


# Part 1: Ontario Has a Waste Problem

## Abstract

Ontarians produce an enormous amount of waste. Most of it ends up in landfills. Landfilling and incinerating waste has adverse environmental consequences, and siting new facilities is very hard. Part 1 explores the environmental consequences of our high-consumption, high-waste lifestyle in order to better understand why enhanced waste diversion is so important.



We throw out too much. Most of it goes to landfill.

**PART 1:  
ONTARIO HAS A WASTE PROBLEM**

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# 1.0 Ontario Generates a Lot of Waste

Ontario produces an astonishing amount of waste: about 12 million tonnes annually.<sup>1</sup> Overall, Canada produces more garbage per capita than most other countries in the world.<sup>2</sup> With over a third of the country's population calling Ontario home, the province carries a fair share of the blame for that title.<sup>3</sup>

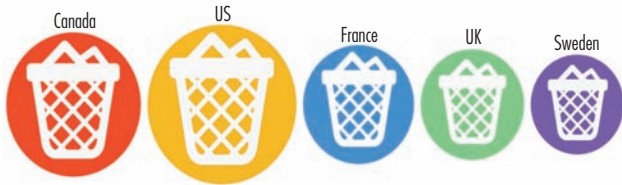


FIGURE 1.1. Canada's annual waste generated, calculated per person (850kg), compared to the U.S. (940 kg), France (700 kg), U.K. (653 kg) and Sweden (587 kg). Source: The World Bank, *What a Waste: A Global Review of Solid Waste Management* (2012).

We throw out all kinds of stuff: food, electronics, mattresses, pharmaceuticals, appliances, tools, lightbulbs, batteries, carpets, construction materials, textiles, plastics, paper, packaging and much more.

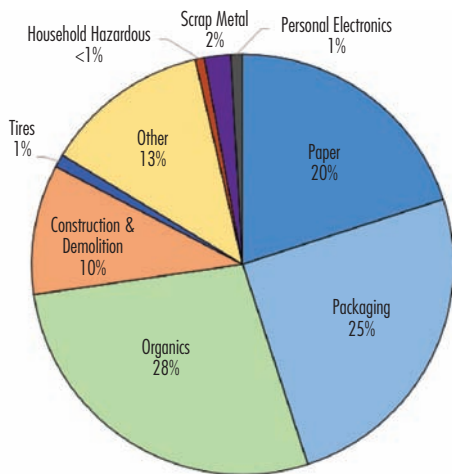


FIGURE 1.2. Rough breakdown of Ontario's waste stream. Source: Data from the MOECC's 2013 *Waste Reduction Strategy*.

Some of this waste we recycle or compost, but **most of our waste is thrown out** in landfills (and some in incinerators). In 2014, the most recent year for which full data is available, Ontarians sent about 9 million tonnes of materials to landfills and incinerators.<sup>4</sup> Two thirds of this waste – about 6 million tonnes – went to Ontario landfills, while 2.7 million tonnes was exported to landfills in the United States, and 3% went to incineration<sup>5</sup> (see Figure 1.3).



FIGURE 1.3. Annual generation and disposal of waste in Ontario in 2014. Source: Environment and Climate Change Canada, *National Inventory Report 1990-2015: Greenhouse Gas Sources and Sinks in Canada, Part 2* (2017).

## 1.1 Why is Waste a Problem?

### 1.1.1 Environmental Consequences of Waste Disposal

**Poorly managed waste can cause serious environmental problems.** One major issue is that when waste is disposed in landfill and rainwater filters down through that buried waste, it picks up metals, chloride and other minerals, nutrients, chemicals and other toxic materials, creating a contaminated liquid called “leachate.” Some older landfills, which lacked rigorous leachate collection systems, contaminated ground and surface water with their leachate. Modern landfills are now required to have

<sup>a</sup> There are a number of different sources of data on waste disposal and diversion rates in Ontario. In this report, we rely largely on Statistics Canada information, but both the Ontario Waste Management Association and the Resource Productivity and Recovery Authority also collect data on certain aspects of the Ontario waste sector. The numbers vary somewhat from data source to source, and the most recent year available differs by source as well. We have chosen to rely primarily on Statistics Canada, where available, because it provides a complete record of data relating to both the residential and non-residential sectors.

expensive, leachate collection systems, which must be operated for decades into the future.<sup>6</sup>

Decomposing waste in landfills also produces gases that can cause fires, damage vegetation and create unpleasant odours. Some of these gases are powerful greenhouse gases (GHGs) that drive climate change. In 2015, 5.2% of Ontario's total GHG emissions –

8.6 megatonnes – were reported to come from waste, with 8 megatonnes (mostly methane) coming directly from landfills and incinerators (the other 0.6 megatonnes came from composting and wastewater treatment) (see Figure 1.4).<sup>7</sup> Although some of this methane is captured and can be used as fuel (marketed as “biogas” or “renewable natural gas”), most of the gas generated is released to the atmosphere (see *Focus on Climate* box below).

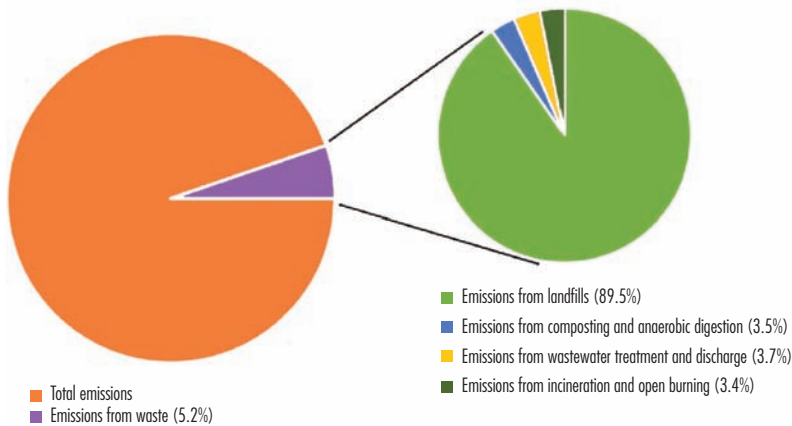


FIGURE 1.4. Portion of total greenhouse gas emissions reported from waste and breakdown of sources of waste emissions.

Source: Environment and Climate Change Canada, *National Inventory Report 1990-2015: Greenhouse Gas Sources and Sinks in Canada, Part 2* (2017).

### 1.1.2 Focus on Climate: Waste has a Bigger Impact Than We Think

The official inventory, shown in Figure 1.4, of the waste sector's contribution to Ontario's GHG emissions do not tell the whole story. As reported by the ECO in our 2016 Annual Greenhouse Gas Progress Report, *Facing Climate Change* (see Chapters 2 and 3), the emissions officially attributed to waste understate the total amount and impact of GHG emissions that come from waste and drive climate change.

#### ***Official reports don't include all the waste generated in Ontario***

For the purposes of calculating Ontario's GHG emissions from waste, only the emissions from waste disposed of within the province are included. This methodology is consistent with international emissions reporting guidelines that are used by countries when reporting their GHG emissions (as required by the United Nations Framework Convention on Climate Change).<sup>8</sup> This approach, however, does not provide Ontarians with a complete picture of our contribution to global GHG emissions from waste.

For example, it fails to include the emissions from the millions of tonnes of waste shipped out of Ontario each year to landfills in the United States. Because much of this waste is carried by private haulers, it is difficult to determine the exact amount of waste involved. The federal government estimates that about 2.7 million tonnes of waste were exported in 2014 (although according to MOECC, the amount could be as much as 3.3 million tonnes) – roughly 30% of all waste generated in Ontario.<sup>9</sup>

#### ***Official reports underestimate the amount of waste going into Ontario landfills***

The most recent federal data (from Statistics Canada and Natural Resources Canada) reported that Ontario landfills – the main source of the waste sector's GHG emissions – received approximately 6.1 million tonnes of waste in 2014, resulting in 7.7 megatonnes of GHG emissions.<sup>10</sup>

*continued...*



However, in 2016, the Ontario Waste Management Association released its first annual *State of Waste in Ontario: Landfill Report*. Based on a survey of the Association's members, this report concluded that Ontario landfills received 7.7 million tonnes of waste in 2014.<sup>11</sup> This suggests that the Government of Canada is significantly underestimating the amount of waste landfilled in Ontario each year, and thus the amount of GHGs generated by Ontario landfills and the waste sector.

### ***Official reports overestimate the efficiency of gas capture systems***

Large Ontario landfills are required to capture, and then use or burn, GHGs generated from the site.<sup>12</sup> Government estimates of the amount of GHGs released from landfills rely on assumptions about the efficiency of these capture systems; overestimating the level of efficiency will underestimate the gases released. The ECO has previously documented flaws in these assumptions, which mean that official estimates understate GHG emissions from Ontario landfills (see the ECO's 2012 Annual Greenhouse Gas Progress Report, *A Question of Commitment*, pp. 68-69).

### ***Official reports hide the near-term importance of methane***

Canada follows internationally accepted protocols when it calculates GHG emissions from each sector in each province. These protocols include factors that are used to convert the measure of different types of gases into one common unit based on the gas' unique climate change impact. This allows governments to more easily tally and compare the total emissions contribution of different sectors and different gas types.<sup>13</sup>

**Much of the gas released from landfills is methane, a potent greenhouse gas.** In recent years, it has become clear that the impact of methane on climate change is more potent than previously thought.<sup>14</sup> As a result, the factor used to convert the measurement of methane into the common unit underrepresents its climate change impact – meaning that methane's impact has been underreported. When estimating the impact of a given GHG, most calculations focus on the impact of the gas over a 100-year time span; this hides the fact that methane is about 100 times more potent than CO<sub>2</sub> during the time it stays in the atmosphere (about 12.6 years).

Taken together, these two factors mean that the impact of methane on the climate has historically been underestimated. When the ECO recalculated the contributions of methane from waste based on a higher – and, in the ECO's opinion, more accurate – global warming potential on a 20-year basis, we found that waste is responsible for 15% of all Ontario emissions – not 5.2% as is officially reported.<sup>15</sup>

Air pollution is another problem created by waste. Incineration releases particulate matter and small amounts of toxic pollutants, such as dioxins and furans, which are known contributors to health problems.

Waste also ends up as litter. Litter is unsightly and expensive to manage, and can pose significant problems to ecosystems and wildlife. For example, plastic garbage can break down and be ingested by microscopic organisms and larger wildlife, introducing toxic chemicals into their bodies and the food chain (for more on this issue, see Part 3.2 of the ECO's 2014/2015 Annual Report).

Lastly, but certainly not least, every missed opportunity to reuse and recycle materials that otherwise go into the waste stream (and to design products to be reusable and more durable in the first place), means new materials must be extracted from the earth. Extracting new materials (e.g., through mining) generates GHG emissions, water pollution, and toxic chemicals, as discussed below in *Life Cycle of a Cell Phone*. The amount of carbon dioxide embodied in the materials extracted and in the goods produced and transported around the world each day represent a massive, under-recognized source of GHG emissions. Further, throwing organic materials (like banana peels and corn cobs) in the garbage wastes valuable nutrients that could be spread on farm fields as compost, or turned into renewable energy.

## Life Cycle of a Cell Phone

The life of a typical smart phone makes a perfect case study of the significant environmental consequences of mining, refining and manufacturing a single product: GHG emissions are generated; landscapes are de-naturalized; water is polluted; and toxic chemicals are emitted at almost every stage of the industrial manufacturing process.

Cell phones have become one of the most ubiquitous signs of modern life. Over 85% of Canadian households subscribe to mobile phone services and almost 75% of Canadians have a smartphone (as opposed to a basic cell phone).<sup>16</sup> Smartphones, in particular, have dramatically changed how many of us interact with the wider world. For many, it is difficult to imagine being without the entire Internet at one's fingertips, let alone the convenience of being able to contact anyone at any time. As important as they are to so many, most cell phones lead relatively transient lives – they come and go quickly, with the average Canadian phone being replaced every 2.5 years.<sup>17</sup>

The 62 different metals<sup>18</sup> contained in the average cell phone must be mined from all corners of the globe, and then processed using and creating toxic chemicals that often contaminate the surrounding air, water and soil. By one estimate, the gold contained in just one phone creates 100 kilograms of mining waste.<sup>19</sup> Plastic, contained in equal part to metals in the average cell phone, is almost always made from fossil fuels and the plastic anticipated to be used in 2017 cell phone production will use over 7 million barrels of crude oil.<sup>20</sup> Other parts are made from materials like glass and ceramics,<sup>21</sup> which require sand, obtained from quarries, as a source ingredient.

These refined materials are then manufactured into component parts, and assembled into the cell phone. Globally, most of this work takes place in China.<sup>22</sup> During this part of the process, workers may be exposed to toxic materials like mercury and lead,<sup>23</sup> which have massive impacts on human health as well as the surrounding environment.<sup>24</sup> These phones are then shipped around the world, generating greenhouse gas emissions and packaging waste in the process.

A few short years later, these phones are discarded. Most Canadians give away, store or recycle their old cell phones, but about 5-10% of old cell phones are still sent directly to landfill.<sup>25</sup> In the landfill, the metals and plastics in cell phones can contribute to toxic leachate, which can pollute groundwater and soil. Additionally, failing to recycle cell phones means a missed opportunity to recover metals that can be reused. For example, copper can be completely recovered without losing quality, and the process uses about 80% less energy than required to mine and refine the same amount of virgin copper.<sup>26</sup> Moreover, it is becoming increasingly difficult to find economically accessible sources of many of the metals in cell phones, which may result in shortages of affordable metals.<sup>27</sup>



FIGURE 1.5. Life of a Cell Phone  
Source: Created by the ECO.





### 1.1.3 Waste Disposal Capacity

Another problem with throwing out so much waste is that it creates a powerful demand for landfills (and incinerators), which are unpopular neighbours. Few people want one of these facilities near them. Because of numerous environmental problems caused by older landfills (see the ECO's 2009/2010 Annual Report, *Redefining Conservation*, Part 6.1), it has become extremely difficult and expensive to find suitable locations for new facilities. Proposals for new or expanded landfills are often faced with intense public opposition and/or litigation from those concerned with potential environmental ramifications and/or decreased property values.

## 1.2 Why Do We Create So Much Waste?

**Waste is a complicated problem with many causes.**

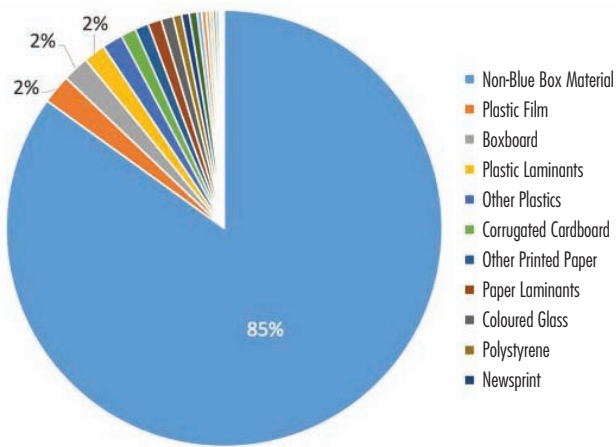
One factor is just how much we consume. The average Ontarian, like the average North American, has a lot of 'stuff.'<sup>28</sup> Global supply chains and improved technology provide Ontarians and people around the world with ever easier, cheaper access to almost any product they might desire. Moreover, much of that 'stuff' cycles faster than ever through our lives and homes. Cell phones are replaced every two and a half years on average, with many other electronics not lasting much longer.<sup>29</sup> Clothing, increasingly inexpensive and subject to the ever-changing trends of "fast fashion," often lasts only a season or two.<sup>30</sup> Many kitchens are dominated by packaged food, single-use coffee pods, and disposable cleaning wipes, pads and scrubbers.<sup>31</sup> Scale up this "out with the old, in with the new" mentality to other items, such as appliances and furniture, and the amount of waste we produce grows exponentially.

Constantly improving technology, declining prices, and the convenience of packaged food and disposable cleaning materials have all made life easier for many Ontarians, but today's consumer culture also creates massive, often invisible, environmental impacts. Most of the products in an average Ontario home are made from materials mined or manufactured outside of Canada, and curbside waste collection across most of the province means few of us see the volume of waste we generate in anything more than small weekly increments. As a result, many Ontarians never turn their mind to the impacts this high-consumption, high-waste lifestyle has on the environment.

Consumer culture is not the only factor. It can be challenging for even the most motivated consumer to avoid creating waste every day. For example, health and safety laws, fear of tampering, theft prevention and marketing all contribute to large amounts of packaging waste. Consumer products and appliances are often cheaper to replace than to repair, partly because they are designed that way and partly because labour costs where most products are made are so much lower than they are in Canada. Appliance certifications, such as EnerGuide, focus on operational efficiency and ignore durability.<sup>32</sup> "Best before" dates and liability laws may strive to protect health but also contribute to food waste. Bedbugs have made it challenging to reuse mattresses and upholstered furniture. Time-starved households may understandably choose convenience over waste minimization.

### 1.2.1 Complexity and Inconvenience

Another factor is likely the often-complex network of recycling options. While it is possible to recycle many items, from single-use batteries to used oil filters, the availability of recycling for individual materials differs from municipality to municipality, and many people are simply unaware of the options or find the distinctions confusing. Accordingly, about 15% of household garbage consists of recyclable materials that should have gone into the Blue Box:



Even when one knows about and understands the recycling options, it may not be convenient to make use of them. Throwing an item in the trash is far simpler than tracking down the proper recycling facility, especially in rural areas. Lack of infrastructure may pose another challenge. For example, many multi-unit residential buildings, which have much lower recycling rates than single family homes, were built with no easy way to accommodate source-separated materials. Typically, there is only one garbage chute, and there may be no appropriate space for recycling trucks to pick up recyclable materials.

FIGURE 1.6. Breakdown of recyclable materials found in the garbage.  
 Source: Continuous Improvement Fund, Co-Ordinated Waste Composition Studies Update.

