Where to from here:

Expanding designated materials under Ontario's *Resource Recovery and Circular Economy Act*

August 2022

Association of Municipalities Ontario

Draft for Discussion and Feedback

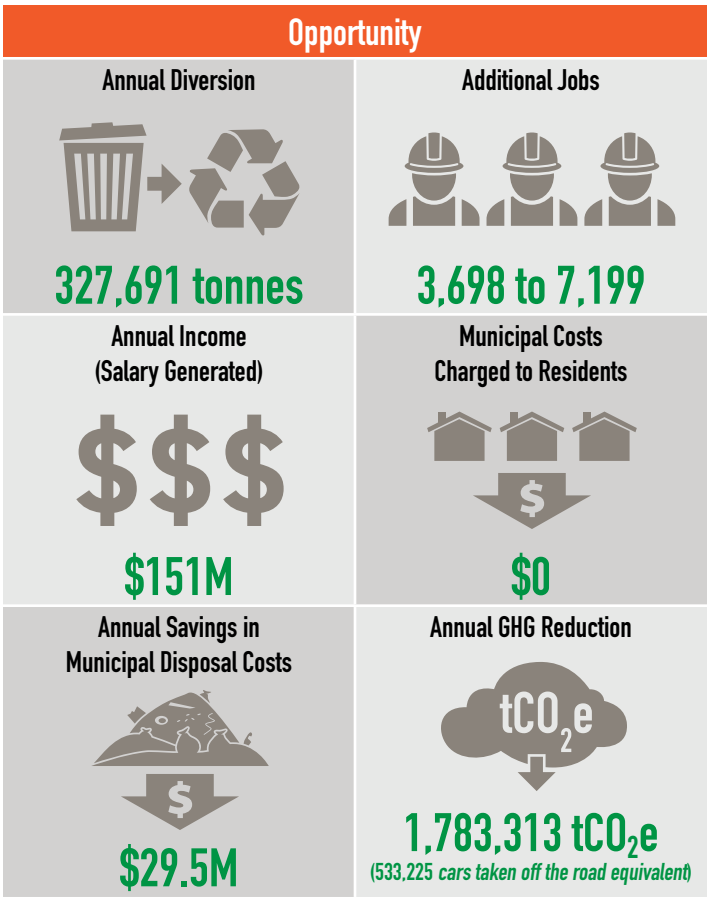
Executive Summary

Municipal governments play a crucial role in ensuring that residential waste is properly managed to safeguard the health of our communities and our environment. This means ensuring that waste is not improperly disposed of in our environment (i.e., litter) or in our wastewater systems, but instead, managed safely in our communities (e.g., recycling programs, take-back programs, deposit return systems).

While significant progress has been made in developing integrated waste management systems that divert about half of Ontario's residential waste stream, household recycling has stalled and the amount of waste keeps increasing, along with costs to manage it, while municipalities have little control over the waste that is produced. Municipal governments understand the need to move away from a "take, make, and dispose" economy (e.g., linear economy). Recirculating resources within our economy offers economic benefits, such as jobs created, and environmental benefits, such as reducing our reliance on virgin materials and reducing greenhouse gas (GHG) emissions. Municipal governments, however, have limited influence over the waste that is created.

Extended producer responsibility (EPR) refers to a policy that assigns responsibility (financial and/or operational) for the end-of-life management of a product or packaging to producers (i.e., brand holders and/or persons with a commercial connection). Municipal governments are strongly supportive of EPR as it creates economic opportunities, incents innovation, improves our environment, and reduces the burden on Ontario's taxpayers.

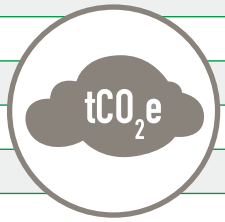
This report explores opportunities associated with designating additional products under EPR in Ontario, with a focus on additions to existing regulations (for electrical and electronic equipment, and hazardous or special products) and new designations under new regulations (for carpets, furniture, mattresses, and textiles). The following table provides a summary of findings for all of the products combined.



The tables below rank the largest opportunities in terms of additional material diverted, GHG emissions reduced, jobs created, and estimated annual income by designating additional materials under EPR. These are meant to be illustrative. While Household Hazardous or Special Products ranks lowest in all categories, these measurements do not capture all impacts (e.g., toxins, health and safety related, etc.).

Ranking	Material Categories	Estimated Amount Collected in Ontario under an EPR Approach (Tonnes, per Year)
1	Textiles	155,497
2	Furniture	76,157
3	Carpet	63,203
4	Electrical and Electronic Equipment	16,944
5	Mattresses	12,296
6	Household Hazardous or Special Products	3,594

Ranking	Material Categories	Estimated GHG Emissions Reduced under an EPR Approach (tCO_2e, per Year)
1	Textiles	1,243,973
2	Furniture	251,319
3	Carpet	167,337
4	Electrical and Electronic Equipment	46,409
5	Mattresses	27,297
6	Household Hazardous or Special Products	1,978



Ranking	Material Categories	Estimated Jobs Related to Diversion Activities, under an EPR Approach (Low Estimate)	Estimated Jobs Related to Diversion Activities, under an EPR Approach (High Estimate)
1	Furniture	1,557	4,211
2	Electrical and Electronic Equipment	1,036	1,036
3	Textiles	423	1,022
4	Carpet	570	758
5	Mattresses	81	141
6	Household Hazardous or Special Products	31	31

Ranking	Material Categories	Estimated Annual Income (Salary Generated) (per Year)
1	Electrical and Electronic Equipment	$51.0M
2	Textiles	$50.0M
3	Furniture	$24.5M
4	Carpet	$20.4M
5	Mattresses	$4.0M
6	Household Hazardous or Special Products	$1.5M

It is important to emphasize EPR is not the only policy mechanism that could be used to improve outcomes. Other tools such as mandatory recycled content mandates, disposal bans, disposal levies, and source separation requirements can be successfully implemented either in combination or instead of EPR. This report is meant to be a discussion piece given a void of action and a need to keep these materials out of disposal sites and reincorporate them into our economy.

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Introduction

Municipal governments play a pivotal role in Canada and around the world in ensuring residential waste is properly managed, to ensure the health of our communities and our environment. We help to make sure waste is managed safely in our communities and not improperly disposed of in our environment, including by cleaning up litter, managing residual waste in our wastewater treatment facilities, through diversion and disposal programs. Significant progress has been made by municipalities to operate integrated waste management systems that keep our communities safe and improve environmental outcomes.

However, waste management is a significant and growing municipal challenge:

- costs are steadily increasing;
- household diversion performance has stalled;
- the amount of waste ending up in the environment (e.g., waterways, parks, and communities) is growing;
- little emphasis has been placed on industrial, commercial and institutional (ICI) waste despite representing a larger amount of materials; and
- limited landfill capacity in Ontario continues to diminish.

Municipal governments understand the need to move away from a "take, make, and dispose" economy (i.e., linear economy). Recirculating resources within our economy offers significant benefits both from an economic and environmental perspective (i.e., circular economy). Municipal governments, however, have a limited scope of influence.

What is Extended Producer Responsibility?

Extended producer responsibility (EPR) refers to a policy that assigns responsibility (financial and/or operational) for the end-of-life management of a product or packaging to brand holders and/or persons with a commercial connection to supplying those products or packaging to consumers (collectively referred to as producers).

Municipal governments have been strongly supportive of the move to EPR as it creates economic opportunities, incents innovation, improves our environment, and reduces the burden on Ontario's taxpayers.

Producers are in the best position to communicate directly with consumers about whether their products can be reused or recycled, and how to best collect them. They are also best informed to invest in the reuse or recycling collection infrastructure and processing systems, and have the ability to influence end markets.

While it is not the only mechanism to drive change, it is a proven mechanism that is being embraced across Canada and throughout the world. Having said that, other mechanisms, such as mandatory recycled content mandates, disposal bans, disposal levies, and source separation requirements, can be successfully implemented either in combination with, or instead of, EPR policies. This report is meant to be a discussion piece given a void of action related to these areas and a need to divert these materials from disposal sites and reincorporate them into our economy.

Focus of the Report

There appears to be broad-based public and political support to increase waste diversion and move to designate more products under producer responsibility regulations. Taxpayers are looking for producers to re-visit their product and packaging design and consider end-of-life management during development. To help inform a path forward on waste management in Ontario, this report is divided into two sections: first, additions to existing regulations (electrical and electronic equipment, and hazardous or special products) and; second, new designations for EPR (carpets, furniture, mattresses, and textiles). The report is based on an initial review that looked at:

- previous commitments on expanding EPR in Ontario;
- designations made in other jurisdictions or proposed designations that have yet to be introduced in Ontario (or in some cases only partially introduced);
- the impacts related to increased diversion (e.g., on resources recovered, on landfill capacity, on municipal costs to manage, on opportunity to drive economic outcomes, and on greenhouse gas (GHG) emissions.

Unfulfilled EPR Commitments	
Canada-wide Action Plan for Extended Producer Responsibility (2009 – Canadian Council of Ministers of the Environment)	• Construction materials • Demolition materials • Furniture • Textiles and carpet • Appliances, including ozone-depleting substances (ODS)
Strategy for a Waste-Free Ontario (2017 – Ontario Ministry of the Environment, Conservation and Parks)	Proposed for 2020 and 2023: • Small appliances • Electrical tools • Mattresses • Carpets • Clothing and other textiles • Furniture and other bulky items
Made-in-Ontario Environment Plan (2018 – Ontario Ministry of the Environment, Conservation and Parks)	• Work with partners to conduct audits to identify materials that could be recovered and recycled rather than sent to landfills. Audits would help identify new materials that could be designated under producer responsibility in an effort to recover high-volume resource streams to increase diversion and phase out these items from being sent to the landfill.

Additions to Existing Regulations

Electrical and Electronic Equipment

Context

The amount of e-waste is growing exponentially across the world. E-waste refers to electronic and electrical equipment that is unwanted, no longer working, or nearing or at the end of its "useful life". A report by Global E-waste Statistics Partnership[1] in 2020 predicted that global e-waste will reach 74 million tonnes by 2030 – double the 2014 figure. According to the report, the growth of e-waste is partly fuelled by higher consumption rates, shorter lifecycles, and limited repair options. While some producers of electronics in Ontario (e.g., computers, mobile phones, televisions) are required by law to collect, reuse or recycle their products, many electronic products are not subject to these requirements. These products often end up in landfills or at depots where municipal governments must pay to manage them.

A provincial government strategy released in 2017 committed to designate more electronics like small appliances and electrical tools under producer responsibility; however, no consultation has occurred to date.

Opportunity

The following table reflects the potential opportunity for Ontario, based on a conservative estimate of the experience in other jurisdictions. The table includes both small appliances and equipment (e.g., electronic thermostats, small appliances, small power tools, smoke and carbon monoxide alarms) and some large equipment (e.g., electric outdoor power equipment, large exercise equipment).

Opportunity	
Annual Diversion **16,944 tonnes** (includes small appliances and equipment, electric outdoor power equipment, and large exercise equipment)*	**Additional Jobs** **1,036**
Annual Resources Recovered – Metals **10,531 tonnes**	**Annual Resources Recovered – Plastics** **5,773 tonnes** (small appliances only)
Annual Income (Salary Generated) **$51M**	**Municipal Costs Charged to Residents** **$0**
Annual Savings in Municipal Disposal Costs **$1.5M**	**Annual GHG Reduction** **46,409 tCO_2e** *(14,236 cars taken off the road equivalent)*

*Note that some large appliances and equipment are assumed to be collected and recycled via the scrap metal market. These include white goods (e.g., refrigerators, stoves, washers, dryers), vending machines, refrigeration coolers, beverage dispensers, and large free-standing power tools.

Why Target Electrical and Electronic Equipment?

Considerations	Impact
Environmental and Human Health Impacts	• Often include heavy metals (e.g., cadmium, lead, mercury) and ozone depleting substances, which need to be properly managed.
Impact on Landfills and Municipal Resources	• The amount of electronic waste is rapidly growing, but remains a small percentage of the waste stream (typically under 2% by weight).[2] • Rising cost for municipal governments to manage.
Economic Impacts	• Estimated that Ontario's limited electronics recycling requirements currently in place generate substantial economic activity (over 2,900 full time jobs and over $140 million in labour income).[3] Potential for growth if more products are designated. • 61 jobs are created for every 1,000 tonnes of electronics recycled. • Strategically important metals are found in e-waste, which are needed for Canada's transition to a greener and circular economy. By extracting metals from e-waste, a supply of recovered metals can be reintegrated into the economy, helping reduce our dependence on a few global suppliers (e.g., cobalt mining in Congo and other critical metals mined in China).

Other Canadian Jurisdictions

In other Canadian jurisdictions, many other types of e-waste are being diverted from landfills under EPR programs, as shown below. These programs cover many **products not captured in Ontario**. British Columbia currently has the most comprehensive program covering a wide-range of electronic and battery powered products.

Products Not Captured in Ontario	Examples of Products	Jurisdictions Where Products are Captured
Large Appliances	Refrigerators, freezers, stoves, dishwashers, washing machines, dryers, air conditioners, portable dehumidifiers, ranges, etc.	BC, QC
Outdoor Power Equipment	Hand-held, walk-behind, free-standing and lawn tractors, etc.	BC
Power Tools	Small and large power tools	BC, AB (pilot), PE, YT
Small Appliances and Equipment	Air treatment devices (air purifiers, fans, etc.)	BC, AB (pilot), PE, YT
	Electronic thermostats, smoke alarms and carbon monoxide (CO) alarms (and combinations)	BC
	Floor cleaning devices (small and full-size) (floor and handheld vacuum cleaners, steamers, polishers, etc.)	BC, AB (pilot), PE, YT
	Garment care devices (irons, steamers, etc.)	BC, AB (pilot), PE, YT
	Kitchen countertop appliances (toasters, grinders, food processors, etc.)	BC, AB (pilot), PE, YT
	Medical and monitoring equipment	BC
	Microwave ovens (countertop)	BC, AB (pilot), SK, MB, NS, PE, NL, YT
	Personal care appliances (hair dryers, curling irons, shavers, etc.)	BC, AB (pilot), PE, YT
	Time measurements devices (alarm clocks, timers, etc.)	BC, AB (pilot), PE, YT
	Weight measurement devices (bathroom, luggage and food scales)	BC, AB (pilot), PE, YT
Sports, Leisure, and Exercise Equipment	Treadmills, cycling machines, cross trainers, sticker maker, pitching machine, cutting and embossing machine, bug zappers, etc.	BC
Toys	Electric ride-on toy cars or trucks, electric toy scooters, electronic toy promotional items (i.e., sold with meals), electronic key chains, action figures or dolls and electronic toy vehicles	BC, AB (pilot)
Other	Electrical fixtures	BC
	Electric vehicle batteries	BC *(proposed)*, QC *(proposed)*
	Laboratory refrigeration units	BC, QC *(proposed)*
	Solar panels	BC *(proposed)*, AB (pilot)
	Vending machines	BC

Household Hazardous or Special Products

Context

A product can be hazardous if it is toxic, flammable, corrosive, or explosive/reactive. When they are no longer needed, these products become household hazardous or special products, and can be harmful to humans and the environment. These products are common in almost every household. While households may take extra care in using these products, unused portions should not be thrown to the garbage or down the drain, where they can pose risks to the environment and human health. Municipalities across Ontario collect these products so that they can be properly managed (e.g., recycled, rendered non-hazardous, or destroyed). Some products such as solvents and fuels can be recycled, while some need to be destroyed in special incineration facilities (e.g., poisons, pharmaceuticals). Corrosives are neutralized (made non-hazardous), while adhesives, cleaners and oxidizers would be subject to physical or chemical treatments. Municipalities play an important role as the final backstop to ensure these products stay out of landfills and sewer systems. According to regular Statistics Canada surveys on household hazardous or special products, Ontario households generally understand that certain products (e.g., pesticides, lubricating oil, and antifreeze) require special management, and try to do their part by actively dropping them off at collection points.[4]

Despite being a small segment of Ontario's overall waste stream, the costs associated with collecting and managing these products pose a significant burden comparatively to other materials collected by municipalities. This section covers products that are typically collected as household hazardous or special products by Ontario municipalities but are not currently covered by producer responsibility under the new Hazardous and Special Products (449/21) regulation. The intention of the inception of the regulation of hazardous or special products was always to expand designated products, but this has not happened. Today, large amounts of household hazardous or special products continue to be managed by municipalities at end-of-life, at the cost of taxpayers, including on average 89% of pesticides, 93% of miscellaneous organics (including solvents), 84% of fertilizers, and 49% of aerosols, between 2017 and 2019.[5]

Opportunity

The following table reflects the potential opportunity for Ontario, based on a conservative estimate of the experience in other jurisdictions. This table covers aerosols (those currently not covered under the current regulations), fertilizers[6], miscellaneous organics (e.g., flammables), pesticides[7], portable fire extinguishers, and switches that contain mercury. Given the wide range of products that may be collected by municipalities under their household hazardous waste programs and the limited data available on these waste streams, this section focused on these categories of products.

Opportunity	
Annual Diversion 3,594 tonnes	Additional Jobs 31
Annual Resources Recovered – Metals 361 tonnes	Annual Resources Recovered – Mercury 32 kilograms
Annual Income (Salary Generated) $1.5M	Municipal Costs Charged to Residents $0
Annual Savings in Municipal Disposal Costs $0.3M	Annual GHG Reduction 1,978 tCO_2e *(607 cars taken off the road equivalent)*

Lead-acid batteries and lubricating oil are collected in market-driven diversion programs outside of municipal waste-sheds and are therefore not included in the totals above. Including these materials would artificially inflate the diversion potential stated for household hazardous or special products. About 79,632 tonnes of lead-acid batteries and 148,020 tonnes (equivalent) of used oil are estimated to be collected per year under a market-driven approach in Ontario. However, it would be prudent that the items are included in a regulated process to ensure they are managed safely and properly with a stable system less reliant on commodity values.

The estimates in the table above also do not include pharmaceuticals and sharps, which are designated for producer responsibility under "Collection of Pharmaceuticals and Sharps – Responsibilities of Producers, O. Reg. 298/12". Municipalities collected 52,500 kg of pharmaceutical waste and 20,000 kg of sharps in 2019 at the cost of taxpayers, despite the existence of a sharps and pharmaceuticals program.[8] Municipal governments have advocated that sharps and pharmaceuticals should be regulated under the same regulation as all the other materials to ensure better performance and oversight.

Why Target Additional Household Hazardous or Special Products for Extended Producer Responsibility?

Considerations	Impact
Environmental and Human Health Impacts	• The discharge of household hazardous waste in the sewer or in the garbage increases the risks to both the environment and human health. For example, traces of products may still be found in discharged wastewater after treatment (e.g., pharmaceuticals) and disposal of household hazardous waste in the garbage and recycling increases health risks for waste collection, material recovery facility and landfill workers. • Long-term storage of unwanted hazardous products at home increases risks to human health, in the case of fire, flooding or other disaster, where contents or products may explode or spill out.
Impact on Landfills	• When household hazardous wastes end up in landfills, they increase the risk of leakage of their contents, which increases the cost and complexity of leachate management at landfills.[9] • When pressurized containers are disposed of in the regular waste stream, they increase the risk of explosion under compaction, including at collection.
Municipal Resources	• There is a high cost associated with managing household hazardous waste (e.g., the management of foam insulation cylinders can cost some larger Ontario municipalities in the range of $200,000 to $300,000 per year), despite it being a small segment of the Ontario waste stream.[10]
Economic Impacts	• There are economic opportunities associated with the management of this waste stream, particularly lead-acid batteries and lubricating oil, because of their large volumes, recyclability and available end-markets. Economic opportunities are more limited for other household hazardous wastes, as some cannot be recycled and require either destruction or treatment.

Other Jurisdictions

The following table indicates what types of products are covered under producer responsibility in other Canadian jurisdictions, **but not in Ontario (or only partially).** Some jurisdictions, such as Manitoba and Saskatchewan, have focused on environmental and health risks (e.g., flammable, corrosive, physically hazardous, toxic), as opposed to a product-based approach, which is used in Ontario.

Material Type	Where Designated in Canada
Corrosives[11]	MB, SK
Fertilizers	None
Fire Extinguishers (Portable)	BC (*proposed*)
Flammables[12]	BC, MB, SK, AB (*proposed*)
Lead Acid Batteries	BC, MB, PE, QC (by 2023)
Lubricating Oil	BC, AB, SK, MB, QC, NB, NS, PE, NL
Pesticides[13]	MB, SK, BC
Physically Hazardous Products (Flammable and Explosive)[14]	MB, SK
Switches that Contain Mercury[15]	None
Toxics	MB, SK

Despite requirements being in place for the collection of pharmaceuticals and sharps in Ontario, these requirements are poorly constructed and significant amounts of these items continue to be collected by municipalities, at the taxpayers expense. A more comprehensive regulated program under the *Resource Recovery and Circular Economy Act, 2016* could address these gaps. Pharmaceuticals are covered under EPR policies in BC, MB, PE, QC (2024) and sharps in BC (*proposed*), MB, PE, QC (2024).

New Designations for Producer Responsibility

Carpet

Context

The general lifespan of a carpet is 10 to 20 years.[16] Carpet can be recycled into a range of products, such as carpet fibre and backing, and engineered products such as car and electronics parts. About 20% of the post-consumer carpet that was recycled in 2017 in the United States was recycled back into carpet face fibre and backings.[17] It is unknown exactly how much carpet waste is diverted by municipalities in Ontario.[18] The carpet industry estimates that about 1% of post-consumer carpets in Canada are recycled.[19] Currently, there is one business that collects carpet for recycling in Ontario, based in Toronto.[20] Carpets from the industrial, commercial and institutional sectors remain a low hanging fruit, given carpet may be more easily collected as part of carpet replacement; however, without proper incentive, these materials will continue to go the lowest cost option, which is disposal.

A provincial government strategy released in 2017 committed to designate carpets under producer responsibility; however, no consultation has occurred to date.

Opportunity

The following table reflects the potential opportunity for Ontario, based on a conservative estimate of the experience in other jurisdictions, including carpets and underlays (padding). Rugs could be included in a producer responsibility program given that the material composition is similar, but would be sourced differently (i.e., sourced outside of the construction, renovation, and demolition sector).

Opportunity	
Annual Diversion 63,203 tonnes	**Additional Jobs** 570 to 758
Annual Resources Recovered – Water Saved 1.5 Billion Litres	**Landfill Space Saved** 544,494 m^3 Over a ten-year period, that is enough to fill the Toronto Rogers Centre 3.6 times.
Annual Income (Salary Generated) $20M	**Municipal Costs Charged to Residents** $0
Annual Savings in Municipal Disposal Costs $5.7M	**Annual GHG Reduction** 167,337 tCO_2e (51,330 *cars taken off the road equivalent*)

Why Target Carpets for Extended Producer Responsibility?

Considerations	Impact
Environmental and Human Health Impacts	• Currently, about 99% of post-consumer carpet in Canada is going to landfill and 95% of commercial carpet ends up in landfill.[21] • Recycling carpet significantly reduces greenhouse gas emissions compared to other end of life management practices, about 2.65 tCO_2e is reduced per tonne of carpet recycled.[22]
Impact on Landfills and Municipal Resources	• Carpet is bulky, heavy, difficult to handle, and takes up valuable landfill space, as it does not compact well. • By diverting carpet from landfill, there are savings in terms of avoided collection and disposal costs and other costs associated to the management of this type of bulky waste.
Economic Impacts	• Carpet can be easily recycled if the incentives are provided and a market is established. Each 1,000 tonnes of carpet recycled creates between 9-12 jobs.[23]

Other Jurisdictions

California is currently the only jurisdiction globally with a program that covers carpet waste under producer responsibility, but New York State may soon join them.[24] The program initially had a recycling rate of 6.5% (of carpet discards) in 2011 and increased it to 21% by 2020. The program had a higher recycling rate in 2020 than in 2019, but recycled less tonnes due to how the available carpet discards were calculated, based on carpet sales. Carpet sales have been declining year over year, from $98M in 2011 to $81M in 2019.[25] In 2020, a total of 35,110 tonnes of carpet waste was collected (31% collection rate) and 23,866 tonnes was recycled (21% recycling rate). The diversion requirement in California only applies to carpet; however, the producer responsibility organisation (Carpet America Recovery Effort) also collects underlays for recycling voluntarily, collecting about 4,234 tonnes in 2020[26]. The program has faced previous criticism for relying on waste to energy and cement kilns for the end-of-life management of carpet that is collected, as opposed to recycling; the program no longer sends carpet to energy recovery or cement kilns, as of 2020.[27]

Furniture

Context

While the amount of furniture waste generated per year in Canada is not tracked, the amount of furniture sent to disposal has increased by about 50% between 2000 and 2018 in the United States.[28] This trend is driven in part by the availability of new low-cost furniture, consumer perceptions of reused and refurbished products, and by a decreased demand for refurbishment or repair.[29] The increasing amount of furniture waste and the complexities of its end-of-life management continues to be a challenge for municipalities. Many municipalities in Ontario offer curbside collection of oversized and bulky items for households; however, the furniture collected is most often destined for landfill, as opposed to reuse, refurbishment or recycling.

According to a Habitat for Humanity survey, Ontario households are twice as likely to recycle materials in the blue box than they are to recycle household furniture such as chairs or sofas.[30] Efforts to reuse, refurbish, and recycle furniture are challenged by the fact that furniture can be bulky and heavy, adding transportation cost, and furniture is rarely designed for easy repair or refurbishment. A lack of convenient no-cost options to divert furniture from landfills perpetuates the problem. Placing furniture at the curb or arranging for disposal is often the easiest solution.[31]

A provincial government strategy released in 2017 committed to designate furniture under producer responsibility; however, no consultation has occurred to date.

Opportunity

The following table reflects the potential opportunity for Ontario, based on a conservative estimate of the experience in other jurisdictions.[32] "Furniture" includes any furniture and components that serve the function of sitting, storing, working or lounging, in a residential, commercial or public setting. The figures below exclude mattresses, which are covered in the next section of this report.

Opportunity	
Annual Diversion **76,157 tonnes**	Additional Jobs **1,557 to 4,211**
Annual Resources Recovered – Plastics **7,616 tonnes**	Annual Resources Recovered – Wood **31,000 tonnes** – reducing the need to harvest about 39,786 mature trees
Annual Income (Salary Generated) **$24.5M**	Municipal Costs Charged to Residents **$0**
Annual Savings in Municipal Disposal Costs **$6.9M**	Annual GHG Reduction **251,319 tCO_2e** *(77,092 cars taken off the road equivalent)*

Why Target Furniture for Extended Producer Responsibility?

Considerations	Impact
Environmental and Human Health Impacts	• Each tonne of furniture diverted from landfill avoids 3.3 tonnes of tCO_2e.[33] • Energy savings from the remanufacture of one office workstation uses 82% less energy than traditional manufacturing – enough to power 342 typical households.[34]
Impact on Landfills and Municipal Resources	• Bulky items such as furniture are costly to manage at landfills, as they may require special management and take up a larger volume than most items. • Low amounts of used furniture are currently diverted from landfill for refurbishment or remanufacturing, estimated at only 10%.[35] • The curbside collection of large bulky items come at the municipalities' expense. For example, it costs the City of Burnaby between $12 and $36 per unit depending on the number of furniture units placed for collection.
Economic Impacts	• Each tonne of furniture that is diverted and refurbished or remanufactured creates between 20 and 55 jobs.[36] • Moving towards a more circular economy creates opportunities for furniture to be leased (e.g., office setting) and for used furniture to be revalued via refurbishment or remanufacturing, and resold.

Other Jurisdictions

France is currently the only country in the world where an EPR law applies to furniture.[37] In 2019, about 1.2 million tonnes of furniture and its components where collected, representing a capture rate of 42%.[38] Of these, 4% was reused, 50% recycled, 31% sent to energy recovery and 15% to disposal.

Mattresses

Context

From 2016 to 2021, the Canadian mattress industry grew by 57% and is expected to grow by almost 6% annually between 2022 and 2026.[39] This growth is fuelled by a growing Canadian population and shifting consumer preferences to online (e.g., mattress-in-a-box). It is estimated that about 600,000 mattresses are thrown out by Ontarians each year.[40] When a mattress reaches its end of life, estimated at an average 11 years, it is often destined to landfill.[41] When mattresses end up in landfills, they take up valuable space, as they do not compact well.

There is a limited market for second-hand mattresses (e.g., charities, Kijiji). Many mattress retailers will accept an old mattress when a new mattress is delivered, for a nominal fee. However, not all mattresses are eligible; mattresses that are dirty, wet or that contain mould or bedbugs are not accepted. Online retailers do not offer this service, leaving consumers on their own, with their mattresses more likely to end up in landfill. Mattresses are difficult to handle during waste pickup and transport and pose challenges to transfer stations and disposal sites. Some Ontario municipal governments, such as the City of Toronto and the Municipality of Muskoka, have recently advocated that Ontario designate mattresses under EPR.

Mattress producers should be encouraged and incentivized to recover valuable material from used mattresses for reuse and recycling.

The City of Toronto has been recycling mattresses for several years and, in 2019, diverted just over 2,300 mattresses to recycling. Based on reports from the City's mattress recycler, over 86% of the mattress components, such as metal, wood, quilting, poly-foam, cotton and felt, are able to be diverted. Consequently, only 14% of each mattress by weight is sent to landfill.

A provincial government strategy released in 2017 committed to designate mattresses under producer responsibility; however, no consultation has occurred to date.

Opportunity

The following table reflects the potential opportunity for Ontario, based on a conservative estimate of the experience in other jurisdictions. Items included in the totals are mattresses and box springs (other sleeping furniture would be covered under the furniture section of this report).

Opportunity	
Annual Diversion 12,296 tonnes	**Additional Jobs** 81 to 141
Annual Resources Recovered – Metals 6,763 tonnes	**Landfill Space Saved** 169,687 m^3 to 553,326 m^3 Over a ten-year period, that is enough to fill the Toronto Rogers Centre 1 to 3 times.
Annual Income (Salary Generated) $4M	**Municipal Costs Charged to Residents** $0
Annual Savings for Municipal Governments (Disposal Costs and Operational Savings) $2M	**Annual GHG Reduction** 27,297 tCO_2e *(8,373 cars taken off the road equivalent)*

Why Target Mattresses for Extended Producer Responsibility?

Considerations	Impact
Environmental and Human Health Impacts	• A number of Canadian mattress recyclers claim that 90% to 95% of a mattress's components can be recycled.[42] These components include the metals, foam, felt, cotton and polyester, among other materials.[43] • Mattresses and furniture commonly contain flame retardants (e.g., Polybrominated Diphenyl Ethers) that should be properly managed at end-of-life to keep these chemicals out of the environment.
Impact on Landfills and Municipal Resources	• The low density of mattresses makes them undesirable landfill material for compaction, and springs in mattresses can negatively impact landfill equipment (e.g., potential puncture hazards). • Some municipalities collect bulky items such as mattresses at the curb, scheduled or as part of regular/special collection. They may also be accepted at municipal drop-off depots. • Mattresses that are disposed of illegally can cost municipalities between $50/unit to $150/unit, based on a British Columbia study.[44]
Economic Impacts	• Since Metro Vancouver instituted a disposal ban on mattresses, there are now two large-scale mattress recyclers in the Vancouver area processing about 165,000 mattresses a year, employing the equivalent of 68 Full-Time Equivalents (FTEs) directly.[45] • Many mattresses are composed of about 55% metals.[46] The recycling of mattresses provides an opportunity to recover valuable materials such as metals and reintegrate them into the economy.

Other Jurisdictions

California, Connecticut, and Rhode Island all have EPR requirements for mattresses to ensure that mattresses are kept out of landfills. Oregon is now the fourth American state to enact EPR requirements for mattresses, with the program expected to launch in 2024. British Columbia is the first Canadian province to have committed to establishing an EPR law for mattresses, under its five-year action plan (2021-2026).[47] In Europe, France's EPR law for furniture also covers mattresses.

Textiles

Context

In the last 15 years, global clothing production has approximately doubled, driven by a growing middle-class in developing economies and increased per capita sales in mature economies like Canada. Contributing factors include "fast fashion", with quicker turnarounds of new styles, increased number of collections offered per year, and very often lower prices. Canadian expenditures on clothing alone increased by 83% between 2004 and 2019, to reach $2.2 billion.[48] The associated environmental impact of this consumption is enormous. While some municipalities and brand owners in Ontario have set up collection programs to complement existing systems operated by charities and non-profits, it is estimated that Ontario still sends about 424,958 tonnes of textiles to disposal annually.[49]

A provincial government strategy released in 2017 committed to designate textiles under producer responsibility; however, no consultation has occurred to date.

Opportunity

The following table reflects the potential opportunity for Ontario, based on a conservative estimate of the experience in other jurisdictions. Clothing includes footwear, accessories (e.g., scarves, hats, gloves), and household linens.[50]

Opportunity	
Annual Diversion 155,497 tonnes	Additional Jobs 423 to 1,022
Annual Income (Salary Generated) $50M	Municipal Costs Charged to Residents $0
Annual Savings in Municipal Disposal Costs $14M	Annual GHG Reduction 1,243,973 tCO_2e (381,587 *cars taken off the road equivalent*)

Why Target Textiles for Extended Producer Responsibility?

Considerations	Impact
Environmental and Human Health Impacts	• The textile industry is the second most polluting industry globally, contributing 8% of all carbon emissions and 20% of all global wastewater.[51] • Extending the lifespan of textiles via reuse and repurposing lowers this enormous environmental impact.
Impact on Landfills and Municipal Resources	• It is estimated that Canadians send about 1.1M tonnes of textiles to disposal, or about 28 kg/capita.[52] • A 2018 City of Toronto waste audit revealed that nearly 70% of textiles found in the waste stream of single-family homes were deemed reusable.[53]
Economic Impacts	• There is an opportunity to reuse and repurpose these materials at home and create jobs in the second-hand goods market, clothing apparel market, and in industrial uses. Used goods and vintage stores are growing in popularity, and in 2021 there were 475 of these types of stores across Ontario.[54] • The Canadian resale apparel market has rapidly grown, driven by a stronger interest in second hand goods and an easier shopping experience facilitated by online sales.[55]

Other Jurisdictions

Across Canada, used textile collection is often limited to networks set up by charities and non-profits, where used clothes are collected, sorted and then sold as a form of revenue, often to international buyers, where there is demand for affordable clothing. France and Sweden are the only countries with EPR policies for textiles; however, other European Union members are required to set up separate collection systems for textiles by 2025, and harmonised rules on EPR for textiles are anticipated as part of the revision of the Waste Framework Directive in 2023.[56]

The EPR policy in France covers textiles broadly, including clothing, household linens, and shoes. About 239,000 tonnes of textiles were collected in 2018, about 3.6 kg per capita, of which 58.6% where reused and 32.6% recycled.[57]

Summary of Findings

Additional Materials to Be Collected under an EPR Approach

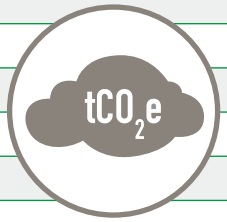
The report explored the impacts associated with designating additional products under producer responsibility, including under existing regulations, for electrical and electronic equipment, and household hazardous or special products, and under new regulations, for carpet, furniture, mattresses, and textiles. These impacts included additional waste collected for reuse, recycling or proper disposal; additional jobs and income; avoided disposal costs; operational savings for municipalities; and greenhouse gas emissions reduced. The following table provides a summary of the findings for all of the products covered in this report. The table excludes materials currently collected via a market driven approach, such as white goods, lead-acid batteries, and used oil, which are covered in the section that follows.

Opportunity	
Annual Diversion 327,691 tonnes	Additional Jobs 3,698 to 7,199
Annual Income (Salary Generated) $151M	Municipal Costs Charged to Residents $0
Annual Savings in Municipal Disposal Costs $29.5M	Annual GHG Reduction 1,738,313 tCO_2e (533,255 *cars taken off the road equivalent*)

The tables below rank the largest opportunities that come from designating additional materials under EPR. Rankings were provided in terms of additional material diverted from disposal, greenhouse gas emissions reduced, additional jobs created related to diversion activities, and annual income (salary generated). These are meant to be illustrative. While Household Hazardous or Special Products ranks lowest in all categories, these measurements do not capture all impacts (e.g., toxics, health and safety related).

Ranking	Material Categories	Estimated Amount Collected in Ontario under an EPR Approach (Tonnes, per Year)
1	Textiles	155,497
2	Furniture	76,157
3	Carpet	63,203
4	Electrical and Electronic Equipment	16,944
5	Mattresses	12,296
6	Household Hazardous or Special Products	3,594

Ranking	Material Categories	Estimated GHG Emissions Reduced under an EPR Approach (tCO_2e, per Year)
1	Textiles	1,243,973
2	Furniture	251,319
3	Carpet	167,337
4	Electrical and Electronic Equipment	46,409
5	Mattresses	27,297
6	Household Hazardous or Special Products	1,978



Ranking	Material Categories	Estimated Jobs Related to Diversion Activities, under an EPR Approach (Low Estimate)	Estimated Jobs Related to Diversion Activities, under an EPR Approach (High Estimate)
1	Furniture	1,557	4,211
2	Electrical and Electronic Equipment	1,036	1,036
3	Textiles	423	1,022
4	Carpet	570	758
5	Mattresses	81	141
6	Household Hazardous or Special Products	31	31

Ranking	Material Categories	Estimated Annual Income (Salary Generated) (per Year)
1	Electrical and Electronic Equipment	$51M
2	Textiles	$50.0M
3	Furniture	$24.5M
4	Carpet	$20.4M
5	Mattresses	$4M
6	Household Hazardous or Special Products	$1.5M

Materials Currently Collected under a Market Driven Approach

Large appliances and equipment were assumed to be mostly collected under a market drive approach (i.e., scrap metal recycling). This includes large appliances (e.g., white goods), large power tools (free-standing), vending machines, refrigeration coolers, and large beverage dispensers. Exercise equipment (e.g., treadmills, elliptical trainers) and electric outdoor power equipment were included under an EPR approach as these are less likely to be collected by the scrap metal recycling sector. These may be better managed under a regulated market to reduce reliance on commodity values and ensure materials (e.g., toxics) are managed properly.

Material Categories	Estimated Tonnes Collected for Diversion, per Year	Estimated GHG Emissions Reduced (tCO_2e), per Year, Associated with Diversion	Estimated Jobs Related to Diversion Activities
Large appliances and equipment (already being collected)	40,390	110,627 tCO_2e (33,935 *cars taken off the road equivalent*)	2,469
Lead-acid batteries	79,632	N/A	1,832
Used oil	148,020 (converted from Litres)[58]	377,450 (115,782 *cars taken off the road equivalent*)	1,280

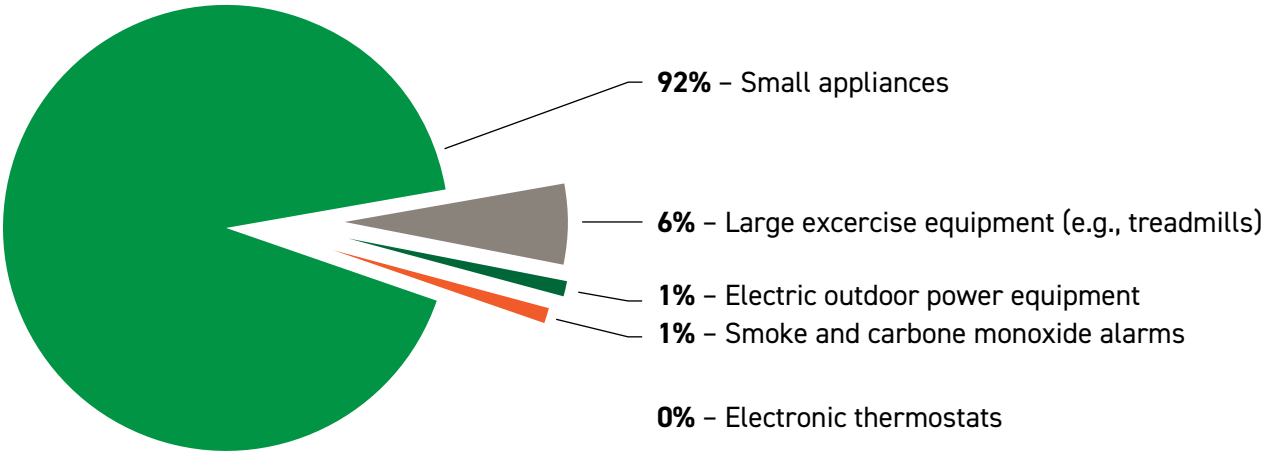
Appendix – Methodology

As much as possible, calculations were made with 2019 data to avoid impacts of COVID-19 on collected quantities.

Electrical and Electronic Equipment

Measure	Methodology	Sources
Annual Diversion	The estimated additional e-waste that could be collected under EPR is based on British Columbia's programs. Data provided in units was converted to kg equivalents, using average weight and quantities sold (large appliances only). Results show that an additional 1.17 kg/capita could be collected and diverted from landfill under an expanded EPR program for e-waste. Products included in the calculation are shown in the figure below. Most large appliances and equipment were excluded, as these were assumed to be collected by the scrap metal sector. Exceptions included exercise equipment (e.g., treadmills) and outdoor power equipment, which are included in the totals for EPR, as these are less likely to be collected.	2019 and 2020 (outdoor power equipment) annual reports, consulted at: https://www2.gov.bc.ca/gov/content/environment/waste-management/recycling/extended-producer-responsibility/extended-producer-responsibility-reports-plans
Annual Resources Recovered	Calculated based on the average composition of appliances. Small appliances are composed of about 37% plastics and 61% metals (ferrous and non-ferrous). Large appliances, for their part, are about 74% metal (ferrous and non-ferrous). The plastics recovered figure is based only on small appliances.	WRAP Electrical Product Material Composition, October 2012 2019 MARRT Annual report
Additional Jobs	Estimated based on 61 jobs created per tonne of e-waste diverted.	The Economic Benefits of Recycling in Ontario – Final Report, AECOM, 2009
Additional Annual Income (Salary Generated)	Estimate based on about $2,997 of salary generated per tonne of e-waste diverted.	The Economic Benefits of Recycling in Ontario, AECOM, 2009
Annual Savings in Municipal Disposal Costs	Based on 2019 total disposal costs for Durham Region, estimated at $90 per tonne, and includes collection, transport, transfer, and disposal.	2019 Solid Waste Management Servicing and Financing Study, Regional Municipality of Durham, Council Report, 2019
Annual GHG Reduction	Estimated at 2,738930808 tCO_2e per tonne of e-waste diverted. *Cars taken off the road equivalent* calculated using a 3.26 factor.	Cap-and-Trade Research for Ontario's Waste Management Sector, 2016 Greenhouse Gases Equivalencies Calculator – Calculations and References, Natural Resources Canada, https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/refs.cfm

Figure 1. Estimated Additional Tonnes of Electronic and Electrical Equipment Collected under an EPR Approach in Ontario (% of Total)

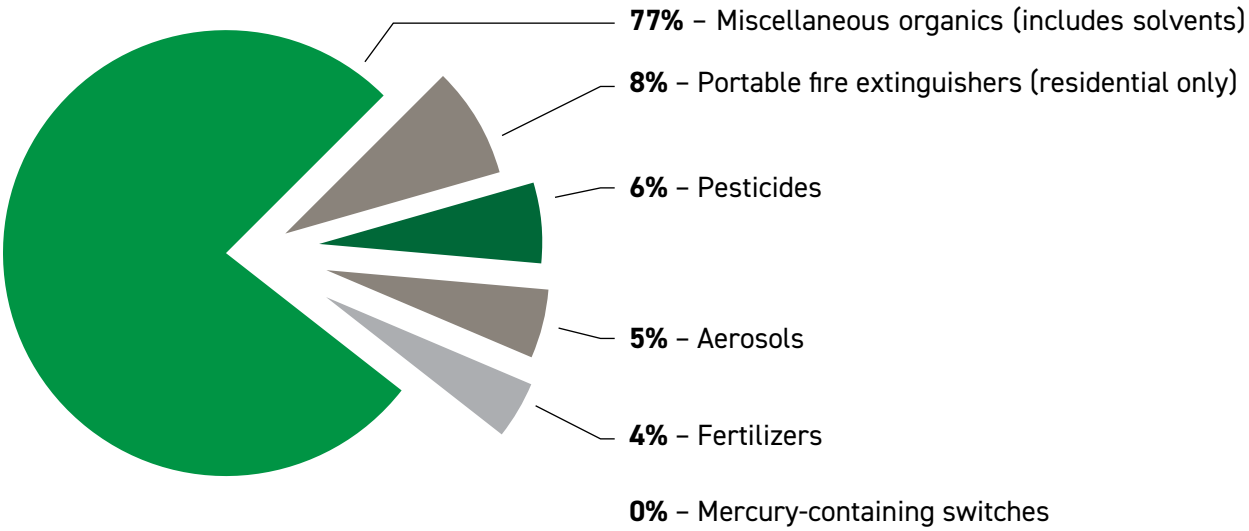


Household Hazardous or Special Products

Measure	Methodology	Sources
Annual Diversion	Data from 2019 was used for all product categories except fire extinguishers and mercury-containing switches, which were projected based on available information in Ontario (2013 MHSW Program Plan). Product Care lab pack analysis was used for calculating the total portion of products available for collection, based on lab pack analysis for aerosols, fertilizers, misc. organics and pesticides (sample data used, 2017-2019). Overall, there is an additional 0,246 kg/capita of household hazardous or special products that could be managed under EPR. Estimates were also provided for lead acid batteries and used oil, with the assumption that most are collected under a market-driven approach. Manitoba data (2019) was used to project quantities in Ontario.	Resource Productivity and Recovery Authority Annual Report 2019 Product Care lab pack analysis for municipalities, https://www.amo.on.ca/sites/default/files/assets/DOCUMENTS/Waste/Waste-Diversion/2020/MunicipalCommentsonProposedRegulationforMunicipalHazardousSpecialWasteUnderRRCEA201620200724.pdf Final Consolidated Municipal Hazardous or Special Waste Program Plan, Stewardship Ontario, 2009 (used for fire extinguishers and mercury switches) Manitoba Association for Resource Recovery Corp 2019 Annual Report (for used oil) Canadian Battery Association, 2019 MB Annual Report

Measure	Methodology	Sources
Annual Resources Recovered	Based on the recovery of metals in aerosols, fire extinguishers, the recovery of mercury in switches, and the recovery of lead in lead-acid batteries.	Draft Wisconsin Mercury Sourcebook: Automotive, Undated (estimates on mercury in switches found in appliances) https://www.usecology.com/services/recycling/elvs-mercury-switch-program (1 kg of mercury per 1,000 switches) https://en.wikipedia.org/wiki/Lead%E2%80%93acid_battery#cite_note-Linden2002-8 (lead-acid batteries are about 60% lead by weight)
Additional Jobs	31 jobs for all waste streams combined (8.65 per 1,000 tonne). Not included in totals: 1,832 jobs associated with lead-acid batteries (23 jobs per 1,000 tonne) and 1,280 jobs associated with lubricating oil management (8.65 per 1,000 tonne). These materials are assumed to be managed under a market driven approach.	The Economic Benefits of Recycling in Ontario, AECOM, 2009 (for all wastes except lead–acid batteries) For lead-acid batteries: Assessment of Economic and Environmental Impacts of Extended Producer Responsibility Programs in BC, 2014
Annual Income	Estimate based on about $424 of salary generated per tonne of household hazardous waste diverted.	The Economic Benefits of Recycling in Ontario, AECOM, 2009
Annual Savings in Municipal Disposal Costs	Likely a conservative estimate, based on 90$ per tonne (Durham Region). The cost to destroy or neutralize chemicals collected is likely higher.	2019 Solid Waste Management Servicing and Financing Study, Regional Municipality of Durham, Council Report, 2019
Annual GHG Reduction	Estimate only applies to materials that would be recycled, in this case aerosol cans, fire extinguishers and used oil. No estimate on greenhouse gas emission reductions was available for lead-acid batteries. Estimated at 1.18 tCO_2e per tonne of steel recycled, 6.49 tCO_2e per tonne of aluminium recycled and 2.55 tCO_2e per tonne of lubricating oil recycled (excluded from totals in the report). Cars taken off the road equivalent calculated using a 3.26 factor.	Assessment of Economic and Environmental Impacts of Extended Producer Responsibility Programs in BC, 2014 Greenhouse Gases Equivalencies Calculator – Calculations and References, Natural Resources Canada, https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/refs.cfm

Figure 2. Estimated Additional Tonnes of Household Hazardous or Special Products Collected under an EPR Approach in Ontario (% of Total), Excluding Lead-Acid Batteries and Lubricating Oil



Carpet

Measure	Methodology	Sources
Annual Diversion	Based on Alberta estimates applied to Ontario's waste stream, where 2.3% of the waste stream is carpet and padding waste, by weight. A collection rate of 27% was used, based on 2019 results from California's carpet EPR program.	Quantifying the Economic Value of Alberta's Recycling Programs, Report for Recycling Council of Alberta, 2019 CARE California Carpet Stewardship Program, Annual Report, 2019
Annual Resources Recovered	Based on estimate that each tonne of carpet waste that is recycled saves 24,109 liters of water. This figure was calculated based on information in the 2017 CARE report.	Carpet America Recovery Effort's 2017 CARE Recycled Content Products Catalog
Additional Jobs	Low estimate of 9 jobs and high estimate 12 jobs per 1,000 tonnes of carpet recycled	Quantifying the Economic Value of Alberta's Recycling Programs, Report for Recycling Council of Alberta, 2019 (low estimate) Assessment of Economic and Environmental Impacts of Mattress Recycling in BC, 2017 (high estimate)
Annual Income	Estimate based on about $322 of salary generated per tonne of waste diverted.	The Economic Benefits of Recycling in Ontario, AECOM, 2009
Annual Savings in Municipal Disposal Costs	Based on 2019 total disposal costs for Durham Region, estimated at $90 per tonne, and includes collection, transport, transfer and disposal.	2019 Solid Waste Management Servicing and Financing Study, Regional Municipality of Durham, Council Report, 2019
Landfill Space Saved	Estimate of 8,62 m^3 of landfill space saved per tonne of carpet waste diverted from landfill	Carpet America Recovery Effort's 2017 CARE Recycled Content Products Catalog
Annual GHG Reduction	Estimated at 2.65 tCO_2e per tonne of carpet recycled. *Cars taken off the road equivalent* calculated using a 3.26 factor.	USEPA, WARM, Version 15 Greenhouse Gases Equivalencies Calculator – Calculations and References, Natural Resources Canada, https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/refs.cfm

Furniture

Measure	Methodology	Sources
Annual Diversion	Based on 672,000 tonnes of furniture waste disposed per year in Canada, which based on population, would be about 260,157 tonnes of furniture disposed of in Ontario per year. It is estimated that an EPR program for furniture waste could achieve a collection rate of 34% (France's collection rate for furniture under EPR). This equates to about 88,453 tonnes per year of furniture waste diverted. This number, however, includes mattresses. The mattresses diverted under EPR (12,296 tonnes) was deducted from this total. The total amount of non-mattress furniture estimated to be collected under EPR in Ontario is projected at 76,157 tonnes per year.	Waste Prevention: The Environmental and Economic Benefits for Canada, National Zero Waste Council, 2021
Annual Resources Recovered and Saved	The plastics savings ratio is 0.1 tonne per tonne of office furniture remanufactured or refurbished. For wood, diverting one tonne of furniture for reuse or refurbishment would save about 0.5 mature trees. The amount of wood that would no longer need to be harvested was based on the average amount of wood that can be harvested for example from a Norway Spruce (780 kg per tree).	Waste Prevention: The Environmental and Economic Benefits for Canada, NZWC, 2021 Where will our next diverted tonne come from? Diversion with a purpose, 2019, Calvin Lahkan Forest Product Conversion Factors for the UNECE Region, 2010, Food and Agriculture Organization of the United Nations.
Additional Jobs	Jobs in remanufacturing and refurbishment. The low estimate is about 20 jobs per 1,000 tonnes of furniture that is remanufactured or refurbished. The high estimate is about 55 jobs per 1,000 tonnes of furniture that is remanufactured or refurbished.	Waste Prevention: The Environmental and Economic Benefits for Canada, NZWC, 2021
Annual Income	Estimate based on about $322 of salary generated per tonne of waste diverted.	The Economic Benefits of Recycling in Ontario, AECOM, 2009
Annual Savings in Municipal Disposal Costs	Based on 2019 total disposal costs for Durham Region, estimated at $90 per tonne, and includes collection, transport, transfer and disposal.	2019 Solid Waste Management Servicing and Financing Study, Regional Municipality of Durham, Council Report, 2019
Annual GHG Reduction	Estimated at 3.3 tCO_2e per tonne of furniture remanufactured or refurbished. *Cars taken off the road equivalent* calculated using a 3.26 factor.	Waste Prevention: The Environmental and Economic Benefits for Canada, NZWC, 2021 Greenhouse Gases Equivalencies Calculator - Calculations and References, Natural Resources Canada, https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/refs.cfm

Mattresses

Measure	Methodology	Sources
Annual Diversion	Based on 0.84 kg/capita of mattress waste that would be collected by municipalities. The proportion of mattresses collected by retailers when new mattresses are delivered is unknown; however, this forms a large portion of the mattresses currently recycled.	Étude de faisabilité d'un projet de récupération et de mise en valeur de matelas postconsommation visant leur détournement de l'enfouissement en Estrie, Centre d'Excellence en Valorisation des Matières Résiduelles, 2017
Annual Resources Recovered	Mattresses are about 55% metals by weight. This factor was used to calculate the amount of metal available in the mattresses discarded.	Assessment of Economic and Environmental Impacts of Mattress Recycling in BC, 2017
Additional Jobs	Low estimate of 7 jobs per tonne to a high estimate of 11 jobs per tonne of mattresses recycled. The high estimate is specific to mattresses whereas the low estimate is not (general recycling only).	The Economic Benefits of Recycling in Ontario, AECOM, 2009 (low estimate) Assessment of Economic and Environmental Impacts of Mattress Recycling in BC, 2017 (high estimate)
Annual Income	Estimate based on about $322 of salary generated per tonne of waste diverted.	The Economic Benefits of Recycling in Ontario, AECOM, 2009
Annual Savings for Municipal Governments	Based on the City of Toronto, operational savings of $1.5M over 5 years for 4,500 tonnes of mattresses per year ($66 per tonne) and an avoided disposal cost of $90 for regular waste management stream, for a total of $156 per tonne of mattresses not managed by municipalities.	2022 Rate Supported Budgets – Solid Waste Management Services and Recommended 2022 Solid Waste Rates and Fees, City of Toronto, 2021
Landfill Space Saved	Low estimate at 0.276 m^3 per mattress to a high estimate of 0.9 m^3 per mattress.	Assessment of Economic and Environmental Impacts of Mattress Recycling in BC, 2017
Annual GHG Reduction	Estimated at 2.2 tCO_2e per tonne of mattresses recycled. *Cars taken off the road equivalent* calculated using a 3.26 factor.	Assessment of Economic and Environmental Impacts of Mattress Recycling in BC, 2017 Greenhouse Gases Equivalencies Calculator – Calculations and References, Natural Resources Canada, https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/refs.cfm

Textiles

Measure	Methodology	Sources
Annual Diversion	Calculated based on "Characterizing Reuse, Recycling and Disposal of Textiles in Canada, Environment and Climate Change Canada, 2022". Study reports that about 1,335,574 tonnes of textile waste is generated on Canada, with 1,095,000 sent to disposal and 240,574 tonnes directed to reuse and recycling. These figures were projected for Ontario, with Ontario accounting for 39% of Canada's population, indicating that in Ontario, about 518,322 tonnes of textile waste would be generated, with 424,958 tonnes sent to disposal and 93,364 directed to reuse and recycling. This assumes that about 6.2 kg/capita/year of textile waste is diverted under the current approach in Ontario. Under an EPR approach, it was assumed that textile waste diversion would increase to about 10 kg/capita/year, from a current level of 6.2 kg/capita. In France, the current EPR program collects about 3.5 kg/capita/year, while the City of Markham's textile collection program collects about 4.3 kg/capita/year; however, projections in Alberta for textiles under an EPR program would collect about 9.5 kg/capita/year in total. Therefore, the estimate for Ontario under an EPR approach is considered to be moderately likely, given results in other jurisdictions, and that about 6.2 kg/capita/year of textile waste is currently estimated to be diverted from disposal.	Characterizing Reuse, Recycling and Disposal of Textiles in Canada, Environment and Climate Change Canada, 2022
Additional Jobs	The lower estimate is about 2.7 jobs per 1000 tonnes of textiles diverted. The higher estimate is 6.57 jobs per 1000 tonnes of waste diverted (general recycling).	Lower estimate: From Waste to Jobs: What Achieving 75 Percent Recycling Means for California, NRDC, 2014 Higher estimate: The Economic Benefits of Recycling in Ontario, AECOM, 2009
Annual Income	Estimate based on about $322 of salary generated per tonne of waste diverted.	The Economic Benefits of Recycling in Ontario, AECOM, 2009
Annual Savings in Municipal Disposal Costs	Based on 2019 total disposal costs for Durham Region, estimated at $90 per tonne, and includes collection, transport, transfer and disposal.	2019 Solid Waste Management Servicing and Financing Study, Regional Municipality of Durham, Council Report, 2019

Measure	Methodology	Sources
Annual GHG Reduction	Estimated at 8 tCO_2e per tonne of textile reused. *Cars taken off the road equivalent* calculated using a 3.26 factor.	A Carbon Footprint of Textile Recycling: A Case Study in Sweden, November 2014, Journal of Industrial Ecology 19(4) Greenhouse Gases Equivalencies Calculator – Calculations and References, Natural Resources Canada, https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/refs.cfm

Endnotes

1 The Global E-waste Monitor 2020, 2020, United Nations University et al.

2 National Waste Characterization Report: The Composition of Canadian Residual Municipal Solid Waste, Environment and Climate Change Canada, 2020

3 Estimates based on indicators published in "The Economic Benefits of Recycling in Ontario - Final Report", AECOM, prepared for the Ontario Ministry of the Environment, 2009

4 According to a 2019 Statistics Canada Survey on household hazardous waste, 84% of Ontarians with unwanted used oil or antifreeze brought it to a depot or drop-off centre, or a retailer/supplier, and 16% still had them (stored). In addition, 74% of Ontarians with unwanted pesticides brought it to a depot or drop-off centre, while the remaining still had them, stored (25%). See: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810012601

5 Association of Municipalities of Ontario 2021 comments on draft Hazardous and Special Products regulation, https://www.amo.on.ca/sites/default/files/assets/DOCUMENTS/Waste/2021/MunicipalSubmissionProposedProducerResponsibilityRegulationHazardousSpecialProductsERO019283620210326.pdf

6 The new Hazardous and Special Products regulation only requires producers of fertilizers to register and perform promotion and education, including how to properly use, share or dispose of unused fertilizers. There is no collection requirement. Hence, fertilizers where included in this estimate of products not covered by the regulation.

7 Applies to pesticides not covered under the current regulation. According to municipal lab pack analysis between 2017 and 2019, about 89% of pesticides collected by municipalities are not covered under producer responsibility.

8 This is about 14% of all pharmaceuticals and 6% of all sharps collected in 2019, including by producers and municipalities collectively. See, RE: Proposed Regulation for Municipal Hazardous or Special Waste under the Resource Recovery and Circular Economy Act, 2016, AMO, https://www.amo.on.ca/advocacy/waste-diversion/hazardous-special-products-ie-municipal-hazardous-special-wastehousehold

9 Evaluating the consequences of household hazardous waste diversion on public health and ecological risks of leachate exposure, International Journal of Environmental Science and Technology, H. Gholampour Arbastan, 2022

10 Association of Municipalities of Ontario 2021 comments on draft Hazardous and Special Products regulation, https://www.amo.on.ca/sites/default/files/assets/DOCUMENTS/Waste/2021/MunicipalSubmissionProposedProducerResponsibilityRegulationHazardousSpecialProductsERO019283620210326.pdf

11 Corrosives include for example grout cleaner, masonry cleaner, pool and hot tub cleaners, rust remover, etc.

12 Flammables include gasoline, other fuels (camping and fondue fuel, kerosene), fuel additives and treatments, adhesives, lubricants, degreasers, used oil, brake fluid, acetone, paint stripper and removers, varsol, other solvents. These are only partly covered in Ontario – solvents are covered, but not others.

13 Includes insecticide, insect repellent, fungicide, herbicide, weed control, ant killer, for example

14 Applies to all pressurized containers including aerosols.

15 Include automobile switches (e.g., convenience lighting), switches in large appliances (e.g., chest freezers, gas light pilot ranges and clothes washing machines), and switches in other products (e.g., sump pumps). The Products Containing Mercury Regulations (SOR/2014-254) prohibit the manufacture and import of most mercury-containing products into Canada, including switches containing mercury. In Ontario, automotive recyclers are required under O. Reg. 85/16 to remove mercury switches from vehicles before the shredding of the hulk. There is no requirement related to the collection of mercury switches in gas ranges or washing machines; however, these are legacy waste streams, with the number of switches available for recovery decreasing each year.

16 Post-Consumer Carpet: Barriers and Opportunities for Reuse, CARE, 2021, https://carpetrecovery.org/wp-content/uploads/2021/06/CARE-CA-Reuse-Report-5-28-21-ADA-Final.pdf

17 Based on Carpet America Recovery Effort's 2017 CARE Recycled Content Products Catalog, https://carpetrecovery.org/wp-content/uploads/2014/04/2017-CARE_Catalogue_FINAL6-MB-1.pdf

18 RPRA Datacall, 2019, Other Recyclables, https://rpra.ca/programs/about-the-datacall/2019-datacall-reports/

19 Canadian Carpet Recovery Effort, 2014, https://carpetrecovery.org/wp-content/uploads/2014/04/Canadian_Carpet_Recovery_Effort.pdf

20 Viking Recycling, https://www.vikingrecycling.ca/

21 Canadian Carpet Recovery Effort, 2014, https://carpetrecovery.org/wp-content/uploads/2014/04/Canadian_Carpet_Recovery_Effort.pdf

22 Based on USEPA WARM, https://www.epa.gov/warm. Figures converted to metric tonnes.

23 Low estimate based on "Quantifying the Economic Value of Alberta's Recycling Programs, 2019" and high estimate based on "Assessment of Economic and Environmental Impacts of Extended Producer Responsibility Programs in BC", https://www2.gov.bc.ca/assets/gov/environment/waste-management/recycling/recycle/rel-res/2011_assessment_of_economic_environmental_impacts_of_extd_producer_responsibility_programs_bc.pdf

24 West and East Coast states make moves in carpet EPR, https://resource-recycling.com/plastics/2022/05/11/west-and-east-coast-states-make-moves-in-carpet-epr/

25 Based on Annual Reports for Carpet America Recovery Effort, 2019 and 2020, see: https://calrecycle.ca.gov/carpet/results/

26 2020 Annual Report Clarifications – CARE, https://www2.calrecycle.ca.gov/Docs/Web/120123

27 Based on the Annual Report for Carpet America Recovery Effort, 2020, https://calrecycle.ca.gov/carpet/results/

28 Durable Goods: Product-Specific Data, USEPA

29 Challenges to the Circular Economy: Recovering Wastes from Simple versus Complex Products, Carly Jacobs et al., 2022

30 When it comes to household furniture, donate don't ditch!, https://habitathm.ca/when-it-comes-to-household-furniture-donate-dont-ditch/

31 Currently IKEA is the only furniture seller or manufacturer to collect used furniture. IKEA launched a sell-back program in Canada for certain IKEA products (e.g., dining table, dressers, and desks). Items received are either sold under IKEA's circular hub or donated to a local charity.

32 Mainly based on France's experience with EPR for furniture

33 Waste Prevention: The Environmental and Economic Benefits for Canada, National Zero Waste Council, 2021, http://www.nzwc.ca/Documents/NZWC-WastePreventionReportOverview.pdf

34 Ibid.

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