

Report prepared for

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# Executive Summary

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Courtney Powell, founder of Elevated Enviro, has been tasked by the Waste Service Department of the City of Edmonton to write a report on the implications of single-use plastics and items, and the effects of implementing a large scale, municipal ban of these items.

The City of Edmonton is considering implementing such a ban, and this investigation will provide insights on the outcomes of this potential action based on industry experience and expert-level knowledge of the subject matter from an unbiased, fact-based position.

This report will establish the context that gives rise to bans of this sort and examine the effectiveness of such bans by reviewing examples of this action on a regional, national and international level. In addition to considering the effect on plastic pollution, there are other considerations when banning single-use plastics and items, and many other effects that this action has in other important areas of the economy, environment and society. Elevated Enviro will also review programs that consider plastic pollution within the framework of other environmental issues.

By conducting a thorough and balanced investigation and consideration of all aspects of the aforementioned scenario, this report will conclude with recommendations for the City of Edmonton.



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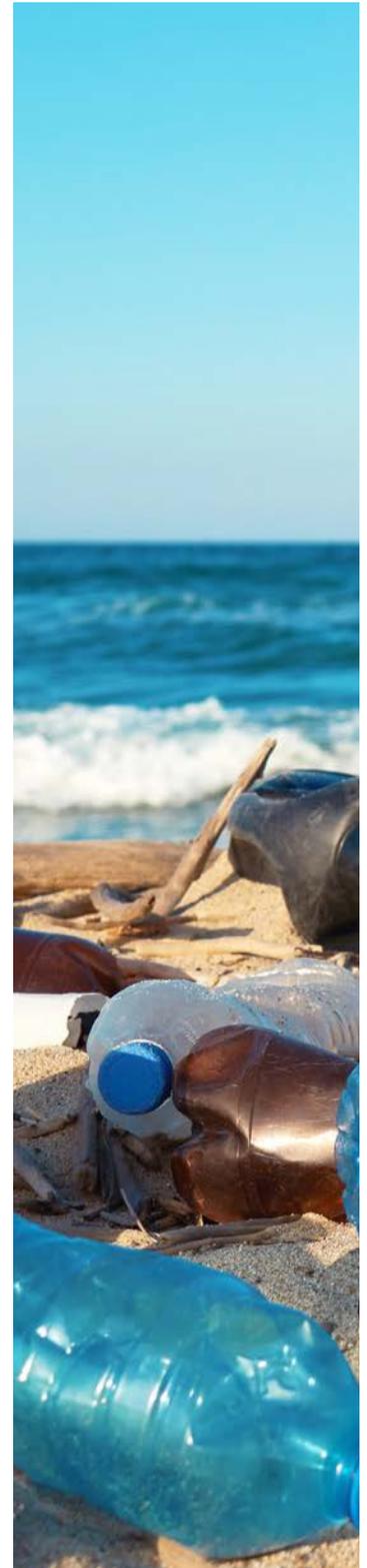
# Drivers of Single-Use Bans

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Awareness is growing regarding the impact our communities, municipalities and nations have on the world's environment. Issues like greenhouse gases, climate change and global warming have been in news headlines for decades. More recently, there has been growing attention towards consumerism and waste from our everyday products. Single-use products and their use have been a focus of discussions on how we can reduce our impact, particularly when considering single-use plastics. Pressure has been building for municipalities to adjust to changes by global recycling markets who have limited the amount and types of recyclable items they accept. Traditional or existing markets, such as China, have recently made dramatic changes to their procedures, and what they will accept and process. In February 2013, China started to inspect imported loads of recyclables with greater scrutiny; due to this increased scrutiny and pressure from global environmental movements, they made changes to the level of contamination they will accept (examples of contamination include mixed grades of plastic, mixed or unsorted materials such as paper in a plastic bale, or unwashed or unclean items still containing waste or organic material). China implemented new guidelines, shifting to a "0.5 percent contamination limit" (Resource Recycling Inc. 1).

Pressure is increasing on municipalities to act, as the realities of how much single-use plastic (and plastic in general) is actually recycled; these practices and policies are being examined, which is leading to some staggering information. The fact that "Canada only recycles 11 per cent of its plastic waste, letting the rest accumulate in landfills or the environment" (Environmental Defense 2) it is a hard for citizens to accept, and is becoming unacceptable to a growing percentage of the population. This evidence signifies that there is a major gap between what is possible and what is actually happening to manage and mitigate our environmental impact, and only adds to growing public concern and call for change. The amount of plastic waste that ends up in our environment is astounding, with at least an "estimated 8 million tonnes of plastic are dumped into the world's oceans every year" (2).

Many believe that single-use bans act to protect the environment, reduce plastic waste and limit plastic pollution. As a result of these beliefs and this growing pressure, many communities, municipalities and countries have begun to implement bans on single-use plastics and items to limit these concerns, and slow the rate at which this waste is being generated. This report shall suspend this belief to examine the implications of single-use bans from an unbiased and impartial position. To get an idea of the scope and scale of such a ban, the next three segments will review some of the regional, national and international bans that have been implemented.



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# Examples of Single-Use Bans in Alberta

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There have been single-use plastic bans in Alberta for almost a decade, with one of the first municipalities to implement a single-use ban being Wood Buffalo in 2010. Wood Buffalo's ban is for single-use bags that are "less than 2.25 mils (.571 millimeter) thick polyethylene; and/or pulp or paper" ( Municipality of Wood Buffalo 3); however, it does allow single-use bags for food service application, such as fast food meals or items, or medical applications, such as prescriptions.

More recently, Wetaskiwin City Council passed the Plastic Checkout Bag Bylaw at their regular October 9, 2018 City Council Meeting (City of Wetaskiwin 4). As of July 9th, 2019 Wetaskiwin will ban "selling or distributing single-use plastic checkout bags thinner than 2.0 mils thick" (4). Similar to the Wood Buffalo ban, single-use plastic bags can still be used in some food service applications, dry cleaning and floral establishments for their normal course of business, in addition to non-profit organizations.



Edmonton, Calgary and St. Albert are currently considering single-use bans of their own, and the effects of such an action. The details of these bans are being debated and evaluated in city council meetings and public engagement events, in addition to various environmental and advocacy groups, as well as the public at large in various channels of discussion.

Communities in Alberta are not alone in these actions; many municipalities across Canada have implemented single-use and single-use plastic bans. They all share similar goals of reducing the amount of plastic waste and working to address plastic pollution. Bans range from types of bags available for use, some just plastic and others ban all kinds. A few are detailed next.



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# Examples of Single-Use Bans in Canada

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Recently, a by-law to regulate and ban the use of check out bags was approved in Victoria, B.C. The by-law defines a checkout bag to be “any bag intended to be used by a customer for the purpose of transporting items purchased or received by the customer from the business providing the bag” (City of Victoria 5). Their ban also includes “bags used to package take-out or delivery of food...and includes Paper Bags, Plastic Bags, or Reusable Bags” (5).

The Victoria ban states that no business shall provide a checkout bag and will only do so “if: (a) the customer is first asked whether he or she needs a bag; (b) the bag provided is a Paper Bag or a Reusable Bag; and (c) the customer is charged a fee not less than (i) 15 cents per Paper Bag; and (ii) \$1 per Reusable Bag. (3) For certainty, no Business may: (a) sell or provide to a customer a Plastic Bag; or (b) provide a Checkout Bag to a customer free of charge. (4) No Business shall deny or discourage the use by a customer of his or her own Reusable Bag for the purpose of transporting items purchased or received by the customer from the Business” (5). This is very extensive legislation, but similar to some of the Alberta bans, there are some exceptions for bulk food, prescriptions and flowers.



On June 1st, 2019 Vancouver B.C. will follow Victoria in banning plastic bags but will take it a step further by including straws, disposal cups and other containers. CBC News states that “2.6 million plastic-lined paper cups and two million plastic bags are thrown in the garbage in Vancouver every week” (6). They also state that “businesses must choose one of the following options: 1. No distribution of disposable cups or plastic/paper shopping bags at all, 2. Charging an extra fee for disposable cups or plastic/paper shopping bags, 3. Other solutions that will be proposed and finalized through consultation” (6).



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# Examples of Single-Use Bans in Canada

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Saint-Lambert, Quebec implemented a single-use bag ban on April 22, 2018. According to the City of Saint-Lambert, “Somewhere between 1.4 and 2.7 billion shopping bags, mainly made of plastic, are distributed every year” in Quebec (City of Saint-Lambert 7). The reasoning behind the ban is that “banning single-use bags is to reduce the waste they generate as well as their environmental impact on nature and wildlife” (7). The type of plastic bag being banned is very similar to other bans, but includes “Plastic shopping bags that are less than 50 microns thick (lightweight)” (7). The explanation behind this ban on 50 microns thick is that “Bags that are thicker than this are unlikely to be swept away by the wind or water and to create litter.” (7). Again, much like the other bans explored here, exemptions are included for bulk food, prescriptions, dry cleaning and floral uses.



As more bans are implemented, focus on and momentum by other municipalities to follow suit is increasing (as is pressure). It seems clear that municipalities have identified that single-use plastic pollution is a concern of their residents, but also as an opportunity to be seen as a global leader on tackling pollution and environmental issues. These bans have not just been implemented in Canada, but around the globe. Next, we will review the scope of these international bans.

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# Examples of Single-Use Bans Internationally

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The European Union has recently joined the growing list of governments enacting legislation, as “Single-use plastic items such as straws, forks and knives as well as cotton buds will be banned in the European Union by 2021”(Roth 8). This decision comes from “Growing concerns about plastic pollution in oceans and stories of dead whales with plastic in their stomachs, together with China’s decision to stop processing waste” (8). The vote addressed “banning 10 single-use plastics including plates, balloon sticks, food and beverage containers made of expanded polystyrene and all products made of oxo-degradable plastic”(8). The EU says that “EU countries can choose their own methods of reducing the use of other single-use plastics such as takeout containers and cups for beverages”(8).



In South America, Chile has had series of bans enacted on single-use plastics and other items. “In 2017, under the presidency of Michelle Bachelet, the country banned the use of plastic bags in 100 coastal communities” (United Nations Environment Programme 9). In May 2018, they took the ban one step further and “On 30 May, Chile became the first South American country to approve a nationwide ban on single-use plastic bags” (9). Other countries in Central and South America have implemented their own versions of a single-use ban; “Antigua and Barbuda was the first country in the region to ban plastic bags in 2016. Soon after, Colombia passed a similar ban, and in 2017 applied a tax to large plastic bags” (9).

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# Examples of Single-Use Bans Internationally

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In January 2019, South Korea implemented a ban on plastic bags, focusing on supermarkets. “It will affect 2,000 major supermarkets and 11,000 supermarkets with a sales floor space greater than of 165 sq. m. Bakeries will also be barred from handing out plastic bags” (Osbourne 10). Similar to other bag bans, bags will still be issued for some food related uses, particularly wet items such as fish or meat. “Violating the ban comes with a fine of up to 3 million won (£2,100)” or \$3,487.00 dollars (10).



*Single-use plastic items such as straws, forks and knives as well as cotton buds will be banned in the European Union by 2021.*

Roth 8

These are just three international examples of governments that are acting against plastic pollution by way of a plastic bag ban and single-use ban. Action by countries in Latin America, Europe and Asia signifies the growing global attention to these issues, and also shows that this isn't solely a North American problem, but one facing the entire world. As a reaction to plastic waste ending up in our landfills, water ways and oceans, bans are being implemented as governments try to determine solutions or the best way to combat these issues. Plastic bags and other single-use items become pollution because of the failure to recycle these items where possible. It makes common sense that restricting their use will limit the amount that becomes pollution. The next section will test this common sense understanding and look at the effectiveness of bans.

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# Effectiveness of Single-Use Bans

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Research conclusively shows that bans on single-use plastic bags significantly reduce the amount of this litter in residential areas, storm drain, rivers and other waterways. As many of these more comprehensive bans are newly enacted, research continues to be conducted on the effectiveness of this legislation.

A study was conducted by Scientist Action and Advocacy Network (ScAAN) to examine the effectiveness of single-use plastic bans and associated fees throughout the United States. It shows that “in San Jose, CA, a ban on thin plastic bags, coupled with a 10-cent fee on paper reduced bag litter in rivers to less than a third of the pre-ordinance levels. Neighborhood plastic bag litter from plastic bags dropped by more than half.

The prevalence of reusable bags increased from 4% to 62% post-ordinance and the prevalence of customers not using a bag increased from 19% to 43% post-ordinance (11).

The major recycling collection company in San Jose cut the time spent untangling plastic bags from their machines nearly in half” (11). A 2014 ban in Austin, Texas “succeeded in decreasing Austin’s thin plastic film waste in the litter and recycling streams” (11). The conclusion was that “all studies show that after a Ban/Fee Hybrid was implemented, many more people started bringing reusable bags-- and the number of people who chose not to use a bag at all at the register increased dramatically” (11).

It is clear from this comprehensive study that plastic bag bans and fees for their use do decrease plastic pollution and use of plastic bags.

These findings are supported by conclusive evidence presented in various other studies. In 2017, a review was conducted looking at “International policies to reduce plastic marine pollution from single-use plastics (plastic bags and micro-beads)” (Xanthos and Walker 12), which was conducted by examining a variety of plastic bag levy’s/fees and bans. The data on these bans was relatively new, but their principal conclusion was that “Despite limited outcome data, it is recommended that the rapidly growing global trend of increased levies or, better still, outright bans continue” (12).

The importance of this issue is well put by a recent article in Scientific American; “The non-profit Worldwatch Institute reports that at least 267 species of marine wildlife are known to have suffered from entanglement or ingestion of marine debris, most of which is composed of plastic;

Tens of thousands of whales, birds, seals and turtles die every year from contact with ocean-borne plastic bags” (13).



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# Effectiveness of Single-Use Bans

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There is no doubt that plastic pollution is severely impacting marine wildlife in extremely negative ways, and there is a growing body of evidence that supports this conclusion. Photos of the devastating effects this plastic has on marine life are widely circulated on the internet (via social media) or traditional forms of media, and are largely responsible for the growing attention to this problem and public support for action against it.

*A recent European Commission study on the impact of litter on North Sea wildlife found that some 90 percent of the birds examined had plastic in their stomachs.*

*Scientific American (13)*



**We can conclusively state that plastic bag bans reduce plastic pollution.** With that in mind, the next step is to consider is how does a plastic bag ban act in relation to other environmental issues and concerns. There are alternative products available for consumers to substitute, but the impact on the environment caused by the use and production of such products must be considered. Single-use plastic products and bags are currently used by so many people globally that a shift in consumer behavior **will have implications for the environment in other ways that must be considered to truly have a positive effect.**

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# Impacts Beyond Plastic Pollution

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There is no question that single-use plastic bag bans achieve the goal of reducing the amount of bags that end up as pollution in our communities, landfills, waterways and oceans. However, what these bans don't consider is their total environmental impact on areas beyond reducing plastic pollution.

These bans often act counter to reducing greenhouse gas emissions, as the production of alternatives causes more greenhouse gases to be emitted. This occurs because the total resource cost of single-use plastic bags is dramatically lower than the alternatives that consumers turn to after a ban is enacted. Examples of alternative products would be paper or cloth reusable shopping bags, paper or metal straws in place of plastic ones, or wood or organic-based single-use items.

In most cases, the difference in resources is attributed to the manufacturing and shipment of these alternative products; the alternatives use more material to manufacture or take more resources to do so. These alternatives are also typically heavier, which means more fuel is needed for transportation (and therefore, more emissions to ship these items to the end user).

One of the reasons that plastic is so prevalent in the packaging industry is the cost efficiency of the material versus these alternatives, which is derived from its efficiency of resource use. It is simply cheaper and easier to manufacture, produce, ship, and use plastic than alternative products. Following are examples of this resource differential, as well as research that supports these important facts.



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# Impacts Beyond Plastic Pollution

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An article by the World Resources Institute states “Denmark’s Ministry of Environment and Food found that **you would need to reuse a paper bag at least 43 times** for its per-use environmental impacts to be equal to or less than that of a typical disposable plastic bag used one time. **An organic cotton bag must be reused 20,000 times to produce less of an environmental impact than a single-use plastic bag. That would be like using a cotton bag every day for nearly 55 years.** (Note that these figures aggregate the bags’ impact on water use, CO2 emissions, land use and more, but they do not include their impact on plastic pollution.)” (14).

Taking away the consideration of plastic pollution, the single-use plastic bag is actually a more environmentally friendly option when considering land use and emissions caused by the production of alternatives. **A plastic bag ban alone would act counter to other environmental goals, like reducing emissions and ensuring effective land use.**



A 2016 article by Wired.com details that the use of cotton reusable bags may seem ideal but what is not considered is that “a cotton bag has major environmental impacts of its own. Only 2.4 percent of the world’s cropland is planted with cotton, yet it accounts for 24 percent of the global market for insecticides and 11 percent for pesticides... A pound of cotton requires more than 5,000 gallons of water on average, a thirst far greater than that of any vegetable and even most meats” (Adler 15). Ultimately, the article concludes that:

*The larger takeaway is that no bag is free of environmental impact, whether that’s contributing to climate change, ocean pollution, water scarcity, or pesticide use.*

Adler 15

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# Impacts Beyond Plastic Pollution

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When it comes to paper vs plastic, plastic comes out on top once again from an emission, water and land use efficiency standpoint. A June 2018 article from Clean Water Action states that “the production of paper bags is much more resource intensive in terms of energy and water” (Molinaro 16). The article also highlights clearly that “paper bags have more mass and are much heavier than plastic bags which means they require more fuel to transport”(16). Molinaro goes on to state that “**seven trucks are required to transport two million paper bags whereas only one truck is needed to transport the same number of plastic ones**” (16). This clearly demonstrates that the use of these alternative products is not a perfect (or even better) solution, and has unintended consequences to other aspects of the environment.



Food waste may be negatively impacted and actually increase upon implementation of bans on single-use plastics. A study by Denkstatt shows that the use of polypropylene bags for plaited yeast buns **dropped food waste to “0.8% food waste instead of 11%”**(17). The same study shows that a 350g cucumber with packaging will **reduce its food waste to “4.6% waste” (17) from 9.4% waste”** (17). The study also claims that the “typical impacts per kg of fresh food” (17) when packaged “**will increase CO2 levels by 70g”** (17) **but the reduced food waste will save “350g of CO2”** (17). The studies conclusion was “in most cases the protective function of food packaging is more important than the impact of different packaging materials, also regarding their recyclability”(17).



Based on the evidence presented here, there is a dilemma when considering total environmental cost, and a need to determine what our collective priorities are. If we want to reduce plastic pollution, bans on these items can be very effective in doing so. **However, banning plastic is counterproductive when considering other environmental goals like reducing CO2 emissions, land use and total resources to create products.** To find a balance between these two realities, the next section will review alternative options that help reduce plastic pollution and total resources.

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# Reducing Plastic Pollution VS Total Resource Cost

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When thinking about the value chain of material waste and recycling, there are five main categories: manufacturing, collection, sorting, processing and markets for re-manufacturing. Within each one of these categories, there could be opportunities to create efficiencies that would reduce waste and increase recycling. This section will review other strategies than single-use bans that could reduce plastic pollution while considering goals of limiting land use and emissions.

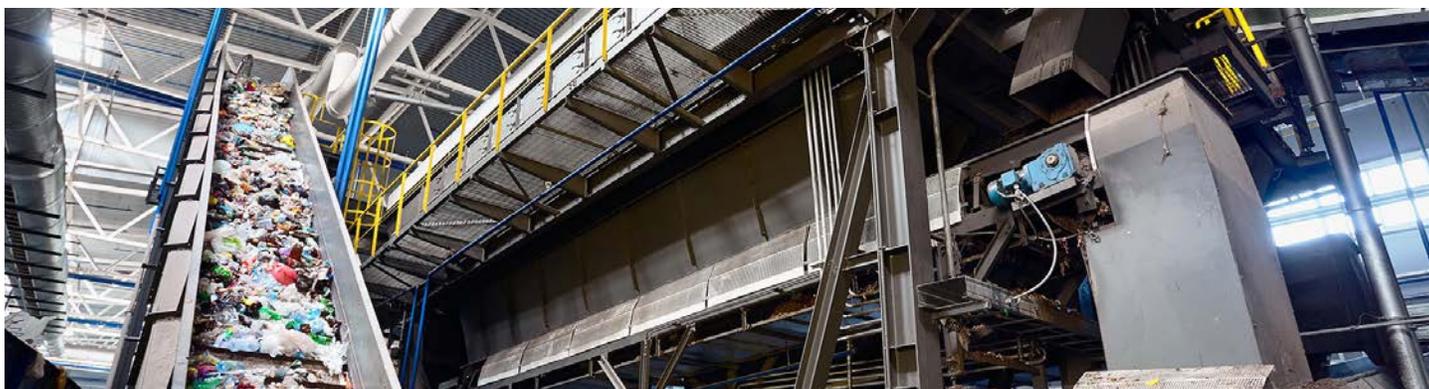
Effective Extended Producer Responsibility Programs (EPR) can reduce the amount or limit the kind of materials manufactures use. EPR means that “producers are responsible for designing, operating and paying for programs to manage the products and packaging they supply into the marketplace at end of life” (EPR Canada 18). This removes the financial burden from municipalities, as they have traditionally been responsible for the waste that is produced from these manufactures. For example, “in May 2014, BC launched North America’s first 100% EPR program through which producers assumed full financial and managerial responsibility for residential recycling of packaging and printed paper (PPP)” (18).

Quebec has an EPR program that “has addressed costs associated with non-designated materials collected through municipal recycling programs and sharing those costs between municipalities and producer responsibility organizations” (18). A 2017 study by EPR Canada claims that these programs have increased “significant tonnages of resource materials being recovered for recycling instead of being disposed of in landfill” (18). However, data on the impact of these EPR programs is difficult to collect as there is no standardized process across different regions.

EPR’s and the growing pressure on manufactures to reduce waste have encouraged companies like Procter & Gamble to create and fund associations to help reduce the packaging they use, collect the waste they produce and improve sorting processes.

In 2019, a group of 25 companies including P&G, Shell and Exxon Mobile created The Alliance to End Plastic Waste. They have committed “\$1bn (£778m) over the next five years, with an aspiration to raise that to \$1.5bn (£1.2bn) if further members join” (Harvey 19) to address the issue of plastic waste. The fund is intended to “invest in a wide variety of projects, including research and development into new recycling technologies, building infrastructure to collect and recycle waste, and cleaning of areas where plastic waste concentrates, such as in rivers” (19).

The association’s first step was to support The Incubator Network by Circulate Capital and Second Muse. The Incubator Network is to “invest in a wide variety of projects, including research and development into new recycling technologies, building infrastructure to collect and recycle waste, and cleaning of areas where plastic waste concentrates, such as in rivers” (Alliance to End Plastic Waste 20).



# Reducing Plastic Pollution VS Total Resource Cost

Other companies are taking a proactive stance to reducing plastic waste. Crayola has recently launched their Color Cycle program where “through this initiative, students in K-12 schools across the continental United States and parts of Canada can collect and repurpose used Crayola markers” (21).



Spud.ca has launched their Pink Bag program; “this program aims to tackle single-use flexible plastic that is not accepted by curbside recycling programs” (Austin 22). Consumers that purchase products that use the “Pink Bag” send the bag back for Spud.ca to recycle. The bags get recycled through a partnership with Terra Cycle, a company that has a network of recycling facilities that can process various types of products.



## Source Separation:

*When an end-user washes & separates all materials to be recycled before they are collected and sent to the processing facility.*

Terra Cycle is another example of a company that helps reduce single-use product and plastic pollution while considering emissions and land use. They achieve this through administering national programs with schools, direct to consumers and direct to businesses; these programs typically involve purchasing a box to sort a specific range of products, and then those groups returning those boxes full of items for processing. They accept products that most municipal recycling programs do not, and they count on the consumer to **source separate** their recyclables before sending them back to larger processing and distribution sites. These sites are either ran by Terra Cycle or in partnership with, who then send the recyclables to processing facilities that are able to process the materials into pellets (in the case of plastic) for remanufacturing. Through TerraCycle.com, consumers can purchase “Zero Waste Boxes” that collect and recycle “fluorescent lamps, plastic cups, action figures, art supplies, baby food pouches, beauty products, candy and snack wrappers” (23), and many other items that are difficult to recycle through traditional municipal programs.



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# Reducing Plastic Pollution VS Total Resource Cost

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Improvements to the collection and sorting procedures of recyclable items would lead to more item recovery, and less single-use waste. The American Chemistry Council (ACC), Association of Post-consumer Plastic Recyclers (APR), Carton Council of North America (CCNA), Foodservice Packaging Institute (FPI) and the National Association for PET Container Resources (NAPCOR), created a commission to study the effectiveness of MRFs (Material Recovery Facilities). In their report, they found that dual stream MRFs that require residents to source separate their recyclables “offer the advantage of reducing loss of plastics and other containers to the paper streams” (RRS 24). This means that by utilizing dual stream MRFs, more single-use products could be potentially collected and captured, reducing contamination of the other streams of recyclable materials.

The equipment used in a MRF can impact the quality of sorting, with the study claiming that optical sorting machines can increase sorting efficiency and decrease contamination. This research states that “another piece of equipment in MRFs that can help improve separation of materials are optical sorters. Optical sorters can recognize materials based on what they are made of along with their size and shape” (24);

compared to the manual processes that are currently in place, it stands to reason that effective implication of technology could increase the amount of material being diverted.

Once the materials from MRFs are collected, sorted, and baled, markets need to exist that want to purchase these bales of material in order to be reprocessed into other products. The National Sword program implemented by China has placed pressure on municipalities to find other markets to sell their recyclables to, due to the increased restrictions.

Unfortunately, most municipalities in North America have largely ignored local markets and purchasers of recyclable materials, but these markets do exist, and there is no reason why they cannot be utilized. A search on [PlasticsMarkets.org](https://www.plasticmarkets.org) (25) for buyers of plastic yields 233 results. These buyers accept every grade of plastic from 1-7 and from every market: consumer, hazardous and commercial. Working with and utilizing these current markets could allow them to grow and provide opportunities for others to follow suit, increasing the amount of options available locally, and potentially increase the volume of recycling that occurs.



**Bio-fuel facility:** *Bio-fuel is created by converting organic waste into renewable natural gas and high quality compost material for reuse by consumers.*

Another option to address the question of how to manage our waste in an environmentally conscious way would be considering conversions of waste to fuel. In Alberta, Enerkem Bio Fuels operates a facility in partnership with the City of Edmonton and Alberta Innovates – Energy and Environment Solutions. The facility takes “household waste that is non-recyclable and non-compostable” (26) and processes it into a bio-fuel that helps to “reduce the volume of waste sent to landfills by over 100,000 metric tonnes per year” (26) in the Edmonton region. For materials that have no market to be recycled, this could be an option to repurpose them into another useful product, thus reducing their total resource cost and increasing their use before the end of their life cycle.

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# Looking Forward & Recommendation

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The suspension of belief is over and the facts show that **there is a plastic and single-use pollution problem.** This problem is being highlighted and even increased by massive changes in the recycling marketplace. Plastic bag bans work in reducing bag pollution and it would be fair to suggest that wider bans that include other single-use items would do the same. It is also clear that bans do not act alone in an environmental silo where only plastic pollution is addressed.

**Bans can encourage the use of alternative products, however those products increase emissions, tax the land and increase food waste (increasing CO2 emissions with it) at a significantly higher environmental cost than the items they replace.**

EPR programs are having an effect in reducing waste, along with MRF facilities and corporate driven programs to return items back for recycling. Despite the reliance on China, recycling process facilities are not dead in North America. Further support of these facilities could lead to their growth, increasing the amount of single-use products that could be recycled while stimulating the local economy by increasing demand for these services. Changes to MRFs and the equipment they use could increase the quality of sorting, and the resulting quality of those material bales for these recycling facilities to buy and process.

Elevated Enviro recommends implementing a ban on single-use plastics and bags; however, we recommend that this ban be temporary. The ban should run in conjunction with other programs that reduce waste. We recommend programs like MRFs, EPRs and building supply chains and partnerships with local recyclers. Elevated Enviro also recommends moving towards multi stream MRFs, and increasing sorting capabilities by mandating source separation of materials by the residential and commercial sector to support multi stream MRFs. We also recommend investment in new technology such as optical sorters for these MRFs to increase effectiveness and recovery.

In order for these recommendations to be successful, thorough education of all users is critical. This could be achieved by a large scale marketing campaign, including media events, content created for social media, and public engagement. We would recommend sharing important information about the implications of alternative products and how best to use them, along with sharing knowledge of programs like Terra Cycle, Spud Pink Bag and Crayola Color Cycle would support this endeavor.



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# Recommendation

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To effectively reduce single-use pollution in conjunction with minimizing land use and emissions of alternative products to replace single-use products we recommend the following staged process:

1. Implement a single-use ban.
2. Educate public on implications and recommended best practice of treatment to alternative products from bans.
3. Phase in more source separation requirements in the commercial and residential sectors.
4. Make changes to MRFs to accept multi-streams of recycling and increase their sorting ability through the implementation of technology.
5. Build supply chains and partnerships with existing local and North American recyclers.
6. Increase volume of material going to Enerkem bio-fuel facility.
7. Educate public on developed and developing return to manufacturing programs such as Terra Cycle, Spud Pink Bags, Crayola Color Cycle and more as they are created.
8. Phase out the single-use ban as recycling networks develop, and public engagement and education continues to increase.



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# Conclusion

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We believe that by considering the information presented herein, a complete picture of the implications of implementing a single-use ban have been carefully explored, and that it is in the best interests of the City of Edmonton to proceed as outlined. The issue of plastic pollution and the environmental impacts of action are layered and complex, but it is our belief that solutions are possible today to address these issues. Careful and thoughtful action must be taken in order to achieve our collective goals of healthier communities and environments, both today and for future generations to come.

Elevated Enviro is more than happy to provide this report to the City of Edmonton and we look forward to collaboration and further discussion.

Yours very truly,



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