



Investigation of opportunities for the  
interim improvement of recycler data

Department of Sustainability, Environment, Water,  
Population and Communities

July 2012

**Report**

## Report preparation

---

**Authors:** Erica Olesson, Associate  
Cassandra Young, Project Consultant  
Rebecca Cain, Senior Associate

**Project Manager:** Erica Olesson  
Associate  
Net Balance

**Project Director:** Guy Edgar  
Associate Director  
Net Balance

**Acknowledgements:** Net Balance would like to thank all stakeholders who participated in the project for their time and input.

### Disclaimer

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Australian Government or the Minister for Sustainability, Environment, Water, Population and Communities.

While reasonable efforts have been made to ensure that the contents of this publication are factually correct, the Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

## Table of contents

---

<b>Executive summary .....</b>	<b>1</b>
Option 1: Government and industry agreement of data to be collected and reported .	3
Option 2: Developing consistent definitions.....	3
Option 3: Development of a national data standard .....	4
Option 4: Online portal feasibility study .....	4
<b>1 Introduction.....</b>	<b>5</b>
1.1 Background .....	5
1.2 Project objectives.....	5
1.3 Project scope.....	6
1.4 Methodology.....	6
<b>2 Recycler data context.....</b>	<b>8</b>
2.1 Current recycler data collection.....	8
2.2 International practices.....	14
<b>3 Initial assessment.....</b>	<b>16</b>
3.1 Strengths and weaknesses of current data collection and reporting.....	16
3.2 Assessment against data principles .....	17
3.3 Initial options for improvement.....	17
<b>4 Stakeholder feedback.....</b>	<b>19</b>
4.1 Survey results.....	19
4.2 Purpose of data collection .....	20
4.3 Feedback on aspects of current systems.....	20
<b>5 Options and initial assessment .....</b>	<b>23</b>
5.1 Options identified .....	23
5.2 Key themes identified .....	23
<b>6 Options assessment .....</b>	<b>24</b>
6.1 Option 1: Government and industry agreement of data to be collected, reported, and disclosed.....	25

6.2	Option 2: Developing consistent definitions.....	28
6.3	Option 3: Development of a national data standard.....	31
6.4	Option 4: Online portal feasibility study.....	34
<b>7</b>	<b>Bibliography .....</b>	<b>37</b>
<b>9</b>	<b>Limitations.....</b>	<b>39</b>
	<b>Appendix A: Current data arrangements.....</b>	<b>40</b>
	<b>Appendix B: Stakeholder engagement .....</b>	<b>47</b>
	Results of online survey .....	47
	Organisations directly engaged in the project (interviews and/or workshop) .....	50
	<b>Appendix C: Options discussed at stakeholder workshop .....</b>	<b>51</b>
	<b>Appendix D: Stakeholder workshop.....</b>	<b>53</b>
	Voluntary and mandatory reporting.....	53
	Data collection and reporting agency options .....	54
	Materials definitions .....	56
	Online portal and data templates .....	57
	Data collection and reporting frequency .....	58
	<b>List of Tables</b>	
	Table 1 Summary of current recycler data collection and reporting by jurisdiction	8
	Table 2 Assessment of current recycler data collection and reporting against data principles	11
	Table 3 Comparison of landfill data against the data principles, with respect to recycler data	12
	Table 4: Strengths and weaknesses of current recycler data collection and reporting practices	16
	Table 5: Comparison of identified weaknesses in current practices against principles of data collection and reporting	17
	Table 6 Improvement options for recycler data collection and reporting by organisation type	18
	Table 7: Assessment of effect of option on improving alignment with data principles	28
	Table 8: Assessment of effect of option on improving alignment with data principles	31
	Table 9: Assessment of effect of option on improving alignment with data principles	33
	Table 10: Key considerations of voluntary and mandatory reporting options	53
	Table 11: Key considerations for data collection and reporting agency	55
	Table 12: Key considerations for developing consistent materials definitions	56
	Table 13: Key considerations for developing an online portal for data collection	57
	Table 14: Key considerations on data collection and reporting frequency	58

## Executive summary

---

The *National Waste Policy: Less Waste, More Resources* sets Australia's waste management and resource recovery direction to 2020. The policy contains sixteen strategies for action towards achieving the policy aims. Of these, Strategy 16 is about waste and resource recovery data and reporting. Strategy 16 has three parts: a commitment to a three-yearly national waste report, a national waste data system to underpin reporting, and interim improvements in data arrangements while the data system is being scoped and developed. The Data Working Group, made up of state and territory authorities, local government and the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), is responsible for identifying interim improvements in waste and recycling data collection and reporting, as well as supporting the rest of Strategy 16.

Within the spread of waste and recycling data and information, there are areas comparatively well-developed, and other areas with much room for improvement. Data about and from recyclers has been identified, in a variety of projects and consultations, as one of the areas offering significant opportunity for data improvement.

The role of this project is to collate ideas for improvements to current recycler data collection and reporting arrangements and undertake an initial assessment of several key options. The focus of this project was on interim improvements that may be made by government, in collaboration with industry. A consistent set of data principles have been used to assess both current systems and potential options. These are transparency, comparability, accuracy, completeness, clarity, and timeliness.

This report outlines the findings of the project, including:

- + a summary of current data collection and reporting arrangements
- + feedback provided by stakeholders on the options and wider issues
- + a range of potential options for improving recycler data collection and reporting
- + a more in-depth review of four selected options.

### **Current arrangements**

Current data collection and reporting arrangements are varied across both states and territories, and materials. Mechanisms used to collect data include both mandatory and voluntary reporting. Mandatory reporting is typically built into licensing and contractual arrangements, and reporting of information from publically listed companies. Several states also have legislative mechanisms in place to compel data provision, however these are not typically used. The most common source of recycler data collection is through voluntary response to surveys. These surveys are undertaken both by industry and government, and are undertaken on a geographic, material, and product basis. Response rates to voluntary surveys are typically high although can vary. The quality of responses can also vary greatly.

## Stakeholder feedback

Stakeholder feedback was sought throughout the project, and included an online survey, direct interviews with stakeholders, and a full day stakeholder workshop discussing options identified for recycler data improvement.

The stakeholder feedback, together with an assessment of current arrangements against data principles, was used to identify a list of potential options for data improvement. The options included improvements to data usefulness, reporting requirements, collection agency, methods of data collection, data reporting (disclosure), and data accuracy.

In the workshop discussions with stakeholders a number of key themes were identified. There was agreement on the themes by most stakeholders as important aspects to improving current data collection and reporting. The themes were:

- + agreement on materials definitions
- + collecting and reporting data in a timely manner
- + clarity of jurisdictional data requirements
- + providing data that is of value of data for industry as well as government
- + consistency of methodology.

## Improvement options

Options to provide interim improvements to current data arrangements were identified through discussions with stakeholders, and a comparison of the weaknesses identified against the data principles. The following table outlines some potential interim improvement options that were used as a start point for discussion with stakeholders.

### Comparison of identified weaknesses in current practices against data principles

Principle	Current practices	Potential options for improvement
Transparency	There is currently limited verification of data.	Provision for data audits to be undertaken randomly. Audits could be required for significant data sets.
Comparability	Jurisdictions and industry associations are currently using a range of different methodologies and definitions which are often inconsistent or unstated.	Align methodologies within material streams and types and between jurisdictions. Develop a single methodology that meets data providers' and users' needs.
Accuracy	The level of data accuracy for the majority of datasets is unknown.	Provide best-practice guidance material to assist data collectors and data users.
Completeness	There is variability in completeness of data provided across Australia with some datasets not included in data collected.	Jurisdictions which are currently experiencing significant gaps in data collection are encouraged and supported to increase data collection coverage.
Clarity	Inconsistencies in methodology and materials definitions currently used causes errors in aggregated data. Data reported represents only a small	Agree a set of materials definitions to be used across the sector. Make data collected clear and available, beyond reporting total figures in annual reporting (e.g.

Principle	Current practices	Potential options for improvement
	amount of the data collected, which could be of use to stakeholders in decision-making.	website download).
Timeliness	Reporting of data is typically around 12 months after the end of annual reporting periods, but one major jurisdiction only collects and reports recycler data every two years.	Increase data collection frequency, and decrease the age of data reported.

After a discussion of a range of options with stakeholders, four options have been identified which address the key themes identified at the workshop.

### **Option 1: Government and industry agreement of data to be collected and reported**

Stakeholders identified a need for consistent data requirements across jurisdictions to achieve comparability and to minimise data collection burden, and also for data collected to provide value back to industry and government.

The purpose of seeking agreement on the data collected and reported is to:

- + clarify priority data collection needs
- + identify possible consistencies in current data needs
- + clarify data reporting (disclosure) requirements
- + identify data disclosure that would be of benefit to government and industry.

Successfully gaining consensus on data collection and reporting requirements will require multiple stages of seeking and collating feedback, and working with the sector to clearly articulate the needs of different groups.

This option may be developed over the short term, though implementation is likely to require a longer timeframe. It may improve recycler data collection and reporting through amendments to current arrangements to reflect data requirements across the sector that result in greater consistency and clarity, and increased response to surveys.

### **Option 2: Developing consistent definitions**

The current range of data collection and reporting, undertaken by a mix of government and industry associations, has resulted in variability in the definitions against which data is sought.

This option would comprise a set of definitions to be developed, and stakeholder support sought, to provide consistency and comparability across data collection. This would include definitions of materials, categories, operations, and flows within the sector. The definitions would consider the different data breakdowns that are useful across the sector. This option would aim to provide definitions which:

- + will be suitable across the sector
- + will be flexible for future developments while maintaining consistency
- + support current regulatory requirements (e.g. NGERs) and current and future Product Stewardship schemes

- + have good uptake in existing data collection and reporting instruments and arrangements.

There are a number of existing resources to provide a starting point for developing definitions that are suitable for the purposes identified with Option 1.

This option may be developed over the short term. Once completed, it may be applied to existing data collection and reporting arrangements, through a modification of the definitions included. Some definitions may be able to more easily be assimilated into current arrangements than others, and may affect some trend data.

### **Option 3: Development of a national data standard**

Agreed 'best practice' approaches to each stage of data collection and reporting may be collated into a 'national data standard'. This may be used to increase consistency between reporting requirements across the jurisdictions and materials, over a number of collection and reporting aspects. This option would ideally incorporate the outcomes of Options 1 and 2.

The standard would be developed with stakeholders, and be agreed to by jurisdictions and industry associations collecting data. The standard may have Signatories, who would agree to move towards meeting the standard within a set time period.

The standard would act as guidance for agencies collecting and reporting recycler data. It would provide increased consistency of data collected prior to the implementation of a national data set. Feedback from stakeholders on the guidance could be used to inform the development of the national data set.

This option may be developed over the short to medium term. Different aspects of the national data standard will align with some current practices, and others may require modification of current practices in order to align with the standard. The option would inform the development of the national data set.

### **Option 4: Online portal feasibility study**

Stakeholders identified a desire for an online portal for data input in order to meet a number of the data principles. These included:

- + increased consistency of reporting
- + increased timeliness due to reduced data collation efforts
- + increased accuracy through online data checks and support.

This option involves the investigation of how online portal(s) may be used to meet these data requirements, and how this may occur. The option would assess possible structures of online reporting, for instance multiple portals to meet the needs of different data requirements, and the flow of data for collection and reporting purposes.

The output of the option is a feasibility study, with no direct impact on the quality of current data collection and reporting arrangements. The feasibility study may provide support to government and industry data collection and reporting agencies who are seeking to improve current surveys or develop online portals for existing surveys. The option is likely to be part of the development of the national data set.



# 1 Introduction

---

## 1.1 Background

The *National Waste Policy: Less Waste, More Resources* sets Australia's waste management and resource recovery direction to 2020. The policy contains sixteen strategies for action towards achieving the policy aims. Of these, Strategy 16 is related to the waste and resource recovery data. The strategy outlines the Australian Government's commitment to an accurate, meaningful, timely, and accessible source of waste and resource recovery data. Strategy 16 has three parts: a commitment to a three-yearly national waste report, a national waste data system to underpin reporting, and interim improvements in data arrangements while the data system is being scoped and developed.

State and territory authorities, local government and the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) have a collaborative responsibility for implementing strategies under the National Waste Policy. The Data Working Group supports work aimed at meeting the goals of Strategy 16.

Several projects have been undertaken to date to work towards these goals, including:

- + *National Waste Data System Requirements Study 2009*
- + *National Waste Report 2010*
- + *Regulation Impact Statement for the National Waste Policy 2009*
- + *National Waste Report 2010 Evaluation Workshops 2011*
- + *Australian recycling sector study 2011*
- + *Data collection and reporting of licensed facilities study 2012.*

These projects have shown that within the spread of waste and recycling data and information, there are areas comparatively well-developed, and other areas with much room for improvement. Data about and from recyclers has been identified, in a variety of projects and consultations, as one of the areas offering significant opportunity for data improvement.

DSEWPaC engaged Net Balance to identify options for improvements to recycler data collection and reporting as part of meeting the first phase of Strategy 16 of the *National Waste Policy*.

## 1.2 Project objectives

The objective of this project is to assist DSEWPaC and the Data Working Group to address the requirements of Strategy 16 for identifying interim options for data improvement while the national waste data system is being scoped and developed.

The role of this project is to collate ideas for recycler data improvement identified to date, work with stakeholders to develop new options, and undertake an initial assessment of several key options.

This report outlines the findings of the project, including:

- + a summary of current data collection and reporting arrangements
- + feedback provided by stakeholders on the options and wider issues
- + a range of potential options for improving recycler data collection and reporting

- + a more in-depth review of four selected options.

The report will provide the basis for further detailed assessment of interim improvement options for recycler data collection and reporting.

### 1.3 Project scope

The focus of this project is on the identification of interim improvement options for recycler data collection and reporting. This project fits within a wider context of waste and recycling data collection and reporting, both currently and in the future.

Current arrangements are presented in Section 2.1 of this report in order to provide context for the project and options identified. This has been collated from previous studies and supplemented with information from stakeholders engaged in the project. The scope of this project did not include further diagnosis of strengths and weaknesses of current data collection and reporting arrangements.

Ideally, the options for improvement of recycler data collection and reporting should align with the development of a national data set. Therefore the options identified and discussions with stakeholders reflect the relationship of the interim options with potential future data arrangements. Where discussions of potential arrangements have been held with stakeholders, their thoughts have been captured, however the focus of the project has remained on aspects related to options for interim data improvements.

Improvements to data collection and reporting practices may be made at all stages and stakeholders involved in data capture and reporting, collation, and publication. This project has focused on the improvements that may be made by government, in collaboration with the industry. Some observations have been made of improvements that may be made by recyclers, industry associations, councils, and government, in Section 3.3 of this report.

### 1.4 Methodology

Options for interim improvement have been identified through understanding current arrangements, comparison with the data principles, and engaging with sector stakeholders. Figure 1 outlines the approach taken.



**Figure 1: Project approach**

Stakeholders were engaged in the project through:

- + an online survey distributed through DSEWPaC and industry association mailing lists based on the findings of the first phase of the project

- + interviews with a sample of stakeholders to obtain in-depth input into the research questions and the identification and preliminary assessment of options
- + a workshop to discuss options identified and provide feedback for further option development.

## 2 Recycler data context

### 2.1 Current recycler data collection

There are various recycler data collection and reporting practices through Australia, undertaken through local and state governments, industry associations and consultants, and including both voluntary and mandatory data collection mechanisms.

#### 2.1.1 Current arrangements by jurisdiction

This study is focused on data that is provided to agencies (government, industry groups, consultants) in response to voluntary surveys and as part of mandatory reporting processes. The relationship of these data collection processes to others, such as data collected by recyclers for business operations, has been included through discussions with stakeholders, and in the development of improvement options.

Previous studies have identified current data arrangements by jurisdiction. These are summarised in Table 1. More detail is provided in Appendix A: Current data arrangements.

Reporting through licensing refers to sites where licenses are required for recycling activities. The licenses typically include a requirement for provision of data on a regular basis, such as material types and tonnages.

**Table 1 Summary of current recycler data collection and reporting by jurisdiction**

Jurisdiction and scale	Mandatory	Voluntary	Quality	Recent improvements
<b>Northern Territory</b> (13,000 tonnes recycled material, 3 per cent diversion)	<ul style="list-style-type: none"> <li>Reporting through licensing</li> </ul>	<ul style="list-style-type: none"> <li>No regular data collection</li> </ul>	<ul style="list-style-type: none"> <li>Most facilities are small, and have limited infrastructure (e.g. weighbridges)</li> </ul>	<ul style="list-style-type: none"> <li>Looking at a system to capture data</li> <li>New license holder annual return form</li> </ul>
<b>Queensland</b> (3,779,000 tonnes recycled material, 47 per cent diversion)	<ul style="list-style-type: none"> <li>Annual reporting by 'reporting entities' and local councils.</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary recycler survey</li> <li>Organics data collected with national survey</li> </ul>	<ul style="list-style-type: none"> <li>High survey response</li> <li>Lack of infrastructure (e.g. weighbridges) at smaller sites</li> <li>Data disclosure due 6 months after the end of the reporting period</li> </ul>	<ul style="list-style-type: none"> <li><i>Queensland Waste Strategy</i> focus on robust data collection and reporting.</li> </ul>
<b>New South Wales</b> (7,995,000 tonnes recycled material, 52 per cent diversion rate)	<ul style="list-style-type: none"> <li>Reporting through licensing</li> <li>Annual reporting by local government for Used Packaging Materials NEPM</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary materials surveys</li> <li>Funding available for ad hoc waste audits</li> </ul>	<ul style="list-style-type: none"> <li>Some materials or waste stream surveys are ad hoc</li> <li>No metals data included</li> <li>Data disclosure dates range from 12 to 32 months after the end of the reporting period</li> </ul>	<ul style="list-style-type: none"> <li><i>Reducing Waste: Implementation Strategy 2011-2015</i> signals focus on waste and recycling data.</li> </ul>
<b>Australian Capital Territory</b> (587,000 tonnes recycled material, 75 per cent diversion rate)	<ul style="list-style-type: none"> <li>Annual reporting requirement placed on ACT government</li> <li>Reporting by recyclers at 'recycling estates' (recycling operations)</li> </ul>	<ul style="list-style-type: none"> <li>Annual voluntary resource recovery survey</li> </ul>	<ul style="list-style-type: none"> <li>High survey response</li> <li>Some data estimated</li> <li>Data disclosure 5 months after the end of the reporting period</li> </ul>	<ul style="list-style-type: none"> <li>None known</li> </ul>

Jurisdiction and scale	Mandatory	Voluntary	Quality	Recent improvements
	<ul style="list-style-type: none"> <li>on ACT leased land)</li> <li>Reporting through licensing</li> </ul>			
<b>Victoria</b> (6,360,000 tonnes recycled material, 62 per cent diversion rate)	<ul style="list-style-type: none"> <li>Reporting through licensing</li> <li>Local government reporting for Used Packaging Materials NEPM</li> </ul>	<ul style="list-style-type: none"> <li>Annual survey of recyclers</li> <li>Plastics data collected with national survey</li> </ul>	<ul style="list-style-type: none"> <li>High survey response rate</li> <li>Validation and cross checking for accuracy</li> <li>Data disclosure 16 months after the end of the reporting period</li> </ul>	<ul style="list-style-type: none"> <li>None known</li> </ul>
<b>Tasmania</b> (75,000 tonnes recycled material, diversion rate unknown)	<ul style="list-style-type: none"> <li>Reporting through licensing</li> </ul>	<ul style="list-style-type: none"> <li>No regular survey</li> </ul>	<ul style="list-style-type: none"> <li>Disclosure approximately 16 months after the end of the reporting period</li> </ul>	<ul style="list-style-type: none"> <li>None known</li> </ul>
<b>South Australia</b> (2,173,000 tonnes recycled material, 66 per cent diversion rate)	<ul style="list-style-type: none"> <li>Reporting through licensing</li> <li>Local government reporting</li> <li>Reporting through kerbside waste collection incentives</li> </ul>	<ul style="list-style-type: none"> <li>Annual recycling activity survey</li> <li>Annual compost processors survey</li> </ul>	<ul style="list-style-type: none"> <li>Some online data collection with ZEUS</li> <li>Data disclosure is approximately 6 and 12-15 months after the end of the reporting period, or the organics and annual recycling survey, respectively.</li> </ul>	<ul style="list-style-type: none"> <li>Online reporting and data disclosure for local councils</li> </ul>
<b>Western Australia</b> (1,708,000 tonnes recycled material, 33 per cent diversion rate)	<ul style="list-style-type: none"> <li>Reporting through licensing</li> <li>Local government Census reporting, including Use Packaging Materials NEPM</li> </ul>	<ul style="list-style-type: none"> <li>Annual recycling activity survey</li> <li>Commercial and industrial and construction and demolition survey</li> <li>Organics data collected with national survey</li> </ul>	<ul style="list-style-type: none"> <li>Some remote and rural facilities provide inaccurate data</li> <li>Disclosure 10 months after the end of the reporting period</li> </ul>	<ul style="list-style-type: none"> <li>None known</li> </ul>

Scale data is sourced from *National Waste Report 2010* estimated tonnes recycled and diversion rate (Table 2.1, p 26).

### 2.1.2 Common mechanisms

There are several common mechanisms for recycler data collection and reporting across Australia, as is summarised in Table 1. These include mandatory and voluntary reporting mechanisms, and some licensing requirements.

#### *Mandatory reporting*

- + There are some legislative mechanisms to compel data provision. However these mechanisms are not typically used and response rates to surveys are less than 100 per cent.
- + Data reported for contractual requirements, such as contracts between local governments and recycling service providers, includes materials handled, recycled and the destination of materials handled. (Net Balance, 2011b)

- + Recycling companies who are publicly listed and are required by the *Corporations Act 2011* to publicly disclose information do so through an annual report containing financial disclosures or a sustainability report containing non-financial disclosures. (Net Balance, 2011b)

### *Licensing*

- + Not all recycling facilities require a license. The data provided by the recycling sector through licensing is not exhaustive of all recycler data. The activities and premises that require a license tend to be those which have significant potential to cause environmental harm, that is, activities and premises relating to materials or processes that are potentially of a hazardous nature. As a result, recycling facilities without significant potential impact on the receiving environment may not be subject to licensing requirements other than basic business licensing.
- + License holders in all jurisdictions (except for Queensland) are required to submit periodic reports focused on compliance with license conditions to the appropriate government body.
- + Organisations involved in the movement of specified recyclable waste materials across state and territory borders are required to report data under the National Environment Protection Measure (NEPM) for the Movement of Controlled Waste between states and territories.
- + Data reporting requirements are often not prescribed in legislation and reporting requirements are often only established as conditions of the license. It is therefore possible that more data is currently, or could be, obtained through licensing arrangements (i.e. compliance with licensing conditions) than is apparent when considering only the letter of the enabling or over-arching legislation.

For more detailed information on licensing, refer to the Net Balance report *Data collection and reporting through licensing arrangements* (2011b).

### *Voluntary reporting*

- + Most state and territory governments undertake regular voluntary surveys of the sector.
- + Materials-specific surveys are typically undertaken by industry associations. These include:
  - o Recyclers of packaging materials report data annually to the Australian Packaging Covenant (APC). (Net Balance, 2011b)
  - o Plastic recyclers report data annually to the National Plastics Recycling Survey commissioned by the Plastics and Chemicals Industries Association (PACIA). Information from this survey is also provided for APC reporting. (Net Balance, 2011b)
  - o The Pulp and Paper Strategic Review and the Pulp and Paper Edge market intelligence report, undertaken by Industry Edge, surveys recyclers of paper and cardboard. Information from this survey is also included in the APC report. (Net Balance, 2011b)
  - o A survey of aluminium can recyclers is undertaken annually by the Aluminium Can Group. This data is included in the APC report. (National Packaging Covenant Council, 2009)
  - o Norske Skorg (the only recycler of newsprint in Australia) report data to the Publishers National Environment Bureau (PNEB) on an annual basis. (Net Balance, 2011b)

- Members of the Ash Development Association of Australia report annually on fly ash recycling. (Net Balance, 2011b)
- Recyclers of steel cans report data to the National Steel Can Recycling Survey by the Australian Food and Grocery Council. (Net Balance, 2009)

### 2.1.3 Quality of the existing dataset

The *National Waste Data System Requirements Study* (Net Balance, 2009) identified six principles to underpin data collection and reporting practices. These are:

- + transparency – data is documented and verifiable
- + comparability – data is produced by same methodologies and can be compared across jurisdictions
- + accuracy – uncertainty in data values is minimised
- + completeness – all sources within state boundaries are identified and accounted for
- + clarity – information is understandable and accessible
- + timeliness – reporting occurs on a regular schedule to enable informed decisions to be made.

A high level assessment of current data arrangements against the data principles is outlined in Table 2.

**Table 2 Assessment of current recycler data collection and reporting against data principles**

Principle	Current recycler arrangements
Transparency	There is currently limited verification of data, methodologies, or assumptions.
Comparability	Jurisdictions and industry associations are currently using a range of different methodologies and definitions, which are often inconsistent. Methodologies for recycling data surveys change periodically, such as due to changes in the agency undertaking the survey or different breakdown of materials surveyed (Hyder Consulting, 2011b). These changes result in a lack of clear comparability between surveys.
Accuracy	The level of data accuracy for the majority of datasets is unknown. This is due to lack of clear reporting of accuracy with data sets. There is also no comprehensive assessment of the level of accessibility and use of infrastructure, such as weighbridges by recyclers. It is likely there is a high variability in the use of weighbridges, from larger recyclers and recyclers located adjacent to landfill sites more likely to use weighbridges, and smaller recyclers with less access. Recyclers that responded to the online survey as part of this project noted that 41% have their own weighbridge. There was also a significant proportion that have access to a weighbridge through a third party (also 41%, as survey respondents were able to choose multiple answers, and for larger organisations would be responding for numerous sites).
Completeness	There is variability in completeness of data provided across Australia with some datasets not included in data collected. Mandatory reporting is predominantly limited to sites requiring licenses for operations.

Principle	Current recycler arrangements
	Data that is collected on a voluntary basis is often done so according to the individual needs of stakeholders e.g. industry associations, government agencies, which may result in gaps or reduced detail. However some voluntary surveys have achieved high response rates of 80-100%.
Clarity	Inconsistencies in methodology and materials definitions currently used causes errors in aggregated data. Data reported and disclosed represents only a small amount of the data collected, which could be of use to stakeholders in decision-making.
Timeliness	Public disclosure of data ranges from 5 to 32 months after the end of annual reporting periods, where data collected and reported is disclosed publically.

#### 2.1.4 Comparison with landfill data

Landfill tonnage data is generally seen as having greater accuracy than data collected in relation to recycling tonnage. This is primarily due to required and established reporting through licensing of most landfill sites, collection of levies associated with landfilled waste, and established infrastructure for recording data (such as weighbridges).

Table 3 provides a high-level comparison of landfill data against the data principles, where this is relevant to recycler data.

**Table 3 Comparison of landfill data against the data principles, with respect to recycler data**

Principle	Landfill
Transparency	Landfill data that is reported to the National Greenhouse and Energy Reporting Scheme, and other reporting mechanisms under the Clean Energy Legislation, may be audited through voluntary or required audits.
Comparability	Landfill data is collected on a largely consistent basis within individual jurisdictions, although there is some variability between states, including as regards definitions and methodologies.
Accuracy	Larger landfill sites typically have infrastructure such as weighbridges that assist with data collection. Where weighbridges are not installed at landfill sites, estimates of quantities are typically made through estimation based on a population (Hyder Consulting, 2011b).  Accuracy of data provided is likely to have increased with the introduction of a landfill levy in some states, with greater emphasis placed on provision and accuracy of data. Exceptions to the accuracy of landfill data is smaller landfills, such as those located in rural areas, which may not have infrastructure for recording waste quantities, or staffing to ensure data that could be provided is collected.  Landfill data for sites outside of metropolitan areas may be estimated, or extrapolated from metropolitan data.



Principle	Landfill
Completeness	The Waste Management Association of Australia undertakes the National Landfill Survey. This includes contacting every operating landfill in Australia. Some survey years have good coverage of larger landfill sites, but the survey is voluntary and response rates drop for smaller landfill sites. Respondents may also only fill out some parts of the survey. Greenhouse gas emissions related data from landfills required to report to the Australian Government is a data collection exercise with a more complete acquittal. There is no mandatory, complete national data set or data collection exercise for Australian landfills.
Clarity	As landfill data is more comparable and has established collection and reporting, the information has better clarity for stakeholders, when they can find it. In general, landfill data is only disclosed at a high level of aggregation (ie all landfill sites for a jurisdiction). While this data may be clear, users may require data at more local scales, or disaggregated by materials types sent to landfill, or by waste stream. Much of this thematic and/or finer-grained landfill data, even if clear at point of collection and reporting to state regulators, is not reported to the public. The environmental performance of licensed landfills is another area without clear and accessible public performance data and information.
Timeliness	Data is reported to regulatory authorities through license arrangements typically on a monthly basis. The release of landfill data is often simultaneous with recycler data, with the analysis of recycler data delaying release of landfill data. However in some jurisdictions, landfill data is not publically disclosed.

Landfill operators are more heavily regulated than recycler operators, including requirements for the provision of data. This has resulted in the development of data systems to assist with meeting regulations. Not all recycler operations require licensing or are affected by regulations, and there may therefore be a range of understanding and system maturity in terms of data collection from recyclers.

Stakeholders noted the direct relationship of the materials collected to market value in the recycling sector, resulting in high confidence in the data provided. However, this is likely to vary significantly across the material types in the sector. For instance, operators processing more highly valued materials such as metals are likely to have greater knowledge of material flows due to the direct impact of material-specific throughput on their financial viability. Organisations such as charitable recyclers may have less focus on specific quantities, as there may be no direct financial benefit tied to the quantities of materials handled.

Stakeholders engaged in the project also identified the greater level of detail provided in recycler data in terms of materials composition detail in recycler data than landfill data, which is typically provided only by waste stream. For instance, surveys for plastics recycling may require a breakdown by seven different plastic types. Landfill data is typically reported for the three waste streams of municipal solid waste, commercial and industrial, and construction and demolition.

Recyclers are likely to be increasingly involved in product stewardship programs, either directly or indirectly. The programs already established have developed robust data collection and reporting process. Stakeholders noted variability in the information required for these schemes and typical recycler data collection requirements.

## **2.2 International practices**

SKM Enviros (2011) undertook a review of several international processes for waste and recycling data collection and reporting. These are summarised here. Further information is available in the full report. Aspects of these systems have been used to develop potential options for improvement to current data collection and reporting in Australia.

### **2.2.1 United Kingdom: WasteDataFlow**

The United Kingdom identified similar inefficiencies and duplication with waste and recycling data as have been identified in Australia. A focus on increasing data accuracy to support evidence-based policy making was reinforced through a requirement to demonstrate compliance with the EU Landfill Directive (1999/31/EC) of diverting organics from landfill.

A web-based quarterly reporting system was the chosen option for improving collection of MSW data in the UK, called WasteDataFlow. The system was implemented in 2004 and has been continually improved to address data needs and feedback from stakeholders. A primary role of WasteDataFlow is to 'reduce the burden of data gathering and reporting, and provide a single consistent data source for all stakeholders'. The system is used by 438 local authorities throughout the UK, including all the local authorities in England.

The system lists 62 material types, which allows for both government and local authority reporting needs. Data is input by local authorities at a waste facility level on a quarterly basis. The local authorities are responsible for ensuring data provided from waste and recycling facilities is accurate. Training and a helpline service has been provided to assist local authorities with correctly inputting information. Data comparison checks are provided to allow for data validation. The system has allowed for better timeliness of data provision, and increased detail. It allows users outside of local authorities and government to access and download data, with the aggregation of data able to be extracted dependent on their user level.

### **2.2.2 Ireland: National Waste Report**

Recycling data in the Republic of Ireland is managed by the Environmental Protection Authority (EPA). Data is collected from a range of sources through annual or biannual excel surveys. The survey response is 100 per cent, in line with license conditions that require timely provision of data. The surveys are sector specific, which has reduced confusion and allow targeted questions specific to operations for each material type.

Validation of submitted data is undertaken through comparison with previous data, and auditing of a number of sites each year. Training and a helpline service is provided to assist survey respondents to provide accurate and timely data, both at a facility and local government level (SKM Enviros, 2011). Guidance material is also provided, which details the information required and how to use the template to provide accurate data (Environmental Protection Agency, 2011).

The system is currently based on excel spreadsheets with some paper reporting. There is a desire to move to online reporting, however how this will be achieved has not yet been determined (SKM Enviro, 2011)

### 3 Initial assessment

Current recycler data arrangements in Australia, outlined in Section 2, have been used to identify gaps across the sector that can be addressed with smaller or larger scale improvements. This has included an assessment of the current practices against the data principles identified in the *National Waste Data System Requirements Study* (2009). A review of international data collection and reporting practices has also informed potential opportunities that could be incorporated into improvement options for data arrangements in Australia.

#### 3.1 Strengths and weaknesses of current data collection and reporting

Some key feedback received from stakeholders surveyed or interviewed on the strengths and barriers of the current data collection and reporting systems are listed in Table 4.

*Table 4: Strengths and weaknesses of current recycler data collection and reporting practices*

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>▪ Data quality is improving</li> <li>▪ High response rate to some voluntary surveys</li> <li>▪ Good coverage of the MSW streams through local government data collection</li> <li>▪ Survey anonymity</li> <li>▪ Companies that have been reporting for a while are familiar with the process</li> <li>▪ Agreed methodology for packaging</li> <li>▪ Good relationships developed between government and industry through some voluntary surveys</li> </ul>	<ul style="list-style-type: none"> <li>▪ Inconsistent material definitions</li> <li>▪ Inconsistent methodologies</li> <li>▪ Lack of verification</li> <li>▪ Lack of timely release of data</li> <li>▪ Lack of coverage of sector</li> <li>▪ Companies' (in)ability to divide information geographically for jurisdictions</li> <li>▪ Multiple reporting mechanisms requiring significant resources both for government and industry, through resources in responding to surveys, and matching the data provided by external surveys to government data requirements.</li> <li>▪ Lack of resourcing</li> <li>▪ Lack of accuracy of some data sets</li> <li>▪ Lack of understanding uncertainty in data (confidence)</li> <li>▪ Lack of trust between some parties in what data will be used for</li> <li>▪ Voluntary surveys don't allow for data auditing</li> <li>▪ Multiple surveys, and often requiring data in different formats</li> <li>▪ Lack of coherent framework and direction</li> </ul>

### 3.2 Assessment against data principles

The data principles identify key aspects of strong data collection systems that provide useful information for stakeholders. These have been used to identify inconsistency with current practices, and options to increase alignment with the principles, as outlined in Table 5.

**Table 5: Comparison of identified weaknesses in current practices against principles of data collection and reporting**

Principle	Current practices	Potential options for improvement
Transparency	There is currently limited verification of data.	Provision for data audits to be undertaken randomly. Audits could be required for significant data sets.
Comparability	Jurisdictions and industry associations are currently using a range of different methodologies and definitions which are often inconsistent or unstated	Align methodologies and definitions within material streams and types and between jurisdictions. Develop a single methodology that meets data providers' and users' needs.
Accuracy	The level of data accuracy for the majority of datasets is unknown.	Provide best-practice guidance material to assist data collectors and data users.
Completeness	There is variability in completeness of data provided across Australia with some datasets not included in data collected.	Jurisdictions which are currently experiencing significant gaps in data collection are encouraged and supported to increase data collection coverage.
Clarity	Inconsistencies in methodology and materials definitions currently used causes errors in aggregated data. Data reported represents only a small amount of the data collected, which could be of use to stakeholders in decision-making.	Agree a set of materials definitions to be used across the sector. Make data collected available, beyond reporting total figures in annual reporting (e.g. website download).
Timeliness	Reporting of data is typically around 12 months after the end of annual reporting periods, but one major jurisdiction only collects and reports recycler data every two years	Increase data collection frequency, and decrease the age of data reported.

### 3.3 Initial options for improvement

With the weaknesses of current data systems identified, an assessment against the data principles shows a number of areas where improvements can be made. These improvements may be made across the process from data collection to reporting, and be made by the various agencies involved through the process. Table 6 outlines some of the options for different organisations through the process.

**Table 6 Improvement options for recycler data collection and reporting by organisation type**

Organisation type	Primary roles in recycler data	Interim improvements
Recyclers	<ul style="list-style-type: none"> <li>▪ Collect</li> <li>▪ Report</li> </ul>	<ul style="list-style-type: none"> <li>▪ Install and/or use weighbridges</li> <li>▪ Ensure sites are staffed</li> <li>▪ Provide regular training for site staff</li> <li>▪ Collect and check data regularly</li> <li>▪ Implement data verification procedures</li> <li>▪ Use data standard when available</li> </ul>
Councils	<ul style="list-style-type: none"> <li>▪ Collect</li> <li>▪ Report</li> </ul>	<ul style="list-style-type: none"> <li>▪ Install and/or use weighbridges</li> <li>▪ Ensure sites are staffed</li> <li>▪ Provide regular training for site staff</li> <li>▪ Collect and check data regularly</li> <li>▪ Include data provision requirements in contracts</li> <li>▪ Work with contractors to ensure data is provided in a timely and accurate manner</li> <li>▪ Collect and check data regularly</li> <li>▪ Implement data verification procedures</li> <li>▪ Use data standard when available</li> </ul>
Industry associations	<ul style="list-style-type: none"> <li>▪ Receive data collected by recyclers and/or other organisations</li> <li>▪ Report</li> <li>▪ Disclose (public)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Document data collation methodologies to ensure consistency</li> <li>▪ Report methodologies to allow comparison</li> <li>▪ Undertake data verification</li> <li>▪ Report assumptions and uncertainties</li> <li>▪ Release results within a timely manner (e.g. no more than 12 months after the end of the reporting period)</li> <li>▪ Make sufficient data available to inform stakeholders' decision-making</li> </ul>
Government (State and Federal)	<ul style="list-style-type: none"> <li>▪ Receive data collected by recyclers and/or other organisations</li> <li>▪ Disclose (public)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Document data collation methodologies to ensure consistency</li> <li>▪ Report methodologies to allow comparison</li> <li>▪ Undertake data verification</li> <li>▪ Report assumptions and uncertainties</li> <li>▪ Release results within a timely manner (e.g. no more than 12 months after the end of the reporting period)</li> <li>▪ Make sufficient data available to inform stakeholders' decision-making</li> </ul>

As this report focuses on the interim improvements that state/territory and federal governments can make, in collaboration with industry, the options discussed in the following sections are predominantly related those applicable to government.

## 4 Stakeholder feedback

---

Net Balance sought feedback on perceptions of current recycler data collection and reporting practices, and thoughts on options for improvement, from a wide range of stakeholders (including recyclers, recycling and waste collectors, local and state government, industry associations and consultants). This information provided further detail on aspects of the current data collection and reporting mechanisms that would most benefit from focused improvement.

Methods of engagement included:

- + an online survey (75 responses received)
- + one-on-one interviews (12 interviews)
- + a six hour stakeholder workshop (17 attendees).

This section collates the feedback received through these engagements. The stakeholder feedback informed the identification and development of a range of options for recycler data improvement. Detailed results of the online survey, and a list of stakeholder groups engaged through interviews and/or the workshop are provided in Appendix B: Stakeholder engagement.

The focus of this report is on interim improvements to recycler data collection and reporting. Some of the discussion with stakeholders moved to focus on requirements for a national data set, rather than interim improvements to current data arrangements. Aspects of the 'big picture' discussion have informed the development of interim improvement options where appropriate. The remainder of the discussions that are related primarily to the development of a national data set have been captured here for reference in future projects.

### 4.1 Survey results

The online survey received 75 respondents, who represented recyclers, recycling and waste collectors, local and state government, industry associations, and consultants, across a range of organisation sizes and all jurisdictions. Key results of the survey are outlined below.

- + Primary weaknesses of current systems identified by survey respondents were inconsistent methodologies and lack of confidence in data (e.g. auditing).
- + Almost half of respondents identified mandatory data provision through an online portal as the most efficient way of collecting recycler data.
- + Almost two thirds of respondents identified data templates as a good way to improve recycler data in the interim
- + National data set and online collection tool were the most desired long-term options. This suggests a movement from the *National Waste Data System Requirements Study (2009)* where a lack of desire for a national data set was identified as a challenge.
- + A data standard and templates were the most commonly identified resources to assist with reporting.

Detailed results are provided in Appendix B: Stakeholder engagement.

## 4.2 Purpose of data collection

The stakeholders identified key drivers for undertaking regular data collection and reporting as:

- + meeting state, territory, and national obligations to report progress against targets
- + informing decisions by state and territory authorities on program requirements and funding
- + informing decisions by industry participants on infrastructure investments, which typically require significant capital costs and material certainty
- + reporting of progress and outcomes to the public and government.

## 4.3 Feedback on aspects of current systems

Some key feedback received during consultation for the project is outlined below.

### 4.3.1 Data usefulness

Several key themes were raised by stakeholders with respect to the usefulness of data collected and reported. These included:

- + There is a need to clarify the purpose of the data being collected, in order to align value for government with value for industry providing data.
- + Data currently collected by industry for their operations is not aligned with data currently required by government. This affects both the ability to provide information needed by government, and the value of the information subsequently provided publically back to industry.
- + Some companies do not see the benefits that come from data collection, such as information and clarity about where the industry is going.
- + Both jurisdictional authorities and industry expressed a need for greater clarity on the federal direction with regards to waste and recycling.

This feedback may be addressed through coordination between government (local, state, and federal) and recyclers on what data is needed by all parties, and identification of data that would provide additional value to data providers and users. Some stakeholders also suggested providing incentives for industry to provide data to government, in order to improve response rates to voluntary surveys.

### 4.3.2 Reporting requirements

Stakeholders and previous studies have identified gaps in data collected and reported and therefore there cannot be confidence in the complete picture of material flows. Stakeholders provided feedback on the potential for various reporting requirements to assist with increased completeness of the data set. These included mandatory reporting, or improvements to voluntary reporting mechanisms.

### 4.3.3 Data collection agency

A range of entities collect data from the sector for internal use, reporting and public disclosure, such as industry associations, government and consultants. Stakeholders identified a range of preferences



for ideal data collection agencies, which were in some cases conflicting. More detail on feedback on specific collection agency options is provided in Appendix D: Stakeholder workshop.

#### *Developing relationships*

A number of stakeholders highlighted the complexity of recycler data and the challenge of understanding the flows through the sector. They stressed the importance of the agency collecting data having the experience in understanding this complexity and being able to ensure methodologies used are able to capture relevant data.

Some stakeholders highlighted the good relationships they have developed within the sector as a result of undertaking annual surveying. These stakeholders also provided feedback that the survey process allows for developing a better understanding of the data, and increased accuracy over time through trust developed between the parties. Some of these stakeholders were concerned that changes to the data collection agency would affect their ability to maintain good relationships they have developed within the sector.

However, other stakeholders noted this has not been achieved in some parts of the sector.

#### *Data disclosure*

Both government and industry stakeholders expressed frustration at the level of data (including detail, transparent workings & quality of data) provided when the survey is collected by the other party. This included where government engaged industry bodies or consultants to undertake surveys, and received only aggregated data at the conclusion of the survey.

#### **4.3.4 Method of data collection**

A number of aspects of data collection methods were raised by stakeholders, as outlined below.

- + Stakeholders suggested mapping flows of materials through the sector, to assist with collecting data at the most useful points of data flow.
- + Changing materials and processes in the sector affect the suitability of methodologies over time. It was suggested that a periodic review of any methodology developed would assist with meeting this ongoing challenge (e.g. 5-yearly review).
- + Online systems are needed rather than spreadsheets, which are open to error in data transcription and manipulation.
- + Stakeholders were divided on the current extensiveness of surveys, commenting both that they are too onerous, and not adequately detailed. These observations may be related to different surveys, and highlight the differences in current approaches between surveys. Surveys should request adequate data to meet reporting and decision-making needs, while being cognisant of the resources required to complete surveys.

#### **4.3.5 Data reporting (disclosure)**

Stakeholders highlighted the variability in both the time taken for data to be collected and publicly released, and the amount of data made available.

## **Timeliness**

The desktop research and stakeholders identified a range of timeframes of data collected and reported, and also a trend of data being ultimately disclosed later than the intended timeframes.

Disclosure for most surveys is intended to be within 12 months of the end of the reporting period, although one jurisdiction has a program to disclose data only biannually. Actual time from the end of the reporting period to the public disclosure of results varies from 5 months through to 32 months, with many over the 12 month intended period.

Some stakeholders also noted that jurisdictional data is released at the discretion of the relevant minister, which can result in delays.

## **Data disclosed**

Stakeholders noted significant differences in data collected and ultimately disclosed.

Surveys typically require detailed data to be provided from recyclers. This data is aggregated as required by the data collection agency, such as to inform policy and program decisions by government. Data then released to the public may be further aggregated and included in an annual report graphically and/or in table format.

Discussions with stakeholders highlighted the varying requirements for recycler data to inform policy and program development and funding for government, capital expenditure decisions for recyclers, and providing feedback on industry trends for industry associations. Each of these data uses requires detailed data that is not currently provided publically by the data collection agencies.

### **4.3.6 Data accuracy**

A number of aspects of data accuracy were raised by stakeholders, as outlined below.

- + In reported data there is limited comment on the uncertainty of the data presented, including an assessment of gaps in the data. It would be valuable to provide assessment of uncertainty with data reported.
- + Due to the predominance of voluntary surveys, there is little verification of data.
- + Confidentiality of supplied data is a key concern of industry, and impacts willingness to respond to voluntary surveys. Surveys established over a long time period receive good response rates through trust developed between the data collector and survey respondents.
- + Smaller sites are not likely to have infrastructure for collecting data, and may also not be staffed for manual data collection. The options developed should be appropriate to the quality of data required from small sites, given the small contribution to final figures.
- + Data accuracy ultimately relies on site operators to input correct data. An option to address this may be providing training and best practice guidance for site level data collection processes.
- + Materials imported and exported impact the calculation of performance in resource recovery, and other aspects of the material hierarchy.

## 5 Options and initial assessment

---

### 5.1 Options identified

Net Balance identified a range of possible options from initial stakeholder engagement and comparison of current practices against the data principles. These options were presented to stakeholders at a workshop for further discussion, and to identify additional options for consideration. The options identified through initial stakeholder consultation and review of current systems against the data principles are provided in Appendix C: Options discussed at stakeholder workshop.

The stakeholders at the workshop discussed the options identified and provided feedback on the relative importance of options to improve current data collection and reporting. The stakeholders then provided further feedback on key aspects of the options, including benefits, barriers, impacts on stakeholders, assessment against the data principles, and enablers that would be required.

The key aspects identified in the workshop for further assessment included:

- + reporting requirements (voluntary and mandatory)
- + data collection and reporting agency options
- + materials definitions
- + reporting process (online portal and data templates)
- + data collection and reporting frequency.

Detailed feedback on the discussions is provided in Appendix D: Stakeholder workshop.

### 5.2 Key themes identified

In the five priority areas discussed with stakeholders, a number of key themes were identified. These themes were largely reflected across the sector as aspects that would improve current data collection and reporting. The themes were:

- + agreement on materials definitions
- + collecting and reporting data in a timely manner
- + clarity of jurisdiction data requirements
- + providing data that is of value for industry as well as government
- + consistency of methodology.

The following section outlines the options which were developed to address the above key themes.

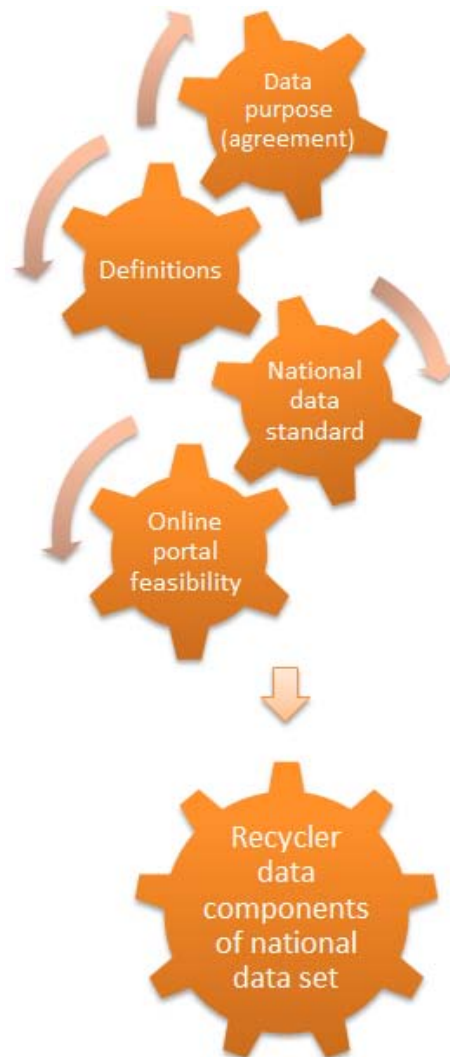
## 6 Options assessment

---

Four key options have been identified which address the key themes identified in the previous section. These are:

1. Government and industry agreement of data to be collected and reported
2. Developing consistent materials definitions
3. Development of a national data standard
4. Online portal feasibility study.

Each option can be individually developed, or can feed into each other if multiple options are developed. Figure 2 outlines the relationships between each of the options identified, which will assist with improving data collection and reporting during the development of a national data set.



**Figure 2: Options for interim data collection, reporting improvements, and interlinkages**

The following sections provide more detail of each option, and an initial assessment of:

1. Current arrangements for the data collection and reporting aspect
2. Key elements of the option
3. Steps required to develop the option

4. Existing resources that may be drawn on to further develop the option
5. Key strengths and barriers to achieving the aims of the option
6. An assessment of the option against the project aims and data principles.

The focus of this project is interim options that may be implemented by government. The options are broad-reaching across the sector, and it is anticipated their development would be led by the federal government, and include input from other stakeholders. This may take the form of a steering group of stakeholder representatives and extensive broader engagement with the sector, or other suitable format. Each option may have a different arrangement.

## **6.1 Option 1: Government and industry agreement of data to be collected, reported, and disclosed**

### **6.1.1 Current arrangements**

Data is currently collected by a range of agencies, including government and industry associations. Each agency undertaking surveys focuses data questions on information that is useful for that agency. For example, data collection undertaken by government agencies includes a breakdown of data into waste streams of municipal solid waste (MSW), construction and demolition waste (C&D), and commercial and industrial waste (C&I), as government policy and funding is often structured in this way. This data is insufficient to inform industry decisions on potential capital investment decisions, or allowing benchmarking between industry players. Other surveys request data at an individual material level, but may not provide a waste stream split.

Industry stakeholders engaged in this project noted a lack of feedback and value provision after responding to data requests by government, and identified a need for data to be disclosed to inform decision-making. This includes materials composition and materials flow data. Industry stakeholders also expressed frustration at requirements to provide different data to different jurisdictions, resulting in additional effort and a lack of ability to align systems with data collection requirements. Similarly, government stakeholders noted that the data collected by industry associations is often in a form that is not suitable for their reporting needs, and/or the underlying, disaggregated data cannot be accessed and checked.

### **6.1.2 Option description**

Stakeholders identified a need for consistent data requirements across jurisdictions to achieve comparability and to minimise data collection burden, and also for data collected to provide value back to industry.

The purpose of seeking agreement on the data collected and reported is to:

- + clarify priority data collection needs
- + identify possible consistencies in current data needs
- + clarify data reporting (disclosure) requirements
- + identify data disclosure that would be of benefit to government and industry.

Some agencies, such as PACIA, have found that providing data back to organisations responding to surveys increases the response rate, due to value gained for the organisation as a result of participating. This concept aligns with Option 2, as definitions developed should reflect the data needs of stakeholders across the sector.

### **6.1.3 Key elements of option development**

Successfully gaining consensus on data collection and reporting requirements will require multiple stages of seeking and collating feedback, and working with the sector to clearly articulate the needs of different groups.

The key aspects of this option include:

- + engagement with state, territory, and federal governments on the following aspects:
  - o clarification of data requirements of state/territory and federal governments
  - o identification of differences in data requirements across jurisdictions
  - o identification of data reporting requirements and aims
- + engagement with industry stakeholders on the following aspects:
  - o data that would be valuable for industry decision-making
  - o data that is considered confidential
  - o data that is not considered confidential and could easily be reported
- + mapping of common data requirements between government and industry
- + identification of key data sets that would be of additional use to industry.

The feedback provided from the different stakeholders can then be mapped in order to identify common and diverse data requirements between government and industry. This mapping can be used to engage further with the stakeholders (individually or combined). The aim of this engagement is to encourage agencies undertaking data collection and reporting to focus efforts on data that provides benefit across the sector, as well as meeting the needs of the data collection agency.

### **6.1.4 Steps required for option development**

The following steps provide a breakdown of how this option may be developed, in line with the key elements outlined above.

1. Initial mapping of current data collection and reporting
2. Engagement with sector groups individually
  - a. Government (local, state, territory and federal)
  - b. Industry (industry members and associations)
3. Mapping of feedback
  - a. Identify consistencies and gaps between data capabilities and needs against government and industry data collection and reporting
  - b. Map existing data collection and reporting that is aligned with identified data needs
  - c. Map gaps in existing data collection and reporting that would provide value to different stakeholders
4. Engaging with the sector again (government and industry).

### **6.1.5 Existing resources**

Key resources are already available outlining current data collection and reporting practices. These may be used to feed into the initial mapping process. Resources include:

- + *Waste Classifications in Australia: A comparison of waste classifications in the Australian Waste Database with current jurisdictional classifications* (Hyder Consulting, 2011b) – this report compares current jurisdictional definitions used to the previous Australian Waste Database definitions, and includes a discussion of primary uses of data collected.
- + *Recycler Sector Study*, Data chapter (Net Balance, 2011b) – this chapter includes a discussion of data the recycling sector collects, could collect, could report, and would like to receive
- + *Waste and Recycling Australia 2011* (Hyder Consulting, 2011c) – this report outlines the common data that is currently collected.

Resources to inform stakeholder engagement include contacts developed through projects about the sector commissioned by DSEWPac, and industry association memberships.

### **6.1.6 Key strengths and barriers**

The focus of this option is on stakeholder engagement, with an aim to facilitating consensus on data to be collected and reported.

Key factors supporting the achievement of this aim include existing resources, and ability to build relationships between government and industry. There are significant existing projects looking at the current state and federal data collection and reporting. As a result, the initial step of further developing this option will be predominantly compiling the information into the format required for engagement with different stakeholder groups.

Engagement with industry on desirable data reporting may benefit relationships within the sector. Good relationships between government and industry have been identified as key to improving data accuracy and completeness in current data collection and reporting arrangements.

Barriers to achieving consensus on data collection and reporting are predominantly around the willingness of stakeholders to modify data collection and reporting processes to take account of other stakeholder requirements. This includes adjusting for differences between jurisdictional data requirements, and a potential increase in data availability for the purpose of industry. Consideration should also be made of confidentiality of data, particularly related to pricing and other economic data.

### **6.1.7 Assessment against project aims and data principles**

This option may be developed over the short term. Current data collection and reporting arrangements could be modified to better reflect the data requirements of the range of stakeholders. Modifications to current arrangements may occur immediately in some cases, and in others may be introduced over time.

The option would inform the development of the national data set.

Table 7 outlines the effect that the option is likely to have on current data collection and reporting against each of the data principles.

**Table 7: Assessment of effect of option on improving alignment with data principles**

Principle	Change through Option
Transparency	There is not likely to be a change in the level of transparency of data disclosed (i.e. documented and verifiable).
Comparability	A clear outline of useful data for the range of stakeholders will allow jurisdictions and industry associations to report data that has greater comparability in terms of data collected and reported.
Accuracy	Not likely to be a change in accuracy.
Completeness	The option may increase data completeness due to greater clarity of data required for different stakeholders, and discussions around what the data will be used for.
Clarity	Not likely to be a change in data reported. Will provide clarity between reporters and data collectors.
Timeliness	The option may reduce a large amount of reporting metrics due to greater clarity and discussion of priority data sets, and therefore allow for more targeted and timely data reporting.

The option is also aligned with other actions outlined in the *National Waste Policy Implementation Plan* (July 2010) (Environment Protection and Heritage Council, 2010a) for both waste and recycling data, including:

- + reaching agreement of needs and purpose of jurisdiction data
- + reaching agreement of needs and purpose of nationally consistent and beneficial waste data.

**6.2 Option 2: Developing consistent definitions**

**6.2.1 Current arrangements**

The current range of data collection and reporting, undertaken by a mix of government and industry associations, has resulted in variability in the definitions against which data is sought. The term ‘definitions’ is used in this section to comprise both material descriptions and material classifications.

The current approach has resulted in some significant variability in data reported, and inconsistency when data is compared across jurisdictions and materials. For example, biosolids, bark, and saw dust were included in the data reported in the *Waste and Recycling in Australia 2009* report (Hyder Consulting, 2009) as it was not possible to remove this data set from some jurisdictional data sets, although it was not included in data collected in other jurisdictions.

**6.2.2 Option description**

This option would comprise of a set of definitions to be developed and stakeholder support sought to provide consistency and comparability across data collection. This would include definitions of materials, categories, and operations and flows within the sector. The definitions would consider the



different data breakdowns that are useful across the sector. The option would aim to provide definitions which are:

- + suitable across the sector
- + will be flexible for future developments while maintaining consistency
- + support current regulatory requirements (e.g. NGERs) and current and future Product Stewardship schemes
- + have good uptake in existing data collection and reporting arrangements.

### **6.2.3 Key elements of option**

The primary output of this option is a document providing agreed definitions to be used in data collection and reporting. The document would include:

- + materials descriptions
- + materials classifications (how materials are grouped [e.g. plastics])
- + recycler sector definitions (boundaries of 'recycler' data collection).

### **6.2.4 Steps required for option development**

This option requires agreement across the sector, and therefore requires elements of consultation along with collation of existing information and feedback. The following steps outline how the option may be undertaken:

1. Collate and compare current definitions used, and identify-
  - o inconsistencies and incompatibilities
  - o gaps in definitions
  - o overlap between products and materials
2. Develop set of proposed definitions
3. Engage with stakeholders on proposed definitions
4. Revise definitions
5. Seek agreement with stakeholders
6. Engage with stakeholders on mechanisms to address concerns and changes required to adjust to revised definitions
7. Develop training and guidance materials.

Stakeholders engaged as part of this project identified a need for training and guidance, both to meet existing data collection and reporting requirements, and with the introduction of new systems. In order to achieve uptake of a common set of definitions, clear guidance will be required to articulate how the definitions may be incorporated into existing and proposed data collection and reporting systems. This material should also assist data collection and reporting agencies with effects of modified definitions on previous trend data.

### 6.2.5 Existing resources

Several key resources exist to assist with identifying current definitions used, and to provide a starting point for developing definitions that are suitable for the purposes identified with Option 2. These include:

- + *Waste Classifications in Australia: A comparison of waste classifications in the Australian Waste Database with current jurisdictional classifications* (Hyder Consulting, 2011b) – this report compares current jurisdictional definitions used to the previous Australian Waste Database definitions
- + *Waste and Recycling in Australia* (Hyder Consulting, 2009) this report includes definitions used in the compiling of the reported data set, and a series of recommendations around the scoping of data to be included
- + *Australian Waste Classifications Roles in Decision Making* (Hyder Consulting, 2011a) – this report documents waste classifications used by jurisdictions, including recycler data
- + *Common data requirements for product stewardship schemes* (Net Balance, 2010) – this report discusses the alignment between the data requirements for product stewardship and the requirements of national reporting and a national waste data system
- + *The Australian Packaging Covenant Methodology* (National Packaging Covenant Council, 2009) includes materials definitions agreed with stakeholders and definitions for material flows
- + National Greenhouse and Energy Reporting Scheme – includes waste definitions which are required to be reported against under Scheme and Clean Energy Legislation.

### 6.2.6 Key strengths and barriers

The development of an agreed set of definitions may be able to achieve significant impact on current data collection and reporting arrangements. Several key strengths of this option will assist with achieving this aim. These include:

- + existing resources, including lessons learnt from the Australian Waste Database experience
- + clear agreement from stakeholders that a common set of definitions are required
- + identification of the option as a key input for the development of a national data set, and therefore it is aligned with Australian Government goals.

The option may also face a number of barriers due to the likely impact on stakeholders. These may include:

- + revised definitions may affect trending data for a number of data sets
- + revised definitions may affect current data collection arrangements
- + if Option 1 is not developed, the development of definitions may not be aligned with some stakeholders' data needs
- + stakeholder consultation may require significant time, as concerns are worked through
- + potential stakeholder unwillingness to change and agree on a common definition
- + potential impact on current systems, and investment required to adjust systems to meet revised definitions.

### 6.2.7 Assessment against project aims and data principles

This option may be developed over the short term. Once completed, it may be applied to existing data collection and reporting arrangements, through a modification of the definitions included. Some definitions may be able to more easily be assimilated into current arrangements than others.

Stakeholders engaged in the project consistently identified the development of a uniform set of definitions as a useful option to improve current data collection and reporting.

Table 8 outlines the effect that the option is likely to have on current data collection and reporting against each of the data principles.

**Table 8: Assessment of effect of option on improving alignment with data principles**

Principle	Change through Option
Transparency	An agreed set of definitions will provide confidence that materials are equally captured.
Comparability	A single set of definitions will allow jurisdictions and industry associations to report data that is comparable in terms of materials definitions. A change in definitions may affect trending data and reduce comparability between future and historical data sets.
Accuracy	There is likely to be some improvement in accuracy in data collection due to clarity from consistency between data sets. Errors in aggregated data due to inconsistent definitions will be reduced.
Completeness	There may be a change from any double counting or unclassified data that may be within the dataset.
Clarity	Will allow more clearly defined discussions between jurisdictions/industry on materials.
Timeliness	Not likely to be a change in data timeliness.

The option is also aligned with other actions outlined in the *National Waste Policy Implementation Plan* (July 2010) (Environment Protection and Heritage Council, 2010a), including:

- + providing recycler information for the national waste classification
- + waste definitions and classifications documentation and mapping of functions.

## 6.3 Option 3: Development of a national data standard

### 6.3.1 Current arrangements

There is currently no national approach to data collection and reporting. Some data sets have agreed methodologies, such as the Australian Packaging Covenant. There is also no agreed best-practice approach to data collection and reporting in Australia that can guide agencies involved.

### 6.3.2 Option description

A national data standard may be used to increase consistency between reporting requirements across the jurisdictions and materials, over a number of collection and reporting aspects. This option

would ideally incorporate the outcomes of Options 1 and 2. It could be developed alongside or after work on those options (which it may subsume).

The standard would be developed with stakeholders, and be agreed to by jurisdictions and industry associations collecting data. The standard would have Signatories, who would agree to move towards meeting the standard within a set time period.

The standard would act as guidance material for agencies collecting and reporting recycler data. It would provide increased consistency of data collected prior to the implementation of a national data set. Feedback from stakeholders on the guidance could be used to inform the development of the national data set.

The standard would cover the process of data collection from the recyclers through to public disclosure by data collection agencies. The standard may be developed in a staged manner, to allow individual elements to be developed and released where agreement is more readily reached.

### **6.3.3 Key elements of option**

The national data standard would be developed in consultation with stakeholders, and would comprise guidance on best-practice for each aspect of data collection and reporting. Scoping for the option would identify the steps of data collection and reporting to be included. It may include:

- + agreed data requirements identified in Option 1
- + materials definitions developed in Option 2
- + maximum timeframes for data collection by agencies
- + best practice recommendations for data collection by organisations (e.g. monthly data collection)
- + maximum timeframes for data reporting
- + principles and confidence (error)
- + suggested methodologies.

### **6.3.4 Steps required for option development**

The following steps outline how a national data standard may be developed:

1. Identify the steps that make up a data collection and reporting approach that best meets the data principles
2. Identify best practice for each element
3. Develop a draft national data standard
4. Test the draft standard with stakeholders, including as a complete document and individual elements
5. Engage with stakeholders to 'sign-up' to the data standard and develop commitments to collect data in accordance with the standard, or targets to progressively meet the standard over time
6. Develop training and guidance materials to assist with meeting the standard.

### **6.3.5 Existing resources**

Several existing resources are available to inform the development of a national data standard. These include:

- + the National Waste Data Requirements study data principles
- + summary of the history and development of WasteDataFlow, the UK MSW waste and recycling data collection system (refer to Section 2.2 of this report)
- + the new national method for standardised national waste data compilation, as tested in *Waste and Recycling in Australia 2011*
- + feedback from stakeholder engagement from this project.

**6.3.6 Key strengths and barriers**

The development of agreed best practice for data collection and reporting presents an opportunity to result in significant improvements on current arrangements. In particular, this would be due to:

- + uses a ‘best practice’ approach to encourage a movement towards aligning individual systems
- + the steps in the standard can be expanded as stakeholder agreement is gained (e.g. the standard may initially include best-practice timelines for data collection and reporting, and later be expanded to include agreed methodologies)
- + if Options 1 and 2 are developed, they can feed directly into the standard
- + the standard can be used to test aspects of the national data set as it is developed.

The national data standard option is based on reaching agreement between stakeholders on a number of elements of data collection and reporting. Some barriers to achieving this include:

- + stakeholders may not modify their practices to meet the aspects of the national data standard
- + it may be difficult to gain consensus on what the ‘best practice’ should be in the standard.

**6.3.7 Assessment against project aims and data principles**

This option may be developed over the short to medium term. Different aspects of the national data standard will align with some current practices, and others may require modification of current practices in order to align with the standard. The option would inform the development of the national data set.

Table 9 outlines the effect that the option is likely to have on current data collection and reporting against each of the data principles.

**Table 9: Assessment of effect of option on improving alignment with data principles**

Principle	Change through Option
Transparency	The national data standard may improve transparency through providing guidance on data verification practices and requirements.
Comparability	The national data standard would improve comparability through providing guidance on expected data collection and reporting practices, and providing a list of agreed definitions.

Principle	Change through Option
Accuracy	The national data standard would improve accuracy through providing clear guidance on data collection and aggregation practices and uncertainty measurements.
Completeness	The national data standard is not likely to improve data completeness in the short term, as early adopters of the standard are likely to be those already reporting. However, the increase in clarity of requirements may encourage better reporting across the sector.
Clarity	The national data standard would improve clarity due to clear guidance on data collection and reporting practices.
Timeliness	The national data standard would improve timeliness through setting expected timeframes for data collection and reporting.

## 6.4 Option 4: Online portal feasibility study

### 6.4.1 Current arrangements

Data is currently collected and reported through a range of mechanisms, including Excel-based data submissions and paper-based data templates. Some data collection agencies have begun to develop online submission of data.

### 6.4.2 Option description

Stakeholders identified a desire for an online portal for data input in order to meet a number of the data principles. These included:

- + increased consistency of reporting
- + increased timeliness due to reduced data collation efforts
- + increased accuracy through online data checks and support.

This option involves the investigation of how online portal(s) may be used to meet these data requirements, and how this may occur. The option would assess possible structures of online reporting, for instance multiple portals to meet the needs of different data requirements, and the flow of data for collection and reporting purposes. This would be in line with the COUNT (collect once and use numerous times) principle.

The output of the option is a feasibility study, with no direct impact on the quality of current data collection and reporting arrangements.

### 6.4.3 Key elements of option

The feasibility study would outline how online portal(s) may be achieved and the structure and processes that would best meet stakeholder needs. The study could include consideration of:

- + single versus multiple portals to meet the range of needs of the sector
- + potential arrangements for ownership of the portal(s)
- + potential structure for how data is collected and input

- + possible timeframes for data collection and input
- + confidentiality requirements and options
- + options for verification of input data
- + guidance materials and training required to support the portal
- + how a portal may be tested prior to national implementation.

If Option 3 is developed, the best practice elements identified will feed into the portal structure investigated.

#### **6.4.4 Steps required for option development**

This option could draw on Options 1, 2, and 3 if developed. Steps to be undertaken as part of the feasibility study would include:

1. Review data requirements for collection and reporting
2. Review structure and details of existing online portals
3. Map stakeholders
4. Map possible data flows between stakeholders, and identify possible:
  - a. System owners
  - b. Bodies which input data (e.g. local government, industry directly)
5. Identify if a single or multiple portals are required to meet data needs
6. Develop possible framework for portal and data flows
7. Identify initial and ongoing training requirements
8. Develop cost estimate for portal development and ongoing costs.

#### **6.4.5 Existing resources**

Several existing resources are available to inform the structure and details of an online portal. These include:

- + the SKM Enviro study of WasteDataFlow which provides a review of the MSW data collection and reporting online portal that has been in use since 2004. This document outlines key lessons from the development of the portal, costs associated, and discussion of the verification and training aspects which have been important to the success to the portal.
- + Online portals for data collection and/or reporting in Australia, such as ZEUS (Zero Waste South Australia online portal for data reporting).

#### **6.4.6 Key strengths and barriers**

Strengths of this option include:

- + significant stakeholder desire for an online portal to improve data collection and reporting
- + feasibility study can be used as a first step to identify options for the portal (as a necessary step towards development of a portal).

Barriers identified to a successful outcome from this option include:

- + if Options 1-3 aren't undertaken, more work would be required to develop the elements of the portal (or would be more high level)

- + there is no stakeholder agreement on who would own the system
- + the output of the option is a feasibility study, with no direct impact on the quality of current data collection and reporting arrangements.

Stakeholders discussed the need to ensure any system(s) developed did not try to encapsulate all possible reporting requirements. This may require clear discussions of the scope of the online portal, and may require multiple reporting for organisations who provide information such as for the Australian Packaging Covenant.

#### ***6.4.7 Assessment against project aims and data principles***

This option may be developed over the short term, and would lead to a longer term project developing the online portal. Until an online portal is developed, there would be no improvement to current data collection and reporting arrangements. The feasibility study may provide support to government and industry data collection and reporting agencies who are seeking to improve current surveys or develop online portals for existing surveys.

The option is likely to be part of the development of the national data set.

This option will not have an immediate effect on improving current data collection and reporting in terms of the data principles. The role of this option is to advance the understanding of what online portal options may provide the best solution to longer term data collection and reporting needs.



## 7 Bibliography

---

- Australian Bureau of Statistics. (2011, June 10). *Waste Management Services*. Retrieved May 15, 2012, from Australian Bureau of Statistics:  
<http://www.abs.gov.au/ausstats/abs@.nsf/Products/8698.0~2009-10~Main+Features~Waste+management+services>
- Department of Environment Climate Change and Water NSW. (2010). *Review of Waste Strategy and Policy in New South Wales*.
- Environment Protection and Heritage Council. (2009). *National Waste Policy: Less Waste, More Resources*. Australian Government.
- Environment Protection and Heritage Council. (2010a). *National Waste Policy: Less Waste More Resources Implementation Plan, July 2010*.
- Environmental Protection Agency. (2011). *Best practice guidance for waste data management: Metal Recovery Operators*.
- Environmental Protection Heritage Council. (2010b). *National Waste Report 2010*.
- Government of South Australia. (2010, December 07). Retrieved May 30, 2012, from Zero Waste SA:  
<http://www.zerowaste.sa.gov.au/councils/zeus>
- Hyder Consulting. (2009). *Waste and Recycling in Australia (Amended)*.
- Hyder Consulting. (2010). *Recycling activity in Western Australia*. Department of Environment and Conservation.
- Hyder Consulting. (2011a). *Australian Waste Classifications: roles in decision making*.
- Hyder Consulting. (2011b). *Waste Classifications in Australia: A comparison of waste classifications in the Australian Waste Database with current jurisdictional classifications*.
- Hyder Consulting. (2011c). *Waste and Recycling Australia*.
- National Packaging Covenant Council. (2009). *Packaging Data Collection Methodologies*.
- Net Balance. (2009). *National Waste Data System Requirements Study*.
- Net Balance. (2010). *Product Stewardship Common Data Requirements*.
- Net Balance. (2011a). *Data collection and reporting through licensing arrangements*.
- Net Balance. (2011b). *Recycler Sector Study*.
- NSW Government. (2012, February 29). *NSW Local Government Waste & Resource Recovery Data Report*. Retrieved May 30, 2012, from NSW Environment & Heritage:  
<http://www.environment.nsw.gov.au/warr/datareport.htm>
- Planet Ark*. (n.d.). Retrieved from <http://planetark.org>.
- Resource Futures. (2008). *London Reuse and Recycling Centre Best Practice Guidance*. Greater London Authority.
- SKM Enviro. (2011). *Summary of the history and development of WasteDataFlow*.

Sustainability Victoria. (2011). *Towards Zero Waste Strategy 2009-2010 Progress Report*.  
Sustainability Victoria.

Waste Policy Unit Department of Environment and Resource Management. (2010). *Queensland's  
Waste Strategy 2010-2020*.

## 9 Limitations

---

Net Balance Management Group Pty Ltd (Net Balance) has prepared this report in accordance with the usual care and thoroughness of the consulting profession. This report has been prepared for use by the Department of Sustainability, Environment, Water, Population and Communities, and only those third parties who have been authorised in writing by Net Balance.

The Report is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the project brief. The methodology adopted and sources of information used by Net Balance are outlined in this report.

Please note that all results have been reported as recorded. Any percentages that do not add up to exactly one hundred per cent are the result of rounding errors.

This report was prepared in June 2012 and is based on the conditions encountered and information reviewed at the time of preparation. Net Balance disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

## Appendix A: Current data arrangements

There is significant variability in the data collection and reporting practices within each jurisdiction. The following tables outline current data collection and reporting practices according to jurisdictions in Australia.

This section outlines current practices in each jurisdiction in the areas of:

- + mechanisms for collecting recycling data (mandatory (including licensing) and voluntary)
- + quality of existing dataset (accuracy and coverage)
- + recent and planned improvements.

Notes for tables:

- + Where a source document is not cited, information has been provided from stakeholders
- + Scale data sourced from National Waste Report 2010 estimated tonnes recycled and diversion rate (Table 2.1, p 26)

Jurisdiction	National
Scale	22,707,000 tonnes recycled material, 52 per cent diversion rate
Mandatory data collection	<ul style="list-style-type: none"> <li>▪ Waste and recycling is primarily the responsibility of State and Territory governments. There is no overall recycler data reporting requirement at a national level, although some recyclers are required to report data for national programs such as the National Greenhouse and Energy Reporting Scheme. (Environment Protection and Heritage Council, 2009)</li> <li>▪ The Australian Customs Service collects import and export data according to ANZUS codes. This includes specific declarations of hazardous wastes under the <i>Hazardous Waste (Regulation of Exports and Imports) Act 1989</i>.</li> <li>▪ The Australian Bureau of Statistics (ABS) undertakes a survey of Waste Management Services, including information on income and expenses, business size, activities, waste quantities, and barriers to resource recovery. The ABS is able to require data to be provided, although does not always exercise this. The scope of the waste management services data collection is not consistent with other sector surveys. (Australian Bureau of Statistics, 2011)</li> </ul>
Voluntary data collection	The Australian Packaging Covenant engages external consultants to undertake the annual national recycling and recovery survey. The survey includes paper and cardboard, glass, plastics, steel and aluminium. The methodologies for each material have been independently verified. (National Packaging Covenant Council, 2009)
Quality of existing data set (accuracy and coverage)	Data within each jurisdiction typically utilises different definitions (e.g. for the same materials), therefore comparisons between jurisdictions, and overall figures, reflect this inconsistency. (Environmental Protection Heritage Council, 2010b)
Recent and planned improvements	<p>Strategy 16 of the National Waste Policy outlines a commitment to three-yearly national data reports, and a basic national dataset to be scoped and developed over five years. (Environment Protection and Heritage Council, 2009)</p> <p>A number of projects have been conducted into a various aspects of data collection and reporting that will inform future improvements. These include:</p> <ul style="list-style-type: none"> <li>▪ <i>National Waste Data System Requirements Study</i> (Net Balance, 2009)</li> <li>▪ Chapter 5 of the 2010 <i>National Waste Report</i>, 'Improving the data' (Environmental</li> </ul>

	<p>Protection Heritage Council, 2010b)</p> <ul style="list-style-type: none"> <li>▪ Expanded classification trees (2010)</li> <li>▪ Review of Data systems of relevance to a national waste data system</li> <li>▪ National Waste Data System Discussion paper (draft) on possible outcomes and core data (2010, unpublished)</li> <li>▪ <i>National waste and recycling reporting: a more uniform approach to data</i></li> <li>▪ <i>Waste Classifications in Australia – A comparison of waste classifications in the Australian Waste Database with current jurisdictional classifications</i> (Hyder Consulting, 2011b)</li> </ul>
--	--

Jurisdiction	Queensland
Scale	<b>3,779,000 tonnes recycled material, 47 per cent diversion</b>
Mandatory data collection	<ul style="list-style-type: none"> <li>▪ ‘Reporting entities’, including recycling and reprocessing companies, are required to submit annual reports (Hyder Consulting, 2011b)</li> <li>▪ Local councils report data as per requirements of the Queensland <i>Waste Reduction and Recycling Act 2011</i>. This includes extensive reporting on waste management. Results are released periodically. The data collected through local government includes kerbside collection, organics, and landfill.</li> </ul>
Voluntary data collection	<ul style="list-style-type: none"> <li>▪ The Department of Environment and Resource Management (DERM) and the Queensland Environment Protection Authority undertake voluntary surveys for ‘The State of Waste and Recycling in QLD’ report. (Net Balance, 2011b)</li> <li>▪ Data on recycled organics is collected through voluntary reporting as part of the Organics Recycling in Australia Industry statistics exercise. (Net Balance, 2011b)</li> </ul>
Quality of existing data set (accuracy and coverage)	<ul style="list-style-type: none"> <li>▪ The survey conducted by DERM has a high response rate, but data is of variable quality and has gaps. Material streams reported include paper and packaging material collected for recycling, segregated green waste and C&amp;D waste. (Net Balance, 2011b)</li> <li>▪ Some sites have no weighbridges, and may not have staff to record data. When data is collected manually, it often requires conversion from volume to weight, which is not as accurate.</li> </ul>
Recent and planned improvements	<ul style="list-style-type: none"> <li>▪ The Queensland Waste Strategy identified that a reform of the legislative framework is required to establish more robust data collection and reporting systems. The strategy looks to partner with local government, the resource recovery sector, and specific industry sectors, to develop appropriate methodologies and reporting mechanisms.</li> <li>▪ Other initiatives include continual development and analysis of infrastructure and technologies as well as the introduction of product stewardship and extended producer responsibility. (Waste Policy Unit Department of Environment and Resource Management, 2010)</li> <li>▪ The <i>Waste Reduction and Recycling Act 2011</i> includes provisions for additional recycling data reporting requirements for operations exceeding 1,000 tonnes of recycling material per year (Hyder Consulting, 2011b).</li> </ul>

Jurisdiction	Australian Capital Territory
Scale	<b>587,000 tonnes recycled material, 75 per cent diversion rate</b>
Mandatory data collection	<ul style="list-style-type: none"> <li>▪ The ACT Government has a statutory requirement to publish an annual report which includes recycler data. (Hyder Consulting, 2011b)</li> </ul>

	<ul style="list-style-type: none"> <li>The ACT Government has established 'recycling estates' where some recycling businesses can lease land at a reduced rate. The ACT Government has the ability to impose data reporting requirements as a condition of the lease agreement. Recycling businesses located in recycling estates are usually required to provide data on the quantity of material received and recycled by category of material (Net Balance, 2011a)</li> <li>Holders of an environmental authorisation are required to report annually on environmental indicators relevant to the site, such as discharges to water. Once a year, on the anniversary of the granting of the authorisation, holders of an environmental authorisation are required to declare the type and amount of materials processed for the year. (Net Balance, 2011a)</li> </ul>
Voluntary data collection	The ACT TAMS NoWaste undertake an annual voluntary Resource Recovery Survey. (Net Balance, 2011b)
Quality of existing data set (accuracy and coverage)	<ul style="list-style-type: none"> <li>The Resource Recovery Survey covers most recyclable materials, and surveys have a very strong response rate. (Net Balance, 2011b)</li> <li>Results are reported approximately five months after the reporting period.</li> <li>Some data is estimated and therefore may not be highly accurate. The voluntary survey has time constraints and no formal auditing system for uncontracted operators. (Environmental Protection Heritage Council, 2010b)</li> </ul>
Recent and planned improvements	There are no known recent or proposed improvements to recycler data.

Jurisdiction	New South Wales
Scale	7,995,000 tonnes recycled material, 52 per cent diversion rate
Mandatory data collection	<ul style="list-style-type: none"> <li>License holders must submit an annual return, including waste transported from the landfill for recycling or recovery (Hyder Consulting, 2011b).</li> <li>The Office of Environment and Heritage collects data from local government annually. This survey includes the data required under the Used Packaging Materials NEPM for biannual reporting. (NSW Government, 2012)</li> </ul>
Voluntary data collection	<ul style="list-style-type: none"> <li>Data is collected through voluntary reporting as part of materials based surveys commissioned by the Office of Environment and Heritage (OEH) on an annual or ad-hoc basis. (Net Balance, 2011b)</li> <li>Data is collected through voluntary reporting as part of the Organics Recycling in Australia Industry statistics exercise conducted by Compost Australia (in partnership with the Recycled Organics Unit). (Net Balance, 2011b)</li> <li>Funding is available for waste audits for local governments, and audits of other waste streams are undertaken on an ad-hoc basis.</li> </ul>
Quality of existing data set (accuracy and coverage)	<ul style="list-style-type: none"> <li>Local government data reported for the Used Packaging Materials NEPM is not audited.</li> <li>Material streams reported on in OEH surveys at various times since 2003-04 are C&amp;D/building materials, glass, paper, textiles, rubber, metals, ash and slag. (Net Balance, 2011b) OEH have been unable to collect data from metals recyclers.</li> <li>The overall results are reported bi-annually, approximately 19 months after the end of the reporting period. Materials survey information is reported approximately 12 months after the end of the reporting period, and local government data reported approximately 30 months after the end of the reporting period.</li> </ul>

	<ul style="list-style-type: none"> <li>Smaller unlicensed resource recovery centres in NSW (under 10,000 tonnes) record incoming recycled waste in cubic metres rather than tonnes. As a result, survey figures are unlikely to be accurate. (Department of Environment Climate Change and Water NSW, 2010)</li> <li>Metals recyclers do not respond to the voluntary surveys.</li> </ul>
Recent and planned improvements	The <i>Reducing Waste: Implementation Strategy 2011-2015</i> published by the NSW Department of Environment, Climate Change and Water (now the Office of Environment and Heritage) identified that improved resource recovery data is required to provide industry and councils with more information for long-term investment decisions. The Strategy states that there is potential to use the powers of the Protection of the Environment Operations (Waste) Regulation 2005 to require all waste recyclers and reprocessors to provide annual waste and recycling data. The Office of Environment and Heritage provided advice that data on the type and quantity of materials handled would be the priority. (Net Balance, 2011a)

Jurisdiction	Victoria
Scale	6,360,000 tonnes recycled material, 62 per cent diversion rate
Mandatory data collection	<ul style="list-style-type: none"> <li>License holders are required to submit a statement of annual environmental performance, referred to as an Annual Performance Statement, to Environment Protection Authority Victoria. Information required depends on the type of premises and/or licence conditions. <ul style="list-style-type: none"> <li>Prescribed industrial waste (PIW) management facilities submit the following: total PIW received, total PIW recycled, total amount of each waste (by waste code) received, total volume of categories of hazardous waste received, total waste received by category.</li> <li>Composters and composters that also compost PIW submit the total amount of each non-PIW waste type composted, quarterly amounts of PIW and non-PIW composted.</li> <li>Tonnage of waste sent to and diverted from landfill. (Net Balance, 2011a)</li> </ul> </li> <li>Sustainability Victoria undertakes the Victorian Local Government Annual Survey. It is compulsory for Councils to participate through the State Environment Protection Policy for Used Packaging Materials.</li> </ul>
Voluntary data collection	Sustainability Victoria manages an annual survey of Victorian recyclers, except for plastics which is done as part of the PACIA survey.
Quality of existing data set (accuracy and coverage)	<ul style="list-style-type: none"> <li>The Sustainability Victoria survey receives a high response rate (approximately 80 per cent), including all the major recyclers. (Net Balance, 2009) Response quality?</li> <li>Material streams reported on include masonry, metals, organics, paper and cardboard, plastics, glass, fly ash, foundry sands, leather and textiles, tyres and other rubber. (Net Balance, 2009)</li> <li>Results are released approximately 16 months after the end of the reporting period.</li> <li>The Victorian Local Government Annual survey faces difficulties with timeliness and quality of data, with final reporting approximately a year after the end of the reporting period. Local councils collect data from waste contractors, who may estimate the breakdown of collection to the LGA area as this data isn't specifically collected by waste contractors.</li> <li>To assist with accuracy of data, Sustainability Victoria undertakes validation and cross checking of data with industry and councils. (Sustainability Victoria, 2011)</li> </ul>
Recent and planned improvements	In June 2011, the Victorian Auditors General Office (VAGO) released a report on Municipal Solid Waste Management in Victoria. In the report VAGO reported the absence of a knowledge

	<p>management system that clearly articulates the purpose of data collection, identifies the data that is required for decision making, and details procedures or guidance to address completeness, validity, consistency, timeliness and accuracy of information. VAGO recommended the development of a knowledge management system to rationalise data, identify and rectify data quality issues and modelling accuracy. Sustainability Victoria along with the Environment Protection Authority and Department of Sustainability and Environment are currently working to address the recommendation from VAGO and make improvements to not only municipal solid waste data but also recycling and landfill waste data collection and management.</p>
--	--

Jurisdiction	South Australia
Scale	2,173,000 tonnes recycled material, 66 per cent diversion rate
Mandatory data collection	<ul style="list-style-type: none"> <li>▪ License holders are required to submit an annual return containing the information required by the license. In addition to information about the site and operator, the annual return requires: <ul style="list-style-type: none"> <li>▪ the types of waste that the company transports or intends to transport</li> <li>▪ the types of premises the waste is collected from</li> <li>▪ the range of quantities of materials handled (specific quantities are not collected, as fees payable are associated with the specified ranges). (Net Balance, 2011a)</li> </ul> </li> <li>▪ Local governments in South Australia are required to provide total annual tonnage of recycling to the Office of Local Government. (Hyder Consulting, 2011b)</li> <li>▪ Zero Waste SA offer incentives for Kerbside waste collection. Councils that receive the incentive are required to provide completed excel template reports to Zero Waste SA. (Government of South Australia, 2010)</li> </ul>
Voluntary data collection	<ul style="list-style-type: none"> <li>▪ Zero Waste SA commission an annual Recycling Activity in South Australia Survey. (Net Balance, 2011b)</li> <li>▪ An annual Compost Processors Survey used to be conducted by Compost Australia on behalf of Zero Waste South Australia. (Hyder Consulting, 2011b) Zero Waste SA now conduct their own survey of composters and recycled organics firms.</li> </ul>
Quality of existing data set (accuracy and coverage)	<ul style="list-style-type: none"> <li>▪ Material streams reported on in the Zero Waste SA survey include masonry, metals, organics, paper and cardboard, plastics, glass, fly ash, foundry sands, leather and textiles, tyres and other rubber. (Net Balance, 2011b)</li> <li>▪ Data is submitted from councils predominantly with excel spreadsheets. Some data is submitted online through ZEUS (see recent improvements below). (Hyder Consulting, 2011b)</li> <li>▪ Results for the Zero Waste SA survey are reported approximately 25 months after the reporting period.</li> <li>▪ Results for the compost survey are reported approximately 6 months after the reporting period.</li> <li>▪ For waste levy purposes, waste facilities must use a weighbridge if they are handling over 10,000 tonnes.</li> </ul>
Recent and planned improvements	Zero Waste SA have an online data reporting system called ZEUS available for councils to download data. The system allows for benchmarking between councils, and some councils input data directly to the system. Zero Waste SA provide training for system users, and training



	manuals. (Government of South Australia, 2010)
--	--

Jurisdiction	Western Australia
Scale	1,708,000 tonnes recycled material, 33 per cent diversion rate
Mandatory data collection	<ul style="list-style-type: none"> <li>It is a condition of licenses that license holders submit an Annual Audit Compliance Report which requires information relating to the license holder and non-compliance with license conditions. (Net Balance, 2011a)</li> <li>Recycling activity data is collected from local government by the WA Department of Environment and Conservation through the local government Census. The Used Packaging Materials NEPM obligation is incorporated into this data collection process. (Hyder Consulting, 2011b)</li> </ul>
Voluntary data collection	<ul style="list-style-type: none"> <li>The Western Australian Government Waste Authority commissions an annual Recycling Activity in Western Australia survey. (Net Balance, 2011b)</li> <li>Commercial and industrial and construction and demolition waste data is collected through voluntary reporting to a reprocessing and recycling activity survey. (Net Balance, 2009)</li> <li>Organics data is collected through voluntary reporting as part of the Organics Recycling in Australia Industry statistics exercise conducted by Compost Australia (in partnership with the Recycled Organics Unit). (Net Balance, 2011b)</li> </ul>
Quality of existing data set (accuracy and coverage)	<ul style="list-style-type: none"> <li>Material streams included in the annual Recycling Activity survey are C&amp;D, metals, organics, paper and cardboard, textiles, glass, plastics and rubber. (Hyder Consulting, 2010)</li> <li>Results are reported approximately 10 months after the reporting period.</li> <li>Most data captured by the waste authority is limited by definition and estimation of load type and tonnage. Some rural and remote facilities are unmanned and may have unreliably recorded data (Environmental Protection Heritage Council, 2010b)</li> </ul>
Recent and planned improvements	There are no known recent or planned improvements to recycler data.

Jurisdiction	Northern Territory
Scale	13,000 tonnes recycled material, 3 per cent diversion
Mandatory data collection	<ul style="list-style-type: none"> <li>It is a condition of licenses that license holders submit an annual report including the amount (in tonnes or kilolitres) of each listed waste handled. (Net Balance, 2011a)</li> <li>Darwin City council collects data on recycled material for the Darwin region only. (Hyder Consulting, 2009)</li> </ul>
Voluntary data collection	There is no regular collection of recycler data in Northern Territory. (Net Balance, 2011b)
Quality of existing data set (accuracy and coverage)	Most facilities in the Northern Territory are small in size and capacity, have no weighbridges and are un-manned so data collection capability is limited. (Environmental Protection Heritage Council, 2010b)
Recent and planned improvements	<ul style="list-style-type: none"> <li>The Northern Territory has been looking at a system to capture data such as inflow/outflow, recycling rates, progress on reduce and recycling programs and independent auditing. (Net Balance, 2009)</li> </ul>

	<ul style="list-style-type: none"> <li>▪ A new version of the annual return form for license holders is currently being considered, but has not yet been adopted. In addition to information about the site and operator, the new form requires license holders to provide the following information: <ul style="list-style-type: none"> <li>▪ compliance with license conditions</li> <li>▪ wastes handled – quantity and method of treatment, storage or disposal</li> <li>▪ recycled waste – material type and quantity.</li> </ul> </li> </ul>
--	--

<b>Jurisdiction</b>	<b>Tasmania</b>
<b>Scale</b>	<b>75,000 tonnes recycled material, diversion rate unknown</b>
Mandatory data collection	It is a condition of licenses that license holders submit data on an annual basis. The license holder must provide data on the quantity of materials recycled, composted, incinerated, landfilled or used on site. The material categories are high level (e.g. municipal domestic, municipal other domestic). The only material/product specific categories are kerbside recycling, car tyres, car bodies and white goods/scrap metal. (Net Balance, 2011a)
Voluntary data collection	There are no regular voluntary surveys undertaken. Survey data collected is released periodically. (Net Balance, 2011b)
Quality of existing data set (accuracy and coverage)	There are currently no datasets for the total amount of waste diverted from landfill through recycling, re-use or resources recovery. Estimates of waste diverted from landfill are drawn from data supplied by landfill operators to the Environmental Protection Authority (DPIPWE). (Net Balance, 2011b) (Environmental Protection Heritage Council, 2010b)
Recent and planned improvements	There are no known recent or planned improvements to recycler data.

# Appendix B: Stakeholder engagement

## Results of online survey

An online survey was conducted of sector stakeholders to provide feedback on preferences for some initial improvement options identified, and seek further thoughts on current arrangements and potential improvement options. The survey was run from 26<sup>th</sup> April to 13<sup>th</sup> May 2012, and was distributed primarily via the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), Waste Management Distribution List.

### Survey respondents

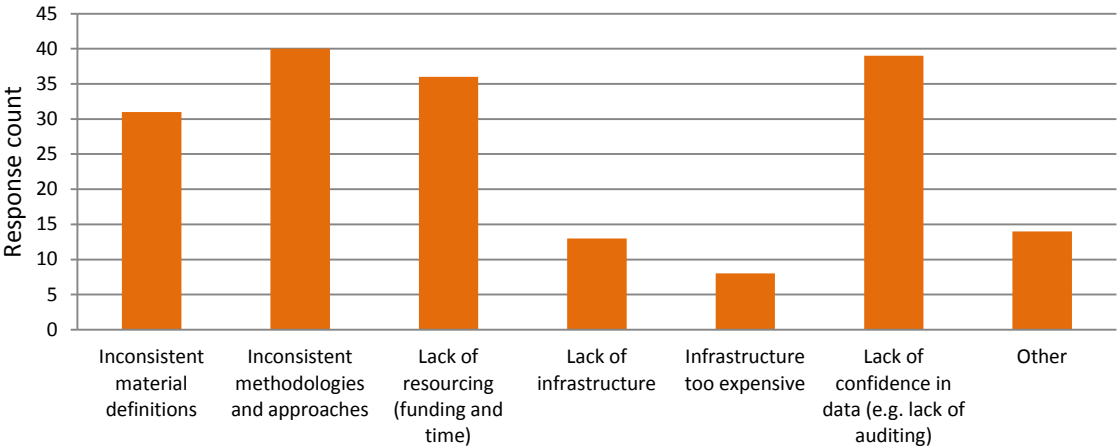
The survey received 75 respondents, who represented recyclers, recycling and waste collectors, local and state government, industry associations, and consultants.

Respondents who identified as recyclers have operations in all jurisdictions, have a range of small to large operations, and handle the following materials: paper and cardboard, glass, plastic, steel, aluminium, organics, masonry, foundry sands, leather and textiles, tyres and other rubber, electronic waste, building and construction waste, batteries, light globes, and non-ferrous metals. The data collected by the respondents' organisations is collected predominantly by weighbridge, either owned by the recycler, or provided by a third party. The second most common method of collecting recycler data identified was estimation based on volume.

### Responses to survey questions

The graphs below show the responses to the survey questions. Respondents were able to provide multiple responses to each question, so the response totals do not add up to the total number of respondents.

**What do you think are the barriers / weaknesses of the current recycler data systems?**

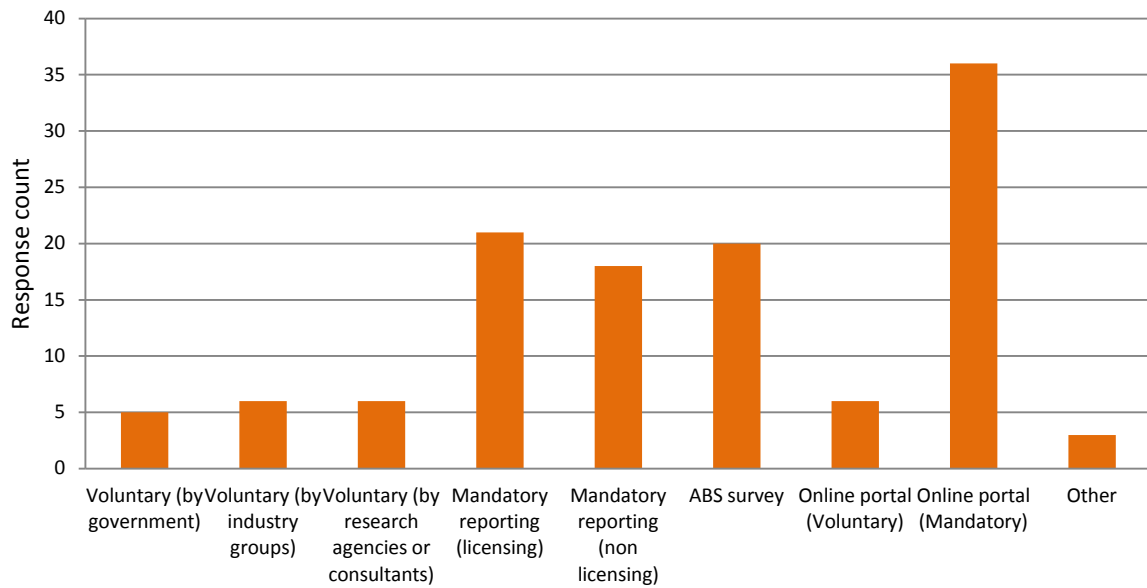


Responses provided in 'other' included:

- + reporting is not required across the sector (not a level-playing field)
- + inconsistent participation in surveys
- + perceived confidentiality and compliance costs

- + surveys not covering all materials or capturing data appropriately
- + variability in capability, infrastructure, legislative requirements.

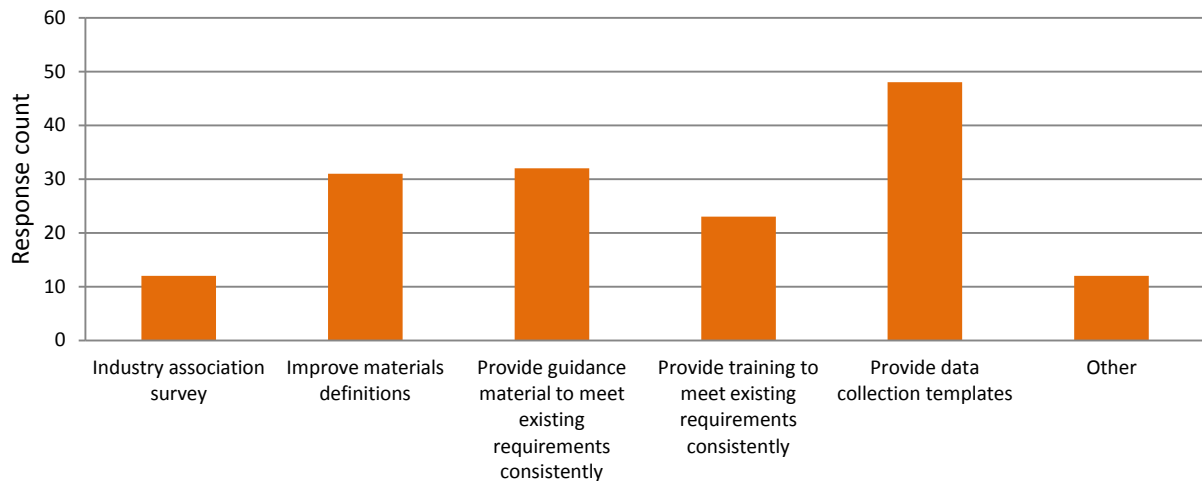
### What do you think is the most efficient way(s) of collecting recycler data?



Responses provided in 'other' included:

- + alignment of data reported with data currently collected by industry
- + similar data reporting to other national environmental reporting, such as EEO, NGRS

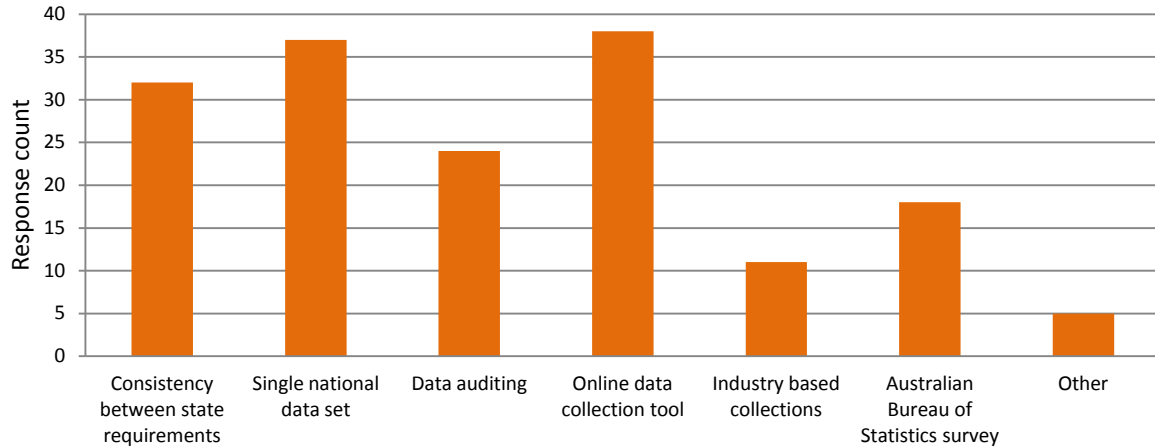
### Do you have any ideas for improvements for recycler data?



Responses provided in 'other' included:

- + monthly completion of a standard template
- + improved data validation and reconciliation
- + alignment of survey requirements with capabilities of recycler (e.g. level of materials definitions available may be varied according to the process)
- + increased funding for surveys
- + mandatory data reporting.

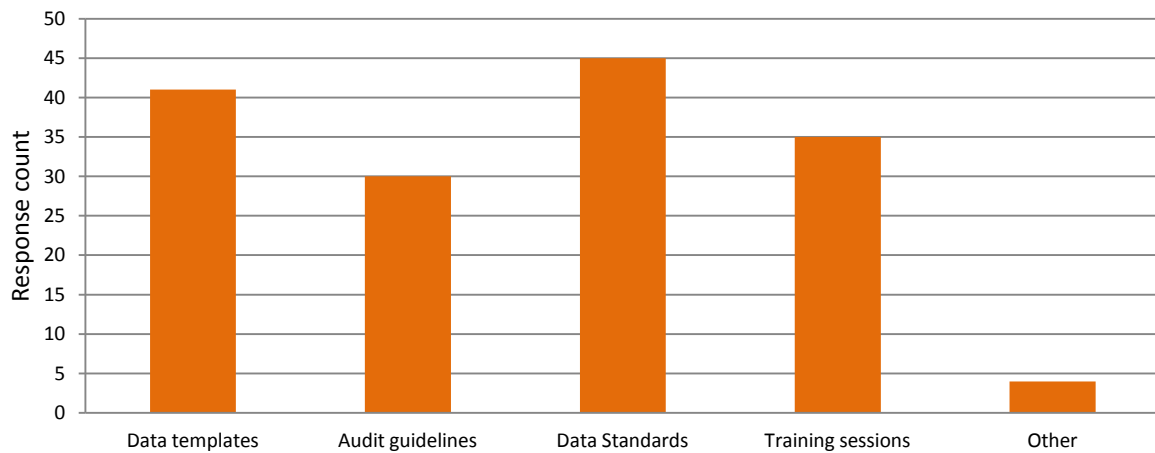
**Do you have any ideas for how recycler data collection and reporting could be in the future? (long-term / ideal world scenario)**



Responses provided in 'other' included:

- + single reporting requirement, that internal systems can be aligned to
- + mandatory reporting
- + reporting of waste metrics in parliament.

**Are there any specific support or guidance you think may be useful for the industry to improve recycler data?**



Responses provided in 'other' included aspects not related to guidance material.

## Organisations directly engaged in the project (interviews and/or workshop)

- + Australian Bureau of Statistics
- + Australian Council of Recycling
- + Australian Packaging Covenant
- + Close the Loop
- + CMA
- + Department of Environment and Conservation (WA)
- + Department of Primary Industries, Parks, Water and Environment
- + Equilibrium OMG
- + Geocycle SBF Pty Ltd
- + Local Government Association of Queensland
- + MS2
- + NSW Environment Protection Authority
- + PACIA
- + SA Environment Protection Authority
- + SITA
- + Sustainability Victoria
- + Sustainable Resource Use
- + Visy
- + Zero Waste (SA)

## Appendix C: Options discussed at stakeholder workshop

Option	Description
<b>Data usefulness</b>	
Align government and industry data requirements	Clearly define the data requirements that will provide information to inform decision-making at a government policy and industry level.
Engage with broader industry	Identify data that would provide an overall picture of resource movement through the supply chain
<b>Reporting requirement</b>	
Voluntary reporting	Agency/agencies survey the sector on a regular basis
Mandatory reporting (licensing)	Reporting would be brought in through a staged approach, with existing licenses updated to a consistent reporting requirement, and subsequently all recyclers required to obtain licenses for operations.
Mandatory reporting (non-licensing)	Legislation would require frequent reporting, which could be similar to NGERs reporting
<b>Options of collection agency</b>	
Surveys conducted by State and Territory Governments	All State and Territory government undertake surveys.
Survey conducted by Federal Government	Federal government would undertake a single survey of the sector
Surveys conducted by industry groups	Industry groups undertake surveys. This would require additional surveys to be developed to cover sections of the industry not already covered by existing voluntary surveys
Survey conducted by single industry group	One industry group would collate surveys across the sector.
Surveys by research agencies or consultants	Surveys would be undertaken by consultants, commissioned by Federal/State and Territory governments/Industry groups
Survey conducted by Australian Bureau of Statistics	Surveys would be undertaken by the ABS, and collated results provided to government
<b>Method of data collection</b>	
Online portal	Data is input directly to a central system
Submission of spreadsheet	A consistent spreadsheet could be completed and provided to the agency.
Data templates	Data templates would provide consistency of data collected. This could be for a nation-wide approach or for current reporting.
Data collection linked to other environmental reporting	Existing national data reporting systems extended to include recycler data (e.g. NGERs)
<b>Data reporting (disclosure)</b>	
Data collection frequency	The method of data collection includes reporting on a monthly/quarterly/6-monthly basis

Option	Description
Data disclosure frequency and timeliness	Data disclosure cycles on a quarterly/6-monthly basis, and within 3-6 months of the end of reporting period
Increase availability of data collected	Make non-confidential data sets and assumptions available (in addition to aggregated figures as part of government reporting)
<b>Data accuracy</b>	
Data auditing	Audits would be made randomly of organisations submitting data. Organisations of a particular size could be required to provide an audit statement (similar to Clean Energy)
Improve materials definitions	A national set of material definitions would be developed to cover existing materials and allow for future changes.
Provide guidance material to meet existing requirements	Training sessions and other guidance material to assist with existing reporting requirements. (Training would also be included with rollout of new systems.)
Provide incentives for data provision	Incentives could be provided to encourage data reporting and accuracy, such as is achieved through rebates on waste levies.
Providing site-level best-practice guidance for data collection	Guidance documents and training to assist data collection at a site level, e.g. weekly data reconciliation, weighbridge options to feed directly into data collection systems.



## Appendix D: Stakeholder workshop

Net Balance held a workshop with a group of stakeholders to discuss options identified and provide feedback on the relative importance of options to improve current data collection and reporting. Stakeholders then provided further feedback on the key aspects identified, including benefits, barriers, impacts on stakeholders, assessment against the data principles, and enablers that would be required.

The key aspects identified in the workshop for further assessment included:

- + reporting requirements: voluntary and mandatory
- + data collection and reporting agency options
- + materials definitions
- + reporting process: online portal and data templates
- + data collection and reporting frequency.

### Voluntary and mandatory reporting

Data collection is currently predominantly through voluntary channels, with some data collection through licensing of sites with operations that have environmental impacts and controls. Some voluntary surveys have high response rates, however significant gaps have been identified in available data sets. Mandatory provision of data, either through licensing or non-licensing options, may be used to ensure the sector is adequately captured.

Options of continuing voluntary reporting and moving to mandatory reporting were considered. Voluntary reporting options would not remove the existing mandatory requirements, such as through licensing.

The option of a combination of mandatory and voluntary reporting was discussed at a high level. A combination of voluntary and mandatory reporting would allow jurisdictions who have developed good relationships with the organisations in their area to maintain current systems and relationships.

Table 10 outlines key considerations of the options.

**Table 10: Key considerations of voluntary and mandatory reporting options**

Aspect	Key considerations
Data principles addressed	Completeness
<b>Voluntary reporting</b>	
Benefits	The key benefit identified by stakeholders of voluntary reporting was the relationships and trust built between the collection agency and industry data providers.
Barriers	<ul style="list-style-type: none"> <li>+ Variability in response rate</li> <li>+ Risk of losing access data if industry decide not to participate</li> <li>+ Reduced ability to improve timeliness of data provision</li> <li>+ Does not ensure complete picture of recycler data.</li> </ul>
Enablers	<ul style="list-style-type: none"> <li>+ Co-operation between government and industry</li> </ul>

	<ul style="list-style-type: none"> <li>+ Clear communication of requirements and timelines</li> </ul>
<b>Mandatory reporting</b>	
Benefits	<ul style="list-style-type: none"> <li>+ Mandatory data reporting would remove gaps in existing voluntary data collection</li> <li>+ Mandatory data reporting would provide a level playing field, and may assist with addressing confidentiality concerns if all recyclers are reporting</li> </ul>
Barriers	<ul style="list-style-type: none"> <li>+ Mandatory reporting would require regulations to be developed to require data reporting</li> <li>+ There would be additional costs both for government and industry in managing mandatory systems</li> <li>+ Requirements for provision of data may be difficult for smaller recyclers to provide if they don't have access to suitable data collection infrastructure</li> <li>+ There is a risk of data being less accessible if it is tied to other reporting requirements</li> <li>+ Industry may push-back on a mandatory approach</li> <li>+ State governments may not use provisions to require data</li> </ul>
Impact on stakeholders	<ul style="list-style-type: none"> <li>+ Increased administration and resourcing costs for government and industry</li> <li>+ Additional regulation on recyclers</li> <li>+ Industry may be more open to providing data if all peers are providing the same data</li> </ul>
Enablers	<ul style="list-style-type: none"> <li>+ Regulation will be required to achieve mandatory reporting</li> <li>+ Resources and guidance material to assist recyclers with meeting additional reporting requirements</li> <li>+ A phased approach of who is required to report, and data required, may assist with implementation of a mandatory approach</li> </ul>

### Data collection and reporting agency options

Data collection and reporting is currently undertaken by a range of government and industry association arrangements. Stakeholders were asked to provide thoughts on data collection agencies that can provide central point(s) for data collection and reporting.

Through the discussions with stakeholders, no clear agreement was reached on a preferred data collection and reporting agency. Common concerns identified by the stakeholders included:

- + data owner provides data at a level that is useful for other parties
- + options with multiple data collection and reporting agencies will require agreement on methodology to ensure data is compatible with needs and comparable.

Table 11 outlines the key considerations that were raised for each potential data collection and reporting agency.

**Table 11: Key considerations for data collection and reporting agency**

Agency	Considerations
State and Territory Governments	<p>A jurisdictional survey could lead to a single survey for all operations within a state or territory, and build on relationships already developed between government and industry. Where good relationships and trust hasn't been developed between government and industry, there may be concerns from industry in providing data directly to government organisations, without clear direction about what the data will be used for.</p> <p>Agreement on methodology between the jurisdictions would be required to ensure comparability of data collected.</p>
Federal Government	<p>A potential option for future reporting may be data collected by the federal government, providing a single point for data collection and reporting. This would ensure a consistent methodology across all data collection. This would provide better overview of material flows across borders.</p> <p>The stakeholders generally considered that the federal government required the least detail of data that is collected, and may therefore not be best placed to collect the data. Data collected by other agencies could be provided in a format and timely manner that suits Federal Government reporting requirements.</p>
Industry groups	<p>Industry associations have a good understanding of the processes and current data collection for each specific material.</p> <p>Some stakeholders expressed a concern that industry groups represent members, and may not have access to the whole sector. There was also concern that data collected by the industry itself may not be viewed as credibly by the public as data collected by government.</p> <p>Agreement on methodology between the associations would be required to ensure comparability of data collected. Agreement would also be required with government to ensure data collected meets state, territory and federal government needs.</p>
Single industry group	<p>A potential option for future reporting may be data collected by a single industry group, providing a single point for data collection and reporting. This would ensure a consistent methodology, and industry confidence in confidentiality of data provided. An alternative would be for an industry group to collate survey information collected by other industry groups, and provide the information to government in a format suitable for industry and government requirements.</p> <p>Some stakeholders expressed concern that data collected by the industry itself may not be viewed as credibly by the public as data collected by government.</p> <p>Agreement would be required with government to ensure data collected meets State and Federal government needs.</p>
Australian Bureau of	<p>A potential option for future reporting may be data collected by the ABS,</p>

Statistics (ABS)	<p>providing a single point for data collection and reporting. This would ensure a consistent methodology across all data collection.</p> <p>Stakeholders suggested the complexity of the sector may not be fully appreciated by a group outside of the sector. However it was suggested that the ABS could play oversight role for an online system or industry group data collection to provide credibility and consistency of methodology.</p> <p>Agreement would be required with government and industry to ensure data collected meets State and Federal government needs.</p>
Research agencies or consultants	<p>Independent third party consultants or researchers may undertake surveys for a primary data collector (such as state, territory or federal government). This would provide assurance for industry in the confidentiality of the data provided.</p>

### Materials definitions

The importance of clarity and consistency across definitions used for materials (including material descriptions and classifications) was highlighted as a key option to improving comparability across the data collected. Aspects for consideration for an option of consistent materials definitions are outlined in Table 12.

**Table 12: Key considerations for developing consistent materials definitions**

Aspect	Key considerations
Data principles addressed	Comparability
Benefits	<ul style="list-style-type: none"> <li>+ Consistent reporting</li> <li>+ Increased accuracy of calculations relying on inter-state and inter-material data</li> <li>+ Ability to benchmark</li> </ul>
Barriers	<ul style="list-style-type: none"> <li>+ Difficulty in defining boundaries for definitions</li> <li>+ Legislative changes may be required to cater for revised definitions</li> <li>+ Definitions being suitable between data provider and receiver</li> <li>+ Integration of local requirements for definitions with other stakeholder requirements</li> <li>+ Changing technologies in the sector may affect definitions over time</li> <li>+ Revised definitions may impact existing trend data</li> </ul>
Impact on stakeholders	<ul style="list-style-type: none"> <li>+ Trend data impacts</li> <li>+ Additional administration required to modify current practices</li> <li>+ Simplified data collection</li> </ul>
Enablers	<ul style="list-style-type: none"> <li>+ A key requirement for a single materials definition set is agreement between state and territory governments, federal government, and industry, to ensure the definitions captured are suitable for data collection systems and provide useful data</li> <li>+ Periodic update of the definitions to ensure they are relevant</li> </ul>

## Online portal and data templates

Successful data collection systems include consistent and clear reporting mechanisms which assist with good accuracy of data. An online portal is a key element in the data collection and reporting system in the UK.

Stakeholders suggested considering a combination of an online portal and data templates, to allow for variation and available technology and capability between recyclers.

Table 13 outlines key considerations for the development of a data collection system as an online portal.

**Table 13: Key considerations for developing an online portal for data collection**

Aspect	Key considerations
Data principles addressed	Transparency, Comparability, Accuracy, Completeness, Clarity, Timeliness
Benefits	<p>Stakeholders identified numerous benefits of reporting data to an online portal, including:</p> <ul style="list-style-type: none"> <li>+ reduced error of transferring data</li> <li>+ consistency</li> <li>+ ability to benchmark</li> <li>+ tailored data requests to material and recycling stream</li> <li>+ single submission of data</li> <li>+ easier collation of data.</li> </ul> <p>Stakeholders also identified elements of an online tool that would provide additional benefit, including:</p> <ul style="list-style-type: none"> <li>+ online help</li> <li>+ data validation tools</li> <li>+ ability to drill down and run customised searches</li> <li>+ training modules</li> <li>+ reduced manual handling</li> <li>+ recycler to have access to their own previous data</li> </ul>
Barriers	<ul style="list-style-type: none"> <li>+ Changes required at state level to achieve consistency of data requirements on recyclers, and all government agreement</li> <li>+ Significant resources required for development training</li> <li>+ Ownership and confidentiality (who runs it)</li> <li>+ Achieving balance between complexity and useability, and ability to keep it current</li> <li>+ Clear definitions required</li> <li>+ Clarify of focus in providing information on a state and/or industry and/or material basis</li> <li>+ Some recyclers may not understand the data collection process broadly and moving to an online portal would not assist with developing the understanding required</li> </ul>
Impact on stakeholders	<ul style="list-style-type: none"> <li>+ Significant impact on the owner of the portal, including development and running costs and requirements</li> </ul>

	<ul style="list-style-type: none"> <li>+ Covers all stakeholders</li> <li>+ Simplified tabulation</li> <li>+ User friendly</li> </ul>
Enablers	<ul style="list-style-type: none"> <li>+ Training and education for all users</li> <li>+ Provide personal assistance where required</li> <li>+ Step-by-step tips during data input, and help menus</li> </ul>

### Data collection and reporting frequency

The frequency of data collection, reporting, and disclosure, was discussed with stakeholders as an option to improve data accuracy and usefulness.

The review of the WasteDataFlow system in the UK provides a reference of alternative timeframes than are currently used in Australian data collection and reporting. The WasteDataFlow system requires data to be submitted on a quarterly basis, allowing for early detection of inconsistencies in data provided. Data is submitted within three months of the end of the reporting quarter, and is available within six months of the end of the reporting quarter.

Key considerations of frequency of data collection and reporting identified with stakeholders are outlined in Table 14.

**Table 14: Key considerations on data collection and reporting frequency**

Aspect	Key considerations
Data principles addressed	Accuracy, completeness, timeliness
Benefits	<ul style="list-style-type: none"> <li>+ Increased collection frequency of data may provide more accuracy through better understanding of causes of changes in data, and identification and easier rectification of errors. Seasonal variation should be considered in comparing data collected in shorter time periods</li> <li>+ More frequent reporting may assist with improving timeliness of data provision, as the data set is smaller</li> </ul>
Barriers	<ul style="list-style-type: none"> <li>+ Increased reporting may increase administration</li> </ul>
Impact on stakeholders	<ul style="list-style-type: none"> <li>+ More frequent reporting may be easier for larger-scale recyclers who may then prepare smaller data sets than a single annual data set</li> <li>+ Smaller-scale recyclers may prefer annual data collection, as this may reduce the time spent, as the data set is smaller</li> <li>+ Any reporting frequency should work with industry to identify the best time of year to enable resources to be available to collate and report data</li> <li>+ Government prefer annual data collection, as additional resources would be required to collate and assess data more frequently</li> </ul>
Enablers	<ul style="list-style-type: none"> <li>+ Legislation requiring data collection and reporting within reasonable timeframes</li> <li>+ Contracts to be written including a requirement for data provision on a</li> </ul>

	<p>set basis, within a set period of the end of the reporting period</p> <ul style="list-style-type: none"><li>+ Clear direction on what data is used for to highlight the need for timely data provision</li><li>+ A data standard outlining best practice timeframes for data collection and reporting</li></ul>
--	--