

Getting *more* ▶▶▶▶

from our
recycling systems

Good practice performance measures
for kerbside recycling systems



recycling systems ▶▶▶▶




Department of
Environment and Conservation (NSW)





Published by
Sustainability Programs Division
Department of Environment and Conservation (NSW)

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This publication was commissioned as a joint project by the NSW
Government and Industry under the National Packaging Covenant.

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Acknowledgement

The Department of Environment and Conservation (NSW) and the NSW Jurisdictional Recycling Group wish to thank the following Councils for their participation in the research project:

Ashfield, Auburn, Bankstown, Baulkham Hills,
Blacktown, Botany Bay, Camden, Canterbury,
Canada Bay (Drummoyne), Fairfield, Hornsby,
Hurstville, Kogarah, Ku-ring-gai, Leichhardt,
Liverpool, Manly, Marrickville, Parramatta,
Penrith, Pittwater, Rockdale, Ryde,
Sutherland, Warringah, Woollahra.

ISBN: 1 920887 09 1

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February 2004



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Acronyms and glossary of terms

| | |
|------------------------------|---|
| Council administration costs | Operating costs such as wages, infrastructure, insurances, telephones, and supporting services |
| DLG | Department of Local Government |
| Gross contamination | Contamination that is caused by the incorrect disposal of waste material by households in their recycling containers |
| Gross yield | The entire quantity of recyclables diverted from the waste stream, inclusive of all contamination and glass breakage expressed as tonnage/household/annum. |
| HDPE | High density polyethylene, used to make such products as milk bottles, pipes and shopping bags |
| JRG | NSW Jurisdictional Recycling Group. This is a cross sectoral group of industry, state and local government members, which develops and implements NSW projects under the National Packaging Covenant. |
| MGB | Mobile garbage bin |
| MRF | Materials recovery facility |
| NEPM | National Environment Protection Measure |
| NESB | Non-English speaking background |
| Net diversion rate | The diversion of material from landfill and other disposal after accounting for gross contamination. Net diversion = Net yield ÷ Total waste generation. |
| Net Yield | The total quantity of recyclables after gross contamination is accounted for (Net yield = Gross yield – Gross contamination) |
| Participation rate | The proportion of households (as a percentage of total households) that utilise kerbside recycling services annually |
| PET | Polyethylene terephthalate used to make products such as packaging and soft drink bottles |
| Presentation rate | The proportion of households (as a percentage of total households) that put out their recycling bin for emptying on any given collection day |
| Total waste generation | The sum of garbage and recyclables generated per household |
| Yield | The amount of recyclables diverted from the waste stream, generally inclusive of all contaminations |

1 Introduction

All Councils in the Sydney, Hunter, Central Coast and Illawarra regions offer their residents a kerbside recycling service for dry recyclables. Many rural and regional Councils also offer this service. 'Dry recyclables' include paper, newsprint, magazines, cardboard packaging, liquid paperboard, PET and HDPE plastics, glass bottles and jars, and steel and aluminium cans and containers. Ongoing debate about the merits and performance of various collection systems has indicated an increased desire by Councils to be able to measure their own performance and compare it with that of other Councils.

In order to plug this information gap and to help Councils deliver better kerbside recycling systems, the NSW Jurisdictional Recycling Group (JRG) of the National Packaging Covenant decided to establish what good kerbside recycling practices looked like. The JRG recognised that performance benchmarks for NSW Councils for kerbside collection of dry recyclables will assist broader government programs, in particular, the work of the Sustainability Programs Division of the Department of Environment and Conservation (NSW), which is responsible for assisting Councils to improve all aspects of their waste management and resource recovery systems, including kerbside recovery of dry recyclables.¹

1.1 The JRG research project

The JRG initiated a research project to establish performance benchmark measures for kerbside recycling using joint industry and state government funding committed under the National Packaging Covenant. The research was undertaken by Nolan-ITU Pty Ltd in late 2002 and reported in September 2003. The key findings are provided below.

The aim of the project was to establish 'good practice' performance measures for key elements of kerbside recycling systems in order to assist Councils to deliver more effective and efficient systems.

The term 'best practice' is not being used as it implies that there is a homogenous system and community. The term ignores variables like population demographics; cultural and social mixes; economic differences across regions; and geographical and urban development that can affect the structure and performance of a recycling system. Despite this, the JRG felt that it was possible to at least establish a picture of what 'good practice' looks like.

Nolan-ITU surveyed 21 metropolitan Councils that volunteered for the survey. These Councils primarily represented higher performing Councils identified in the Recycling Contract Review carried out by the (former) NSW EPA in 2000, and a number of other Councils that were achieving relatively high yields according to either the Nolan-ITU or EPA databases. The project aimed to establish a regional NSW benchmark as well, but only three Councils volunteered and this was insufficient to establish performance bands.

The project also involved face-to-face interviews with waste officers from 15 Sydney Councils to discuss their recycling systems; structures and approaches, in order to establish common patterns or elements that seemed to deliver improved performance.

The project attempted a statistical analysis to identify any clear correlation between a range of demographic factors and recycling system performance to establish

¹ The responsible department at the time of this project, Resource NSW, is now part of the Sustainability Programs Division of the Department of Environment and Conservation (NSW)

common patterns or elements that seemed to influence improved performance. Unfortunately, no common pattern or element, which would provide clear guidance to Councils for future action, was identified.

The good practice measures established by this research are preliminary. At this stage, they are based on data from the 21 Sydney metropolitan Councils that volunteered for this project. In some cases the National Environment Protection Measure (NEPM) data for all metropolitan Councils were used to adjust the research findings. In all cases, more data is needed from all Councils to verify and, where necessary, adjust these preliminary performance measures.

No Council is specifically identified in this benchmarking work and participating Councils were assured that their individual data would only be published in an aggregated form with their data used only to identify performance bands.

1.2 What is in this document

| | |
|-------------------|--|
| Section 2 | A summary of the key findings |
| Section 3 | <p>Good practice performance measures for five key indicators of kerbside performance, based on data from half of the Sydney metropolitan Councils. In most cases, a minimum performance level (baseline) is proposed as well as a good practice target. The five key aspects are:</p> <ul style="list-style-type: none"> – Household net yield (kg/hh/wk) and per capita net yield (kg/pp/wk); – Net diversion rates (%); – Contamination rates by the householder; – Service cost per household (\$/hh/year); and, – Tonnage cost (\$/tonne). |
| Section 4 | <p>Additional performance measures, including,</p> <ul style="list-style-type: none"> – Advice on best performing kerbside collection systems in terms of recyclables diversion; – Preferred bin colours, which will provide a more standardised garbage and recycling system throughout NSW; and, – The preferred minimum range of materials that should be included in kerbside recycling systems. |
| Section 5 | Findings from in-depth interviews with 15 Councils to identify characteristics of Council structures and services that deliver good results. |
| Section 6 | An opportunity to participate in the establishment and verification of performance bands for each of the measures for all NSW Councils offering kerbside recycling services. |
| Appendix 1 | The methodology used. This will enable your Council to appreciate how we calculated the performance measures. |

1.3 Next steps

This research fills an important gap in our knowledge and will assist Councils to assess their performance within the bigger picture. However, this research is only the beginning. The performance measures will be improved and refined over time as more data becomes available from Councils, particularly in the Hunter, Central Coast, Illawarra and regional areas of NSW.

If sufficient data is received from Councils, the Department of Environment and Conservation (NSW) intends to periodically collate and publish Councils' performance against each of the performance measures identified in this document. The Department is offering to calculate any Council's performance against these measures on request (**see Section 6**). Alternatively you may choose to do your own calculations and provide the results for verification of the performance bands.

2 Summary of key findings

The limited availability of good quality data meant that good practice measures were only developed for service areas for which sufficient and reasonable data was available. From the available data, 'net diversion' (total proportion of domestic waste diverted to the recycling stream) was found to be the strongest measure of kerbside recycling performance. Some Councils are achieving net diversion rates of up to 46% of the total household waste stream (garbage, garden organics and recyclables).

Translating net diversion rates to actual net yield results for kerbside recyclables, a number of higher performing Councils were found to be capturing between 0.32 and 0.39 tonnes per household per year.

For those performance areas where sufficient and reasonable data was available, results were ranked into percentiles. The setting of the good practice performance varies across the percentile measures, depending on what is being measured.

Based upon this ranking process, Table 1 below sets out the good practice measures. For most measures, a minimum (baseline) figure is provided as well as a target for good practice. All of the measures need to be further tested and verified with more data from Councils. It is anticipated that there may also be different performance measures for Councils outside the Sydney metropolitan area. Tonnage cost and contamination rates, in particular, need more verification due to the low response rate and/or availability of data from participating Councils.

Table 1 – Preliminary good practice measures

| Performance Measure | Unit | Description | Potential good practice measure | | Response rate % | |
|---------------------|----------------------------|-------------|---|-------------------------------|-----------------|-----|
| | | | Baseline | Target | | |
| 1 | Household net yield | Kg/hh/wk | Total kerbside recyclables collected per household, excluding gross contamination. | ≥ 4.0 | ≥ 5.5 | 100 |
| | Per capita net yield | Kg/pp/wk | Quantity of kerbside recyclables collected per person, excluding gross contamination. | ≥ 1.5 | ≥ 2.1 | 100 |
| 2 | Net diversion rate | % | Total proportion of domestic waste diverted to the recycling stream. | ≥ 19% | ≥ 29% | 100 |
| 3 | Contamination rate | % | Contaminants placed in recycling bins by householders | N/A | ≤ 3.5% | 100 |
| 4 | Service cost per household | \$/hh/year | Annual cost of collection and MRF acceptance of kerbside recyclables per household.* | Target range = \$24 to \$49 | | 86 |
| 5 | Tonnage cost | \$/tonne | Cost per net tonne of kerbside recyclables collected and accepted at MRF.* | Target range = \$143 to \$225 | | 38 |

* Excluding Council administration costs

Summary of key findings

Following an analysis of the 21 participating Councils and their systems, it was found that Councils most likely to be achieving a better recycling result have the following service attributes:

- 120-litre receptacle per dwelling for garbage and 240-litre split or commingled Mobile Garbage Bin (MGB) per dwelling for recyclables; or a 'three bin' system (garbage, mixed containers, paper);
- Fortnightly recycling collections;
- Collection of PET, HDPE, steel, aluminium, glass, paper, cardboard, and liquidpaperboard;
- An established community education strategy.

Insufficient data was available to enable the drawing of meaningful conclusions and the development of complete good practice measures for the additional service areas of household waste minimisation education, materials quality, and occupational health and safety. Many Councils are only capturing collection quantities and costs.

The 15 in-depth interviews with Councils demonstrated that approaches to total service provision vary widely, taking into account service expectations, geography, demographics, Council resources and administrative requirements. Council approaches to total waste management remain individualised as a reflection of individual waste managers' understanding of their Council's circumstances.

3 Performance measures

Nolan-ITU used a telephone survey method to collect recycling performance data from the participating Councils. The survey was conducted in the second half of 2002 (calendar year), and the data typically relates to the 2001-02 financial year. Table 2 explains how the data is presented in the rest of this section.

Table 2: Data presentation – explanatory notes

| Response rate | Unit | Minimum | 25th percentile | Median (50th percentile) | 75th percentile | Maximum (100th percentile) |
|---|---|-----------------------------|--|---|--|----------------------------|
| Refers to the percentage of participants who could provide a response | The unit of measure. For example, '\$/household/year' | The smallest response value | Indicates ¼ mark of responses from the minimum upwards | Indicates median or middle value of responses | Indicates ¾ mark of responses from minimum upwards, or ¼ mark from maximum downwards | The largest response value |

A number of the performance measures and bands will need to be verified and modified as we receive additional data from Councils. For example, as shown in Table 1, tonnage costs are based on data from only 38% of participating Councils. Others did not have this data.

3.1 Household and per capita net yield

Net yield represents the *total quantity of kerbside recyclables collected (after adjusting for gross contamination)*.² As the number of people per household varies quite significantly in different Council areas, both per capita and per household targets are shown below. Councils may not be able to meet both targets. For example a Council area with small household sizes in the inner city may meet the per capita target and not the per household target. The targets were developed using data from Nolan ITU's survey of 21 Councils in 2002 and the 2002-03 NEPM recycling data recently submitted by 40 Sydney metropolitan Councils. The net yield percentile bands for both data sets are similar. The targets were adjusted slightly from the percentiles presented in Tables 3 and 4, to reflect the distribution for net yield across all Sydney Councils. The tables below are based only on Council data.

Table 3: Household net yield (kg per household per wk)

| Baseline = 4 kg / household / week | | | | | | |
|--|----------|---------|-----------------|--------------------------|-----------------|----------------------------|
| Good practice target = 5.5 kg / household / week | | | | | | |
| Response Rate | Unit | Minimum | 25th Percentile | Median (50th Percentile) | 75th Percentile | Maximum (100th Percentile) |
| 100% | kg/hh/wk | 2.54 | 4.08 | 4.69 | 5.66 | 7.44 |

² Participants found it easy to provide yield measures as all Councils compile data on annual generation and disposal rates for both kerbside recycling and domestic solid waste.

Performance measures

Table 4: Per capita net yield (kg per person per week)

| Baseline = 1.5 kg / per person / week Good practice target = 2.1 kg / per person / week | | | | | | |
|--|----------|---------|-----------------------------|--------------------------------------|-----------------------------|--|
| Response rate | Unit | Minimum | 25 th Percentile | Median (50 th Percentile) | 75 th Percentile | Maximum (100 th Percentile) |
| 100% | kg/pp/wk | 0.083 | 1.52 | 1.88 | 2.37 | 2.72 |

3.2 Net diversion rate

The net diversion rate measures kerbside dry recyclables collection system performance as a *percentage of domestic waste diverted from landfill through the kerbside collection of dry recyclables*. (See Table 5) It accounts for losses due to gross contamination at the kerbside by the householder but does not account for losses from glass fines or other MRF or transportation system losses. It is calculated as shown below. More details on calculations are in **Appendix 1**.

$$\text{Net diversion rate (\%)} = \frac{\text{Annual kerbside dry recyclables MINUS householder contamination at kerbside} \times 100}{\text{Total domestic waste stream, including dry recyclables, residual waste and garden organics}}$$

Table 5: Net diversion rate

| Baseline = 19% Good practice target = 29% | | | | | | |
|--|------|---------|-----------------------------|--------------------------------------|-----------------------------|--|
| Response rate | Unit | Minimum | 25 th Percentile | Median (50 th Percentile) | 75 th Percentile | Maximum (100 th Percentile) |
| 100% | % | 11% | 19% | 27% | 29% | 41% |

3.3 Contamination rate

Contamination is caused by the incorrect disposal of waste material in the dry recyclables container by the householder. The measure does not account for losses during collection or other MRF system losses. Data about contamination at the kerbside may be determined by kerbside audits. Some MRF operators also provide this information to Councils after undertaking audits on a Council specific basis.

Significant variation was observed at the end of Nolan-ITU's telephone survey on the number of Councils that could provide a contamination rate and the method for measuring contamination. The data was revised by Nolan-ITU with the help of the Department of Environment and Conservation (NSW) and JRG. This involved recontacting some Councils; comparison with data from the Department of Environment and Conservation (NSW) and, in some cases, discussion with receiving MRFs. The outcome was a consolidated set of 'best available' data on gross contamination levels only for the participating Councils.

Table 6: Contamination rate at the kerbside

| Good practice target: ≤ 3.5% | | | | | | | |
|------------------------------|------|---------|-----------------------------|--------------------------------------|-----------------------------|--|------------------|
| Response Rate | Unit | Minimum | 25 th Percentile | Median (50 th Percentile) | 75 th Percentile | Maximum (100 th Percentile) | Best Performance |
| 100% | % | 1% | 3.5% | 5% | 7.5% | 14% | ≤ 3.5% |

3.4 Service cost per household and tonnage costs

Service cost per household is a measure of the *annual service cost per household for the collection, transport and sorting of kerbside recyclables*. When combined with the net diversion rate, cost per household is a good measure of efficiency and value for money for all aspects of a kerbside recycling service. Tonnage cost is *the cost per net tonne of kerbside recyclables collected*.

The costs presented in Tables 7 and 8 are typically the annual contractor's fee, including MRF related costs, but excluding Council administration costs. The target ranges are quite broad, as there is substantial variation in how Councils calculate service costs. For example, provision and replacement of containers to collect recyclables may be included in contractor fees or in administration expenditure.

The cost per net tonne of recyclables shows the overall efficiency of the service. However, there was a large variation in results. Figure 1 provides a scatter plot of the data from the 21 participating Councils. There is an outlier of \$61. Eliminating this outlier, the proposed good performance range is \$143 to \$225.

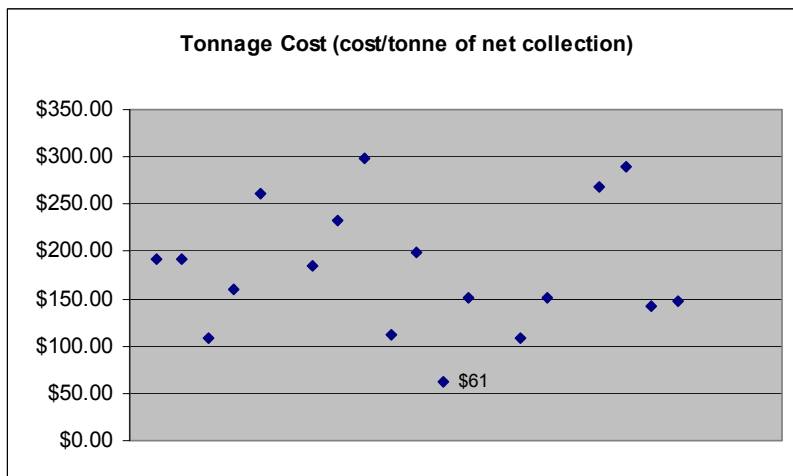
Table 7: Service cost per household per year

| Target range: \$24 to \$49 per household per year | | | | | | |
|---|------------|---------|-----------------------------|--------------------------------------|-----------------------------|--|
| Response Rate | Unit | Minimum | 25 th Percentile | Median (50 th Percentile) | 75 th Percentile | Maximum (100 th Percentile) |
| 86% | \$/hh/year | \$24 | \$36 | \$41 | \$49 | \$69 |

Table 8: Cost per net tonne

| Target range: \$143 to \$225 per tonne | | | | | | |
|--|----------|---------|-----------------------------|--------------------------------------|-----------------------------|--|
| Response Rate | Unit | Minimum | 25 th Percentile | Median (50 th Percentile) | 75 th Percentile | Maximum (100 th Percentile) |
| 86% | \$/tonne | \$61 | \$143 | \$172 | \$225 | \$299 |

Figure 1: Cost per net tonne - Scatter plot



Assistance is sought from Councils in providing a service cost division by area where possible or a summary of what areas are included within their service cost. This information will assist in refining service cost targets in the future. **(See Appendix 1)**

4 Additional performance measures

The additional performance measures in this section have been compiled from the 'good practice' research conducted by Nolan-ITU (the subject of this report) as well as some additional research and analysis of system performance. In most cases, these additional measures align with similar performance measures established in Victoria.

4.1 Best performing kerbside systems

According to another recent study³ undertaken by Nolan-ITU in 2003 for the JRG and the Publishers National Environment Bureau (PNEB), the best performing recycling systems, in order of performance are:

1. Kerbside recycling systems employing fortnightly collection of commingled containers in a mobile garbage bin (MGB) and fortnightly collection of paper/cardboard in a separate MGB.
2. Fully commingled collection in an MGB (commingled containers and paper cardboard) collected fortnightly
3. Separate crates – one for commingled containers and one for paper cardboard

The study also confirms the key findings of the *Independent Assessment of Kerbside Recycling*⁴ that the environmental benefits of kerbside clearly outweigh the financial costs of providing the service. In relation to paper recovery, recycling of paper to make paper provides the most significant environmental benefit.

4.2 Materials for kerbside collection

Materials that should be collected are:

- cardboard packaging and liquidpaperboard;
- newspapers, magazines and phone books;
- glass and aluminium rigid packaging;
- PET and HDPE rigid packaging; and,
- steel rigid packaging;

Councils should also explore the merits of expanding the range of plastics collected at kerbside when contracts come up for renewal.

4.3 Bin colours

An Australian Standard is being developed to provide common requirements for dimensions, design, colour, signage, performance and safety of mobile recycling and waste containers. The Department of Environment and Conservation (NSW) has provided much input into the development of this Standard and is working with Standards Australia as part of a working group of stakeholders. A draft Standard is expected to be ready for comment by mid-2004, with the final Standard planned for release late this year.

³ *Assessment of Domestic Waste and Recycling Systems*, (to be published in early 2004).

⁴ *Independent Assessment of Kerbside Recycling in Australia*, Nolan-ITU Pty Ltd and Sinclair Knight Merz, January 2001

Additional performance measures

To help develop this Standard, the Department of Environment and Conservation (NSW) recently surveyed Sydney Councils to determine the current range of sizes and colours of mobile recycling and waste containers. The survey showed large differences in the range of bin types used by Councils and, in many cases, showed that the same colours are commonly used for entirely different applications.

The Department is of the view that standardised colour coding of mobile recycling and garbage containers provides a number of benefits, including:

- Providing Councils with a standard to reference in contracts;
- Reducing public confusion and making recycling systems user-friendly;
- Facilitating broader-based education initiatives; and,
- Providing consistency among Council and public areas, and within schools and workplaces;

Standardising colour coding of recycling and waste containers should be part of an overall strategy to encourage increased source separation of waste materials and to reduce the levels of contamination within each material stream. Colour coding creates an association between a specific colour and a waste material type, helping shift community waste disposal and recycling behaviour.

The Department would welcome the opportunity to assist Local Government to ensure that bin colour choices are consistent with the impending Australian Standard and to help Councils with the inclusion of appropriate bin sizes, types and colours in collection contracts and service specifications. Councils are encouraged to contact the Department prior to making decisions on bin colour selection or bin purchases. Council support in adopting a consistent approach will assist the delivery of improved outcomes and benefits for all NSW Councils and their communities.

The following bin colours for domestic kerbside recyclables and garbage are preferred at this time. They are similar to those included in the revised best practice guidelines issued by EcoRecycle Victoria.

- Domestic garbage bins should be dark green, grey or black with dark green, grey, black or red lids but red lids are preferred;
- Domestic recyclables (fully co-mingled or containers only) should be green or black bins with yellow lids;
- Blue lids for domestic paper-only bins or sections of bins;
- Organics bins should be dark green or black with bright green/lime lids.

Councils should avoid using corporate colours for bins. Wherever possible bins in public places should reflect this same colour schemes. Where current kerbside collection bins are outside this scope, bin lids should be changed at the start of the next contract or as significant numbers of bins are replaced with appropriate resident education including bin lid messages.

4.4 Education

The 'good practice' study attempted to establish some measure of good practice education provision – either allocation on a per household basis or as a percentage of total budget. This was difficult as the actual education costs relating to kerbside recycling were hard to separate. There also seemed to be wide variation in costs and a single year snapshot would have been misleading since education costs often vary

greatly over time, being strongly focussed around the introduction of new or changed services. As such, no numerical performance measure was established.

Councils should undertake to provide feedback to their community on recycling and waste minimisation achievements. This should include amount of material recovered, waste collection and disposal reductions, and environmental gains (greenhouse gases, resource recovery, water etc.). As many households are unlikely to be aware of other recycling and reuse opportunities beyond kerbside, Councils should promote reduction of domestic waste through other opportunities, including:

- Retail drop off points (e.g., shopping bags, corks);
- Transfer stations (e.g., oil, branches, timber, and metals); and,
- Reuse opportunities (e.g., clothing bins, charities, computers).

4.5 Service complaints

The 'good practice' study also considered establishing a measure for the number of complaints per year per 1,000 households. However, only 50% of Councils could identify a bona fide service complaint from information related calls and new service requests. Councils are encouraged to provide this information, if they have it.

4.6 Material quality

Participants in the 'good practice' study were asked to provide any information they had on the following, relating to MRF performance:

- Materials on sold;
- Input contamination; and,
- Sorting losses.

The majority had little or no data on MRF performance. This is, to some degree, dependent on what the MRF chooses to report to Council. In addition, MRFs also find it hard to differentiate tonnages and contamination when they receive materials from several Councils.

4.7 Occupational Health and Safety

As part of a holistic measure of good practice, Councils were asked to provide yearly data on:

- Lost time Injuries;
- Vehicle accidents (per 1,000 km driven);

The vast majority did not hold or did not have such data reported to them. Councils are encouraged to provide this information if they have it so that good performance measures can be established.

5 In-depth Council interviews

In addition to the benchmarking data, the JRG project also included face-to-face surveys with 15 Sydney Council waste officers to discuss their recycling systems; structures and approaches. This was to establish common patterns or elements that seemed to deliver improved performance.

The interview program covered three categories of Councils:

- Five higher performing Councils (based upon the established measures);
- Five lower performing Councils (based upon the established measures);
- A base-range⁵ group of five Councils not in the original sample of 21 Councils and representing some of the lower performing areas in metropolitan Sydney.

The interviews provided an insight of service beyond the data, clarifying some differences between higher performing Councils and the base and lower performing Councils. Many of these differences were primarily of a demographic nature and hence beyond the direct control of the Council waste managers. The following sections provide a brief description of the overall responses to each question, as provided by Nolan-ITU.

5.1 Garbage collection characteristics

How long have residents had smaller garbage bin/smaller bin option – what is the smallest size available?

The responses suggest that there is some correlation between garbage bin size and good practice performance. The base-range Councils mostly provide 240-litre garbage bins whilst higher performing Councils have moved to smaller garbage bins.

What is the cost variation in different mobile garbage bin (MGB) sizes to residents?

Higher performing Councils tend to have a larger financial penalty for upsizing to a larger bin.

Is the % of potentially recycled material in the garbage bin (recyclable by existing services) known? Are waste audits undertaken regularly? When was the last/how often?

Responses suggest that the higher performing Councils have generally not conducted waste audits in recent times, while the lower performers had all conducted audits within the last two years. It appears that a sentiment of “things are going well” directly influences regularity of audits.

5.2 Kerbside recycling service

How long have the current services been in place? What was the previous service – and how long was it in place?

Apart from the base-range Councils that mostly had the same system in place since before 2000, the response to this question did not seem to differentiate the higher and lower performing Councils.

⁵ This base-range group was identified based on existing NSW EPA and Nolan-ITU databases on kerbside recycling in the State. They represent the lowest performing in metropolitan NSW.

What is the frequency of contractor/collection reports, and what aspects are reported on?

Although there are few differences between the aspects reported on, the higher achieving Councils tended to have a more frequent report/contact with the contractor.

What is the typical % contamination, how is it measured? When was it last measured?

Follow-up with Council has shown that there is often discrepancy or some uncertainty about contamination rates.

What is the average lift weight per bin? Any seasonal variation? What is the average composition?

Accurate bin lift data is not commonly compiled. Also Councils have little interest in seasonal fluctuation. Composition data was not always easily found, but based on the responses, cardboard and paper accounts for 50% to 70% of kerbside recyclables by weight.

Regulatory approaches to recycling service misuse.

Regulatory approaches are mixed across the three categories. Better performing Councils tend to have a more formal procedure for offences.

5.3 Education

Describe the education strategy evolution. How has the budget changed?

Most Councils said that there was an extensive education campaign before, during and after the introduction of new services, with budget significantly reducing following introduction of the new service.

Who is primarily responsible for education strategy? How are targets/audiences determined?

For most Councils, the responsibility rests on an education officer/team, with occasional external inputs. It is a very mixed approach, with some Councils using compiled data to determine targets, whilst others have a more ad-hoc approach.

Do residents receive feedback on recycling performance?

The lower performing Councils appear to be making more of an effort on this aspect than the other two groups.

Is there a proportion of education spent on Non-English Speaking Backgrounds – how?

For Councils where the NESB population is more prominent, interviewees spoke of ways to tackle the issue, such as easily understood brochures.

How is education measured for effectiveness?

Responses are mixed across the three Council categories. The lower performing Councils appear to be a little more focused on trying to measure effectiveness.

5.4 MRF arrangements

What is the charging arrangement with the MRF? Where is it? Who operates? What are the specifications on compaction, how are these measured?

The lower performing Councils tended to indicate that MRF arrangements were the contractors' concern and primarily not an issue for the Council. A majority have some flat fee with penalty for contamination. Compaction rates were flagged as an emerging issue and that penalties on compaction could lead to greater expense in collections.

5.5 Service cost

Are there contractual links with collection/sorting and material disposal? Any performance provisions for collectors or incentives/penalties?

There do not seem to be many disposal incentives in place, but it does appear that the higher performing Councils have introduced, or are close to introducing collection incentives, which in many cases provide some disposal benefits, typically where penalty for contamination exists. The incentives that did exist included a share in any profit on a particular material between Council and collector, or the shared expense imposed by the MRF for higher contamination levels.

5.6 Garden organics collection service

How does garden organics recycling participation rate compare to that of kerbside dry recycling services?

For the majority of Councils this question was either difficult to answer or not relevant. However, at a qualifying level, it is noteworthy that regular kerbside garden organics collections were almost exclusively found in higher performing Councils.

Are there any volume or weight limits? What is the average weight per bin lift? Seasonal influences?

All services have some kind of limit. Average weight of bin lift is not measured, but most flagged a seasonal variation, and the impact of bushfires and prevention awareness increasing the yield of garden organics.

5.7 Other

What is the organisational structure of Council's waste management team?

Organisational structure differed only slightly across responses. All featured a similar backbone of resources/personnel, the major difference being in the provision of additional resources, such as bin inspectors and educators.

What performance indicators for management of the kerbside services exist for Council?

Generally speaking, the higher performing Councils have more complex/whole picture indicators like total generation rather than just diversion rates. The lower performing Councils focused more on base level indicators such as service complaints. Diversion rates are a focus for all Councils.

6 Next step – Building a better picture

The measures established in this document are a good start and will give us something to build on. However, we need a more complete data set to validate and possibly adjust the Sydney metropolitan performance measures and to establish whether different measures are needed for Councils in the Hunter, Central Coast, Illawarra and regional areas.

6.1 Measuring your own Council's performance

Appendix 1 contains the methodologies, which were used to calculate each of the good practice performance measures in this document. This enables you to understand how the measures were calculated. The methodologies are simple and straightforward. Every Council needs to apply the same methodology in measuring its own performance if we are to maintain the integrity of the current set of measures and refine this with consistent data, which are reliable and comparable. The majority of calculations can be based on data already supplied to the government through NEPM reporting or the Department of Local Government survey.

The Department of Environment and Conservation (NSW) would be pleased to calculate the performance of any individual Council using this methodology and provide the results to that Council. There is only a small amount of additional information you would need to supply. Please complete and return the attached form at the end of this document, if you would like us to calculate your performance.

Alternatively, you may prefer to calculate your own Council's performance for all or a range of the performance measures to enable you to see how your own system is performing and improving over time. If you are calculating your own performance, please check that the data and calculations are consistent with the methodologies.

Also, if you calculate your own performance, we encourage you to provide your results to the Department of Environment and Conservation (NSW) so that we can add them into our data set and continue to verify the preliminary performance measures. If sufficient data is received, we will collate and publish performance data for each good practice measure so that Councils can compare their performances.

To avoid additional work for Councils, we will, in the medium term, try to integrate all the data needed to report against these performance measures with other annual data collection processes that Councils are already participating in.

6.2 Proposed additional indicator

Since undertaking this research, we have become aware that we have omitted to collect data on one other important indicator of system effectiveness. This is the recovery rate of dry recyclables recovered for recycling as a proportion of total dry recyclables available, that is, in the garbage as well as the recycling bin. It tells us how much we are still failing to recover.

This means we would need to begin to collate data about what percentage of dry recyclables remain in the garbage stream. Not all Councils have this information because it can only be determined by kerbside audits. If your Council has this data, we would also appreciate you providing it so we can develop bands and include this indicator at a later date.

Appendix 1 – Methodologies

NOTE: Councils already collect much of the data that is required to make these calculations. We have identified the particular source from which we obtained these data to calculate the performance measures in this document.

1. Household net yield (kg/household/week) and per capita net yield (kg/per person/week)

The calculation for household net yield is as follows:

$$\text{Household net yield} = \frac{\text{Total annual net yield dry recyclables collected at kerbside (tonnes)}}{\text{Number of households serviced by recycling collections}} \times \frac{1000}{52}$$

(kg/household/wk)

The calculation for per capita net yield is as follows:

$$\text{Per capita net yield} = \frac{\text{Total annual net yield dry recyclables collected at kerbside (tonnes)}}{\text{Population for the Local Government Area}} \times \frac{1000}{52}$$

(kg/per person/wk)

Explanation of variables and data source:

- Total annual net yield dry recyclables collected at kerbside (tonnes) (2002-2003)
 - Tonnes of dry recyclables collected at kerbside via a formalised collection, usually weekly, fortnightly or monthly, excluding gross contamination.
 - Gross contamination is contamination that is caused by the incorrect disposal of a waste material in the recycling container by the household. Data about gross contamination at kerbside may be determined by kerbside audits. Some MRF operators also provide this information to Councils after undertaking audits on a Council specific basis.
 - Does not include garden organics and materials recovered from clean-up style collection such as white goods and scrap metals. It does not include drop-off, bottle banks or community group recycling.
 - Data Source: NEPM/EPA form 2002/2003 – sub section 9: Residential kerbside recycling collected (in tonnes). A total of the tonnes of kerbside dry recyclables is required for all the material categories for paper, cardboard, liquid paperboard, glass, plastic containers, aluminium cans and steel cans and tins. Other material codes should be excluded such as garden organics, vehicle batteries and “other (please specify)” categories. Gross contamination (tonnes) is then subtracted to give a net yield.
- Number of Households serviced by recycling collections (2002-2003)
 - Data Source: NEPM/EPA form – sub section 6. ‘Number of premises/households serviced by recycling collections – Residential’.
- Population total for Local Government Area (2002-2003)
 - Data Source: NEPM/EPA form – sub section 2. ‘Residential Population’.

2. Net diversion rate (%)

The calculation for net diversion rate is as follows:

$$\text{Net diversion rate (\%)} = \frac{\text{Total annual net yield dry recyclables collected at kerbside (tonnes)} \times 100}{\text{Total domestic waste stream}}$$

where,

| | |
|-------------------------------|--|
| Total domestic waste stream = | $\left\{ \begin{array}{l} \text{Total annual domestic waste to landfill collected from kerbside (tonnes)} \\ + \\ \text{Total annual dry recyclables collected at kerbside (tonnes)} \\ + \\ \text{Total annual garden organics collected from kerbside (tonnes)} \end{array} \right.$ |
|-------------------------------|--|

Explanation of variables and data source:

- Total annual net yield dry recyclables collected at kerbside (tonnes) (2002-2003)
 - Tonnes of dry recyclables collected at kerbside via a formalised collection, usually weekly, fortnightly or monthly, excluding gross contamination.
 - Gross contamination is contamination that is caused by the incorrect disposal of a waste material in the recycling container by the household. Data about gross contamination at kerbside may be determined by kerbside audits. Some MRF operators also provide this information to Councils after undertaking audits on a Council specific basis.
 - This does not include garden organics and materials recovered from clean-up style collection such as white goods and scrap metals. It does not include drop-off, bottle banks or community group recycling.
 - Data Source: NEPM/EPA form 2002/2003 – sub section 9: Residential kerbside recycling collected (in tonnes). A total of the tonnes of kerbside dry recyclables is required for all the material categories for paper, cardboard, liquid paperboard, glass, plastic containers, aluminium cans and steel cans and tins. Other material codes should be excluded such as garden organics, vehicle batteries and “other (please specify)” categories. Gross contamination (tonnes) is then subtracted to give a net yield.
- Total annual domestic waste to landfill collected from kerbside (tonnes) (2002-2003)
 - All household waste placed on the kerbside for collection by Council or Contractor at regular intervals e.g. weekly or fortnightly. This excludes clean-up type waste that may be collected from the kerbside on a quarterly, six-monthly or annual basis.
 - Data Source: DLG form – sub section I. Domestic Waste disposed of to landfill – converted from kilograms to tonnes.
- Total annual garden organics collected from kerbside (tonnes)
 - Data Source: DLG form – sub section e: Total kilograms of domestic garden organics collected from the kerbside only *converted from kilograms to tonnes*.
 - Data to be sourced from weighbridge dockets or records from reprocessors/recyclers for domestic garden organics collected from the kerbside as a separate regular service (i.e., bin based or bundled on a weekly, fortnightly and monthly basis only). All other recycling should be excluded for instance: Commercial and dry recyclables should be *excluded*. Garden organics may include other organics, which are collected separately with garden organics e.g., compostable food.

3. Service cost per household (\$/household/year)

The calculation for service cost per household is as follows:

$$\text{Service cost per household} \text{ (\$/household/year)} = \frac{\text{Total annual cost for recycling collection/reprocessing of kerbside recyclables} \text{ MINUS } \text{revenue from sale of materials}}{\text{Number of households serviced by recycling collections}}$$

Explanation of variables and data source:

- Total annual cost for recycling collection/reprocessing of kerbside recyclables (2002/2003)
 - A total annual cost for recycling collection and MRF acceptance/reprocessing of kerbside dry recyclables needs to be determined. Any revenue from sale of recyclable materials where applicable should be subtracted from the collection and processing costs.
 - The total should be collection and reprocessing only of kerbside dry recyclables and not include other associated costs such as Council administration costs and education.
 - In many instances, there are a number of service attributes that are included in the tendered collection price such as education, auditing, customer service, on-property collections, bin purchase and bin maintenance/replacement. The reporting form will allow you to identify which components are included and ask you to nominate whether your contract or service arrangement includes or excludes initial purchase of bin stock.
 - It is understood that in some instances it is difficult to isolate costs associated with the recycling service in relation to other services offered.
- Number of households serviced by recycling collections (2002-203)
 - Data Source: NEPM/EPA form – sub section 6. ‘Number of premises/households serviced by recycling collections – residential’.

NOTE: The Per premises fee for Recycling in section 7. of the NEPM/EPA form could be used, providing other costs components such as administration and education are removed.

4. Tonnage cost (\$/tonne)

The calculation for tonnage cost is as follows:

$$\text{Tonnage cost} \text{ (\$/tonne)} = \frac{\text{Total annual cost for recycling collection/reprocessing of kerbside recyclables} \text{ MINUS } \text{revenue from sale of materials}}{\text{Total annual net yield dry recyclables collected at kerbside (tonnes)}}$$

Explanation of variables and data source:

- Total annual cost for recycling collection/reprocessing of kerbside recyclables (2002-2003)
 - As per Methodology 3 above
- Total annual net yield dry recyclables collected at kerbside (tonnes) (2002-2003)
 - As per Methodologies 1 and 2 above

Fax back form

Request for kerbside recycling performance measurement

To request the Department of Environment and Conservation (NSW) to calculate your Council's performance measures, please complete this form; sign and date it and fax it to (02) 8837 6099.

| Best practice reporting area | Data / Response |
|--|---|
| <p>Kerbside contamination (%)</p> <p>Kerbside recycling gross contamination losses caused by the incorrect disposal of waste material in recycling stream by householder. This data may be determined by kerbside audits. Some MRF operators also provide this information to Councils after undertaking audits on a Council specific basis</p> | <p>Kerbside contamination =%</p> <p><u>Source of data (please tick):</u></p> <p>Kerbside audit <input type="checkbox"/></p> <p>MRF feedback <input type="checkbox"/></p> <p>Others (please specify): <input type="checkbox"/></p> <p>.....</p> <p>.....</p> |
| <p>Annual recycling collection and reprocessing cost (\$)</p> <p>Total cost of recycling collection and MRF acceptance reprocessing less any revenue from sale of recyclable materials, excluding other associated costs such as Council administration costs and education (wherever possible).</p> | <p>Total cost = \$.....</p> <p><u>This includes:</u></p> <p>Initial bin stock purchase? (Yes / No)</p> <p>On-going bin repair and replacement? (Yes / No)</p> <p><u>Service attributes included in tendered collection price (please tick):</u></p> <p>Education <input type="checkbox"/></p> <p>Auditing <input type="checkbox"/></p> <p>Customer service <input type="checkbox"/></p> <p>On-property collections to unit blocks <input type="checkbox"/></p> <p>Others (please specify): <input type="checkbox"/></p> <p>.....</p> <p>.....</p> |
| <p>Recovery Rate (%)</p> <p>Recovery rate is the amount of dry recyclables recovered for recycling as a proportion of the total dry recyclables in the waste stream. This data can be obtained by kerbside audits of the garbage and recycling stream (e.g., a recovery rate of 65% indicates that 65% of the available dry recyclables are in the recycling stream and the remaining 35% is in the garbage stream.</p> | <p>Recovery rate =%</p> <p><u>Source of data (please tick):</u></p> <p>Kerbside audit (specify year):..... <input type="checkbox"/></p> <p>Others (please specify): <input type="checkbox"/></p> <p>.....</p> <p>.....</p> |

By signing and returning this form to the Department of Environment and Conservation (NSW), you authorise the Department to carry out the calculations referred to in this document using the data provided in this form and the other source data identified in Appendix 1, and to publish the calculations made by the Department.

Signature of authorised officer:..... Date:.....

Name/position of authorised officer:.....

Name of Council:.....

Phone:..... Fax:..... e-mail:.....

