Organic materials

The last few years has seen the commissioning of several composting and anaerobic digestion plants for organic materials (OM) generated in Quebec, thus diverting these materials from disposal to recycling. This helps all sectors, both the municipal sector and the industrial, commercial and institutional (ICI) sector, which now have new opportunities to exploit organic material and allow this precious resource to go back into the soil.

35% **Overall OM recycling rate in municipal sector**

5% **OM recycling rate in ICI sector** (excluding agri-food industry)

34% **Putrescible OM recycling rate in pulp and paper industry**

97% **OM recycling rate in agri-food processing industries**

Overall profile of recycling and disposal of organic materials

The overall 2018 recycling rate for putrescible organic materials (excluding agri-food sector[1]) is estimated at 27%. In total, all these sectors recycled nearly 1.1 million tonnes, either by composting, anaerobic digestion or landspread, while nearly 2.9 million tonnes of organic materials were disposed.

When accounting data available for the agri-food processing industry, the overall recycling rate would be 44%, i.e., just shy of 2.3 million tonnes. The quantity of organic material generated is slightly under 5.2 million tonnes.

Data in this 2018 Report confirms that organic material recycling has trended upward, but Quebec must continue its efforts to prevent the disposal of these resources.

1 Due to a significant variation in the methodological approaches used to acquire data from the agri-food industry compared to other ICI sectors presented in this report, the agri-food industry is excluded from the overall profile.

Table 1.1

GENERATED AND RECYCLED PUTRESCIBLE ORGANIC MATERIALS IN 2018

(in wet tonnes)

		DISPOSAL			RECYCLING								
TYPE OF ORGANIC MATERIALS BY SECTOR	TOTAL GENERATED	LANDFILL [b]	INCINERATION [c]	TOTAL DISPOSED	ANIMAL FEED AND RENDERING	COMPOSTING [d]	ANAEROBIC DIGESTION [d]	LANDSPREADING	TOTAL RECYCLED	2018 RECYCLING RATE	2015 RECYCLING RATE	2015 QUANTITIES RECYCLED	2015–2018 VARIATION IN RECYCLED QUANTITIES
Organic materials from municipal sector including sludge [a]	**1,937,000**	924,000	338,000	1,262,000	N/A	443,000	21,000	211,000	675,000	35%	29%	687,000	-2%
Sludge and putrescible organic materials from pulp and paper mills	**977,000**	247,000	399,000	646,000	N/A	4,000	N/A	327,000	331,000	34%	34%	367,000	-10%
Organic materials from ICI sector	**1,019,000**	968,000		968,000	N/A	37,000	14,000	N/A	51,000	5%	3%	29,000	76%
TOTAL putrescible organic materials (excluding agri-food wastes)	**3,933,000**	**2,139,000**	**738,000**	**2,877,000**	**N/A**	**484,000**	**35,000**	**538,000**	**1,057,000**	**27%**	**25%**	**1,083,000**	**-2%**
Agri-food sludge and organic materials	**1,249,000**	32,000	8,000	39,000	928,000	15,000	147,000	120,000	1,210,000	97%	97%	1,047,000	16%
TOTAL putrescible organic materials	**5,183,000**	**2,171,000**	**745,000**	**2,916,000**	**928,000**	**499,000**	**182,000**	**658,000**	**2,267,000**	**44%**	**38%**	**2,130,000**	**6%**

a Includes an unknown quantity of ICI organic materials recovered by municipal collection.

b Landfilled quantities for other ICI sectors and agri-food sludge and organic materials are the same as those estimated in 2015.

c In absence of specific criterias for waste-to-energy, incineration is defined as any type of material combustion with or without energy recovery. These quantities exclude waste from primary wood processing currently sent to biomass cogeneration plants.

d Quantities exclude physical contaminants contained in the feedstock.

Municipal sector

Overall, the recycling rate of organic materials[2] in the municipal sector increased between 2015 and 2018 and is at 35%, i.e., an increase of six percent. Although this is notable progress, it is believed that more than 1.2 million tonnes of putrescible organic materials from the municipal sector are disposed annually.

More than 500 municipalities in Quebec, i.e., a little less than half, now partially or fully offer leaf and yard and food waste collection (brown bins).[3] Consequently, the recycling rate of leaf and yard and food waste in the municipal sector (excluding sludge) went up significantly now reaching 31% in 2018. This is almost twice the recycling rate of 17% observed in 2015. This improved performance is due to the total of generated quantity, which is estimated to be lower in 2018 than what was indicated in the 2015 Report, mainly due to a drop in quantities generated by households observed in the most recent *Étude de caractérisation des matières résiduelles du secteur résidentiel*[4] (characterization study on residential waste). This decrease could possibly be explained by source reduction or recycling by residents (such as household composting, grasscycling and leafcycling) and for which the quantities are not accounted. Moreover, this total generated quantity does not take into account organic materials (mainly food waste) generated by small ICI included in municipal collection, a practice that had previously been marginal, but seems to be gaining popularity. The average 2018 rejection rate for all leaf and yard and food waste collected in the municipal sector was 6%.

The recycling rate of municipal sludge declined from 51% to 42%. This diminution is due to, among others, fewer municipalities emptying their sludge ponds and subsequently recycling the sludge, resulting in a drop of 100,000 tonnes[5] recycled between 2015 and 2018. In total, nearly 290,000 tonnes of municipal sludge (treatment plants and septic tanks) had been recycled in 2018, mainly by landspreading directly onto the soil (71%) and composting (2%). Quantities of disposed sludge have decreased, from 78,000 tonnes in 2015 to 66,000 tonnes in 2018 (15% drop), while quantity of incinerated sludge has remained relatively stable during that same period.

2 These organic materials include leaf and yard and food waste as well as municipal sludge (sludge from municipal water treatment plants and septic tanks).

3 Map of municipalities offering organic material collection.

4 Data from the *Caractérisation des matières résiduelles du secteur résidentiel 2015-2017* (2015–2017 characterization study on residential waste) (ÉEQ and RECYC-QUÉBEC, publication pending).

5 Sources: Bilan 2015 du recyclage des matières résiduelles fertilisantes (2015 report on recycling fertilizing residual materials) (MDDELCC, 2016) and the *Bilan 2018 du recyclage des matières résiduelles fertilisantes* (2018 report on recycling fertilizing residual materials) (MELCC, pending publication).

Table 1.2

GENERATED AND RECYCLED ORGANIC MATERIALS FROM MUNICIPALITIES IN 2018

(in wet tonnes)

		DISPOSAL			RECYCLING							
MUNICIPAL ORGANIC MATERIAL	TOTAL GENERATED	LANDFILL	INCINERATION	TOTAL DISPOSED	COMPOSTING	ANAEROBIC DIGESTION	LANDSPREADING	TOTAL RECYCLED	2018 RECYCLING RATE	2015 RECYCLING RATE	2015 RECYCLED QUANTITIES	2015–2018 VARIATION IN RECYCLED QUANTITIES
Municipal leaf and yard and food waste	**1,244,000**	857,000		857,000	360,000	21,000	6,000	387,000	31%	17%	256,000	51%
Municipal sludge [a, b]	**692,000**	66,000	338,000	404,000	83,000	N/A	205,000	288,000	42%	51%	431,000	-33%
TOTAL	**1,936,000**	**923,000**	**338,000**	**1,261,000**	**443,000**	**21,000**	**211,000**	**675,000**	**35%**	**29%**	**687,000**	**-2%**

a In addition to the recycled municipal sludge is another 2,500 tonnes sent to anaerobic digestion plants and for which digestates have been composted or spread on farmland (according to statements from treatment plants in 2018).

b Quantities of spread municipal sludge could be underestimated due to spreading done in Ontario. In 2015, this quantity had been estimated at 26,000 tonnes (source: *Bilan 2015 du recyclage des matières résiduelles fertilisantes* [2015 report on recycling fertilizing residual materials]).

Figure 1.1

DESTINATION OF LEAF AND YARD AND FOOD WASTE IN THE MUNICIPAL SECTOR IN 2018

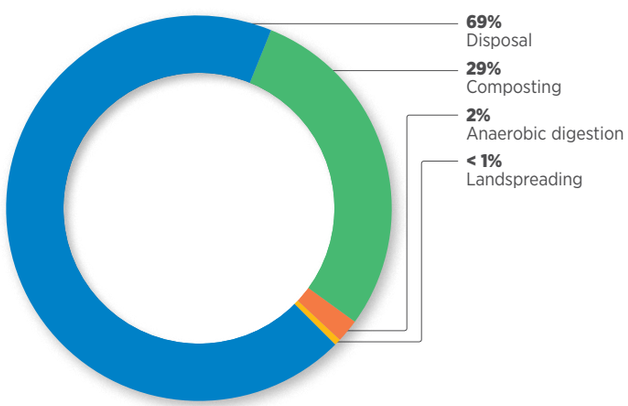
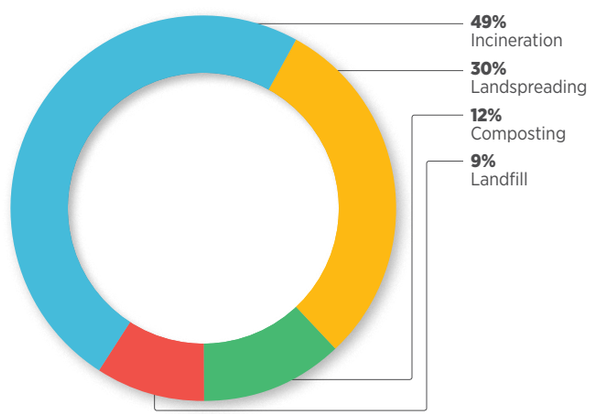


Figure 1.2

DESTINATION OF SLUDGE IN MUNICIPAL SECTOR IN 2018



Industrial, commercial and institutional (ICI) sector

The ICI sector includes activities in the pulp and paper industry, agri-food processing industry and all other ICI sector. Like the municipal sector, the ICI sector contributes a large share of putrescible organic materials generated in Quebec. Aside from the pulp and paper industry, the large variation in the types and quantities of organic materials from this wide-ranging sector makes it more complicated to estimate the quantities of generated and disposed organic materials based on the type of industry. Note that quantities of non-expired food that are redistributed, specifically to food banks, are not taken into consideration and are thus excluded from the overall compilation, as in previous reports.

Industrial, commercial and institutional sector (excluding agri-food and pulp & paper industries)

In total, the recycling rate of putrescible organic materials in the ICI sector (excluding agri-food and pulp and paper industries) was 5% in 2018, i.e., a slight increase of two percent compared to 2015. This rate remains low, especially due to the fact that putrescible organic material collection services in the ICI as grocery stores, restaurants and healthcare facilities, though they are increasing, are still not common. It should be recalled that an unknown quantity of organic material generated by small ICI sector establishments is recovered through municipal collections. Moreover, quantities of oil and grease from the food industry are mainly excluded from this report due to a lack of data. Nevertheless, they are largely recovered due to their calorific properties.

Table 1.3

GENERATED AND RECYCLED ORGANIC MATERIALS FROM ICI SECTOR (EXCLUDING AGRI-FOOD AND PULP AND PAPER INDUSTRIES)

(in wet tonnes)

		DISPOSAL			RECYCLING							
	TOTAL GENERATED	LANDFILL	INCINERATION	TOTAL DISPOSED	COMPOSTING	ANAEROBIC DIGESTION	LANDSPREADING	TOTAL RECYCLED	2018 RECYCLING RATE	2015 RECYCLING RATE	2015 RECYCLED QUANTITIES	2015–2018 VARIATION IN RECYCLED QUANTITIES
Organic materials from ICI sector (excluding wood, agricultural waste, liquid manure and peat moss)	**1,019,000**	968,000		968,000	37,000	14,000	N/A	51,000	5%	3%	29,000	76%

Pulp and paper industry

In 2018, pulp and paper mills[6] in Quebec[7] generated over 2.2 million tonnes, all mill residual materials combined,[8] i.e., a slight 4% increase compared to 2015. Of all this generated waste, 34% was recycled, which is a four percent improvement compared to 2015.

Table 1.4

PULP AND PAPER MILL RESIDUAL MATERIALS

(in wet tonnes)

	TOTAL GENERATED[a]	DISPOSAL			RECYCLING[c]	RECYCLING RATE
		ENGINEERED LANDFILL	LANDFILL (MILL SITE)	COMBUSTION[b]		
2015 pulp and paper mill residual materials	**2,113,000**	35,000	486,000	952,000	640,000	30%
2018 pulp and paper mill residual materials	**2,207,000**	64,000	474,000	914,000	756,000	34%
Variance (tonnes/year)	**94,000**	29,000	-12,000	-38,000	116,000	–
Variance (%)	**4%**	83%	-2%	-4%	18%	–

a All mill residual materials combined (putrescible and non-putrescible organic materials and inorganic residual materials). Total generated quantities exclude materials used as daily cover in landfills.

b Mill residual material combustion activities used to produce the energy required for processes (reference: *Bilan annuel de conformité environnementale du secteur des pâtes et papiers 2012* [2012 annual report on the pulp and paper industry's environmental compliance] – MELCC). *The Regulation respecting pulp and paper mills* refers to the terms "combustion of mill residual materials" rather than the term incineration, which is used in the *Regulation respecting the landfilling and incineration of residual materials* and to which paper manufacturers are not subject.

c Recycling activities, as reported by pulp and paper mills, basically include composting, valorization (for agriculture, forestry and other purposes) and site remediation.

6 According to 2018 statements from the pulp and paper industry (MELCC, not published), there were 36 pulp and paper mills in operation in 2018, a decrease compared to 2015, when there were 41 manufacturers.

7 Pulp and paper mills in Quebec are subject to the *Regulation respecting pulp and paper mills* and must comply with certain specific requirements for processing their wastes. Consequently, many of them are using their own disposal sites or combustion plants to manage their wastes.

8 "Mill residual materials" means bark, wood residue, pulp, paper and paperboard discards, ash from a combustion facility, sludge from process water treatment, de-inking sludge, lime sludge, green liquor dregs, residues from lime slaking and any other residue from the pulp or paper product manufacturing process that is not a hazardous material within the meaning of section 1 of the Environment Quality Act (RSQ, c. Q-2).

However, in accordance with the government's recovery objective set for organic materials, only putrescible organic waste is used to calculate the recycling rates of organic materials in this industry. Therefore, approximately 331,000 tonnes of such material was recycled over a total of slightly above 977,000 tonnes generated, which means 34% was recycled as in 2015.

Table 1.5

GENERATED AND RECYCLED PUTRESCIBLE ORGANIC MATERIALS IN THE PULP AND PAPER INDUSTRY IN 2018

(in wet tonnes)

		DISPOSAL			RECYCLING							
	TOTAL GENERATED	LANDFILL	INCINERATION	TOTAL DISPOSED	COMPOSTING	ANAEROBIC DIGESTION	LANDSPREADING	TOTAL RECYCLED	2018 RECYCLING RATE	2015 RECYCLING RATE	2015 RECYCLED QUANTITIES	2015–2018 VARIATION IN RECYCLED QUANTITIES
Sludge and putrescible organic material from pulp and paper mills[a]	**977,000**	247,000	399,000	646,000	4,000	N/A	327,000	331,000	34%	34%	367,000	-10%

a Only putrescible organic material from the pulp and paper industry is used to calculate generated waste and the recycling rate of putrescible organic materials. Total generated quantities exclude materials used as daily cover in landfills.

Figure 1.3

DESTINATION OF PUTRESCIBLE ORGANIC MATERIALS GENERATED BY PULP AND PAPER MILLS

(in wet tonnes)

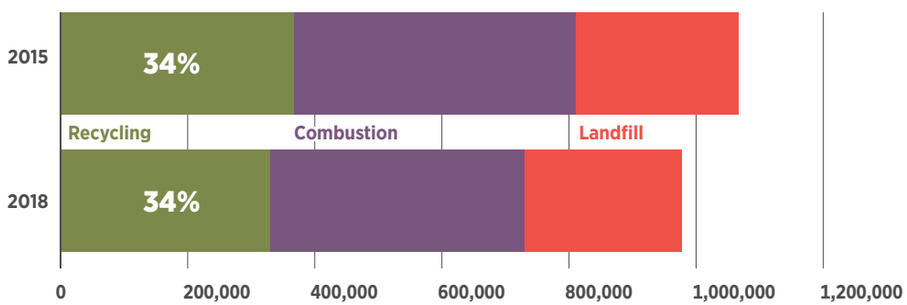


Table 1.6

GENERATED AND RECYCLED ORGANIC MATERIALS FROM THE AGRI-FOOD INDUSTRY IN 2018

(in wet tonnes)

		DISPOSAL			RECYCLING								
	TOTAL GENERATED	LANDFILL [a]	INCINERATION	TOTAL DISPOSED	ANIMAL FEED AND RENDERING	COMPOSTING	ANAEROBIC DIGESTION	LANDSPREADING	TOTAL RECYCLED	2018 RECYCLING RATE	2015 RECYCLING RATE	2015 RECYCLED QUANTITIES	2015–2018 VARIATION IN RECYCLED QUANTITIES
Agri-food sludge and organic materials	**1,249,000**	32,000	8,000	40,000	928,000	15,000	147,000	120,000	1,210,000	97%	97%	1,014,000	19%

a Landfilled quantities are the same as those estimated in the 2015 Report since no recent data is available.

Some data for this industry come from an exhaustive study [9] conducted in 2013 on behalf of the Ministry of the Environment and the Fight against Climate Change (MELCC), on evaluating residual materials from agri-food in Quebec. This study evaluated that some 928,000 tonnes of organic materials were sent to animal feed and rendering, 32,000 tonnes to landfill and 8,000 tonnes were incinerated. Data from that study was incorporated in the 2018 Report, i.e., data from the investigation on organic material treatment sites and the *Bilan 2018 du recyclage des matières résiduelles fertilisantes* (2018 report on recycling fertilizing residual materials) (MELCC, publication pending).

For 2018, 282,000 tonnes of putrescible organic materials from the agri-food industry were recycled by composting, anaerobic digestion and landspread, an increase of over 300% compared to 2015 (87,000 tonnes). In total, more than 1.2 million tonnes of putrescible organic materials were recycled in 2018.

9 *Portrait du gisement de résidus organiques de l'industrie agroalimentaire au Québec et estimation des aliments consommables gérés comme de résidus par les ICI de la filière de l'alimentation* (Solinov, 2013).

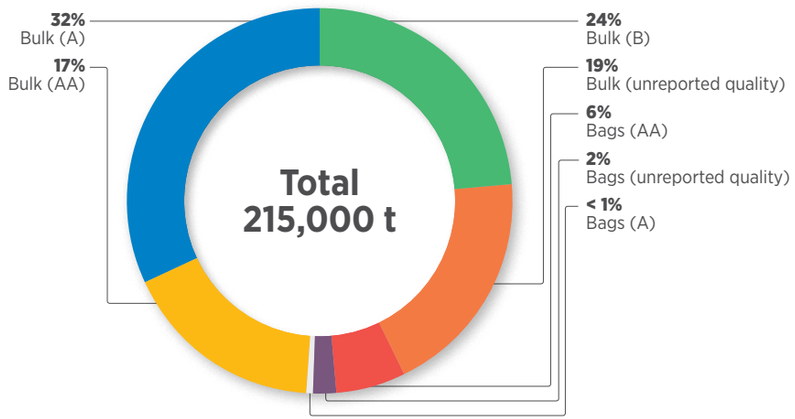
Quality and markets for composts and digestates

In 2018, the quantity of compost produced and put on the market is estimated at 215,000 tonnes, including 200,000 tonnes sold in bulk and 15,000 tonnes that were bagged and then sold or distributed. According to reports made by composting sites, composts of a quality meeting category AA and A requirements of the compost quality standard (CAN/BNQ 413-200/2016) represent 55% of all composts produced,[10] while 24% of composts meet the requirements for category B. The quality level was not identified for 21% of composts in the compost site reports.

Digestates generated in 2018 account for an estimated 18,000 tonnes, including 88% that were spread on farmland and 12% composted.

Figure 1.4

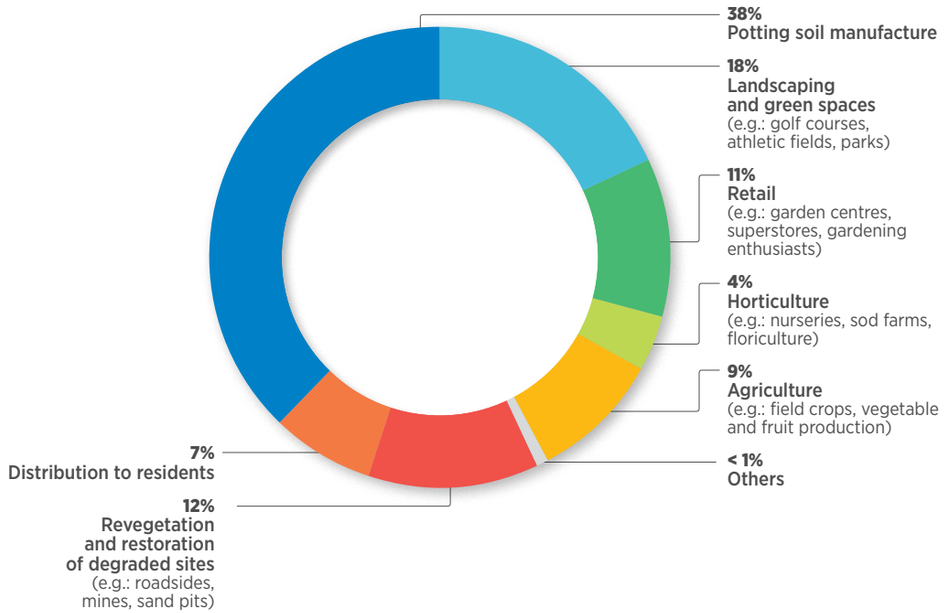
COMPOSTS PRODUCED IN QUEBEC IN 2018 BASED ON QUALITY CATEGORY *



* Quality reports based on requirements of BNQ 0413-200/2016 standard

Figure 1.5

MARKETS FOR COMPOST PRODUCED IN QUEBEC IN 2018



10 Note that standard CAN/BNQ 0413-200 was revised in 2016, making the comparison to previous years difficult, as some standard criteria have changed between 2015 and 2018.