



# Measuring Recycling in Ontario

An examination of the definition of recycling and defining system performance

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June 26, 2017

Michael Birett  
Continuous Improvement Fund Office  
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Barrie, ON L4N 0Z7

Dear Mike

On behalf of Scout Environmental, I am pleased to submit this revised report on the definition of recycling and measuring system performance. After an extensive literature review on the subject, the one thing that was abundantly clear is that there is no specific definition for recycling or for how recycling system performance should be measured.

This paper is offered as a summary of some of the key findings and provides a series of points for further consideration as Ontario moves to a new circular economy.

Please do not hesitate to contact us with any questions you may have.

Sincerely,

*Daniel Lantz*

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# Introduction

Looking at the Strategy for a Waste-free Ontario, although recycling is mentioned as a necessary part of the circular economy, there is no definition of what is considered recycling, or, perhaps more importantly from a performance measurement perspective, what does “recycled” mean. It is one thing to collect materials, either at the curb, be it through single stream, two-stream or other combinations, or through depot store take-back or other recycling collection methodologies. It is quite another to get the combined materials into their individual commodity constituents, and deliver them to end markets where they are turned into valuable recycled materials. Even at that point, the question arises as what should qualify as recycling and recycled? Does broken glass as landfill cover count? As landfill roadbed? Or even as part of roads? Or does the recovered material have to have the ability to be put back into the economy such that it has the opportunity to be recovered again, maybe not in an original form, e.g., PET bottles to carpeting, but maybe from carpeting or clothing?

These, and other questions will be considered as this paper reviews recycling definitions, how recycling is measured and recycling within the context of diversion.



# Definition of Recycling

Dictionary.com defines recycling as

*“to treat or process (used or waste materials) so as to make suitable for reuse; as in to recycle paper to save trees”*. This definition is very similar to that provided by the Organization for Economic Co-operation and Development (OECD) who define recycling as *“the processing and use of wastes in production and consumption processes, for example, melting of scrap iron so that it can be converted into new iron products”*. Interestingly, Businessdictionary.com defines recycling differently as *“waste minimization strategy in which reusable materials are recovered from a waste stream, and put to the original or different use.”* Here, recycling is no longer simply a verb, but rather a strategy, suggesting that it is part of a bigger plan.

## The European Union

The EU Directive 94/62/EC states that *“‘recycling’ shall mean the reprocessing in a production process of the waste materials for the original purpose or for other purposes, including organic recycling but excluding energy recovery”*. The 2008/98/EC Waste Framework Directive (WFD) went further with the definition of recycling as follows: *“‘recycling’ means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations”*. Note that the EU added in the process of backfilling. Unfortunately, a definition of backfilling was not specifically provided in the WFD.

In the European Commission Eurostat Division 3E: Environment and Forestry document: *“Guidance on the definition of the term backfilling”*, further clarification of backfilling was provided, specifically referencing definitions in the WFD, Article 3(17) on recycling and Article 3(15) on recovery. The EC Eurostat states that in the definition of recycling, the intention of recycling was that a waste material was captured and processed in order to alter its physiochemical properties *“allowing it to be used again for the original or for other purposes and thus closing the economic material cycle”*. In other words, it would be kept in the manufacturing process and not put into a state where it could not be captured again in the future, albeit recognizing it may not be in the same form as the original material being recycled, e.g., PET bottle turned into a carpet tile that is recyclable at some point in time in the future.



## The United Kingdom

The UK takes the identical stance on recycling as does the EU and is only mentioned here as the UK Department of Environment, Food and Rural Affairs (DEFRA) only last year (May 2016) updated its guidance on how to define waste and defines recycling as follows: *“Recycling is any operation by which waste is reprocessed into products, materials or substances, for either its original or other purposes. For example, crushed waste glass graded for blasting or playground surfaces from waste tyres. Recycling does not include the reprocessing into materials that are to be used as fuels, or backfilling operations, for example when a suitable waste replaces a non-waste in the reclamation of excavated areas or in landscape engineering.”*

## Australia

The Australian Standard (AS/NZS 3831:1998) definition of recycling is *“a set of processes (including biological) for converting recovered materials that would otherwise be disposed of as waste, into useful materials and or products. The standard differentiates between types of recycling as follows:*

- *Closed loop recycling - recycling process in which the reclaimed output is used as an input to the same product system.*
- *Open loop recycling - recycling process in which the reclaimed output is used as an input into another product system.”*

Australia, in the *National Waste Report 2010*, defines recycling as *“a resource recovery method involving the collection and processing of waste for use as a raw material in the manufacture of the same or similar non-waste product”*. The *National Waste Report 2010* also defines recycle, which is a *“material able to be processed for recycling in a facility. Sometimes only to refer to materials actually recovered from recycling, excluding residual wastes.”*

## Canada

Other than British Columbia, which has engrained through the Environmental Management Act Recycling Regulation B.C. Reg. 449/2204 the requirement to prove disposition, no other jurisdiction has any strict definitions from which a preferred definition of recycling could be developed. However, the Multi-Material British Columbia (now Recycle BC) RFP for Post-collection services defined recycling as the *“Utilization of PPP in the production of a new product that is not energy.”*



Ontario's new Bill 151 speaks generically to recovered resources and resource recovery, with the definitions as follows:

- *"recovered resources" means material recovered from collected products and packaging or from other sources*
- *"resource recovery" means the extraction of useful materials or other resources from things that might otherwise be waste, including through reuse, recycling, reintegration, regeneration or other activities*

In these definitions, recycling is simply seen as part of the resource recovery value chain. The closest the new Bill gets to defining recycling is in Section 69(2) which reads as follows:

*"69(2) Without limiting the generality of subsection (1) (related to establishing and operating a system), a regulation may provide that a person responsible for managing material shall handle, reuse, recycle, recover resources from, and dispose of the material in accordance with the prescribed requirements, and may provide that a person*

- (a) must allow for the material or part of the material to be,*
  - (i) reused,*
  - (ii) used in the making of new products, packaging or other things."*

### **Canadian Standards Association**

The one place where effort was made to specifically define recycling (and recycled) was in the Canadian Standards Association (CSA) Guideline for accountable management of end-of-life materials. CSA defined recycling as follows:

*"Any operation by which EOL products or materials are reprocessed into new products, materials, or substances (solids, liquids, or gases), whether for original or other purposes, to replace virgin equivalents of that material. This includes biological processes like anaerobic digestion and composting that produce a nutrient amendment."*

Again, the focus of the definition is on the replacement of virgin materials.

CSA's definition of recycling however does not provide any indication of whether or not a material such as mixed broken glass when used as an aggregate, for example, supplanting another material that could be equally recycled in the same place, thereby technically increasing used glass utilization at the expense of, say, recovered



aggregate or asphalt, would be counted as recycled and included in the CSA's recycling efficiency rate.

### **End Use Examples of Acceptable Recycling**

After the review of the literature from across a number of jurisdictions and agencies, the definition of what counts as recycling, for the most part stayed the same, with the following key concepts/processes being promoted as important principles and acceptable examples:

- The recycled material must be a direct substitute for a virgin material in the production of a product or packaging;
- Printed Papers/OCC/Other Paper Packaging processed for the production of new paper products;
- Plastics should be recycled such that they can go into a similar application. Once that cannot occur, plastics recovered for use in other products can be considered where a virgin plastic would need to be used to generate the product, e.g., recycled PET into clothing or carpeting;
- Biodegradable plastics is a disruptor to the non-biodegradable plastics and, consistent with ISO/IS 18604, would not be counted as recycled if captured in a bale of mixed plastics. If the material was captured in a biological treatment option, e.g., composting, anaerobic digestion (AD), and did breakdown in the process, it could be counted. If, however, the material did not breakdown, i.e., as occurs when biodegradable plastics are introduced into an AD system (they are skimmed off and disposed), then recycling credit cannot be given to the material, consistent with the CSA Guideline;
- Steel packaging sent to steel mills for the production of new steel products;
- Aluminum rigid used beverage containers for production of new beverage containers or other rigid aluminum;
- Aluminum food grade cans and foil sent for production into deox for use in steel manufacturing;
- Glass for new glass bottles and jars or fibreglass; and
- Aseptics/Polycoated Milk Cartons processed for the production of new paper products. The skim fraction of plastics, unless sent for further processing and recycling, would need to be removed from the net total, consistent with the CSA Guideline. Aluminum as well, unless sent for further processing into deox.



# Measuring Recycling

The literature provides little in respect to how recycling is or should be measured. The thought that simply collecting the material and sending it to a processing facility, i.e., MRF, where it is coarsely sorted into commodities that are then sold off to end markets, does not by practice, mean that the materials were recycled. Key questions on material quality, product specifications and end market yields all play into how recycling really needs to be measured.

In Ontario today, only gross recycling is measured. This section reviews the definitions and practices of measuring recycling and will introduce the concept of real recycling rate (RRR), which advances the thought on how recycling should be measured such that it is fair, representative and transparent to all involved.

## **The European Union**

The EU has set firm ground rules by which the term “recycled” is defined. For metals, under the Council Regulation (EU) 333/2011, there are strict rules which end markets have to follow such that a material can then be declared recycled. These rules include visual and physical inspections, i.e., sampling and testing, as appropriate, of the materials, culminating in the end market filling in a Statement of Conformity (Figure 1). This Statement of Conformity must be kept on record for a period of one year.

With the Statement of Conformity, the material moves from a designated “waste” to a recycled commodity. There are also similar requirements in place for glass and copper. Figure 2 shows the Statement of Conformity for glass out of the Council Regulation (EU) 1179/2012. The approach used by the EU is important as it sets clear specifications as to what is acceptable for shipment to a market in order for it to be recyclable and defines when a material is considered recycled. This approach helps avoid the issue of “recyclable materials” being shipped to an “end market” without any assurances that the material shipped was, in fact, as declared and was truly recycled.





Figure 1  
Metals Statement of Conformity

ANNEX III

Statement of Conformity with the end-of-waste criteria referred to in Article 5(1)

1.	Producer/importer of scrap metal: Name: Address: Contact person: Tel. Fax E-mail:
2.	(a) name or code of the scrap metal category, in accordance with an industry specification or standard: (b) where relevant, main technical provisions of a customer specification, such as composition, size, type and properties:
3.	The scrap metal consignment complies with the specification or standard referred to in point 2:
4.	Quantity of the consignment in tonnes:
5.	A radioactivity test certificate has been established in accordance with national or international rules on monitoring and response procedures for radioactive scrap metal:
6.	The producer of scrap metal applies a quality management system complying with Article 6 of Regulation (EU) No 333/2011 <sup>(1)</sup> , which has been verified by an accredited verifier or, where scrap metal which has ceased to be waste is imported into the customs territory of the Union, by an independent verifier:
7.	The scrap metal consignment meets the criteria referred to in points (a) to (c) of Articles 3 and 4 of Regulation (EU) No 333/2011 <sup>(1)</sup> :
8.	Declaration of the producer/importer of scrap metal: I certify that the above information is complete and correct to my best knowledge. Name: Date: Signature:

<sup>(1)</sup> Council Regulation (EU) No 333/2011 of 31 March 2011 establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2008/98/EC of the European Parliament and of the Council (OJ L 94, 8.4.2011, p. 2).

Note: From <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011R0333&from=EN>



Figure 2  
Glass Statement of Conformity

ANNEX II

Statement of conformity with the end-of-waste criteria referred to in Article 4(1)

1.	<p>Producer/importer of the glass cullet:</p> <p>Name:</p> <p>Address:</p> <p>Contact person:</p> <p>Telephone:</p> <p>Fax:</p> <p>E-mail:</p>
2.	<p>(a) Name or code of the glass cullet category in accordance with an industry specification or standard:</p> <p>(b) Main technical provisions of the industry specification or standard, including compliance with EoW product quality requirements for non-glass components, i.e. content of ferrous metals, non-ferrous metals, non-metal/non-glass inorganics and organics:</p>
3.	The glass cullet consignment complies with the industry specification or standard referred to in point 2.
4.	Quantity of the consignment in kg:
5.	The producer of the glass cullet applies a management system complying with the requirements of Regulation (EU) No 1179/2012, which has been verified by an accredited conformity assessment body or by an environmental verifier or, where glass cullet which has ceased to be waste is imported into the customs territory of the Union, by an independent external verifier.
6.	The glass cullet consignment meets the criteria referred to in paragraphs 1 to 3 of Article 3 of Regulation (EU) No 1179/2012.
7.	The material in this consignment is intended exclusively for direct use in the production of glass substances or objects in re-melting processes.
8.	<p>Declaration of the producer/importer of the glass cullet:</p> <p>I certify that the above information is complete and correct and to my best knowledge:</p> <p>Name:</p> <p>Date:</p> <p>Signature:</p>

Note: From <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R1179>

In the EU, measuring recycling cannot be done without considering the definition of recovery and how capturing materials accordingly relates. The WFD definition of "recovery" means any operation the principal result of which is waste serving a useful



*purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy".* EC Eurostat states that the keys in this definition is the point on replacing other materials and preparation to fulfil a function. Backfilling is considered "other recovery" in the EU. These defined intentions of recycling and recovery are important when considering glass recycling.

In some jurisdictions, glass used as landfill roadbed, or even as an aggregate substitute, would be considered recycled glass. However, based on the fact that in these applications, the glass does not "close the economic material cycle", but does meet the recovery definition intention of replacing other materials that would otherwise have to be used. In the EU, glass as landfill roadbed or aggregate substitute would be considered backfilling and thus qualify as recovery, but would not be considered as being recycled. Interestingly, reference in the literature suggests that because of the large amount of captured used asphalt and other construction and demolition materials, which are available for reuse, if glass was used in these applications, the result would be that these other captured materials would have to be landfilled. In other words, one captured material should not get credit for recycling at the expense of another captured material that can and should be used in the same application.

Although compliance schemes in the EU (which vary by country) must prove they have sent specified tonnages of materials to be recycled, there are no minimum end market specifications, although ISRI standards could be considered a good placeholder. There is no information on the net yields from the end markets which means that although materials are sent for recycling, after accounting for yield losses, regardless of the reason, there is no information on the actual real recycling rate (RRR). *Real recycling rates are defined as recycling rates attributable to each commodity sent to market, net of yield losses in the reprocessing. This is a new term as provided by the author and not in general use.* It does provide for recycling to continue from one reprocessor to another, such as would occur with PP lids on PET bottles (which are first sent to the PET bottle reprocessor), with all net recycling measured and assigned to the appropriate material.

## **The United Kingdom**

The UK diverges from the EU with respect to how recyclables are marketed. In the UK, where recycling rate targets are set for businesses, in order for businesses (or the compliance scheme to which they belong) to prove their compliance, they must acquire a prescribed form of evidence called a Packaging Waste Recovery Note (PRN)



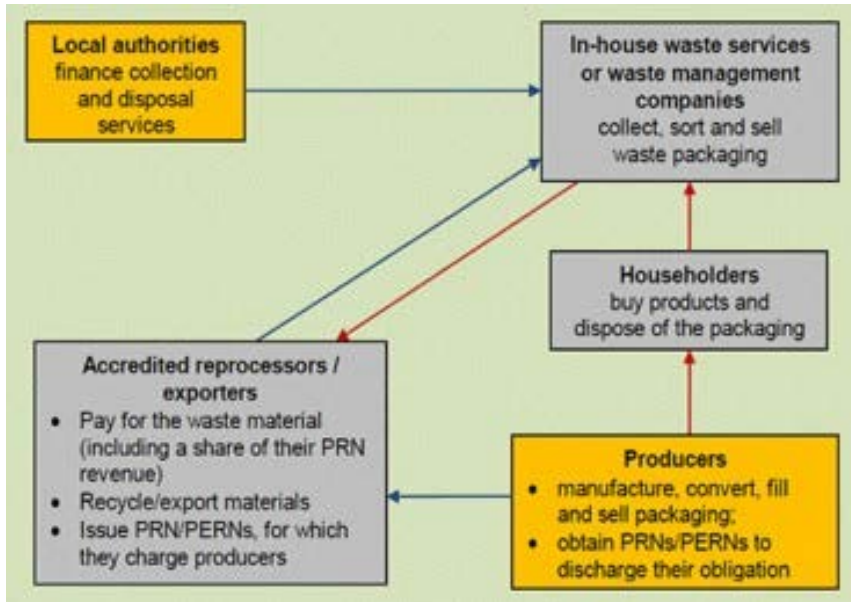
or a Packaging Waste Export Recovery Note (PERN) from accredited reprocessors (Figure 3). The accreditation process is undertaken by the country specific enforcement agency, i.e., the Environment Agency in England, the Scottish Environment Protection Agency, Northern Ireland Environment Agency or Natural Resources Wales.

Material reprocessors and exporters (bottom left) must apply to the National Packaging Waste Database (NPWD) for accreditation. The relevant country Agency (as outlined above) will review the submitted documentation which must include:

- A business plan;
- Sampling and inspection plans;
- Details of the recovery and recycling processes used; and
- Evidence regarding export sites to show equivalent environmental standards as found in the UK.

At the discretion of the country Agency, an inspection of the facility may be undertaken.

Figure 3  
PRNs and PERNs in the UK Recycling Scheme



Material flow in red; financing flow in blue

Note: From <http://www.co2compliance.co.uk/experts-archive/how-the-prn-market-works/>



The approach outlined above is also undertaken in Poland. The fourth bullet in the submitted documentation (see bulleted list on previous page) is identical to the approach used in British Columbia where the processor, who is also the marketer, must provide identical evidence for all non-OECD end markets for which it wishes to use as an end market.

Although this approach provides proof that the materials were sent to a market, there is no outline of the minimum specifications the materials must meet, although one could again assume typical ISRI standards, or, more importantly, the net yield coming from the materials sent for recycling. From Figure 3, it appears that as the reprocessors provide PRNs/PERNs on materials received, there is an implied 100% yield. Knowing that bales of materials often fail to meet formal specifications, 100% yields are not realistic, meaning that the process does not measure RRR, rather a simple “tonnes to market rate”.

### **Australia**

The Australian Government, in their Waste and Recycling in Australia report, outline that recyclable diversion is to be measured in tonnes as it is more practical and easier to explain performance. The recycling rate must be net of contaminants and residuals, although the report does not indicate how exactly the netting out of the contaminants and residuals is to be done. Although there is no strict formula by which recycling is measured, at least the recycling rate recognizes that there is a less than 100% yield.

### **Canada**

As outlined in the first section of this report, Ontario’s new Bill 151 speaks generically to recovered resources and resource recovery. Although the Bill intimates that targets will be set and that affected parties will have to report on how the program is doing relative to the targets, there is no definition of how performance will be measured or how one can definitively prove compliance. However, having a definition that allows material be used in the “*making of ‘other things’*”, there is no clear guidance as to whether or not items such as glass used in roadbed or as an aggregate substitute would qualify as recycled or would (should) fall in line with the definitions in the EU and Australia and be classified as ‘other recovery’.

Furthermore, in British Columbia, although there is no definition of recycling, the Recycling Regulation under the Environmental Management Act does define recovery rate as follows: “*‘recovery rate’ means the amount of product collected divided by the amount of product generated, expressed as a percentage*”.



## Canadian Standards Association

The recycling efficiency rate proposed by CSA in the document tries to account for the net amount of material that is truly recycled, similar to the proposed RRR outlined herein. Their definition is as follows:

*“The amount of material recycled as a percentage of the amount of targeted material collected (inbound) minus reuse and shrinkage. The recycling efficiency rate must reflect the net mass balance of all processing of that material, not simply one service provider’s gate-to-gate efficiency rate.”*

The Guideline indicates that to measure the recycling efficiency rate, service providers need to provide evidence of how materials were managed and their point of final disposition. As well, there needs to be a tracking system in place for *“controlling, weighting or counting, and documenting total inbound and outbound materials.”*

CSA clearly states that if the secondary entity (Figure 5) cannot provide reasonable (undefined) proof that all materials sent to them were recycled, then the primary entity cannot claim 100% recycling of the materials, i.e., the primary entity can only claim the net yield from the secondary processor.

CSA suggests that a data verification audit following the verification processes as outlined in ISO 19011 and ISO 17021 be undertaken to ensure that the audit conclusions are accurate and reliable.

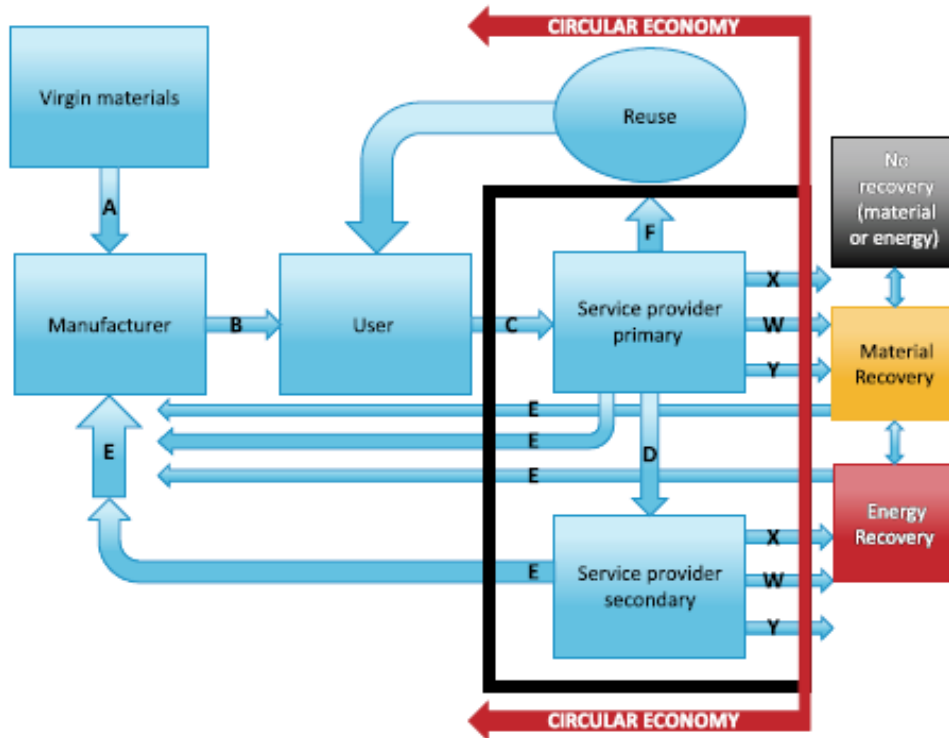
The Guideline is a good start, however, as the tracking falls to the plant operator to undertake, there is currently no incentive to undertake such an audit under the EPR compliance schemes anywhere in Canada. The assumption is that once the materials are shipped to the end market, they are considered recycled in the whole. The Guideline does not provide the auditing rules on what is considered recycled. For example, assume a bale of PET water bottles with their caps still on are sent to a PET recycler for pelletizing into clear PET for remanufacturing. As the current weight of a PET water bottle is just 9 grams and the cap, which is made of PP is 3 grams, under the rules suggested by the guideline, does the PET recycler report a 75% yield or a 100% yield? Who receives and benefits from the results?

Typically today, the PET recycling rate would be credited with 100% of the bale weight going to end market, at the expense of the recycling rate for PP. Considering the implications on stewardship fees in many jurisdictions, including Ontario, stricter



guidelines on reporting back, i.e., not just percentages, but a full breakdown by remarketed/ recovered commodity is needed.

Figure 5  
End-of-life Material Flows



\* E, F, W, and reuse may create waste as well.

**Legend:**

- A = virgin material extracted and shipped to the manufacturer
- B = products or materials sold to users
- C = EOL products or materials collected from users (inbound)
- D = sorted material shipped to secondary service providers (outbound)
- E = secondary materials shipped for recycling to manufacturers as substitutes for virgin materials (outbound)
- F = materials shipped for reuse, repair, refurbishment and re-manufacturing (outbound)
- W = no recovery (material or energy) (outbound)
- X = energy recovery (outbound)
- Y = material recovery (outbound)

Note: From CSA: A Guideline for accountable management of end-of-life materials, Report SPE-890-15



## When is Recycling not Recycling?

There is definitely a grey area about how far down a recovered product can be taken before it should no longer be considered recycled, but rather other recovery, which, by definition in the EU, does not necessarily mean it is captured for energy recovery. Backfilling, where a product is used as a filler simply as a means of keeping it from disposal, is not considered recycling and thus does not count towards a material's recycling rate. Glass as roadbed on a landfill is a prime example.

Glass as aggregate is not considered recycling as it is being substituted for aggregate from the C&D sector that is actually better suited for the application and, because glass is being used, the recycling rate for the aggregate suffers. As Ontario does not have EPR for anything beyond the residential materials, currently, this is not an issue. However, if Ontario moves to including other material streams (as is the case in European and Australian programs), then what qualifies as recycling will need to be revisited.

For Ontario, considering the poor performance to date of C&D material capture and reuse/recycling, the focus should shift from allowing glass to be used in applications where other materials should be captured and used first. If, and only if, C&D sources of material were not available, then Ontario could consider glass as an aggregate substitute as being recycled.





# Recycling in the Context of Diversion

## What Should We Be Measuring and Focusing On?

The hierarchy stipulates that we should reduce first, reuse second and then recycle in that order. Both Quebec and British Columbia place the emphasis for discarded materials management (DMM) squarely within the hierarchy. Quebec clearly stipulates that reduction is more important than recycling and that a life cycle analysis (LCA) approach should be used to inform decision making for the management of discarded materials, as witnessed by the following passage from the Environmental Quality Act:

### *"2 PRINCIPLES*

*Residual materials management is based on a principle of action that gives priority to management methods that will have the least impact on the environment. Known as the 4R-D, this principle is defined as follows in Québec:*

### *4R-D*

*Unless an environmental analysis based on a goods and services life cycle approach indicates that a deviation is justified, residual materials management must give priority to source reduction, reuse, recycling (including by biological treatment or land spreading), other forms of material reclamation, energy production, and disposal, in that order."*

In British Columbia, Section 3(1) of the Recycling Regulation under the Environmental Management Act, stipulates that:

*"(3) For the purposes of subsection (1) (c) (viii), the pollution prevention hierarchy is as follows in descending order of preference, such that pollution prevention is not undertaken at one level unless or until all feasible opportunities for pollution prevention at a higher level have been taken:*

- (a) reduce the environmental impact of producing the product by eliminating toxic components and increasing energy and resource efficiency;*
- (b) redesign the product to improve reusability or recyclability;*
- (c) eliminate or reduce the generation of unused portions of a product that is consumable;*
- (d) reuse the product;*



- (e) recycle the product;
- (f) recover material or energy from the product;
- (g) otherwise dispose of the waste from the product in compliance with the Act.”

In Europe, even though the EU Directive has material specific targets (not the subject of this paper), the Directive does indicate that reduction and reuse are preferable over recycling and recycling over recovery, and it understands that not everything should necessarily be recycled rather “life-cycle assessments should be completed as soon as possible to justify a clear hierarchy between reusable, recyclable and recoverable packaging”.

Interestingly, within the Waste and Recycling in Australia report, it was discovered that the country believes that a better measure of recycling performance is embodied energy, GHG emission reduction and potential water savings (a concern in parts of Australia) as a result of diverting recyclables from landfill. The report even uses an example of how much more important one tonne of aluminum diversion is compared to one tonne of timber. In other words, not all tonnes are worth the same from the broader perspective of reducing the impact on the environment from anthropogenic activities.

Taken from the National Waste Report 2010, the Australian Government outlines the overall benefits derived from a typical Melbourne’s weekly recycling activities (Figure 4).

Figure 4  
Benefits of Recycling from a Typical Melbourne Household

Impact	Unit	Totals	Equivalence
Greenhouse	kg CO <sub>2</sub> -e	3.2	This equates to 0.25% of a households total allocation of greenhouse gases from all sources.
Embodied energy	MJ	32.2	9 kWh or enough energy to run a 40 Watt light bulb for 72 hours (Accounting for electricity losses).
Smog precursors	Grams of C <sub>2</sub> H <sub>4</sub> equivalent	1.3	Equivalent to the emission from 4.5 kms of travel in average post 1985 passenger car.
Water use	litres	92.5	The equivalent of 5 sink loads of dishes.
Solid waste	kg	3.6	Depending on the material, between 60% to 90% of the product placed for recycling will remain out of solid waste.

Note: From <http://www.nepc.gov.au/system/files/resources/020c2577-eac9-0494-493c-d1ce2b4442e5/files/wastemgt-nat-waste-report-final-20-fullreport-201005-0.pdf>



There are two ISO standards that speak to packaging, its overall environmental impact and the measurement of recycling. ISO/IS 18602 outlines the standard on optimization of the packaging system, reflecting that design should contribute to reducing the environmental impact of packaging. The standard outlines the requirements to ensure that the packaging should be an optimal ratio between the weight/volume used in relation to the packaging functions. The ISO standard also outlines an assessment procedure to help ensure packaging design is optimized.

The second standard is ISO/IS 18604 which outlines the requirements for packaging to be classified as recyclable and, as with ISO/IS 18602 provides procedures for assessing whether a package meets the requirements. The result of the process is that suppliers need to declare the percentage of the packaging that is recyclable.

The inter-relationships between the standards is such that even if a packaging supplier wants to comply with ISO/IS 18604, they must first comply with ISO/IS 18602. Again, this is consistent with the concept that reduction of resources is more important than recycling and that packaging should reflect this reality, of course, paying heed to all public health and safety requirements and mitigating the use of any hazardous materials in the development of the packaging.

### **Better System Performance Measures**

Fundamentally, although measuring tonnes of material collected at the municipal level is easy to do and measuring the quantity put into the marketplace by individual stewards/vendors is considered reasonably easy to measure, because of the number of channels that now feed into and out of the system, getting the numbers correct is no longer guaranteed to be accurate. The double-digit annual increase in online shopping from retailers around the world means transportation and other packaging is coming into the Ontario market at an unknown rate. Much of these materials are not captured in the inbound quantity estimate, but do show up in the outbound material streams. Too much "credit" for recycling may occur, and thus lower stewardship fees, if these tonnes are not captured in the generation/available total.

Another interesting point taken from the review was the fact that Canada appears to be the only jurisdiction that measures residential waste generation (or tries to) on its own. Other jurisdictions do not typically separate the residential from the commercial stream citing that residential and small commercial, particularly in light of the large increase in small, home-based (online) businesses, waste is being "mixed" together blurring the lines between generation and recovery.



Australia does not recognize a recycling rate for many materials because of the lag between the time the material is made into a product and when it is recovered through recycling. The government uses the example of CRTs, which although are no longer being produced, are being recovered such that in the typical definition of recycling rate, which is the quantity recovered divided by the quantity generated, with no generation, the recycling rate far exceeds 100% and thus is a pointless measure.

There are better measures of system performance. The first would be to adopt, rather than percentage recycling targets, based on weight measures, a simple kg/capita to disposal target. Ultimately, as is clearly seen from the literature, reduction is more important than recycling and thus, total quantities to disposal should decrease, even if there is no increase in recycling rates. Setting a goal for Ontario of 150 kg/capita would be consistent with a number of EU countries and would help push for more environmentally responsible packaging and stronger manufacturing processes that reduces the net impact, by weight, going to disposal.

The CSA Guideline started to address measuring effective recycling; what the author herein calls the Real Recycling Rate (RRR). However, weight measurements are only part of the equation. In setting the definition of and future policy surrounding packaging and materials management in Ontario, heed should be paid to the hierarchy first and foremost as, ultimately, as the province looks to reduce consumption and greenhouse gas emissions, from a GHG emissions perspective, not generating something is better than generating something and then recycling it.

As Ontario has recognized that climate change is the real problem and that MOECC activities must attack the problem (as the waste sector is responsible for 6% of the total greenhouse gas emissions in the province), now is the time to rethink what targets are set and how targets are defined, and consider total potential GHG emission reductions first, ahead of simple tonnage targets.

Glen Murray, the Minister of Environment and Climate Change, in his address at the Resource Productivity and Recovery Authority Annual General Meeting on June 22, 2017 made a very interesting pronouncement that should impact how we move forward in looking at diversion and waste management in general. Paraphrased Minister Murray stated that Bill 151 "Waste Free Ontario Act" and Bill 172 "Climate Change Mitigation and Low-carbon Economy Act" need to be considered as two parts that provide a solution; where one cannot be considered without the other. Bearing that in mind, should performance measurements for the management of discarded



materials not be set in terms of the ability to reduce the impacts on climate change and our dependence on carbon, be it in the products, packaging or printed materials?

Australia and the EU recognize that total environmental performance must be considered. Sustainable Materials Management (SMM), combined with the Circular Economy (CE) concepts, as supported through true Extended Producer Responsibility (EPR) (i.e., not simply EPR as a funding mechanism, but rather EPR as a means of having packaging and product producers actually extend their responsibility such that they rethink packaging design), would result in practices (and policies) supporting the use of less materials, thereby reducing overall GHG emissions, helping Ontario achieve its goals.

Further work on targets and measuring performance is required to show the impact of a completely different view combining SMM, CE and EPR to help "Transform Ontario into a Leader".



## Scout Background

Scout is a not-for-profit organization that specializes in the development, delivery and management of creative programs that engage people on issues related to the environment.

For over fifteen years, we have been pioneers in applying creative approaches to air quality, energy conservation and waste. We're B-Corp certified and pleased to have been recognized and awarded for our culture, people, and numerous environmental programs.

We don't just talk about what needs to be done – we actually do it!

