



# Circular Cities:

A Scan of Global Approaches  
and Key Takeaways for Canadian  
Local Governments

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The National Zero Waste Council, an initiative of Metro Vancouver, is a leadership initiative bringing together governments, businesses and non-government organizations to advance waste prevention in Canada

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# Key Takeaways

- The aspirational circular city has embraced the principles of a circular economy with an emphasis on preventing waste, maximizing the lifespan and utilization of products and infrastructure, closing material loops by enabling 'waste' materials as input to new processes and products, and restoring ecosystems.
  - Circular economy initiatives can be a route to address community-wide environmental, health, and economic objectives in a systems-based way. A circular economy approach can contribute to and align with city efforts relating to waste management, climate change mitigation, community revitalization, and more.
  - Cities are well positioned to facilitate the transition to a circular economy as they possess a unique complement of leverage points that can bring about systemic change. From the research, four common intervention points were identified:
    - **Research and Education:** Increasing understanding of material flows and technological innovation opportunities and disseminating this learning.
    - **Support and Collaboration:** Leading, convening, or supporting stakeholders in collaborative circular economy efforts.
    - **Procurement and Operations Management:** Advancing new markets for recovered materials through purchasing policies that support a circular economy.
    - **Planning and Regulation:** Exploring the full range of potential to advance the circular economy through plans, strategies, and regulatory tools.
  - There is no standardized methodology for circular city initiatives, but based on the experiences of other jurisdictions we can glean that the following steps are becoming common:
    - *Local Situation Assessment*
    - *Mapping and Scanning*
    - *Creating an Action Plan* and
    - *Monitoring and Evolving.*
- Regardless of the process undertaken, leading circular economy examples have maintained strong engagement with stakeholders, particularly with businesses.
- It is also important to build from a city's own unique opportunity space. If circular economy approaches are new to the City it is possible to start simple, with initiatives that do not require new regulations, large investments or complex collaboration. Others, with strong support from senior staff and elected officials may choose to initiate a broad-based program from the start.
  - There are many examples, internationally and domestically, of cities acting as catalysts, enablers and leaders in the circular economy and European cities have been leaders in adopting the circular economy<sup>1</sup>. For cities new to circular economy there is an opportunity to learn from these early adopters, but we must also consider the unique opportunities, barriers and levers present in Canada.

1 Ellen MacArthur Foundation. (July 17, 2018). Which country is leading the circular economy shift? *Circulate*. Retrieved from: <https://circulatenews.org/2018/07/which-country-is-leading-the-circular-economy-shift/>

# Background

The National Zero Waste Council (NZWC)'s Circular Economy Working Group commissioned this scan of concepts and European best practices related to circular cities to help inform and promote the adoption of circular city approaches in Canada.

The scan involved desktop research and key informant interviews. Interview subjects included representatives from within Canada to ground-truth the research in a Canadian context, and representatives of Ellen MacArthur Foundation and Circle Economy to obtain input on leading European examples. Abundant desktop research sources were available to compile 'snapshot' overviews of leading circular city examples; as such, no interviews were conducted with European city representatives. Subsequent work may include further refinement of this summary report, development of a primer, and development of a webinar or knowledge platform to support Canadian cities in transitioning to a circular economy.

This summary report includes:

- Review of circular city best practices including distillation of common elements and key takeaways for embedding circular economy (Circular economy) principles and objectives into local government planning, including: effective framing, intervention points and approaches in general.
- Illustrative "snapshot" examples from leading jurisdictions, including Brussels, Glasgow, Paris, and Rotterdam. Additional illustrative examples from Europe and North America are also included throughout the report.
- Recommendations for advancing the uptake of circular city approaches within Canada.

## CIRCULAR CITIES EXPLAINED

A circular city is a city that has embraced principles of the circular economy. The Ellen MacArthur Foundation defines the circular economy as an economy that decouples economic activity from the consumption of finite resources. Products, components, and materials are kept at their highest use and value, waste is designed out of the system, and natural ecosystems are restored over time.<sup>2</sup>

Circularity has emerged from earlier concepts such as biomimicry<sup>3</sup> and cradle-to-cradle production<sup>4</sup>. It is also linked to and builds upon other frames such as zero waste, materials management and sustainable consumption. In a circular economy, resource flows have shifted from current linear patterns of take-make-waste towards circular flows that facilitate materials and products being reused and recycled again and again.

- 2 Ellen MacArthur Foundation website: <https://www.ellenmacarthurfoundation.org/circular-economy/concept>
- 3 The Biomimicry Institute (<https://biomimicry.org/>) defines biomimicry as an approach to innovation that seeks sustainable solutions to human challenges by mimicking patterns and strategies in nature.
- 4 The 'cradle to cradle' approach similarly seeks to model manufacturing practices after natural processes. The C2C Product Institute aims to provide a design framework that will advance the circular economy. (See: <https://www.c2ccertified.org/>)

The circular economy achieves high levels of resource effectiveness and efficiency by following these principles:

- Maximizing the utilization of products and infrastructure through sharing and extending their lifespan and capacity for reuse through design for durability, repair, and disassembly.
- Minimizing material and energy used in providing a product or service, for example by dematerializing and virtualizing.
- Optimizing assets through reselling, refurbishing, and remanufacturing until their end of life, at which point they are recycled. This is using 'waste streams' as a feedstock, thereby eliminating waste.
- Shifting to resource types that are regenerative and conducive to achieving a circular system (e.g., replacing fossil fuels with renewable energy sources).
- Eliminating externalities by designing out sources of waste and pollution.

#### ILLUSTRATIVE EXAMPLES:

**Fuel switching.** Fossil fuels are non-renewable and thus linear rather than cyclical resources. A circular city relies on primarily zero emission, renewable power for housing, transport and industry.

#### **Optimizing use of products and infrastructure.**

Products and infrastructure are often underutilized. For example, an average private vehicle is parked 92% of the time<sup>5</sup> and only a small amount of the energy consumed goes towards moving the passengers. A circular city maximizes utilization of products and infrastructure, for example through sharing economy initiatives, and shifts to more efficient options (e.g., right-sized/alternative fuel vehicles, active transportation and public transportation).

5 Ellen MacArthur Foundation. (2017). Cities in the Circular Economy: An Initial Exploration. Retrieved from: [https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Cities-in-the-CE\\_An-Initial-Exploration.pdf](https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Cities-in-the-CE_An-Initial-Exploration.pdf)



# Why Circular Cities?

Businesses around the world have been experimenting with a host of circular economy innovations from new circular supplies and resource recovery models to sharing platforms and more. The value proposition to businesses is clear and growing - brand reputation, fulfilling corporate social responsibility obligations, recovering value from waste and averting risk.

Increasingly, cities are recognizing their own value propositions, or reasons, to embrace circularity. Cities, like businesses, are realizing that circularity can be a route to support economic stability and resource security, and to address environmental concerns. Circular city initiatives can help achieve significant resource efficiency and carbon reductions in a way that future proofs both their infrastructure and populations.<sup>6,7</sup>

By supporting the transition to a circular economy, cities are investing in solutions and approaches that will prevent waste from being generated and needing to be managed - potentially relieving pressure on existing waste management systems over the long-term.

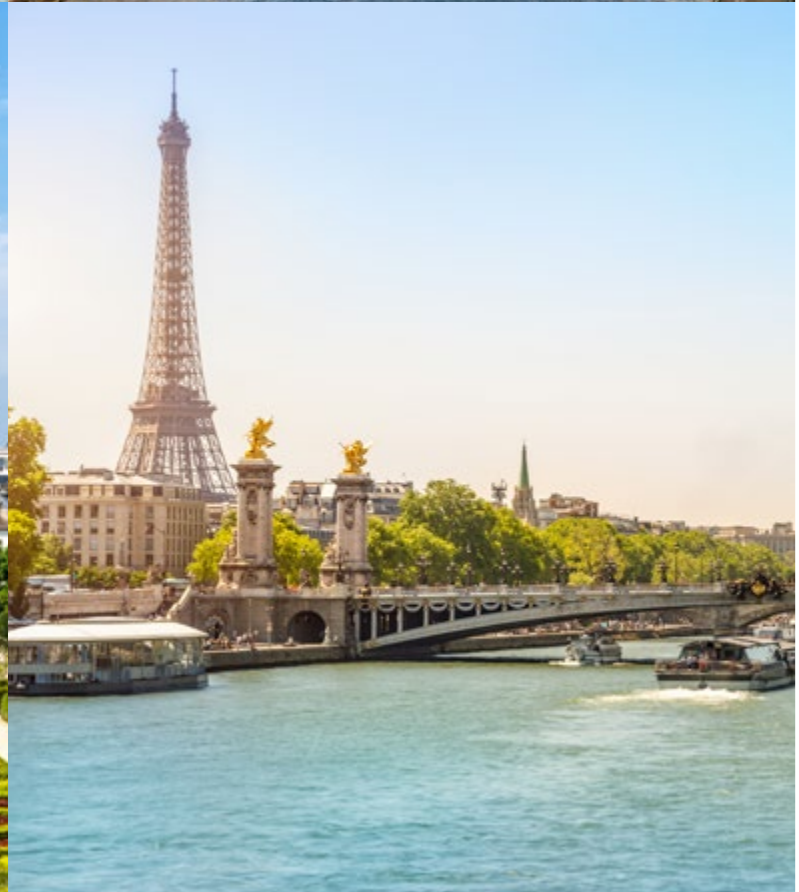
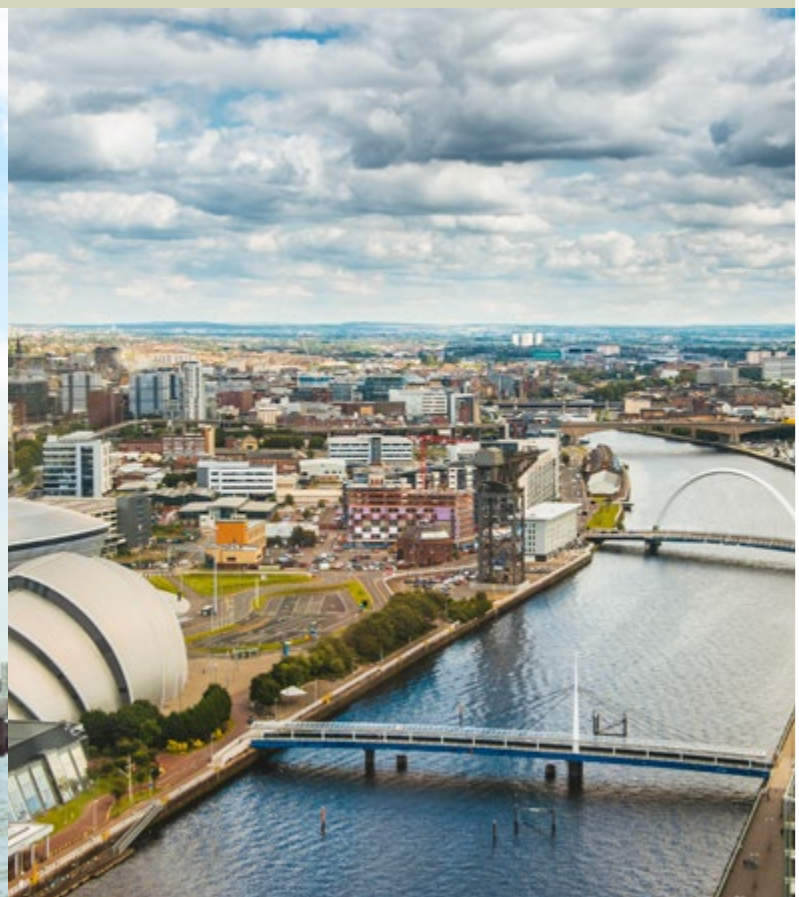
It has been estimated that \$4.5 trillion (USD) of economic activity could be generated globally by circular technological and resource innovations.<sup>8</sup> Circular economy efforts can contribute to building the economy while simultaneously addressing global environmental challenges such as climate change and resource scarcity.

Cities are well poised to serve as catalysts, enablers and leaders in the circular economy as they possess a unique complement of leverage points. For example, cities contain a level of resource flows that can generate economies of scale to advance circular economy activities; they directly interface with community stakeholders and other levels of government; and they provide key services and have access to legal tools to influence activities and behaviours in the community. Because of this, cities are well placed to build or support collaborations that can yield systemic change.

6 M. Parry. (2007). Climate Change 2007: Impacts, Adaptation and Vulnerability: Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel.

7 Rosenzweig, C, et.al. (2011). Climate Change and Cities: First Assessment Report of the Urban Climate Change Research Network.

8 Accenture. (September 28, 2015). News Release: *The Circular Economy Could Unlock \$4.5 trillion of Economic Growth, Finds New Book by Accenture*. Retrieved from: <https://newsroom.accenture.com/news/the-circular-economy-could-unlock-4-5-trillion-of-economic-growth-finds-new-book-by-accenture.htm>





## City Snapshots

Activity in transitioning to a circular economy is accelerating internationally, but European cities have been some of the early leaders. There are a few reasons for this leadership. Europe is land and resource constrained and has limited landfill space, compared to North America, providing a greater impetus for resource efficiency. Greater reliance on imports also exposes European countries to increased supply risk and resource price volatility. These issues were particularly felt during the global economic downturn in the early 2010s and are seen as a significant factor in the high unemployment rates in many European countries.<sup>9</sup>

In June 2014, the European Union released their 'Circular Economy Package' to stimulate local level initiatives. This package consists of a range of strategies, guidance documents and draft directives, all aimed at stimulating local and national level action.<sup>10</sup> This package has prompted many national and city level circular initiatives, many of which are rapidly scaling up and expanding. A transition to a circular economy is seen by many in Europe as having significant potential to boost and stabilize the economy – while also meeting pressing environmental targets.

This scan has reviewed the experiences of four European cities – Rotterdam, Glasgow, Brussels and Paris. These cities were chosen because they are leading examples of embedding circular economy approaches into their planning and strategic initiatives and each has unique characteristics: the Port is a key focal point of circular economy activities in Rotterdam; in Glasgow, the City and the Chamber of Commerce formed a strong partnership; in Brussels, the City is providing broad support and is rapidly scaling up action and has a strong emphasis on revitalization; and in Paris, the City is providing broad support with a strong emphasis on public-private partnerships, and is incorporating revitalization and equity into circular economy initiatives.

The scope of this research was to select and focus on three or four cities, however, it should be noted that there are many other leaders in Europe (and elsewhere) that could have been profiled, such as London, Amsterdam, Peterborough, Helsinki, and many others.

9 Ellen MacArthur Foundation. (July 17, 2018). Which country is leading the circular economy shift? *Circulate*. Retrieved from: <https://circulatenews.org/2018/07/which-country-is-leading-the-circular-economy-shift/>

10 European Commission, See: [http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm)





## ROTTERDAM

Rotterdam is unique from the other three cities profiled in that it includes a large seaport with a port authority and businesses eager to collaborate on circular economy initiatives. But even without the port initiatives, Rotterdam is a leader in the transition to a circular economy.

To date the City has:

- Completed a circularity and materials flow scan with consultancies Circle Economy and Metabolic.
- Prepared a circular economy action plan - 'Rotterdam Circular' and Roadmap - containing aggressive targets for circular economy-based procurement and operations, waste reduction (zero waste by 2030, with all materials looped), and growth in circular economy jobs (particularly in the bio-based economy).
- Founded 'City Lab 010' with partners, to serve as a collaborative circular economy platform for knowledge sharing and networking; it also provides a venue for individuals, businesses or organizations to pitch ideas to the City and its partners to receive start-up seed funding.
- Launched the 'Blue City' incubator hub, which provides space for small businesses and start-ups to experiment with operating more circularly. Waste materials are exchanged within the hub and an onsite lab provides space to experiment with material recovery and uses.
- Launched 'Street Lab' - the Rotterdam Innovation District which provides space for businesses to experiment with new circular economy innovations such as new recycled road materials and street fixtures.

The City's biggest circular economy partnership is with the Port of Rotterdam. It is the largest port in Europe and is currently responsible for 18% of the country's greenhouse gas emissions.<sup>11</sup> Like many ports, it is a hub

for the import/export of materials, including recyclables and waste, and it is a high density industrial cluster, making it an ideal location to pilot circular economy initiatives.

The Port created a Circularity Center to guide its circular economy transition. The Center serves as a circular economy knowledge and business development hub and is a partnership with four businesses located at the Port, with the support of the City.

The Port has a goal to be carbon neutral by 2050, which will contribute to its circular economy strategy. Actions to advance this goal include: in the near-term, shipping will be converted from diesel (inland will be electrified and offshore will be converted to liquefied natural gas); and in the long-term, offshore shipping will also be electrified or converted to biofuels. Energy use within the port will all also be electrified and the materials and products produced there will align with their circular economy objectives.

Petrochemical processing is one of the major industries at the port, and this industry has been the focus of many of the early circular economy initiatives, for example:

- The Bio-based Delta Alliance has created a cluster of renewable bio-based production including four vegetable oil refineries, four biofuel plants, and two biochemical plants. It continues to expand as a means of replacing fossil fuel feedstocks for fuel, chemical and plastics production with organic residuals feedstocks.<sup>12</sup>
- The Waste to Chemicals (W2C) plant uses non-recyclable waste to produce valuable chemicals and biofuels.
- The Heat Alliance captures waste heat from industry at the Port to supply heat for industry, greenhouses, and up to 500,000 homes.

<sup>11</sup> SWZ Maritime Online. (July 20, 2017). Rotterdam to be a sustainable port by 2050. Retrieved from: <http://swzonline.nl/news/8582/rotterdam-be-sustainable-port-2050>

<sup>12</sup> Live Circular. (April 2016). Rotterdam: Five challenges en route to the Port of 2050. Retrieved from: <https://livecircular.com/rotterdam-five-challenges-en-route-port-2050>





## GLASGOW

Glasgow provides an example of effective partnership development to support circular economy initiatives. The City has been collaborating with Zero Waste Scotland on circular economy-related initiatives for nearly two decades. In 2010 the City also launched Sustainable Glasgow with the University of Strathclyde as a means of advancing sustainable policy, innovation and action. Then in November 2017, the City formed a partnership with the University of Strathclyde, Zero Waste Scotland, and the Glasgow Chamber of Commerce to launch [Circular Glasgow](#) to help further spur Glasgow's circular economy. Zero Waste Scotland and the University of Strathclyde have also teamed up to form '[The Scottish Institute for Remanufacturing](#)' which co-funds projects to stimulate innovations in manufacturing that will contribute to the circular economy.

Similar to Rotterdam, in which the City has strong collaboration with the port authority, the City of Glasgow has a partnership with their Chamber of Commerce, and the Chamber has taken the lead on several circular economy initiatives.

Some of the key resources and initiatives supporting the circular economy in Glasgow include:

- A comprehensive [circularity and materials flow](#) scan conducted by the Dutch consultancy Circle Economy.
- [Future Glasgow](#) and [Open Glasgow](#) which are open data platforms that provide the general public and industry access to a wide array of data, including data that can support circular economy initiatives.
- The [Green Business Network](#) led by the City and the Chamber to support and foster collaboration between businesses to advance circular economy initiatives.
- A range of Chamber hosted circular economy workshops and events for businesses.
- The [Circle Assessment Tool](#) (an online tool), provided through the Chamber that helps businesses assess how circular they are and identify opportunities for improvement.





## BRUSSELS

The City of Brussels identified circular economy as having the greatest potential to support economic revitalization and job creation, two key priorities for the City, and has embedded circular economy into long and short-term planning. Brussels currently has a relatively weak economy and high unemployment levels. The City sees its high dependence on external resources as a significant contributing factor to these challenges.<sup>13</sup> Brussels is a strong example of a City providing broad support to the circular economy and achieving a rapid scale-up.

The City convened stakeholder working groups comprised of representatives of other levels of government, businesses, non-governmental organizations, and the public to collaboratively produce the Brussels Regional Programme for Circular Economy (BRPCE). The BRPCE identified 111 measures, all of which were underway or in the planning stage within the first few years of the programme being developed. The programme also includes sector-specific targets and indicators to define what circular economy means for each of the sectors. Every 18 months, stakeholders reconvene to review results and make amendments to the programme. Initially, the City of Brussels introduced circular economy measures within its waste management plan. Now, with the BRPCE, circular economy is addressed in a much broader economy-wide way. Some of the key initiatives and successes led by the City and its partners include:<sup>14</sup>

- Brussels Circular Economy Transition (BRUCETRA) - a research project analyzing the economic potential of the City's material flows in

partnership with universities ULB and KU Leuven, and funded by Innoviris.

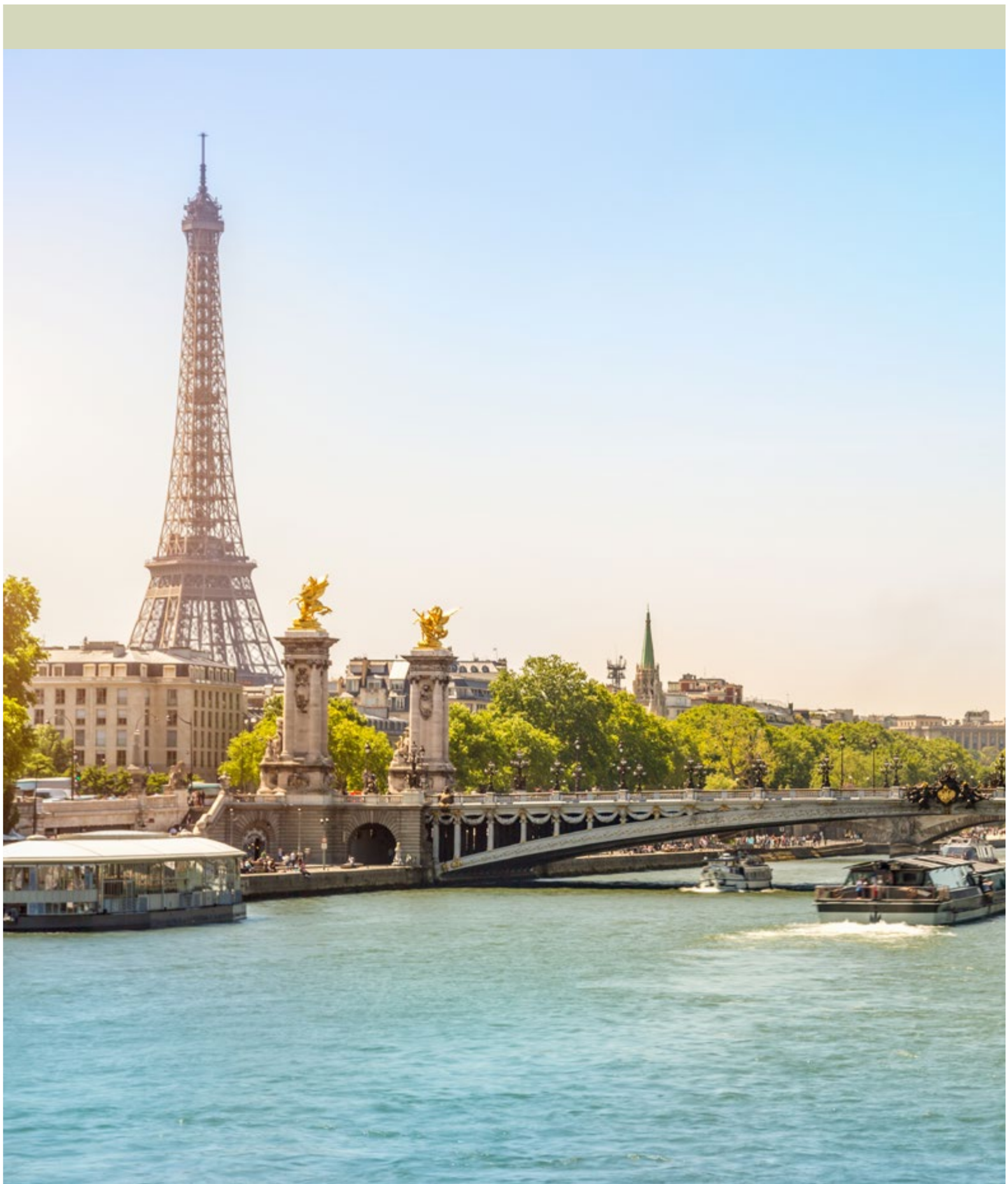
- Be Circular Be Brussels - a platform for businesses and new entrepreneurs to gain circular economy knowledge, support and funding. Funded projects must incorporate circular economy principles and new business models. In the first two years, 70 projects were funded, and in 2017 29 projects received €1.7 million in seed funding.<sup>15</sup>
- Circular Brussels - a comprehensive circularity and materials flow scan conducted by the Dutch consultancy Circle Economy.
- The Urban Renovation Contract - a funding program for local circular economy pilot projects with a €110 million budget.
- The City is supported by the work of Village Finance (a non-profit micro-financing organization), which supports a circular economy transition in a way that directly contributes to social equity. It provides start-up funding and support for sustainable business ventures in the city's poorer neighbourhoods.<sup>16</sup>
- The MODULL 2.0 and BRIC pilot projects, which are providing education and training to the construction sector on how to transition to circular operations.
- Greenbizz, a circular economy incubator hub that provides space for small businesses and new entrepreneurs to experiment with circular economy initiatives and onsite support services.
- A Business Network in which businesses and the City can work together to resolve barriers to the circular economy transition.

13 Metropolis Policy Transfer Platform. (n.d.). Brussels Regional Programme for a Circular Economy. Retrieved from: <https://policytransfer.metropolis.org/case-studies/brussels-regional-programme-for-a-circular-economy>

14 European Union. (March 2016). Brussels Regional Programme for a Circular Economy. Retrieved from: <https://circulareconomy.europa.eu/platform/en/good-practices/brussels-regional-programme-circular-economy>

15 Metropolis Policy Transfer Platform. (n.d.). Be Circular - Be Brussels. Retrieved from: <https://policytransfer.metropolis.org/case-studies/be-circular---be-brussels>

16 Metropolis Policy Transfer Platform. (n.d.). Brussels' Village Finance: Grants to create jobs and improve the local environment. Retrieved from: <https://policytransfer.metropolis.org/case-studies/brussels-village-finance>





## PARIS

Paris is an example of a City providing broad support and building strong public-private partnerships to advance circular economy objectives. Paris is utilizing its circular economy initiatives to help revitalize economically depressed areas of the city and to help advance social equity.

In 2015, the [General Assembly on the Circular Economy of Greater Paris](#) was convened to develop recommendations for a regional circular economy strategy. Approximately 250 stakeholders participated from local and regional government, businesses, academia, NGOs and associations. The results included a set of strategies and 65 initiatives and informed the subsequent [Paris Circular Economy Plan](#).<sup>17</sup>

The flagship initiative of the Paris Circular Economy Plan is the business district Les Deux Rives, a group of 700 companies with 100,000 employees. The initiative is led by the deputy mayor of Paris and RATP, the state transit authority. The project started with a core of 30 members linked with a digital platform that enables sharing of best practices, collaboration on initiatives and an open invitation for any other organization or individual in the district to join. The initial focus of the group is to work on sharing of services (business-to-business sharing), including waste management. The district is attracting new businesses to setup operations there so that they can participate in the circular innovations.<sup>18</sup> The following are highlights of the Paris Circular Economy Plan (2017-2020):

- A circular procurement policy for the City and circular requirements and supports for City

operations, such as requirements to recycle all road materials; and provision of a digital platform to facilitate exchange of materials and resources across City departments.

- Commitment to work with the construction industry on deconstruction of buildings and recovery of materials.
- Development of waste sorting methods to facilitate diversion to markets.
- Establishing an organization to oversee materials recovery and reuse.

In addition, the Economic Development and Innovation Agency of Paris, [Paris&Co](#), leads many circular economy initiatives:

- [Paris&Co Incubators](#), which manages a range of incubator labs, including one focused on the circular economy. Other labs are also supportive of the circular economy, such as the “Rolling Lab” for mobility solutions. Through these labs, business start-ups are selected to support circular initiatives and are given space to experiment and run their business. Through the incubator, they also have access to the City, relevant stakeholders, mentoring, and training workshops.
- [Urban Lab](#), which provides assistance for businesses wanting to conduct circular urban experiments, such as guidance on how to design and evaluate an experiment, access to City departments to partner or consult with, and physical space for the experiments.
- [Open Innovation Club](#), which facilitates collaborative relationships amongst businesses.

<sup>17</sup> Perchard, Edward. (21 March, 2017). Circular cities are doing it for themselves. Resource Magazine. Retrieved from: <https://resource.co/article/circular-cities-are-doing-it-themselves-11754>

<sup>18</sup> World Economic Forum. (October 2018). 5 things we can learn from the world's greenest business district. Retrieved from: <https://www.weforum.org/agenda/2018/10/paris-world-greenest-business-district-deux-rives-circular-economy/>

# Intervention Points

Cities that have embedded circular economy principles into their practices have used a range of leverage points to do so. For cities new to the circular economy, there is an opportunity to learn from early adopters, a few of which have been profiled in the City Snapshots in the previous section. Communities can start small and gradually build knowledge, capacity and momentum over time. They can play a lead role, an enabling role, or both. There is no one-size-fits-all approach, and it is important to build from the City's own unique opportunity space. In general, however, the following leverage points are commonly pursued<sup>19</sup>:

- *Research and Education;*
- *Support and Collaboration;*
- *Procurement and Operations Management; and*
- *Planning and Regulation.*

## RESEARCH AND EDUCATION

A transition to a circular model requires a shift in the current mindset – from the linear take-make-waste model towards a system that embraces circular economy principles. It also requires the knowledge base to support the transformation. Fortunately, the seeds of this transition are already in place in Canada. For example, many municipalities have adopted aggressive waste reduction and climate mitigation strategies and targets, and individuals and businesses are exploring opportunities to engage in the sharing economy.

Meaningful progress towards advancing circular economy objectives requires:

- Gaining a thorough understanding of material flows, and how to influence them.
- Continuous exploration of technological innovations and opportunity spaces to enable circularity.
- Education and engagement of key stakeholders so that they can become active collaborators in building the circular economy.

## Mapping Energy and Material Flows

A typical early step for circular economy initiatives is to undertake a mapping of material and energy flows in the city. For this work, some municipalities contract consultancies, while others form partnerships with local universities. For example, the consultancy, Circle Economy has prepared material flow analyses for many cities, including three of the four cities profiled in this report (Brussels, Glasgow and Rotterdam). Involvement of key technical stakeholders in this process – such as with waste haulers, industry associations, and other levels of government – can also be helpful.

Results of the mapping should ideally be presented in an accessible and engaging format for businesses and other stakeholders, and be made widely available. Engaging with key stakeholders to review the results of the mapping and to work with them to explore how to best frame the results also provides the opportunity to build a shared understanding of circular economy gaps, opportunities, leverage points and further research needs. Continuing to monitor material flows and the impacts of policies and initiatives on these flows over time can help ensure continuous improvement in the circular economy and it can help maintain momentum and motivate further efforts.

<sup>19</sup> Guidance on Intervention Points was gleaned from interviews, numerous City circular economy plans, and guidance documentation from Ellen MacArthur Foundation, Circle Economy and Circle Economy's Circle Lab

## Exploring Social and Technological Innovations

In addition to mapping, ongoing research is generated to explore and advance circular economy opportunities, including research on:

- circular economy methods and technology opportunities (e.g., materials development, methods for remanufacture).
- Local benefits of the circular economy (i.e., in terms of job creation and environmental metrics), which can be used as a tool to foster ongoing support.
- Local barriers, opportunities and supporting initiatives.

While some of this research is carried out by municipalities, research partners including universities, consultants, businesses and circular economy social enterprises are also supporting or leading these efforts. Universities and consultancies can help with technical challenges such as identifying new ways to recycle or remanufacture high-impact materials in the region.

It is also important that the knowledge gained through material flow analysis and other research be translated into circular economy approaches and goals for individual sectors. For example, in the retail and manufacturing sectors the details of the circular approaches will have a different focus including unique barriers and opportunities. This information will help inform needed regulatory changes to support a circular economy and show where new innovations or business initiatives are needed.

## Education

Municipalities are providing key stakeholders (City Council and staff, businesses, community organizations and residents) with the necessary knowledge to secure support and empower action. A broad-based dialogue with key stakeholders can uncover allies and partners; and engaged stakeholders will be primed to provide valuable input, and to contribute to, or lead circular economy initiatives.

Education of residents is an important step, as they will be taking up the new circular products and services. They could also become inspired to support and participate in circular economy initiatives, or even to launch new initiatives or businesses. Education campaigns can also help stimulate behavioural change and **cultivate cultural demand** to further advance the circular economy.

## CULTIVATING CULTURAL DEMAND FOR CIRCULAR INNOVATION

Circular innovation by businesses and local governments often respond to citizen and broader cultural demand. In Finland, for example, grassroots efforts by citizens to organize citywide Cleaning Days where public spaces are used for the sale and donation of unwanted household goods are now recognized as the catalyst for a variety of circular start-up innovations. Initially resisted by local and national government, they are now recognized for their positive role in fostering cultural demand for the circular economy and are regular quarterly events.

Rather than simply responding to citizen demand, circular cities can proactively influence citizen behaviour change. One means is through social marketing campaigns. For example, the National Zero Waste Council delivers [Love Food Hate Canada](#) campaign in collaboration with local governments and other key partners. The campaign was originally developed by WRAP UK and is run in jurisdictions globally. As well, Metro Vancouver runs additional campaigns aimed to get consumers thinking differently about waste and resources: [Create Memories Not Garbage](#) and [Think Thrive](#) (a campaign to help citizens love, repair, reuse their clothing and textiles). SITRA, the Finnish Circular Economy innovation fund, frames its efforts as fostering sustainable well-being (versus simply economic growth) and has a Sustainable Everyday

Life program area. The SITRA 'resource-wise citizens' program includes a variety of projects and events that focus on two complementary areas: inspiring Finnish citizens to embrace 'smart everyday living' behaviours; and helping small and large companies develop their sustainable consumer business and launch new supportive innovations, often with a collaborative approach.

In the summer of 2018, Circular London hosted [Circular Economy Week](#) - a week of events to showcase the many circular initiatives going on in the region and to encourage more people and organizations to get involved. The week featured a series of events and included a communications campaign. Residents were encouraged to undertake 15 circular challenges, such as: making use of a tool library, repairing broken electronics, and finding out where they can compost their food waste. Initiatives like these can help to foster greater uptake of circular initiatives, like the reuse-based mall in Sweden established by the municipality of Eskilstuna. At the ReTuna Mall, residents can drop off unwanted items and these items are then repaired or refurbished and then resold.<sup>20</sup> Shifting societal norms around reuse helps to generate greater participation in these opportunities.

Education and engagement of City staff are also important and can be focused on providing training on key priorities, such as procurement. Digital platforms (e.g., 'sharing' websites) are also utilized to promote adoption of circular initiatives within City operations, as has been done in Paris.

Some academic institutions are playing an important role in mapping exercises and in the exploration of technological innovations, and they are also supporting advancement of knowledge through incorporation of circular economy principles and methodologies into

course offerings. In London, following engagement of local Universities in developing London's Circular Economy Route Map, these Universities committed to promoting the circular economy within their courses.<sup>21</sup>

20 World Economic Forum (in collaboration with PWC). (2018). Circular Economy in Cities Evolving the model for a sustainable urban future. Retrieved from: [http://www3.weforum.org/docs/White\\_paper\\_Circular\\_Economy\\_in\\_Cities\\_report\\_2018.pdf](http://www3.weforum.org/docs/White_paper_Circular_Economy_in_Cities_report_2018.pdf)

21 Eurocities. (October, 2017). *Full Circle: Cities and the Circular Economy*. Retrieved from: [http://nws.eurocities.eu/MediaShell/media/2017cities\\_and\\_circular\\_economy-web-spreads.pdf](http://nws.eurocities.eu/MediaShell/media/2017cities_and_circular_economy-web-spreads.pdf)



## SUPPORT AND COLLABORATION

A City's catalytic role ranges from providing supportive policy, space and programs to serving as an active partner in collaborative efforts with the private sector. Businesses are important collaborators, as they can trial new solutions and business models, like redesigning products to be more circular (i.e., designed to last or be more effectively recycled or composted), or experimenting with access over ownership models where consumers gain access to a product but the ownership of the product remains with the company. In many cases, initiatives are being established through public-private partnerships, as has been widely done in Paris.

Cities are playing a range of supporting and collaborating roles, for example:

- Bringing together key stakeholders.
- Supporting circular economy-related start-ups via funding, provision of space, and mentoring (i.e., through 'incubator hubs').
- Providing or supporting collaboration platforms.
- Leading or supporting circular economy pilot projects and business districts.

## Convening Stakeholders

Cities are well positioned to be facilitators in the transition to a circular economy as they can bring together the interests of regional and national governments, researchers, businesses and the community at large. Stakeholders should be engaged at all points in the process; scoping and mapping; exploring barriers and opportunities; developing a shared action plan; and monitoring and reviewing progress. In London, they have found that by engaging industry and academic stakeholders in the development of their circular economy Route Map, these stakeholders have gone on to encourage circular economy innovations within their spheres of influence.<sup>22</sup> In Paris, the General Assembly on the Circular Economy of Greater Paris convened two hundred and forty stakeholders from the local government sector, the business community, academia, and the non-profit sector to develop a set of strategies and 65 initiatives which then informed the subsequent Paris Circular Economy Plan.<sup>23</sup>

<sup>22</sup> Eurocities. (October, 2017). *Full Circle: Cities and the Circular Economy*. Retrieved from: [http://nws.eurocities.eu/MediaShell/media/2017cities\\_and\\_circular\\_economy-web-spreads.pdf](http://nws.eurocities.eu/MediaShell/media/2017cities_and_circular_economy-web-spreads.pdf)

<sup>23</sup> Metropolis website, see: <https://policytransfer.metropolis.org/case-studies/grand-paris-metropolis>

## Supporting Start-ups

Start-ups and entrepreneurs with an idea often need support in the form of capital and business knowledge. Financing may be a significant hurdle for circular economy ventures because they often represent new and unique approaches that can be seen as high risk by investors. Cities can help overcome these challenges by offering support to start-ups in a variety of ways. There is also opportunity to align non-circular economy related ventures with circular economy principles.

Some cities have made significant progress building capacity in their communities to advance circular economy principles through competitions. Leading examples are 'Be Circular Be Brussels' campaign and the 'Amsterdam Circular Challenge'. Calls for projects are framed around priorities for innovation that have been identified in the City circular economy mapping. These competitions enable a city to select and provide seed funding to projects that best align with their circular economy priorities. Some municipalities, such as Paris, are providing continued support to the grant recipients via 'incubator hubs', where the City provides space to the businesses while also arranging mentoring, connections with relevant stakeholders, workshops and training on circular economy business models and specific challenges of different sectors to adopting circular economy principles.

Cities are also providing space for businesses to experiment with new circular economy innovations. The Rotterdam Innovation District – referred to as the 'Street Lab' – is used to test new recycled road materials and street fixtures. Amsterdam provides legislative "free-zones" for experimenting with circular economy initiatives where, for example, better waste collection approaches are being developed.<sup>24</sup> Flexibility around city bylaws in the experimental stage of a circular economy start-up can support success of a new venture.

### INCREASING THE UPTAKE OF CIRCULAR ECONOMY OFFERINGS

Cities can increase the uptake of circular economy offerings by supporting them with their own purchasing power and by fostering greater uptake throughout the community by helping to shift societal norms around circular economy activities (like sharing and repairing) through communications campaigns. Municipal efforts to support sharing economy initiatives like car sharing illustrate the many avenues of municipal action that can stimulate uptake. For example, cities such as Vancouver are joining carsharing companies to meet their corporate fleet needs;<sup>25</sup> they have facilitated carsharing uptake in new multi-family developments; and they can provide parking preference for carshare vehicles.<sup>26</sup>

24 Prendeville, Sharon & Cherim, Emma & Bocken, Nancy. (2017). Circular Cities: Mapping Six Cities in Transition. *Environmental Innovation and Societal Transitions*. 10.1016/j.eist.2017.03.002.

25 West Coast Electric Fleets. (2016). Partner Fleet Profile: City of Vancouver – EV Fleet Management. Retrieved from: [http://www.westcoastelectricfleets.com/portfolio-items/vancouverbc\\_fleet\\_profile](http://www.westcoastelectricfleets.com/portfolio-items/vancouverbc_fleet_profile)

26 movmi Shared Transportation Services. (July 2018). An Overview of Vancouver Carsharing: Canada's Capital for Shared Mobility. Retrieved from: <http://movmi.net/carsharing-vancouver-canada/>

## Collaboration Platforms

Cities can support businesses and community action by hosting or supporting platforms that facilitate circular economy initiatives. Typically, three different types of platforms have been implemented:

1. **Knowledge sharing:** providing access to data and analysis on material flows, guidance on what the circular economy means to each sector type, and general knowledge sharing and discussion on the circular economy. (For example, Amsterdam provides open access to data that researchers, businesses and residents can use to guide circular economy activities.<sup>27</sup>)
2. **Sharing initiatives:** supporting various sharing opportunities, such as Community sharing and Business-to-Business (B2B) sharing. (For example: Community tool libraries; B2B online platforms, such as Share Peterborough, through which businesses can share staff and equipment.)
3. **Match-making:** connecting businesses across sectors so that they can identify synergies between material flows and resourcing, and identify opportunities to repurpose unwanted products or waste materials. Match-making platforms can help businesses replace raw material feedstocks with recycled materials. They can also be used to target priority material streams. (Some platforms combine waste-to-feedstock match-making with other B2B sharing within one platform, like Share Peterborough.)

## Pilot Projects

Cities can advance the circular economy through pilot projects, as has been done in the Les Deux Rives business district in Paris. This flagship initiative of the Paris circular economy Roadmap aims to create the world's most circular business district. It is strongly supported by the City and the co-leads for the project include the Deputy Mayor of Paris and RATP, the state transit authority.<sup>28</sup> In Peterborough (UK) a materials swapping pilot project was initiated in the Fengate Industrial Park. Initially, 12 businesses participated in the network to swap materials, and subsequently, the project scaled up to include 100 businesses.<sup>29</sup>

27 Circle Economy. (October, 2018). Municipal Policy for the Circular Economy: Lessons learned from Amsterdam. Retrieved from: <https://www.circle-economy.com/wp-content/uploads/2018/10/Municipal-Policy-for-the-Circular-Economy-Lessons-learned-from-Amsterdam-FINAL.pdf>

28 World Economic Forum. (October 2018). 5 things we can learn from the world's greenest business district. Retrieved from: <https://www.weforum.org/agenda/2018/10/paris-world-greenest-business-district-deux-rives-circular-economy/>

29 Perchard, Edward. (21 March, 2017). Circular cities are doing it for themselves. Resource Magazine. Retrieved from: <https://resource.co/article/circular-cities-are-doing-it-themselves-11754>

## PROCUREMENT AND OPERATIONS MANAGEMENT

Cities are supporting the evolution of new markets to foster the circular economy through their purchasing power, specifically, by creating purchasing policies to preferentially choose products and services that incorporate circular economy principles. Cities are also incorporating circular economy principles into their existing operations.

**The City of Paris** adopted a circular procurement policy, and circular practices for their operations, such as requiring recycling of all road materials, and provides a digital platform facilitating exchange of materials and resources across City departments. These actions are included in the [Paris Circular Economy Plan \(2017-2020\)](#).

The City of London has adopted a circular procurement policy and has embedded circular economy principles into the operations of the Greater London Authority which includes the Metropolitan Police, London Fire Brigade and Transport for London. These actions were recommended in London's [Circular Economy Route Map](#).<sup>30</sup>

To ensure that procurement policies effectively contribute to circular economy objectives, it is important that criteria are developed for individual sectors; and that the policy considers full lifecycle impacts and externalities (e.g., greenhouse gas emissions). circular economy practices can by their nature be transformative, potentially requiring flexibility in budgeting. For example, shifting from a product to a service delivery model may require some allowances in budgeting procedures. Allowances may also be required to accommodate end of life handling (e.g., advancing remanufacture and disassembly.)

circular economy-based purchasing and operations policies can help to create the economies of scale needed to build a business case for launching more circular products and services. This will stimulate the market for circular economy and support the development of new markets for materials currently in the waste stream.

Smaller cities can pool efforts with neighbouring communities to leverage sufficient purchasing power. Larger cities too can benefit from shared purchasing power. This has been the case for the 124 municipalities in Greater Paris which has a population of 7 million. In addition to leveraging purchasing power, Greater Paris municipalities are coming together to identify shared circular economy opportunities and overcome market transformation barriers collectively.<sup>31</sup> Local governments can amplify their influence by encouraging other partners and stakeholders to create their own circular economy-focused procurement policies.

As circular economy efforts mature in cities, many have launched large scale pilots as a district, such as Les Deux Rives in Paris. Les Deux Rives includes 700 companies that employ 100,000 people. These districts are large enough to influence circular economy market development through coordinated circular economy procurement policies – such as combined waste and recycling management. High density business districts are also ideal for experimenting with business-to-business sharing opportunities.<sup>32</sup>

31 Perchard, Edward. (21 March, 2017). Circular cities are doing it for themselves. Resource Magazine. Retrieved from: <https://resource.co/article/circular-cities-are-doing-it-themselves-11754>

32 World Economic Forum. (October 2018). 5 things we can learn from the world's greenest business district. Retrieved from: <https://www.weforum.org/agenda/2018/10/paris-world-greenest-business-district-deux-rives-circular-economy/>

30 Eurocities. (October, 2017). *Full Circle: Cities and the Circular Economy*. Retrieved from: [http://nws.eurocities.eu/MediaShell/media/2017cities\\_and\\_circular\\_economy-web-spreads.pdf](http://nws.eurocities.eu/MediaShell/media/2017cities_and_circular_economy-web-spreads.pdf)



## PLANNING AND REGULATION

Cities are using regulation, strategies and plans to provide top-down guidance within City operations, and to businesses and consumers, in order to support a transition to a circular economy. As stated previously, specific circular economy guidance and goals for different sectors are needed to give clear direction for policy.

Numerous cities have developed Strategic Plans to guide their circular economy efforts, such as the [Paris Circular Economy Plan](#), [Rotterdam Circular](#), [Circular Economy Route Map](#) for London. While some cities are developing comprehensive Circular Economy strategic plans, others are taking an incremental approach by embedding circularity into a range of short-term or medium-term plans, including those focused on waste management, economic development and climate change. An overarching element of these efforts is to advance a shift away from ‘waste management’ towards a more circular framing such as materials management, sustainable consumption and circularity.

In the US, for example, cities like Portland, Eugene, Denver and Minneapolis, are incorporating the concept of sustainable consumption into their climate action plans.<sup>33</sup> In doing so, they’re shifting the focus upstream from waste management to reducing consumption levels and supporting businesses in minimizing the carbon intensity of their supply chains. The plans include consumption and production-specific objectives, targets and actions, where typically the focus has been on waste and recycling. The “Consumption and Solid Waste” section of Portland’s 2015 Climate Action Plan encourages sustainable

consumption action, such as focusing on reuse and repair and making low-carbon food choices as well as providing support to businesses in minimizing the carbon intensity of their supply chains.<sup>34</sup>

Cities can focus circular economy initiatives in one planning area that already has high priority and funding and grow from there. Toronto, New York and London all began their efforts with a focus on waste, but have now evolved to encompass a spectrum of circular economy opportunity spaces. Because circularity cuts across many city priorities, there are many potential places to begin. For example, strengthening support for maintaining existing building supply and enhancing building deconstruction are circular strategies relevant to housing and land use planning department. Circular food and textile strategies can be linked to waste, economic development and social planning priorities.

Cities and regions also use a range of regulatory tools to catalyze circular innovation. For example, landfill bans on high-impact waste streams like organics (food waste), construction materials, and textile waste can provide the incentive for businesses to transition to more circular practices. Municipalities have also begun to ban certain products (e.g., single-use plastics). For these bans to be effective, local and regional governments typically consult with and actively engage the business community in their design and implementation, and consideration needs to be given to harmonizing approaches across jurisdictions where possible. A phased approach to implementation is also often key to allow time for adjustment. Consulting with the business community may demonstrate that a ban may have unintended consequences and that more needs to be done to help key sectors and businesses build their capacity to respond effectively.

33 USDN. (n.d.). Sustainable Consumption Toolkit. Retrieved from: <http://sustainableconsumption.usdn.org/initiatives-list/addressing-consumption-in-climate-action-plans>

34 City of Portland and Multnomah County. (June 2015). Climate Action Plan Summary. Retrieved from: <https://www.portlandoregon.gov/bps/article/531994>

## INNOVATION LABS TO INFORM REGULATION

Some municipalities have hosted innovation labs focused on identifying circular innovations for key waste streams. For example, in Vancouver, a Textiles Leverage Lab was convened that involved City of Vancouver, Metro Vancouver and about 20 key textile industry stakeholders. After mapping textile material flows and exploring the impacts of a potential landfill ban for the textiles sector they decided to delay the ban and instead focus on cultivating new product opportunities from textile waste.<sup>35</sup>

Regulation of the circular economy at the municipal level is at an early stage of development. Understandably, regulation linked to municipal waste management goals is one of the most developed areas and includes a focus on:

- Collection and treatment standards and targets.
- Using regulation to change the definitions of waste and how it is collected and handled. This can include sorting requirements for priority materials so that they can be looped back into use and support the creation of new markets.
- Landfill disposal charges as a complement to mandatory source separation and disposal bans to stimulate product design with end-of-life in mind, designing for disassembly and enhancing reuse options.

Municipal regulation can both hinder and support positive circular economy innovation. Discerning how to support positive innovation while honouring the municipal requirement to protect public health and safety, affordability, and fair business practice is an important area of further research and exploration. Some of the approaches and lessons learned from regulating the sharing economy are worth drawing from here. For example, Amsterdam's policymakers engaged in direct dialogue with sharing start-ups to develop enabling policy that met the needs of citizens while at the same time advanced entrepreneurship opportunities and generated local economic development opportunities.<sup>36</sup> Like the Sharing Economy, achieving the "right" regulation of circular economy initiatives will need to be customized to specific circular economy sectors and innovations.

Providing temporary regulatory exemptions, similar to Rotterdam Innovation District's 'street lab', or Amsterdam's legislative "free-zones", provides the opportunity for circular economy experimentation. These experiments help to identify regulations that obstruct innovation and those that are supportive.

<sup>35</sup> Personal communication, Rosemary Cooper, CreatingPlaces, December 19th, 2018.

<sup>36</sup> Lauren Razavi. (August 2017). Building a City: Regulating the Sharing Economy in Amsterdam. Retrieved from: <https://medium.com/@LaurenRazavi/building-a-city-regulating-the-sharing-economy-in-amsterdam-faecee8dfb0>

Cities are also collaborating with other levels of government to implement complementary legal frameworks that bridge their differing responsibilities. Where national, provincial or regional circular economy strategies are already in place, cities are using them to guide their own initiatives and where they are lacking, or barriers outside City jurisdiction exist, cities are engaging with other levels of government to find solutions. For example, inter-municipal collaborations can advocate for the creation of extended producer responsibility (EPR) programs, or for improvements to existing programs.

Municipal regulation should not be viewed in isolation but rather as part of a package of policy levers and incentives to support circular economy innovation. For example, research conducted through the Vancouver Economic Commission concluded that, to advance

circular textiles initiatives, a combination of approaches should be adopted: regulatory approaches like EPR and waste disposal bans; research and development for recycling methods; collection programs and recycling infrastructure; consumer education and awareness; financial incentives; and pilot take-back programs.<sup>37</sup> Collaborative projects that bring together municipal governments, businesses, academia, and other stakeholders can facilitate a comprehensive change strategy; and together they can more effectively engage higher levels of government.<sup>38</sup>

37 Smart Prosperity Institute. (January 2018). Getting To A Circular Economy: A Primer For Canadian Policymakers. Retrieved from: <https://institute.smartprosperity.ca/sites/default/files/spipolicybrief-circulareconomy.pdf>

38 Helsinki Metropolitan Smart & Clean Foundation. (n.d.). Retrieved from: <https://smartclean.fi/en/>

# Steps to Adopting Circular Approaches at the City Level

Many municipalities are experimenting to find the right balance of intervention points to drive circular economy innovations. If circular economy approaches are new to the City, then one option is to start simple, with initiatives that do not require new regulations, large investments or complex collaboration. Simpler start-up initiatives could include repair centers and tool libraries, and business-to-business sharing networking events, which a municipality can facilitate by providing city-owned space. For cities that are ready to take a more systematic and integrated approach, they can consider adopting a broad set of intervention points (summarized in the previous section of this report), aimed at promoting bottom-up community and business initiatives and top-down regulation to enable them.

A circular economy approach provides a broad framework that can directly support and be aligned with many city goals and focal areas, including economic development, **waste management (zero waste)**, climate change mitigation, 'smart cities' and broader sustainability, health, and livability initiatives. In some cases, circular economy initiatives are being combined with **neighbourhood revitalization** efforts.

## **Expanding to circular economy from waste management:**

The City of London created the London Waste and Recycling Board (LWARB) in 2007 with the mandate of advancing a strategic approach to waste management. The Board's approach has included a growing emphasis on the circular economy. In June 2017 the LWARB released a [Circular Economy Route Map](#) to address five sectors: construction, food, electronics, textiles and plastics; and it focuses circular economy efforts on waste management, economic development and business support.<sup>39,40</sup>

## **Using the circular economy to support**

**revitalization:** Rotterdam established their Blue City Circular Economy incubator hub in what was previously an abandoned swimming pool. In Brussels, support for circular business start-ups is focussed on initiatives that will generate employment opportunities in impoverished neighbourhoods of the city.

Although there is no cookie-cutter approach, based on the experiences of other jurisdictions, we can glean that the following steps are becoming common.<sup>41</sup>

39 Eurocities. (October, 2017). Full Circle: Cities and the Circular Economy. Retrieved from: [http://nws.eurocities.eu/MediaShell/media/2017cities\\_and\\_circular\\_economy-web-spreads.pdf](http://nws.eurocities.eu/MediaShell/media/2017cities_and_circular_economy-web-spreads.pdf)

40 Perchard, Edward. (21 March, 2017). Circular cities are doing it for themselves. Resource Magazine. Retrieved from: <https://resource.co/article/circular-cities-are-doing-it-themselves-11754>

41 This overview of steps represents a compilation and distillation of guidance developed by the Ellen MacArthur Foundation and Circle Economy.

**Stakeholder Engagement (Ongoing):** Regardless of the process undertaken, leading circular economy examples have maintained strong engagement with stakeholders, particularly with businesses. Partnerships with businesses and other levels of government can help ensure access to adequate support and resources for successful circular economy programs. Although engaging with business is a priority, it is also important to engage citizens as they will be the ones that will need to shift purchasing behaviours and lifestyle habits to accommodate the new circular economy alternatives. In the previous section, detail is provided on key points at which engagement is important.

**Local Situation Assessment:** circular economy initiatives often begin with generating an understanding of the local landscape for action through a high level exploratory assessment to identify key leverage points and alignments (i.e., alignment with existing strategies, plans and funding at the City; and also identification of key partners and/or leaders already active in this space in the community).

**Mapping and Scanning:** A material flow analysis (MFA) is conducted and sectors to focus on are identified. A scan is also undertaken to identify existing initiatives and policies that would support or block a circular economy. Based on this analysis, potential circular economy opportunities are explored and analyzed. Criteria for the selection of priorities could include scale of impact, visibility, potential for creating short-term successes, and existing relevant partnerships.

**Develop an Action Plan:** Based on the mapping and scanning analysis, potential actions are selected for inclusion in an action plan or road map. Ideally, this process involves convening working groups comprised of representatives of the local government, businesses, academia, and other local organizations.

**Monitor and Evolve:** Cities can then continue to study impacts of new initiatives to make sure they are achieving the desired result. The plan can be continually evolved, for example by exploring opportunities to scale up and expand pilot projects. Cities that are leading in circular economy have continued to broaden support after focussing initially on limited sectors and initiatives. Results can be shared regularly to build momentum and continually identify new opportunities.



# Applying Circular Economy Principles in Canadian Cities

When compared to Canada, there has been a higher level of adoption of circular economy principles amongst European businesses and communities.<sup>42</sup> Yet, there is a growing interest in exploring circular economy opportunities amongst Canadian communities, governments and organizations. Toronto, Montreal, Vancouver/Metro Vancouver and Guelph have been some of the early leaders in these endeavours.

A thorough overview of the Canadian landscape was not included in this scope of work, and can be more fully evaluated in subsequent research. However, when reviewing circular economy practices and methods from other jurisdictions it is important to 'ground truth' these practices against the Canadian reality and context. Specifically, it is important to consider the unique opportunities, barriers and levers present in Canada, compared to these other jurisdictions. Approaches should be modified and adapted to reflect these unique features, where present. It is also true that there is tremendous diversity across the country, and as a result, there is no one-size-fits-all approach for all Canadian municipalities. A high-level, preliminary overview of some unique Canadian characteristics are summarized below. Additional perspectives on Canadian context pertinent to multiple levels of government are included in recent reports prepared by Delphi, Smart Prosperity Institute, Circular Economy Leadership Coalition, CPQ and the National Zero Waste Council.

## CANADIAN CONTEXT:

**Resource intensity:** Canada is a large country, often with large distances between communities, resulting in significant transportation demands. It also has a climate that results in relatively high heating and cooling demands. Furthermore, the population is largely affluent suggesting a high level of consumerism throughout the country.

*Opportunity: Use the circular economy as a framework to address the relatively high energy and resource demands of Canadian communities.*

**Reliance on primary resources:** The Canadian economy is dominated by the service sector as is the case for other developed economies, however in Canada there is more reliance on primary resources such as oil and gas, logging, mining, agriculture and fishing.<sup>43</sup>

*Opportunity: Demonstrate that the circular economy can contribute to diversifying the economy by providing new value-added industry, knowledge-based jobs; and leveraging and further building entrepreneurial activities.*

**Extensive rural areas:** Canada has a strong resource and agricultural sector; and many of the country's communities are in, or neighbour rural areas.

*Opportunity: Group communities together and adopt a regional approach; and explore opportunities in the food and agricultural sector.*

<sup>42</sup> Ellen MacArthur Foundation. (July 17, 2018). Which country is leading the circular economy shift? Circulate. Retrieved from: <https://circulatenews.org/2018/07/which-country-is-leading-the-circular-economy-shift/>

<sup>43</sup> World Atlas. (n.d.). What are the biggest industries in Canada. Retrieved from: <https://www.worldatlas.com/articles/what-are-the-biggest-industries-in-canada.html>

**Little incentive to reduce waste:** Landfill space is abundant in most Canadian locations and tipping fees are low compared to international jurisdictions. As a result, there is limited financial incentive to prevent and divert waste. Furthermore, there are tax benefits provided to virgin material production that are not available for recycled and reused materials.

*Opportunity: Use circular economy framing to demonstrate the value of preventing waste and to support creation of markets for recycled and remanufactured materials.*

**Regulatory variability:** Waste is defined differently in various jurisdictions of the country, creating barriers for cross-jurisdictional trade of reclaimed materials. Furthermore, there is no overarching Canada-wide circular economy framework or policy guidance.

*Opportunity: Work toward common definitions of waste and the circular economy and build a national circular economy program or vision.*

**Limited access to data:** There is significant private waste hauling occurring in Canada, particularly in the commercial sector, and many of these haulers are not reluctant to disclose data. This makes it challenging to conduct urban metabolism studies to evaluate the flows of resources.

*Opportunity: Encourage governments and other stakeholders to include requirements for reporting in their hauler contracts.*

**Lack of awareness of circular economy opportunities:**

The circular economy is not widely known or understood across the country. Education and awareness campaigns are needed to stimulate interest and support.

*Opportunity: Build from existing campaigns like Love Food Hate Waste Canada, and model programs after successful European examples.*

**Strong network of universities and colleges:** There are many universities and colleges across the country that could become active participants in the circular economy - some in fact already are. For example, the University of Guelph is working on circular food systems and researchers at the University of Victoria are experts in Urban Metabolism studies. HEC Montreal University, Polytechnic Montreal Technical University, and the University of Montreal have all partnered with EDDEC Institute to advance CE and other environmental objectives.

*Opportunity: Conduct a thorough review of academic leadership in Canada that could help inform and support municipal efforts.*

