market recycling options as this allows them to offer more competitive prices. Such marketing is currently restricted to medium and large waste generators.

Marketing costs for C&I collectors to encourage change are likely to be significant, potentially much higher than the $200 per customer found for retail electricity. Partly this reflects business-specific quoting and the need to understand the materials likely to be collected from a business

There is not much incentive for waste collectors to market to smaller businesses due to the costs of marketing and overcoming small business inconvenience costs. Collectors are unlikely to be able to take on the role of councils for municipal waste as they have to persuade each customer of the merits of source separation and small business customers are not likely to sign contracts for over a year. Reflecting this, we expect that for small waste generating businesses waste collectors will be more likely to undertake sorting through dirty MRFs in order to gain competitive advantage.

Marketing is highly effective for larger businesses when combined financial advantage and sustainability advantage can be offered. The levy is an important part of being able to offer financial advantage, although current high material prices also contribute to the financial gains from recycling.

- **More intensive subsequent sorting by collectors is likely to be a more financially viable option than separated collection in many instances**

For smaller businesses, inconvenience costs need to be outweighed by significant cost reductions. For these businesses, collectors are likely to use dirty MRFs to reduce their disposal costs rather than seeking to work with small businesses to undertake separated collection.

- **What is holding back separated collection in the C&I sector?**

A number of large waste collectors expected that recovery rates in the C&I sector would increase rapidly even without any further increases in the levy. This reflects the lags in businesses changing what they do.

Costs within a business could be a significant barrier to businesses taking on separated collection. If this is the case there may be no *total financial gain* from source separating as reduced waste collection costs might be more than offset by higher internal business costs.

There is very little recent information on what businesses actually do and how this differs across business type, size and location in NSW. A survey of businesses offers the opportunity to better understand costs that businesses incur from different waste management options and take stock of current activities of different types of businesses.

There is the potential for small business collections to better leverage off council collections. Many councils already offer small business collection services (including recycling) through their contracted collector. In these areas contracted collectors build in capacity to accept business waste. However, in other cases collectors are not allowed to mix business collections and municipal as part of their municipal contract.

- **What is holding back collectors undertaking their own sorting?**

Waste collectors could likely lower their financial costs through sorting material prior to disposal to landfill to remove materials that can be recovered. This would require setting up C&I dirty MRF facilities that are marginally viable at the current landfill price. The timing of these facilities can take up to three years for project development and planning approval and another 18 months for construction.

Remondis is moving down this path and is seeking approval for a C&I recovery facility in Camellia. Other businesses are likely to pursue similar projects as the levy rises, in order to remain competitive. Smaller players are believed to be pursuing less intensive sorting processes through small scale MRFs, although the extent of these activities is not well understood.

For the larger industry players, the model that they operate under is to seek to lock in waste volumes through long term contracts. Larger waste generators might sign waste contracts of up to five years, but small waste generators will typically use much shorter contracting periods. Even at five years, this is well below the time period used by larger waste management companies for facilities taking municipal

waste (typically over 15 years). These companies will either have to accept a non-contract model, shorter contract periods or use facilities operated by other companies.

A major risk in setting up these facilities is the sale/disposal costs of materials generated. Materials such as paper and plastics recovered from these facilities will have lower value than clean materials. Residuals may be able to be disposed of in class 2 landfills, which are cheaper than class 1 landfills. Industry indicated that there was substantial risk around how much this saving might be and that this saving was a key driver of the commercial gain from a dirty MRF.