



# Scottish composting sector survey 2017

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## Executive summary

The composting sector in Scotland was surveyed for the period covering January-December 2017 with a focus, as in previous surveys, on waste management licenced (WML) and pollution prevention and control (PPC) sites. Limited information was also gathered on relevant waste management licence exempt (WMX) sites.

The survey found a reduction in the number of PPC and WML sites/processes since the last survey held in 2014 and an associated reduction in full time equivalent (FTEs) employees working in the sector.

The 2017 input tonnage suggests a 4% decrease from 2014, at 398,170 tonnes although grossing was required for non-participating sites as in previous surveys which may affect this; the grossing approach used in the 2017 survey benefited from access to input data from the Scottish Environment Protection Agency (SEPA) online 'waste sites and capacity tool'.

A significant change from 2014 was the increase in comingled green and food waste from local authorities with a corresponding decrease in green only waste. Based on operator estimates of food in comingled green and food waste, alongside separated food waste inputs, the food waste to Scottish composting sites remains at a similar level to the 2014 survey at 34,300 tonnes.

Compost production in 2017 was 224,925 tonnes. Compost site outputs diversified in 2017 with production of 16,189 tonnes of anaerobic digestion (AD) 'soup' (produced by cleaning of source-separated food waste). Information has also been gathered on production and fate of oversize. A challenge for many operators was cleaning of oversize outputs to remove physical contamination (i.e. film plastic); the cost of cleaning counteracting revenue achieved for the material.

Agriculture remains the largest market in tonnage terms for compost outputs (84,407 tonnes, 38%), closely followed by land restoration (60,955 tonnes, 27%). The most valuable market (based on the estimating approach used) was landscaping (27,289 tonnes, 12% generating £281,895), with bagged product (7,651 tonnes, 3%) earning the highest price (mean of £16.88/tonne, generating £129,149).

A key focus on this year's survey was physical contamination given the current ongoing SEPA tightening of limits on compost outputs from publicly available specification 100 (PAS100) certified sites. The survey captured information on contamination levels, rejected loads, operator concerns on contamination and suggestions for tackling this problem.

## Glossary of terms

Animal By-Products Regulations (ABPR)	The Animal By-Products Regulations (EC) 2009 (142/2011) indicate clearly what may or may not be done with any part of an animal or product of animal origin not intended for human consumption. This is transposed into Scottish law through The Animal By-products (Enforcement) (Scotland) Regulations 2013. This controls the collection, transport, storage, handling, processing and use or disposal of animal by-products in Scotland, including catering wastes. Similar legislation applies in England and Wales.
Bioaerosol	Bioaerosols are considered as particles released from terrestrial ecosystems into the atmosphere and include living (e.g. microorganisms) and non-living components. As composting processes are microbiologically driven processes, bioaerosols may be elevated concentrations at and around composting processes.
Ex-situ	A term used to describe composting processes where the sanitisation phase is carried out in the open (potentially with covered) as compliance with ABPR requirements is not required due to the limited range of suitable feedstocks..
In-vessel	A term used to describe a wide range of composting systems where the composting feedstock is contained in a purpose-built structure for the sanitisation phase of composting, allowing a higher degree of process control and compliance with ABPR requirements.
PAS 100	Publicly Available Specification 100, which is the British Standards Institution's specification for composted material.
Permitted capacity	The capacity of material that the site has been permitted to treat. This figure can be higher than the actual amount of material treated by a site and represents the maximum amount that the site can treat per annum.
Permitted/exempt waste operation	A permitted waste operation is one which is subject to the granting of a Pollution Prevention Control permit. This is a permit granted by SEPA allowing the operation of a regulated facility subject to certain conditions. Some activities are exempt from permitting or waste management licencing provided they meet certain conditions.

## Acronyms

ABPR	Animal By-Product Regulation
AD	Anaerobic Digestion
AfOR	Association for Organics Recycling (now merged with REA – see ORG, below)
CCS	Compost Certification Scheme
EWC	European Waste Catalogue
FTE	Full Time Equivalent
ORG	The Organics Recycling Group. A section within the REA which represents the membership of the former AfOR
PAS	Publicly Available Specification
PPC	Pollution Prevention and Control
REA	Renewable Energy Association
REAL	Renewable Energy Assurance Ltd
SEPA	Scottish Environment Protection Agency
WML	Waste Management Licence
WMX	Waste Management eXemption
WRAP	Waste and Resources Action Programme

# 1 Introduction

Surveys of the composting sector in Scotland were last carried out on behalf of Zero Waste Scotland and the Scottish Government in 2014<sup>1</sup> and 2013<sup>2</sup>. Prior to this, surveys of the Scottish composting sector were part of UK-wide surveys, the most recent carried out by Waste Resources Action Programme (WRAP) in 2012<sup>3</sup> and the Association for Organics Recycling (AfOR) in 2010<sup>4</sup>.

The purpose of this report is to present updated information for the Scottish composting sector covering the period January-December 2017 and, where applicable, make comparison to previous survey data.

In this report the following key definitions were used;

- A **site** being a physical geographical location with one or more composting process(es).
- A **process** being a series of steps used to transform inputs (i.e. feedstocks) in to outputs (i.e. compost, oversize, 'other').

Composting processes can be broadly categorised as either in-vessel and ex-situ, with only the former suitable for processing animal by-product regulation (ABPR) feedstocks. As such, a composting process for food waste may be limited to use of an in-vessel system or use of an in-vessel system followed by covered or open air maturation. In both cases, these are here considered as in-vessel processes.

## 2 Methodologies

### 2.1 Identifying relevant sites and sourcing information

Composting sites were identified using the following sources:

- Past Zero Waste Scotland survey database
- SEPA WML, PPC and WMX lists relating to composting
- Renewable Energy Assurance Ltd (REAL) compost certification scheme (CCS) website

### 2.2 Survey questions and design

The 2014 composting sector report was initially reviewed to consider relevant questions for inclusion and discussed with the wider project team from Enscape Consulting Ltd and Cambridge Eco Ltd. Feedback was also sought from relevant industry stakeholders. A key comment made by several stakeholder individuals was to keep the survey short and focused.

As a result of this process, a number of changes were made to the survey from previous years:

- The survey questions were cut down in number (from 18 to 10) by reformatting questions and by removing questions for information available publicly.
- In the 2014 survey, sites operating under exemption were excluded; however, three waste management licence exempt (WMX) sites were known to be certified under PAS100. Therefore, these three sites and a couple of sites operated by a waste management company under exemption were considered relevant and so included for specific parts of this 2017 survey

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<sup>1</sup><https://www.zerowastescotland.org.uk/sites/default/files/2014%20organic%20survey%20Final%20%20801-07-2016%29.pdf>

<sup>2</sup><http://www.organics-recycling.org.uk/uploads/article2928/Scottish%20ASORI%20Report%2020140924.pdf>

<sup>3</sup><http://www.wrap.org.uk/sites/files/wrap/ASORI%202012.pdf>

<sup>4</sup><http://www.organics-recycling.org.uk/uploads/article2439/ASORI%20Final%20Report%202010.pdf>

(feedstock tonnage and PAS100 certification). Although included they are reported separately from the waste management licenced (WML) and pollution prevention and control (PPC) site results.

- In the 2014 survey, reference was made to site, facility and process. We simplified this to site and process (i.e. removed facility)
- The 'have your say' section of the survey was changed to focus on a few specific issues. For example, given current ongoing changes from SEPA on physical contaminant limits in compost outputs it was felt prudent to focus this year's survey on this important issue<sup>5</sup>. The two other issues focused on were odour and bioaerosols.

The draft survey was then trialed with one operator and outcomes discussed with the project team before finalising. The summary of the questions used in the survey can be found in Appendix A.

## 2.3 Operator engagement

A project summary was prepared and circulated to relevant industry organisations to promote the survey via websites and update emails. Relevant organisations included the Organics Recycling Group (ORG) of the Renewable Energy Association (REA) and REAL. Zero Waste Scotland also notified operators of the survey where current contact details were available.

Operators were initially contacted by email providing links to the project summary and requesting availability. Operators not responding were followed up by email and/or phone as required (November 2018 to January 2019).

## 2.4 Analysis (including grossing)

As with previous surveys, grossing was required for individual sites not participating in the survey or not responding to specific questions. The foundation of the approach used here was to determine input tonnage of relevant wastes from the SEPA's online 'waste sites and capacity tool'<sup>6</sup>. The approach was verified by cross checking using this tool for a selection of reporting sites. A summary of the grossing method is provided in Appendix B.

# 3 Results and discussion

## 3.1 Permitted, licenced and exempt composting infrastructure

### 3.1.1 Site, operator and process types/numbers

In 2017, 24 PPC and WML sites were operational in Scotland with three sites operating two parallel composting processes leading to a total of 27 processes (Table 1). Of these processes, seven were in-vessel system based (in whole or part); the remainder being ex-situ.

The number of sites shows a reduction from 2014 due to both council and privately run sites ceasing operations. Resulting from these closures some feedstock material is known to have been diverted to other PPC and WML composting operators.

For one site, shredded feedstock material was sent to a number of WMX facilities for processing in 2017. The site and associated tonnage information has been maintained with the PPC/WML

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<sup>5</sup><https://www.sepa.org.uk/media/219843/wst-g-050-regulation-of-outputs-from-composting-processes.pdf>

<sup>6</sup> <https://www.sepa.org.uk/data-visualisation/waste-sites-and-capacity-tool/>

site/process figures as from 2018 material stopped going to WMX facilities and started going to a fully licensed site.

The number of PPC and WML sites has further declined during 2018 with closure of one PPC and one WML site. Although it can be expected that other PPC/WML sites will pick up the feedstock from these closed sites, to help maintain throughput tonnage, some of the feedstock previously going to the now closed PPC site maybe suitable for other waste management facilities (e.g. anaerobic digestion).

**Table 1.** Scottish composting sector and survey participation in 2017 compared to previous years. Numbers are sites and in brackets processes

PPC/WML sites (processes)	2017	2014	2013
Operational sites (processes)	24 (27)	29 (31)	29 (31)
Sites refusing survey	3	1	1
Sites (processes) surveyed	21 (24)	27 (29)	26 (29)

For this 2017 survey, specific information relating to WMX (SEPA paragraph 12) sites was also included. Specifically, WMX sites known to produce PAS100 compost and/or operated by waste management companies were considered here. Five WMX sites were contacted although limited information was gained on these and is reported separately from PPC/WML information at the end of each section.

### 3.1.2 Operational composting site input and capacity

**Associated with the reduction in the number of PPC/WML sites since 2014, actual input tonnage suggests a 4% decrease in 2017 (Table 2).** However, the actual input tonnage value for 2017 is based on grossing for four ex situ sites; three due to non-participation in the survey and one lacking data (site now closed). Therefore, although there were more non-participating sites in 2017 than 2014, the 2017 survey has benefited from the use of SEPA's online 'waste sites and capacity tool'.

The seven in-vessel processes took 44% of the input material (feedstock) in 2017.

To determine the overall permit capacity of PPC/WML sites, grossing was applied to five sites due to these sites having multiple activities and the publicly available permit licence information not being limited to composting. In these cases, the actual permit capacity for composting was based on an average 65% usage of the permitted capacity from reported site data (or estimated input tonnage in the case of non-participating sites). Changing the usage of these sites to 81% (the average usage reported in the 2014 survey) still comes to an overall permitted capacity of >600,000 tonnes. An increase in composting capacity is justified in that two large sites have significantly increased permitted capacity since 2014. Analysis of the permit capacity for in-vessel and ex situ sites shows that collectively the in-vessel sites are closer to capacity (77%) than the ex-situ sites (58%).

In addition to permit capacity and actual input tonnage, operators were also asked the technical capacity of sites i.e. how much feedstock material could be practically composted at the site annually. In most cases it was reported as the same as the permitted capacity. Technical capacity was not provided for 15 processes – in these cases technical capacity was considered the same as the actual or grossed permit capacity. The overall technical capacity came out as very similar to the overall permitted capacity.

**Table 2.** PPC/WML composting input tonnage and capacity based on grossed values

PPC/WML sites	2017	2014 <sup>7</sup>	2013 <sup>8</sup>	2012 <sup>9</sup>
Actual input tonnage	398,170	416,000	411,000	430,000
In-vessel	176,537	-	-	-
Ex-situ	221,633	-	-	-
Permitted capacity	614,897	-	-	-
In-vessel	229,260	-	-	-
Ex-situ	385,367	-	-	-
Technical capacity	614,777	-	-	-

In addition to the above, the five WMX sites surveyed processed 8,425 tonnes (after estimating input tonnage for one site) in 2017. Two of these sites individually processed more than the smallest WML sites in 2017.

### 3.1.3 Sector employment

As with previous sector surveys, the number of full time equivalents (FTEs) was determined for each PPC and WML site (Table 3). The number of FTEs for 2017 was estimated (allowing for five non-reporting sites) by a grossing approach based on an average of 1 FTE per 4000 tonnes input (a calculated average from participating sites). The estimated FTEs figures for the five sites were then rounded up to the nearest whole number.

The results show a decline in FTEs in the sector since the last survey reflecting in part the reduction in operational site numbers. One council run site operator also commented about a lack of staff suggesting that the reduction in FTEs may not be limited to site closures but also a reduction in staff numbers at operational sites.

**Table 3.** Number of FTEs for all PPC/WML sites in 2017 compared to grossed values for 2013 and 2014

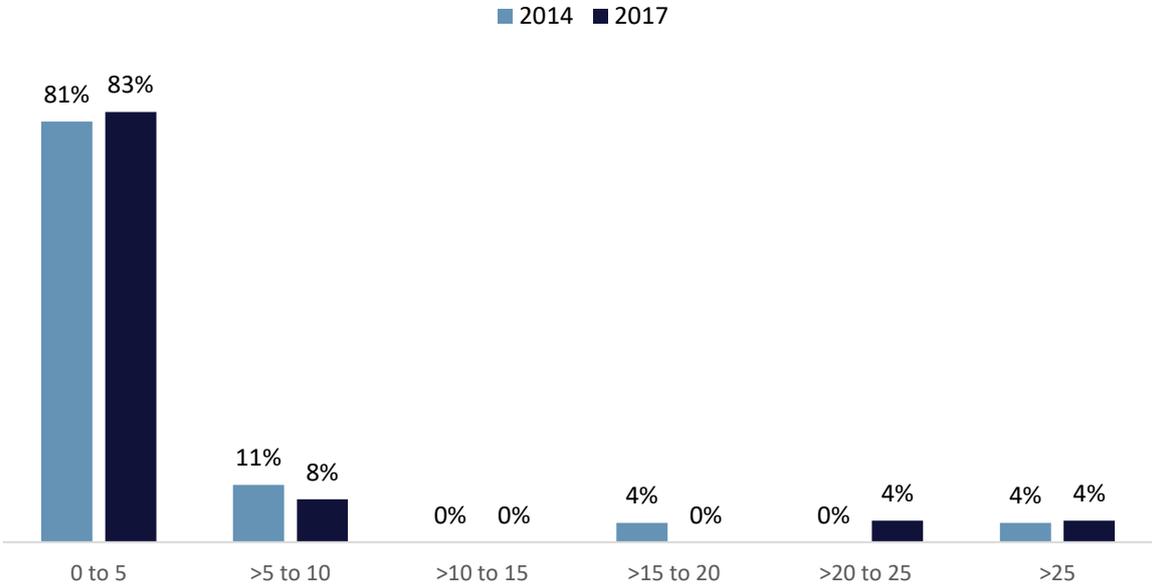
Year	2017	2014	2013
FTEs	112	139	139

<sup>7</sup> Zero Waste Scotland Scottish survey 2014

<sup>8</sup> Zero Waste Scotland Scottish survey 2013

<sup>9</sup> WRAP UK wide survey (Scotland data)

As found in the previous survey the majority of sites have <5 FTEs (Figure 1). Comparison with the 2014 survey supports the above assumption about reducing numbers of staff at certain sites with a decrease in sites with between 5-10 FTEs from three to two. One site has increased the number of FTEs from 15-20 to 20-25.



**Figure 1.** Percentage of PPC/WML sites by the number of FTEs for 2017 compared to 2014

### 3.1.4 PAS100 certification

As three PPC/WML operators each have sites with two parallel composting processes, PAS100 certification was considered here on the compost resulting from an individual processes rather than site level; these operators having either one process certified and the other not certified or both processes certified.

A total of 21 out of 27 PPC/WML processes were PAS100 certified in 2017 (right) processing 87 % of grossed input material and producing 83% of grossed compost. This compares with 25 out of 27 sites (92%) in 2014. It was also reported in 2014 that in the case of one site, not all processes were PAS100 certified.

One non-PAS100 PPC/WML process is expected to be PAS100 certified in the near future.

Three WMX processes were PAS100 certified in 2017.

## 3.2 Feedstocks

### 3.2.1 Feedstock types and tonnages

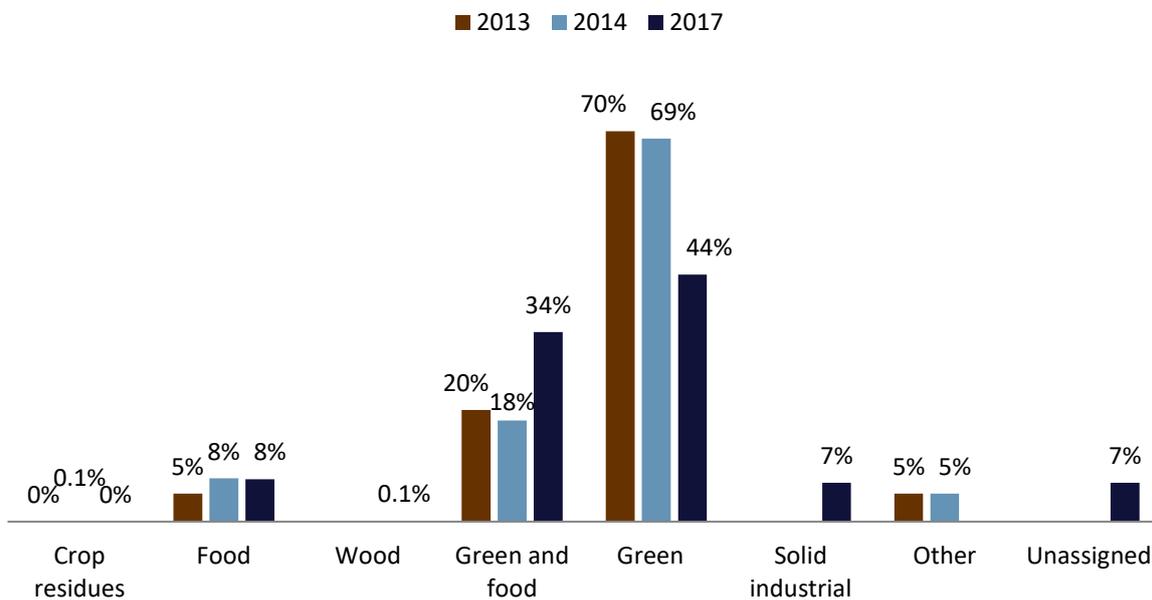
Operators were asked to quantify the reported input tonnages by feedstock type (Figure 2). The results show significant change from the previous survey with over 135,000 tonnes of comingled 'green and food' waste processed compared to 75,455 tonnes in 2014. The increase in comingled 'green and food' waste tonnage corresponded with a decrease in 'green' only waste more likely

reflecting an increase in local authorities turning to co-mingled collections to reduce costs. Current discussions suggest a further move in this direction.

In 2017, two sites included small quantities of wood as feedstock. As wood was not a separate category in previous surveys, this may have been previously covered under 'other'.

'Solid industrial' included a wide range of wastes including abattoir, egg, fish processing and morts, food processing, molasses/sludges, forestry (not already covered in wood) and screenings from mills and distilleries.

Feedstock could not be attributed to categories for all sites and so 7% of feedstock tonnage was unassigned. Given the non-reporting sites were all ex situ operations without animal byproduct regulation (ABPR) registration the most likely category for this material is green waste.



**Figure 2.** Percentage of feedstock by type based on tonnage information for 2017 compared to previous surveys.

### 3.2.2 Food waste and estimated tonnage

**Five out of six in-vessel composting sites processed an estimated 34,300 tonnes of food waste in 2017;** food waste considered here (and in the above figure) as that falling under the European Waste Catalogue (EWC) code 20 01 08 or biodegradable kitchen & canteen waste only. The "solid industrial" category also includes food waste under the EWC code 02 XX XX, however the tonnages reported under this (less than 7% of the total), as mentioned in the previous section, are combined with industrial by-products and other categories of waste, and cannot therefore be individually quantified.

Two of the six sites processed food waste only as comingled (domestic) waste. For these sites, the food content of the waste was estimated by operators at 5%. The other three sites processed between 30-60% food waste.

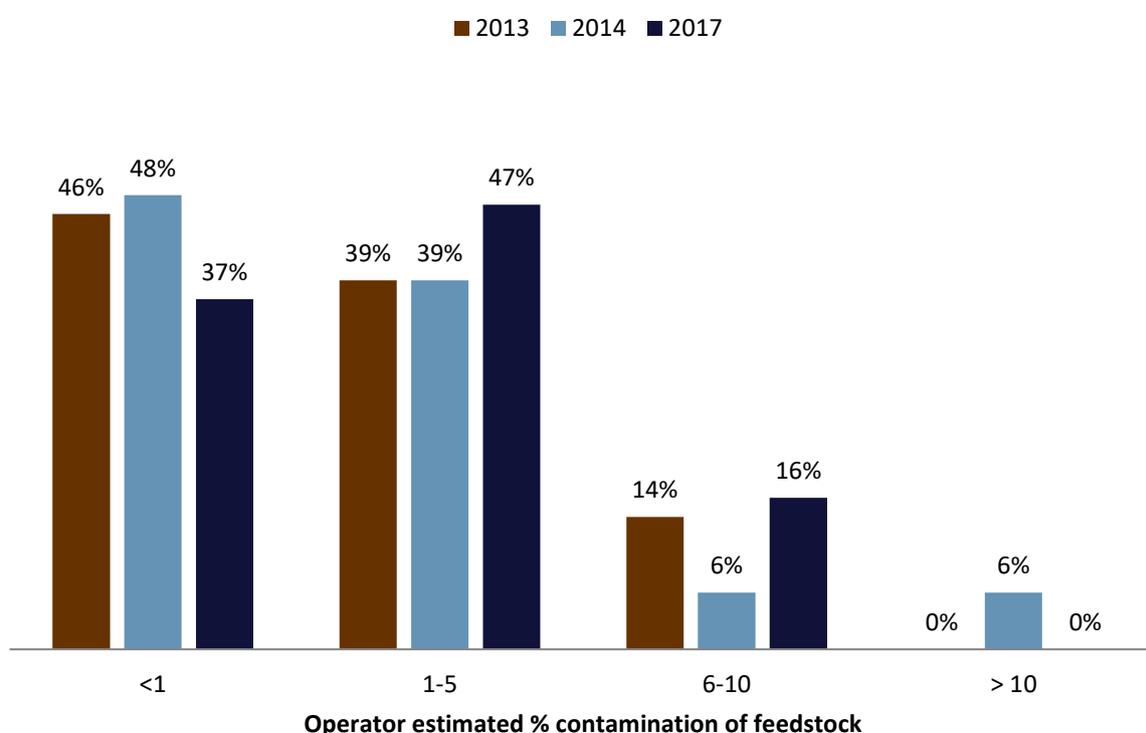
The processing of food waste by composting has remained stable from 2014 when 32,000 tonnes was estimated.

### 3.2.3 Feedstock quality

#### 3.2.3.1 Contamination levels and source

In 2017, operators were asked to estimate the average level of physical contamination in feedstock (e.g. plastic, glass, metal) using the same thresholds as applied in previous surveys (Figure 3). Although the total number of responses is lower than in the 2013 and 2014 surveys (see section 3.1.1) the results suggest that from the operator perspective the level of contamination in feedstock is comparable with previous years.

This survey question prompted comment from several operators about local authority contracts generally and the standard 5% limit for physical contaminants in these contracts. It was felt by several operators that 5% contamination was the norm rather than the exception for some sources. However, it was also highlighted that quality of feedstock from local authorities was variable and some sources were good.



**Figure 3.** Estimated level of contamination in feedstock for 2017 going to PPC/WML composting processes as a percentage of responses (n=19) compared to previous survey years (based on responses for facilities)

#### 3.2.3.2 Rejected loads

In order to understand more about physical contamination going to composting sites in 2017, operators were asked how many loads they rejected because of contamination.

Fifteen sites (relating to fifteen different operators) responded to the question on the number of rejected loads in 2017. Nine of these sites did not reject any loads in 2017. Five sites rejected between 1-3 loads. One site rejected 8 loads in 2017.

For sites not rejecting any loads the reasoning for this varied including:

- Being able to handle the material elsewhere onsite (i.e. through other parts of the organisation)

- The nature of material processed (i.e. taking 'clean' feedstock only)
- Having no alternative but to accept the material to protect a contract
- Having no alternative outlet for the material

Operators were also asked how many loads they should have rejected in 2017. Twelve sites responded to this question; the answers providing further insight into the attitude of operators to contaminated loads. Six of the sites not rejecting loads in 2017 felt feedstock was of sufficient quality not to require rejection, whereas, two of the other three felt they should have rejected loads (estimated at 1% and 10% of input respectively). One of the five sites rejecting between 1-3 loads, felt they should have rejected 9 loads. In short 25% of sites responding to this question felt they should have rejected more loads.

### 3.3 Process

#### 3.3.1 *Use of oversize in process*

In 100% of cases, oversize was reported as removed at the backend of the process (i.e. after maturation) as the material was found useful to the composting process. Oversize was either fed back into the process, used elsewhere on site or removed from site (see section 3.4.3 for further information).

#### 3.3.2 *Feedstock/'product' cleaning*

In the 2014 survey, operators were asked what pre-sanitisation activities were used for composting processes (e.g. screening, handpicking etc.). A wider range of defined options was provided in the 2017 survey within both pre- and post-sanitisation activities considered (Figure 4).

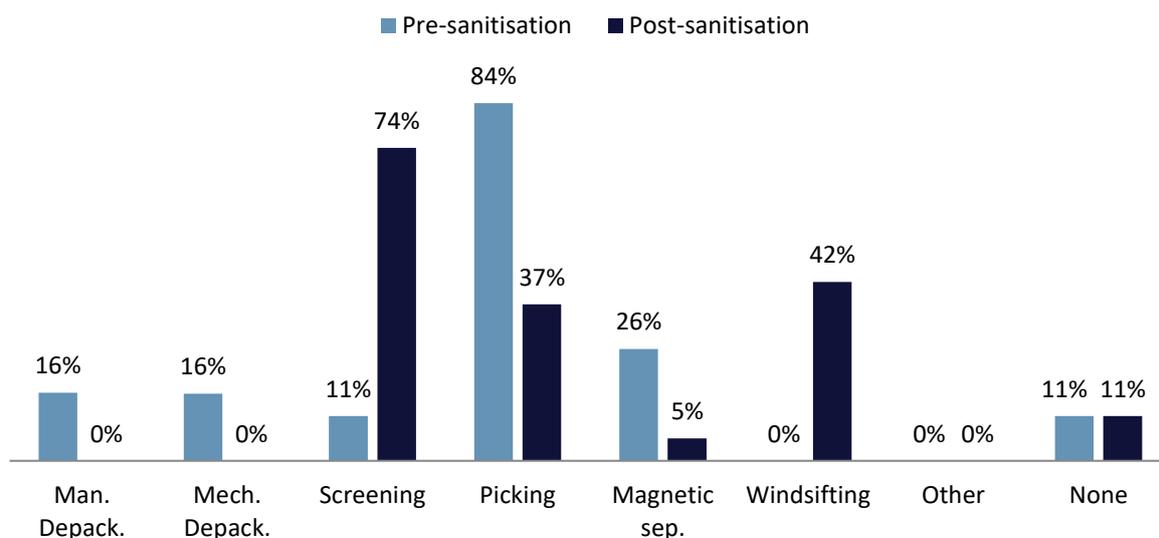
In terms of waste depackaging, this was exclusively a pre-sanitisation process limited to operators taking source segregated food waste.

For screening, this was used post-sanitisation by 74% of operators responding to this section of the survey. Screening was also used pre-sanitisation for two composting processes - a similar response to the 2014 survey.

Handpicking and floor picking were initially considered separately as in the 2014 survey but results later combined. The reason for this was that it was found during the survey that interpretation of what these approaches were varied and so the results were amalgamated. The results show that in the majority of cases, picking was carried out pre-sanitisation. For seven composting processes picking was carried out both pre- and post-sanitisation.

Windsifting was used for seven processes at the post-sanitisation stage in 2017. In addition, further operators were interested in this approach with one operator looking to trial windsifting at their site and another mentioning it in their response to the survey question on business opportunity support (section 3.6.2).

One operator used no pre or post-sanitisation activities for cleaning by restricting feedstock types/sources.



**Figure 4.** Usage of pre- and post-sanitisation activities for cleaning/other as percentage of responses (n = 19).

## 3.4 Outputs

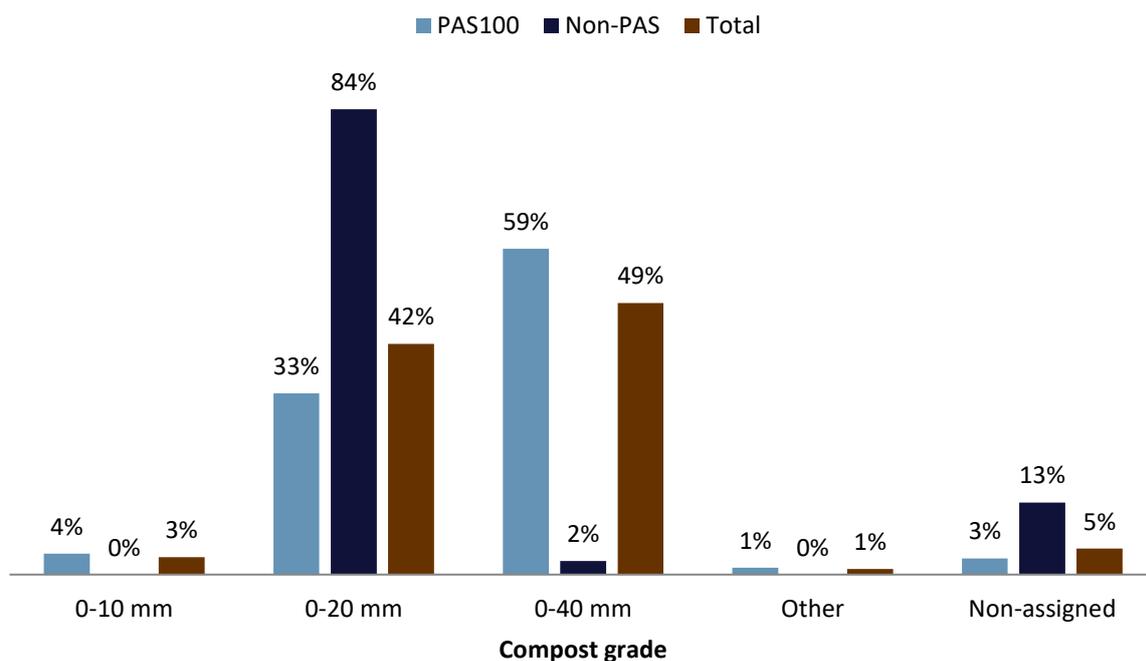
### 3.4.1 Certified and non-certified compost

Compost tonnages were not provided for seven PPC/WML sites; all with ex situ processes and with no food waste inputs. Using data from similar sites reporting both input and output data, and removing outliers, 60% of input tonnage was used to calculate **a gross compost production in Scotland of 224,925 tonnes for 2017**. The 60% value is further justified by literature<sup>10</sup> when 10% oversize (see section 3.4.3) and 5% contaminant removal are added (i.e. 25% mass reduction of input).

Analysis of grades of certified (PAS100) and non-certified (non-PAS100) compost are shown using surveyed data and assigning grossed tonnage to processes where a single grade could be assumed from publicly available information (Figure 5).

As found in previous surveys (data not shown), the most common grades produced were 0-20 and 0-40 mm. Interestingly, one PAS100 certified operator commented that they had changed in 2018 from producing a 0-40 mm to a 0-20 mm product to remove contaminated coarser material in response to SEPA's physical contamination limit changes. For the non-PAS100 compost, the significant percentage of 0-20 mm was skewed by output from one site.

<sup>10</sup> Breitenbeck G.A. & Schellinger D. (2004) Calculating the reduction in material mass and volume during composting. *Compost Science & Utilization*, 12: 365-371.



**Figure 5.** Compost grade production as percentage of grossed tonnage produced in 2017 for PPC/WML processes. The 0-40 mm grade includes mulch. The other category combines 0-6 and 0-12 mm grades. Tonnage which could not be allocated to a particular grade is non-assigned.

### 3.4.2 Anaerobic digestion ‘soup’

Two composting operators produced anaerobic digestion (AD) ‘soup’ in 2017 – source segregated food waste cleaned by mechanical depackaging. **The total tonnage of material fed to Scottish AD sites was 16,189 tonnes.** Aside from the commercial opportunity for these operators this process has technical benefit for composting operations in reducing the liquid (moisture content) of food waste and minimising contamination (i.e. plastic) entering the composting process.

### 3.4.3 Oversize produced and its fate

In this 2017 survey, 10 sites reported producing oversize (providing tonnages). Three sites reported ‘producing’ no oversize as material was reused onsite i.e. material did not pass over the weighbridge.

In order to estimate total tonnage of oversize produced in 2017 (whether reused onsite or not), the % of oversize generated from sites reporting input and oversize tonnages was determined. Based on this data, 10% of input material was calculated and used in grossing. **Taking this approach the tonnage of oversize ‘produced’ in Scotland at PPC/WML sites in 2017 was estimated as 45,692 tonnes.**

For all composting sites, oversize represented a neutral or negative cost. In many cases, oversize was shredded and fed back into the composting process. For others cleaning oversize to remove physical contamination (i.e. film plastic) and sending for biomass in most cases was considered cost neutral with cost of cleaning (in-house or by a third party) cancelling out the price achieved for the material as biomass. One operator reported that oversize was an income stream.

## 3.5 Compost markets and economics

### 3.5.1 Compost markets

Seven processes did not provide information on compost markets accounting for 11% of the grossed compost production for 2017 (Table 4).

Although agriculture remains the largest market for compost in tonnage terms, there was a significant increase for land restoration with 27% of compost going to this market in 2017 (assigned to 'other' in 2013 and 2014 surveys). The reported increase in compost to land restoration is supported by a known increase in land restoration activities and the demand for material in this market.

Indications are that growing media and turf manufacture markets have shown decline in compost used. Although some unassigned compost may have gone to these markets there is a supporting downward trend from 2013 to 2014 for both these markets.

**Table 4.** Compost tonnages to different markets for 2017 in comparison to estimates for 2013 and 2014.

Market	2017	2014	2013
Agriculture and field horticulture (own land)	34,647	101,000	
			111,000
Agriculture and field horticulture (3 <sup>rd</sup> party land)	49,760		
Growing media	300	2,000	6,000
Landfill restoration (not daily cover)	15,593	22,000	
			13,000
Landfill restoration (daily cover)	-		
Landscaping	27,289	28,000	32,000
Land restoration (e.g.brownfield sites)	60,955	-	-
Turf manufacture	-	3,000	9,000
Bagged product <sup>11</sup>	7,651	-	-
Other <sup>12</sup>	3,206	32,000	28,000
Unassigned	25,524	-	-
<b>Total</b>	<b>224,925</b>		

<sup>11</sup> Bagged (or other 'loose') product which is directly sold by operators to customers

<sup>12</sup> In 2014 this included material for brownfield restoration, bagged compost or topsoil manufacture. In 2017 this was limited to material made available for free collection to the general public

### 3.5.2 Compost economics

The minimum and maximum ex work prices (i.e. excluding costs incurred or charges applied to compost associated with transportation to customers) and total value of compost to different markets are shown (Table 5). The total value calculated by multiplying the mean compost price by the tonnage of compost to each market (Table 4). Where an operator provided a price range for a specific market the average of that range has been used.

Agricultural own land and third party land were combined as although in some cases compost sent to own land had no financial value, in other cases a cost was applied. Further, the min, max and mean of the two agricultural markets separately were very similar. The results show both a reduction in compost tonnage and value to agriculture in 2017. Although, we are aware from one operator that their price to the agricultural market increased in 2018 (i.e. after the survey period) from the min to above the max which would give a mean of £2.40 (higher than that found in 2014).

Of the other markets, landfill restoration shows reduced tonnage but an increased mean price on 2014 (up from £0.25) resulting in a significantly higher market value. The landscaping market remaining the most valuable market for compost based on a combination of quantity and market price, although it is down on 2014 with slightly reduced tonnage and a £3 reduction in mean price per tonne. Bagged product price was the most variable but as might be expected has the ability to command the highest market price. A price for unassigned compost tonnage was calculated from the means of other markets.

The value of compost to all markets was estimated as £657,079 (broken down below) which falls just below the market value in 2013.

**Table 5.** Min and max prices ex works (£/tonne) and value of compost to market.

Market	Min	Max	Mean	Value to market <sup>13</sup>
Agriculture and field horticulture (own land and 3 <sup>rd</sup> party combined)	£0	£3.50	£1.23	£103,821
Growing media			£0	n/d
Landfill restoration (not daily cover)	£0	£4	£2.00	£31,185
Landscaping	£2	£20	£10.33	£281,895
Land restoration (e.g.brownfield sites)			£0	n/d
Bagged product	£2.50	£50	£16.88	£129,149
Other			£0	n/d
Unassigned			£4.35	£111,029
<b>Total</b>				<b>£657,079</b>

<sup>13</sup> Value to market is calculated from the tonnage

### 3.6 Sector and business concerns and opportunities

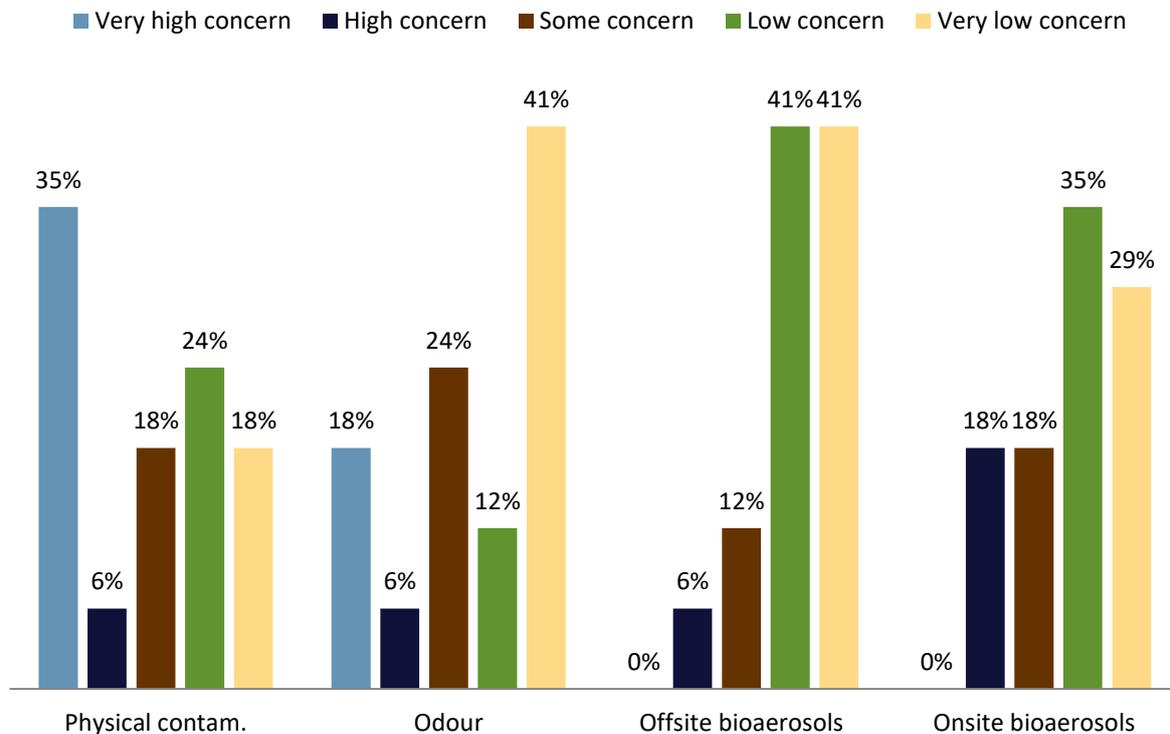
#### 3.6.1 Sector and business concerns

A summary of responses from operators on the specific sector issues of physical contamination, odour and bioaerosols is shown in Figure 6.

Physical contamination of feedstock was clearly the most concerning of the four factors for operators with six identifying it as a very high concern to the sector and/or their specific operation. Of the six, this included four operators accepting domestic and/or commercial food waste in 2017. All six of these operators were PAS100 certified.

Offsite odour was a very high concern for three operators. Location of specific sites is likely to be a key factor in the responses to this question.

For bioaerosols, it should be noted that not all individuals surveyed were familiar with this term and therefore influencing some responses to this concern. From the responses, it was clear operators had greater concern about onsite bioaerosols (i.e. risk to site operators) than bioaerosols offsite.



**Figure 6.** Level of concern of operators on known sector / business concerns expressed as percentage of responding sites (n = 16).

After the targeted sector questions, operators were asked openly about sector/business concerns. Comments were categorised relating to physical contamination, cost of PAS100 certification and other regulatory issues.

##### 3.6.1.1 Physical contaminant limits

Seven operators elaborated on their concern regarding SEPA's changes to the physical contaminant limits. Concern in terms of the ability to achieve new limits and/or the cost incurred into doing so. One

operator felt the contamination of compost feedstock was compounded given cost cutting measures in local authorities, with household collections seen as the most significant source of contamination by the majority of operators.

#### **3.6.1.2 Cost of PAS100**

Two operators commented on costs associated with PAS100. In one case the costs were considered inhibitory to obtaining certified status for low throughput sites. Another operator already PAS100 certified commenting that effort to achieve and maintain PAS100 gave little financial return.

#### **3.6.1.3 Regulatory issues**

Two operators highlighted regulation by SEPA as a major issue and financial burden. For example enforcement process relating to odours were not substantiated but put financial burden on the business.

One individual operator commented on effects of green waste charging on decreasing feedstock tonnage. However, this could have a positive effect in terms of the quality of material.

One operator commented on need to maintain the ability to send material to agriculture through paragraph 7 exemption. If this exemption is taken away or became more stringent operations would no longer be viable for them.

### **3.6.2 Sector and business opportunities**

Operators were also asked what support they felt the sector or their business needed. Responses are grouped and discussed under relevant sections.

#### **3.6.2.1 Capital support**

Five operators (representing both large and small operations) made comments relating to capital support needs to address specific concerns for their business including; developing the treatment area, equipment to clean composting materials (e.g. wind sifter) and, equipment to handle food waste.

One of these operators commented that they would benefit from knowing more about funding support available for projects. Another operator commented that they had applied for funding to support their business confirming that funding was available but that knowledge of accessing funding sources in the sector was variable.

#### **3.6.2.2 Tackling contamination in feedstock**

Comments of tackling contamination were made by four operators Suggestions including adverts, education campaigns, better household education, engagement with local authorities and, direct financial assistance in reducing contamination.

#### **3.6.2.3 Compost market and oversize outlet support**

Four operators commented on a need for support with marketing of composts. For two of these operators this was a general request for help with compost marketing and getting across the benefits of the product. For another operator, however, the concern was related to the specific location of the compost site and the lack of apparent local markets. The fourth operator commented that further engagement with local authorities was needed to increase take back of the produced compost. A fifth operator commented on a need for support with outlets for oversize material.

## 4 Conclusions

The 2017 survey has shown a number of key changes in the Scottish composting sector since 2014 including;

- A reduction in sites/processes (24 sites and 27 process in 2017) and FTEs (112 in 2017)
- A reduction in green only food waste and corresponding increase in comingled green and food waste feedstock
- A significant increase in compost going to land restoration (60,955 tonnes in 2017)

Consistencies with the 2014 survey included:

- High and stable percentage of PAS100 certified processes supported by requirement for local authority contracts (78 % of processes)
- Food waste tonnage to composting remains stable at just over 30,000 tonnes
- The level of contamination in feedstock appears to remain consistent based on operator estimates

The survey has obtained new information on;

- A selection of WMX processes
- Oversize production and fate
- Anaerobic digestion soup production
- Activities pre and post sanitisation to clean feedstocks
- Rejected load numbers
- Tonnage of PAS100 certified and non-PAS 100 compost by grade
- Tonnage of compost to an increased number of defined markets
- Attitudes of operators to specific sector concerns of physical contamination, odours and bioaerosols

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