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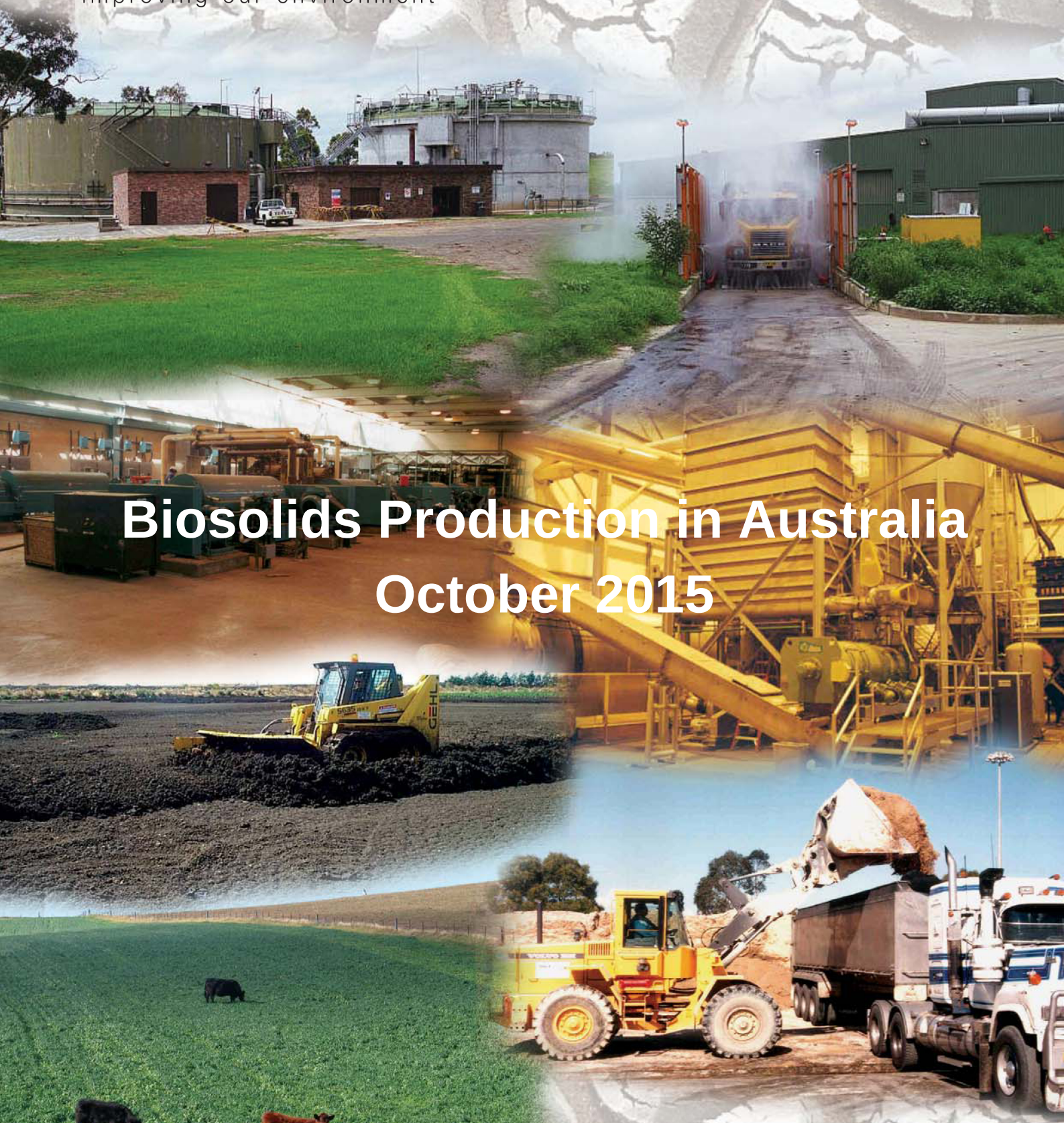

Biosolids Production in Australia
October 2015

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improving our environment

Australia & New Zealand Biosolids Partnership

Biosolids Production in Australia 2015

October 2015

Statement of Limitation

This submission has been prepared solely for the Australia & New Zealand Biosolids Partnership. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

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1 INTRODUCTION

In 2010, the Australian and New Zealand Biosolids partnership commissioned a national survey to identify the main features of biosolids management. The survey was repeated in 2013 and 2015. This report represents an update based on survey results for 2015. This survey catalogues the following primary parameters:

- δ Biosolids production;
- δ Biosolids end use;
- δ Biosolids stabilisation grade;
- δ Biosolids contamination grade;
- δ Biosolids primary stabilisation process;
- δ Biosolids dewatering process.

These are the same parameters as the 2010 and 2013 surveys, with the exception of contamination grade which was added to the 2013 survey data. The results of the 2015 survey are presented below on a national and state basis. Some discussion is also provided on significant changes since 2010.

2 METHOD

The approach used to determine the biosolids production in Australia was to survey all plants over 25,000 people or 5 ML/day. The ANZBP indentified that this criteria would capture around about 80% of Australia's population. In the course of the survey many water utilities provided information on plants smaller than this threshold and where they did, the data was included.

All classifications are made on the basis of tonnes of production.

3 CLASSIFICATIONS

To enable relatively simply analysis and presentation of the data each area of information, such as end use, was classified into a number of broad groupings. These groupings are discussed below.

3.1 PRODUCTION

Production is presented in terms of tonnes of dry biosolids.

3.2 END USE

The following classifications were used for end use:

- δ Agriculture: for biosolids which is applied to land for its fertiliser value without value added processing;
- δ Landscaping (compost): for biosolids which processed through a composting facility and used for landscaping or other horticultural use;
- δ Forestry: for biosolids which is applied to plantation forests to aid tree growth;
- δ Landfill: for biosolids which is disposed to landfill;
- δ Ocean discharge: for biosolids which is discharged to the ocean;
- δ Stockpile: for biosolids which is stored, pending future planning, processing or use;

- δ Land rehabilitation: for biosolids which is applied to land, such as mine sites for rehabilitation of the land;
- δ Other: and other uses;
- δ Unspecified: for plants which did not respond or for which the end use could not be identified.

3.3 STABILISATION GRADE

Stabilisation grade was classified on the basis on the basis of an A, B or C grading. This grading was adopted in light of the broad variation in nomenclature for stabilisation grading across Australia. The equivalent grades are shown in the table below.

Table 3.1 – Stabilisation grading

Classification	NSW	Vic	SA	Qld	Tas	WA	NZ
A	A	T1, T2,	A,	A	A	P1, P2,	A
B	B	T3	B	B	B	P3	B
Unstabilised	C	Unstabilised	Unstabilised	C	C	P4	Unstabilised

3.4 CONTAMINATION GRADE

Contamination grade was classified on the basis on the basis of an A, B, C, Unsuitable for Use or Unspecified. This grading was adopted in light of the broad variation in nomenclature for stabilisation grading across Australia. The equivalent gradings are shown in the table below.

Table 3.2 – Contaminant grading

Classification	NSW	Vic	SA	Qld	Tas	WA	NZ
A	A	C1	A	A	A	C1	A
B	B	C2	B	B	B	C2	B
C	C	C2	C	C	C	C2	B
Unsuitable for Use	D	Unsuitable for use	Unsuitable for use	D	Unsuitable for use	Unsuitable for use	Unsuitable for use
Unsuitable for use	E			E			

3.5 STABILISATION PROCESS

Classification of the stabilisation process was made on the basis of the primary stabilisation process following the sewage treatment process. The following stabilisation process categories were used.

- δ Anaerobic digestion
- δ Aerobic digestion
- δ Agitated air drying
- δ Thermal drying
- δ Autothermal thermophilic aerobic digestion
- δ Thermal hydrolysis (CAMBI)
- δ Composting (used only for biosolids with no prior stabilisation)
- δ Incineration
- δ Lagoon (used for biosolids stored in liquid form)
- δ Lime stabilisation
- δ Long term storage (used for biosolids stored in dewatered form)

- δ Thermophilic anaerobic digestion
- δ None
- δ Other
- δ Unspecified

3.6 DEWATERING PROCESS

Classification of the dewatering process was made on the basis of the following categories:

- δ Belt filter press
- δ Conventional centrifuge
- δ High solids centrifuge
- δ Drying bed or drying lagoons
- δ None
- δ Other
- δ Unspecified

3.7 FINDINGS

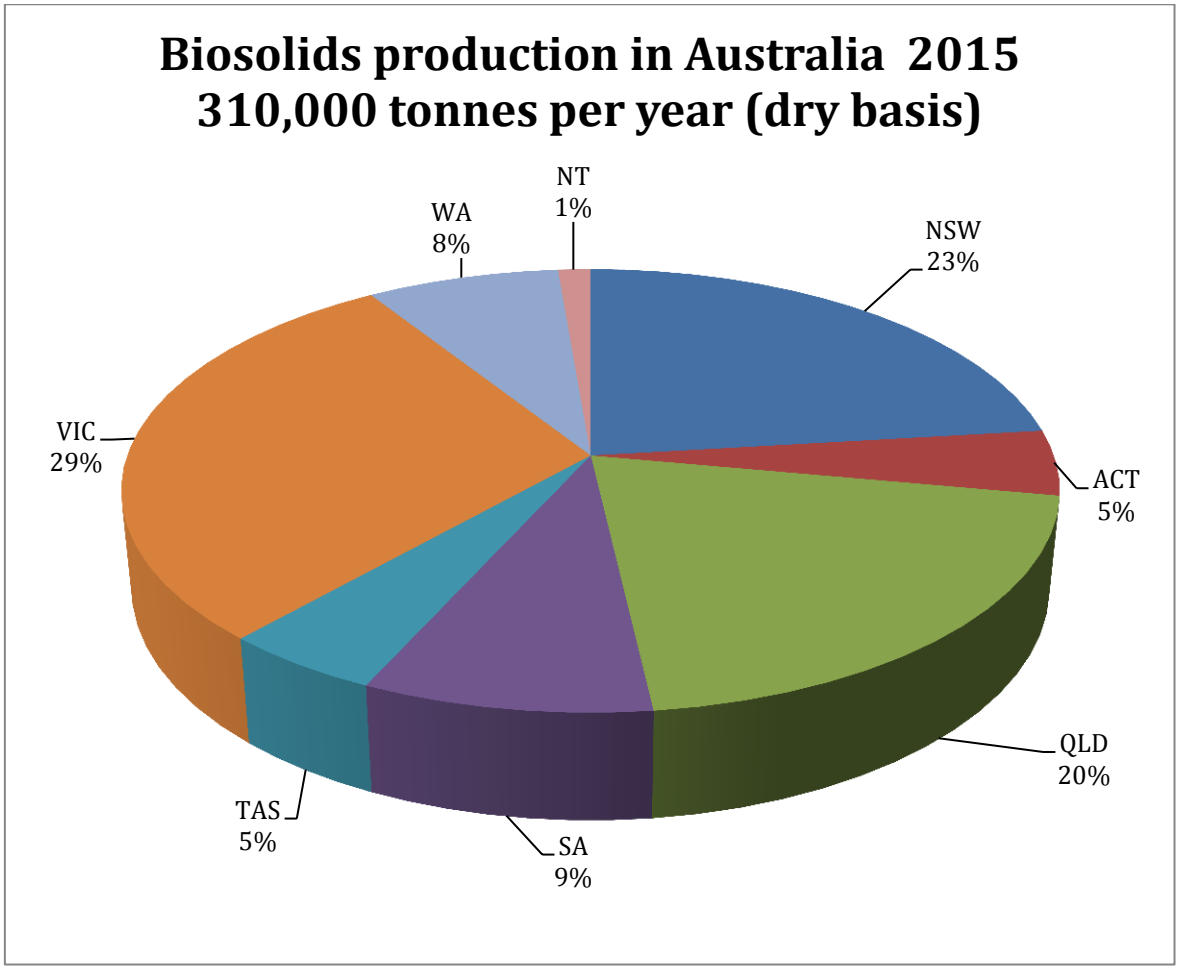
The findings of the survey are presented below.

4 RESULTS

4.1 PRODUCTION

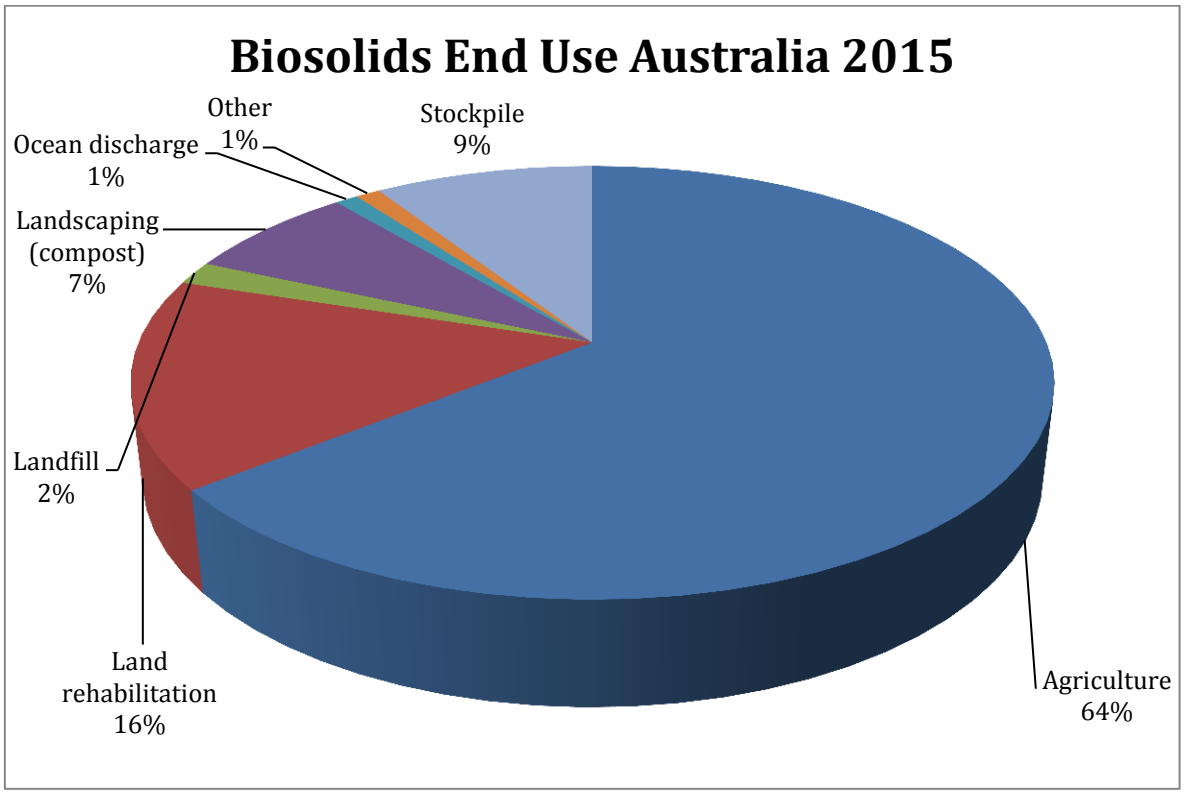
The total biosolids production of Australia identified in the survey is about 310,000 tonnes per year of dry solids. This compares to 300,000 tonnes in 2010 and 330,000 tonnes in 2013. This does not reflect any significant change in biosolids production, and is due to both changes to analysis and records keeping and improvement in and implementation of stabilisation processes. The average solids content of biosolids is around 21% and this equates to around 1.5 million tonnes of biosolids in dewatered form (also called wet).

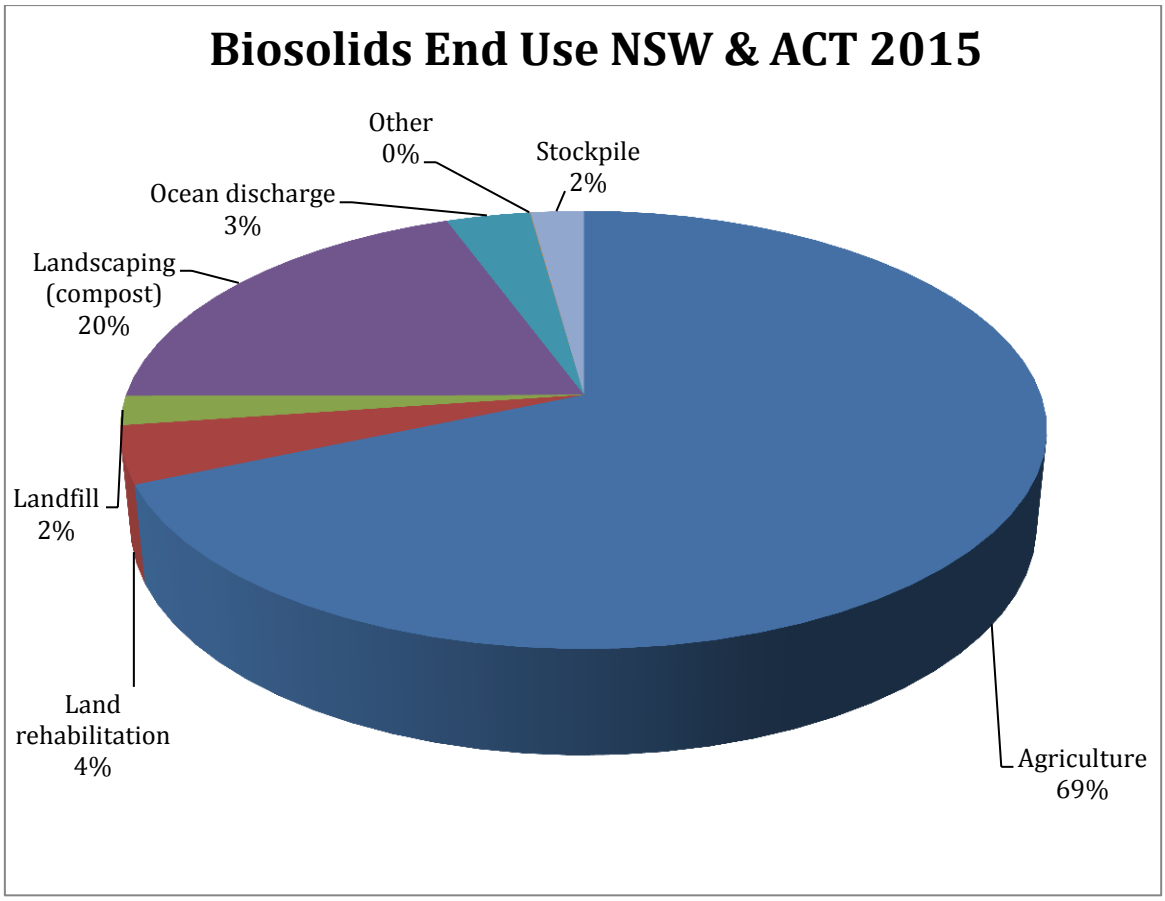
A breakdown by state of biosolids production is given in the chart below. There were no significant changes in proportional state contribution from 2010 or 2013.

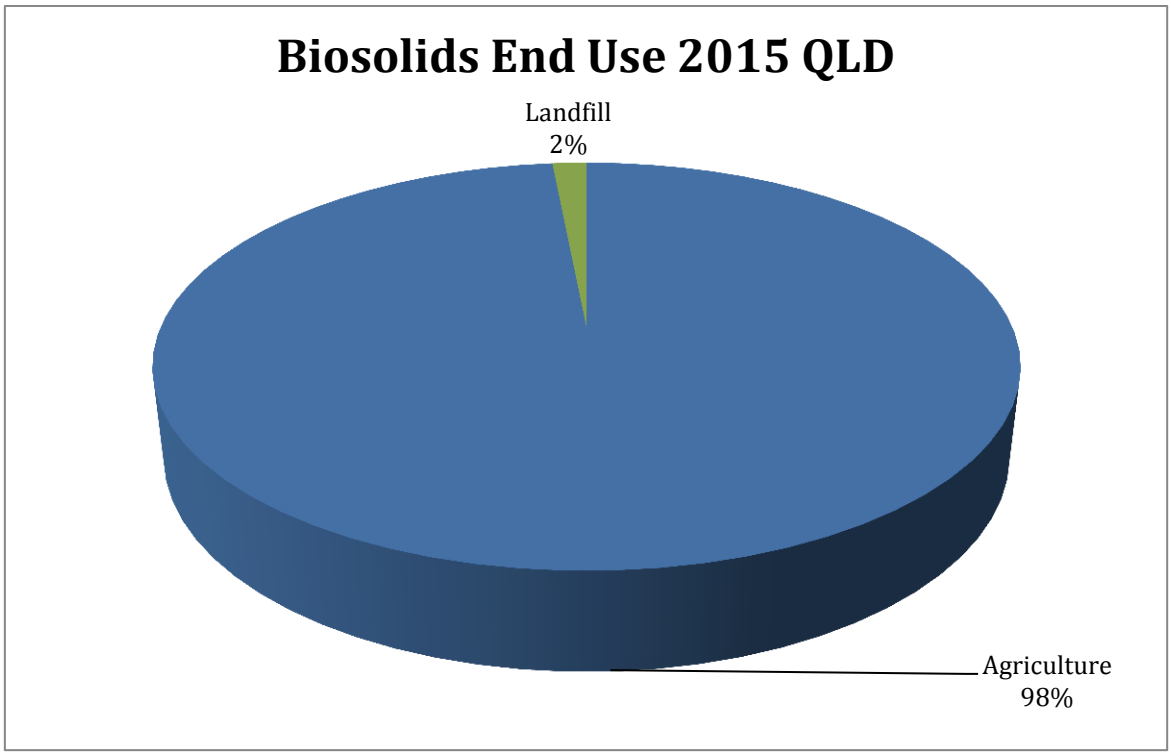


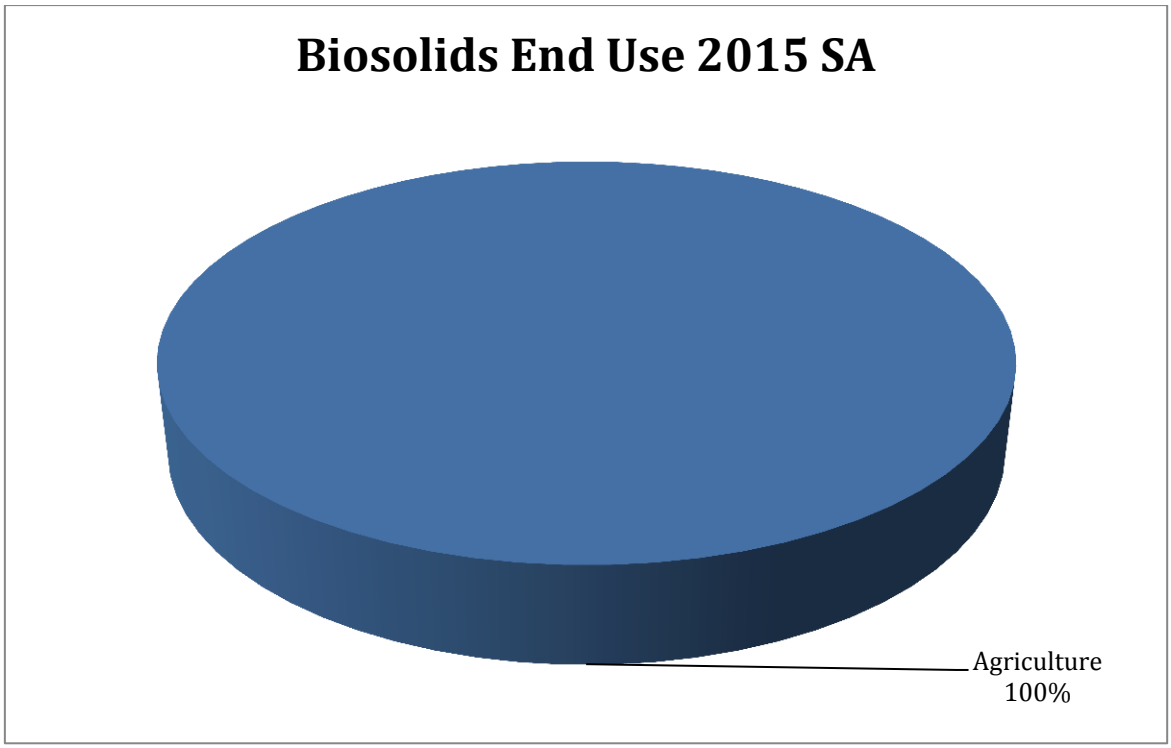
4.2 END USE

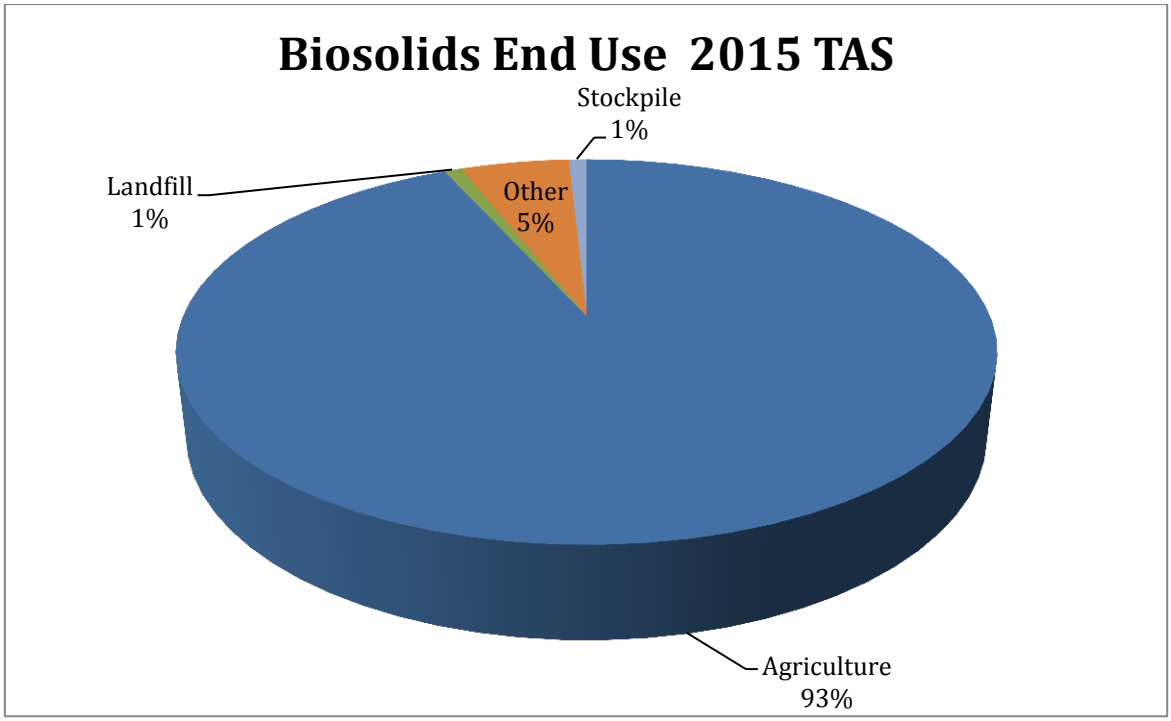
Biosolids end use nationally and for each state is presented in the charts below. Overall, there was a decrease in stockpiling of biosolids (down from 23% in 2010 and 20% in 2013 to 9%) while there was a marginal drop in other, unspecified and landfill end uses of biosolids. There was an increase in biosolids used for land rehabilitation (unmeasured in 2010 and up from 4% in 2013 to 16%) as well as an increase in biosolids used for agriculture (up from 55% in 2010 and 59% in 2013 to 64%). This indicates a significant shift towards greater beneficial use of biosolids.

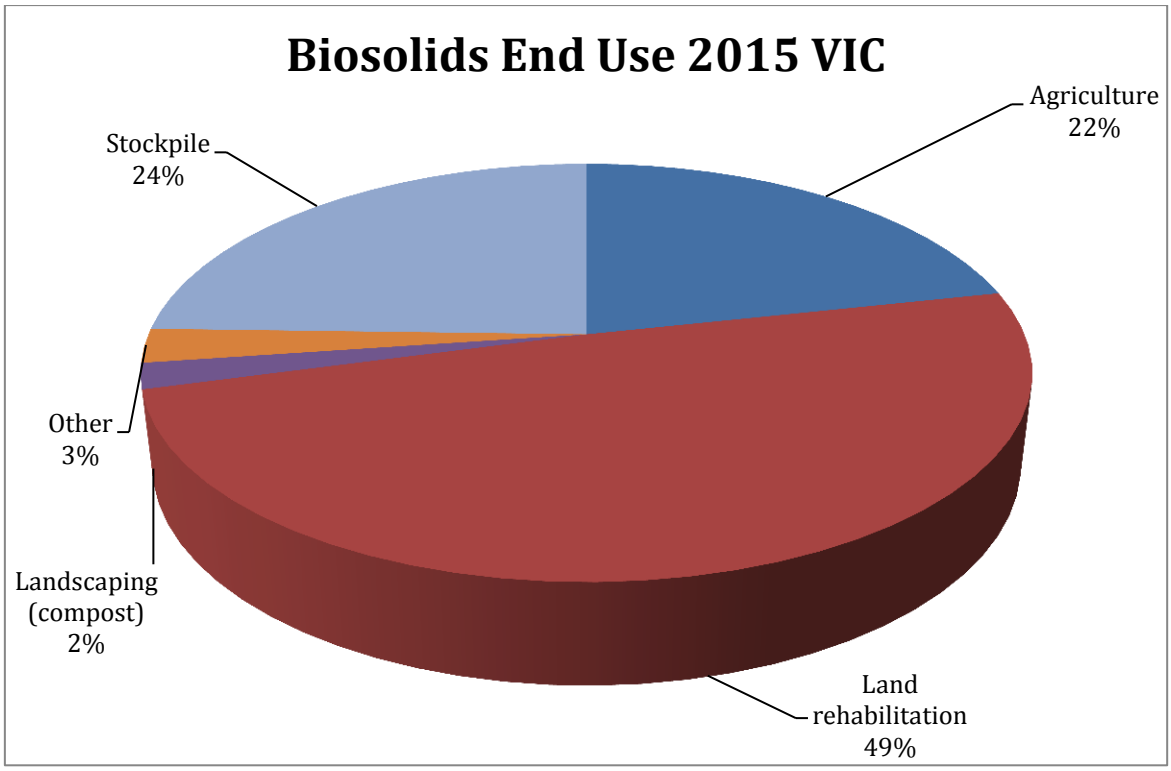


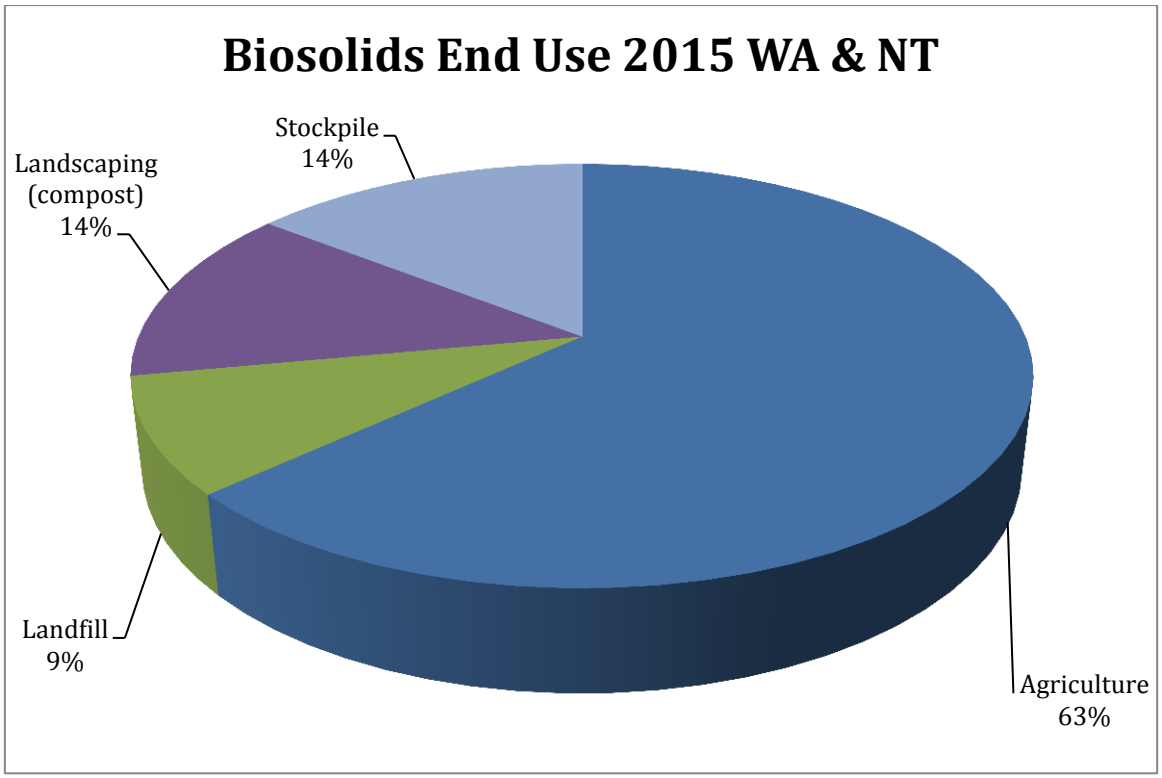

Biosolids End Use NSW & ACT 2015
Other 0%
Stockpile 2%
Ocean discharge 3%
Landscaping (compost) 20%
Landfill 2%
Land rehabilitation 4%
Agriculture 69%


Biosolids End Use 2015 QLD
Landfill 2%
Agriculture 98%


Biosolids End Use 2015 SA
Agriculture
100%


Biosolids End Use 2015 TAS
Stockpile
1%
Landfill
1%
Other
5%
Agriculture
93%

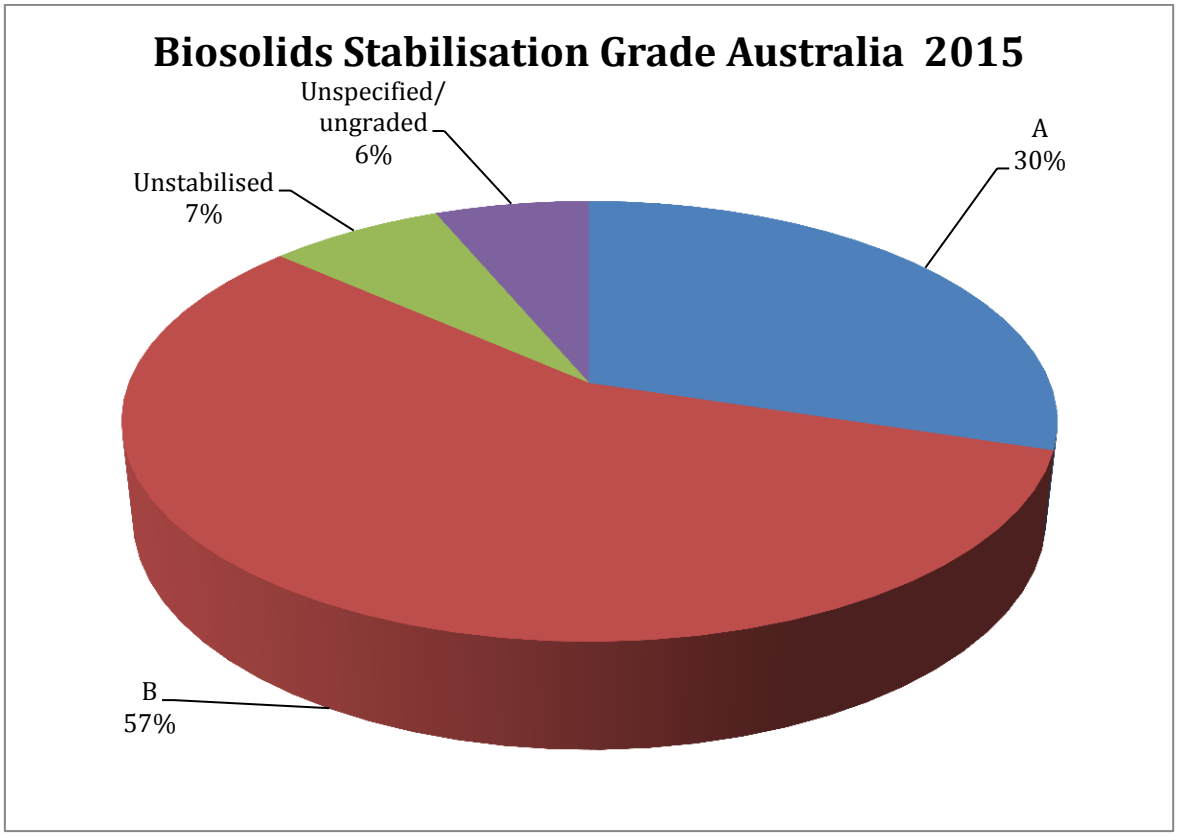

Biosolids End Use 2015 VIC
Agriculture 22%
Stockpile 24%
Other 3%
Landscaping (compost) 2%
Land rehabilitation 49%

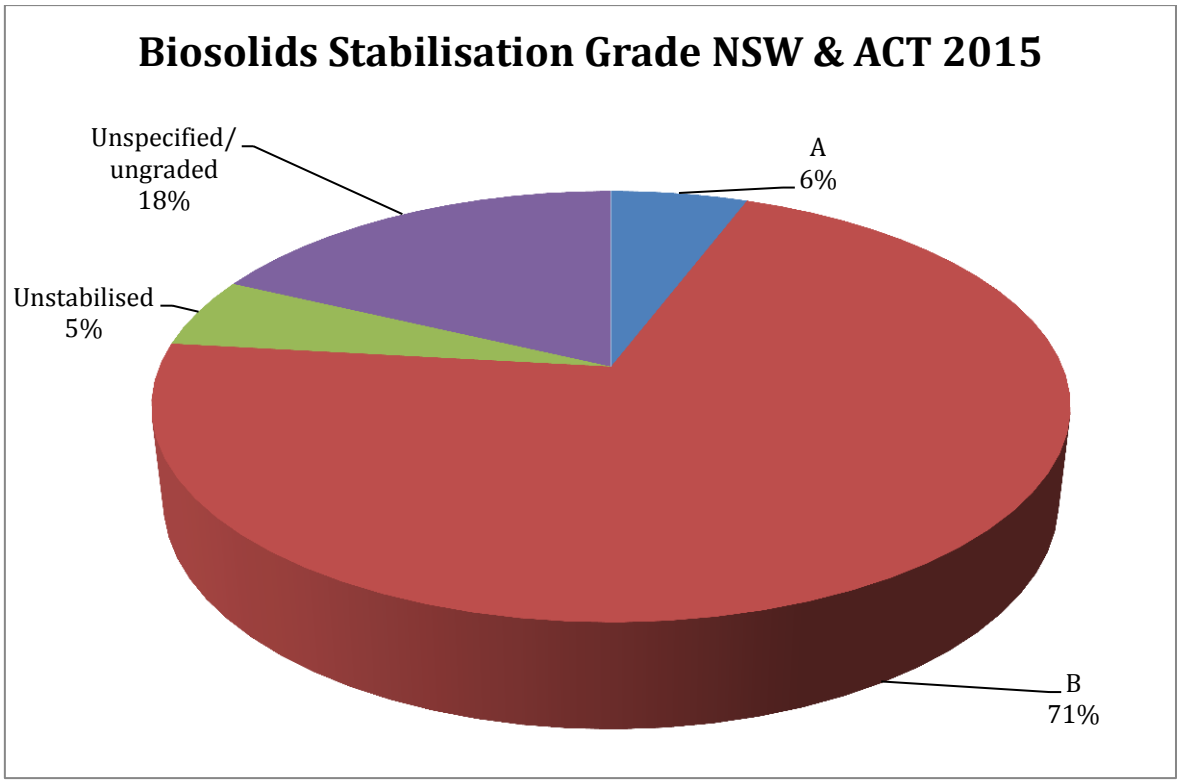

Biosolids End Use 2015 WA & NT
Stockpile 14%
Landscaping (compost) 14%
Landfill 9%
Agriculture 63%

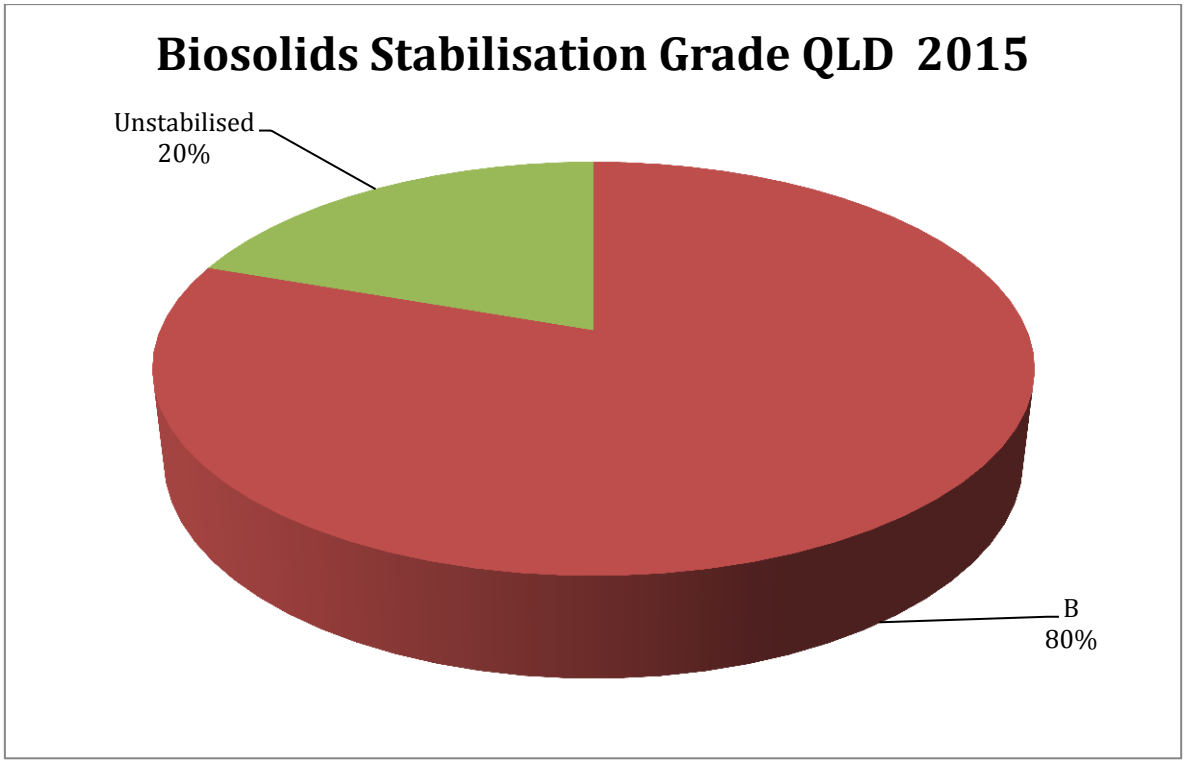
4.3 STABILISATION GRADE

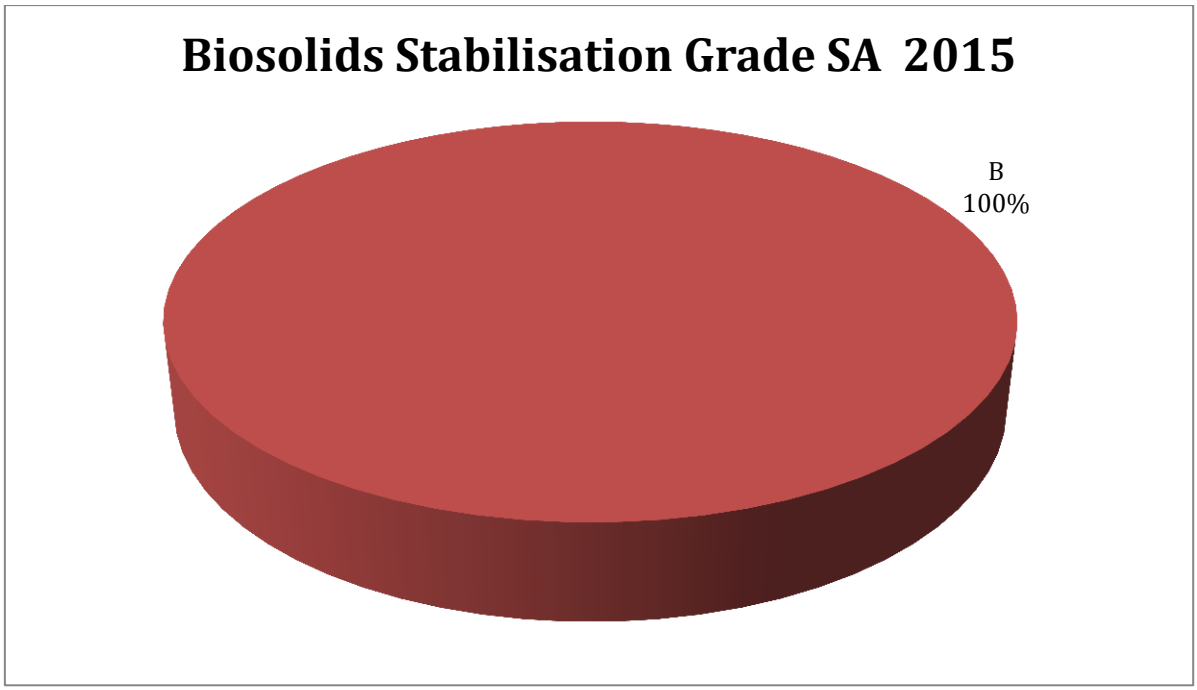
Biosolids stabilisation grade nationally and for each state is presented in the charts below.

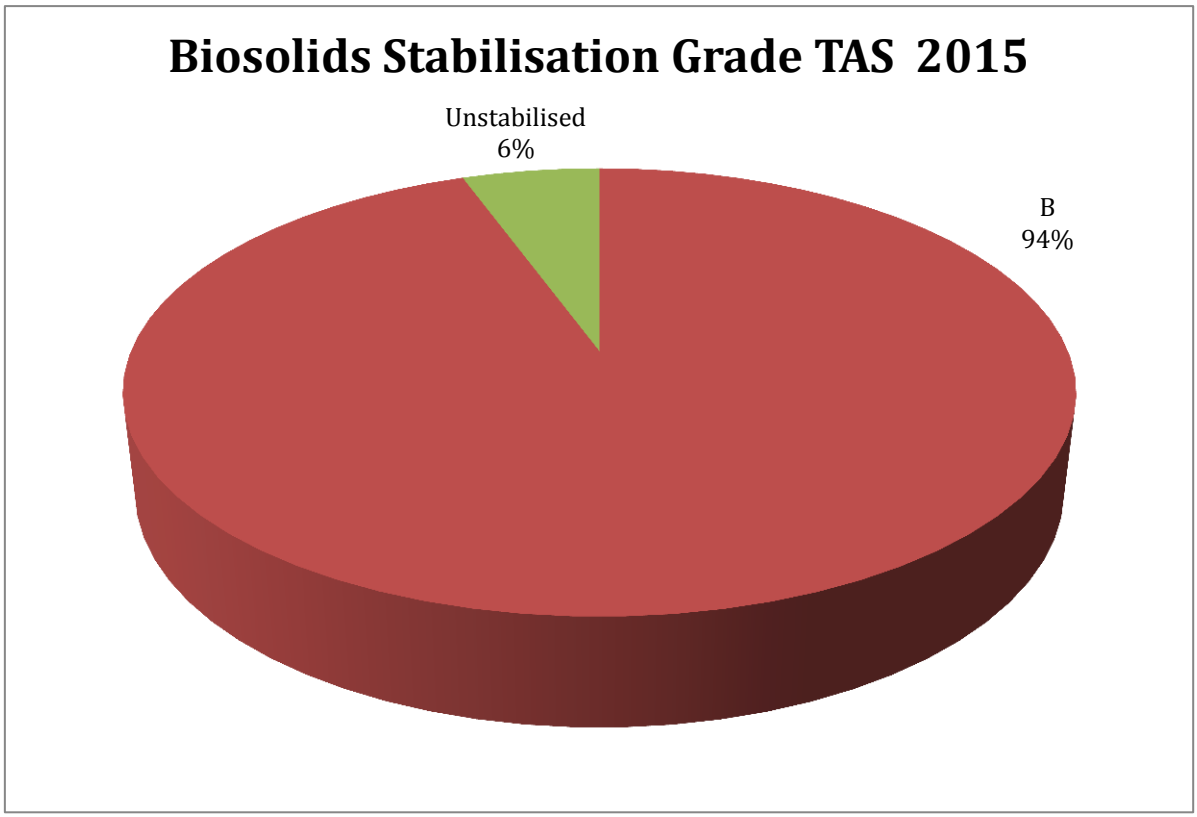
A greater proportion of biosolids is now classified as Grade B (up 36% from 2010 and 51% in 2013 to 57%). Previously the increase in classification Grade B was due to changes in the way respondents categorised their biosolids however the increase in this year's Grade B classification is mainly due to greater testing and grading of biosolids which was previously ungraded.

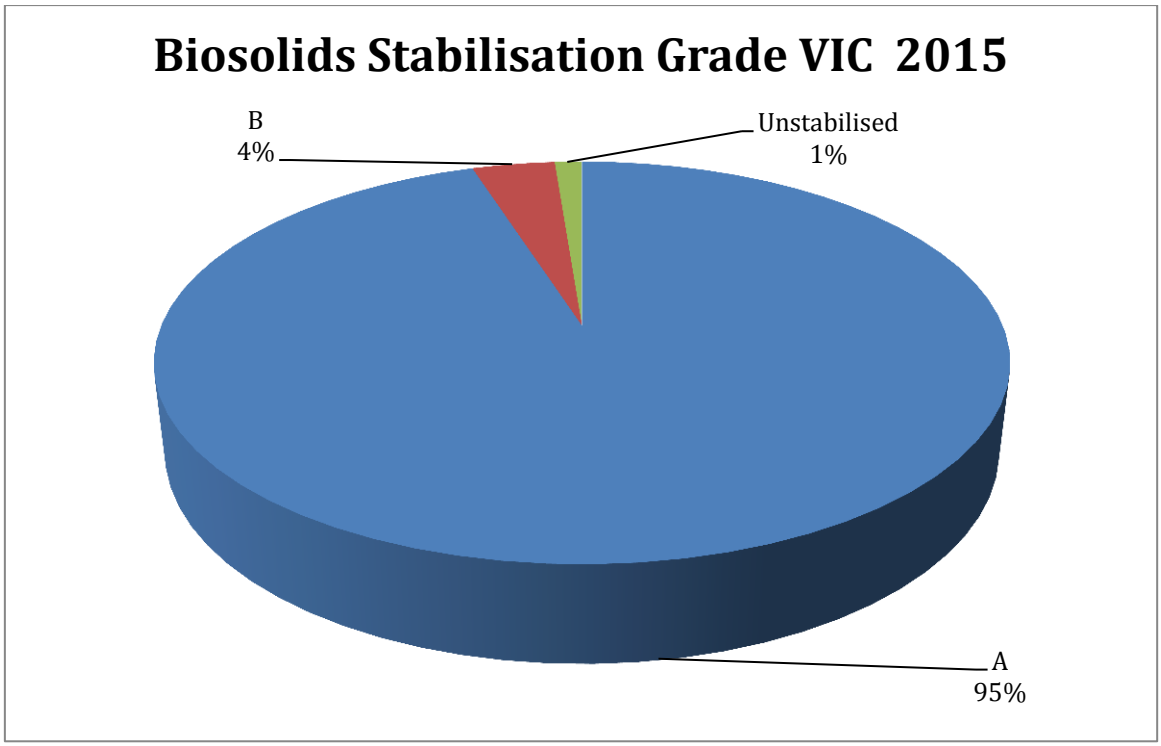


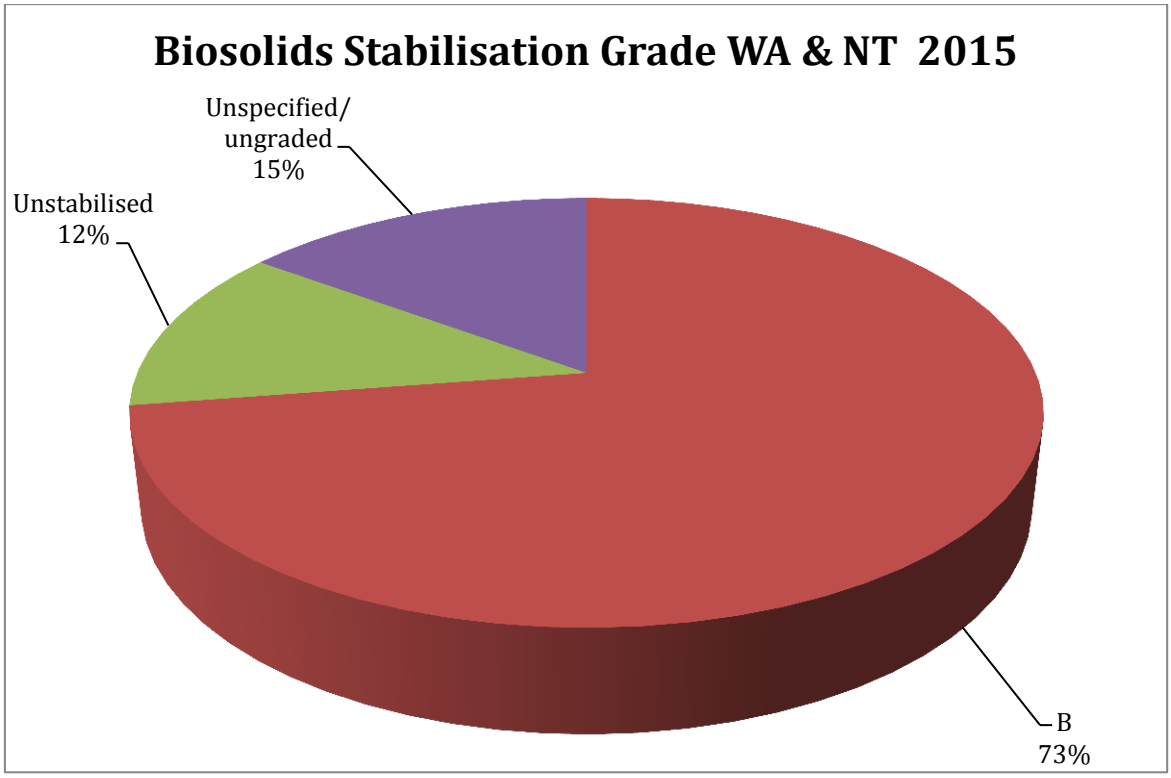

Biosolids Stabilisation Grade NSW & ACT 2015
Unspecified/ ungraded 18%
A 6%
Unstabilised 5%
B 71%


Biosolids Stabilisation Grade QLD 2015
Unstabilised 20%
B 80%


Biosolids Stabilisation Grade SA 2015
B
100%

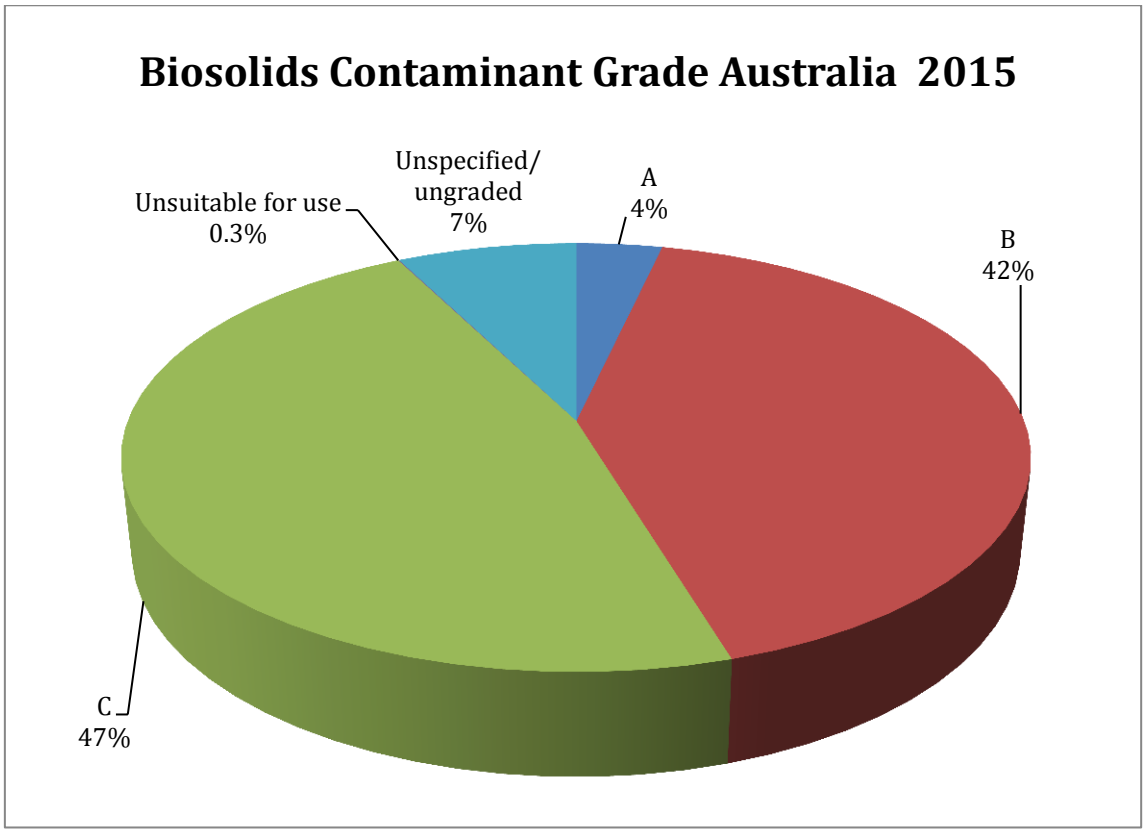

Biosolids Stabilisation Grade TAS 2015
Unstabilised
6%
B
94%

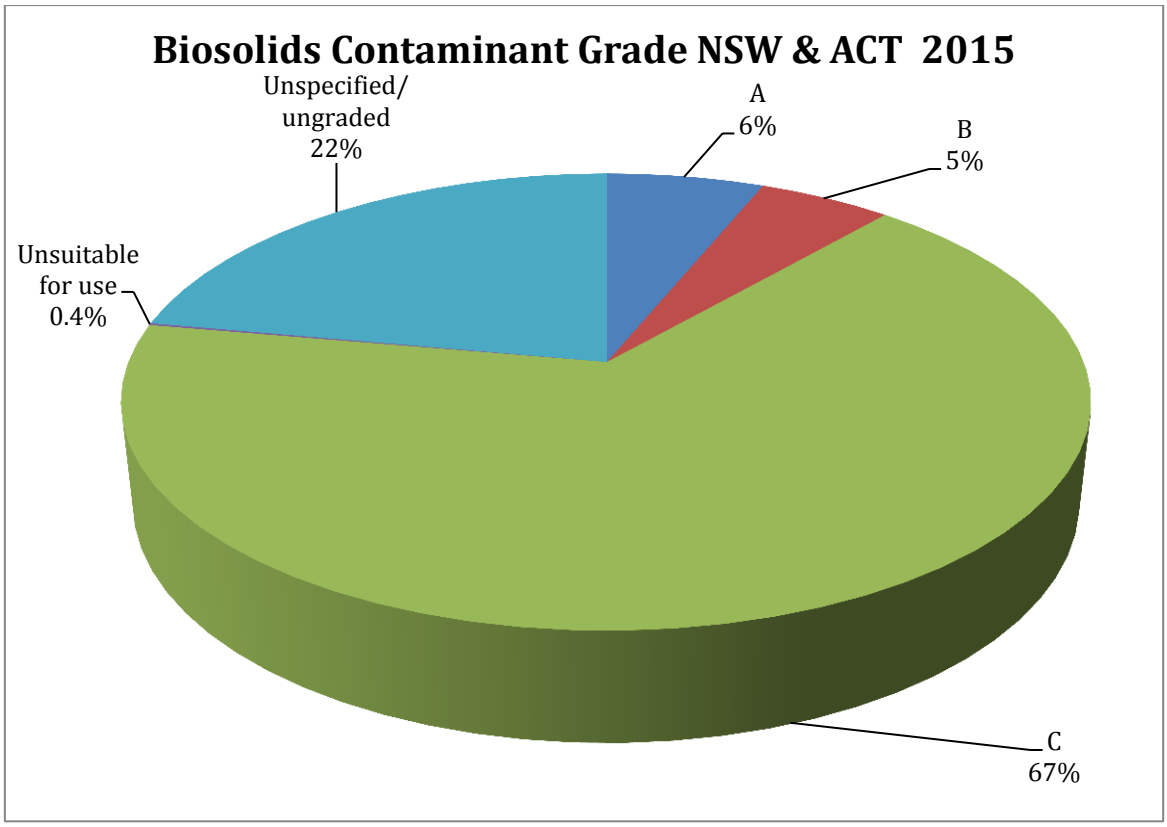

Biosolids Stabilisation Grade VIC 2015
B
4%
Unstabilised
1%
A
95%

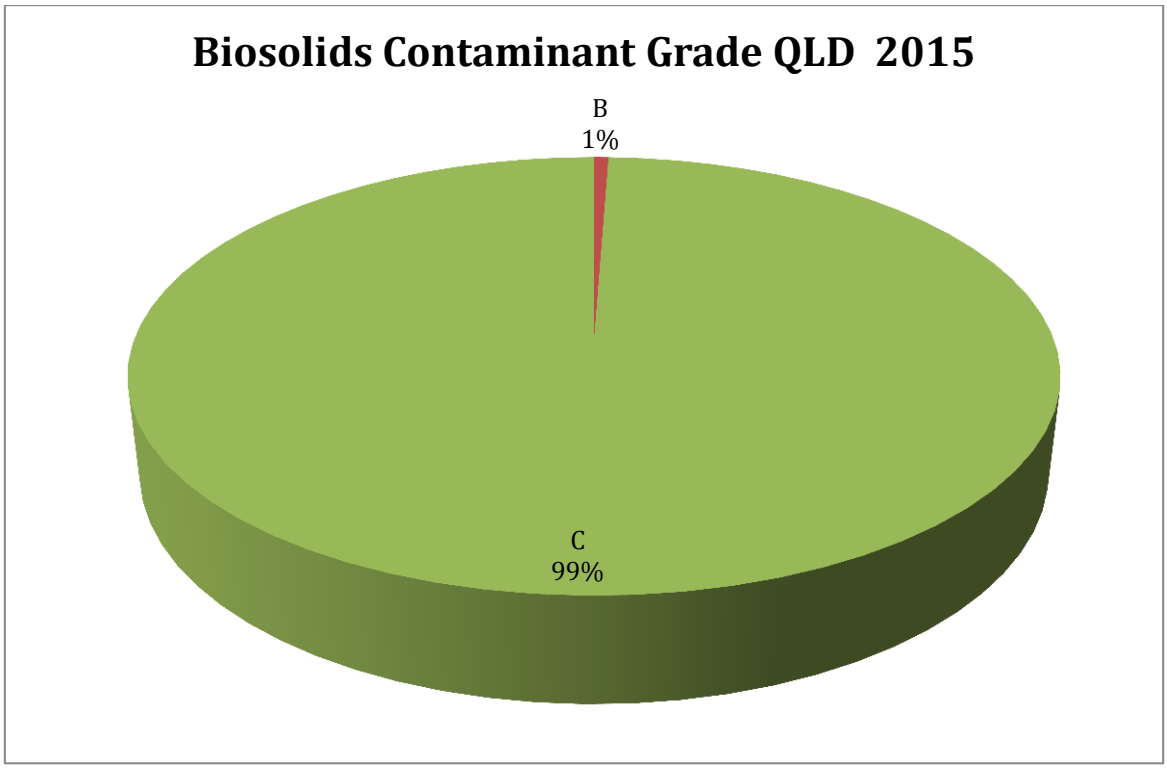

Biosolids Stabilisation Grade WA & NT 2015
Unspecified/
ungraded
15%
Unstabilised
12%
B
73%

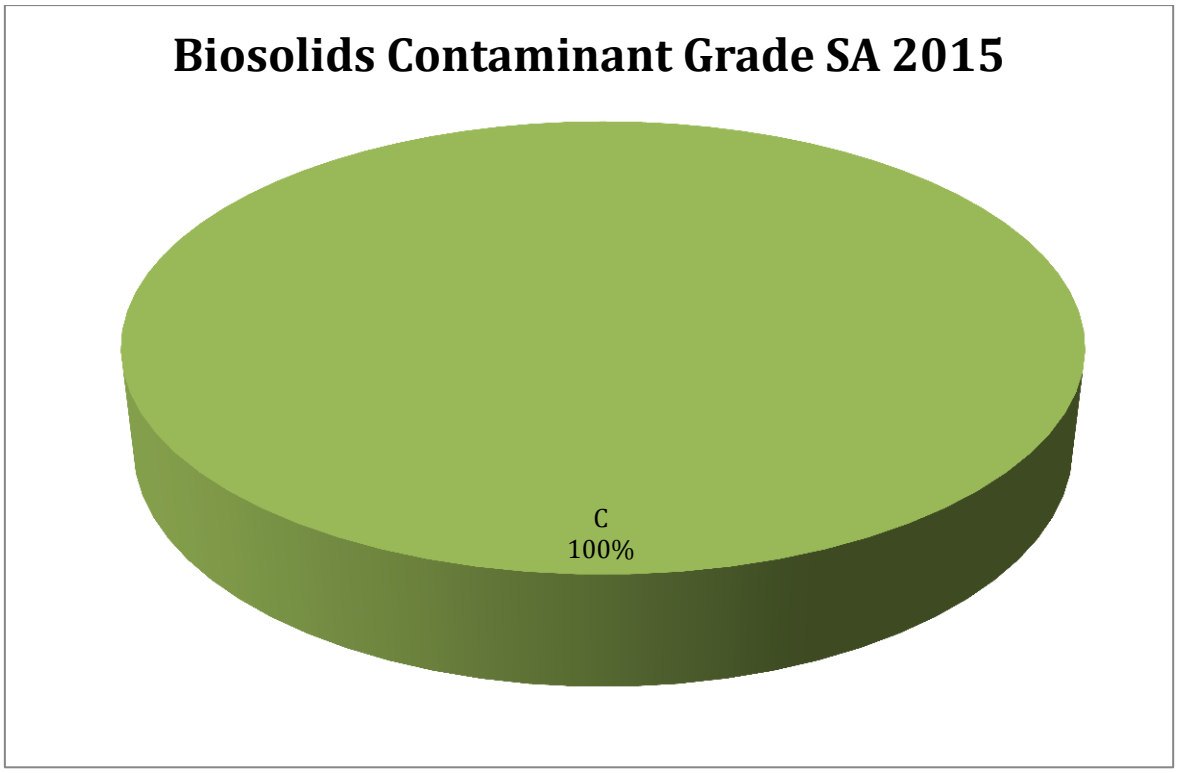
4.4 CONTAMINANT GRADE

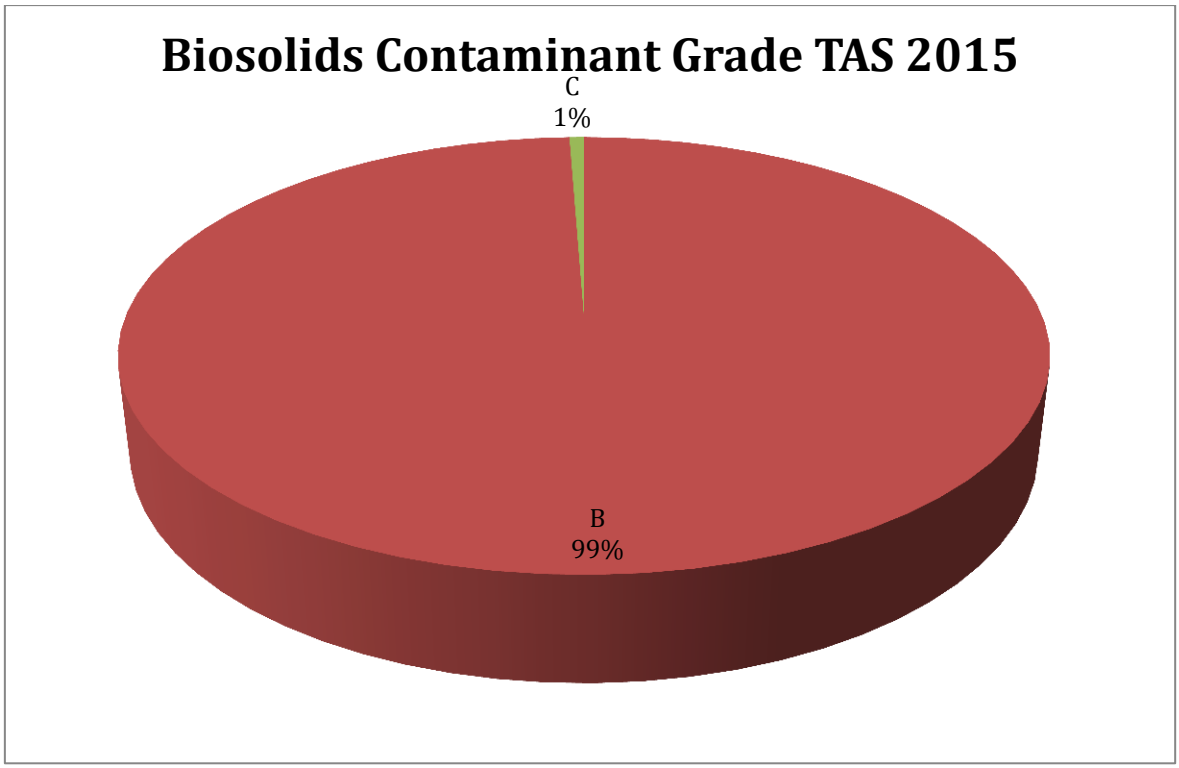
Biosolids stabilisation grade nationally and for each state is presented in the charts below. This was not surveyed in 2010. Since 2013 there has been a marginal increase in contaminant grades A, B and C with a marginal decrease in the unspecified/ungraded category.

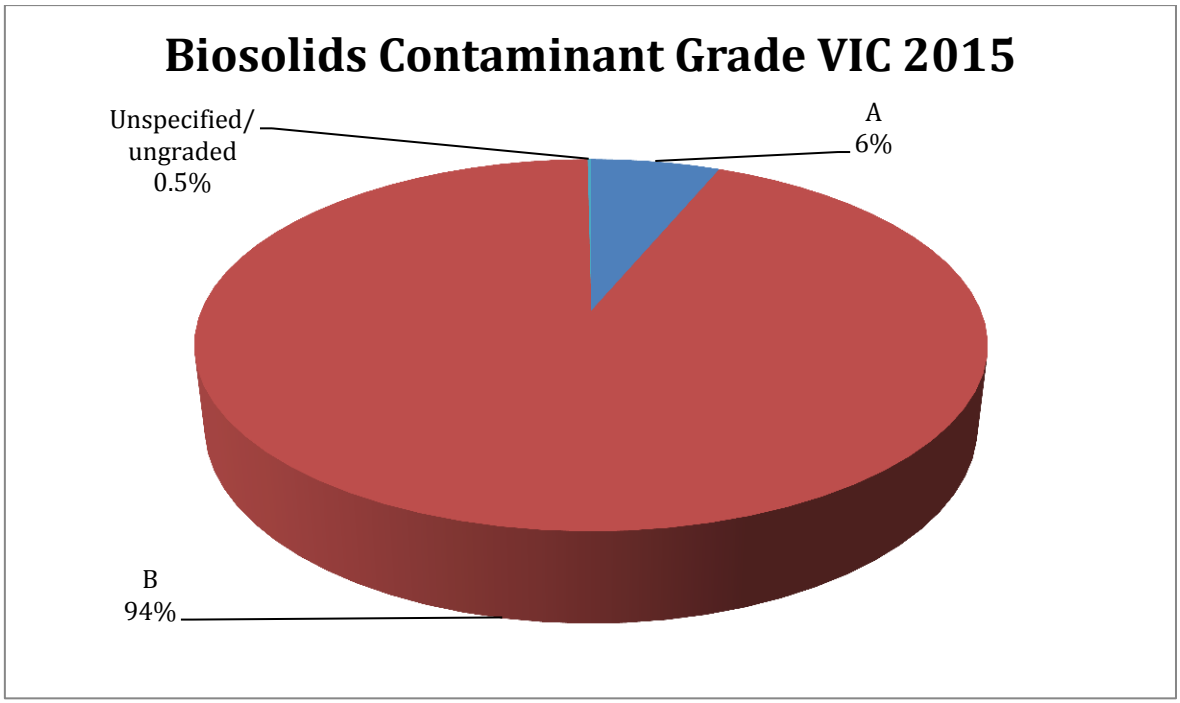


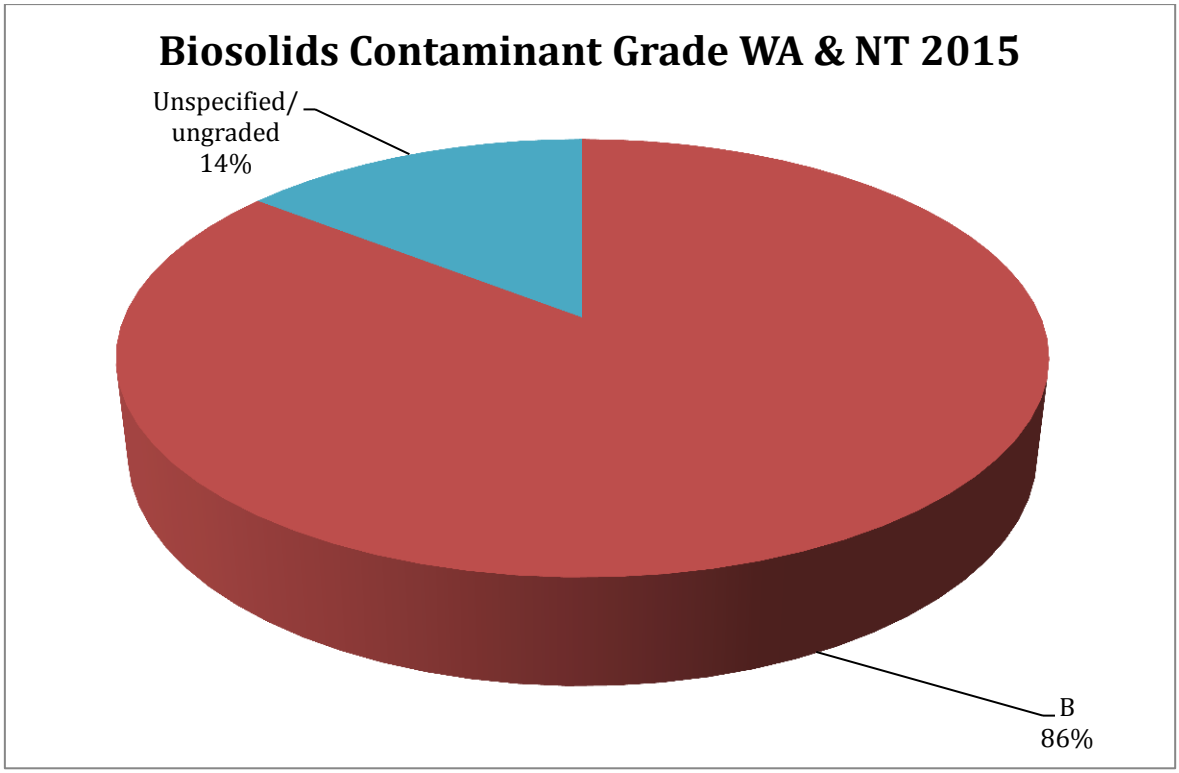

Biosolids Contaminant Grade NSW & ACT 2015
Unspecified/ ungraded 22%
A 6%
B 5%
Unsuitable for use 0.4%
C 67%


Biosolids Contaminant Grade QLD 2015
B 1%
C 99%


Biosolids Contaminant Grade SA 2015
C
100%


Biosolids Contaminant Grade TAS 2015
C
1%
B
99%

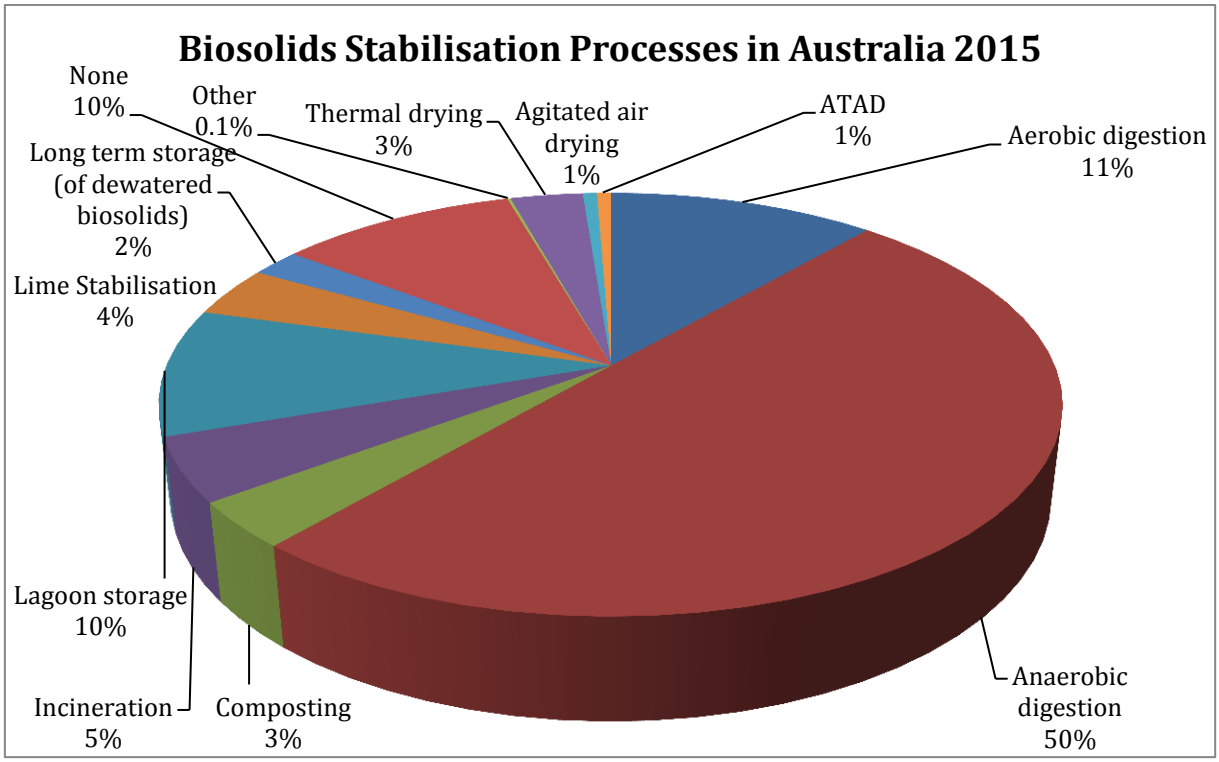

Biosolids Contaminant Grade VIC 2015
Unspecified/ ungraded 0.5%
A 6%
B 94%

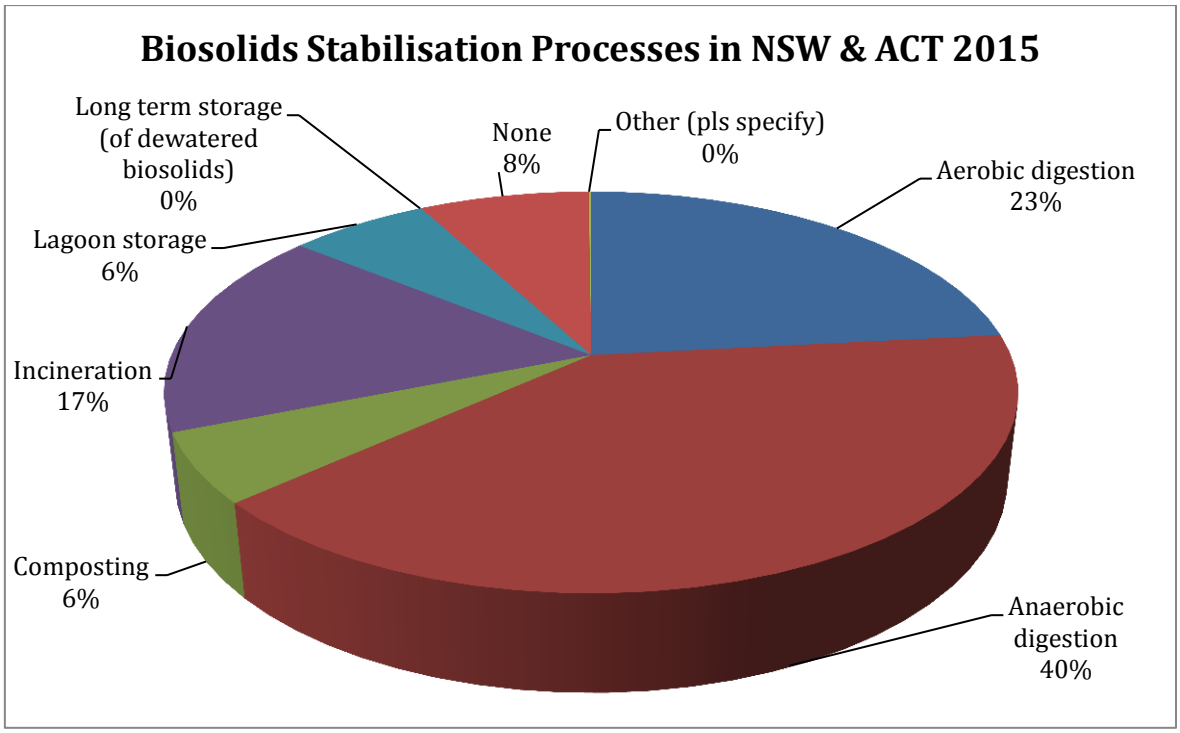

Biosolids Contaminant Grade WA & NT 2015
Unspecified/ ungraded 14%
B 86%

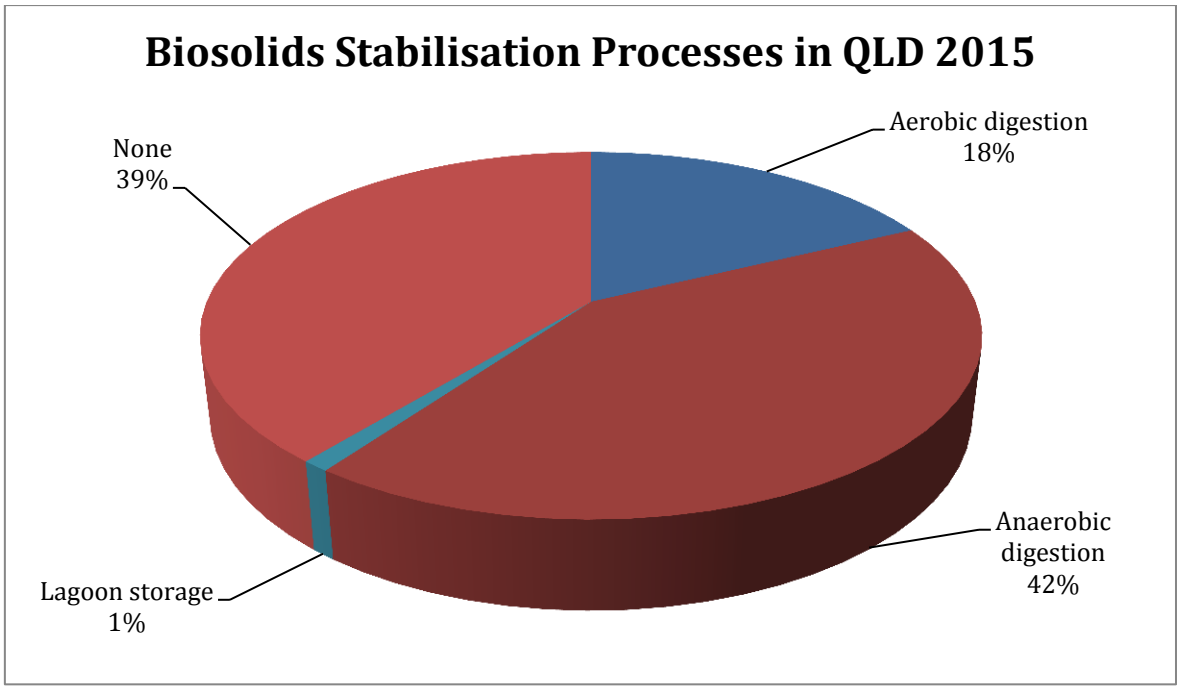
4.5 STABILISATION PROCESS

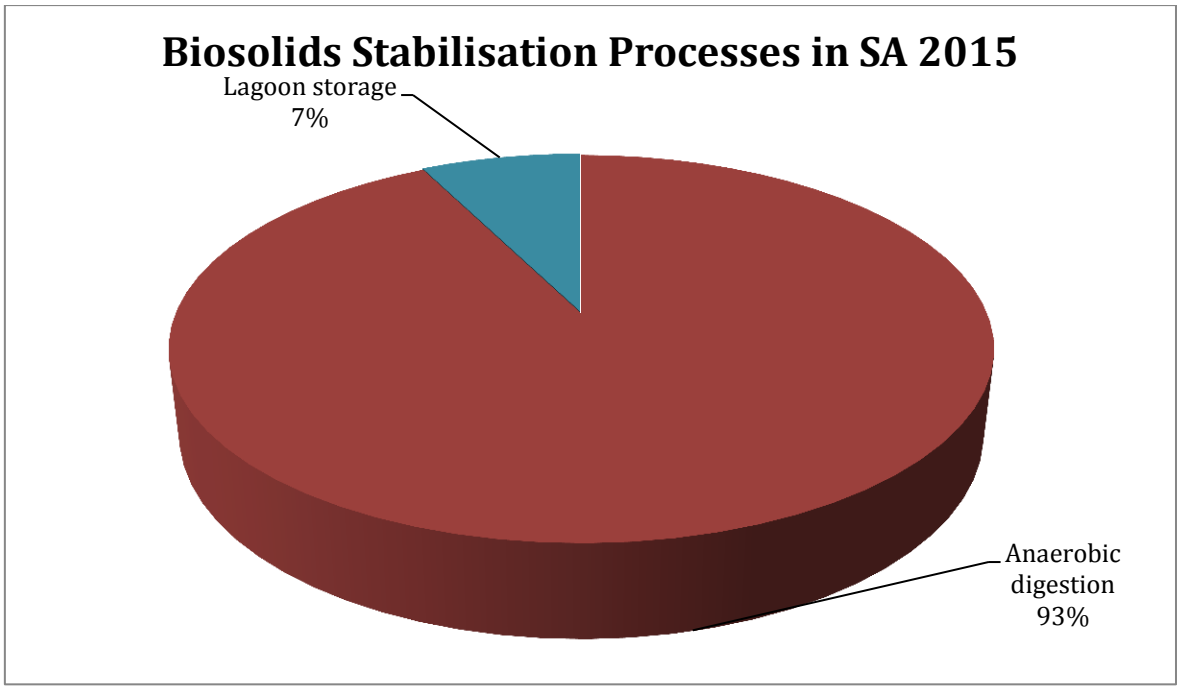
Biosolids stabilisation process nationally and for each state is presented in the charts below. Overall there was a moderate increase in Anaerobic Digestion (up from 31% in 2010, 46% in 2013 to 50%) likely due to new plants coming online. There was also an increase in lagoon stabilisation (3% in 2010 to 10%) likely due to better data reporting. There was a marginal increase in composting, thermal drying, lime stabilisation and incineration which is likely due to small differences in collecting and reporting of data.

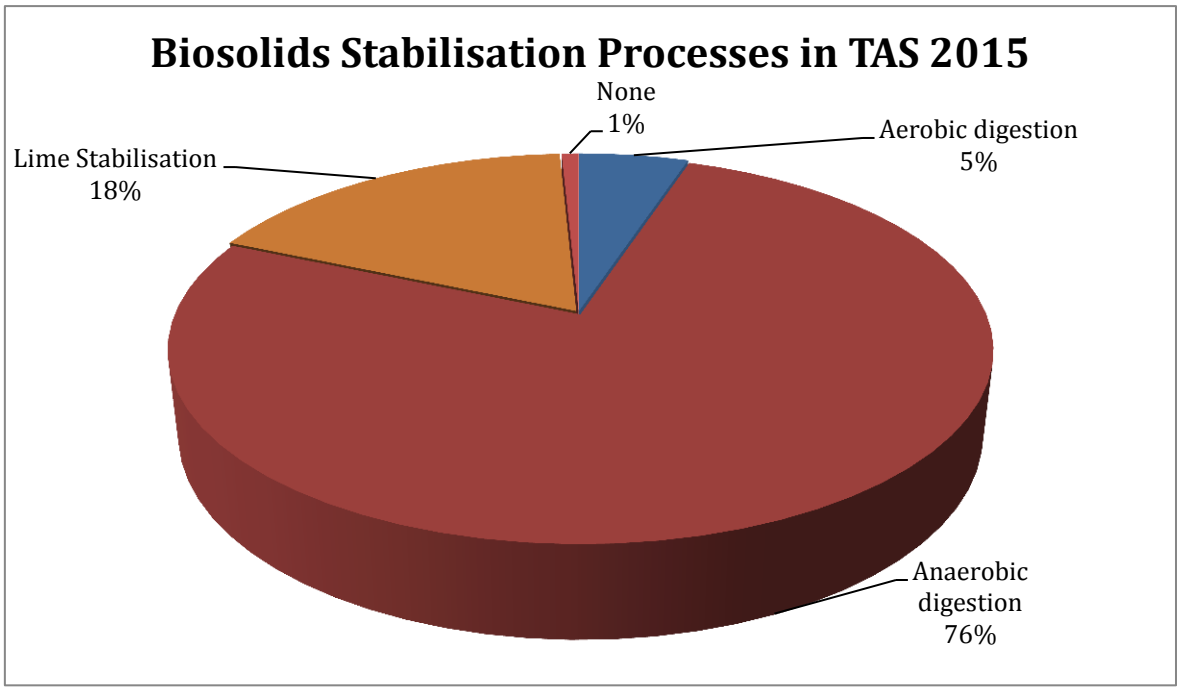
The amount of biosolids being stored on site for the primary stabilisation process held steady (20% in 2010, to 2% in 2013 and 2015). Aerobic digestion returned to the 2010 levels (12% in 2010, 18% in 2013 to 11%). This is likely due to reporting errors rather than changes to stabilisation processes.

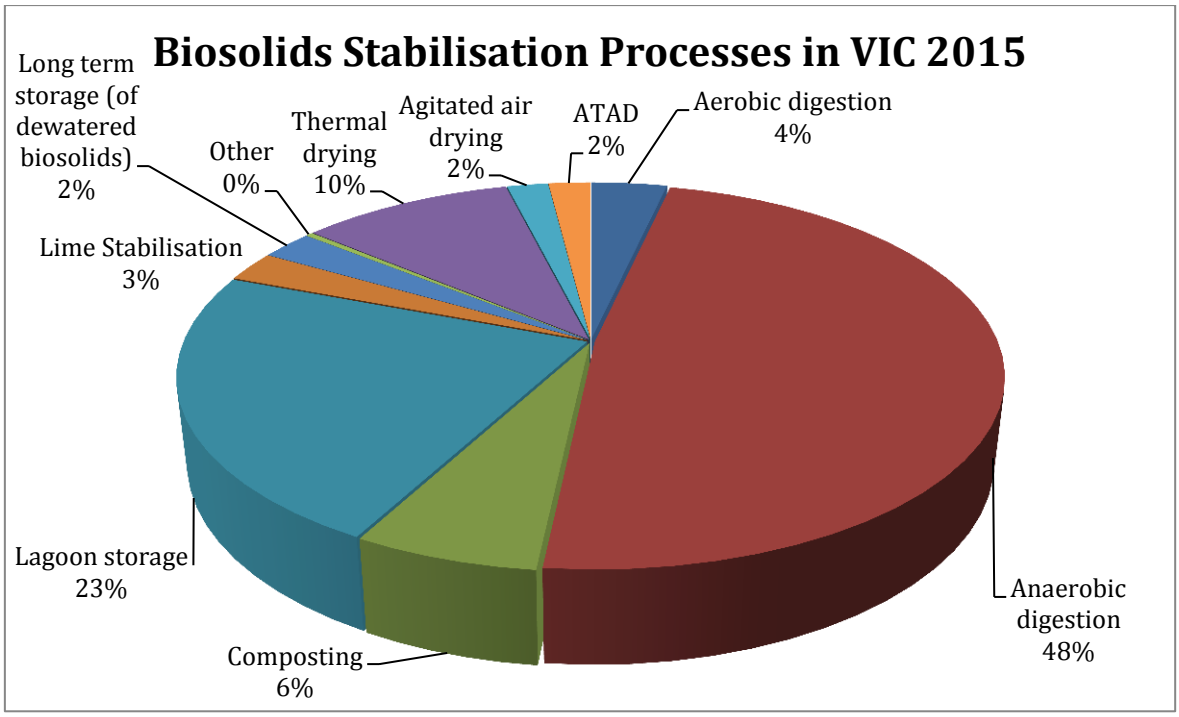


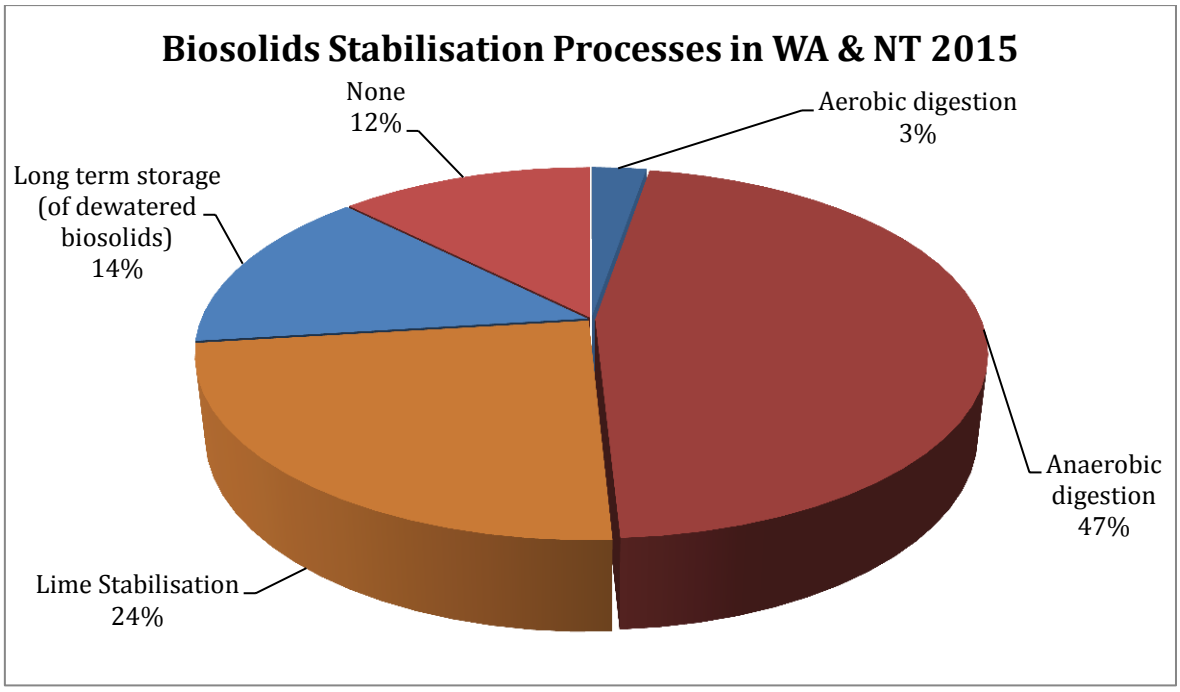

Biosolids Stabilisation Processes in NSW & ACT 2015
Long term storage (of dewatered biosolids) 0%
None 8%
Other (pls specify) 0%
Aerobic digestion 23%
Lagoon storage 6%
Incineration 17%
Composting 6%
Anaerobic digestion 40%


Biosolids Stabilisation Processes in QLD 2015
Aerobic digestion 18%
None 39%
Anaerobic digestion 42%
Lagoon storage 1%


Biosolids Stabilisation Processes in SA 2015
Lagoon storage
7%
Anaerobic
digestion
93%

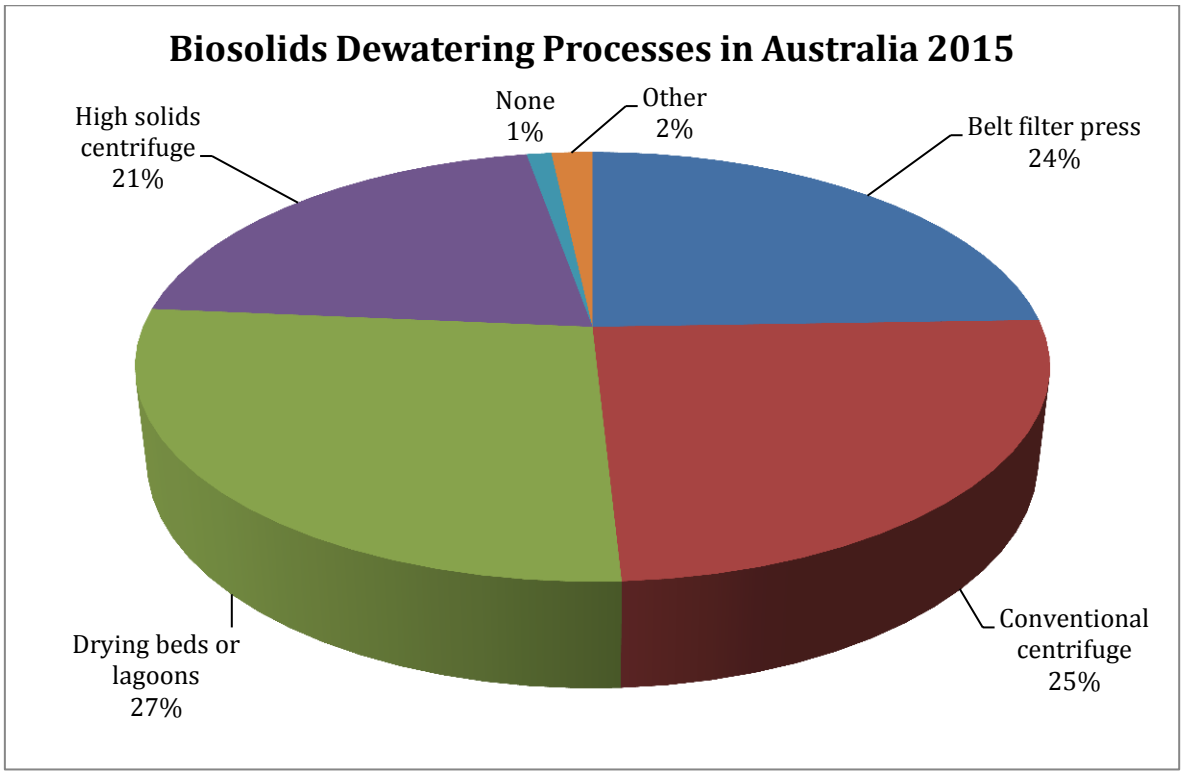

Biosolids Stabilisation Processes in TAS 2015
None
1%
Aerobic digestion
5%
Lime Stabilisation
18%
Anaerobic
digestion
76%

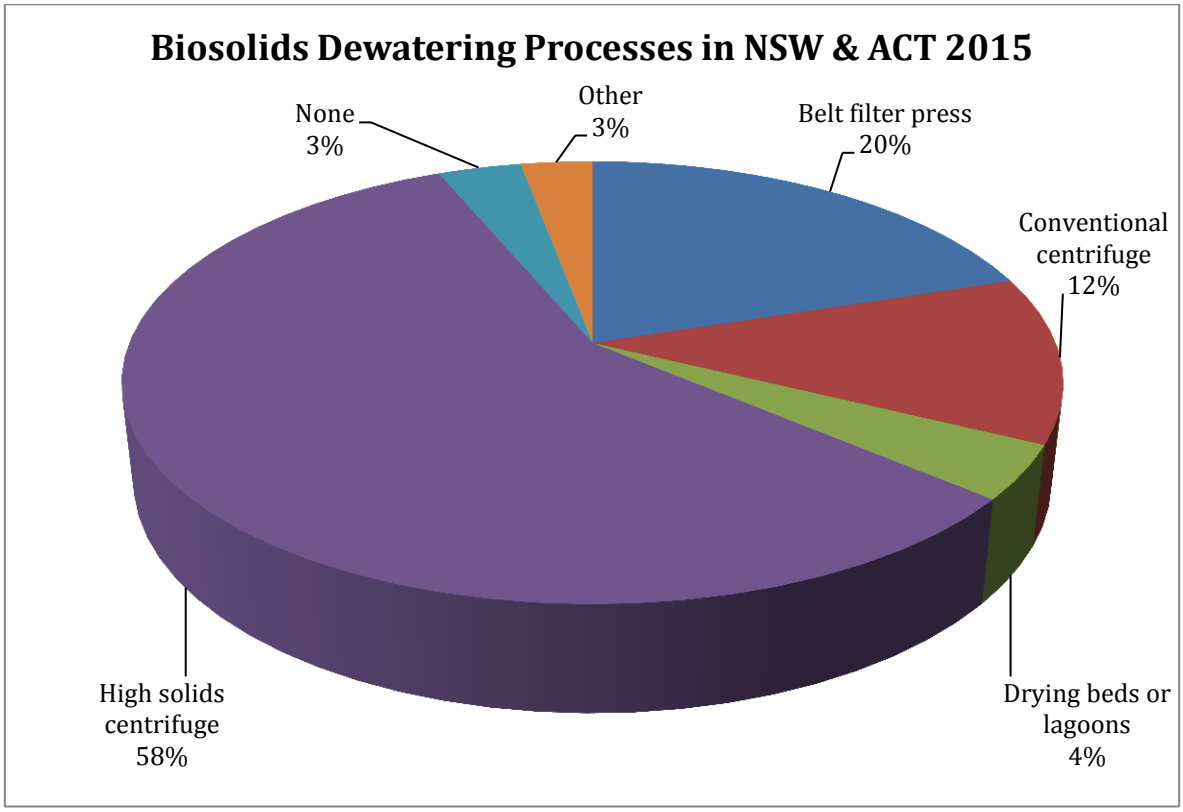

Biosolids Stabilisation Processes in VIC 2015
Long term storage (of dewatered biosolids) 2%
Other 0%
Thermal drying 10%
Agitated air drying 2%
ATAD 2%
Aerobic digestion 4%
Lime Stabilisation 3%
Lagoon storage 23%
Composting 6%
Anaerobic digestion 48%

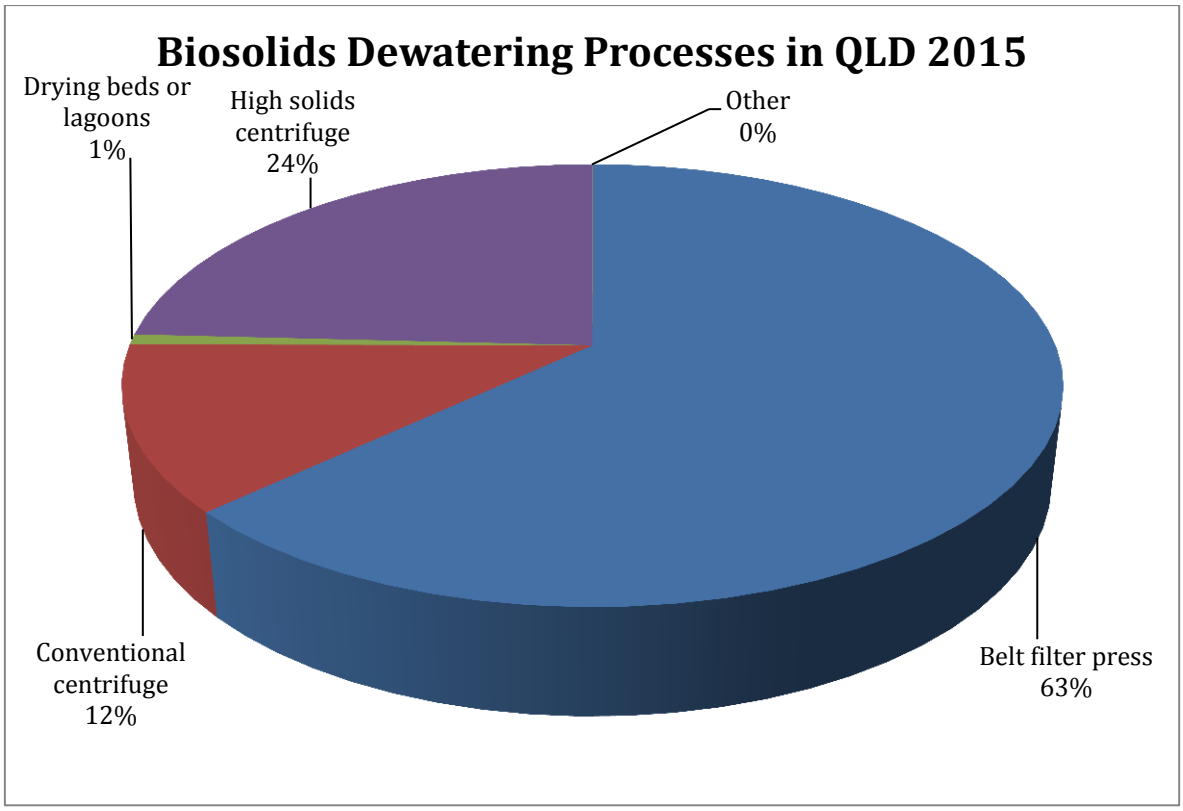

Biosolids Stabilisation Processes in WA & NT 2015
None 12%
Aerobic digestion 3%
Long term storage (of dewatered biosolids) 14%
Anaerobic digestion 47%
Lime Stabilisation 24%

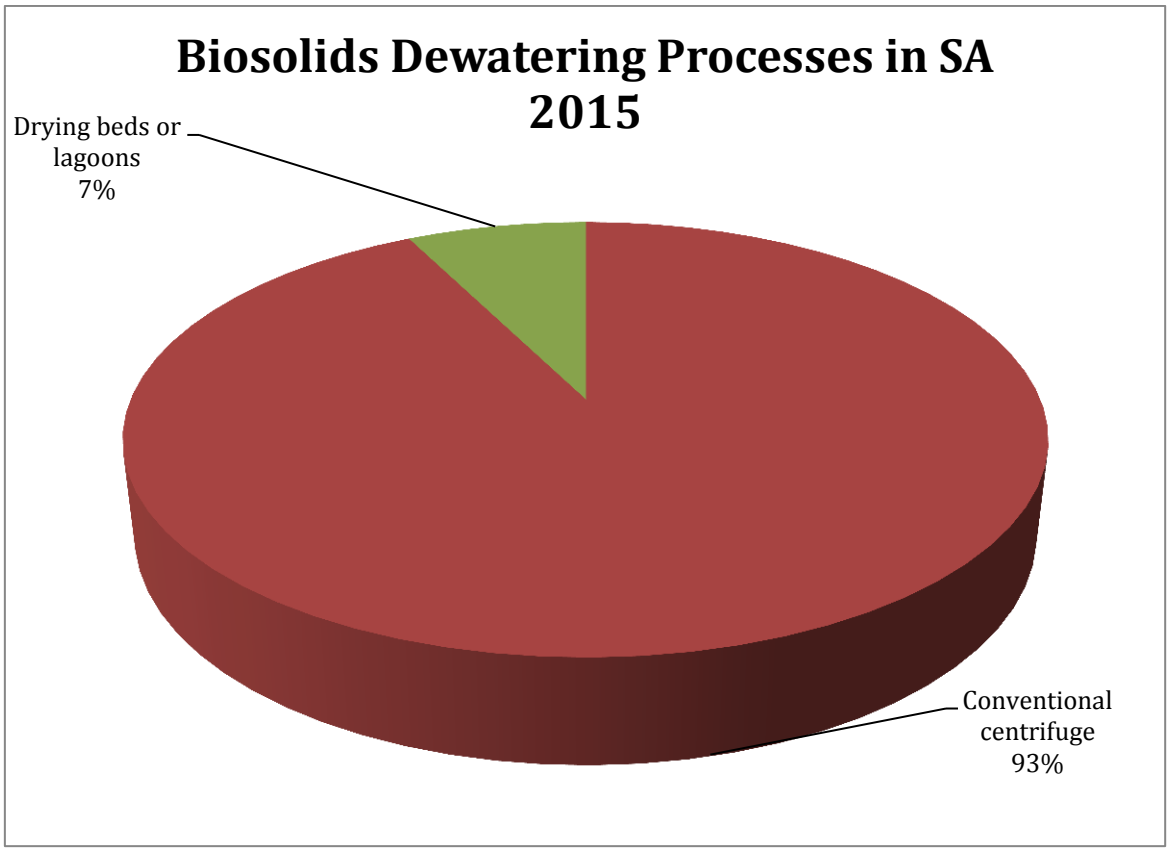
4.6 DEWATERING PROCESS

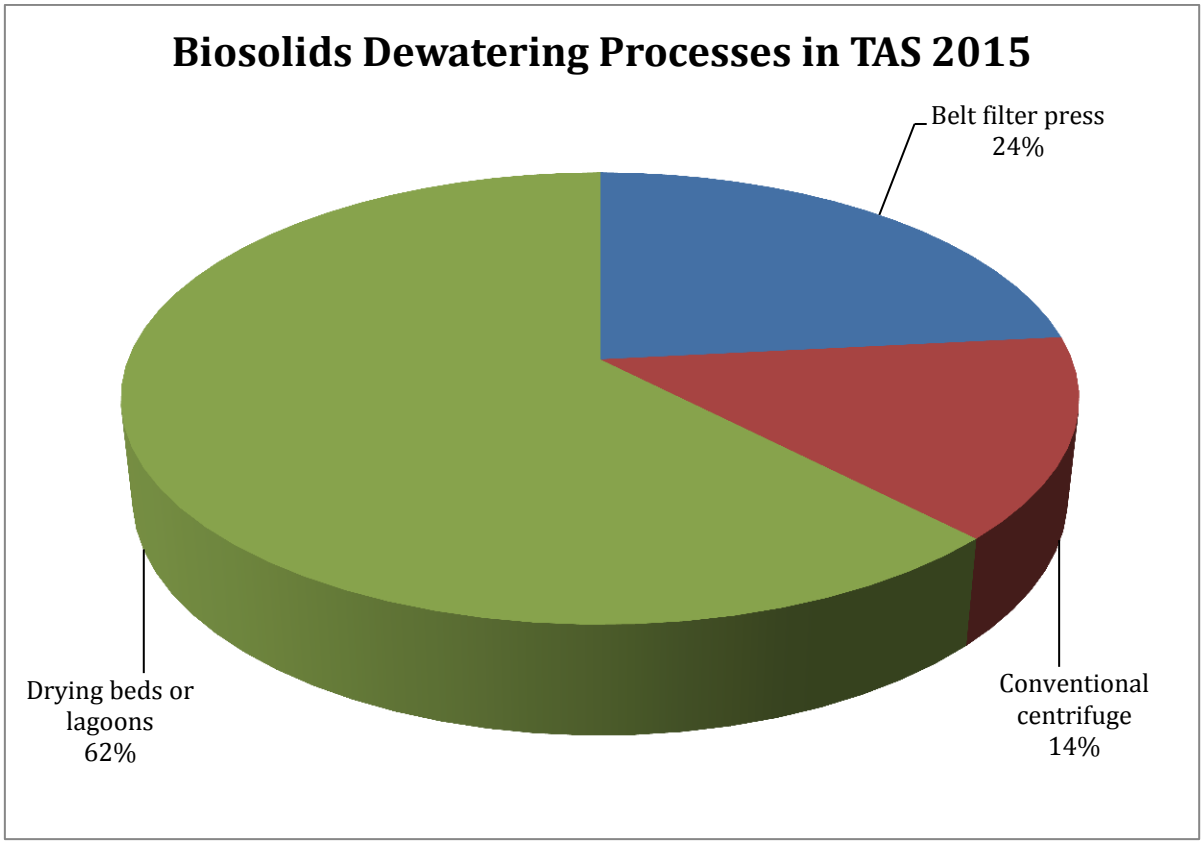
Biosolids dewatering process nationally and for each state is presented in the charts below. Overall, there was a moderate increase in drying beds and lagoons (up from 21% to 27%) with much of this attributable to improved reporting (unspecified decreasing from 12% in 2010, 6% in 2013 to 0% in 2015).

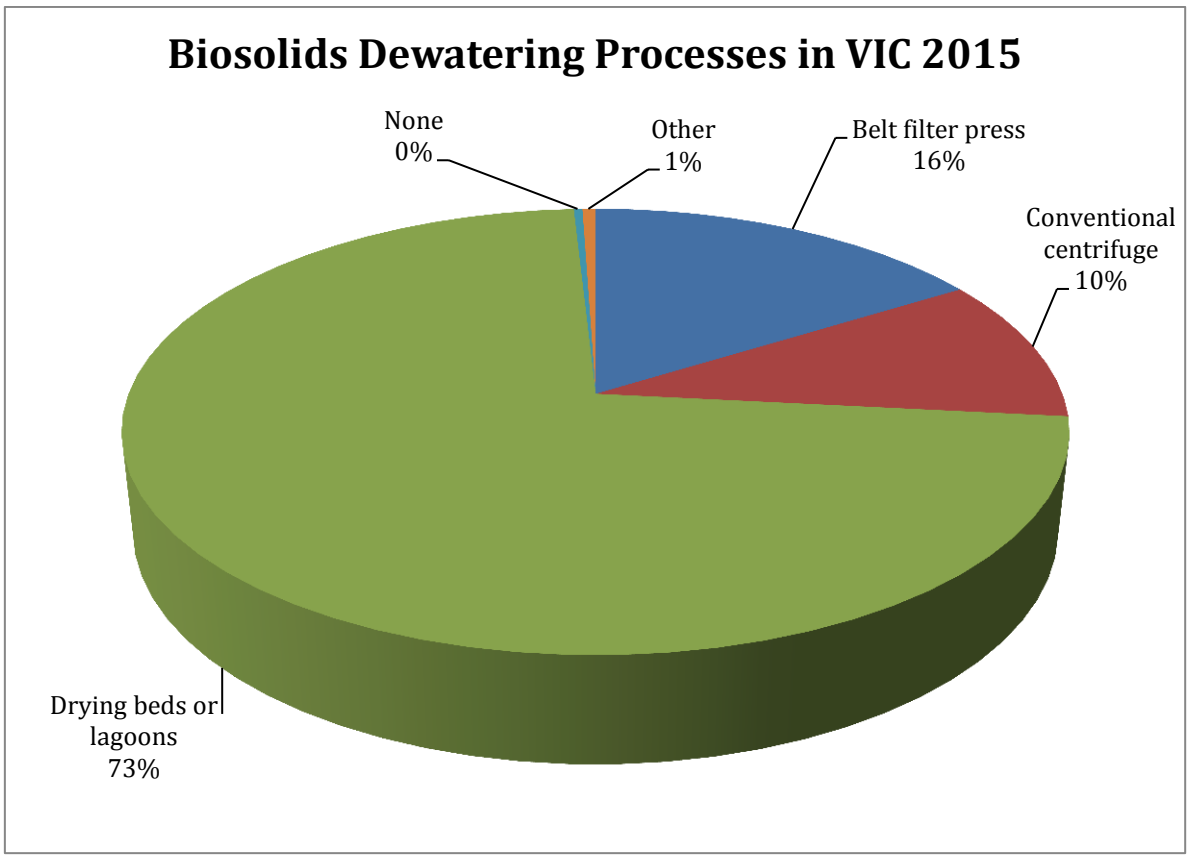


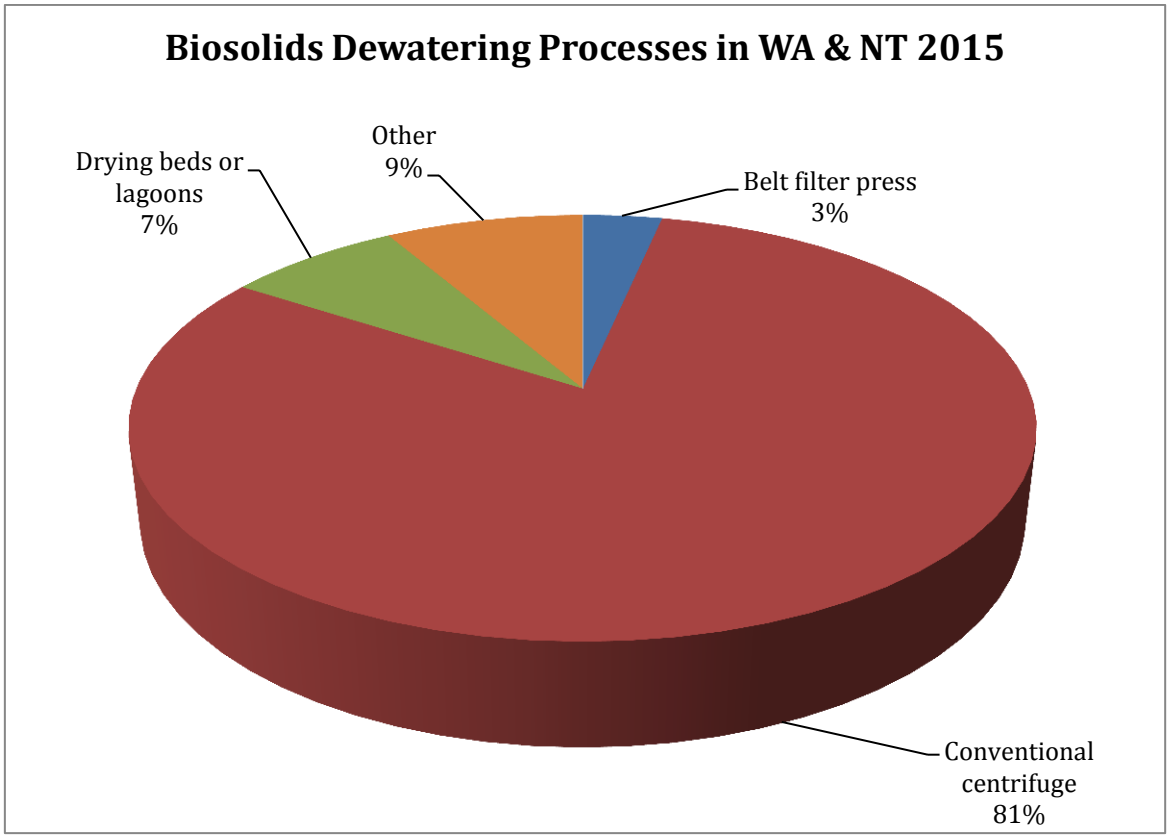



Biosolids Dewatering Processes in QLD 2015
Drying beds or lagoons 1%
High solids centrifuge 24%
Other 0%
Conventional centrifuge 12%
Belt filter press 63%


Biosolids Dewatering Processes in SA 2015
Drying beds or lagoons 7%
Conventional centrifuge 93%


Biosolids Dewatering Processes in TAS 2015
Belt filter press
24%
Drying beds or
lagoons
62%
Conventional
centrifuge
14%


Biosolids Dewatering Processes in VIC 2015
None
0%
Other
1%
Belt filter press
16%
Conventional
centrifuge
10%
Drying beds or
lagoons
73%


Biosolids Dewatering Processes in WA & NT 2015
Other 9%
Drying beds or lagoons 7%
Belt filter press 3%
Conventional centrifuge 81%