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Australian Bureau of Statistics

Information Paper

Waste Account, Australia, Experimental Estimates

Australia

2013

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AUSTRALIAN BUREAU OF STATISTICS

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PREFACE

The Waste Account, Australia, Experimental Estimates, 2013 provides a series of experimental tables showing information on the generation and disposal of waste to landfills or to recycling facilities, the supply of recycled materials in the economy and related financial flows. The methodologies and data used in this release will be reviewed and assessed to improve the quality and usefulness of information provided in future waste accounts.

This release is part of a set of integrated environmental–economic accounts currently being published by the ABS that uses the System of Environmental–Economic Accounting (SEEA). The SEEA is a measurement framework being developed by the United Nations Statistics Division that provides a range of metrics on the economy and the environment. In early 2012 the SEEA Central Framework was adopted as an international statistical standard. For further information on environmental–economic accounting please refer to the ABS publication: *Completing the Picture – Environmental Accounting in Practice, 2012* (cat. no 4628.0.55.001).

Where possible, this release has been produced in accordance with the SEEA and has followed previous ABS environmental–economic accounting publications utilising this system – *Energy Account, Australia 2010–11* (cat. no. 4604.0), *Water Account, Australia, 2010–11* (cat. no. 4610.0) and *Land Account: Victoria, Experimental Estimates, 2012* (cat. no. 4609.0.55.002).

This Waste Account also aims to contribute to one of the six key directions of Australia's *National Waste Policy*:

> *Providing the evidence* – Access by decision makers to meaningful, accurate and current national waste and resource recovery data and information, in order to measure progress and educate and inform the behaviour and the choices of the community.

There were no new statistical collections conducted to provide data for this release. It was compiled from existing data sources from commonwealth, state government agencies and industry associations. Information on the sources of data and how these were used to compile this release is presented in the Explanatory Notes.

ACKNOWLEDGEMENTS

The ABS would like to thank the organisations that assisted in the preparation of this release, in particular the Australian Government Department of Sustainability, Environment, Water, Populations and Communities.

Brian Pink
Australian Statistician

ABBREVIATIONS

'000 t	thousand tonnes
$m	million dollars
%	percentage
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABRI	Australian Battery Recycling Initiative
ABS	Australian Bureau of Statistics
AHECC	Australian Harmonised Export Commodity Classification
ANZSIC	Australian and New Zealand Standard Industrial Classification
cat.	catalogue
CE	completely enumerated
COAG	Council of Australian Governments
CPC	Central Product Classification
DCCEE	Department of Climate Change and Energy Efficiency
DEC	Department of Environment and Conservation
DECCW	Department of Environment, Climate Change and Water
DEPHA	Department of Environment, Parks, Heritage and the Arts
DERM	Department of Environment and Resource Management
DEWHA	Australian Government Department of the Environment, Water, Heritage and the Arts
DIISR	Department of Innovation, Industry, Science and Research
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (formerly DEWHA)
EAS	Economic Activity Survey
EPA	Environment Protection Authority
FOB	free on board
GVA	gross value added
HTISC	Harmonized Tariff Item Statistical Classification
IOPC	Input-Output Product Classification
no.	number
NEPM	National Environment Protection Measure
NTCRS	National Television and Computer Recycling Scheme
RSE	relative standard error
SEEA	System of Environmental Economic Accounts
SISCA	Standard Institutional Sector Classification of Australia
SNA	System of National Accounts
UNEP	United Nations Environment Programme
WAAEE	Waste Account Australia, Experimental Estimates
WMAA	Waste Management Association of Australia
WMS	Waste Management Services
WRiA	Waste and Recycling in Australia

This publication is the first Australian waste account produced using an environmental economic accounting framework. The *Waste Account, Australia, Experimental Estimates (WAAEE) 2013* (cat. no. 4602.0.55.005) presents integrated monetary and physical waste information using an internationally recognised conceptual framework to assist in informing waste policy and discussion in Australia.

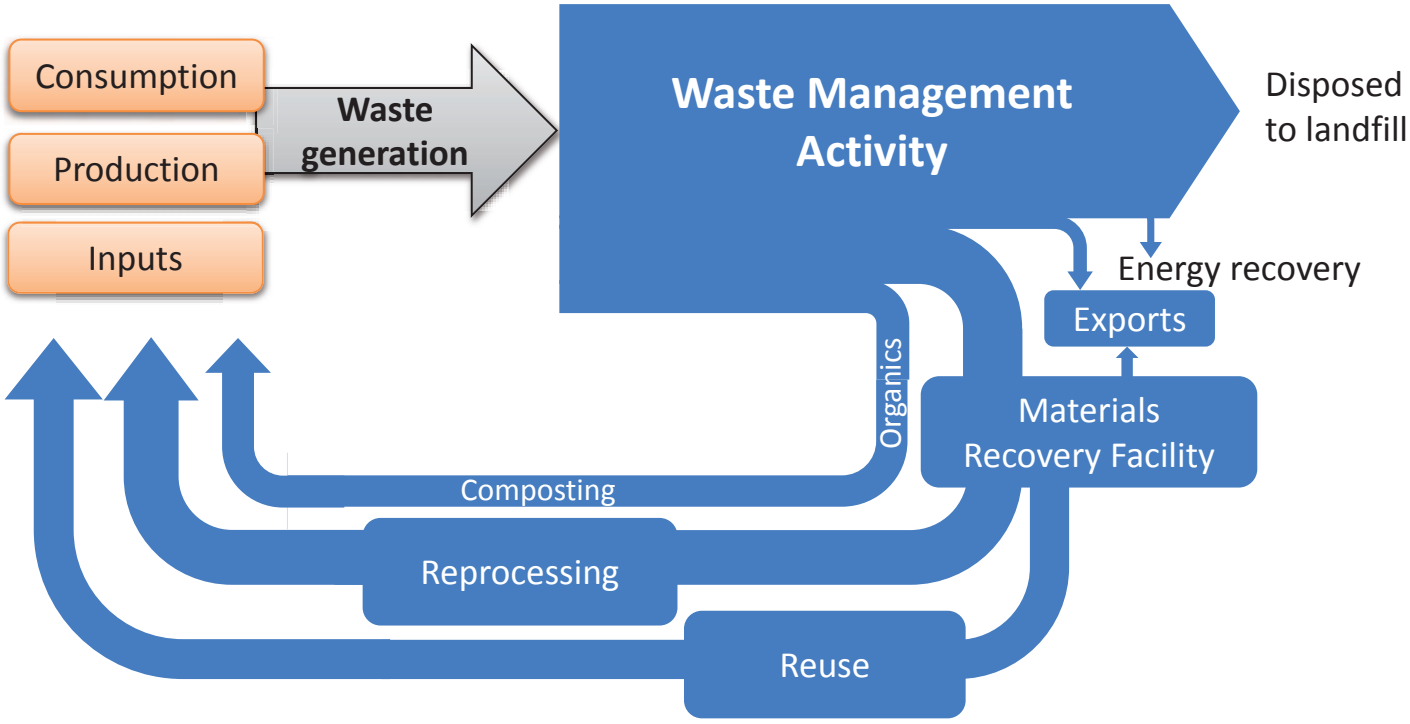
Waste management is a complex issue and consequently poses a number of measurement challenges. The production and use of materials, goods and services have a range of environmental and economic consequences. Effective waste management is much broader than the provision of waste services, typically involving the recovery of materials, recycling, and disposal to landfill, provided primarily by the Waste Management Services Industry.

Government, businesses and households are all involved in waste generation and waste management either by: actively reducing, reusing, recovering, recycling materials; paying others to recover or to dispose of unwanted materials; or utilising recycled waste products. Government policies, pricing mechanisms, types and location of waste facilities are just some of the broader issues that make the management of waste a complex task.

Waste management is largely the responsibility of state/territory and local governments, with information often based on different classifications, policies and regulations across Australia. As a result it is difficult to analyse and compare data between jurisdictions with the result that the relationship between the environment and economy is not fully understood.

Figure 1 illustrates the economic processes of waste generation, management and use within the economy. Waste accounts highlight and measure the inputs, generation and management (use) of waste by industries as it flows either directly to the environment, be taken for treatment, stored or used within the economy. This, in turn, will assist in analysing the effectiveness and impact of policy, and potentially show where policy can be improved to reduce waste generation and minimise waste to landfill.

FIGURE 1. WASTE GENERATION AND FLOW THROUGH THE ECONOMY.



Why a Waste Account and What is it?

There is a close connection between the environment and the economy. The economy depends on the environment as a source for its raw materials and also as a sink for its waste and emissions to air and water. Pollution of the environment leads to environmental problems such as climate change, air and water degradation, which affects society's sustainability. The United Nations System of Environmental Economic Accounting (SEEA) framework integrates information on the environment and economy and provides a conceptual basis for providing statistical information for waste policy.

Using the SEEA framework, the WAAEE presents a series of tables showing information on the generation of waste, the destination of waste to landfills or to recycling facilities, and the supply of recycled materials to the economy, including the related financial flows of these waste transactions.

The WAAEE includes tables on:

- Waste generated by industry, government and households, by waste material, 2009–10, '000 tonnes (physical supply);
- Waste management, treatment and disposal, by waste material, services provided by industry 2009–10 and waste product and residual, '000 tonnes (physical use);
- Supply of Waste Goods and Services by Industry 2009–10, $m (purchasers' prices) (monetary use); and
- Use of Waste Goods and Services by Industry 2009–10, $m (purchasers' prices) (monetary use).

Why a Waste Account and What is it? continued

The figures in these tables are experimental and intended to demonstrate the presentation and potential value of waste information in an integrative framework. They differ in scope and concept to data published in the three yearly National Waste Report produced by the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) and are not proposed to replace other official sources of waste generation, recovery or disposal statistics.

The primary purpose of presenting information in this framework is to highlight the importance of the integration of both bio–physical information, which measures the state of the environment, with socio–economic information that reports on economic and social drivers, pressures, impacts and responses. For example, the WAAEE integrates physical waste data to the Australian National Accounts, as well as providing information on other environmental issues (e.g. water and energy use by industry and households).

The WAAEE will also identify data gaps and deficiencies and provide a framework to help underpin integrated waste data by using consistent concepts, terminology and classifications.

This publication also highlights some key waste issues including e–waste, hazardous waste and international trade in waste in the associated feature articles.

Practical applications of an integrated Waste Account

The integration of environmental and socio–economic information and the use of common frameworks, classifications and standards can assist policy–makers by:

- enabling analysis of the impact of economic policies on the environment and vice versa;
- providing a quantitative basis for policy design;
- identifying the socio–economic drivers, pressures, impacts and responses that affect the environment;
- supporting greater precision in the development of environmental regulations and resource management strategies;
- providing indicators that express the relationships between the environment and economy; and
- organising information within a conceptual framework that ensures consistency, completeness and accountability over time.

In particular, a waste account can provide consistent economic and physical data on:

- the waste 'market' and, in particular, which sectors (i.e. private or government) and industries are providing these services;
- what services are being provided and the value of these services;
- which industries have the greatest demand for waste services; and
- whether waste recovery is becoming more profitable.

TABLE 1:KEY FACTS WASTE MANAGEMENT SERVICES, AUSTRALIAN INDUSTRY 2009–10

AUSTRALIAN AND NEW ZEALAND STANDARD INDUSTRIAL CLASSIFICATION (ANZSIC), 2006

	Waste Management Services Industry(a)	*Agriculture*	*Mining*(b)	*Manufacturing*	*Construction*	*Services*(c)	*Households*	***Total***(d)
Waste generated ('000t)	14	1 920	267	8 465	16 541	13 554	12 425	**53 186**
% waste generated	0	4	1	16	31	25	23	**100**
Expenditure on waste services ($m)	2 903	56	52	714	1 642	2 603	1 623	**9 593**
% total expenditure on waste services	30	1	1	7	17	27	17	**100**
% on recyclable services	19	61	52	36	48	28	na	. .
Income from waste services ($m)	7 661	na	127	170	748	815	. .	**9 521**
Income from recyclable services ($m)	1 238	na	68	113	139	425	. .	**1 983**
% total income from waste services	80	na	1	2	8	9	. .	**100**
% income from recyclable services	16	na	53	66	19	52	. .	**21**
Income from waste products ($m)	2 275	34	225	723	114	1 145	na	**4 516**
% total income from waste products	50	1	5	16	3	25	na	**100**
GVA ($ millions)	3 327	28 416	95 185	107 782	96 694	870 576	. .	**1 201 980**
% GVA	0	2	8	9	8	73	. .	**100**
GVA($m)/'000t	238	15	356	13	6	64	. .	. .
'000 tonnes generated/GVA($m)	0	0	0	0	0	0	. .	. .
Waste expenditure ($m)/'000t generated	207	0	0	0	0	0	. .	. .
Waste expenditure/GVA ($m) – %	1	0	0	1	2	0	. .	. .
Employment (as at May 2010) ('000)	33	376	184	990	1 012	8 512	. .	**11 107**
No. households	. .	. .	. .	. .	. .	. .	8 394 980	**8 394 980**
Waste generated/ household (tonnes)	. .	. .	. .	. .	. .	. .	2	**2**
Expenditure waste services/household ($)	. .	. .	. .	. .	. .	. .	196	**196**

. . not applicable
na not available
(a) Includes Waste Collection, Treatment and Disposal Services (ANZSIC Division D, subdivision 29)
(b) Excludes mineral waste
(c) Includes all industries other than agriculture, mining, manufacturing and construction
(d) Total waste generated excludes imports

Note: Numbers subject to rounding
Source: Australian System of National Accounts, 2011–12 (cat no.5204.0), Labour Force, Australia, Detailed, Quarterly, Nov 2012 (cat no. 6291.0.55.003), Australian Industry, 2010-11 (cat no. 8155.0), Waste Management Services, Australia, 2009–10 (cat no. 8698.0), Household and Family Projections, Australia, 2006 to 2031 (cat. no. 3236.0)

Key Indicators, 2009–10

Table 1 is a compilation of WAAEE supply and use tables and other ABS sources to provide key indicators for the waste management services industry.

Of the estimated 53.2 million tonnes of waste generated by business, government and households in 2009–10, 31% is attributed to construction, 25% to service industries, and 23% to households.

Expenditure on waste management services (eg payments to contractors and subcontractors, fees for waste management etc) totalled $9,593m. Thirty per cent of this expenditure was by the waste management industry (including local government). Construction, households and the service industries consumed the bulk of the rest of these services.

The majority of income from waste management services (80%) was provided by the waste management industry (including local government). Sixteen per cent of this income was for the provision of recyclable waste management services.

Income from waste products (raw waste materials with a positive value) totalled $4,516m. Half of this amount was from the sales of raw materials resulting from materials recovery or reprocessing by the waste management industry. One quarter of the total income from waste products was for the services industries, and a further 16% by the manufacturing industry.

Gross value added ($m GVA) per '000 tonnes waste generated varied greatly between industries, from $6m GVA per '000 tonnes of waste generated by the construction industry, up to $356m, GVA per '000 tonnes waste generated by the mining industry (excluding mineral waste).

In 2009–10, the average household generated 1.5 tonnes of waste and spent, on average, $196 on waste management services.

Please see explanatory notes for information on the scope, methods and data sources used to compile the WAAEE.

International Waste Accounts

There are other countries currently producing physical waste accounts. Statistics Netherlands first presented an illustrative NAMEA (National Accounting Matrix including Environmental Accounts) in 1991. In the Dutch waste accounts the amount of landfilled waste has been considered an important environmental pressure indicator by government.

Statistics Norway first produced a Waste Account in 1995 and this is now an annual publication. They collect data for household waste, waste from manufacturing industries, hazardous waste statistics, construction and demolition waste, service industries and survey landfills, incineration and composting. The waste account data are used by Eurostat, the Organisation for Economic Co–operation and Development (OECD) and industrial and non–government organisations, education and research institutes.

International Waste Accounts continued

FIGURE 2, Norway, Waste generated by Industry, 1995–2010

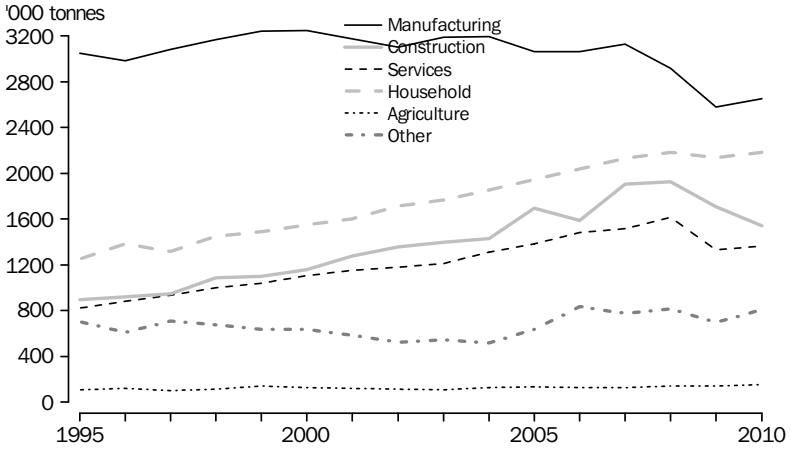


Figure 2 shows total waste generated by industry sector from 1995 to 2010 for Norway. In 2010 Manufacturing comprised 28% of the total waste amount with Households contributing 23%.

FIGURE 3, Norway, waste sent to landfill 1995 to 2010

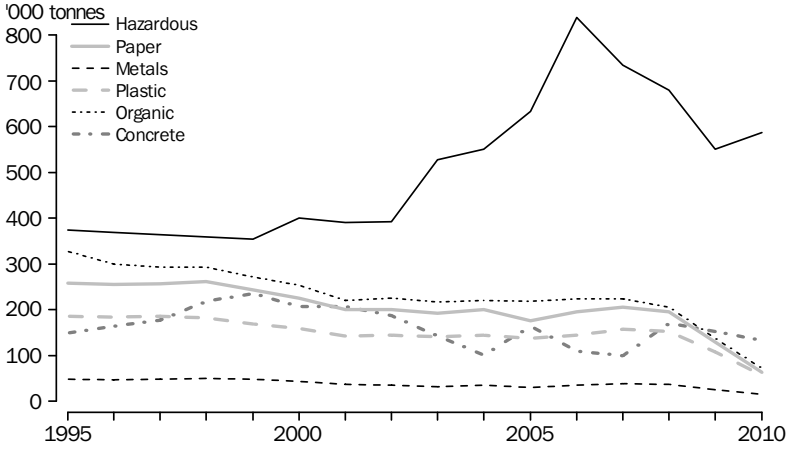


Figure 3 shows waste material types sent to landfill from 1995 to 2010 for Norway. Measures to control land waste have seen organic, paper, plastic, concrete and metal wastes dropping by as much as 30% in three years from 2007 to 2010.

Further information on Environmental Accounting

These experimental estimates explore concepts and methods while also assessing the quality and limitations of available data sources. The timing and frequency of future WAAEE's will be determined in consultation with stakeholders and the availability of data and other resources.

For further information on environmental–economic accounting please refer to the ABS publication – Completing the Picture – Environmental Accounting in Practice (cat. no. 4628.0.55.001) or the System of Environmental and Economic Accounting United Nations Statistics Division 'System of Environmental–Economic Accounting', *http://unstats.un.org/unsd/envaccounting/seea.asp*.

Other ABS publications utilising the SEEA framework include:

- *Energy Account, Australia, 2010–11, 2009–10, 2008–09, 2006–07* (cat. no 4604.0).

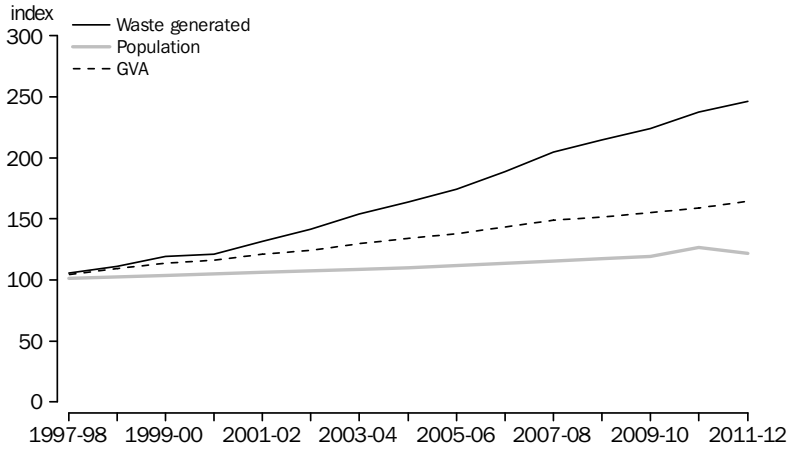
Further information on Environmental Accounting continued

- *Land Account: Great Barrier Reef Region, Experimental Estimates, 2011* (cat. no 4609.0.55.001).
- *Land Account: Victoria, Experimental Estimates, 2012* (4609.0.55.002).
- *Water Account, Australia, 2010–11, 2009–10, 2008–09, 2004–05, 2000–01* (cat. no 4610.0).

Australia's population is projected to be 35.5 million by 2056 which will place increasing pressure on the natural environment and its resources.

Figure 1 shows the rate of Australian waste generation compared to Gross Value Added (GVA) and population growth. From 1997 to 2012 the population rose by 22%, Gross Value Added increased by 64% and waste generation in Australia has increased by 145%.

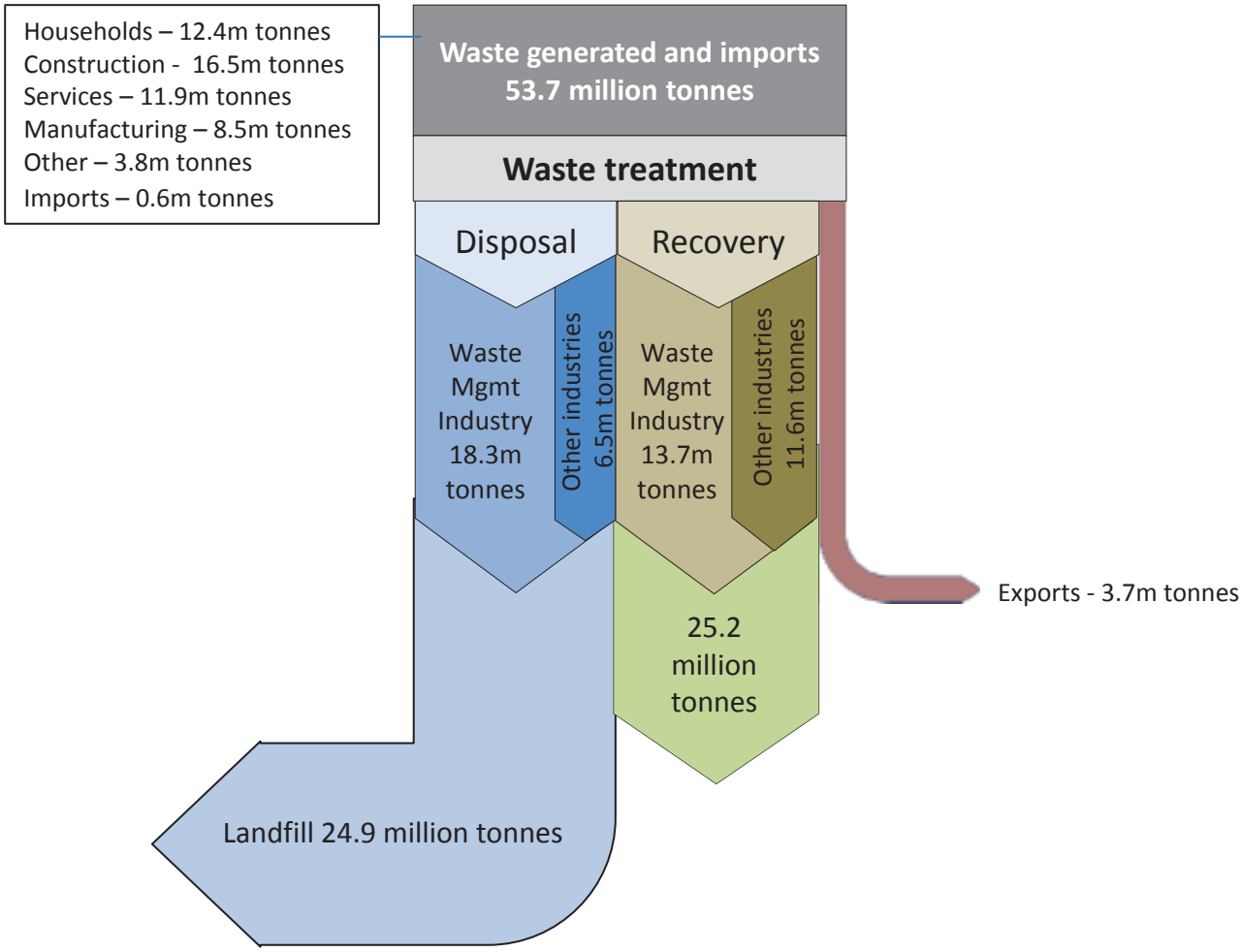
FIGURE 1, Waste generation, Population and GVA, 1997–2012



Waste Generation by Industry and Households

- During 2009–10, 53.7 million tonnes of waste was generated within the Australian economy, including imports.
- The Construction industry generated the largest volume of waste with over 16.5 million tonnes, representing 31% of the total waste generated during 2009–10.
- The largest volume of waste generated by industry and households was masonry materials, which accounted for 37% (19.8 million tonnes) of the total waste generated in 2009–10. Organic waste was the second largest generator by type, representing 24% (12.8 million tonnes) followed by paper and cardboard with 12% (6.4 million tonnes).
- In 2010 the number of households in Australia was estimated to be 8.4 million with an average household consisting of 2.6 persons. Each household in Australia is estimated to produce almost 1.5 tonnes of waste each year for a total of 12.4 million tonnes.
- Nearly half (47%) of all waste from households was organic waste and almost a quarter (23%) was paper and cardboard waste.
- Over a third of Australians (35%) always compost or recycle garden waste and 23% always compost or recycle kitchen or food waste.
- Almost 97% of households recycled and 73% reused consumed items. The most common items recycled or reused were paper and cardboard, glass, plastic bottles or containers and aluminium or steel cans. The most common way for households to recycle these items was to have the items collected from the house through kerbside bin collections.

FIGURE 2 SUMMARY OF WASTE GENERATED AND WASTE SERVICES PROVIDED, 2009–10



Waste Generation by Industry and Households continued

Note:

Disposal – Waste that is buried in landfill or incinerated or any other permanent form of removing waste that is not recovered or reused in any way. For facilities other than landfill, quantities disposed refer to waste that is sent to disposal facilities operated by either the same or a different organisation.

Recovery – The process of extracting materials or energy from a waste stream through re–use (using the product for the same or a different purpose without further production), recycling or recovering energy from waste.

Waste Management

Most waste is managed by the Waste Management Services Industry. This includes those businesses whose main activity is waste management as defined by the Australian and New Zealand Industry Classification (ANZSIC) 2006 (ANZSIC Division D, subdivision 29) and waste management activities of local government. Waste that is managed/treated by non–waste management businesses and exports of waste are also covered.

There are broadly three 'destinations' for Australia's waste:

1. Disposal to landfill;

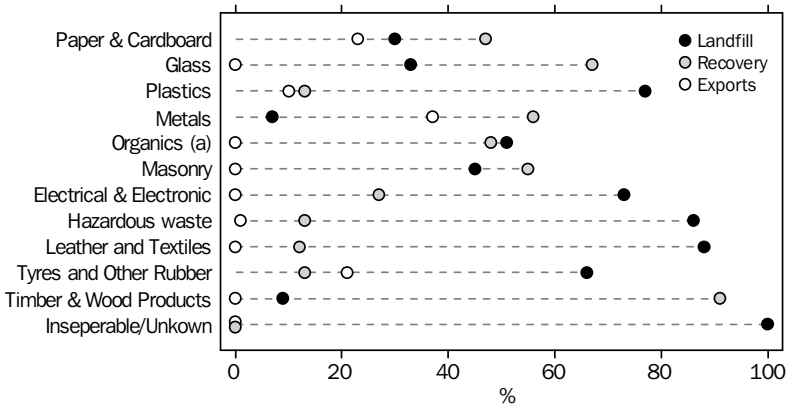
2. Recovered for the domestic economy; and

Waste Management continued

3. Exports.

- Of the total waste generated in 2009–10, 25.2 million tonnes was recovered domestically, 24.9 million tonnes was disposed to landfill and 3.7 million tonnes was exported.
- Of the 25.2 million tonnes of recovered waste in 2009–10, 10.9 million tonnes was masonry materials and 6.2 million tonnes was organic waste. Masonry materials recovered by businesses outside the waste management industry accounted for 5.0 million tonnes.
- In 2009–10, 8.9 million tonnes of masonry materials and 6.6 million tonnes of organic waste was disposed to landfill, representing 62% of all waste to landfill.
- In 2009–10, just under one million tonnes of glass waste was recovered with a further 0.5 million tonnes of glass disposed to landfill.
- Paper and cardboard waste recovered domestically amounted to 3.0 million tonnes in 2009–10, with 1.9 million tonnes disposed to landfill and 1.5 million tonnes exported.
- In 2009–10, 1.9 million tonnes of metal waste was exported which represented 52% of total waste exports.

WASTE MANAGEMENT BY MATERIAL (% OF MATERIAL TOTAL GENERATION) 2009–10



(a) Doesn't include timber

Supply and Use of Waste Management Services and Products, 2009–10 ($m)

WASTE MANAGEMENT SERVICES

- Businesses and government supply (provide) waste management services which are used (consumed) by other businesses, government and households. Waste management services include income from a range of services relating to waste management including collection, transport, recycling, treatment, processing or disposal of waste. In 2009–10, the supply of these services was valued at $9,595m.
- Private (includes public trading enterprises) waste management businesses supplied just over half (54% or $5,149m) of the value of these services while local government provided just over one quarter (26% or $2,512m).
- The remaining 19% ($1,860m) of waste management services was provided by non–waste management businesses. A large proportion of this (40% or $748m) was provided by the construction industry.

Supply and Use of Waste Management Services and Products, 2009–10 ($m) continued

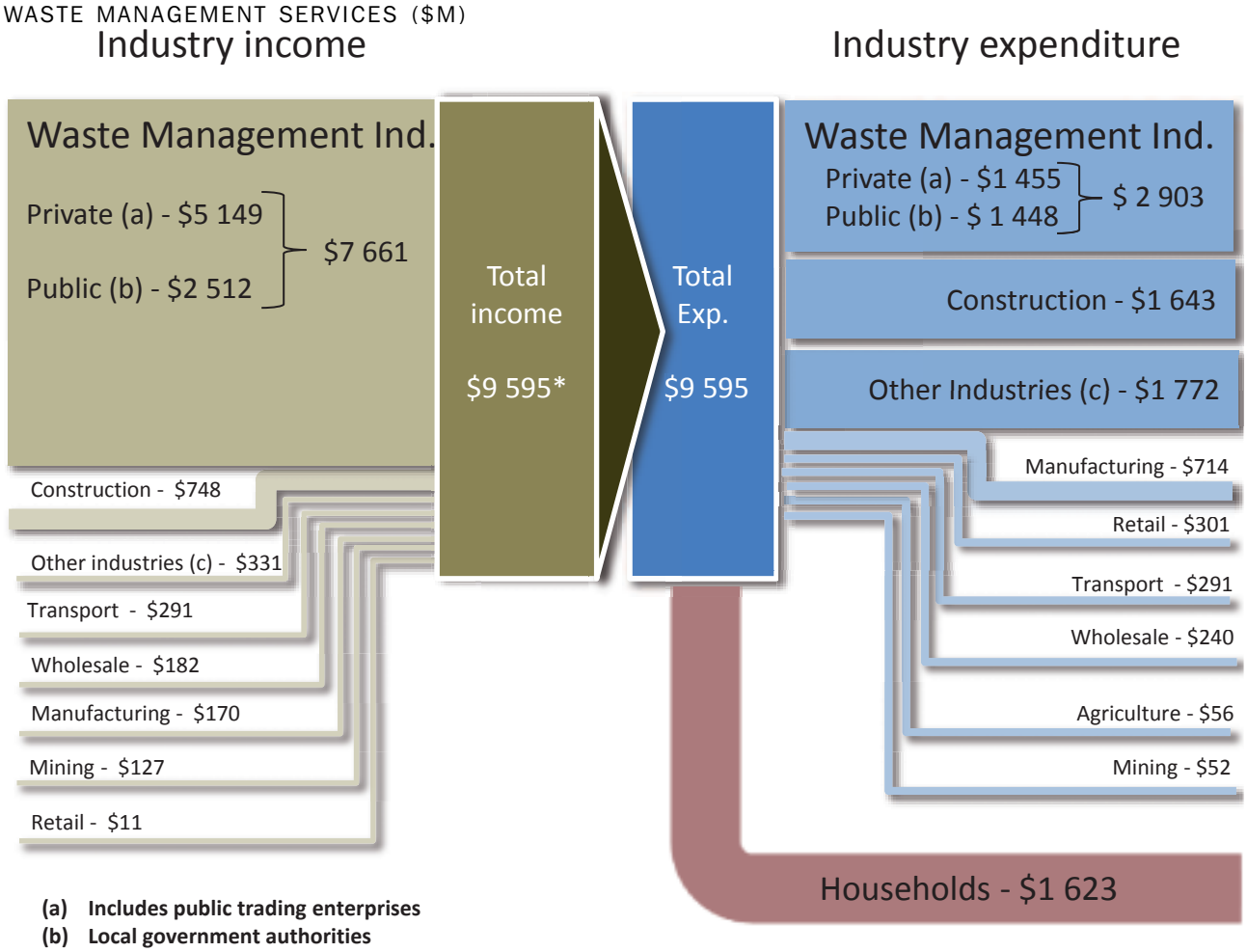
WASTE MANAGEMENT SERVICES *continued*

- The majority of income from waste management activities related to non–recyclable waste services, accounting for 79% or $7,539m. Most of this (85%) was provided by the waste management services industry.
- Income from recyclable waste services amounted to $1,981m. Although small relative to non–recyclable waste services, a relatively large proportion (38% or $743m) was provided by businesses outside the waste management services industry.
- Waste management services are used or 'consumed' by businesses as part of their production processes (this expenditure is termed intermediate consumption), or by households as final consumption. In 2009–10, the waste management services industry consumed 30% or $2,903m of these services with the construction industry contributing 17% or $1,643m.
- In 2009–10, businesses spent $2,403m on recyclable waste services. One–third of this amount ($785m) was by the construction industry with a further 19% ($457m) by local government.
- Households spent $1,623m on waste management services (recyclable and non–recyclable combined), mostly on municipal rates related to waste management services. Household expenditure constitutes 17% of total expenditure on waste management services.

WASTE PRODUCTS

- Not all waste that is produced has a negative value. Where the owner/discarder of the waste materials receives an income for the waste, it is termed a waste product. In 2009–10, waste products supplied to the economy were valued at $4,582m.
- The waste management industry supplied 50% or $2,275m of the value of these products in the form of sales of raw materials (eg paper, cardboard, metals, organic material etc) resulting from materials recovery or reprocessing operations.
- The remaining 50% or $2,240m of waste products were supplied by non–waste management businesses. Manufacturing ($723m), Wholesale ($547m) and Retail ($550m) made up over 80% of this remaining income from waste products.
- In 2009–10, nearly two–thirds (63% or $2,870m) of the total amount of waste products supplied to the economy were consumed domestically with the remaining exported.

WASTE MANAGEMENT SERVICES ($M)



(a) Includes public trading enterprises
(b) Local government authorities
(c) Includes electricity, gas and water supply industries and all other service industries

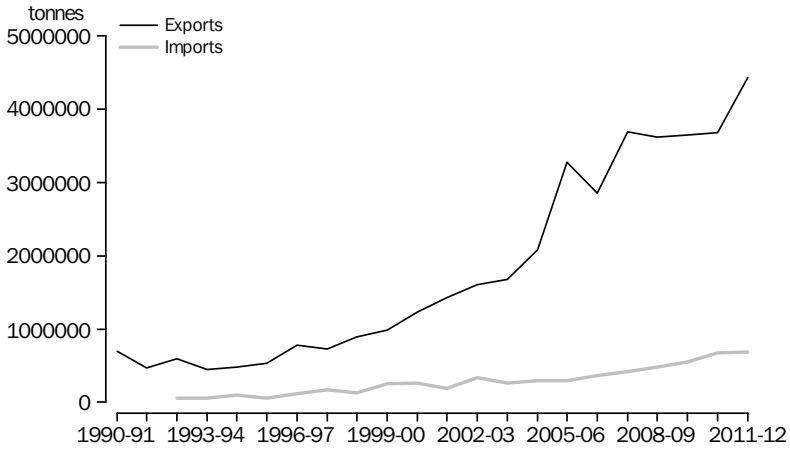
***includes taxes less subsidies on products - $74 million**

International Trade of Waste

- In 2011–12 Australia exported 4.4 million tonnes of waste valued at $2,407 million or 0.8% of Australia's total exports. In the last decade the value of Australia's waste exports has tripled from $696 million and the share of total exports has risen from 0.4% in 2000–01 to the current figure of 0.8%.
- Australia imported 685,000 tonnes of waste material valued at $139 million in 2011–12, representing only 0.05% of the value of Australia's total imports. In the last decade there has only been a small increase in the share of waste imports to total imports, up from 260,000 tonnes of waste material valued at $58 million in 2000–01 (0.04% of the value of Australia's total imports).

International Trade of Waste continued

FIGURE 5, International Trade in Waste, 1990–2012



Did you know?

- Australians are among the highest users of technology, and e–waste is one of the fastest growing types of waste.
- 17 million televisions and 37 million computers have been sent to landfill up to 2008[1].
- 99% of Australian households have at least one television set. while 55% have a second set[2].
- Of the 15.7 million computers that reached their 'end of life' in Australia in 2007–08, only 1.5 million were recycled – that's less the 10%[3].
- The cumulative volume of televisions and computers reaching the end of their useful life is expected to reach 181,000 tonnes or 44 million units by 2027–28[4].
- Australians buy more than 4 million computers and 3 million televisions annually[5].
- Older televisions that contain Cathode Ray Tubes (CRT) have more than 2 kilograms of lead and account for the largest source of lead in the waste stream. Flat screen televisions contain less lead but more mercury[6].
- If 75% of the 1.5 million televisions discarded annually were recycled there would be savings of 23,000 tonnes of CO^2 equivalents, 520 mega litres of water, 400,000 gigajoules of energy and 160,000 cubic metres of landfill space[7].

What is E–Waste?

E–waste is defined as waste electrical and electronic equipment that is dependent on electric currents or electromagnetic fields in order to function (including all components, subassemblies and consumables which are part of the original equipment at the time of discarding). They include:

1. Consumer/entertainment electronics (e.g. televisions, DVD players and tuners).

2. Devices of office, information and communications technology (e.g. computers, telephones and mobile phones).

3. Household appliances (e.g. fridges, washing machines and microwaves).

1 E waste Fact sheet – Clean Up Australia
http://www.cleanup.org.au/PDF/au/clean-up-australia---e-waste-factsheet-final
2 Planet Green Recycling http://www.planetgreenrecycling.net.au/ewaste-growing-problem.php
3 Total Environment Centre 2008, Tipping Point: Australia's E-Waste Crisis
http://www.tec.org.au/images/e-waste%20report%20updated.pdf
4 National Waste Policy Fact Sheet
http://www.environment.gov.au/settlements/waste/ewaste/publications/pubs/fs-householders.pdf
5 PGM Refiners. Australian E-Waste Statistics
http://www.pgmrefiners.com/about-e-waste/australia-ewaste-statistics/
6 GreenYour. Your Guide to Green Living.
http://www.greenyour.com/home/electronics/television/tips/dispose-of-your-television-properly
7 Environment Protection and Heritage Council, Statement on End of Life Televisions, Nov 2008

What is E–Waste? continued

4. Lighting devices (e.g. desk lamps).

5. Power tools (e.g. power drills) with the exclusion of stationary industrial devices.

6. Devices used for sport and leisure including toys (e.g. fitness machines and remote control cars).

The Problem with E–Waste

Disposal of unwanted televisions, computer products and other electrical or electronic devices in an environmentally responsible way is becoming an increasingly important issue due to the increase in consumption of raw materials, taking up of landfill space and disposal of hazardous substances in areas where they could leach into soil and water. Over 2011–12, an estimated 29 million televisions and computers[8] across Australia reached their end–of–life. Those dumped in landfill contain valuable materials that can be recycled and re–used, as well as substances which are hazardous to humans and the environment when disposed of inappropriately.

Televisions and computers also contain valuable non–renewable resources including gold, steel, copper, zinc, aluminium and brass. The amount of gold recovered from one tonne of electronic scrap from personal computers is more than that recovered from 17 tonnes of gold ore[9].

However, televisions and computers contain hazardous materials such as lead, cadmium and mercury, which need to be managed in a safe manner. Despite this many computers and televisions are disposed with household rubbish and end up in landfill.

Computer and television recycling entails the breaking down of the product into its various components (ie. plastics, metals, glass etc), where 95–98% (by weight)[10] of these materials can be fully recycled for future use. Many e–waste products also contain hazardous waste that requires special handling.

For example, the glass in CRT televisions contains a high concentration of lead and needs to be crushed in a contained environment, separated and cleaned. The recycled lead can be used as flux material to remove slag from newly mined lead and the glass can be used in the manufacture of new televisions and computers. Circuit boards can be shredded down to a fine powder and separated into plastics and precious metals which are able to be used for items ranging from jewellery to computer chips. Plastic casings can be turned into pellets and used for resins for new products or fuels. Scrap metals are melted down to form new metal based components.

The disposal of CRT televisions is a particular issue with the progressive closure of the analogue signal across Australia. In those places where the analogue signal has already been shut down there has been a significant increase in the disposal rate of CRT televisions.

8 Holroyd City Council. Television and Computer Disposal. http://www.holroyd.nsw.gov.au/your-city/environment/waste-and-recycling/television-and-computer-disposal/

9 Electronics TakeBack Coalition. Facts and Figures on E-waste and Recycling http://www.electronicstakeback.com/wp-content/uploads/Facts_and_Figures

10 1800ewaste http://www.ewaste.com.au/perth-ewaste-computer-recycling/

The Problem with E–Waste continued

The international movement of hazardous waste is managed by the Basel Convention, an international treaty designed to reduce and regulate the movements of hazardous waste. The Basel Convention was brought into force in 1992 and over 170 countries have joined the convention, including Australia who became a signatory in 1992.

Efforts to Manage E–Waste

Over many years the Australian Government, in partnership with State and Territory Governments and industry, has developed the National Product Stewardship Scheme to promote and encourage recycling. One of the outcomes of this Scheme is the National Television and Computer Recycling Scheme (NTCRS), which is funded and run by the television and computer industry and builds on existing recycling efforts by councils, charitable and other organisations to enable householders and small business to drop–off their unwanted televisions and computer products free of charge at selected collection locations across Australia.

The NTCRS is expected to boost the recycling rate for these products from the current 17 per cent to 30 per cent by June 2013 and 80 per cent by 2021–22, providing a long–term solution to television and computer waste. E–waste collection and drop off services were introduced gradually from mid to late 2012 and will expand to cover all of Australia by the end of 2013.

The ACT became the first jurisdiction to offer services to householders under the NTCRS. From May 2012 householders were able to drop off unwanted televisions and computers for free at waste transfer stations with the knowledge that these products would be recycled in an environmentally friendly way. Hazardous materials, including lead, mercury and zinc, would be prevented from entering the environment through landfill. Valuable non–renewable resources, including gold and other precious metals would also be reclaimed for reuse.

Collection services have been introduced gradually across Australia from mid–2012 and the scheme is designed to build on existing recycling services already available. Since the NTCRS began in May 2012 there are now over 40 recycling drop off points available in the ACT, Victoria, Western Australia, Queensland, South Australia and NSW. Recycling drop off points will continue to roll out with the timing and location determined by the industry recycling providers.

There are also other waste management schemes in place across Australia to reduce other forms of e–waste and associated wastes from going to landfill, including:

- Mobilemuster – Mobile phone recycling;
- Cartridges 4 Planet Ark – Printer cartridge recycling; and
- Australian Battery Recycling Initiative.

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National Television and Computer Recycling Scheme – Department of Sustainability, Environment, Water, Population and Communities http://www.environment.gov.au/settlements/waste/ewaste/publications/index.html

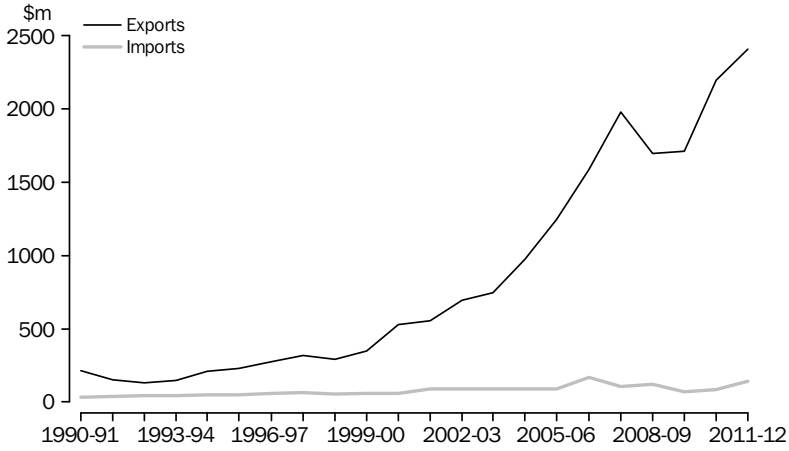
National Waste Policy Fact Sheet – National Television and Computer Recycling Scheme – a guide for householders http://www.environment.gov.au/settlements/waste/ewaste/publications/pubs/fs–householders.pdf

ANZRP – Australia and New Zealand Recycling Program. http://www.anzrp.com.au/

E–Waste Fact Sheet – Clean Up Australia http://www.cleanup.org.au/

Since the early 1990's Australia has had a positive balance of trade for waste materials (i.e the value of exports has exceeded imports). This trade balance has grown significantly in the last ten years from $469 million in 2001–02 to $2,268 million in 2011–12.

FIGURE 1, International Trade in Waste, 1990–2012



EXPORTS OF WASTE MATERIAL

In 2011–12 Australia exported 4.4 million tonnes of waste valued at $2,407 million or 0.8% of Australia's total exports. In the last decade the value of Australia's waste exports has tripled from $696 million and the share of total exports has risen from 0.4% in 2000–01 to the current figure of 0.8%.

Exports grew from $215 million in 1990–91 to $289 million in 1998–99 and then experienced rapid growth to reach $2,407 million in 2011–12. Conversely, imports of waste have only increased from $60 million to $139 million over the same period.

Although trade in waste products have grown significantly in the last 10 years, waste exports experienced a sharp downturn from $1,977 million in 2007–08 to $1,694 million in 2008–09 and waste imports almost halved from $122 million in 2008–09 to $67 million in 2009–10. The downturn in trade in waste materials over this period was considered to be partly related to the global financial crisis.

Australia's main waste exports are waste metals comprising waste and scrap of cast iron, ferrous metals, gold, copper and aluminium (82% of Australia's total value of waste exports). The next most valuable waste export was waste and scrap paper or paperboard. Global scrap metal prices are driven by the increased demand for steel, particularly from countries experiencing rapid economic growth such as China.

EXPORTS OF WASTE MATERIAL *continued*

TABLE 1: WASTE EXPORTS 2011–12

Category	*Gross weight* ('000 tonnes)	*Value (FOB)* (a) ($m)
Glass	3	1
Hazardous	28	41
Metals	2 463	1 969
Organics	121	41
Other	39	30
Paper & Cardboard	1 469	241
Plastics	175	74
Rubber	127	10
Timber	15	1
Total	**4 440**	**2 407**

(a) (FOB) - Free on Board (see glossary for definition)

In 2011–12 Australia's major trading partner for exported waste products was China which received 32% of the total value of Australia's waste exports.

Australia's main waste export to China was waste metal ($602 million or 592,000 tonnes) which accounted for 31% of the value of all exported waste metals. Aside from China, Australia's waste metals were also exported to Taiwan ($149 million or 196,000 tonnes), Malaysia ($140 million or 302,000 tonnes), Indonesia ($120 million or 280,000 tonnes), Korea ($108 million or 77,000 tonnes) and Vietnam ($77 million or 184,000 tonnes).

China also received 64% ($146 million or 941,000 tonnes) of Australia's waste paper and cardboard. Australia's other main trading partners for this product were Indonesia ($47 million or 225,000 tonnes), Hong Kong ($18 million or 169,000 tonnes), Malaysia ($11 million or 60,000 tonnes) and Korea ($7 million or 29,000 tonnes).

Waste paper and cardboard contributed 10% of Australia's total waste exports in 2011–12. The value of Australia's waste paper exports experienced rapid growth from $98 million in 2003–04 to $251 million in 2007–08, but has since fallen slightly to $241 million in 2011–12.

Hong Kong was Australia's main trading partner for plastic waste in 2011–12 receiving 62% ($43 million or 110,000 tonnes) of this waste product. China ($16 million or 45,000 tonnes), Indonesia ($2 million or 5,000 tonnes), and Thailand ($2 million or 4,000 tonnes) also receive significant amounts of plastic waste.

In 2011–12 hazardous waste exported by Australia was largely in the form of lead waste and scrap (90%) and chemical residual products (5%). Our main trading partners for this type of waste were Korea, Philippines and Germany. Australia exported $17 million of hazardous waste to Korea in the form of lead waste in 2011–12.

Australia exported 77% of rubber waste products to Vietnam ($5 million or 98,000 tonnes) in 2011–12.

The main destinations for organic waste in 2011–12 were New Zealand, Indonesia and Korea with these countries receiving 86%(104,000 tonnes) of the total amount exported.

EXPORTS OF WASTE MATERIAL *continued*

FIGURE 2, Waste Exports (major components by $ value) 1999 to 2012

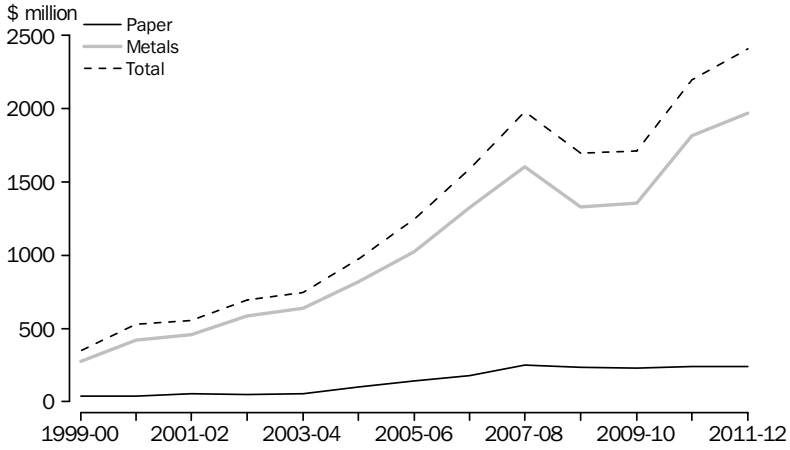
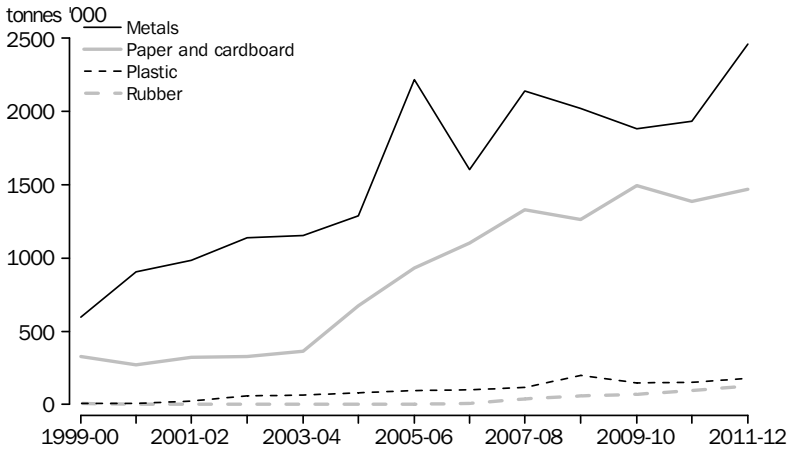


FIGURE 3, Waste Exports (major components by tonnes) 1999 to 2012



Imports of waste material

In 2011–12 Australia imported 685,000 tonnes of waste material valued at $139 million which represents only 0.05% of the value of Australia's total imports. In the last decade there has only been a small increase in the share of waste imports to total imports, up from 260,000 tonnes of waste material valued at $58 million in 2000–01 (0.04% of the value of Australia's total imports).

Imports of waste material continued

TABLE 2: WASTE IMPORTS 2011–12

Category	Gross weight ('000 tonnes)	Value (FOB) (a) ($m)
Glass	7	(b)0
Hazardous	8	24
Metals	620	88
Organics	10	6
Other	18	10
Paper & Cardboard	2	1
Plastics	6	3
Rubber	2	2
Timber	11	6

(a) (FOB) – Free on Board (see glossary for definition)
(b) Less than $500,000

As with exports Australia's major waste material imported was metals. In terms of weight, the main item of waste metal imported in 2011–12 was 574,000 tonnes of granulated slag valued at $2 million. In monetary value Australia's primary waste metal import was gold waste and scrap valued at $60 million (2 tonnes), followed by aluminium and copper waste metals valued at $11 million (5,200 tonnes).

Australia's main trading partners in 2011–12 for imported waste products were Japan, New Zealand, USA, Singapore and China. Eighty eight percent (601,000 tonnes) of Australia's total waste imports came from Japan, mainly in the form of granulated slag from the manufacture of iron and steel.

From New Zealand, Australia imported waste glass, waste metals and waste organics. Eighty five percent (6,000 tonnes) of total waste glass materials were imported from New Zealand in 2011–12.

In 2011–12 Australia's imports of hazardous waste came mainly from Singapore ($18 million) in the form of waste oils and petroleum products.

The main item of waste imported from the USA in 2011–12 were gold waste and scrap ($29 million or 1 tonne).

Over half the weight (55% or 3,000 tonnes) of Australia's imports of waste from China in 2011–12 were waste slag and ash.

In 2011–12 Australia's imports of organic waste mainly originated from New Zealand ($2 million or 1,400 tonnes) and China ($1 million or 1,700 tonnes).

Australia imported just over 2,000 tonnes of waste paper and cardboard in 2011–12 with almost 65% (1,300 tonnes) originating from Fiji and small amounts also imported from New Zealand and the USA.

Imports of plastics waste in 2011–12 came primarily from China (2,000 tonnes) and Taiwan (1,000 tonnes).

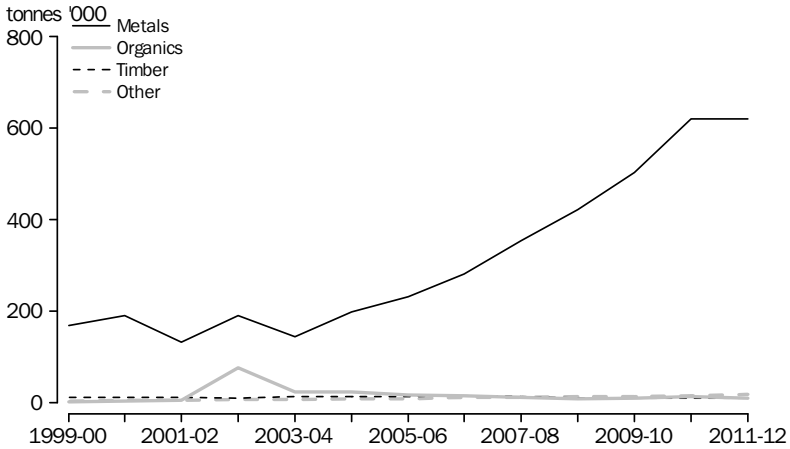
Italy supplied 30% (696 tonnes) of all waste rubber products imported in 2011–12 in the form of waste parings and scrap.

Imports of waste material continued

Timber waste imported into Australia was sourced primarily from South Africa ($3 million or 7,300 tonnes) in 2011–12. Most of the timber waste that is imported into Australia is in the form of residual lyes 84% (9300 tonnes) from the manufacture of wood pulp.

FIGURE 4, Waste Imports (major components by $ value) 1999 to 2012

FIGURE 5, Waste Imports (major components by tonnes) 1999 to 2012



What is hazardous waste?

Hazardous Waste is waste that poses substantial or potential threats to public health or the environment. It generally relates to materials that are known or tested to exhibit one or more of the following four hazardous traits:

- ignitability.
- reactivity.
- corrosivity.
- toxicity.

The international movement of hazardous waste is managed by the Basel Convention, an international treaty designed to reduce and regulate the movements of hazardous waste between nations. The Basel Convention was brought into force in 1992 and now has membership of over 170 countries, including Australia who has been a signatory since 1992.

Hazardous waste refers to the solids, liquids, or contained gases generated by industrial processes that pose a substantial present or potential hazard to human health or the environment when improperly treated, stored or disposed. Examples of common hazardous wastes include spent auto batteries, spent solvents, and sludges from industrial wastewater treatment units.

Over recent years the amount of hazardous waste has increased due to a number of factors including:

- population growth and the associated increase in demand for goods and services;
- growth in trade in chemical products and increased use of oils, pesticides, acids and alkalis;
- an increase in the amount of hazardous components in household waste; and
- improved health care which has led to more clinical and pharmaceutical waste.

The Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was established in 1992. The main objective of the convention is to protect, by strictly controlling, human health and the environment against the adverse effects which may result from the generation, transboundary movement and management of hazardous and other wastes.

Other objectives of the convention include reducing transboundary movements of wastes to a minimum, consistent with sound and efficient environmental management, and controlling any permitted transboundary movement under the terms of the convention. The convention also aims to minimize the amount of hazardous wastes generated and assist developing countries in managing the hazardous and other wastes they generate.

A waste falls under the scope of the Basel Convention if it is listed and exhibits one of the hazardous characteristics of being explosive, flammable, toxic or corrosive. It may also fall under the scope of the convention if the laws of the exporting or importing country or any of the transit countries define or consider it to be a hazardous waste.

The Basel Convention continued

Through the Basel Convention hazardous wastes can be exported only if the exporting country does not have the technical capacity and facilities to ensure disposal in an environmentally sound manner. Transboundary movement is prohibited if the country of export or import has reason to believe that the waste shall not be managed in the expected manner.

The convention is complemented by a protocol which provides for a comprehensive regime for liability as well as compensation for damage resulting from the transboundary movement of hazardous wastes and other wastes and their disposal, including incidents occurring because of illegal traffic in those wastes. Those involved in the transboundary movement and disposal of hazardous waste are strictly liable for damage caused regardless of the presence of fault up to the financial limits established by the protocol. Fault–based liability is also regulated by the protocol.

In 1995 the Basel Ban Amendment was adopted, which prohibits the export of hazardous waste from a list of developed countries to developing countries. The Basel Ban applies to hazardous waste exports for any reason, including recycling.

Radioactive waste is covered under other international regulatory systems and is not covered in the Basel Convention.

For information on the international trade of hazardous waste please see the feature article Australia's International Trade in Waste.

Hazardous Waste Act 1989

In Australia, the Hazardous Waste Act 1989 was introduced to regulate the export and import of hazardous waste. The Act ensures that hazardous waste is disposed of safely both in Australia and overseas so both communities and the environment are protected from the harmful effects of the waste.

The Act was developed to enable Australia to comply with the Basel Convention and is administered by the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC).

DSEWPaC is the official authority for Australia under the Basel Convention. They process import, export and transit permit applications under the Act, and ensure compliance and enforcement. DSEWPaC also prepares, implements and amends legislation relating to movements of hazardous waste to, from or through Australia.

National Environment Protection Measures

The *Waste Account, Australia, Experimental Estimates* (cat no. 4602.0.55.005) shows that in 2009–10 a total of 3,500 kilotonnes of hazardous waste was generated in Australia, which represented 6% of the total waste generated. This hazardous waste comprised quarantine waste, contaminated soil, industrial waste and asbestos.

The most hazardous category of waste is *controlled waste* which includes those wastes that exhibit toxicity and chemical or biological reactivity.

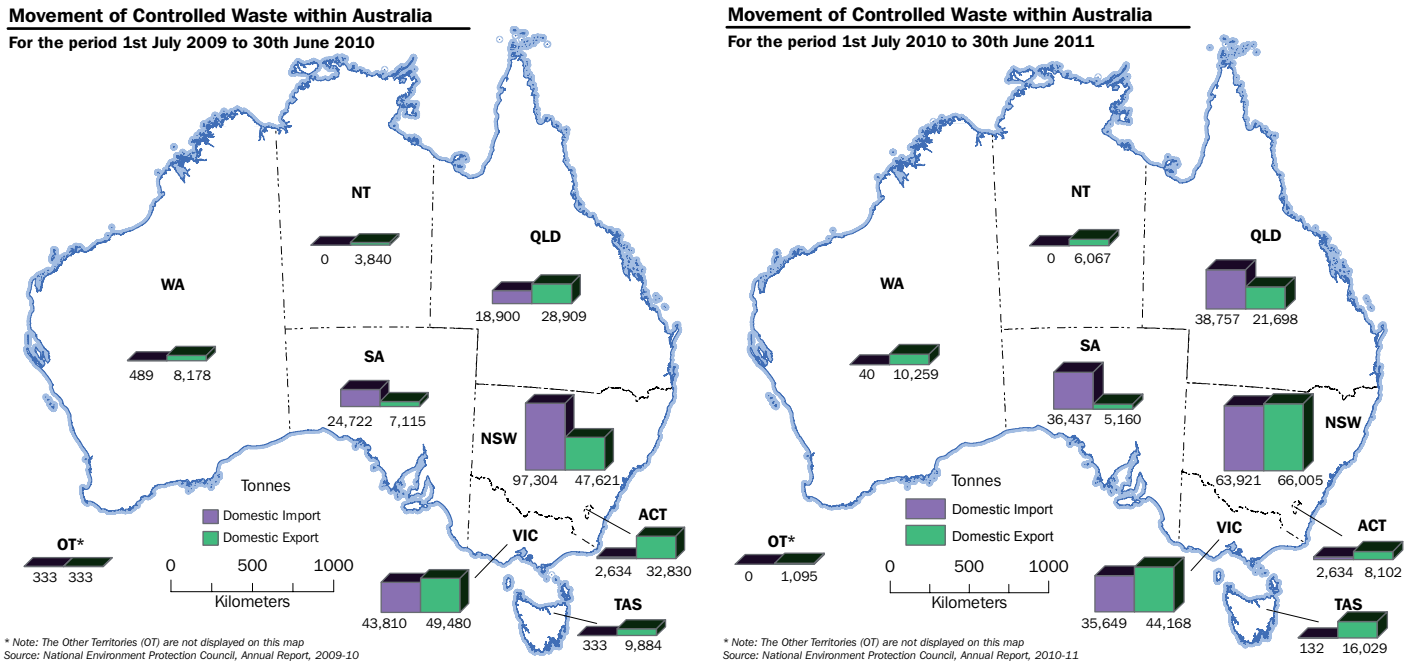
The transport of controlled wastes in Australia is covered by National Environment Protection Measures (NEPMs), which were introduced in 1998 to track the movement of controlled waste around Australia to assist waste producers, waste transporters and the operators of waste receival facilities.

Movement of Controlled Waste within Australia

Controlled waste transported domestically between states and territories amounted to 188,000 tonnes during 2009–10, declining to 179,000 tonnes for 2010–11. These wastes consist primarily of inorganic chemicals, oils, soil/sludge, acids, alkalis, and putrescible/organics.

The figures below shows the movement of controlled waste by each state and territory within Australia for 2009–10 and 2010–11. New South Wales was the biggest importer of controlled waste in both periods, despite the amount falling from 97,304 tonnes in 2009–10 to 63,921 tonnes in 2010–11. Victoria was the largest exporter of controlled waste in 2009–10 with 49,480 tonnes but was recently overtaken by NSW in 2010–11 with exports of 66,005 tonnes.

FIGURE 1 MOVEMENT OF CONTROLLED WASTE IN AUSTRALIA, 2009–10 AND 2010–11



Note:

The total for exports and imports do not align because of discrepancies in the movements of controlled waste due to consignment non-arrival, transport without authorisation, non-matching documentation and waste data.

Household Hazardous Waste

Household hazardous waste includes products that contain corrosive, toxic or reactive ingredients such as paints, cleaners, oils, batteries and pesticides. These products contain potentially hazardous ingredients and require proper disposal to protect human health and the environment. Hazardous waste items are disposed of in a number of different ways with the most common method being non–recycled garbage. Safer disposal methods include dropping off at a business or central point or taking the product to a specialised area at a waste transfer station.

The most common hazardous waste disposed by households is batteries, which grew from 57% in 2000 to 68% in 2009. The second most disposed hazardous waste item is medicines, drugs or ointments which fell from 38% in 2000 to 32% in 2009.

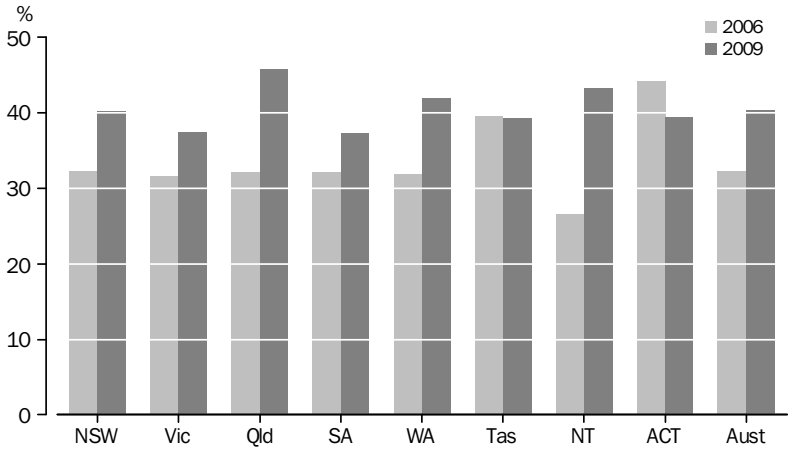
Awareness of Hazardous Waste Disposal Facilities, Australia

The ABS publication *Environmental Issues: Waste Management and Transport Use, March 2009* (cat no. 4602.0.55.002) included information about domestic waste management. A range of household waste management issues were covered including the types of items recycled/reused, the ways households recycle, the frequency of recycling collection and the reasons for not recycling. Household waste management issues of hazardous material were also reported in the publication. Information was collected regarding the type of hazardous item disposed, the ways households disposed of hazardous waste and the awareness of, and reasons for not using hazardous waste disposal facilities.

Figure 2 shows that awareness of hazardous waste disposal services has increased across Australia from 32% in 2006 to 40% in 2009. The Northern Territory had the largest increase rising from 27% to 43% and Queensland also showed a marked increase rising from 32% to 46%. The ACT experienced a fall in awareness from 44% to 39%.

The survey reported that the most common reason for households not to engage in correct disposal of hazardous wastes was that they did not have sufficient material to warrant the use of the drop–off facilities, rather than the cost of disposal.

FIGURE 2, Awareness of Hazardous Waste Disposal Facilities, by state and territory, 2006 and 2009



Source – *Environmental Issues: Waste management and Transport Use, March 2009* (ABS cat. no. 4602.55.002).

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EXPLANATORY NOTES

INTRODUCTION

1 The ABS Waste Account Australia, Experimental Estimates, (WAAEE) 2013, is a pilot project, which adds to the existing suite of environmental accounts produced by the ABS based on the United Nations System of Environmental–Economic Accounts (SEEA). It consists of the following data tables for 2009–10:

- Waste generated by industry, government and households, by waste material, '000 tonnes (Physical supply).
- Waste management, treatment and disposal, by waste material, '000 tonnes (Physical use).
- Supply of waste goods and services, by industry, $million (Purchasers' prices) (Monetary supply).
- Use of waste goods and services, by industry and households, $million (Purchasers' prices) (Monetary use).

2 Additional data and analysis has been included to add further context including feature articles and main findings.

3 These experimental estimates explore concepts and methods while also assessing the quality and limitations of available data sources. The timing and frequency of future WAAEE will be determined in consultation with stakeholders and the availability of data and resources.

4 The WAAEE integrates data from different sources into a consolidated framework making it possible to link physical data on waste to economic data, such as those contained in Australia's National Accounts.

ENVIRONMENTAL ACCOUNTING FRAMEWORK

5 The WAAEE was developed using the SEEA, which is a measurement framework that provides a range of metrics that link information on the environment and the economy. The SEEA was first published by the United Nations in 1993 and was adopted as an international statistical standard in 2012 by the United Nations Statistical Commission. For further information on the SEEA and the ABS environmental accounts program please see *Completing the Picture – Environmental Accounting in Practice, May 2012* (cat. no. 4628.0.55.001).

PHYSICAL SUPPLY AND USE OF SOLID WASTE IN THE WAAEE

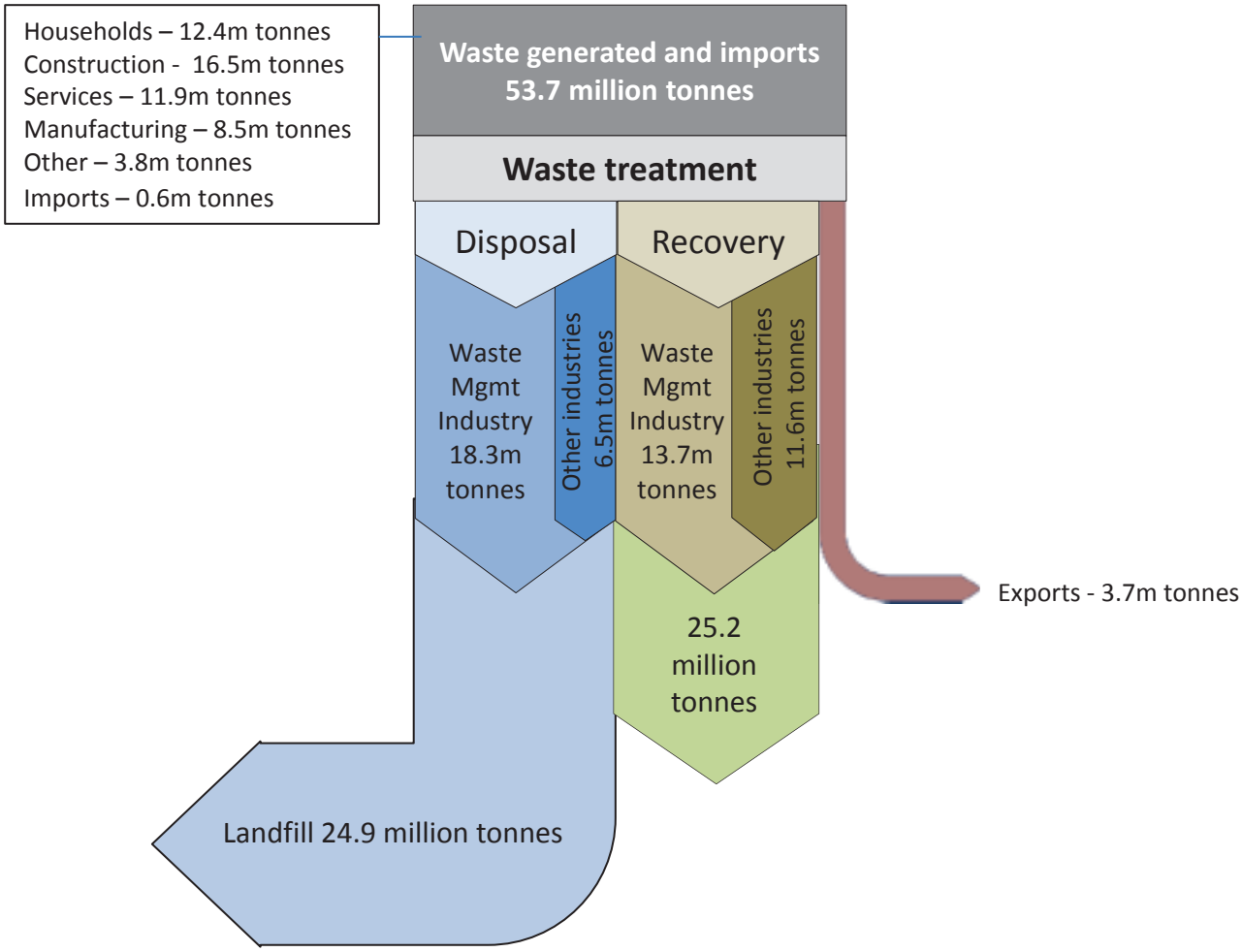
6 The physical supply table records the total supply of solid waste products within the economy (including imports). The physical use table records the total use of solid waste materials within the economy (including exports).

7 The supply and use methodology is based on the fundamental economic identity that supply of products equals use of products.

Scope

8 The physical waste supply and use tables present aggregates of all available physical data (tonnes) in terms of the supply and use of solid waste in the Australian economy for the financial year 2009–10. This is set out in Figure 2 below.

FIGURE 2. WASTE GENERATION AND MANAGEMENT



Scope *continued*

9 The SEEA defines solid waste as "*discarded materials that are no longer required by the owner or user. Where the unit discarding the materials receives no payment for the discarded materials that are no longer required by the owner or user. Where the unit discarding the materials receives no payment for the materials then the flow is considered a residual flow of solid waste. Where the unit discarding the materials receives a payment but the actual residual value of the material is small, for example in the case of scrap metal sold to a recycling firm, this flow is considered a product flow of solid waste.*"

10 Data on the physical supply and use of waste are primarily derived from *Waste and Recycling in Australia (WRiA) 2011* commissioned by the *Australian Government Department of Sustainability, Environment, Water, Population and Communities* (DSEWPaC). The WRiA compiles solid waste and recycling data published by the states, territories and industry for the 2008–09 financial year. It presents data on the recycling of solid waste, energy recovery from solid waste, and the disposal of solid waste to landfill. The report presents data by material category and material type in terms of solid waste streams. The ABS uses the SEEA to transform this data into a framework to enable linkages between waste supply, waste use and the various economic aggregates contained in the Australian National Accounts.

Coverage

11 Coverage for both the physical supply and use tables includes the following waste materials:

- Paper and Cardboard
- Glass

Coverage continued

- Plastics
- Metals
- Organics
- Masonry
- Electrical and Electronic
- Hazardous
- Leather and Textiles
- Tyres and other Rubber
- Timber and Wood products
- Inseparable/unknown

12 The following waste materials were out of scope and were excluded in the physical supply and use tables:

- Liquid waste
- Radioactive waste
- Mineral waste from the mining industry
- Wastewater (untreated effluent, sewage water and trade waste). For further information see *Water Account, Australia, 2010–11* (cat. no 4610.0)
- Emissions
- Fly ash
- Fishing waste

13 Industry classifications used for the physical supply and use tables follow the Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 (cat. no. 1292.0). The categories used in the tables are:

- Agriculture, Forestry and Fishing
- Mining
- Manufacturing
- Electricity, Gas, Water
- Waste Collection, Treatment and Disposal Services – Subdivision 29
- Construction
- Local Government Administration – Class 7530
- Services

14 Services consists of the following industries:

- Wholesale Trade
- Retail trade
- Accommodation and Food Services
- Transport, Postal and Warehousing
- Information Media and Telecommunications
- Financial and Insurance Services
- Rental, Hiring and Real Estate Services
- Professional, Scientific and Technical Services
- Administrative and Support Services
- Public Administration and Safety – excluding Class 7530
- Education and Training
- Health Care and Social Assistance
- Arts and Recreation services
- Other Services

15 In the WAAEE the Municipal Solid Waste (MSW) stream is used to estimate household waste. MSW includes waste collected directly (e.g. kerbside collections of recycling and waste to landfill) and indirectly (e.g. householder drop off at transfer stations, householder self–haul to landfill) from households. It also includes some Commercial and Industrial (C&I) waste where local governments provide (directly or indirectly) a collection service that covers businesses and households.

Data Sources

16 The physical estimates contained in this publication are drawn from a wide range of ABS and non–ABS data sources, including:

- ABS Sources:
  - *Waste Management Services, Australia, 2009–10* (cat. no. 8698.0)
  - *Completing the Picture – Environmental Accounting in Practice, May 2012* (cat. no. 4628.0.55.001)
  - *Australian National Accounts: Input–Output Tables 2008–09* (cat. no. 5209.0.55.001)
  - *Australian System of National Accounts, 2011–12* (cat. no. 5204.0)
  - *Australian Industry, 2010–11* (cat. no. 8155.0)
  - *Environmental Issues: Waste Management and Transport and Motor Vehicle Usage, March 2012* (cat. no. 4602.0.55.002)
  - *International Trade in Goods and Services, Australia Sep 2012* (cat. no. 5368.0)
- Non ABS Sources:
  - National Waste Report 2010 – *Environment Protection and Heritage Council* and the *Department of Sustainability, Environment, Water, Population and Communities* (DSEWPaC), formerly the Department of Environment, Water, Heritage and the Arts.
  - Waste and Recycling in Australia 2011: Incorporating a revised method for compiling waste and recycling data, commissioned by *DSEWPaC*.
  - 2011 National Plastics Recycling Survey – Plastics and Chemicals Industries Association (PACIA)
  - Australian Forest and Wood Products Statistics 2011 – *Australian Bureau of Agricultural and Resource Economics and Sciences* (ABARES)
  - Analysis of Battery Consumption, Recycling and Disposal in Australia – Warnken ISE for Australian Battery Recycling Initiative
  - Organics Recycling in Australia – Industry Statistics 2010, Recycled Organics Unit
  - A Study of Australia's Current and Future E–Waste Recycling Infrastructure Capacity and Needs, 2010, commissioned by *DSEWPaC*.
  - Place–Based Approaches to Commercial and Industrial Waste and Recycling 2012, commissioned by *DSEWPaC*.
  - Kerbside Domestic Waste and Recycling Audit for ACT NoWaste 2009 – APC Environmental Management
  - Domestic Kerbside Waste and Recycling in NSW 2007–08 – NSW Office of Environment and Heritage
  - Construction and Demolition Waste Status Report: Management of Construction and Demolition Waste in Australia, commissioned by DSEWPaC and the Queensland Department of Environment and Resource Management, 2011

METHODOLOGY

Physical supply (generation) of waste

17 Before allocating data to industries and the household sectors a total waste generated amount was derived from WRiA with the inclusion of additional data sources (see non–ABS data sources above) considered in scope of the WAAEE.

18 The *Australian National Accounts Input–Output tables* (cat. no. 5209.055.001) was used to allocate waste generated to industries. Each product balance describes the supply (domestic output + imports) and the use (intermediate consumption and final demand) of the product at a detailed level. The Intermediate Use of specific products were aggregated to certain waste flow categories for specific industries as presented in Tables 1 and 2.

Waste generation by the Mining Industry

19 Estimates of total non–mineral waste generated by the mining industry were estimated using publicly available annual sustainability reports sourced from Australian mining companies. These reports also provided employment numbers (including contractors), which were used to approximate the average amount of non–mineral waste generated per employee. A total non–mineral waste generated amount was then derived using *Australian Industry* (cat no. 8155.0). The total waste generated was then allocated using the *Australian National Accounts Input–Output tables* (cat. no. 5209.0.55.001) to aggregate the waste flow categories by material to the mining industry.

Waste Generation by the Agriculture, Forestry and Fishing Industry

20 Data from the *Organics Recycling in Australia Report 2010* relating to primary production was used to estimate organic waste generation, recovery and disposal. The total organic waste generated was allocated to the agricultural sector of the WAAEE.

Waste generation by Households

21 The quality of Information available on household waste from the Municipal Solid Waste (MSW) stream varies across states and territories. The WAAEE used the NSW Kerbside Audit Study as the benchmark for the allocation of waste materials for households across Australia. This study covered a large sample area consisting of 51 Local Government Areas in the Sydney Metropolitan Area and Extended Regulated Area. All three waste collection systems were covered by this study – residual waste, recycling, and garden organics, and included waste materials going to facilities other than landfills.

22 The MSW stream includes wastes from the operations of local governments despite some wastes from households classified as C&I or Construction and Demolition (C&D). Household demolition or construction activities undertaken by households but collected by skip operators are produced by the MSW stream but allocated to the C&D stream. As a result of this practice part of the MSW materials were allocated to industries as "Inseparable/Unknown" waste.

23 The kerbside audits did not provide sufficient data on E–waste which was allocated across industries and households using data from the *Study of Australia's Current and Future E–Waste Recycling Infrastructure Capacity and Needs, 2010*, commissioned by DSEWPaC.

24 For plastics, the Plastics and Chemicals Industries Association (PACIA) identifies specific generators of plastic waste in its annual *National Plastics Recycling Survey* on consumption, recovery and recycling of plastics. The WAAEE allocated 44% of plastics waste to households based on this survey and the remaining 56% of plastic waste was allocated to industries using the Australian National Accounts Input/Output table.

25 Inseparable/Unknown was allocated to industries and households using broad indicators derived from the *Australian National Accounts: Input–Output Tables 2008–09* (cat. no. 5209.0.55.001).

Physical waste use (management)

26 The WAAEE physical use table was based on *WRiA, 2011 National Plastics Recycling Survey, The Study of Australia's Current and Future E–Waste Recycling Infrastructure Capacity and Needs, 2010* and ABS *Waste Management Services 2009–10* (cat. no. 8698.0). The total physical waste use was balanced to equal total waste generation.

27 *WRiA, Table 4.9: Waste generation, recycling and recovery rates by material* disaggregates relevant waste streams by destination (landfill or recycling) This breakdown, calculated as a proportion of waste materials disposed to landfill or recovery, was applied to the totals estimated in physical waste generation.

28 Total waste treated (by landfill and recovery) by ANZSIC subdivision 29 (Waste Management Services) was taken from ABS *Waste Management Services, Australia* (cat. no. 8698.0).

Physical waste use (management) continued

29 To align with the SEEA framework the exports of waste materials is considered separate to domestic recovery as these have undergone transformation and/or been sold. For further information please see Waste Imports and Exports (below).

Timber waste

30 The ABS *Waste Management Services* survey (cat. no. 8698.0) publishes data on timber waste disposal and recovery at facilities other than landfills. This survey was used in conjunction with Recycled Organics data on the proportion of timber waste in organics, and the *National Waste Report* (NWR) data to estimate the amount of timber waste generated.

31 The NWR was used to estimate the amount of timber waste sent to landfill, in particular *Table 2.38: Average proportions of different materials in MSW waste sent to landfill; Table 2.42: Average proportions of different materials in C&I waste sent to landfill; and for C&D materials Figure 2.83: NSW—C&D materials landfilled, 2006–07.*

32 Industries other than the waste management industry also deal with waste management issues. Insufficient data was available to allocate their contribution and they were assigned to "Other industries".

Plastics waste

33 The Plastics and Chemicals Industries Association (PACIA) represents the chemical and plastic industry and conduct an annual *National Plastics Recycling Survey* on the consumption, recovery and recycling of plastics. The results from the 2011 survey provide a comprehensive picture of consumption, flow and recycling in plastics and were used in the production of estimates in the WAAEE.

Data extrapolation

34 The relative proportions of waste materials generated by each industry sector and households for 2008–09 were used for 2009–10 estimates. This also applied to the use of waste services by industries for landfill and recovery purposes.

35 Where data sources were not available for every year, estimates were derived using the proportions for the available time periods. The physical supply and use WAAEE tables for 2009–10 were extrapolated using the 2008–09 WRiA. The *Australian National Accounts (cat. no. 5204.0) Table 5: Gross Value Added (GVA) by Industry*, was used to calculate the GVA movement from 2008–09 to 2009–10.

36 Household waste generation for 2009–10 was derived using *Australian National Accounts* (cat. no. 5204.0) *Table 42: Household Final Consumption Expenditure (HFCE)*. The movement in the HFCE from 2008–09 to 2009–10 was calculated and applied to the total waste generated by the household sector in 2008–09 and used to derive estimates for 2009–10.

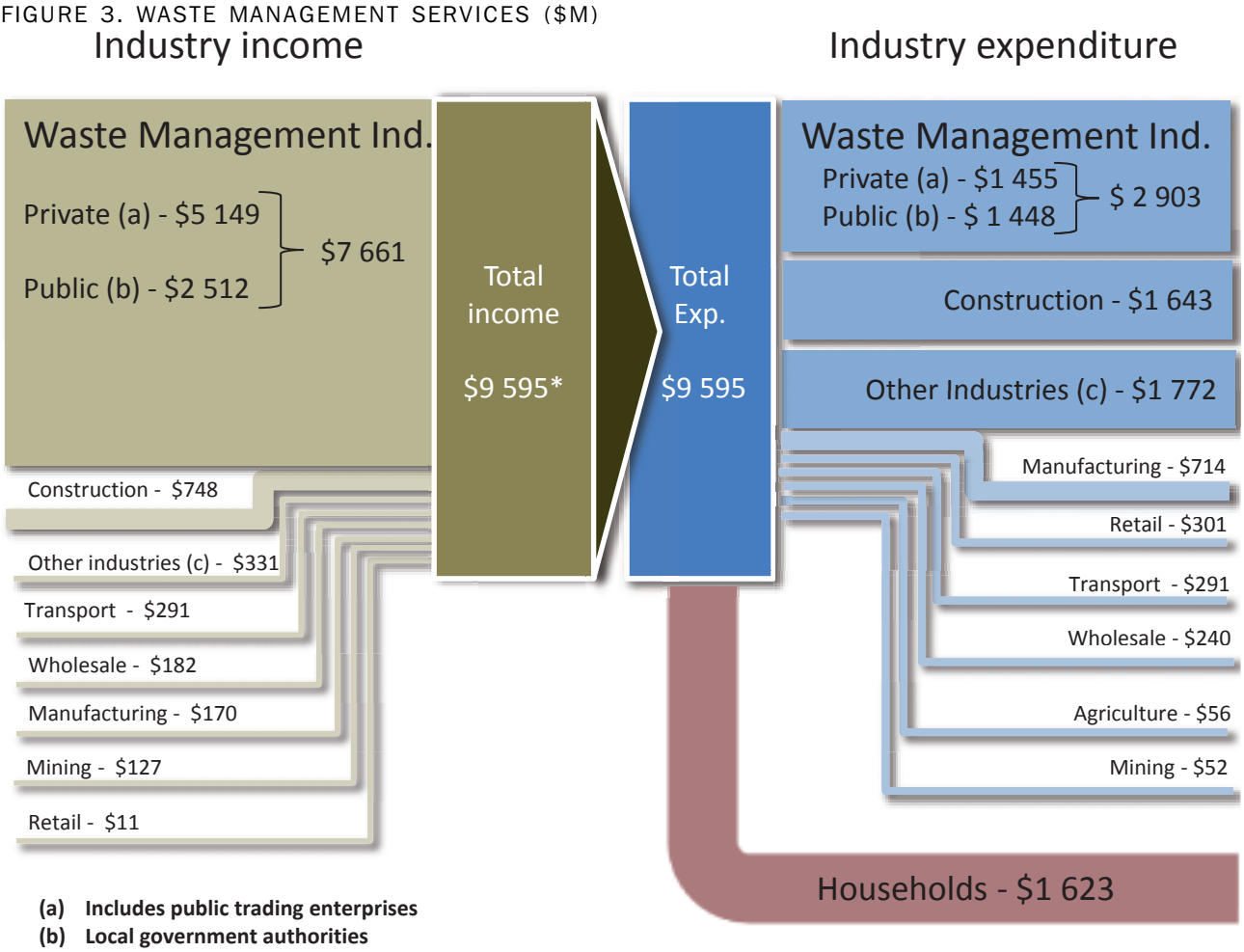
37 Data for both imports and exports of waste materials were obtained from international trade data and are included in the 2009–10 waste supply and use physical tables. See waste imports and exports (below) for further information.

MONETARY SUPPLY AND USE

Scope

38 The Monetary supply and use tables present aggregates in monetary terms ($million) for the supply and use of waste goods and services within the Australian economy for the financial year 2009–10. Monetary supply and use tables illustrate the economic transactions associated with the income generated by the supply of waste management services and sales of recovered waste material and expenditure on the use of waste management services and purchase of recovered waste material.

FIGURE 3. WASTE MANAGEMENT SERVICES ($M)



(a) Includes public trading enterprises
(b) Local government authorities
(c) Includes electricity, gas and water supply industries and all other service industries

***includes taxes less subsidies on products - $74 million**

Coverage

39 Coverage for both the monetary supply and use tables includes the following:

- Income and expenditure ($million) relating to waste management services
  - Non–recyclable
  - Recyclable
- Income from sales ($million) of recyclable/recoverable material
  - Paper and cardboard
  - Organic material
  - Metals
  - Other
- Imports and exports ($million) of waste material:
  - Paper and cardboard
  - Organic material
  - Metals
  - Other

40 Coverage for waste management expenditure included:

- Agriculture (excl Aquaculture, Forestry and Fishing)
- Mining
- Manufacturing
- Waste Collection, Treatment and Disposal Services (private and local government authorities)
- Construction

Coverage *continued*

- Wholesale
- Retail
- Transport, Postal and Warehousing
- All other service industries

41 Coverage for waste management expenditure for "All other service industries" included:

- Aquaculture, Forestry and Fishing
- Electricity, Gas and Water Supply services
- Accommodation and Food services
- Information, Media and Telecommunications
- Financial and Insurance Services
- Rental, Hiring and Real Estate Services
- Professional, Scientific and Technical Services
- Administrative and Support Services
- Public Administration and Safety
- Education and Training
- Health Care and Social Assistance
- Arts and Recreation Services
- Other Services
- Commonwealth and State Governments

42 Coverage for income from waste management services included:

- Mining
- Manufacturing
- Waste Collection, Treatment and Disposal Services
- Wholesale
- Retail
- Construction
- Transport, Postal and Warehousing
- All other service industries

43 Coverage for income from waste management services for "All other service industries" included:

- Electricity, Gas and Water Supply services.
- Agriculture, Aquaculture, Forestry and Fishing*
- Rental, Hiring and Real Estate Services*
- Professional, Scientific and Technical Services*
- Administrative and Support Services*
- Public Administration and Safety*
- Education and Training*
- Health Care and Social Assistance*
- Arts and Recreation Services*
- Other Services*
- Commonwealth and State Governments
- *Income from these service industries was assumed to be zero.

44 Coverage for income from sales of recyclable/recoverable material included:

- Agriculture
- Mining
- Manufacturing
- Waste Collection, Treatment and Disposal Services
- Construction
- All other service industries

45 Coverage for income from sales of recyclable/recoverable material for "All other service industries" included:

Coverage continued

- Electricity, Gas and Water Supply services.
- Aquaculture, Forestry and Fishing*
- Transport, Postal and Warehousing*
- Rental, Hiring and Real Estate Services*
- Professional, Scientific and Technical Services*
- Administrative and Support Services*
- Public Administration and Safety*
- Education and Training*
- Health Care and Social Assistance*
- Arts and Recreation Services*
- Other Services*
- Commonwealth and State Governments
- *Income from these service industries was assumed to be zero.

DATA SOURCES

46 The monetary estimates contained in this publication are drawn from ABS and non–ABS data sources, including:

- ABS sources:
  - *Waste Management Services, Australia, 2009–10* (cat. no. 8698.0)
  - Economic Activity Survey 2010–11
  - *Australian Industry, 2010–11* (cat. no. 8155.0)
  - *Australian System of National Accounts, 2011–12* (cat. no. 5204.0) National Accounts supply–use benchmarks data for taxes, subsidies, margins, imports
  - *International Trade in Goods and Services, Australia Sep 2012* (cat. no. 5368.0)
  - *Consumer Price Index, Australia, Sep 2012* (cat. no. 6401.0)
  - *Household Expenditure Survey, Australia: Summary of Results, 2009–10* (cat. no. 6530.0)
- Non ABS Sources:
  - Local Government Authorities (Local councils) – 2009–10 Financial Reports and Budget Reports
  - Role and Performance of Local Government – Waste and recycling related data and information, 2011. commissioned by *DSEWPaC*

METHODOLOGY

Income

47 Income from waste management services was compiled from *Waste Management Services (WMS) 2009–10* (cat. no. 8698.0) for the Waste Management Services industry and the *Economic Activity Survey (EAS)* 2010–11 for other industries.

48 Income from waste management services (by recyclables/non–recyclables) and sales of recyclable/recovered material for the Waste Management Services industry is derived from Tables 4 and 5 of *Waste Management Services, Australia, 2009–10* (cat. no. 8698.0). Note that "Private" refers to Private and Public Trading Enterprises, and "Public" refers to the waste management activities of local government.

49 Income data from the ABS *Economic Activity Survey, 2010–11* for industries other than Waste Management Services in 2009–10 was estimated using the Industry Sales and Service income movement from *Australian Industry* (cat. no. 8155.0).

50 Income from the supply of waste products (recyclable/recoverable material) has been calculated as a trade margin because these products are typically sold after undergoing only relatively minor processing (such as grading, cleaning etc.). Following the principles of the 2008 SNA, trade margins have been calculated as the difference between the price realised on the sale of the good, and the price paid for the good. However, data sources used within this publication indicate that prices paid to acquire the recyclable/recoverable material are negligible and therefore the trade margin is effectively equal to the price realised on the sale of these goods. For further information

Income continued

on Supply and Use tables and the concept of margins, see *Australian National Accounts: Concepts, Sources and Methods, Edition 3* (cat no. 5126.0).

Expenditure

51 Intermediate consumption of waste management services (by recyclables/non–recyclables) by the Waste Management Services industry were sourced from Tables 8 and 9 of *Waste Management Services, Australia, 2009–10* (cat. no. 8698.0)."Private" refers to Private and Public Trading Enterprises, and "Public" refers to local government.

52 In–scope expenditure items included:

- contract and subcontract expenses for waste management services for recyclables and non–recyclables;
- fees for the treatment/processing/disposal of waste, and
- waste disposal levies/contributions paid to the EPA.

53 Intermediate consumption of waste management services (by recyclables/non–recyclables) for Other industries were estimated based on payments to contractors and subcontractors for waste management services derived from the ABS *Economic Activity Survey, 2010–11*.

54 Expenditure on the use of waste management services for industries other than waste management services in 2009–10 were estimated from ABS *Economic Activity Survey, 2010–11* estimates and backcast using the Industry Gross Value Added movement from the *Australian System of National Accounts* (cat. no. 5204.0).

55 No data was available for expenditure on recyclable/recovered materials. This data was marked as "n.a." in WAAEE monetary table 2.

56 Household final consumption (expenditure on waste services) was derived from annual financial reports of Local Government Authorities (LGA's). LGA's are responsible for the provision of waste services for households and household waste services charges are included in annual rates charges.

WASTE IMPORTS AND EXPORTS

International Trade Classifications

57 Australia applies the international *Harmonized Commodity Description and Coding System (HS)* for the classification of internationally traded goods. The HS is a 6–digit hierarchical classification designed by the World Customs Organization (WCO).

58 Information provided by importers, exporters and their agents to the Australian Customs and Border Protection Service was used in the WAAEE as a source of information for import and export data in the physical and monetary supply and use tables. Australia expands the HS to produce two different classifications for imports and exports. These classifications are the *Harmonized Tariff Item Statistical Code (HTISC)* ,also known as the Customs Tariff and the *Australian Harmonised Export Commodity (AHECC)* (cat. no. 1233.0).

Exports

59 The following information can be obtained or derived from export documentation for all goods exporters:

- Value of commodity
- State of origin of the commodity
- Period of time the commodity was exported
- Industry of origin of the commodity
- Gross weight of commodity
- Destination of commodity
- AHECC code of commodity exported

Imports

60 The following information can be obtained or derived from import documentation for all goods importers:

- Value of commodity
- Gross weight of commodity

Imports continued

- Period of time the commodity was imported
- Country of origin of commodity
- State of final destination of commodity
- HTISC code for the commodity imported

Waste product classification for imports and exports

61 In the WAAEE, imports and exports of waste products are components of the physical supply and use tables.

62 Imports and exports classified as being waste were identified by using AHECC, HTISC and the Central Product Classification (CPC) Version 2 in order to calculate amounts of wastes (by weight and dollars) entering and exiting Australia. This data is available from ABS *International Trade in Goods and Services, Australia* (cat. no 5368.0).

Table 1 Waste generated by industry, government and households 2009-10, by waste material, '000 tonnes (Physical supply)

	Australian and New Zealand Industry Classification 2006								Other			
	Agriculture and Forestry (a)	Mining (b)	Manufacturing	Electricity, Gas, and Water Services	Waste Management Services (c)	Construction	Services (d)	Total	General Government	Households	Imports	Total
	'000t	'000t	'000t	'000t	'000t	'000t	'000t	'000t	'000t	'000t	'000t	'000t
Paper & Cardboard	1	2	1 507	34	2	230	1 586	**3 362**	186	2 868	3	**6 419**
Glass	0	0	570	1	0	57	204	**832**	5	585	0	**1 422**
Plastics	2	1	335	8	0	201	246	**793**	8	648	6	**1 454**
Metals	5	44	2 522	49	0	1 124	453	**4 197**	11	439	503	**5 149**
Organics (e)	1 749	1	1 719	4	2	11	3 380	**6 866**	20	5 897	10	**12 794**
Masonry	18	74	298	471	0	14 087	3 695	**18 643**	590	556	0	**19 789**
Electrical & Electronic	2	3	35	5	0	26	92	**163**	2	68	0	**233**
Solid Hazardous Waste	107	91	1 059	69	7	497	1 362	**3 192**	13	278	6	**3 488**
Leather & Textiles	3	2	111	2	1	15	137	**271**	4	293	0	**568**
Tyres & Other Rubber	0	1	60	5	1	30	185	**282**	36	0	3	**321**
Timber & Wood Products	2	1	56	1	0	157	44	**261**	2	190	10	**464**
Inseparable/Unknown	32	46	194	31	1	107	567	**978**	33	601	13	**1 626**
Total	**1 920**	**267**	**8 465**	**680**	**14**	**16 541**	**11 951**	**39 838**	**909**	**12 425**	**554**	**53 726**

(a) Excludes Fishing
(b) Excludes mineral waste
(c) Includes Waste Collection, Treatment and Disposal Services (ANZSIC Division D, subdivision 29)
(d) Includes ANZSIC Divisions F-S, excluding subdivision 75
(e) Excludes Timber

Table 2 Waste management, treatment and disposal 2009-10, by waste material, '000 tonnes (Physical use)

	Australian and New Zealand Industry Classification 2006							
	Waste Management Services (a)		Other industries (b)					
	Landfill	Recovery	Landfill	Recovery	Total Landfill	Total Recovery	Exports	Total
	'000t	'000t	'000t	'000t	'000t	'000t	'000t	'000t
Paper & Cardboard	1408	1633	500	1381	1909	3014	1 497	**6419**
Glass	343	517	122	437	465	954	2	**1422**
Plastics	829	100	294	85	1123	185	147	**1454**
Metals	273	1569	97	1326	370	2895	1 884	**5149**
Organics (c)	4849	3355	1722	2836	6571	6191	32	**12794**
Masonry	6533	5926	2320	5009	8853	10936	0	**19789**
Electrical & Electronic	125	35	44	29	169	64	0	**233**
Hazardous Waste	2223	245	789	207	3013	453	23	**3488**
Leather & textiles	370	36	131	30	501	66	0	**568**
Tyres & other rubber	155	23	55	19	211	42	68	**321**
Timber and Wood products	32	228	11	193	43	420	0	**464**
Inseparable/unknown	1198	0	425	0	1623	0	2	**1626**
Total	**18339**	**13668**	**6512**	**11553**	**24851**	**25220**	**3 655**	**53 726**

(a) Includes Waste Collection, Treatment and Disposal Services (ANZSIC Division D, subdivision 29)

(b) All other industries involved in waste management activities. For further information see Explanatory notes.

(c) Excludes Timber

Table 3: Supply of Waste Goods and Services by Industry 2009-10, $m (purchasers' prices)

	Industry output at basic prices													
	Waste Management Services(a)		Other Industries											
	Private(b)	Local Government Authorities	Agriculture	Mining	Manufacturing	Construction	Wholesale	Retail	Transport, Postal & Warehousing	All other service industries	Total output at basic prices	Taxes less subsidies on products	Rest of the world (Imports)	Total supply at purchasers' prices
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
Income from Waste Management Services														
Non-recyclable	4,318	2,106	0	60	58	609	2	0	131	257	7,539	n.a	0	n.a
Recyclable	832	406	0	68	113	139	180	11	160	74	1,981	n.a	0	n.a
Total waste services	**5,149**	**2,512**	0	**127**	**170**	**748**	**182**	**11**	**291**	**331**	**9,521**	**74**	**0**	**9,595**
Income from sales of recyclable/recovered material(c)														
Paper and cardboard	505	8	n.a	n.a	n.a	n.a	n.a	n.a	0	n.a	n.a	..	1	n.a
Organic material	8	5	n.a	n.a	n.a	n.a	n.a	n.a	0	n.a	n.a	..	6	n.a
Metal	924	16	n.a	n.a	n.a	n.a	n.a	n.a	0	n.a	n.a	..	33	n.a
Other	794	14	n.a	n.a	n.a	n.a	n.a	n.a	0	n.a	n.a	..	28	n.a
Total recyclable/recovered material	**2,232**	**43**	**34**	**225**	**723**	**114**	**547**	**550**	**0**	**48**	**4,515**	**..**	**67**	**4,582**

(a) Includes Waste Collection, Treatment and Disposal Services

(b) Includes Public Trading Enterprises

(c) Income from sales of recyclable/recovered material is entirely comprised of Trade and Transport Margins since these materials are considered to have been purchased at negligible cost

.. Not applicable

n.a. Not available

Table 4: Use of Waste Goods and Services by Industry and Households 2009-10, $m (purchasers' prices)

	Waste Management Services(a)		Other Industries												
	Private(a)	Local Government Authorities	Agriculture	Mining	Manufacturing	Construction	Wholesale	Retail	Transport, Postal & Warehousing	All other service industries	Total	Rest of the world (Exports)	Actual Final Household Consumption	Capital Formation	Total use at purchasers' prices
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
Intermediate consumption of waste management services															
Non-recyclable	1,346	991	22	25	459	858	194	238	163	1,272	**5,568**	0	n.a.	..	n.a.
Recyclable	108	457	34	27	255	785	46	63	128	500	**2,403**	0	n.a.	..	n.a.
Total waste services	**1,455**	**1,448**	**56**	**52**	**714**	**1,643**	**240**	**301**	**291**	**1,772**	**7,972**	**0**	**1,623**	**..**	**9,595**
Purchases of recyclable/recovered material															
Paper and cardboard	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	228	..	n.a.	n.a.
Organic material	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	20	..	n.a.	n.a.
Metal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1,356	..	n.a.	n.a.
Other	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	108	..	n.a.	n.a.
Total recyclable/recovered material	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**2,870**	**1,712**	**..**	**n.a.**	**4,582**

(a) Includes Public Trading Enterprises

.. Not applicable

n.a. Not available

GLOSSARY

Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006	The ANZSIC is the standard classification used in Australia and New Zealand for the collection, compilation, and publication of industry statistics.
Biosolids	Treated sewage sludges
Basic price	The amount receivable by the producer from the purchaser for a unit of a good or service produced as output, minus any tax payable plus any subsidy receivable, on that unit as a consequence of its production or sale; it excludes any transport charges invoiced separately by the producer.
Carcinogenic	Any substance which tends to produce a cancer in the body.
Clinical waste/medical waste	Waste products that cannot be considered general waste and are produced from health care activities. May also refer to health–related wastes produced by households and discarded into the municipal waste stream.
Commingled materials	Materials mixed together, such as plastic bottles with glass and metal containers. Commingled recyclable materials require sorting after collection before they can be recycled.
Commercial & Industrial waste (C&I)	Waste that is produced by institutions and businesses; includes waste from schools, restaurants, offices, retail and wholesale businesses, and industries including manufacturing. Unless otherwise noted, C&I waste does not include waste from the construction and demolition (C&D) sector.
Construction	The process which involves adding structure to real property or the building or assembling of infrastructure. It includes the additions, alterations, reconstruction, installation and maintenance and repairs of buildings and other structures.
Construction & Demolition waste (C&D)	Refers to waste produced by demolition and building activities, including road and rail construction and maintenance and excavation of land associated with construction activities. The C&D waste stream usually covers only some of the generation, disposal and recycling of C&D wastes, as these materials can also be found in the MSW and C&I streams, or as hazardous wastes.
Current taxes on income, wealth etc	Consists mainly of taxes on the incomes of households or profits of corporations and of taxes on wealth that are payable regularly every tax period (as distinct from capital taxes levied infrequently).
Disposed waste	Waste that is buried in landfill or incinerated or any other permanent form of removing waste that is not recovered or reused in any way. For facilities other than landfill, quantities disposed refer to waste that is sent to disposal facilities operated by either the same or a different organisation.
Diversion rate	Proportion of waste received at all facilities that are diverted from being disposed. Equal to the amount recovered at all facilities divided by the sum of the amount disposed at landfills and the amount recovered at all facilities. Waste that is transferred is not included in this calculation. The calculated diversion rate only includes waste received at facilities in scope of the *Waste Management Services, Australia, 2009–10* (cat no. 8698.0).
Electrical & Electronic waste (or Ewaste)	Waste electrical and electronic equipment that is dependent on electric currents or electromagnetic fields in order to function (including all components, subassemblies and consumables which are part of the original equipment at the time of discarding. Ewaste may include (a) consumer/entertainment electronics (e.g. televisions, DVD players & tuners) (b) devices of office, information & communications technology (e.g. computers, telephones & mobile phones) (c) household appliances (e.g. fridges, washing machines & microwaves) (d) lighting devices (e.g. desk lamps) (e) power tools (f) devices used for sport & leisure including toys (e.g. fitness machines & remote control cars).
Emission	The release of a particular gas to the atmosphere as a result of a certain activity.

Emission *continued*

Emissions can be of the following four types:
(a) Generated – the gross result of a process or activity
(b) Recovered – the diversion of emissions for use in a secondary process, such as power generation
(c) Sinks – the process of removing carbon from the atmosphere
(d) Net emissions – remaining gas released to the atmosphere after generation, recovery and sinks are taken into account

Environmental account

An information system and framework that links the economic activities and uses of a resource to changes in the natural resource base, thus linking resource use with the System of National Accounts. See also SEEA.

Exports

The exports of goods represents the quantity of goods sent to other countries or for which ownership changes from residents to non–residents.

Ferrous metals

Metals which contain iron (e.g. cast iron, steel)

Fishing waste

Fishing waste is material resulting from industrial fish processing operations from either wild stocks or aquaculture consisting of particles of flesh, skin, bones, entrails, shells or liquid stick water.

Fly ash

Fly ash is a pre–consumer waste generated during the combustion of material, most usually coal for electricity generation (a secondary industry). It is also sometimes classified as a hazardous or regulated waste.

Free on board

The value of goods measured on a free on board (f.o.b.) basis includes all production and other costs incurred up until the goods are placed on board the international carrier for export. Free on board values exclude international insurance and transport costs. They include the value of the outside packaging in which the product is wrapped, but do not include the value of the international freight containers used for transporting the goods.

General Government

The general government sector as used in this publication mainly comprises local government administration units (ANZSIC Division O, Class 7530) including regional councils which provide waste and other services on behalf of member councils.

Glass

Glass is an amorphous (non–crystalline) solid material. Glasses are typically brittle and optically transparent. Glass is produced by fusion, usually consisting of mutually dissolved silica and silicates that also contain soda and lime, as in the ordinary variety used for windows and bottles.

Green Waste

Biodegradable waste such as grass or flower cuttings and hedge trimmings. May also include domestic and commercial food waste.

Gross value added

The value of output at basic prices minus the value of intermediate consumption at purchasers' prices. The term is used to describe gross product by industry and by sector. Basic prices valuation of output removes the distortion caused by variations in the incidence of commodity taxes and subsidies across the output of individual industries.

Hazardous waste

Hazardous, special, listed or prescribed wastes, that are potentially harmful to human health or the environment, requiring special treatment. Examples include waste oils, organic chemicals, contaminated earth, medical wastes, asbestos, acids, reactive chemicals, pesticides and radioactive material.

Households

A group of two or more related or unrelated people who usually reside in the same dwelling, who regard themselves as a household, and who make common provision for food or other essentials for living; or a person living in a dwelling who makes provision for his/her own food and other essentials for living, without combining with any other person.

Imports

The imports of goods represents the quantity of goods received from other countries or for which ownership changes from non–residents to residents.

Inseparable/unknown	General waste consists of non–hazardous materials which have been discarded and cannot be re–used or recycled. General waste is also known as putrescible or mixed waste. General waste can include food waste, wax cardboard, tissue paper and soiled containers.
Landfill	A site used for disposal of solid material (i.e. is spadeable) by burial in the ground between layers of earth.
Liquid waste	Wastes that are not solid or gaseous. May refer to sludges and slurries, or other liquids discharged to sewer. May also refer to waste water. Liquid waste means any waste that (a) has an angle of repose less than 5 degrees above horizontal or (b) becomes free–flowing at or below 60 degrees Celsius or when it is transported or (c) is generally not capable of being picked up by a spade or shovel.
Manufacturing	The process where units are engaged in the physical or chemical transformation of materials, substances or components into new products (except agriculture and construction). The materials, substances or components transformed by units in this division are raw materials that are products of agriculture, forestry, fishing and mining or products of other manufacturing units.
Masonry materials	Masonry materials include asphalt, bricks, concrete, clay, fines, rubble and soil. Waste produced by demolition and building activities, including road and rail construction and maintenance and excavation of land associated with construction activities.
Material Recovery Facility (MRF)	Facility that receives and separates recyclable materials such as glass, plastic, steel, aluminium and paper that are collected from household recycling bins and recyclable materials from commercial premises. Recyclable materials at a materials recovery facility are separated and sent away to be processed into new products.
Metals	There are two main categories of metals: ferrous and non–ferrous. Metals which contain iron in them are known as ferrous where metals without iron are non–ferrous. According to the The Institute of Scrap Recycling Industries (ISRI), common non–ferrous metals are copper, brass, aluminium, zinc, magnesium, tin, nickel, and lead. Non–ferrous metals also include precious and exotic metals. Precious metals are metals with a high market value in any form, such as gold, silver, and platinum. The more frequently recycled metals are scrap steel, iron, lead, aluminium, copper, stainless steel and zinc.
Mineral waste	Waste rock and overburden, tailings and spent heap leach ore form mineral processing, rock masses disturbed by block caving, rejects from beneficiation or concentration of coal and other minerals, bauxite residue from alumina production, dross refinery discards and sludges, smelter and other furnace slags, ashes, water treatment sludges, dredging materials and soils contaminated by mineral waste.
Mining	The process where units extract naturally occurring mineral solids, such as coal and ores; liquid minerals, such as crude petroleum; and gases, such as natural gas from the earth, from an ore body, vein or (coal) seam. The term also includes the removal of soil. The term mining is used in the broad sense to include: underground or open cut mining; dredging; quarrying; well operations or evaporation pans; recovery from ore dumps or tailings as well as beneficiation activities (i.e. preparing, including crushing, screening, washing and flotation) and other preparation work customarily performed at the mine site, or as a part of mining activity.
Municipal Solid Waste (MSW)	Waste produced primarily by households and council facilities, including biodegradable material, recyclable materials such as bottles, paper and cardboard and aluminium cans, and a wide range of non–degradable material including paint, appliances, old furniture and household lighting.
Mutagenic	An agent or substance which is capable of inducing genetic mutation
Non–ferrous metals	Those metals that contain very little or no iron (e.g. copper, brass and bronze).

Non–mineral waste	Non–mineral wastes include but are not limited to used oil, antifreeze, greases, batteries, solvents, coolants, spent reagents and paints, tyres, contaminated soils and debris, solid sewage residues, construction debris, spent pot liners, bath, anode wastes, refractory bricks and any other waste materials from processing, maintenance and medical facilities, canteens, offices, workshops, laboratories and gardens, including off–specification raw materials (other than ore) used in processes. Non–mineral wastes do not include residues directly derived from mining or processing of rock and unconsolidated sediments.
Non–organic waste	Includes glass, plastic, metal, construction/demolition waste, rubber and tyres, electrical waste, hazardous and liquid waste.
Organic waste	Component of the waste stream from plant or animal sources that is readily biodegradable, e.g. paper and cardboard, food waste, biosolids, green waste and timber.
Other taxes on production	Consists of all taxes except taxes on products that enterprises incur as a result of engaging in production.
Other industries	Industries other than those included in ANZSIC Division A Agriculture, Division B Mining, Division C Manufacturing, Division D Electricity, Gas, Water, Division E Construction, sub division 29 Waste Collection, Treatment and Disposal Services and Class 7530 Local Government Administration. .
Paper & cardboard	Various forms of paper and cardboard which can be recycled and reused include cardboard boxes, newspaper, office paper, envelopes, junk mail, cards milk and juice cartons. The main component of paper and cardboard is cellulose fibre.
Plastics	Any of a group of synthetic or natural organic materials that may be shaped when soft and then hardened, including many types of resins, resinoids, polymers, cellulose derivatives, casein materials, and proteins: used in place of other materials such as glass, wood, and metals, in construction and decoration, for making many articles, as coatings, and, drawn into filaments, for weaving.
Purchasers' price	The amount paid by the purchaser, excluding any deductible tax, in order to take delivery of a unit of a good or service at the time and place required by the purchaser. The purchaser's price of a good includes any transport charges paid separately by the purchaser to take delivery at the required time and place
Recovery rate	Proportion of waste received at facilities other than landfill that was recovered for recycling or reprocessing. Equal to the amount recovered divided by the sum of the amount sent for disposal and the amount recovered. Waste that is transferred is not included in this calculation.
Recovered or reprocessed	Process of converting or modifying waste into useful material or energy so that they do not need to be disposed. Also referred to as materials or resource recovery. Includes sorting, separating and baling.
Recycling	A resource recovery method involving the collection and processing of waste for use as a raw material in the manufacture of the same or similar non–waste product.
Regulated waste	In some jurisdictions the term 'regulated waste' is used to refer to hazardous wastes.
Residuals	All solid, liquid and gaseous wastes. The incidental and undesirable outputs from production and consumption processes within the economy.
Residual waste	The waste that remains after resource recovery processes, is unable to be recovered, and may require disposal in landfill.
Resource recovery	The process of extracting materials or energy from a waste stream through re–use (using the product for the same or a different purpose without further production), recycling or recovering energy from waste.

SEEA The System of Environmental and Economic Accounting (SEEA) is a measurement framework that can provide a range of metrics that link information on the economy and the environment. This integration of information is achieved by the use of common frameworks, classifications and standards, providing an integrated database for policy analysis and decision making. In 2012 it was adopted as an international statistical standard by the United Nations Statistical Commission and has the staus as the System of National Accounts.

Solid Material that:
(a) Has an angle of repose of greater than 5 degrees; and
(b) Does not contain, or is not comprised of, any free liquids; and
(c) Does not contain, or is not comprised of, any liquids that are capable of being released when the waste is transported;
(d) Does not become free flowing at or below 60 degrees Celsius or when It is transported; and
(e) is generally capable of being moved by a spade at normal temperatures (i.e. is spadeable).

Solid hazardous waste Component of the waste stream which by its characteristics poses a threat or risk to public health, safety or the environment (includes substances which are toxic, infectious, mutagenic, carcinogenic, teratogenic, explosive, flammable, corrosive, oxidising and radioactive) and meets the definition of a solid.

Solid waste Waste materials ranging from municipal garbage to industrial waste, but excluding gaseous, liquid, hazardous, clinical and intractable wastes.

Spadeable A physical state of a material where the material behaves sufficiently like a solid to be moved by a spade at normal outdoor temperatures.

Subsidy on product A subsidy payable per unit of a good or service.

Taxes less subsidies on production and imports Defined as *'taxes on products'* plus *'other taxes on production'* less '*subsidies on products*' less '*other subsidies on production*'.

Taxes on production and imports Consist of *'taxes on products'* and *'other taxes on production'*. These taxes do not include any taxes on the profits or other income received by an enterprise. They are payable irrespective of the profitability of the production process. They may be payable on the land, fixed assets or labour employed in the production process, or on certain activities or transactions. See also *Current taxes on income and wealth, Other taxes on production* and *Taxes on products*.

Taxes on products Taxes payable per unit of some good or service. The tax may be a specific amount of money per unit of quantity of a good or service (quantity being measured either in terms of discrete units or continuous physical variables such as volume, weight, strength, distance, time, etc.), or it may be calculated ad valorem as a specified percentage of the price per unit or value of the goods or services transacted. A tax on a product usually becomes payable when the product is produced, sold or imported, but it may also become payable in other circumstances, such as when a good is exported, leased, transferred, delivered, or used for own consumption or own capital formation. See also *Current taxes on income and wealth, Other taxes on production* and *Taxes on production and imports*.

Teratogenic Leading to the production of foetal abnormalities.

Transport and Trade margins The total of trade margins by product is equal to the total of trade margins by the trade industries, plus the secondary trade margins by other industries. An analogous equation holds for the transport margins. The transport margins include transportation costs paid separately by the purchaser and included in the use of products at purchasers' prices but not in the basic prices of a manufacturers' output or in the trade margins of wholesale or retail traders.

Waste

(a) any substance that is discarded, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment;

(b) any discarded, rejected, unwanted, surplus or abandoned substance;

(c) any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, reprocessing, recovery, or purification by a separate operation from that which produced the substance.

Waste (management) hierarchy

A nationally and internationally used guide which prioritises waste management practices in order of preference (from the most to least preferred) to achieve the best environmental outcome. The order of practice it sets out is avoidance, re–use, recovery, and recycling, with disposal as a last resort.

Waste Management Services Industry

Can include any combination of collection, transport, recycling, treatment, processing, disposal, managing and monitoring of waste materials (ANZSIC Division D, subdivision 29).

Waste streams

The sector where the waste is produced; the source from which the waste is obtained. There are three main waste streams:

(a) *Domestic and municipal*: waste from municipal kerbside garbage and recycling collections, council garbage from litter bins, council waste from parks and gardens, and domestic waste brought to landfills and transfer stations.

(b) *Commercial and Industrial*: waste generated by businesses, state and federal government and education, excluding waste collected by municipal collections.

(c) *Construction and Demolition*: waste from residential, civil and commercial construction & demolition (e.g. bricks, concrete, rubble, soil, rock).

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