Development of an Experimental Waste Account for Australia

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This paper sets out the methods used to develop Australia's first experimental waste account: *Waste Account, Australia, Experimental Estimates, 2013*. This waste account is part of a set of integrated environmental–economic accounts currently being produced by the Australian Bureau of Statistics (ABS) that are based on the System of Environmental–Economic Accounting (SEEA).

The ABS waste account provides a series of experimental tables showing the physical supply (generation) of waste by industries and households and the physical use (management of) waste via landfill, recovery or export. It also includes tables showing monetary transactions related to supply and use of waste management services and recyclable/recoverable waste material in Australia.

The methodologies and data used in the waste account will be reviewed to improve the quality and usefulness of information provided in future accounts.

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A. Introduction

1. Australia's National Waste Policy was released by the Department of Environment (then known as the Department of Sustainability, Environment, Water, Population and Communities or SEWPaC) in November 2009. The purpose of the policy was to set a clear direction for Australia over the next 10 years, toward producing less waste for disposal, and managing waste as a resource to deliver economic, environmental and social benefits[1]. Specific aims of the policy are to: avoid the generation of waste, reduce the amount of waste going to landfill (including hazardous waste), manage waste as a resource, and ensure that waste management, disposal, recovery and re-use are undertaken in a safe, scientific and environmentally sound manner.

2. The "*Sustainable Australia 2013: Conversations with the Future*" produced by SEWPaC highlighted a number of trends in Australia and the world that will have a significant impact on the next generation of Australians. The amounts of waste generated, disposed to landfill and recycled are regarded as key environmental indicators. The ABS identifies waste information as one of the essential statistics for Australia[2]. The statistics on waste in Australia collected by the ABS are intended to inform the National Waste Policy as well as in measures of sustainability and well-being.

3. The ABS, in consultation with a range of stakeholders, released the *Waste Account Australia, Experimental Estimates*[3] in March 2013. The account used the SEEA as a framework to provide information for developing and reviewing waste policy objectives. The ABS waste accounts provides a series of tables showing information on the physical supply (generation) of waste by industries and households and physical use of waste (management of) waste by waste management service providers (disposal of waste to landfills or resource recovery facilities) in the economy and monetary transactions related to supply and use of waste management services and recyclable/recoverable waste material.

4. The importance of waste accounting is likely to increase with growing pressures. Australia's population is currently estimated at 22.8 million people and projected to increase to between 30.9 and 42.5 million people by 2056[4]. Such growth generates increasing demands on the environment, particularly though the production and consumption of goods. In parallel with population growth, waste generation continues to rise in Australia, with significant amounts still ending up in landfills - the least preferred waste management strategy. Figure 1 shows the rate of Australian waste generation compared to total Gross Domestic Product (GDP) and population growth. From 1997 to 2012 the population rose by 22%, GDP increased by 63% and waste generation in Australia has increased by 145%.

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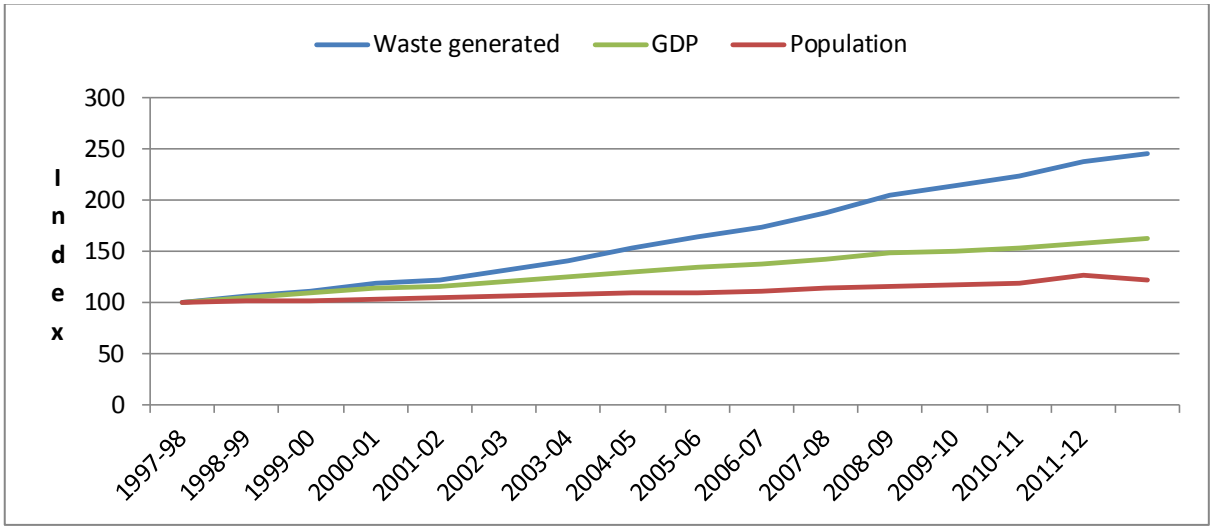
[1] National Waste Policy 2010. Department of Sustainability Environment Water Population and Communities
[2] Australian Bureau of Statistics. Essential Statistical Assets for Australia, 2013 (cat. no. 1395.0)
[3] Australian Bureau of Statistics. Waste Account, Australia, Experimental Estimates, 2013; (cat. no. 4602.0.55.005) http://www.abs.gov.au/ausstats/abs@.nsf/mf/4602.0.55.005
[4] Australian Bureau of Statistics, 2008, Population Projections, Australia, 2006 to 2101. <http://www.abs.gov.au/Ausstats/abs@.nsf/mf/3222.0>, viewed November 2011.

Figure 1: Waste generation, Population and GDP, 1997-2012



5. Australians generate solid waste at a higher rate compared with most other OECD countries and in 2010[5] disposed more municipal waste to landfill (58%) than the OECD average (46%). Technologies and processes to avoid, reduce and recover waste are generally not used as extensively in Australia as in some other OECD countries[6] due to the size of the country. There is an increasing need for Australia's waste policies to consider the impacts of a growing population and global climate change, while simultaneously supporting economic growth and sustainability in the waste management and recycling industries[7].

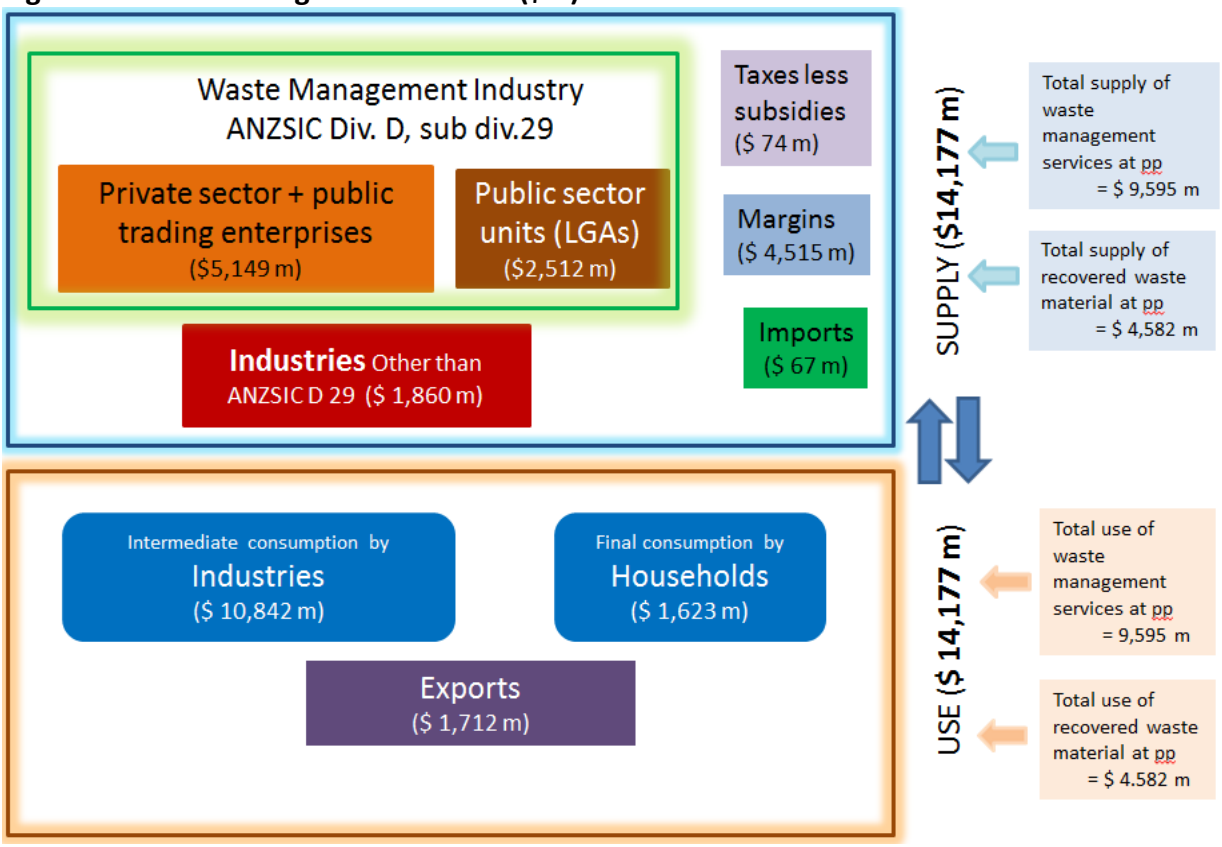
B. Results

Monetary supply and use tables

6. The monetary supply and use tables are presented in Appendix 1. Table 1 (supply table) shows the economic transactions associated with the income generated by the provision of waste management services and sales of recyclable/recoverable waste material. Table 2 (use table) shows intermediate and final consumption expenditure on waste management services and purchase of recyclable/recoverable waste material. Figure 2 illustrates the supply and use of waste related products in monetary terms.

[5] Sustainability Australia Report 2013, National Sustainability Council, http://www.environment.gov.au/sustainability/measuring/publications/pubs/14-environmental-indicators.pdf, viewed August 2013.
[6], Productivity Commission, 2006, Waste Management: Productivity Commission Inquiry Report, No.38. http://www.pc.gov.au/__data/assets/pdf_file/0014/21614/waste.pdf , viewed August 2013.
[7] Australian Government Department of Sustainability, Environment, Water, Population and Communities, 2009, 'National Waste Policy: Less Waste, More Resources'. <http://www.environment.gov.au/wastepolicy/about/index.html>, viewed September 2011.

Figure 2: Waste Management Services ($m)



7. The Waste Management Industry accounted for 80% of the income generated from waste management services. The Waste Management Industry also dominates the income from sales of recyclable/recoverable waste material.

8. The Waste Management Industry recorded the highest (36%) total intermediate consumption expenditure of all industries on waste management services. This is due to the number of contracting and subcontracting waste management activities taking place within the industry.

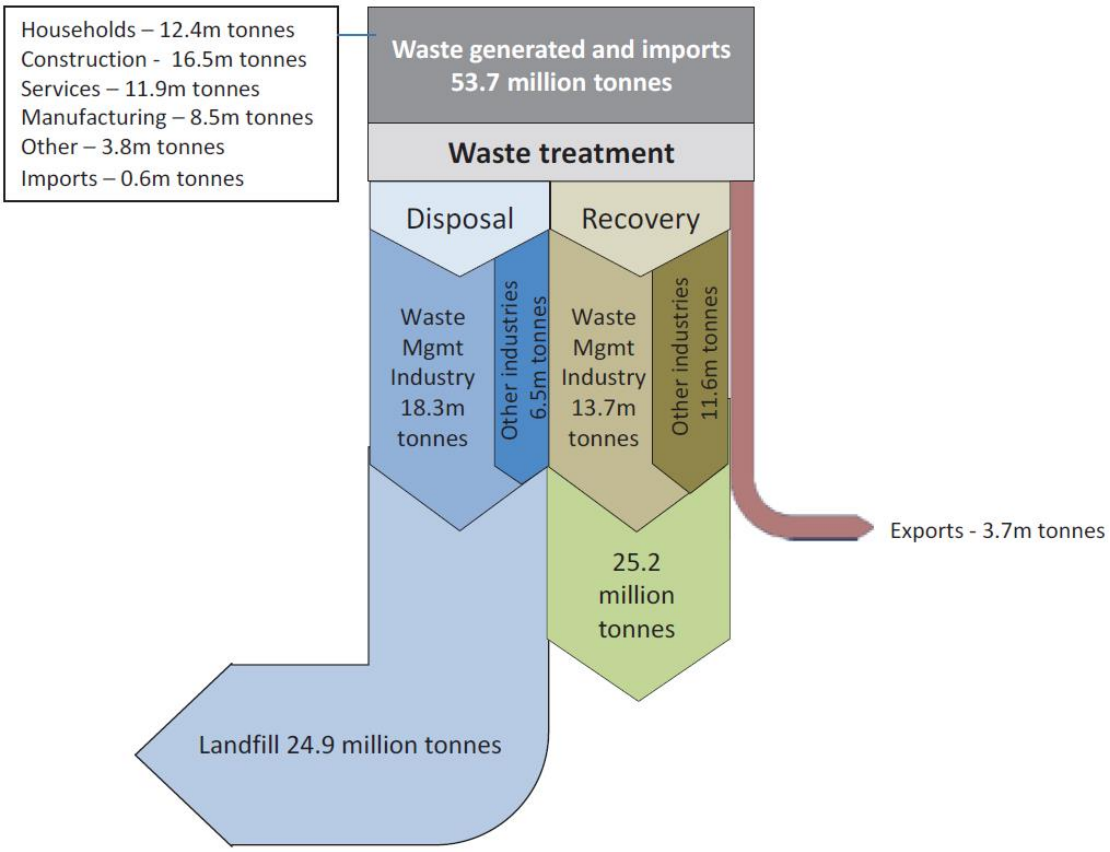
9. The Construction industry recorded the second highest (21%) of the total intermediate consumption expenditure of all industries on waste management services followed by the manufacturing industry (9%). Final consumption expenditure by households accounted for 17% of the total expenditure on waste management services (see appendix 1). There was $1,712 million worth of exports of recyclable/recoverable waste material compared to $ 67 million worth of imports.

Physical supply and use tables

10. Figure 3 illustrates supply and use of waste related products in physical terms; i.e. quantity of waste generated and quantity of waste managed. The physical supply and use tables are presented in Appendix 2.

11. Nearly 54 million tonnes of waste was generated in Australia (including imports) in 2009-10. 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.

Figure 3: Summary of waste generated and waste services provided, 2009-10



12. 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.

13. 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. Nearly half (47%) of all waste from households was organic waste and almost a quarter (23%) was paper and cardboard waste.

14. Waste exports have grown significantly over the last 20 years, from 0.7 million tonnes in 1990-91 to 4.4 million tonnes in 2011-12. This is mainly due to an increase in exports of metal, paper and cardboard waste products since the early 2000s. Australia has had a positive balance of trade for waste products over this period and in 2011-12 the trade balance was $2,268 million.

C. Concepts, sources and methods used in compilation

Scope

15. The term 'waste' used throughout this paper refers to 'solid waste'. As described by SEEA, this covers discarded materials that are no longer required by the owner or user and includes residual flow and product flow which excludes second hand goods. Solid waste material includes:
    - paper and cardboard
    - glass
    - plastics
    - metals
    - organics
    - masonry
    - electrical and electronic
    - hazardous
    - leather and textiles
    - tyres and other rubber
    - timber and wood products and
    - inseparable/unknown.

16. In the SEEA definition, solid waste includes materials that are in a solid or liquid state but excludes wastewater and small particulate matter released into the atmosphere[8]. The solid waste considered in ABS waste account is confined only to waste disposed to landfills and recoverable/recyclable waste. Waste sent to incinerators and other treatment facilities are not covered due to lack of information. The monetary tables include liquid waste treatment (excluding sewage treatment).

17. Industry classifications used for the physical and monetary supply and use tables follow the Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006[9]. The categories used in the tables are:
    - Agriculture, Forestry and Fishing (ANZSIC A)
    - Mining (ANZSIC B)
    - Manufacturing (ANZSIC C)
    - Electricity, Gas, Water, Waste Collection, Treatment and Disposal Services (ANZSIC D)
    - Construction (ANZSIC E) and
    - Services industries (ANZSIC F to S).

[8] United Nations Statistics Division, System of Environmental-Economic Accounting. http://unstats.un.org/unsd/envaccounting/seea.asp, viewed 23 January 2012.
[9] Australian Bureau of Statistics. Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 http://www.abs.gov.au/ausstats/abs@.nsf/mf/1292.0

Monetary supply and use tables

18. The monetary supply and use tables include output and expenditure ($million) relating to waste management services (non-recyclable and recyclable) and recyclable/recoverable material, imports and exports ($million) of recyclable/recoverable waste material for the financial year 2009-10.

19. Monetary supply and use tables were constructed following the principles of the 2008 System of National Accounts (SNA). Monetary supply and use tables presented by the Statistics Netherlands were also used as a guide[10]. Monetary supply and use tables in the ABS waste account identify two waste related products:
    - waste management services; and
    - recyclable/recoverable waste material (goods).

20. Output and intermediate consumption expenditure of waste related products for the Waste Management Industry (ANZSIC D29) were sourced from ABS *Waste Management Services survey 2009–10*. This publication presents estimates of the financial performance of the waste management industry for 2009-10, and includes the Local Government Sector.

21. Output from waste management services by ANZSIC D29 included income generated from:
    - The provision of waste management services (recyclable and non-recyclable)
    - waste management related rates collected by the local government authorities.

22. Intermediate consumption expenditure of waste management services by ANZSIC D29 includes:
    - 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 Environmental Protection Authorities.

23. For industries outside the ANZSIC D29, output and intermediate consumption expenditure of waste related products were not available for the 2009-10, but available for 2010-11 from another ABS data collection: *Economic Activity Survey* 2010–11. These data were used to back cast for each industry's output and intermediate consumption expenditure related to waste products for 2009-10. Output for each industry was back cast by applying the movement of Industry Sales and Service income movement, while intermediate consumption expenditure was back cast by applying the Industry Gross Value Added movement from *Australian Industry*[11]. The *Economic Activity Survey 2010-11* covers only the private sector units for the Public Administration and Safety, Education and training, Health care and social assistance industries. Therefore output and intermediate consumption expenditure for the public sector units for each of these industries were estimated using the private to public sector ratio for the same sourced from the National Accounts.

[10] Roel Delahaye, Statistics Netherlands, 2006, NAMEA – Solid Waste Accounts

[11] Australian Bureau of Statistics. Australian Industry, 2010-11 (cat. no. 8155.0) http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8155.02010-11

24. For industries outside the ANZSIC D29, output from waste management services includes:
    - income generated from the provision of waste management services (recyclable and non-recyclable).

25. For industries outside the ANZSIC D29, intermediate consumption expenditure of waste management services (by recyclables/non–recyclables)includes:
    - payments to contractors and subcontractors for waste management services.

26. Income from the sales of recyclable/recoverable waste materials has been treated as a trade margin as these products are sold after undergoing only relatively minor processing (such as sorting, grading, cleaning etc.). Trade margins are calculated as the difference between the price realised on the sale of the good, and the price paid for the good. It was assumed 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.

27. Intermediate consumption expenditure on purchase of recyclable/ recoverable waste materials by industry was not available. Therefore, total intermediate expenditure on purchase of recyclable/ recoverable waste materials by industries was derived by assuming that the total use at purchasers' price was equal to the total supply at purchasers' price and subtracting the value of the exports from the total use at purchasers' price.

28. There is no capital formation related to recyclable/ recoverable waste materials. There was no data available for inventories related to recyclable/ recoverable waste materials. Therefore inventories were not considered when subtracting the value of the exports from the total use at purchasers' price. This issue will be addressed in the next monetary waste use table.

29. Actual final consumption expenditure by households was sourced from annual financial reports by the local government authorities. In addition to these sources, *Consumer Price Index, Australia, Sep 2012* (cat. no. 6401.0), *Household Expenditure Survey, Australia: Summary of Results, 2009-10* (cat. no. 6530.0*), Role and Performance of Local Government - Waste and recycling related data and information, 2011* (commissioned by SEWPaC) were also used in data validation. According to SEEA, final consumption expenditure by households for purchase of recyclable/ recoverable waste material is not applicable.

30. Taxes and subsidies on waste management services were sourced from the ABS Public Finance data. Taxes and subsidies on the recyclable/recoverable waste material are not applicable.

31. Values of imports and exports (Free on board) of recyclable/recoverable waste material were sourced from the ABS International Trade data. Australia applies the international *Harmonized Commodity Description and Coding System* (HS) for the classification of internationally traded goods. Imports and exports classified as waste were identified using *Harmonized Tariff Item Statistical Code* (HTISC)[12]-also known as the Customs Tariff- and the

[12] Australian Bureau of Statistics. Information paper: Proposed Changes to Statistical Codes in the HTISC, 2012

Australian Harmonised Export Commodity (AHECC)[13] and the *Central Product Classification* (CPC) Version 2 in order to determine amounts of wastes (by weight and dollars) entering and exiting Australia. This data is available from *International Trade in Goods and Services, Australia*[14]. Imports and exports of waste management services were negligible.

Physical supply and use tables

32. Physical supply refers to the quantity of solid waste generated by industries and households, plus imports. Physical use refers to the quantity of solid waste collected, treated and disposed by the Waste Management industry and other industries (outside ANZSIC D29) carrying out waste management activity as a secondary activity. Physical supply and use tables were based principles of SEEA[15] and the Statistics Netherlands[16] physical supply and use tables.

33. The physical waste supply and use tables present aggregates of all available physical data (tonnes) on waste to landfill and recovered waste material in terms of the supply and use of solid waste in the Australian economy and imports and exports of recyclable/recoverable waste material for the financial year 2009-10.

34. Data on the physical supply and use of waste are primarily derived from *Waste and Recycling in Australia (WRiA)*[17] commissioned by the SEWPaC. The WRiA did not have data for 2009-10 but compiled solid waste and recycling data published by the states, territories and industry for the 2008-09 financial year.

35. Total amount of waste generated was derived from WRiA and allocated to industries and households using the *Australian National Accounts Input-output Tables*[18]. 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 was aggregated to certain waste flow categories for specific industries as presented in physical supply and use tables (Appendix 2) using various data sources.

36. The physical data from the *Waste Management Survey* 2009-10 was used to allocate the total amount of waste received (for landfill or recovery) by ANZSIC D 29. There was insufficient data to allocate the total amount of waste received by each of the industries outside ANZSIC D29 which provide waste management services. They were assigned to "other industries" as an aggregate as the difference between total waste use (sourced from WRiA) and total use by ANZSIC D 29. To compile the physical use table for the industries outside ANZSIC D29, WRIA was used to allocate the type of treatment waste materials had undergone (landfill or recovery) and applied to total waste generated estimates for each

[13] Australian Bureau of Statistics. Australian Harmonized Export Commodity Classification (AHECC) – Electronic Publication, Jan 2012 (cat. no. 1233.0)
[14] Australian Bureau of Statistics. International Trade in Goods and Services, Australia Sep 2012 (cat. no. 5368.0)
[15] United Nations Statistics Division, System of Environmental-Economic Accounting. http://unstats.un.org/unsd/envaccounting/seea.asp, viewed 23 January 2012.
[16] Roel Delahaye, Statistics Netherlands, 2006, NAMEA – Solid Waste Accounts
[17] Department of Sustainability, Environment, Water, Population and Communities. Waste and Recycling in Australia 2011: Incorporating a revised method for compiling waste and recycling data. August 2012
[18] Australian Bureau of Statistics. Australian National Accounts: Input-Output Tables, 2008-09 (cat. no. 5209.0.55.001) http://www.abs.gov.au/AusStats/ABS@.nsf/MF/5209.0.55.001

waste material in the supply table. The *Australian System of National Accounts*[19] *Gross Value Added by Industry* was used to extrapolate from 2008-09 to 2009-10. Household waste generation was extrapolated using the *Australian System of National Accounts Household Final Consumption Expenditure*.

D. Challenges and issues

Monetary supply and use tables

37. Lack of reliable data and information for recyclable/recoverable waste material, particularly for industries outside the ANZSIC D29 was the biggest issue. Output by type for recyclable/recoverable waste material for industries outside the ANZSIC D29 was not available. Intermediate consumption expenditure for recyclable/recoverable waste material by industries also was not available.

38. Inventories data for recyclable/recoverable waste material were not available and not considered in the use table. Total intermediate expenditure on purchase of these materials by all industries was estimated ignoring inventories. This may have resulted overstating the Total intermediate expenditure on purchase of these materials by all industries. Estimation of inventories of recyclable/recoverable waste material will be considered in the future monetary use tables.

39. For monetary waste supply table, sales income from recyclable/recoverable waste material was considered as 100% trade margins based on the assumption that prices paid to acquire the recyclable/recoverable waste material are negligible. This needs to be confirmed through a recyclers' survey. The current presentation of the monetary supply table does not show margins separately but as basic prices under each industry with a footnote that they are considered as trade margins.

Physical supply and use tables

40. The ABS waste account identified the lack of data available to provide sufficient information on the breakdown of waste materials by ANZSIC industry in the physical use table. The breakdown was disaggregated by destination (landfill or recycling) for the waste management industry (ANZSIC D29) and industries outside ANZSIC D29. Data availability for the waste accounts is non-ongoing and requires annual information if the Waste Account is to be used as a tool for decision making.

41. Currently there are slight differences between the physical and monetary tables in the products and scope. This will be addressed in the future productions.

42. The production of the ABS waste account involved engagement with SEWPaC, University of Sydney, Australia and Department of Climate Change who provided data and methodologies which aided the compilation of the physical tables. Future development of

[19] See Australian System of National Accounts

the waste account will require on-going collaboration between government agencies and industry groups involved in the provision and study of waste management services.

43. Because of differences in policies, regulations and classifications in jurisdictions it is difficult to analyse and compare type of waste data between jurisdictions. Quantities of waste data are collected by all levels of government to meet jurisdictional regulatory and policy needs and while these data may satisfy the requirements of specific jurisdictions the data is not consistent or comparable at a national level. Collaboration between governments on standards and classifications is required to develop a national system of reporting quantities of waste and recycling.

E. Further developments and extensions

44. The annual production of a Waste Account by the ABS for Australia will enable a time series to be produced which can be used to forecast future waste management services trends and values and aid in the forming of waste policy. Therefore identifying improved data sources and filling the data gaps is currently being examined to improve the quality of the ABS Waste Accounts.

45. Conducting a survey on recycling activities and resource recovery facilities will be also considered in the future for better information (both physical and monetary) on recycler facilities and resource recovery more generally in Australia. This would greatly enhance the capacity to link the physical and monetary data to undertake future analytical work.

46. Currently, the physical and monetary supply and use tables are not entirely compatible. There are differences in the definition of supply and use of physical and monetary tables and coverage. Therefore development of combined monetary and physical supply and use tables is being considered to provide indicators to help assist analytical work. Proposed tables shells are provided in appendix 3.

F. Examples of waste accounts elsewhere

47. There are other countries producing waste accounts. Statistics Denmark presented Waste Accounts for Denmark in 1999[20] which published data for physical measurements of solid waste. Statistics Netherlands presented a compilation of both physical and monetary supply and use tables, based on National Accounting Matrix including Environmental Accounts (NAMEA) framework[21].

G. Reference material

48. Reference materials are given as footnotes in the earlier sections.

[20] Waste Accounts for Denmark 1999, Ole Pedersen, Statistics Denmark, http://circa.europa.eu/Public/irc/dsis/pip/library?l=/environmental_expenditur/country_studies/water_accounts/accounts_1999pdf/_EN_1.0_&a=d

[21] Roel Delahaye, Statistics Netherlands, 2006, NAMEA – Solid Waste Accounts

H. Questions to the London Group

(a) Do you have any comments on the methodology used to produce the ABS waste account?
(b) Would the ABS monetary and physical supply and use tables be suitable as "core" tables?
(c) Is the combined presentation of physical and monetary measurements of waste a useful extension?

Appendix 1: Supply and use tables – monetary

Table 1: Supply of waste related goods and services by industry 2009-10, $m (at purchasers' 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/recoverable waste 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/recoverable waste 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 2: Use of waste related goods and services by industry and households, 2009-10, $m, (at 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/recoverable waste 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/recoverable waste 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

Appendix 2: Supply and use tables – physical

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

	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

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

	Waste Management Services (a)		Other industries (b)		Total Landfill	Total Recovery	Exports	Total
	Landfill	Recovery	Landfill	Recovery				
	'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

Appendix 3: Proposed combined monetary and physical Supply and use tables

Table 1: Combined supply table

Products	Output of industries						Rest of the world (imports)	Taxes less subsidies on products	**Trade and transport margins**	**TOTAL supply at purchasers' price**
	Waste Services (D29)	Mining	Manufacturing	Construction	All other industries	Total supply at basic prices				
1 (a). Income from Supply of Waste management services ($ million) 1.a(i). Recyclable 1.a(ii). Non-recyclable (disposed to landfill) **1 (b). Income from Sales of recyclable/recoverable waste material**										
2. (a) Quantity of waste received at waste management services facilities ('000 tonnes) 2.a(i). Recyclable 2.a(ii). non-recyclable (disposed to landfill) **2. (b) Quantity of recyclable/recoverable waste material ('000 tonnes)**										

Table 2: Combined use table

Products	Intermediate consumption by industries (by ANZSIC06 categories)							Rest of the world (Exports)	**Actual Final consumption by**	**TOTAL at purchasers' price**
	Agriculture	Mining	Manufacturing	Waste Services (SD29)	Construction	Other service Industries	**Total use at basic prices**			
1. Total expenditure on waste management (payments to contractors/subcontractors for waste management services and treatment/processing/disposal of waste) (Monetary units - $million)										
1.a(i). Recyclable										
1.a(ii). Non-recyclable										
1.b. Expenditure on purchasing recyclable/recoverable waste material ($ million)										
2. Total waste sent for waste management services ('000 tonnes)										
2.a(i). Recyclable										
2.a(ii). Non-recyclable										
2.b. Quantity of recyclable/recoverable material purchased ('000 Tonnes)										