Organics Recycling in Australia

Industry Statistics 2011

Recycled Organics Unit®

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This report is the 2011 financial year edition of an annual series. Annual national data from 2004 – 2005 can be freely accessed and downloaded from the publications page of the ROU website www.recycledorganics.com

Author:
Angus Campbell

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Section 1 About this report

1.1 How to cite this report

This publication should be cited in the following manner:

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1.2 Availability of annual data

Annual industry data from 2004-05 financial year is available from the publications page of the *Recycled Organics Unit* website: http://www.recycledorganics.com/publications/index.htm

1.3 Objectives

The national industry survey was initiated in 2002 by the Recycled Organics Unit to contribute to the process of industry formation and development. The objectives of the national industry survey are:

i. To establish and maintain contact details for organics reprocessing enterprises across Australia.

ii. To collect quality data in consistent format from each jurisdiction that provides a tool for reporting; and for identifications of trends, opportunities and risks for both industry and Government.

iii. To quantify the nature and scale of the industry on a nationally aggregated basis to support industry engagement with the Australian Government.

iv. To identify and track industry issues and priorities to inform industry development programs.

v. To avoid over-surveying of the industry by conducting and publishing the results of a single national survey each year that meets the needs of both industry and government.

1.4 Acknowledgement

The national response rate for the 2011 industry survey is 99%. The ROU thanks the organics recycling industry for once again supporting the implementation of the national survey.

The Recycled Organics Unit (ROU) thanks the following agencies for providing support for implementation and reporting of the survey in respective jurisdictions:

- *Zero Waste South Australia* (ZWSA)
- Western Australian *Department of Environment and Conservation* (DEC)
- *Sustainability Victoria*

- Queensland *Department of Environment and Heritage Protection* (DEHP)
- NSW *Office of Environment and Heritage* (OEH) and the NSW *Environment Protection Authority* (EPA)

The ROU also thanks the Australian Government *Department of Sustainability, Environment, Water, Population and Communities* for supporting normalisation of state data for aggregation and reporting nationally.

Section 2 National summary

2.1 Executive summary:

Recovery and beneficial use of biodegradable organic materials

Biodegradable organic materials derived from urban waste and agricultural manures and residues (including processing of agricultural produce) contain nutrients, organic carbon, moisture, and microorganisms that can be returned to soil to maintain soil health and productivity, to assist rehabilitation of degraded land, and for a range or urban and amenity horticulture applications.

In all states the rate of increase in the recovery of biodegradable organic materials that are diverted from urban waste streams has accelerated substantially over the past decade. A large proportion of urban solid waste is comprised of biodegradable organic waste and the achievement of government waste reduction and resource recovery targets necessarily includes a focus on diversion of biodegradable organic materials from solid waste streams.

State government policies and programs have significantly focused on accelerated demand creation for recycled organics products to support the viability of this accelerated recovery of biodegradable organic materials. The challenge of characterising essential qualities of recycled organics products has continued, with the current revision of the Australian Standard AS-4454 *Composts, soil conditioners and mulches* (due for release early 2012) more clearly expressing requirements for pasteurisation (sanitisation), and more clearly defining biological stability and compost maturity. Correct characterisation of products is a precursor to quantification of reliable performance benefits of recycled organics for specific applications, including demonstrating the value of recycled organics products for agricultural markets.

These State government and industry programs continue to increase the diversion of biodegradable organic materials for beneficial use in all states.

The total reported quantity of biodegradable organic materials received for reprocessing or land application as beneficial recycled organics products by the organics reprocessing industry in Australia for the 2011 financial year is reported to be 6,330,749 tonnes. This data is reported from 198 facilities across all mainland states of Australia.

Regulatory framework

Different biodegradable organic materials can embody a range of generic physical, chemical and biological characteristics and/or contaminants that are associated with potential risks to environment, community health or biosecurity. When large quantities of biodegradable organic materials are aggregated together on a site, risks arise in association with potential impact on surrounding land use, including potential for odour generation and leachate. Different materials present different degrees of risk in each instance, and should be effectively handled and processed to manage risks relevant to the raw material inputs and the target product applications.

Inconsistent regulatory requirements and inconsistent interpretation of regulatory requirements has been uppermost on the list of concerns expressed by the industry in each state since the inception of the survey as the consequences of inappropriate product selection and use can affect the reputation of all recycled organics products, and because regulatory compliance imposes costs that impact business viability and commercial competitiveness.

Waste regulations and associated planning consent/licensing requirements for organics processing facilities are different in each state. State based guidelines are often interpreted differently by local government planning consent authorities and regional compliance officers within an individual state jurisdiction. Whilst the risks to environment, health and biosecurity are embodied in the raw material inputs, very commonly infrastructure and management requirements for planning consent and regulatory compliance differ not on the basis of risk, but on the basis of whether the state EPA or DPI exercises authority over the particular biodegradable materials, or whether the materials are managed by a local government authority, a primary producer, or a commercial organics processing facility. Commercial organics processors concern is that management requirements and associated costs should be risk based, and should apply equally to all facilities on the basis of risk.

State regulatory agencies are variously aware of these issues, and the need for clear guidelines for planning approval and licensing of organics processing facilities to encourage investment in additional processing capacity in order to increase resource recovery rates. This includes a requirement for clearly defined minimum buffer or separation distances that should apply in relation to potential odour risk (in different land use zonings), a clearly defined process for quantifying potential odour impact that is applied consistently to facilities processing biodegradable organic materials, and that odour impact should be policed consistently using documented and objective methods. Environmental regulation authorities often have limited jurisdiction over agricultural sector activities, and very commonly the environmental protection guidelines for commercial organics processing facilities differ for facilities processing biodegradable organic materials from urban sources, even where such facilities are located in areas with rural zoning.

Also very commonly, waste and recycling regulations exclude any integration of agricultural biosecurity regulations as these issues are commonly regulated by state DPI's through instruments derived from different Acts and are consequently outside the scope of the environmental regulatory authority. There is a need for agricultural authorities and environmental protection authorities to collaborate on the development of common minimum guidelines for management of risks associated with environmental protection, community health and agricultural biosecurity. There is also a requirement for evidence based buffer or separation distance guidelines that apply for organics processing facilities to address risk of odour impact on surrounding land use.

These issues are emerging as a higher priority with the renewed focus of state government agencies on increasing the diversion and recovery of food materials from urban solid waste streams as food wastes present a range of potential biosecurity risks.

Price signals

Whilst the landfill levy has increased the price of landfill disposal in the Sydney region, elsewhere cost control and regulatory compliance are the commonly the primary drivers for the sector.

Outside of metropolitan Sydney and Perth, the common practice for processing biodegradable organic materials involves aggregating biodegradable materials into open outdoor piles (most commonly windrows), with varying levels of management of these piles. The commercial viability of outdoor windrow facilities simply cannot support the fixed capital investment required to install forced aeration technology in the form of concrete aerated floors, in-vessel composting technology, or enclosed composting infrastructure.

A price signal is required to encourage the development of additional processing infrastructure, to encourage improved management practices across the industry (to “raise the low bar”), and to support the development of agricultural markets for recycled organics products. This would enable the achievement of real, measurable, additional and verifiable reductions in methane emissions from the management of biodegradable organic wastes, manures and agricultural residues, consistent with Australian Government policy objectives.

2.2 Scope of survey data

Data reported in this document includes biodegradable organic materials received for reprocessing or land application as beneficial recycled organics products for the financial year to 30 June 2011 from:

- All licensed commercial organics reprocessing facilities in all mainland states of Australia,
- All “AWT” reprocessing facilities[1] that include, including those that process source segregated organics and also those that process mixed solid waste (MSW), including anaerobic digestion facilities (see Section 2),
- All organics processing facilities where a group of local councils have jointly formed a separate entity and have collectively invested in the establishment and operation of shared processing infrastructure (eg. the Southern Metropolitan Region of Councils – SMRC facility at Canning Vale in Perth; and the Eastern Metropolitan Region of Councils – EMRC facility at Red Hill in Perth).

This data does not include:

- Small, unlicensed on-farm facilities processing materials primarily for their own on-farm use,
- Facilities in Tasmania, Northern Territory, or ACT,

[1] AWT reprocessing facilities includes anaerobic digestion and aerobic reprocessing facilities, but does not include waste (EfW) facilities that implement thermal treatment or combustion to extract energy.

- Facilities operated directly by individual local councils (with the exception of Queensland where local council figures are included, with deliberate effort to avoid risk of double counting). State government agencies obtain waste and recycling data survey from local councils as a component of their broader annual data collection and survey of local government sector in each respective state jurisdiction,

- Finally, the survey is not an agricultural industry survey. The survey records data relating to quantities received by processing facilities and does not capture generation data directly from intensive livestock or agricultural production industries. Although a significant quantity of feedlot manures, paunch, animal bedding, and animal mortalities are received by the industry for processing, there are large quantities of poultry manures and other manures that are not captured as they are either directly applied as fertilizer via different market channels or are otherwise managed and utilised by the generator on their own properties as an agricultural input. The feedlot industry alone (mammalian livestock, excluding poultry) is estimated in reports for that industry to generate in excess of 5 million metric tonnes of manure per year. Historically, agricultural manures and crop residues have not been treated, disposed of, or counted as "waste" by the authorities (see background documents and classification system for the Australian Waste Database: http://awd.csiro.au/).

2.3 Direct employment across the organics recycling industry

The ROU historically collaborated with *Compost Australia* to establish a relationship between quantity of raw materials processed and direct employment via direct consultation with a cross section of organics processing enterprises of different scale, processing type and complexity of production systems (in relation to the diversity of materials processed and the breadth or product types manufactured).

Applying this average employment coefficient of one FTE employee per ~ 5,000 tonnes per annum (tpa) of material processed to the total reported quantity of 6,330,749 tonnes of biodegradable organic materials for the 2011 financial year equates to the direct employment of over 1,260 FTE personnel in compost operations and operational management.

This average employment coefficient does not take into account any year-to-year variation in supply and demand ratios or year-by-year changes in establishment of new processing infrastructure across the sector. The viability of rural and regional facilities (including manure composting facilities) relies on lower staffing levels per tonne of material processed. Metropolitan AWT facilities have a higher degree of engineering complexity, and a higher corporate and administrative employment levels per tonne of material processed. Facilities producing bagged product lines have higher employment levels per tonne of material processed than facilities that distribute only bulk product.

This total does not account for additional indirect employment in associated corporate or administrative activities, product development, compost marketing and sales, plant and equipment maintenance, transport of raw materials to processing facilities and transport of recycled organics products to application sites, product spreading and application, research and development, corporate and local government planning/procurement/management/contract management, community education, state and commonwealth government strategy, regulation and planning.

Section 3 Significant developments: state by state

3.1 Significant developments: New South Wales

3.1.1 NSW number and type of facilities

A total of 64 organics recycling facilities have participated in the 2011 survey, consistent with 2010. Newly established facilities included in the 2010 survey have operated for the entire year for the first time, whilst infrastructure processing design capacity has not increased, reported quantities have increased as this relatively recent infrastructure has been utilised to capacity during the 2011 reporting period.

Open air windrow composting remains the overwhelmingly dominant method for reprocessing a wide range of non-putrescible materials, including garden vegetation and woody materials, and also a range of highly putrescible materials such as grease trap and organic sludges; manures and other agricultural residuals.

As a consequence of high landfill and waste disposal costs there has been significant move in the Sydney metropolitan area to the collection and processing of co-collected kerbside food and garden organics. There has also been a strong move towards "AWT" infrastructure for processing mixed solid waste, including the recovery of a stabilised organic rich fraction that is physically separated after collection from other mixed waste materials using a sequence of MRF technologies. Retail centres are now calculating that combined costs of collection and disposal (or mixed waste treatment) are approaching the level of $300 per tonne of waste collected.

There are also widespread anecdotal reports of notable increases in direct land application of food wastes and organic liquids/sludges, and also of the use of food waste as animal feed. There are widespread reports of food waste being transported to farms as animal feed in a manner that contravenes NSW DPI and Australian Government biosecurity laws and regulations in order to avoid the costs of waste disposal (and payment of the NSW Government landfill levy).

3.1.2 NSW quantities of organic material received and processed

The total reported quantity of biodegradable organic materials received for reprocessing or land application as beneficial recycled organics products has marginally decreased over the 2011 reporting period by around 1% to a total of 1,788,746 tonnes of raw materials compared to the total of 1,808,669 tonnes of raw materials reported in 2010. This total figure is misleading at first reading, as there has been a large collective increase in the processing of urban organic materials (from ~ 950,000 tonnes in 2010 to 1,073,000 tonnes in 2011), and a large *notional* decrease in the reported quantity of manures received for processing. This notional decrease in manure quantities is offset by an equivalent increase in inventories at the source feedlots which is a function of adverse weather conditions that have restricted access for heavy vehicles used for transporting these manures to facilities for processing. Adjusting for this anomaly would result in an annual total that is 220,000 tonnes higher, with a more credible total of 2,008,746 tonnes for the 2011 financial year, representing an increase of around 11% in total.

The quantity of raw materials received for processing and diverted from landfill increased across the overwhelming majority of raw material categories with the exception of the reported reduction in manures, and also a reduction in the quantity of forestry barks and sawdusts received. In particular, there were significant increases in processing quantities of garden organics, biowaste (combined collection of kerbside food plus garden organics), commercial and industrial wood/timber, biosolids, and mixed solid waste (noting that the survey counts only the biodegradable organic fraction of the mixed solid waste processed by waste facilities, and not the total tonnage of mixed waste received).

Note that facilities that are directly operated by individual local councils are not accounted for in this data as OEH/EPA conducts an annual survey of local government, including the organics processing data for annual reporting, however kerbside materials generated from the greater Sydney region (GSR) are overwhelmingly processed by commercial contractors.

Notable developments:

- Reported quantities of **garden organics** diverted from the waste stream for reprocessing into beneficial recycled organics products have increased to a total of 637,306 tonnes in 2011, an increase of 28,508 tonnes (4.7%) from the 608,798 tonnes reported for the 2010 financial year.

- Reported quantities of **wood and timber** diversion from commercial and industrial sources from the waste stream for reprocessing into beneficial recycled organics products have increased to a total of 93,935 tonnes in 2011, an increase of 18,444 tonnes (24%) from the 75,491 tonnes reported for the 2010 financial year.

- Reported quantities of source segregated **food waste** diverted from the waste stream for reprocessing into beneficial recycled organics products have decreased from 102,670 tonnes in 2010 to 95,490 tonnes in 2011. This is a consequence of the major food waste processing facility being decommissioned for overhaul, and reported food waste quantities are expected to increase significantly in the following 12 months as this anaerobic digester is recommissioned, with a design capacity of 80,000 tpa of food waste. In the interim, a significant quantity of food waste is reportedly being transported to the Woodlawn bioreactor landfill; and there are also widespread anecdotal reports of notable increases in direct land application of food wastes and organic liquids/sludges, and also of the use of food waste as animal feed. These quantities are not captured by this survey. There are widespread reports of food waste being transported to farms as animal feed in a manner that contravenes NSW DPI and Australian Government biosecurity laws and regulations in order to avoid the costs of waste disposal (and payment of the NSW Government landfill levy).

- Reported quantities of **mixed solid waste** reprocessing and associated recovery of the organic rich fraction has increased substantially as recently completed infrastructure has achieved full capacity, reported quantities of the organic fraction of this mixed waste have increased to a total of 191,621 tonnes in 2011, an increase of 78,846 tonnes (70%) from the 112,775 tonnes reported for the 2010 financial year. Note that quantities for MSW reported in this survey include the biodegradable organics fraction only, using performance data from each facility. Whilst this represents an increase in the quantities of food organics and garden organics being reprocessed, this data is not readily disaggregated into separate subcategories of organic materials.

- There has been a large *notional* decrease in the reported quantity of **manures** received for processing, with a total of 174,765 tonnes reported in 2011. This data reports a *notional* decrease of 203,532 tonnes from the total of 378,297 tonnes reported for the 2010 financial year. However this is offset by a increase in reported inventories of manure in the source feedlots from 26,000 tonnes (in 2010) to 220,000 tonnes (in 2011). The large decrease in reported quantities received at the compost facilities for processing is a function of adverse weather conditions that have restricted access for heavy vehicles responsible for transporting these manures to facilities for processing. Accounting for raw materials inventory at the feedlot and material received at facilities as a combined figure, this represents an actual reduction of ~ 30,000 tonnes in 2011, and is a consequence of reduced demand in this export oriented industry due to global economic conditions and higher exchange rate for the Australian dollar.

- Reported quantities of **biosolids/grit/screenings diversion** from the waste stream for reprocessing into beneficial recycled organics products have significantly **increased** to a total of 245,667 tonnes in 2011, an increase of 76,657 tonnes (45%) from the 169,010 tonnes for the 2010 financial year. It should be noted that there are significant cross-border transfers of biosolids between northern NSW and southern Queensland for direct land application (in conformance with the NSW EPA biosolids guidelines), and that total biosolids quantities can vary significantly depending on moisture content.

3.1.3 NSW quantities and type of recycled organic product sold

Notable developments:

- An increase in sales of composted **soil conditioner** from ~ 538,000 m^3 (2010) to ~ 587,000 m^3 (2011) is reported; and a large decrease in sales of pasteurized soil conditioner, down from ~ 136,000 m^3 (2010) to ~ 24,000 m^3 (2011) is reported.

- There is a relatively small decrease in reported sales of composted **mulch** (- 9,000 m^3), a large decrease in pasteurized mulch is reported (- 41,000 m^3), and a very large increase in sales of raw mulch is reported (+ 100,000 m^3).

- Reported sales of composted **manure** have decreased by a very large volume (-300,000 m^3), which is consistent with the increase in inventories of unprocessed manures in feedlots awaiting transport to facilities for composting, as reported above.

- Reported quantities of organic materials going to **direct land application** increased again in 2011, increasing to 160,000 m^3 in 2011, up from ~ 110,000 m^3 in 2010, and ~ 99,000 m^3 in 2009.

3.1.4 NSW inventories

Total inventories represent the combined quantity of raw materials, materials being processed, and stockpiles of finished product on-site at the end of the financial year. There is little value in attempting to distinguish between these categories as materials in process will be held back or pushed through to final product to meet sales orders. There has been a strong drive since the 2006 survey to clarify the question asked in relation to inventories, and to encourage industry to provide a more accurate response. The current year survey continues this emphasis and the total inventories in New South Wales have remained stable.

Reported inventories have increased significantly in 2011 to 983,701 m^3, up from the 661,057 m^3 reported in 2010. This inventory figure does not include the almost 200,000 tonnes of manure in feedlots awaiting transport to facilities for processing.

The significant reduction in manures and increase in inventories from regional processors is reportedly a result of two factors: protracted wet weather impacting on site access and production, and a reversal of the Australian dollar exchange rate trend, with the higher Australian dollar resulting in relatively lower fertilizer prices.

3.1.5 NSW industry issues and priorities

The key issues expressed by the industry are listed below in order of priority, with comparison to expressed priorities from the previous two survey years.

Table. Issues and priorities for the recycled organics industry in NSW.

Rank	Prioritised issues 2011	Prioritised issues 2010	Prioritised issues 2009
1.	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)
2.	Inadequate / not enforced regulation of competing products	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy
3.	Raw materials contamination	Inadequate / not enforced regulation of competing products	Development of new products/markets (particularly agriculture)
4.	Cheap substandard products being marketed at low price or free as "compost" from mixed waste processing and from local government shredding facilities undermining agricultural market development.	Raw materials contamination	Inadequate / not enforced regulation of competing products
5.	Carbon Farming Initiative readiness and carbon sequestration	Development of new products/markets (particularly agriculture)	Raw materials contamination

3.2 Significant developments: Western Australia

3.2.1 WA number and type of facilities

A total of 29 organics recycling facilities have participated in the 2011 survey, increasing from the 28 facilities participating in 2010. Open air composting in windrows remains the dominant method for reprocessing all manner of materials, however the industry in WA is characterised by a significant diversity of organics processing technologies (see Section 2 above), including two “AWTs” processing mixed waste, and additional anaerobic digestion facilities at various stages of development.

3.2.2 WA quantities of organic material received and processed

The total reported quantity of biodegradable organic materials received for reprocessing or land application as beneficial recycled organics products is reported to be 732,995 tonnes, increasing by around 36,860 tonnes (5.3%) compared to the 696,129 tonnes of raw materials reported in 2010.

Notable developments:

- Reported quantities of **garden organics**, and **wood/timber** (from commercial and industrial sources) in aggregate has remained flat, with no significant change reported for the 2011 financial year.
- Reported quantities of source segregated **food waste** diverted from the waste stream for reprocessing into beneficial recycled organics products have nearly doubled from 7,453 tonnes reported in 2010 to 14,338 tonnes reported in 2011, representing an increase of around 6,885 tonnes (92%).
- Reported quantities of **mixed solid waste** reprocessing and associated recovery of the organic rich fraction has increased from 143,420 tonnes reported in 2010 to 162,580 tonnes reported in 2011, representing an increase of around 19,160 tonnes (13%). This continues the growth trend from the previous year as recently completed “AWT” infrastructure (Mindarie) has increased operational throughput to design capacity.
- Reported quantities of **biosolids/grit/screenings**, and **oils/greasetrap/organic sludges** in aggregate have increased from ~ 57,000 tonnes reported in 2010 to ~ 60,500 tonnes reported in 2011, representing an increase of over 3,500 tonnes (6%), continuing the growth trend from the previous year.

3.2.3 WA quantities and type of recycled organic product sold

The clear trend reported in WA for 2008 – 2010 of a rapid and continuing increase in sales of lower quality and price pasteurised soil conditioners and mulches.

This is characterised by:

- An increase in sales of composted **soil conditioner** from ~ 322,450 m^3 (2010) to ~ 353,817 m^3 (2011) is reported; and a very large increase in sales of pasteurized soil conditioner, from ~ 26,790 m^3 (2010) to ~ 83,736 m^3 (2011) is reported, representing an increase of around 57,000 tonnes (212%).
- There is a relatively small increase in reported sales of composted **mulch**, increasing by ~ 8,500 m^3 (6.6%); and a similar increase in sales of pasteurized mulch, from ~ 93,750 m^3 (2010) to ~ 100,355 m^3 (2011) is reported, representing an increase of around 6,600 tonnes (7%).
- Reported sales of **manufactured soils** increased significantly by ~ 41,000 m^3 (22%) to a total of 225,830 m^3 over the 2011 financial year, reversing the decline in sales reported since 2009.

3.2.4 WA inventories

Total inventories represent the combined quantity of raw materials, materials being processed, and stockpiles of finished product on-site at the end of the financial year. There is little value in attempting to distinguish between these categories as materials in process will be held back or pushed through to final product to meet sales orders. There has been a strong drive since the 2006 survey to clarify the question asked in relation to inventories, and to encourage industry to provide a more accurate response. The current year survey continues this emphasis.

- Reported WA inventories appear to have reversed the decreasing trend of the previous two years and have **increased** for the 2010 financial year to 569,623 m^3. This represents an increase of ~ 32,000 tonnes (6%) on the 2010 financial year total of 537,646 m^3. A portion of this increase represents additional material in production and finished product at the recently developed and now fully operational facility at Mindarie.

3.2.5 WA industry issues and priorities

The key issues expressed by the industry are listed below in order of priority, with comparison to expressed priorities from the previous two survey years.

Table. Issues and priorities for the recycled organics industry in Western Australia.

Rank	Prioritised issues 2011	Prioritised issues 2010	Prioritised issues 2009
1.	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)
2.	Industry structural economics and government incentives (absence of coordinated government policy support with local govt, state govt and national govt agencies all working independently of each other)	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy
3.	Factors placing downwards pressure on prices and increasing production costs, including transport distances and fuel price,	Market and political perception of composts and industry (external), Promoting the national industry brand, Industry organisation and communication (internal), delivering value for CA members	Market and political perception of composts and industry (external), Promoting the national industry brand, Industry organisation and communication (internal), delivering value for CA members
4.	shred and give away cheap greenwaste as "compost" and mulch; cheap substandard products being marketed as "compost" making equivalent performance claims and undermining reputation and market price of quality products	Raw materials contamination	Inadequate / not enforced regulation of competing products
5.	Need application-specific/performance based product specifications and market education to better differentiate products in the market, and for associated cost/benefit performance data	Need application-specific product standards/Product standards need revision	Raw materials contamination

3.3 Significant developments: Queensland

3.3.1 Qld number and type of facilities

A total of 42 organics recycling facilities have participated in the 2011 survey, consistent with 2010. Open air composting in windrows remains the overwhelmingly dominant method for reprocessing all manner of materials, including garden vegetation (elsewhere green organics, garden organics, green waste); food organics (elsewhere food waste); and highly putrescible materials such as grease trap and organic sludges; manures and other agricultural residuals.

3.3.2 Qld quantities of organic material received and processed

The total reported quantity of biodegradable organic materials received for reprocessing or land application as beneficial recycled organics products has increased to a total of 2,172.592 tonnes of raw materials reported in 2011 compared to 1,997,339 tonnes of raw materials reported in 2010.

Notable developments:

- The survey reports a large increase in the quantity of **garden organics** diversion from the waste stream for reprocessing into beneficial recycled organics products, however the 2008 - 2010 reports did not include garden organics reported in the Queensland local government survey, which was last included in the 2007 report (at 578,420 tonnes). Care has been taken over the years to avoid double counting of transfers from Council to commercial facilities, but due to the large quantity being processed directly by local government (primarily shredding), and the fluctuating quantities being transferred to commercial facilities in south eastern Queensland (in the absence of a clear price signal), local government quantities are again reported in 2011. As a consequence, the total quantity of garden organics diversion is reported as 928,456 tonnes in 2011 (including 740,456 tonnes diversion by local government). This figure includes storm debris vegetation from Cyclone Yasi (February 2011).

- There is significant direct land application of **biosolids** as this option is cost effective, and there are clear and detailed guidelines for management of risk and for safe and beneficial application. Reported quantities of biosolids/grit/screenings for land application have fluctuated from 432,000 tonnes (2009), to 922,020 tonnes (2010), to 587,000 tonnes (2011). Whilst there has been a trend of continuing increase in quantities in Queensland over the years, the variation for 2010, though confirmed with the contractors, is due to anomalies in the way biosolids are quantified. For Queensland, as of 2012, the survey will consider biosolids on a dry weight equivalent basis to manage the noted variation in reporting.

- A note regarding **manure** quantities. Feedlot enterprises are affected by a range of economic and market conditions (including exchange rates) that can influence international demand and production levels. Whilst production levels influence the quantity of manure generated, access to feedlots and the timing removal of manures from feedlots can also be affected by adverse weather. Reported quantities of manure received by composters for processing can therefore fluctuate depending on weather conditions in a manner that can distort the reporting of total quantities of manure generated. The quantities of paunch generated can be an indicator of changes in the level of feedstock business activity.

- Whilst this is not an agricultural industry survey, it should be noted that there are significant quantities of shredded sugarcane mulch (bagasse) that is increasingly being distributed for horticultural use as a raw mulch that are not being captured in this survey. It is noted that studies have shown that fresh bagasse can release water soluble phytotoxic compounds that have a detrimental effect on vegetable production (reduced yield for tomato production), but that bagasse that has been decomposed (by aging for a minimum period of 6 months) can be beneficial as a mulch for use in vegetable production.

3.3.3 Qld quantities and type of recycled organic product sold

Industry reported sales of recycled organics products to decrease or remain flat across the range of product categories. This is unsurprising given the high rainfall across the summer months and the impact of the cyclone and is not representative of historic trends. Notable developments:

- Reported sales of composted mulch **decreased** by ~ 50,000 m^3 over the 2011 financial year, almost half the figure of ~ 103,000 m^3 reported in 2010, which is most suggested to be a consequence of the high rainfall received over the spring/summer period.

3.3.4 Qld inventories

Total inventories represent the combined quantity of raw materials, materials being processed, and stockpiles of finished product on-site at the end of the financial year. There is little value in attempting to distinguish between these categories as materials in process will be held back or pushed through to final product to meet sales orders. There has been a strong drive since the 2006 survey to clarify the question asked in relation to inventories via reduced complexity of subcategories, and to press the industry for a more accurate response. The current year survey continues this emphasis.

- Note that inventories are affected by storm damage material from cyclone Yasi, and as a consequence are disproportionately high for the 2011 year.

- Reported inventories appear to have **increased** from 1,144,750 m^3 for the 2010 to 1,281,550 m^3 for the 2011 financial year. Inventories appear to have increased by ~ 106,400 m^3 over 2010, an increase of ~ 10%.

- Note that the local government survey does not record inventories at facilities that are directly managed by local government

3.3.5 Qld industry issues and priorities

The key issues expressed by the industry are listed below in order of priority, with comparison to expressed priorities from the previous two survey years.

Table. Issues and priorities for the recycled organics industry in Qld.

Rank	Prioritised issues 2011	Prioritised issues 2010	Prioritised issues 2009
1.	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)
2.	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy
3.	Inadequate / not enforced regulation of competing products	Inadequate / not enforced regulation of competing products	Inadequate / not enforced regulation of competing products
4.	Product standards and associated certification or verification systems	Development of new products / markets (particularly agriculture)	Development of new products / markets (particularly agriculture)
5.	Product specifications applied by government agencies and the absence of transparency in the methods used assess product suitability and select suppliers.	Market and political perception of composts and industry (external), Promoting the national industry brand, Industry organisation and communication (internal), delivering value for CA members	Product quality standards need revision

3.4 Significant developments: South Australia

3.4.1 SA number and type of facilities

33 organics recycling facilities have been involved in the survey, consistent with 2010. Open air composting in windrows remains the overwhelmingly dominant method for reprocessing all manner of materials, including garden vegetation (elsewhere green organics, garden organics, green waste); food organics (elsewhere food waste); highly putrescible materials such as grease trap and organic sludges; manures and agricultural residuals.

3.4.2 SA quantities of organic material received and processed

The total reported quantity of biodegradable organic materials received for reprocessing or land application as beneficial recycled organics products has decreased by around 41,000 tonnes (6%) to a total of 637,271 tonnes of raw materials reported in 2011 compared to 678,587 tonnes of raw materials reported in 2010.

Notable developments:

- Reported quantities of **garden organics** diverted from the waste stream for reprocessing into beneficial recycled organics products have increased marginally to a total of 222,693 tonnes in 2011, an increase of around 2,900 tonnes (~ 1.3%) from the 219,795 tonnes reported for the 2010 financial year.

- Reported quantities of **manure** diversion for reprocessing into beneficial recycled organics products increased by around 6,000 tonnes (~ 10%) to a total of 66,483 tonnes over the 2011 financial year.

- Reported quantities of **barks and sawdust** (from forestry) for reprocessing have decreased by around 10,000 tonnes to a total of 200,881 tonnes over the 2011 financial year. Note that the quantity of sawdust (from forestry) is reported as zero. This is a quirk of the classifications within the survey, with South Australia reporting barks and sawdust (from forestry) as a single figure.

- Reported quantities of **oils, grease trap and other sludges** diverted from the waste stream for reprocessing into beneficial recycled organics products decreased by around 20,000 tonnes, seemingly reversing the trend of increases since 2007 (increasing by 22% in 2010, by 24% (2009), by 44% (2008) and by 42% (2007). However, this is offset by an equivalent increase of 20,000 tonnes of material reported in the miscellaneous category and represents a change in reporting category, not a change in actual quantity.

- A large reduction is reported in the quantity of **paper pulp/sludge** being processed, falling from > 50,000tpa in 2010 to 16,881tpa in 2011.

- The reported quantity of **biosolids** being composted has more than doubled, although the total quantity remains small at ~ 12,000 tonnes.

- The reported quantity of **animal mortalities** being composted has increased by over 3,000 tonnes.

- Note that there are no facilities attempting to process mixed waste in SA, and the state government has a clear policy position that discourages mixed waste processing, with strong encouragement of source segregated collection and processing of biodegradable organic materials.

3.4.3 SA quantities and type of recycled organic product sold

Notable developments:

- Reported sales of composted **mulch** products have remained steady. Sales of pasteurized mulch products have decreased by ~ 50,000 m^3 since 2010. The significant change is a large increase in the reported quantities of raw mulch sold, increasing to 494,000 m^3 in 2011.

- Reported sales of composted **soil conditioner** have decreased by ~ 12,000 m^3, however this is offset by a large manufactured soils increased from ~ 64,213 m^3 to a total of ~ 111,735 m^3 over the 2011 financial year, which continues the growth trend for these products (22% increase reported in 2010).

- The format of data collection in South Australia does not allow breakdown of reported sales quantities by market segment, consequently total quantities only are by product category are reported.

3.4.4 SA inventories

The method of surveying industry in South Australia is undergoing transition from 2011, and inventory data at end of 2011 financial year is not available. The ROU is working with the agency and processors to provide inventory data for subsequent reports.

3.4.5 SA industry issues and priorities

The key issues expressed by the industry are listed below in order of priority, with comparison to expressed priorities from the previous two survey years. Issues and priorities expressed in 2011 are consistent with those expressed in 2010.

Table. Issues and priorities for the recycled organics industry in South Australia.

Rank	Prioritised issues 2011	Prioritised issues 2010	Prioritised issues 2009
1.	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)
2.	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy
3.	Raw materials contamination	Raw materials contamination	Raw materials contamination
4.	Inadequate / not enforced regulation of competing products	Inadequate / not enforced regulation of competing products	Inadequate / not enforced regulation of competing products
5.	Market and political perception of composts and industry (external), Promoting the national industry brand, Industry organisation and communication (internal), delivering value for industry association members	Market and political perception of composts and industry (external), Promoting the national industry brand, Industry organisation and communication (internal), delivering value for industry association members	Research & development / inadequate compost performance data

3.5 Significant developments: Victoria

The survey of the recycled organics industry in Victoria is conducted directly by Sustainability Victoria, with the ROU consulting with the agency to normalise data for integration into the national report. The complete data set was not available at the time of reporting for the 2010 national report, and data from only 20 facilities was reported. Due to the timing of production of the 2011 national report, complete data is available with all 33 facilities reporting quantity data for this report.

Consequently it is not valid to conduct comparison with 2010 data. The response rate for processors in Victoria has increased to 100% due to the efforts of Sustainability Victoria staff and arrangements are in place for full data to be included in the 2012 report, where trends will be identified.

The total reported quantity of biodegradable organic materials received for reprocessing or land application as beneficial recycled organics products in Victoria for the 2011 financial year is 999,145 tonnes of raw materials.

Open air composting in windrows remains the overwhelmingly dominant method for reprocessing all manner of materials, including garden vegetation (elsewhere green organics, garden organics, green waste); food organics (elsewhere food waste); and highly putrescible materials such as grease trap and organic sludges; manures and other agricultural residuals. However, the quantities of food waste reported are largely C&I sector source segregated food wastes that are processed at an enclosed and force aerated tunnel composting facility in Dandenong.

- The format of data collection in Victoria does not allow breakdown of reported sales quantities by market segment, consequently total quantities only are by product category are reported.

- Product quantity data is reported variously by Sustainability Victoria in either tonnes or cubic meters, across other states for both the current and previous years such data is reported in cubic metres. Standard ROU survey conversion factors have been applied to the Victorian data, and where necessary clarification has been sought from individual processors. Consequently conversion factors applied may not be perfectly consistent with those applied for state reporting by the agency.

3.5.1 Victoria inventories

Inventory data for Victoria at end of 2011 financial year is not available. The ROU is working with the agency and processors to provide inventory data for subsequent reports.

3.5.2 Victoria industry issues and priorities

The key issues expressed by the industry are listed below in order of priority, with comparison to expressed priorities from the previous years.

Table. Issues and priorities for the recycled organics industry in Victoria.

Rank	Prioritised issues 2011	Prioritised issues 2010
1.	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy	Site regulation and planning consent - inconsistent, unnecessarily costly, requirements don't support policy
2.	Guidelines for the establishment and regulation of compost and related facilities	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)
3.	Factors placing downwards pressure on prices and increasing production costs (oversupply, competition from non-commercial facilities, fuel price, absence of incentives for growers)	Raw materials contamination
4.	Suitable product standards and costs of certification	Demand creation and product performance data for agricultural applications
5.	Raw materials contamination	Suitable product standards and costs of certification

3.6 Australian Capital Territory, Tasmania and Northern Territory

ACT, NT and Tasmania have not participated in the 2011 national industry survey, it is hoped that these jurisdictions will participate in future years. Please refer to *Organics Recycling in Australia: Industry Statistics 2006* report for ACT data from that year survey, available online from www.recycledorganics.com

Section 4 Recommendations for subsequent survey implementation

4.1 Recommendations:

i. Implementation of the survey should begin at the beginning of August each year, close to the end of financial year and prior to the busy spring sales period. This is required both for the purpose of achieving superior data quality and for timeliness of reporting of results for use by industry and government for planning and to inform current year sales and programs. Whilst reporting later in the subsequent financial year can satisfy the reporting requirements of the various state and federal government agencies that contribute funding for survey implementation, earlier implementation and reporting can yield more accurate data.

ii. There is a need for the collection of annual inventory data to support analysis of market and sales trends in all states. It is preferable to collect total inventories (representing the combined quantity of raw materials, materials being processed, and stockpiles of finished product on-site) at the end of the financial year (at 30 June). Historically the ROU has found it to be counterproductive to draw a line between material in production and finished product for sale as large batches move from one category to another with the stroke of a pen, and materials in process can be held back or pushed through to finished product via increased intensity of management to meet sales orders.

iii. To establish a common practice baseline for the industry and to support Australian Government reporting requirements the ROU has developed an additional set of standard questions for inclusion into the industry survey in each state. These additional questions can be completed in under 2 minutes by processors, and enable the classification of different types of "composting facilities" on the basis of technology and management practices employed. The ROU is working with government agencies and industry to progressively include this additional information into the industry survey for each state. Interested stakeholders should contact a.campbell@recycledorganics.com for details.

There has been significant change to the organisation of the sector across 2011 and 2012 calendar years. The ROU has developed an action plan for continuation of national survey. This plan is currently being implemented in cooperation with state government agencies and industry.

Section 5 Aggregated survey results for the 2010- 2011 financial year

Please refer to subsequent pages. Please note: ACT, Tasmania and NT have not been included in the 2011 survey, as identified in sections 3.6 above. Comments on data from each state are addressed in Section 3 of this report, and general explanatory footnotes on the structure of data in these are provided at the end of this report.

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ORGANICS PROCESSING INDUSTRY: Annual national survey National Aggregate Survey 2010/11 Financial Year		National total	NSW total	WA total	SA total	VIC total	QLD total
SECTION A - Organisation details							
2 Facility type Total	No.	198	61	29	33	33	42
On-farm operation		45	17	2	10		16
Council facility		6	1	1	2	1	1
Licensed commercial facility		142	40	26	20	31	25
Other [1]		5	3		1	1	
Response rate%		99	100	100	97	100	98
SECTION B: Raw materials received/processed							
3 Total quantity of raw materials processed	t	**6,330,749**	**1,788,746**	**732,995**	**637,271**	**999,145**	**2,172,592**
4 Types of raw materials processed							
Garden organics (green organics / garden vegetation)	t	2,411,176	637,306	200,919	222,693	421,802	928456
Wood/timber/sawdust (from commercial/industrial sources)	t	292,540	93,935	42,590	15,318	107,199	33,498
Sawdust (from forestry residuals)	t	205,590	94,875	26,836		8,479	75,400
Barks (from forestry residuals)	t	769,467	122,530	131,990	200,881	117,866	196,200
Food organics (food waste)	t	150,555	95,490	14,338	4,379	22,368	13,980
Biosolids/grit/screenings	t	917,076	245,667	33,721	11,953	38,715	587,020
Oils, grease trap, sludges	t	263,087	23,730	26,720	36,612	73,435	102,590
Straw	t	27,019	1,295	7,520	10,204	8,000	
Manure	t	460,473	174,765	32,523	66,483	90,000	96,702
Animal bedding	t	24,484	250	10,490	1,044	12,000	700
Animal mortalities	t	80,065	2,044	5,258	3,575	69,188	
Paunch	t	55,262	750	3,811	9,201	3,000	38,500
Other - Miscellaneous agricultural organics	t	84,924	15,550	10,384	17,344		41,646
Other - Paper pulp/sludge	t	23,881	7,000		16,881		
Other - MSW (organic fraction)	t	380,699	191,621	162,578			26,500
Other - Biowaste	t	54,949	54,949				
Other - Miscellaneous	t	129,502	26,989	23,317	20,703	27,093	31,400

NOTE: In relation to totals for "Recycled organics product types and quantities sold" are correct as reported, however the sum of individual market segments may not equate to the total as not all processors are able to provide market breakdown due to the manner in which company sales records are structured. Market breakdown is not reported in Vic or SA by product category.

ORGANICS PROCESSING INDUSTRY: Annual national survey National Aggregate Survey 2010/11 Financial Year		National total	NSW total	WA total	SA total	VIC total	QLD total
SECTION C: Recycled organics product types and quantities sold							
5 Total quantity of product sold, recycled organics content [2], market breakdown (where reported) [3 6]							
Composted soil conditioner							
Quantity product sold [3]	m^3	**1,405,174**	**587,640**	**353,817**	**89,719**	**108,858**	**265,140**
Recycled organic content	%	418	1,700	99	99	100	95
Intensive agriculture	m^3	74,285	49,447	24,838			
Extensive agriculture	m^3	187,125	84,135	102,990			
Urban amenity	m^3	611,539	403,571	207,968			
Rehabilitation	m^3	37,221	31,873	5,348			
Enviro-remediation	m^3	30,851	18,179	12,672			
Pasteurised soil conditioner							
Quantity product sold	m^3	**149,058**	**24,400**	**83,736**	**2,923**	**24,034**	**13,965**
Recycled organic content	%	96	100	92	96	100	94
Intensive agriculture	m^3	5,704		5,704			
Extensive agriculture	m^3	26,237		26,237			
Urban amenity	m^3	27,841		27,841			
Rehabilitation	m^3	33,526	24,400	9,126			
Enviro-remediation	m^3	14,829		14,829			
Composted mulch							
Quantity product sold	m^3	**407,785**	**37,722**	**136,106**	**162,407**	**21,050**	**50,500**
Recycled organic content	%	100	100	100	100	100	100
Intensive agriculture	m^3	15,054	12,176	2,878			
Extensive agriculture	m^3	2,210		2,210			
Urban amenity	m^3	141,024	23,512	117,512			
Rehabilitation	m^3	8,601	2,033	6,568			
Enviro-remediation	m^3	6,938		6,938			
Pasteurised mulch							
Quantity product sold	m^3	**150,163**	**913**	**100,355**	**33,308**	**15,587**	
Recycled organic content	%	75	100	100	varies	100	
Intensive agriculture	m^3	580		580			
Extensive agriculture	m^3	0					
Urban amenity	m^3	100,615	840	99,775			
Rehabilitation	m^3	73	73				
Enviro-remediation	m^3	0					
Raw mulch							
Quantity product sold	m^3	**1,549,541**	**167,002**	**215,101**	**493,740**	**325,828**	**347,870**
Recycled organic content	%	100	100	100	100	100	100
Intensive agriculture	m^3	78,252	14,822	63,430			
Extensive agriculture	m^3	15,000		15,000			
Urban amenity	m^3	217,431	93,560	123,871			
Rehabilitation	m^3	46,480	33,680	12,800			
Enviro-remediation	m^3	0					
Manufactured soil							
Quantity product sold	m^3	**1,224,454**	**431,822**	**225,830**	**111,735**	**125,067**	**330,000**
Total RO content in product	m^3	434,728	289,793	107,640	37,295		
Recycled organic content	%	20 - 100	40 - 100	45 - 70	20 - 100	50-100	30 - 80
Intensive agriculture	m^3	42	42				
Urban amenity	m^3	406,030	383,200	22,830			
Rehabilitation	m^3	45,520	45,520				
Enviro-remediation	m^3	3,060	3,060				
Potting mixes							
Quantity product sold	m^3	**813,076**	**203,881**	**167,000**	**176,389**	**55,806**	**210,000**
Total RO content in product	m^3	370,808	122,037	89,745	159,026		
Recycled organic content	%	20 - 100	20 - 100	45 - 100	90 - 100	80-100	75 - 100
Intensive agriculture	m^3	7,504	3,252	4,252			
Urban amenity	m^3	363,189	200,629	162,560			

ORGANICS PROCESSING INDUSTRY: Annual national survey National Aggregate Survey 2010/11 Financial Year		National total	NSW total	WA total	SA total	VIC total	QLD total
SECTION C: Recycled organics product types and quantities sold *(continued)*							
Playground surfacing							
Quantity product sold	**m^3**	**109,335**	**8,800**		**15,853**	**62,982**	**21,700**
Recycled organic content	%	100	100		100	100	100
Urban amenity	m^3	8,800	8,800				
Biofuels/biogas (energy from methane)							
Quantity product sold	**kWh**	**12,000,000**	**12,000,000**				
Biofuels/solid fuel							
Quantity product sold	**m^3**	**615**				**615**	
Other - Composted products							
Quantity product sold	**m^3**	**53,250**	**23,250**			**30,000**	
Recycled organic content	%	75	100	100			100
Intensive agriculture	m^3	5,250	5,250				
Extensive agriculture	m^3	0					
Urban amenity	m^3	18,000	18,000				
Rehabilitation	m^3	0					
Enviro-remediation	m^3	0					
Other - Organic fertiliser							
Quantity product sold	**t**	**1,800**	**1,000**				**800**
Recycled organic content	%	100	100				100
Intensive agriculture	t	0					
Extensive agriculture	t	0					
Urban amenity	t	0					
Other - Composted manure							
Quantity product sold	**m^3**	**283,227**	**173,959**	**28,840**	**51,157**		**29,271**
Recycled organic content	%	80	100	100	98		100
Intensive agriculture	m^3	117,284	116,900	384			
Extensive agriculture	m^3	8,456	5,000	3,456			
Urban amenity	m^3	76,934	51,934	25,000			
Rehabilitation	m^3	0					
Enviro-remediation	m^3	125	125				
Other - Raw manure							
Quantity product sold	**m^3**	**98,150**	**32,440**	**5,000**	**40,710**		**20,000**
Recycled organic content	%	100	100	100	100		50
Intensive agriculture	m^3	175	175				
Extensive agriculture	m^3	29,325	29,325				
Urban amenity	m^3	7,940	2,940	5,000			
Other - Direct land application							
Quantity product sold	**m^3**	**795,000**	**160,000**				**635,000**
Recycled organic content	%	57	100				14
Food organics	m^3	54,000	54,000				
Biosolids	m^3	112,135	111,500				635
Other	m^3	23,000	23,000				
Other - Aqueous compost extracts							
Quantity product sold	**L**	**206,400**	**200,000**				**6,400**
Intensive agriculture	L	200,000	200,000				
Extensive agriculture	L	0					
Urban amenity	L	0					
SECTION D: Inventory on site							
6 Total all material/product on site 30-06-2010 [4]	**m^3**	**2,744,874**	**893,701**	**569,623**	**-**		**1,281,550**

Footnotes:

1. Other types of facilities include: vermiculture facilities, rendering facilities (for tallows and oils); animal feed production facilities, direct land application; facilities of unknown license status; licensed on-site facility.

2. *Recycled organics* refers to a range of products manufactured from the reprocessing of a variety of biodegradable organic materials including: garden organics (elsewhere garden vegetation, green organics, green waste, yard waste); food organics (elsewhere food waste); residual wood and timber; biosolids; agricultural organics (including manures, crop residues, post harvest residues, animal bedding and animal mortalities); and other biodegradable organic materials.

3. Totals for "*Recycled organics product types and quantities sold*" are correct as reported, however the sum of individual market segments may not equate to the total as not all processors are able to provide market breakdown due to the manner in which company sales records are structured. Market breakdown is not reported in Vic or SA by product category.

4. Whilst inventory figures for larger processors may arise from formal quantitative survey, for smaller processors inventory figures provided are commonly an "informed estimate" provided by the same yard manager year after year. Note: South Australia does not record inventories; and Victoria records only stockpiled product rather than total inventory, and has received a very low response rate for this question that is inadequate for reporting.

6. Product quantities reported in Section C may be sold to markets located outside the region, the structure of reporting state by state is not intended to suggest that all products sold are used within the reporting jurisdiction.

Section 6 Types of organics processing facilities

6.1 Introduction

To date the survey has not distinguished between different practices at "composting" facilities, classifying facilities only as "anaerobic digestion" facilities, "vermiculture" facilities or "aerobic composting" facilities. The generic "aerobic composting" classification was historically intended to only to distinguish composting and shredding facilities from the other two generic categories (in particular, from *anaerobic* digestion), but differentiation of composting on the basis of management practice or associated performance attributes has been outside the historic scope of the survey. Clearly with regard to objective iii) above, the needs of government have changed with the emergence of national greenhouse gas inventory reporting as the applicable emissions coefficients are dependent on environmental conditions (particularly oxygen levels) throughout the composting biomass mass, which are in turn dependent on equipment applied and management practices employed to manage the decomposing biomass.

Previous editions of this report have been applied to the new national greenhouse inventory reporting obligations, and in this process the expression "aerobic composting" as historically used in the annual *Organics Recycling in Australia* report has been misinterpreted. The term "aerobic composting" has been incorrectly read as having a specific meaning in a greenhouse gas emissions context to indicate that the all materials reported under this category have composted in a manner that maintains sufficiently aerobic conditions within the entire composting mass at all facilities included under this category. This is an incorrect interpretation of the data and the intent of the authors of this report.

Consequently, from 2012 the survey will progressively include additional questions to identify the actual management practices employed at facilities in order to classify facilities into more accurate groupings that can better identify the common practice baseline for different regions and better inform the Australian Government's new purpose of greenhouse emissions reporting. This will require complementary field work to correlate defined practices with actual performance as relevant to methane emissions.

In an effort to improve understanding of the operation and context of this industry sector, this section of the report provides an overview of the different types of organics processing facilities operating across Australia at a commercial scale. "Composting facilities", can be reasonably differentiated into one of the following five types of operation, characterised below in order of increasing cost per tonne of material processed:

a) **Facilities that stockpile materials (such as feedlot manures) in unturned piles to decompose and dry with age.** Aging is associated with a darkening in colour and results in a material that can have similar visual appearance (colour) to products that are actively composted. This is the least cost option for managing large quantities of manures, and is not consistent with the definition of "composting" in the AS4454 Australian Standard.

b) **Facilities that stockpile vegetative materials** (commonly for months) until sufficient quantity of material is available to justify the expense of engaging a commercial shredding contractor to bring a machine to site to shred the material (commonly referred to as "campaign shredding"). Shredding commonly occurs only when the available area is full in order to obtain best value from floating in a contract shredder. Shredded material may be directly applied to land, but commonly sits in an adjacent stockpile to age, with shredded material being dispatched progressively for use as required. This process is colloquially referred to as "*shred and spread*", and is the most common practice for regional councils as the least cost alternative to disposal (other than burning). This practice not consistent with the definition of "composting" in the AS4454 Australian Standard.

c) **Facilities that compost materials in actively turned and managed compost piles or windrows** (with or without prior shredding, depending on the materials being processed), with the intent of making more intensive use of available land area (as required for commercial viability), to manage the biological risks embodied in the raw material inputs, to manage risk of impacts from the composting process on surrounding neighbours and local environment, and to manufacture products of more consistent quality. Such practices are common (to varying degrees of quality) around the major metropolitan areas where the recycled organics products are to be used in retail home lawn and garden applications. Such practices are sometimes found at facilities around large regional population centres (in some states) products are to be used in retail home lawn and garden applications. Such practices are often found at on-farm composting facilities where the scale of production and the agricultural residues being processed usually do not require a license or additional planning consent and compost production is targeted to the manufacture of quality products for self use, or as an input into local agricultural production systems. This practice can be implemented in a manner that is consistent with the definition of "composting" and other requirements specified in the AS4454 Australian Standard, which necessarily requires the implementation and verification of a validated method of pasteurization to manage biological risks that may be present in the raw materials (via the destruction of plant propagules and disease organisms, destruction of human and animal pathogens).

d) **Facilities that compost source segregated biodegradable organic materials using force aeration** (whether in open piles, covered piles, or enclosed structures). This is not common practice as additional infrastructure costs and the costs/risks of transition to a new system have been prohibitive, but such technology may be implemented where mandated under applicable regulations and guidelines, and where higher disposal costs (and levies) can support higher gate fees for receiving materials at the facility (see listed viability conditions below). Where space allows, such facilities commonly further mature compost products in outdoor turned windrows or compost piles. This practice can be implemented in a manner that is consistent with the definition of "composting" and other requirements specified in the AS4454 Australian Standard, which necessarily requires the implementation and verification of a validated method of pasteurization to manage biological risks that may be present in the raw materials.

e) **Facilities that receive and process mixed solid waste**. Such facilities de-package and separate materials post collection via a MRF, and subsequently homogenise and compost the organic rich fraction in an enclosed structure with an aerated floor, and biofiltration of process gas prior to release to atmosphere (see listed viability criteria below). Where space allows, such facilities commonly further mature compost products in outdoor turned windrows or compost piles, or some facilities dispatch a relatively immature product with lower moisture content for application to land, or to a contractor who further processes the material. This practice can be implemented in a manner that is consistent with the definition of “composting” and other requirements specified in the AS4454 Australian Standard, which necessarily requires the implementation and verification of a validated method of pasteurization to manage biological risks that may be present in the raw materials.

All facilities tend to sell or distribute their products under the generic title of “compost” and/or “mulch” irrespective of the process employed, and irrespective of whether the products comply with the requirements detailed in the AS4454 (2012) Australian Standard (ie. classification requirements, processing requirements, process control and verification requirements, compost maturity requirements, labelling and user information requirements, and physical/chemical/biological specifications).

A key point is that cost control is the primary objective for many facilities. Facilities in groups a), b), and c) above represent the overwhelming majority of organics processing facilities in Australia. Outside of metropolitan Sydney and Perth, the common practice for processing biodegradable organic materials involves aggregating biodegradable materials outdoors into open piles (most commonly windrows), with varying levels of management of these piles. The commercial viability of outdoor windrow facilities simply cannot support the fixed capital investment required to install forced aeration technology in the form of concrete aerated floors, in-vessel composting technology, or enclosed composting infrastructure.

6.2 What is an AWT?

The term *Advanced Waste Technology* (AWT) has entered common use as a means of marketing organics reprocessing infrastructure to governments and communities as something that is better than “compost facilities”. The term is variously and often selectively applied to facilities in groups c), d) and e) above, but is most commonly applied to facilities that are designed to process putrescible biodegradable organic materials such as food waste with the associated higher odour generation risk potential. While open windrow composting facilities processing source segregated food waste in South Australia have been cited as evidence of the successful implementation of “AWTs”, the term is otherwise only applied to facilities that completely cover or enclose the composting process and force aerate the composting mass under pressure to maintain adequate oxygen levels in the composting mass in order to manage potential risk of generating problematic odours.

Irrespective of the political and market sensitive language used to promote “AWT” infrastructure, the organic fraction at all such facilities in Australia is biologically stabilised by force aerated composting.

All force aerated commercial scale composting facilities in Australia are applying a similar aerated floor or aerated static pile (ASP) technology whereby air distribution pipes, channels or plenums at the base of the pile allow air to be forced into the composting mass under fan generated pressure. This forced aeration allows oxygen levels and aerobic conditions within the composting mass to be maintained at sufficiently high levels to prevent the development of anaerobic conditions that are associated with formation of putrescible and obnoxious odours, and if well designed and operated should accelerate the rate of decomposition compared to turned compost piles.

Whether a facility is processing source segregated food waste, biowaste (co-collected food plus garden organics), or mixed solid waste, ASP or aerated floor technology is the common practice for force aerated facilities. Whether the decomposing biomass is completely covered (eg. with a semi-permeable membrane), conducted in a large enclosed composting hall, or conducted in a fully enclosed in a concrete tunnel installation, aerated floor /aerated static pile (ASP) technology is technology of choice for force aerated facilities.

The actual process employed at all commercial AWT plants in Australia for stablilising putrescible biodegradable organic materials is force aerated composting using aerated floor /aerated static pile (ASP) technology[2]. Stripping away the rhetoric, these facilities are, amongst other things, correctly described as “force aerated composting facilities”.

The cost of implementation of facilities with enclosed/covered and force aerated composting systems has been restricted to high population density metropolitan areas where landfill levies and high waste disposal costs apply (Sydney), areas with a novel environmental regulatory framework (Perth), and a handful of coastal population centres where a source of biosolids requiring management is available as a secure and sufficiently high value feedstock to justify the viability of such high levels of capital investment in operational plant.

With the exception of metropolitan Sydney and Perth, such facilities are highly uncommon because the capital investment and civil works costs of fixed infrastructure are much higher than for management via outdoor turned piles/windrows. Even where disposal costs and landfill levies are sufficiently high (metropolitan Sydney), it is only viable to implement such intensive and higher cost force aerated and enclosed processing for the initial stage of decomposition until the biodegradable material is sufficiently decomposed that it is no longer considered to be putrescible. Once the material has achieved a demonstrable reduction in potential for odour generation, leachate generation and vector attraction (including insects and birds), where the material is further processed to a higher degree of maturity such additional or extended duration of processing is conducted in open air windrows.

Like Sydney, the Perth metropolitan area has also significantly moved to enclosed and aerated processing facilities for treatment of putrescible biodegradable materials from the household solid waste streams and

[2] Excluding the two established anaerobic digestion facilities that are also described as AWTs. Anaerobic digestion is not the subject of this section.

commercial sector biodegradable effluents, but not as a direct consequence of the price signal of high disposal costs.

If development of enclosed processing infrastructure in Perth has not been driven directly by the price signal of high disposal costs, why has it occurred? Perth suffers limited water availability and has a reliance on groundwater for public water supply. Perth is situated on the Swan Coastal Plain with porous sandy geology over a vulnerable aquifer. A WA Parliament Select Committee report on *Recycling and Waste Management* (1995) recommended a range of measures to protect water quality of the aquifer, including a clear recommendation that no new landfill sites should be established on the coastal sand plain because of their potential to pollute groundwater (this policy was subsequently reflected in the 1997 WA *State Planning Strategy* and a WA Department of Water *Water Quality Protection Note*). At this time, the City of Sterling putrescible landfill was under orders to cease receiving putrescible waste due to the concerns related to impact on expanding residential developments in the immediately surrounding area. Government agencies are required to consider the recommendations from these select committee reports and requirements of the *State Planning Strategy* when assessing proposals for infrastructure development, and consequently no new putrescible landfill has been established on the Swan Coastal Plain. The limited availability of putrescible waste disposal capacity has underpinned the high capital investment in enclosed and force aerated processing infrastructure for putrescible waste treatment within the specified boundaries of the catchment for this aquifer. Development of processing infrastructure in Perth has therefore been driven by regulation of what is permitted and what is not permitted, and has not been directly driven by the price of landfill disposal.

These circumstance highlight the two key influences on development of the sector: price signal and regulation.

Note that NSW EPA is currently initiating an additional survey of AWT facilities for the 2012 financial year (implemented by the ROU), to capture all details of materials, including organics, inert recyclables (glass, metals, plastics) and also the residual quantity being landfilled. In this NSW EPA project, only facilities receiving and processing mixed solid waste are included as AWT facilities.

6.3 Conditions that have motivated investment in large scale fully enclosed facilities

Whether a facility is processing source segregated food waste, biowaste (co-collected food plus garden organics), or mixed solid waste, ASP or aerated floor technology is the common practice for force aerated facilities. Whether the decomposing biomass is completely covered (eg. with a semi-permeable membrane), conducted in a large enclosed composting hall, or conducted in a fully enclosed in a concrete tunnel installation, aerated floor /aerated static pile (ASP) technology is technology of choice for force aerated facilities.

The actual process employed at all commercial AWT plants in Australia for stablilising putrescible biodegradable organic materials is force aerated composting using aerated floor /aerated static pile (ASP) technology[3]. Stripping away the rhetoric, these facilities are, amongst other things, correctly described as "force aerated composting facilities".

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Enclosed and force aerated facilities are not common because the capital costs and civil works costs of fixed infrastructure are much higher than for turned piles/windrows. Even where disposal costs and landfill levies are high, it is only viable to implement such intensive and higher cost processing for the initial stage of decomposition until materials are no longer considered putrescible

Historically facilities with enclosed/covered and force aerated composting systems are established in situations where a number of the following conditions coincide to underpin the viability of the high capital investment required:

- Limited remaining putrescible landfill capacity causing heightened consideration of cost and challenge of development of new landfill sites,
- Lack of availability of alternative long term landfill sites, often associated with community and/or environmental risks,
- Environmental regulations and planning consent obstruct the construction of new landfills (to a greater degree than to which such instruments obstruct the establishment of organics processing infrastructure),
- State government expresses a commitment to implement a significant waste disposal levy per tonne of waste disposed of at landfill (it should be noted that in the Sydney region, the acceleration of infrastructure development did not occur until the NSW waste levy was formally gazetted to increase annually on 1 July by specified amount, providing a reliable price signal for private sector investment in infrastructure),
- Projected costs of landfill disposal (over 10 to 20 years) justify the capital investment in processing infrastructure,

[3] Excluding the two established anaerobic digestion facilities that are also described as AWTs. Anaerobic digestion is not the subject of this section.

- The local authority responsible for solid waste management is also the responsible authority for management of the sewage system, creating opportunity for a single plant and a single contract to provide an option for both putrescible solid waste and biosolids,

- A financial contribution from carbon financing as a certifiable emissions offset is available. The SMRC facility at Canning Vale (Perth), the NRS facility at Dandenong (the only fully enclosed and aerated food waste composting facility in Melbourne), and the GRL UR-3R facility at Eastern Creek (Sydney) all benefited from an additional revenue stream and marketing benefit from the sale of certified emissions offsets of avoided landfill emissions under the Howard Government's *Greenhouse Friendly* carbon trading scheme,

- A financial contribution from government via infrastructure grants and/or R&D tax concessions is available to reduce the commercial barriers to innovation,

- Active encouragement and incentives from State Government for neighbouring local government authorities to partner on the establishment of processing facilities for collective use.

Outside the Sydney and Perth metropolitan areas, adequate concurrence of such conditions has resulted the implementation of only a very small number of facilities with enclosed/covered and force aerated composting systems designed to compost biosolids and other putrescible solid waste materials, these facilities are located to service coastal population centres on the east coast of Australia (Port Stephens, Cairns, Port Macquarie, and Coffs Harbour).

There are clearly barriers to financial viability that obstruct the development of fully enclosed and aerated organics reprocessing facilities, and the necessary circumstances do not apply generally in other major populations centres nor across rural and regional Australia. This is demonstrated by the rarity of facilities with enclosed/covered and force aerated composting systems beyond the areas of Sydney and Perth.

In rural and regional areas the common practice is to stockpile, or to stockpile and periodically shred (as infrequently as possible, commonly when the available area is full) as the least cost management alternative to disposal (other than burning).

Open air windrow composting remains the dominant method for reprocessing non-putrescible biodegradable organic wastes around high population metropolitan centres.

Facilities with enclosed/covered and force aerated composting systems for processing food and other putrescible organic materials are becoming more common only where high disposal costs and high landfill disposal levies provide a sufficient, and sufficiently reliable price signal (Sydney).

Improved management practices for the composting of biodegradable organic materials, whether from regional centres or from agricultural activities requires a price signal to motivate the additional investment and expense required to effectively manage biosecurity risks via management of moisture and effective management of piles for pasteurization, and via forced aeration to avoid emissions to atmosphere, including risk of both methane and odour generation.

Comments on this section of the report are welcome. Please address comments to a.campbell@recycledorganics.com