



Zero-waste: Reality or Fantasy?

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INTRODUCTION

[Science & Policy Exchange \(SPE\)](#) and [Climatable](#) hosted a two-hour public forum “[SPEForum: Zero Waste Cities - Reality or Fantasy?](#)” on June 4, 2019, at BAnQ, Montreal, to learn and discuss the challenges and opportunities that come with transforming into a zero waste city. This was an opportunity for the public to ask questions and engage with leading experts in research and policy to help answer them. The panelists were Alex Tyrrell, leader of the Green Party of Québec; Mariève Isabel, Montreal Urban Sustainability Experience, McGill University; Sophie Bernard, Department of Mathematics and Industrial Engineering, Polytechnique Montréal. The forum represented a policy, production, and consumer perspectives - to address how we can achieve our ambitious sustainability goals.

“[SPECafe: Demystifying Zero Waste](#)” followed the forum, on July 30th, 2019, to address the barriers to zero waste lifestyles. This was an interactive event for our community to learn about waste, zero waste living and related local policies. This was an opportunity to engage, share and discuss the barriers faced to living a zero-waste lifestyle and consequently brainstorm and exchange practical solutions and strategies to minimize waste. The SPECafe opened a round table discussion based on the following questions:

1. What barriers do you face that prevent you from reducing your waste at individual level habits?
2. What barriers do you face that prevent you from reducing your waste at city infrastructure?
3. How can you drive change at individual, policy and market level?

The following report summarizes the guest lectures topics from the public forum, and is followed by a summary of the themes that emerged in the round table discussion of the SPECafe.

I: A policy perspective

Quebec, and Canada at large, is currently undergoing a waste management crisis. The Canadian recycling management system relies on a free-market approach. Developed countries, including Canada, sell their plastic waste to low-and-middle-income countries (LMIC), as many LMIC often have more lenient environmental regulations and lower cost of labor. Overseas waste is then processed according to the needs of the free-market. However, since 2018, countries such as China have begun to refuse a variety of plastic waste and recyclable materials due to the environmental-burden, as the waste supply outweighs the demand. The federal government estimates 8,000 tonnes of plastic entered Canadian waterways in 2010 alone¹; however, with the imposed ban on waste and recycling exports, this number may escalate in the upcoming years.

¹ Josh K. Elliott, “Why China has Canada spooked about the world’s plastic waste crisis,” *Global News*, June 10, 2018, <https://globalnews.ca/news/4259225/china-plastic-waste-ban-canada-crisis-g7/>



Panelist share their insights on zero-waste economies. Left to right: Sara Ferwati, Alex Tyrrell, Dorian Zephir (Café le 5e), Mariève Isabel.

The current Montreal municipal government, Projet Montréal, has committed to lead Montreal to become zero-waste by 2030². This goal is supported by initiatives to ban plastic water bottles in municipal buildings and a city-wide ban on single-use plastic bags. However, such policies have proven to also have caveats. For example, the single-use plastic ban is thought to be compromised by the substitution of thicker, 'recyclable' plastic bags³; this does not necessarily eliminate waste (see Production Perspective section below).

The structural and political frameworks that have led to the waste crisis are:

1. The free-market model for-profit recycling that exists in Quebec hinders the complete recycling of local waste. Considering that recyclable waste is not sorted at home, there is greater cross-contamination of recyclable materials, thus decreasing the market value of our recycling material. The free-market model favors high-quality and pure materials for purchase.
2. Quebec lacks the infrastructure to deal with the large volumes of waste produced by its citizens. For example, paper recycling facilities are strained and cannot handle the influx of material. Specifically, the buildup of recyclable paper at a facility in Montreal North was stored outdoors and subsequently was irreparably damaged by rain.
3. Lack of local-infrastructure to process locally-produced plastic waste increases the environmental burden of recycling. Canada ranks within the top 20 in both global exporters of waste.
4. Voluntary participation in Quebec's sustainable development policy has led to a situation where we are not on track to meet our sustainable development goals. The Auditor General emphasized the limits of policy that is merely voluntary, reflecting that a mere 15% of municipalities and only 22% of academic institutions currently have a sustainable development plan. Overall, this combination of policies, or lack thereof, has contributed to the current issue of an overabundance of plastic waste.

² Collin HARRAIS, "How the City of Montreal plans to go 'zero waste'," CBC, October 18, 2019,

<https://www.cbc.ca/news/canada/montreal/montreal-zero-waste-grocery-compost-textile-recycling-1.5325319>

³ Matt D'Amours, "Montreal has officially banned single-use plastic bags — but heavy-duty bags are OK," CBC, January 03, 2018,

<https://www.cbc.ca/news/canada/montreal/montreal-has-officially-banned-single-use-plastic-bags-but-heavy-duty-bags-are-ok-1.4470689>

At the *Science and Policy Exchange (SPE) "Public Forum: Zero Waste Cities: Reality or Fantasy?"* discussion between panelists and the audience primarily focused on waste treatment, packaging regulation and taxation. The following are key discussion points and recommendations discussed by panelists and the audience.

1. There must be a comprehensive redesign and expansion of a government-run waste treatment system to replace the free-market privatized model. This would eliminate the for-profit bias that encourages the exportation of waste, and theoretically, may lead to additional policies that would curb excessive waste production as safe waste disposal would incur direct government expense. Green party leader, Alex Tyrrell, suggested that as we shift away from fossil fuels, oil and gas treatment plants in the East End of Montreal may be converted into recycling facilities, including facilities that would allow for energy capture and treatment of wastewater⁴. Further, there is no adequate biomethanization facility in Montreal. Biomethanation is a process by which organic material is microbiologically converted under anaerobic conditions to biogas⁵, and thought to be one of the most sustainable, cost-effective, zero waste, wet waste management models. As such, Mr. Tyrrell suggests that composting could rely on a sustainable biomethanization model, where compost is decomposed in facilities that capture the methane that is naturally emitted and repurposed as fuel.
2. Re-evaluation of waste regulations and policies at the production level, including product packaging and durability. Bans on single-use plastics were discussed with an emphasis on the need for proper life-cycle analyses (see Production Perspective), and policy by-passing tactics as in the case of thicker plastic bags. This includes regulating the durability of products and integrating solutions for issues such as planned obsolescence, a product designed with an artificially limited useful life. Regulating this can be potentially linked to an eco-tax. This tax would be imposed on goods that have resource-intensive or environmentally damaging production methods, or on products with overly short lifespans. Funds generated from such a tax would be put towards financing local recycling and potentially stimulate the purchase of durable goods.
3. The Canadian carbon tax is a positive effort made by the Government of Canada as it draws attention and regulates the extent of fossil fuel use in production. This tax is potentially a source of funding for initiatives that aid in our transition from fossil fuels.

⁴ Modelled from initiatives implemented in Washington, DC.

⁵ Angelidaki, Irini, Dimitar Karakashev, Damien J. Batstone, Caroline M. Plugge, and Alfons J.m. Stams. "Biomethanation and Its Potential." *Methods in Methane Metabolism, Part A Methods in Enzymology*, 2011, 327–51.

II: A production perspective

Circular Economy

The linear economy model is the traditional model for production. In this system, raw material is extracted for product manufacturing, the product is distributed, consumed, and then discarded in landfills (Figure 1). The circular economy is an alternative model. In essence, a circular economy model seeks to continually rethink and optimize supply and production chains an economic system aimed at eliminating waste and the continual use of resources.

There are three principles that underpin a circular economy:

1. Waste does not exist: products are designed and optimized for a cycle of disassembly and reuse.
2. There is a distinction between durable and consumable material. Consumable material has biological cycles, where they are designed to feed back into the system through processes like composting and anaerobic digestion (food, cotton etc.). These cycles regenerate living systems, such as soil, which provide renewable resources for the economy. On the other hand, durable materials, which includes products such as engines or computers, are made of technical materials (metal, plastics, etc.) unsuitable for the biosphere. These are designed from the start, for high durability, restoration of components and materials through strategies like reuse, repair, or (in the last resort) recycling
3. The energy required to fuel a product life cycle should be renewable by nature, to decrease resource dependence and increase systems resilience.

The ultimate goal of a circular economy is to keep materials in a constant cycle, rather than continuously injecting new materials into the supply chain and rejecting old products. Circular economy models are closely linked to life cycle analyses, whereby production should consider the impacts of a product at all stages of its existence.

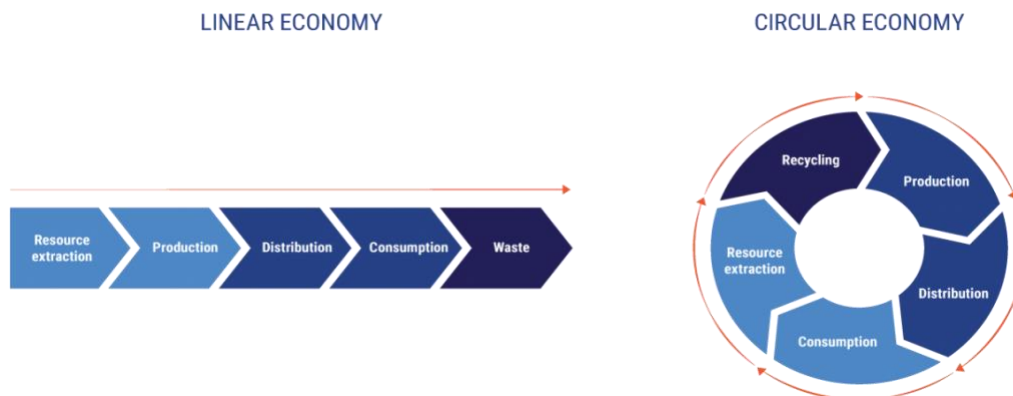


Figure 1. Steps of linear economy versus circular economy.

Critical Consideration: Environmental Burden Shift

True 'green products' are designed in a multidimensional way that captures the whole-cycle impacts of its existence. Modifying one part of a product's life may shift the environmental burden to another stage, which may have more adverse environmental consequences- such an effect is called an environmental burden shift. Therefore, failure to consider whole products-life cycle may lead to greenwashing scenarios wherein products appear to be sustainable, however, it's life cycle produces a net negative environmental impact.

The following are examples of environmental burden shift in a product life-cycle:

- Produce plastic wrapping can extend a food's shelf life and reduce food waste. In the case of English cucumbers, the plastic wrap extends the shelf life from 3 to 14 days. Therefore, elimination of plastic wrap may improve the environmental footprint of production, but will increase greenhouse gases released from food waste. This is referred to as the packaging paradox.
- Coffee capsules produce excess plastic. However, they allow coffee drinkers to increase their efficiency by using precise amounts of coffee, energy, and water. It is estimated that the capsule accounts for 3% of the environmental impact of the coffee; thus the tradeoffs of plastic waste versus efficiency must be considered, given that coffee beans are energy-intensive at stages of harvesting, shipping, roasting, and grinding.
- Reusable items such as straws, cups, and bags may be more resource and energy-intensive than disposable items, thus a reusable item's negative environmental impact may be greater than its disposable version if its use is not exhausted. For instance, the cotton in bags that replace disposable plastic shopping bags, requires vast investments in water, pesticides, and energy. As such, a cotton bag must be used at least 131 times in order to outweigh a plastic bag's environmental impact. Another example is replacing a single-use coffee cup with a ceramic mug; the mug must be used over 210 times to outweigh the environmental impact of a single-use coffee cup.

III: A consumer perspective



A full house at Bibliothèque et Archives nationales du Québec (BAnQ) listen intently as panelists answer questions.

Principles of sustainable lifestyle

A response to the waste crisis and other environmental concerns is the rise in green consumerism- individuals who wish to consume goods and services in a way that protects the natural environment. While this is important and admirable, green consumerism alone is vastly insufficient to tackle the waste crisis because it does little to address the underlying issue of overconsumption. Instead, efforts are needed to transition towards sustainable lifestyles that focus primarily on reducing

consumption. Reducing consumption is key to the social and economic movement of “degrowth”. The movement argues that overconsumption lies at the root of long-term environmental issues and social inequalities. Components of this include buying local products in addition to a heavy emphasis on sharing goods and services and shortening the circuit of production.

There are six principles for a sustainable lifestyle that reduce waste and consumption:

1. Refuse
2. Reduce
3. Reuse
4. Recycle
5. Repair
6. Rot

The greatest barriers faced by individuals to adopting a more sustainable lifestyle, are often psychological barriers. The most critical part of being a responsible citizen is to simply do one’s best and avoid perfectionism and cynicism. Perfectionism is difficult to achieve when individuals are overwhelmed by the ambiguity of available information, and the inherent complexity of determining an environmental impact. Further, at a structural level, individuals may not be able to achieve waste reduction due to a lack of or affordability of sustainable product options and/or institutional barriers such as lack of recycling facilities and regulations. Social pressures, including criticism and judgment of zero-waste efforts, may discourage individuals from pursuing reducing their waste. The takeaway for consumers is to live simply and to reduce consumption.

SPECafe: Demystifying Zero Waste

SPECafe: Demystifying Zero Waste attracted 25 participants of diverse demographics. Round table discussions were held on the questions presented below. Following each question, a summary of the main themes that emerged are presented, accompanied with supporting quotes from the discussion.

I: What barriers do you face that prevent you from reducing your waste at individual level habits?

Culture

1. Education can inform social norms and can play a role in implementing new habits. For instance, what we were taught as children can impact our practices and perceptions

“Something that I really don’t do is food waste [...] I grew up with that and now it really bothers me when I see other people throwing away their food. But it’s just because it became part of myself”.

2. In our consumer-driven society, buying on impulse is part of our culture.

“If I don’t have my reusable cup with me, I still buy my coffee, I cannot say no to myself. I have to have access.”

3. Our work culture reflects the cultural element above.

“We spend so much time working that we don’t have as much energy and time to maybe plan ahead or plan our meals or choose a more sustainable [option]”.

Lack of discipline

1. As a society, we’ve gotten used to convenience, and lack disciplined enough to pare down our consumption if it becomes inconvenient to do so.

“We’re uncomfortable with anyone telling us no, we are uncomfortable with the concept of discipline...I have to have access to whatever I want, whenever.”

2. Self-discipline can be tainted by perfectionism when setting too high performance standards.

“If I cannot do it perfectly, I am not gonna do it.”

Time

1. Issues with planning ahead.

“Takeout Styrofoam. If you're somewhere close by and you're hungry [...] takeout is a quick option. If you plan ahead, I guess bringing Tupperware would be an option. But if it's on the spot and you decided to buy something...”

“If you're thinking of going zero waste for food, it takes time to look up what you need to buy, look up your recipes, etc. This takes more time than, than going to buy it”.

2. During the discussion, some mentioned that they lack a good “lifestyle change” plan.

“There's a like a lot of people suggesting a lot of ideas and a lot of ways for a zero waste lifestyle...But having a clear plan on how to manage your life is difficult.”

Money

1. Budget can limit us in implementing zero waste habits.

“I think [zero waste living] is way more expensive than living as we've always done. And it's not necessarily affordable to everybody. So if you're a student or if you have a low income, this is not sustainable.”

“There are shops here in Montreal and you can just bring a container and refill, it's a little more expensive.”

II: What barriers do you face that prevent you from reducing your waste at the city level?

Information and education about sustainability

1. Gap between the citizens and the city towards reducing waste

“...would have liked to learn how we can do more collective actions, there is a gap between individual and policy, how can we strive for change?”

2. Access to information on sustainable initiatives by the city

Lack of resources and infrastructure to process waste

“Free market recycling is just broken and does not work, because if recycling is not purchased, it doesn't go anywhere, it does not get recycled ...”

III: What barriers do you face that prevent you from reducing your waste at the market level?

Markets/Grocery stores should re-evaluate their packaging systems and reusable plastic packaging

1. Packaging

a. It is understood that packaging is important for sanitary reasons (barriers against bacteria) and longer food shelf life.

b. Policies at pharmacy prevents reusing plastic medical containers

“I have to use medication. I bring my plastic tube (container) for a prescription refill and ask if they (pharmacist) could reuse the container, and they said no...”

c. Taking into consideration consumer sustainable lifestyles

“if you take the things in the supermarket that aren't wrapped in plastic versus the things that are, if more and more people start doing this, maybe the supermarket will stop buying items that are wrapped in plastic. I think every person is responsible for driving the desire to change”

Cycle of consuming

1. Manufacturers need to take responsibility for what they produce.

“.... right now, there is very little incentive for companies to buy recycled materials....”

IV: How can you drive change at individual, policy and market level?

Individual

1. Do your bit: recycle and embody the 'less waste' strategies

“As an individual, you can recycle or reduce as much waste as you can. I think the individual feeds the collective, you have to practice. You have to have certain practices in your daily habits in order for you to completely internalize and invest into the collective.”

2. Education: The information on what is good and what is bad, from a consumer perspective is very confusing. If people were more educated in what is the 'best' choice it would be easier for them to make the right choices

“...having an application on your phone that can give you feedback on how much carbon footprint that you are doing. Similar to the apps that track nutrition but an app for sustainability”

3. Support companies that have a sustainable business model

4. Use your time as a volunteer to support initiatives with 'green' ideals

"Food Secure Canada for instance, they are working towards the relocation of the food system towards smaller or small-scale farming and they are working on a political level to have a national food policy guide for the federal government and the provinces to implement. These types of organizations are there already and perhaps the best that we can do is to join them and to help them become more like have more strength financially or volunteers or whatever as opposed to reinventing the wheel or just feeling like this, disempowered individuals."

5. Be active in your community: Get involved in municipal consultation/the elections, voice your voice, about the current issues you see with waste.
6. Mentorship: If you have any advice for other people in your community be supportive of other people's endeavors.

Policy

1. Education: Give clear guidance on how to be proactive, clear guidance on what the 'best thing' to do it, in certain situations,

"I think education should have a huge role in this. Especially because I think whatever you learn as a kid becomes normal to you. If this could be implemented in the school programs... minimizing waste becomes normal for the kids and they'll carry it with them for the rest of their lives"

2. Facilitate a market for recycled materials

"the free market recycling system, is just broken and does not work. If recycling isn't purchased, it doesn't go anywhere, it doesn't get recycled, So like how, how can we influence policy to actually mandate the use of recycled materials and products?"

Market Level

1. Education on product lifecycles and use of materials
2. Transparency: Provide clear information on materials recyclability and where recycled materials can be used
3. Support companies that have a sustainable business model and produce less waste