EXECUTIVE SUMMARY

2006-2007 Characterization Study on Household Waste in Québec

RECYC-QUÉBEC and Éco Entreprises Québec, in cooperation with Dessau and NI Environnement

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Québec

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Table of contents

LIST OF CHARTS

LIST OF TABLES

Note to the reader

This document is a translation of the executive summary of the study entitled *Caractérisation des matières résiduelles du secteur résidentiel au Québec 2006-2007* (2006-2007 characterization study on household waste in Québec). The findings and a complete description of the methodology used are presented in the project report (in French), available on RECYC-QUÉBEC's website at www.RECYC-QUEBEC.gouv.qc.ca, as well as on Éco Entreprises Québec's website at www.ecoentreprises.qc.ca.

Additional analyses will eventually be made of the data collected in this study. Those findings will also be available on RECYC-QUÉBEC's website.

The information provided in this document was derived from data on waste materials collected from a sampling of homes participating in municipal curbside recycling programs in several regions of Québec. The characterization of waste will serve as a reference for the *Bilan de la gestion des matières résiduelles au Québec* (assessment of waste management in Québec) to determine the size of the municipal sector as compared to that of industries, businesses and institutions, as well as to proportionately distribute waste generation among those sectors.

The *Bilan* is based on an extensive investigation of declarations submitted by disposal site managers (landfills and incineration) and companies that reclaim waste materials (salvagers and shredding, composting, sorting, and recycling centers). Consequently, the reader should consult the Bilan for information on Québec's performance and progress towards achieving the goals set out in the *Politique québécoise de gestion des matières résiduelles 1998-2008 (Québec Residual Materials Management Policy, 1998-2008).*

What is a waste characterization study?

Almost all household waste is recoverable. It is therefore useful to know what types of materials make up that waste, and in what quantities, to then develop strategies to recover and recycle as many materials as possible. This can be done by conducting a waste characterization study.

The objective of this type of study is to identify exact quantities of waste produced in each category and generated from one or several specific sources: businesses, organizations (government departments, NGOs, etc.), public buildings (arenas, schools, etc.) or private homes, as is the case in this study.

Characterization reveals, among other things, how the waste will be dealt with: recycled, composted or eliminated. From this information, it is also possible to evaluate recycling and recovery rates of those materials. ⁘

Why is a new characterization study required?

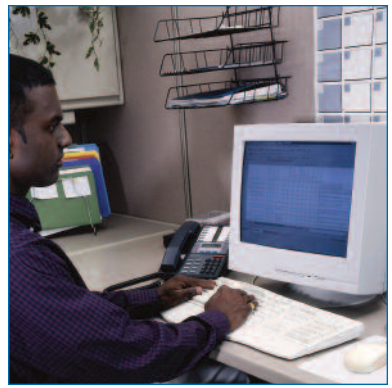
The last characterization study was conducted in 1999-2000[1]. The situation has since evolved due to changes in consumer behaviour and advances in environmental awareness, among other reasons. A new characterization study was therefore required to update available data. Éco Entreprises Québec and RECYC-QUÉBEC mandated Dessau and NI Environnement to conduct the study. ⁘

1. Conducted by Chamard-CRIQ-Roche (CCR).

Main steps involved in the characterization study

Details of the methodology used can be found in the study report. Let's just say here that the characterization followed standardized procedures that included the following steps:

1. Random selection of addresses, in this case a sample of some 8,000 addresses including all types of buildings, in both rural and urban areas[2]
2. Sampling of waste materials put out for pick up
3. Transportation of the materials to a work platform
4. Preliminary sorting of materials into nine general categories, which were then subdivided into 68 subcategories
5. Weighing of the materials
6. Transportation of the materials to recovery and recycling installations or, as a last resort, to disposal sites
7. Compilation, validation and analysis of results.



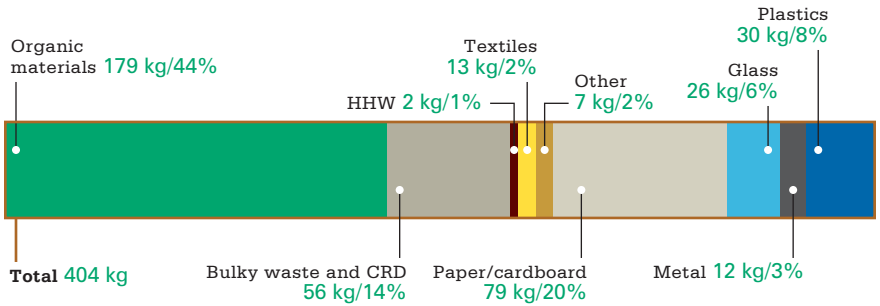
2. A telephone survey of sampled homes was also conducted to gather their socio-economic data

Generation of household waste in Québec

Chart 1 shows the typical composition of waste generated per person, independently of its final destination.

CHART 1

Composition of all household waste (kg/person/year)



As shown in Chart 1, each Quebecer generates an average 404 kg of waste each year. Organic waste constitutes, by far, the greatest part of that total, with 179 kg per person (i.e. 44%). In second place comes paper/cardboard at a rate of 79 kg per person. Bulky waste and construction waste, as well as plastics, follow with 56 kg and 30 kg per person, respectively. Metal accounts for only 12 kg per person per year.

Different materials, different destinations

Household waste is sent to different locations according to its nature, as will be seen in this report, including:

- Trash collection, which is still the most common in Québec (278 kg/person/year)
- Curbside or recyclables collection, available to 96% of Québec's population (69 kg/person/year)
- Organic waste collection, an emerging option for green waste (branches, grass and leaves) and still at an embryonic stage for table scraps (15 kg/person/year)
- Deposit-return system for non-refillable beer and soft drink containers, which recovers millions of drink containers annually (6 kg/person/year)
- Household hazardous waste, or HHW, (paints, used oils, batte-ries, medication, etc.), are generally sent for recycling to companies that resell the products, mostly Éco-peinture and Société de gestion des huiles usages (SOGHU) (1 kg/person/year);
- Bulky waste (furniture, major appliances, etc.) recovered by iron dealers, waste sorting and recovery dealers or thrift stores (32 kg/person/year)
- Textiles, recovered by thrift stores, waste sorting and recovery dealers and second-hand clothing stores (3 kg/person/year)

Data on trash collection and recyclable waste was developed in this characterization, while other required data was taken from the *Bilan 2006 de la gestion des matières résiduelles au Québec.*

Comparison between Québec and the rest of Canada

Table 1 shows quantities of household waste generated annually per person in Canadian provinces with the exception of HHW and returnable drink containers. This data and the Canadian average were taken from the *2004 Waste Management Industry Survey: Business and Government Sectors*[3] while population data for each province came from Statistics Canada. Data on Québec was taken from the same document for 2002 and 2004 but data for 2006 was gathered by this study.

TABLE 1

Quantities of household waste generated per province (kg/person/year)[4]

Province	2002	2004	Estimate 2006[5]
Newfoundland and Labrador	466	N/D*	N/D
Prince Edward Island	N/D	N/D	N/D
Nova Scotia	313	348	388
New-Brunswick	347	359	370
Ontario	369	405	445
Manitoba	426	454	483
Saskatchewan	319	354	393
Alberta	381	407	436
British Columbia	346	383	423
Canada (excluding Québec and territories)	365	387	411
Québec	**466**	**477**	**397**[6]

* N/D: data not available.

3. *Waste Management Industry Survey: Business and Government Sector, Statistics Canada, 2007, pages 20 and 21.*
4. Data excludes HHW and returnable containers.
5. The estimate for 2006 was derived by determining the percentage change observed between 2002 and 2004 and applying it to 2004 data.
6. Estimate after returnable containers (6 kg) and HHW (1 kg) was deducted from the total of 404 kg mentioned previously.

Waste generated in Québec, estimated at 397 kg per person[7] in 2006, is below the estimated Canadian average of 411 kg per person for the same year. However, more up-to-date data on waste generation in other provinces will be needed to establish a definitive comparison of actual quantities generated.

Moreover, a marked reduction of waste generated in Québec between 2004 and 2006 has been observed. That is explained by the fact that data on household waste used by Statistics Canada was taken from the *Bilan 2004 de la gestion des matières résiduelles au Québec,* which was itself based on a 1999-2000 characterization study conducted by Chamard-CRIQ-Roche, which studied a smaller sample of homes. That study may have overestimated the quantity of household waste generated.

This new characterization study is based on a wider sample than the 2000 Québec study as well as on a profile of building types found in Québec. The significant variations observed between the two studies can be explained by an improved methodology applied to the 2006 study, details of which are fully explained in the project report. Once revised, household waste generation per person in Québec is noticeably below the estimated Canadian average for 2006.

Moreover, we cannot totally exclude the possibility that some reduction at source has taken place to explain the lower generation of waste. Over the past years, a good number of companies have abandoned the use of glass containers and opted for lighter materials such as plastic and multilayered containers. It is also probable that the many awareness campaigns conducted over the years have had a positive effect on the practices and behaviour of businesses and consumers to reduce at source, as the recent popularity of reusable shopping bags shows.

Table 2 shows the composition of residual materials according to various studies conducted in Québec, Ontario and all of Canada. The results appear similar, particularly for categories of materials generally included in curbside recycling programs, i.e. paper/cardboard, glass, metal and plastic.

7. Estimate after returnable containers (6 kg) and HHW (1 kg) are deducted from the total of 404 kg mentioned previously.

TABLE 2

Comparison of the composition of household waste generated according to various studies

Category	Québec CCR Characterization[8] 2000	Canada 2002[9]	Ontario 2004[10]	Québec Characterization 2006-2007
Paper/cardboard	26%	26%	24%	20%
Glass	7%	3%	5%	6%
Metal	4%	4%	3%	3%
Plastic	7%	9%	4%	8%
Organic waste	43%	40%	38%	44%
Other	13%	18%	26%	19%

With regard to organic waste and other materials, the notable differences can be generally explained by variations in category definitions. For example, Ontario's study places sanitary fibres in the "Other" category, while other studies put them in the "Organic Waste" category.

Based on this data, percentages in each category remain relatively constant according to location, i.e. Ontario, Québec and Canada, as well as over time when comparing the two Québec studies. ⁘

8. *Caractérisation des matières résiduelles au Québec, Chamard-CRIQ-Roche (CCR), page 64. 2000. Quantities (35.2 kg) have been added to this composition for single-use returnable containers, HHW, textiles and large appliances.*

9. *L'activité humaine et l'environnement, statistique 2005. Les déchets solides au Canada, Statistique Canada, p. 3, 2005. Report available in English under the title: Human Activity and the Environment*

10. *Ontario's 60% Waste Diversion Goal, A discussion paper, page 4, 2004.*

Overview of waste disposal

Every year, each Quebecer sends an average of 278 kg of waste to trash collection. Chart 2 shows a detailed composition of that waste, of which 95% could be recycled or composted.

Organic waste represents 59% of the total while it could otherwise be recovered through the development of appropriate municipal curbside collection programs.

Recyclable materials constitute 27% of trash collected. Now that curbside recycling programs are available to almost all (96%) Québec homes, communities are increasingly committed to the environmental cause and consumer habits will likely change to considerably reduce the amount of recyclable materials that are now being sent for disposal.

Bulky waste and CRD debris (residential construction, renovation and demolition waste) account for 8% of the total. These can be recovered through various services such as special municipal collections, eco-centres, etc.

With regard to HHW (household hazardous waste), two systems have been developed in Québec in the years following the adoption of legislation on the issue, i.e. the Société de gestion des huiles usagées (SOGHU) which is responsible for recovery of used oils, oil containers and filters, and Éco-peinture, which coordinates the recovery of used paints and paint cans.

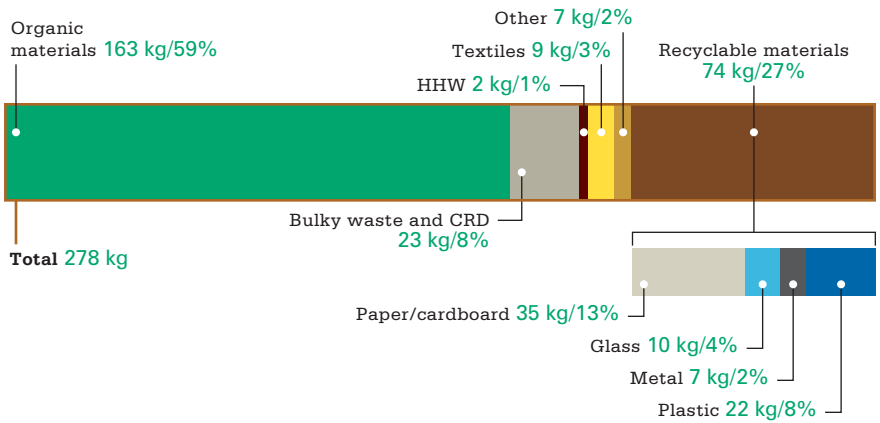
As for textiles, which account for 3% of the total, they can find a new life through second-hand clothing stores, waste sorting and recovery dealers and thrift stores, or recycled into other products (padding material, acoustic screens, rags, etc.).

Finally, the "Other" category (only 2%) is more difficult to define because it contains waste that is often composed of several materials, making their recovery and recycling difficult. Examples are skates, bicycle helmets, disposable razors, and some baby articles.

Recycling: In clear progress

CHART 2

Composition of household waste sent to trash (kg/person/year)



A noteworthy comment is that Quebecers have contributed, for the first time in 2006, to the recovery of over half of their recyclable materials through curbside programs. This characterization reveals that they put in their recycling bins 52%[11] of potentially recyclable materials, which is an encouraging sign. Once data from the *Bilan 2004*[12] is revised, recovery rates of designated materials in curbside programs come to 42%[13], an increase of 10% between 2004 and 2006.

Chart 3 shows the composition of recyclable materials recovered through curbside programs. Total generation amounts to 69 kg per person per year, including 65% paper/cardboard and 19% glass, while plastic and metal account for 10% and 4% of that total, respectively. Other materials placed in recycling bins, considered as contaminants, amount to 2% and are composed of organic waste, bulky waste and CRD, textiles, etc.

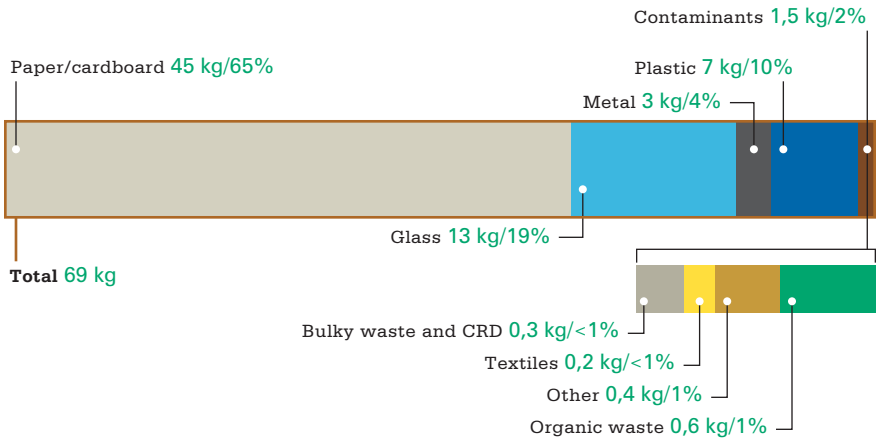
11. It is important to note that materials rejected by sorting centres have not been deducted from quantities used to establish the recycling rate. Only contaminants have been deducted. Contaminants are defined as materials that are not accepted for curbside recycling (organic waste, textiles, HHW, plate glass, ceramics, etc.).

12. The *Bilan de la gestion des matières résiduelles au Québec* is produced by RECYC-QUÉBEC every two years. The *Bilan* presents statistics on the generation and recycling of waste from the municipal (household), industrial, commercial and institutional (ICI) sectors, as well as that for construction, renovation and demolition (CRD). Recovery rates are expressed according to the potential to recycle the waste. The distribution of waste disposal attributable to the ICI sector and to the municipal (household) sector used in *the Bilan 2004* was based on the 1999-2000 characterization study. This 2006 characterization study will update that distribution.

13. This recycling rate has been calculated by revising data contained in the *Bilan 2004* with generation data gathered in the 2006-2007 characterization study.

CHART 3

Composition of recyclable household waste (kg/person/year)



Study data extrapolated to cover all of Québec's population[14] shows that 514,000 tons of recyclable waste was collected through curbside recycling programs in 2006. Of that quantity, organic waste, bulky waste, CRD, textiles and other materials that should not be found in recycling bins (contamination) represent about 12,000 tons. Part of the paper/cardboard, glass, metal and plastic (such as plate glass, ceramics, plastic pens, etc.), amounting to 16,000 tons, also constitute waste that is not accepted by sorting centres. In total, non-accepted waste placed in recycling bins amounts to 28,000 tons, or about 5%.

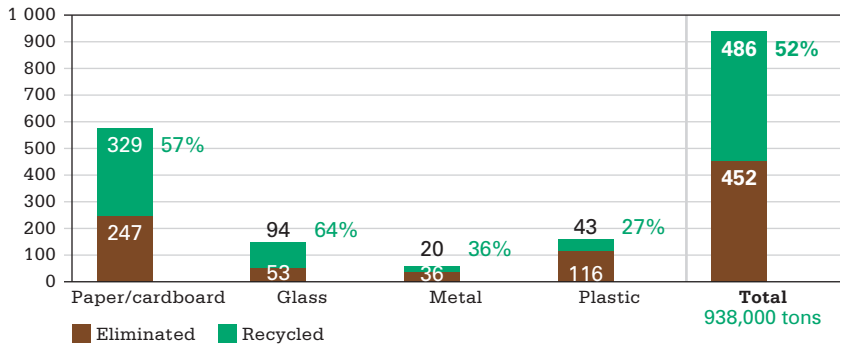
When the 28,000 tons of non-accepted waste is subtracted from the 514,000 tons collected, we end up with 486,000 tons, out of a potential of 938,000 tons, of recyclable waste that is collected from Québec homes through curbside recycling in 2006. This estimate is represented on Chart 4. We can also see that paper/cardboard is the category of waste that is most recovered in terms of volume, with 329,000 tons and a recovery rate of 57%. Then comes glass with 94,000 tons and the highest recovery rate (64%). Metal and plastics follow with 20,000 and 43,000 tons, respectively, and corresponding recovery rates of 36% and 27%.

14. Québec's population living in private homes is 7,400,567.

At the top of the list: glass, paper/cardboard and drink containers

CHART 4

Waste collected through curbside recycling, quantities eliminated and recovered (in million tons and %)



A number of factors can explain the significant progress in curbside recycling performance over the past few years. The generalization of door-to-door curbside recycling throughout Québec and the gradual extension of service to apartment buildings are factors to be considered. Gradual implementation of roll-out containers in a number of municipalities has provided opportunities to recover more waste per household. It is also likely that recovery is becoming a daily habit for residents.

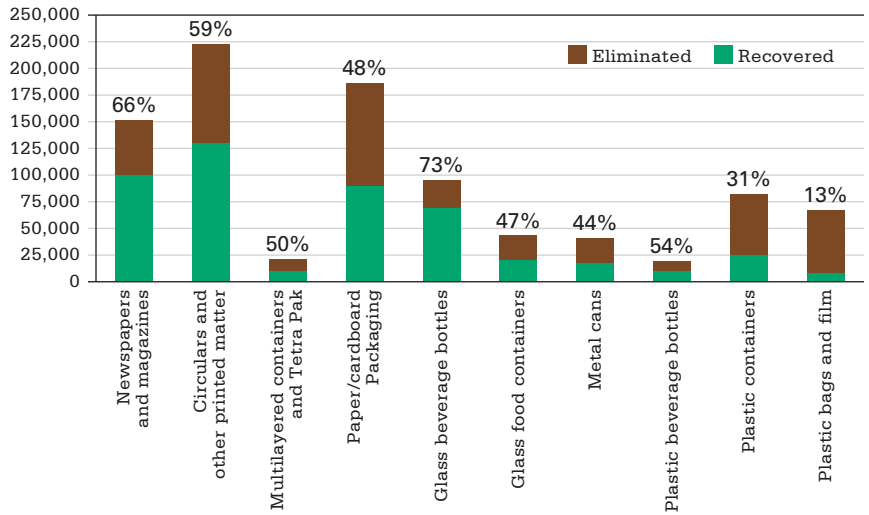
As previously mentioned, some categories of recyclable materials are more likely to be placed in recycling bins, including glass, at the top of the list with a 64% recovery rate. In second place is the large category of paper/cardboard, with a 57% recovery rate. This situation confirms that residents clearly associate these materials with curbside recycling programs.

Though metal and plastics recovery has progressed, they are still well behind the two first categories, showing respective recovery rates of 36% and 27%.

As Chart 5 shows, recovery rates vary greatly according to the various uses of the materials. At home, for example, Quebecers have developed the reflex of recovering their drink containers. Considering all categories together, bottles used for water, juice, milk, wine and other drinks have a 67% recovery rate. Note that returnable containers are not included in this rate.

CHART 5

Recovery rates of various products according to their use (tons and %)



Glass beverage bottles have the best recovery rate at 73%. Plastic beverage bottles follow at 54%. Finally, despite their having been included in curbside recycling programs only very recently, multi-layered drink containers like one-litre milk and juice boxes are now recovered at a rate of 50%.

Residents appear to clearly associate wine and liquor bottles with curbside recycling. Indeed, 74% of these containers are placed in recycling bins. The same is true for water bottles, with a 57% curbside recovery rate.

Desirable improvements regarding some materials

Recovery rates are significantly different depending on whether or not drink containers are returnable. As mentioned above, non-returnable drink containers have a 67% recovery rate. Of those returnable drink containers not returned to the retailer and placed at the curb, 41% are put in recycling bins while 59% are thrown in the trash. From an environmental point of view, curbside recycling is as good as returning the containers to the retailer.

As for containers other than for beverages (glass, metal or plastic food containers), the recovery rate is 44%. Once rinsed (to avoid nuisances such as insects, odours, etc.), these containers are indeed materials accepted by sorting centres and recyclers. However, the effort required by residents to wash their containers appears to be an obstacle to the recovery of these materials.

Some other categories of materials are also at the bottom of the list with a 13% recovery rate, including plastic bags (shopping bags, bread and milk bags, frozen fries and vegetable bags, dry cleaning plastic, bags for soil or fertilizer, etc.). Note, however, that these items represent less than 2% of all household waste.

Residents' participation

The study also revealed the rate of participation in curbside recycling programs among residents living at some 1,200 addresses and in green waste collection15 (around 300 addresses) over a period of one month. It shows that 79% of homes studied participate at least once a month in recycling programs where these are offered. A significant gap appears between communities, with participation rates ranging between 53% and 97% in 15 communities assessed. The participation in green waste collection is 22%, on average, where a recovery service is offered.

15. With regard to table scrap collection, since this service is offered by only a very few municipalities and often as a pilot project, we felt that assessing this aspect of resident participation was not pertinent at this time.

Availability of services — a determining factor

The conditions under which collection services are offered by municipalities have an impact on recovery rates. The type of container used as well as collection frequency are important parameters. The following table shows frequency of collection as at the time the sample was taken.

TABLE 3

Frequency of collection as at the time of sampling

Trash collection	Distribution (%)
Once a week	60%
Twice or more a week	23%
Every other week or more	17%
Recyclables collection	**Distribution (%)**
Once a week	53%
Every other week or more	43%
No collection	4%
Green waste collection	**Distribution (%)**
No collection	92%
Once a week	6%
Every other week or more	2%
Compostables waste collection	**Distribution (%)**
No collection	99%
Once a week	1%

Trash collection is offered to all households (100%) at least once a week in 60% of cases, and twice or more a week in 23% of cases. For 17% of homes, the collection takes place every other week or more.

On the other hand, recyclables collection (curbside recycling) is available to a total of 96% of homes sampled, at a rate of once a week for 53% of them or every other week or more for 43% of homes. However, no recycling programs are available in 4% of homes, which consist mainly of secondary homes and apartment buildings.

Green waste collection is available to 8% of homes sampled, at a rate of once a week (6%) or every other week or more (2%). Compostable waste collection (table scraps) is only available to 1% of sampled homes. Given the little information recorded in this regard, findings cannot be considered representative of the province-wide situation.

Table 4 shows the distribution of homes according to the types of containers used for collecting recyclables and trash. The most common type used is the 360-L roll-out bin for both trash collection (38%) and recyclables (46%).

Urban and rural: two performance profiles

Characterization allows us to break down the factors that influence the generation and composition of waste. People's occupation and their consumption habits, for example, will differ according to their environment, which has an impact on the types and quantities of residual materials generated according to the community.

TABLE 4

Types of containers used for collections during sampling

Trash collection	Distribution (%)
240 L roll-out bin	6%
360 L roll-out bin	38%
Container	8%
Bag	27%
Choice [16]	22%
Recyclables collection	**Distribution (%)**
44 L bin	2%
64 L bin	39%
240 L roll-out bin	5%
360 L roll-out bin	46%
Bag	3%
Choice	2%
No collection	4%
Green waste collection	**Distribution (%)**
Bag	8%
No collection	92%
Compostables waste collection	**Distribution (%)**
360 L roll-out bin	1%
No collection	99%

TABLE 5

Quantities of waste recovered, eliminated and generated in urban and rural areas (kg/person/year)

Location	Recovered	Eliminated	Generated
Rural	121	254	374
Urban	123	292	415

The study shows the differences between total quantities generated by city dwellers and rural inhabitants (Table 5). In an urban setting, total generation is 415 kg per person per year comparatively to 374 kg generated in a rural setting, i.e. 10% less. On the other hand, the composition of waste generated is practically the same on a percentage basis (Table 6). The main differences between the two types of location are lower rates in the generation of paper/cardboard (19 kg/person/year less) and organic waste (18 kg/person/year less) in rural areas. The lower number of daily newspapers available outside large urban centres as well as more wood burning stoves

16. On a same collection route, the choice of container is left to the discretion of residents. Generally, bags and variable size trash containers are used.

and fireplaces in rural areas could explain the difference with regard to paper/cardboard. As for organic waste, we can hypothesize that green waste (branches, grass, leaves, horticultural and garden waste) are more likely to be left on site in a rural setting than is the case in the city.

TABLE 6

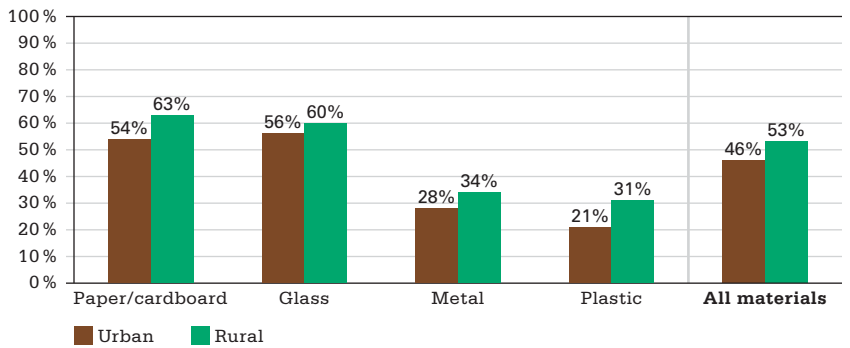
Waste generation in urban and rural areas by category of material (kg/person/year)

Category of material	Rural area		Urban area	
	Kg	%	Kg	%
Paper/cardboard	66.2	18%	84.6	20%
Glass	23.7	6%	26.5	7%
Metal	12.6	3%	11.6	3%
Plastic	29.2	8%	30.6	7%
Organic waste	167.6	45%	182.9	44%
Bulky waste and CRD	51.8	14%	57.2	14%
HHW	2.6	< 1%	2.3	< 1%
Textiles	12.6	3%	12.7	3%
Other	8.2	2%	6.8	2%
Total	374.0	100%	415.0	100%

Even though the composition of materials is quite similar, Chart 6 shows that recovery rates differ according to area, with country dwellers generally having higher recovery rates overall. The difference may be attributable to the higher proportion of single-family homes in rural areas, where organizing collection programs is easier than for apartment buildings and multiplexes. In addition, the roll-out bin was first generally implemented in rural areas, which resulted in a greater quantity of materials being recovered. ::

CHART 6

Recovery rates of designated materials through curbside programs according to area



Variations according to type of housing

Regardless of the area, the type of housing is another parameter that influences waste generation and recovery rates. Table 7 clearly demonstrates this factor by showing results in three separate categories: single-family homes, multiplex buildings (building with 2 to 9 apartments) and large apartment buildings.

TABLE 7

Quantities of waste recovered, eliminated and generated according to housing type (kg/person/year)

Type of housing	Recovered	Eliminated	Generated
Single-family home	135	294	429
Multiplex	110	285	395
Large apartment bldg.	96	247	343

The type of housing has a significant influence on waste generation. People who live in multiplexes generate 52 kg more than people who live in large apartment buildings. Similarly, those who live in single-family homes generate, on average, 34 kg more than those living in multiplexes and 86 kg more than those living in large apartment buildings.

Such differences can be explained by the fact that more densely populated areas have less space for lawns, trees, and gardens, which are sources of much organic waste. The generation of CRDs is also greater in single-family homes than in large apartment buildings.

TABLE 8

Waste generation according to housing type and category of materials (kg/person/year)

Category of material	Single-family home		Multiplex		Apt. building	
	Kg	%	Kg	%	Kg	%
Paper/cardboard	86	20%	81	21%	74	21%
Glass	27	6%	24	6%	26	8%
Metal	12	3%	13	3%	11	3%
Plastic	31	7%	30	8%	30	9%
Organic waste	198	46%	146	37%	137	40%
Bulky waste and CRD	53	12%	80	20%	40	12%
HHW	3	1%	3	1%	2	0%
Textiles	12	3%	12	3%	14	4%
Other	7	2%	7	2%	9	3%
Total	**429**	**100%**	**395**	**100%**	**343**	**100%**

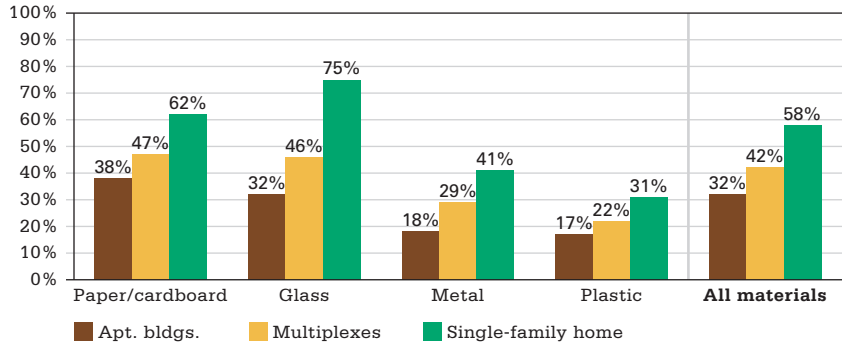
As can be seen in Table 8, each Quebecer generates practically the same quantity of glass (between 6% and 8%), metal (3%) and plastic (between 7% and 9%), no matter the type of housing occupied. The same can be said about HHW, textiles and other materials.

A significant difference is observed in the weight of paper/cardboard (between 74 kg and 86 kg), organic waste (between 137 kg and 198 kg), as well as bulky waste and CRD (between 40 kg and 80 kg). Organic waste, particularly green waste, explains most of the gap between the different types of housing. Single-family homes indeed generate greater quantities in this category, i.e. 198 kg as compared to 146 kg and 137 kg for multiplexes and apartment buildings, respectively. As for the greater quantities of bulky waste and CRD in multiplex housing, this characterization study cannot provide any plausible explanation for these findings.

Chart 7 shows that curbside recycling rates of designated materials also vary according to housing type.

CHART 7

Curbside recycling rates of designated materials according to housing type



We also noted an inverse relationship between the number of units in a building and curbside recycling rates of designated materials : the greater the number of units in a building, the lower the recovery rate.

Indeed, while the recovery rate for paper/cardboard is 38% in apartment buildings, it is 62% in single-family homes. In the case of glass, the rates are 32% vs. 75%. For metal, it is 18% vs. 41%. For plastic, it is 17% vs. 31%. In general, the percentage of materials recovery performance doubles when comparing apartment buildings to single-family homes.

It can therefore be said that better performance in curbside recycling will depend among other things on improving services to people living in multiplexes and apartment buildings.

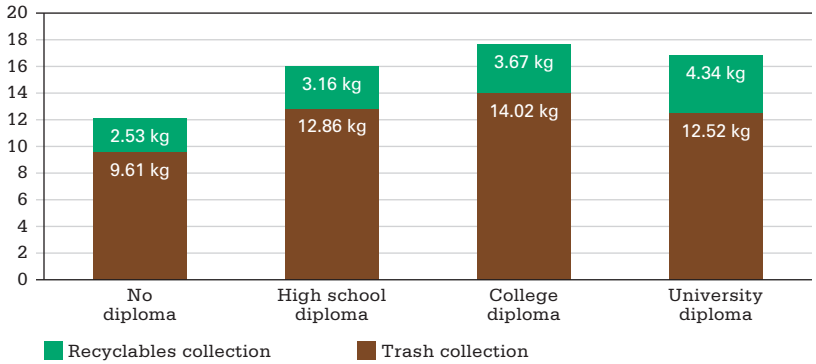
Income and education levels make a difference

In a similar way as the types of housing and environment (rural or urban) influence performance, income and education levels play a part in waste generation and recovery rates.

Chart 8 shows that, generally speaking, waste generation increases according to level of education, except for homes where the highest diploma reached is university. In that case, there is indeed a slight drop in the quantity of trash collected as well as an increase in the quantity of curbside recycling.

CHART 8

Effect of education level on the generation of waste materials in the home (kg/home/week)



A similar trend can be observed with regard to the level of education and recycling rates, as can be seen in Chart 9. The recovery rate is higher in homes with a university diploma, i.e. 53%, compared to 49% of those with a college diploma and 45% in homes with no diploma or where a high school diploma is the highest reached.[17]

17. Homes in which residents had no diploma and those with a high school diploma were considered together since there was no significant difference between them with regard to performance.

CHART 9

Effect of education level on recovery rates

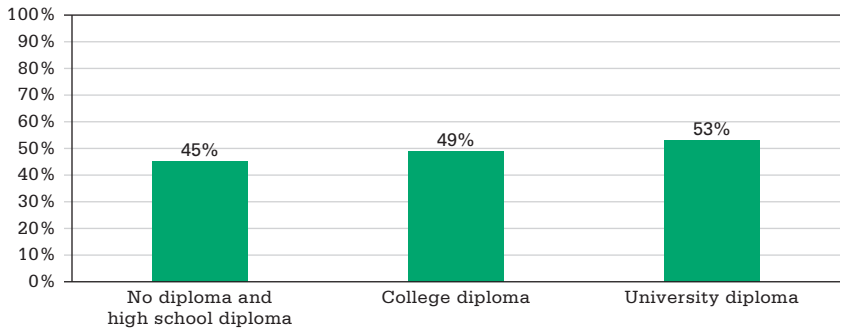


Chart 10 illustrates the influence total household revenue has on the generation of waste. It shows that waste generation increases according to revenue, with incomes of $100,000 and over (20.97 kg per week) practically double that of homes with revenues of less than $20,000 (11.74 kg per week). The increase is particularly marked between the $40,000 to $59,999 class and that of $60,000 to $79,999 class, with corresponding waste figures going from 16 kg to 19 kg per week.

CHART 10

Effect of revenue level on the generation of household waste (kg/home/week)

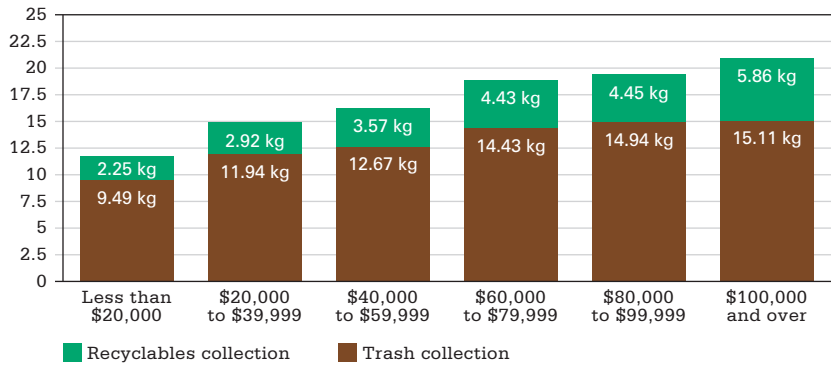
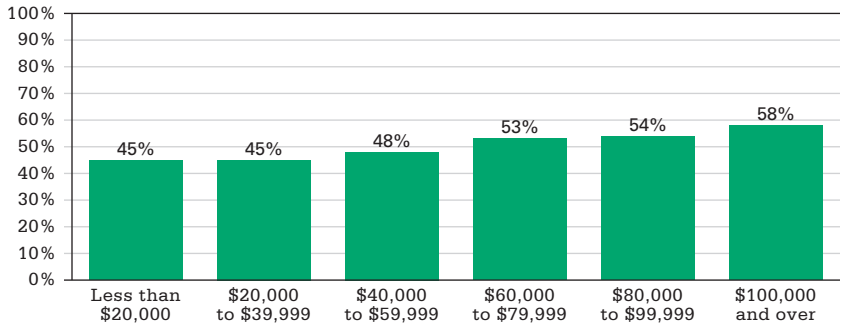


Chart 11 shows that households with higher revenues generate not only more waste, they also have higher curbside recycling rates. That rate grows from 45% for households with revenues of $20,000 or less, to 58% for households with revenues of $100,000 or more. Just as it was for waste generation, a marked difference can be observed in recovery rates between the $40,000 to $59,999 revenue class and the $60,000 to $79,999 revenue class, i.e. 48% vs. 53%.

CHART 11

Effect of revenue level on curbside recycling rates



Conclusion

Generation and recovery of household waste have evolved appreciably since the last characterization study was conducted throughout Québec in 2000. This new study provides an update six years later.

Every Quebecer generates an average of 404 kg of household waste each year, a total noticeably lower than the Canadian average of 411 kg in 2006. Of the 404 kg generated, 278 kg are sent to the trash and 69 kg are placed in recycling bins, with the remaining 57 kg being sent to other recovery and recycling destinations.

The study shows that recyclables collection is in net progress in Québec. In fact, in 2006, Quebecers have, for the first time, recovered more than half of the waste they generate through curbside recycling. The characterization study shows that they have indeed placed 52% of the materials that were potentially recyclable in their recycling bins.

It is estimated that, for all Québec homes, 486,000 tons of household recyclables, out of a potential of 938,000 tons, have been recovered through curbside programs in 2006. The study shows that materials most recovered are, in order, paper/cardboard, glass, metal and plastic. Paper/cardboard and glass are by far the items most recovered, both in terms of tonnage and recovery rates.

Several factors can explain the significant progress of recyclables collection. Among these are the greater number of door-to-door collection services offered throughout Québec, the gradual inclusion of apartment buildings in recovery programs and changes in residents' habits.

Study findings also show the differences between total quantities generated according to rural or urban environments. While urban dwellers generate more waste, rural homes have higher recovery rates. The composition of materials generated is quite similar between the two types of areas.

The study also shows that residents of single-family homes generate more waste per person than those in multiplex buildings. For their part, the latter generate more waste than apartment dwellers. Recovery rates vary in a similar fashion. Materials recovered are similar in all types of housing.

Generally speaking, waste generation increases according to the level of education. Recovery rates are also higher in homes where residents are more highly educated.

Revenue levels also influence waste generation. The higher the household revenue, the more waste is generated. Recovery rates also increase with higher income.

On the basis of all these findings, we can see that there is still room for improvement in recovering household waste in Québec. A major turnaround will have to be made with regard to organic waste, which has a recovery rate far below the target of 60% set down by the *Politique québécoise de gestion des matières résiduelles 1998-2008 (Québec Residual Materials Management Policy, 1998-2008).* With regard to curbside recycling, on the other hand, current recovery rates lead us to believe that the 60% reduction target will be reached by 2008.

Glossary

CHARACTERIZATION

A study to gather detailed information on the composition of waste materials and quantities generated.

COMMUNITY

A community is a borough, a local municipality or a regional municipality. A community generally corresponds to the "natural" limits of waste collection territories. For the purposes of this study, Québec was divided into 171 communities.

CONTAINER

Container in which waste materials are placed in order to be recovered. A container may be a bag, a 64 L bin, roll-out bins or any other type of container.

CRD

Construction, renovation and demolition waste: lumber, asphalt shingles, gypsum, concrete, brick, stone, soil, ceramic tiles, etc. For the purposes of this study, only household CRD have been considered.

HHW

Household hazardous waste: oils, paints, stains, varnishes, batteries, fluorescent bulbs, medications, solvents, thermometers, syringes, pesticides, antifreeze, acids, bases, nail polish, smoke detectors, ink cartridges, etc.

ORGANIC WASTE COLLECTION

Door-to-door collection of waste materials to be sent to a composting site. Notably included are green waste (branches, grass and leaves) and table scraps. Bins or containers made available to apartment dwellers are also considered as door-to-door collection.

RECYCLABLES COLLECTION (CURBSIDE RECYCLING)

Door-to-door collection of waste materials to be sent to a sorting centre. Curbside recycling focuses on paper/cardboard, plastic, glass and metal. Bins or containers made available to apartment dwellers are also considered as door-to-door collection.

TRASH

Waste collected from waste bins and sent to an elimination site, whether or not the material is potentially recoverable.

TRASH COLLECTION

Door-to-door collection of waste materials intended for elimination. Bins or containers made available to apartment dwellers are also considered as door-to-door collection.

WASTE

Any residue from production, transformation or usage processes, any substance, material or product or, more generally, any movable item that has been abandoned or that the holder seeks to abandon. For the purposes of this study, only household waste has been considered.

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