Unlocking the Potential of Municipal Engineers in the Circular Economy Transition

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Presentation Outline

1. Who We Are and What We're Working Toward
2. Municipal Engineers and the Circular Economy Transition
3. Unlocking Potential Through Circular Procurement
4. What's Next for Toronto

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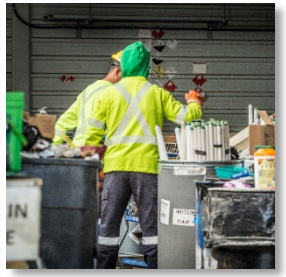
Who We Are and What We're Working Toward

Solid Waste Management Services

Responsible for **collecting, transporting, processing, composting** and **disposing** of municipal and some private sector waste, recyclables, organics, electronics, and household hazardous waste; and, **providing city-wide benefits** through litter pick-up, parks and street litter bin collection, promotion and education, community outreach, and Community Environment Days.

Waste managed:	**~900,000 tonnes/year**
Customers served:	**870,000**
Residential diversion rate:	**53%**
Waste operating budget:	**$377 million**
Waste 10-Year capital plan:	**$849 million**
Asset portfolio value:	**$600 million in assets**

Estimates suggest that Toronto's economy generates ~2.1 million tonnes of waste per year!



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Circular Economy and Innovation

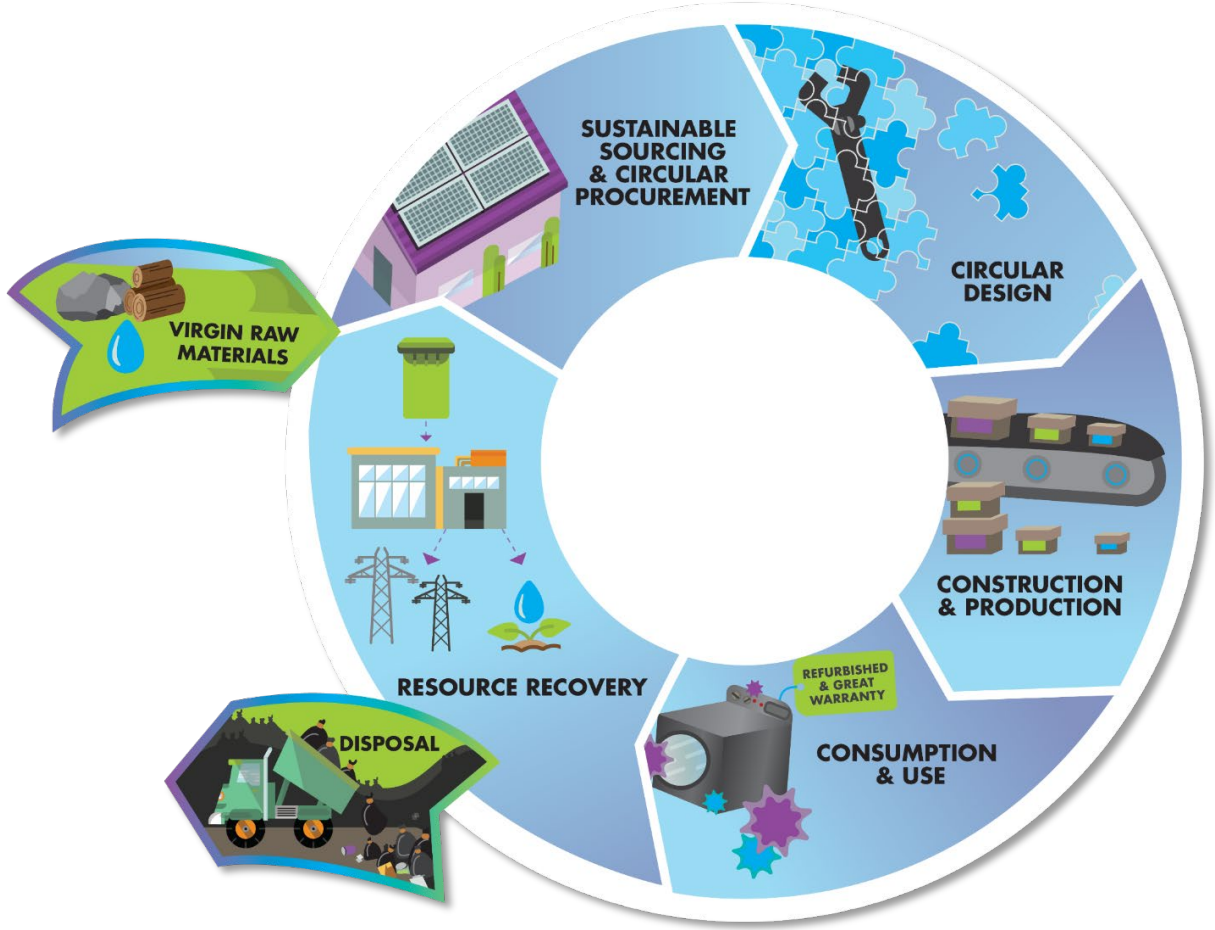
One of the first dedicated circular economy teams in a North American municipality

Interdisciplinary team representing a wide range of professional expertise

Responsible for a range of initiatives for Solid Waste Management Services, City of Toronto Divisions, and community stakeholders

The Circular Economy Defined

The Circular Economy Defined



Reuse Business Models

Building as Material Bank

Modular Infrastructure

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Toronto's Circular Economy Journey

The City of Toronto's Long Term Waste Management Strategy set an **aspirational goal** of working toward zero waste and a circular economy

The Circular Economy and Innovation unit (CEI) was formed to develop a **strategy and policy framework** to make Toronto a circular city, and to help the City of Toronto determine:

- What could this aspirational goal mean in practice?
- What programs, policies, partnerships, and investments are necessary to operationalize circular economy goals?

toronto.ca/circulareconomy

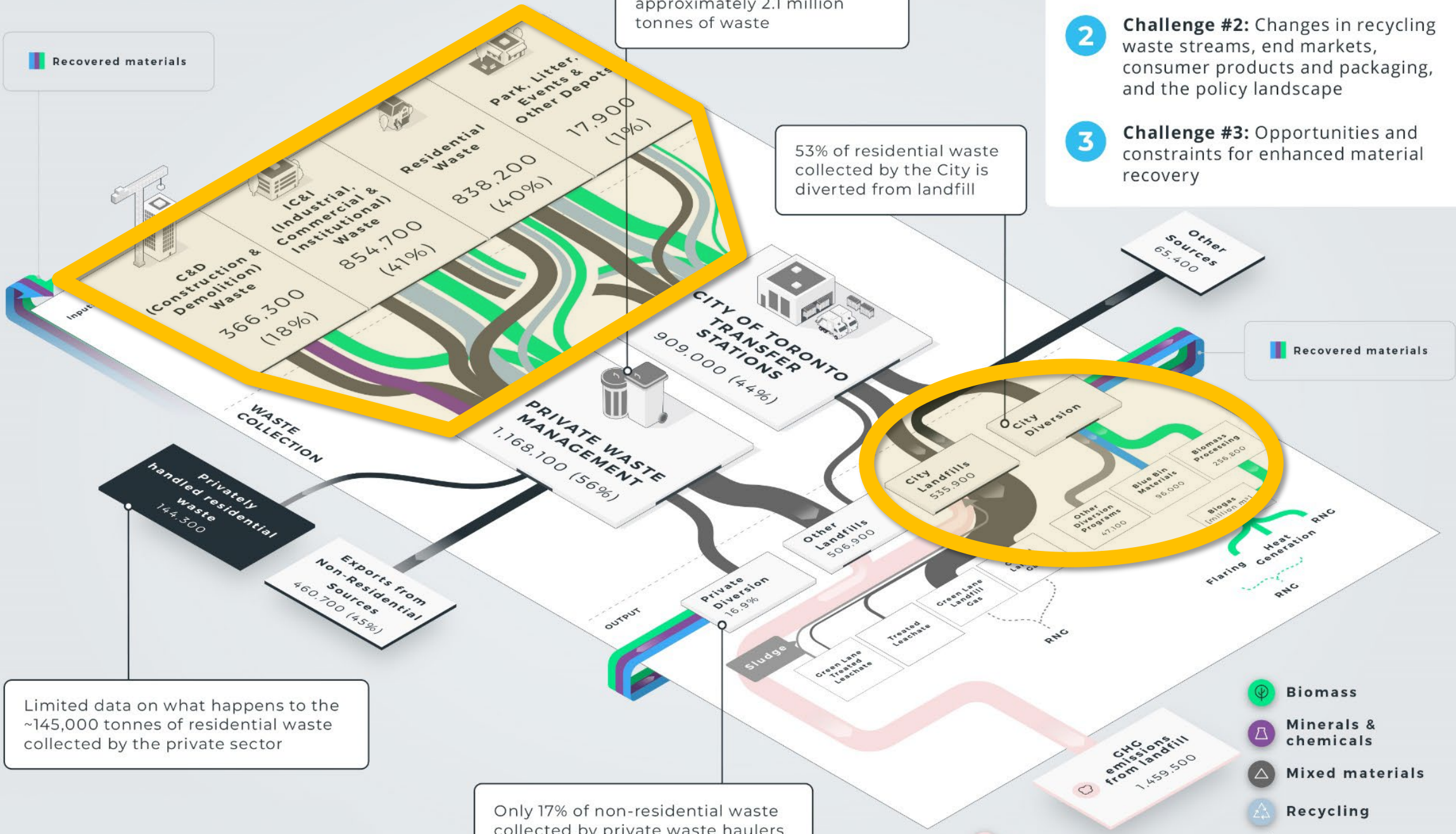
Baselining for a Circular Toronto

MATERIAL FLOW ANALYSIS

Toronto's economy generates approximately 2.1 million tonnes of waste

1. **Challenge #1**: Jurisdictional and regulatory limitations and data gaps
2. **Challenge #2:** Changes in recycling waste streams, end markets, consumer products and packaging, and the policy landscape
3. **Challenge #3:** Opportunities and constraints for enhanced material recovery

53% of residential waste collected by the City is diverted from landfill



Limited data on what happens to the ~145,000 tonnes of residential waste collected by the private sector

Only 17% of non-residential waste collected by private waste haulers is diverted from landfill

Municipal Engineers and the Circular Economy Transition

Why municipal engineers?

We're learning that…

The specific circular economy outcomes you might target, and the strategies you can adopt, will vary depending on the sector, scale, and myriad other variables.

This means all kinds of expertise will be needed for a successful circular economy transition.

Solid Waste Management Services Division does not have all the expertise required for a successful circular economy transition, or the jurisdiction to adopt all of the strategies required to move the needle.

So what's the role for municipal engineers?

Why municipal engineers?

The circular economy isn't just about waste – it's about design.

Technical expertise enables us to explore what's possible and determine what's feasible.

Standards help ensure transformative new approaches and technologies can be sustained and scaled.

Policymakers need feedback from a range of disciplines to ensure policy outcomes will be achieved.

Engineers are well positioned to generate and interpret the data required for performance monitoring.

Municipal engineers can lead by example and set the bar for the rest of the industry.

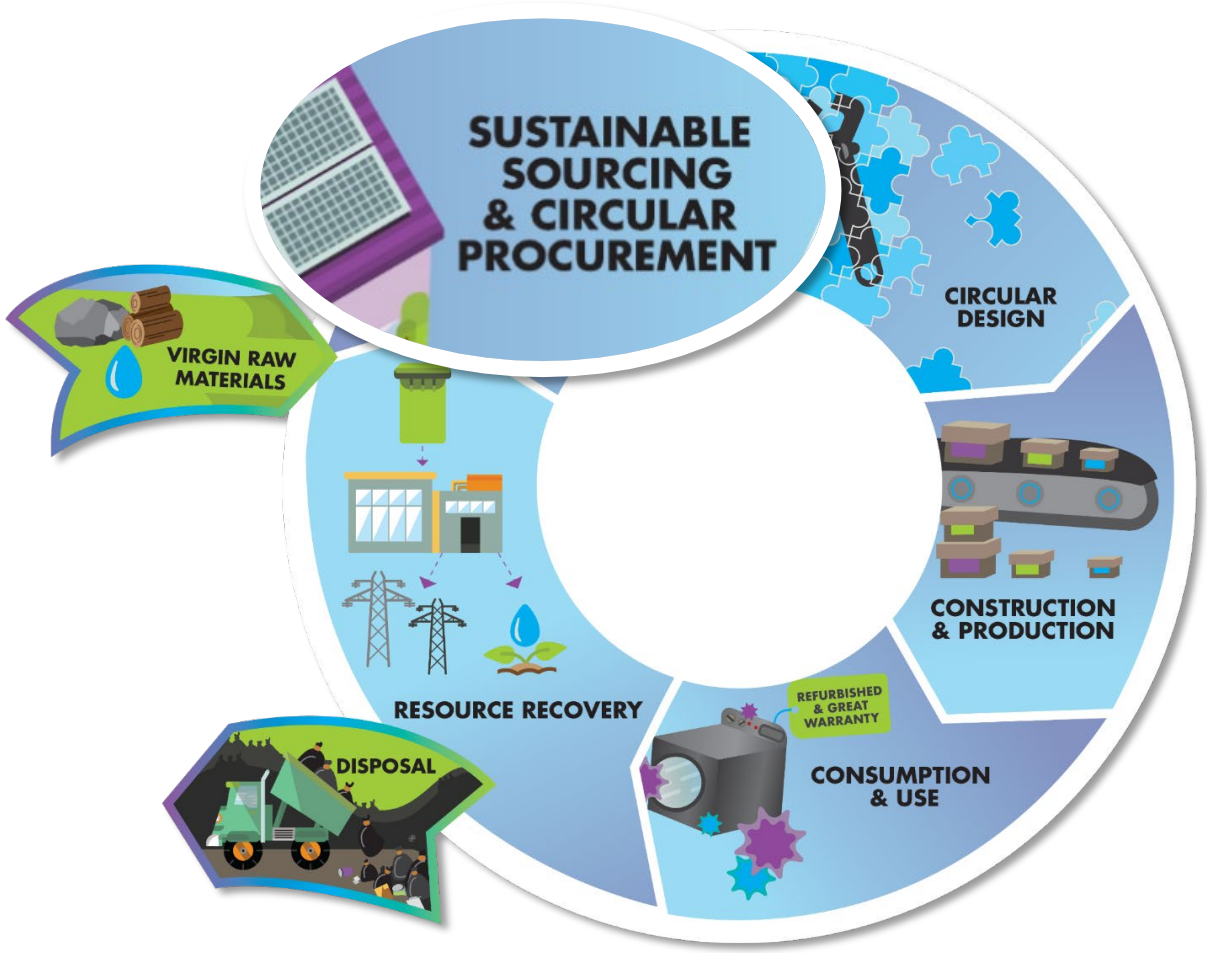
Unlocking Potential Through Circular Procurement

Circular Procurement

An approach to purchasing products and services that focuses on **keeping materials in use for longer**.

This means purchasing products and services that will allow for, or are designed for, **repair**, **reuse**, or **recycling**.

This **limits a product's lifecycle environmental impact** and **maximizes the use of limited resources**.



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The Circular Procurement Framework

Vision

Develop a strategy for City procurement to drive waste diversion through the application of circular economy principles

Core Area Impacts

Environmental
Including:
CO2 savings
Waste diversion

Economic
Including:
Cost savings
Job creation

Social
Including:
Capacity-building
Asset sharing activities

Framework Goals

More City goods & services with:
- Non toxic materials
- Lower GHG emissions
- Less raw materials
- Designed to regenerate ecosystems

More City contracts that consider:
- Full Lifecycle impacts
- Maximum Resource potential
- Maximum utility of goods/services

Re-examination of City contracts through a circular economy lens, including:
- Updating the City's existing Environmentally Responsible Procurement Policy

Framework Implementation Objectives and Strategies

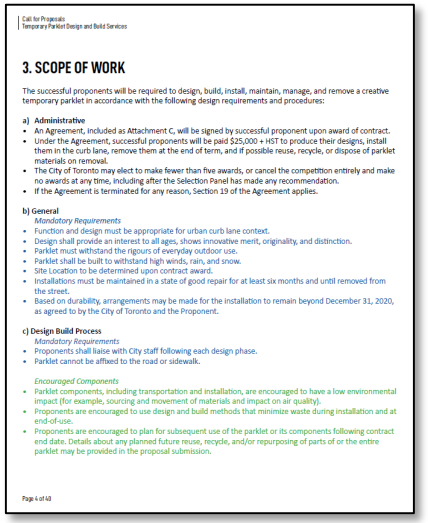
- Apply circular economy principles to pilot procurements
- Enhance circular economy sector development & supplier engagement
- Enhance the circular economy capacity of City staff
- Identify & refine circular procurement KPIs
- Share case studies and best practices

Circular Procurement Pilots

King Street Design Call

Encouraged proponents to adopt circular design principles, including:

- Transport, packaging, or installation that minimizes waste
- Sustainable material selection and sourcing, e.g. recycled content, refurbished or reclaimed materials, and materials from local suppliers
- Design for circular system improvement, e.g. renewable power, vegetation, green infrastructure, or social benefit
- Planning for repurposing, donation, and/or recycling of parklet at end of use



Results:

- Fostered dialogue with the market and with interdivisional partners
- Demonstrated market readiness
- Saved money on disposal costs while encouraging more sustainable outcomes

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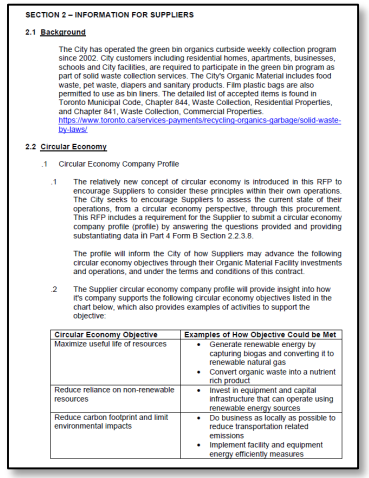
Circular Procurement Pilots

SSO Processing Services RFP

Two different strategies were adopted in this RFP to deliver circular economy impact.

1. Circular criteria in evaluation:
   - Proponents required to submit Circular Economy Company Profiles that were scored as part of the technical submission

2. Circular criteria in contract management:
   - Successful proponents required to generate a Circular Economy Action Plan and report annually on progress



SECTION 2 – INFORMATION FOR SUPPLIERS

2.1 Background

The City has operated the green bin organics curbside weekly collection program since 2002. City customers including residential homes, apartments, businesses, schools and City facilities, are required to participate in the green bin program as part of solid waste collection services. The City's Organic Material includes food waste, pet waste, diapers and sanitary products. Film plastic bags are also permitted to use as bin liners. The detailed list of accepted items is found in Toronto Municipal Code, Chapter 844, Waste Collection, Residential Properties, and Chapter 841, Waste Collection, Commercial Properties. https://www.toronto.ca/services-payments/recycling-organics-garbage/solid-waste-by-laws/

2.2 Circular Economy

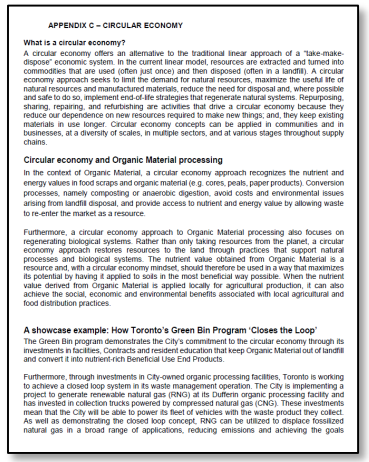
.1 Circular Economy Company Profile

.1 The relatively new concept of circular economy is introduced in this RFP to encourage Suppliers to consider these principles within their own operations. The City seeks to encourage Suppliers to assess the current state of their operations, from a circular economy perspective, through this procurement. This RFP includes a requirement for the Supplier to submit a circular economy company profile (profile) by answering the questions provided and providing substantiating data in Part 4 Form B Section 2.2.3.8.

The profile will inform the City of how Suppliers may advance the following circular economy objectives through their Organic Material Facility investments and operations, and under the terms and conditions of this contract.

.2 The Supplier circular economy company profile will provide insight into how it's company supports the following circular economy objectives listed in the chart below, which also provides examples of activities to support the objective:

Circular Economy Objective	Examples of How Objective Could be Met
Maximize useful life of resources	• Generate renewable energy by capturing biogas and converting it to renewable natural gas • Convert organic waste into a nutrient rich product
Reduce reliance on non-renewable resources	• Invest in equipment and capital infrastructure that can operate using renewable energy sources
Reduce carbon footprint and limit environmental impacts	• Do business as locally as possible to reduce transportation related emissions • Implement facility and equipment energy efficiently measures



APPENDIX C – CIRCULAR ECONOMY

What is a circular economy?

A circular economy offers an alternative to the traditional linear approach of a "take-make-dispose" economic system. In the current linear model, resources are extracted and turned into commodities that are used (often just once) and then disposed (often in a landfill). A circular economy approach seeks to limit the demand for natural resources, maximize the useful life of natural resources and manufactured materials, reduce the need for disposal and, where possible and safe to do so, implement end-of-life strategies that regenerate natural systems. Repurposing, sharing, repairing, and refurbishing are activities that drive a circular economy because they reduce our dependence on new resources required to make new things; and, they keep existing materials in use longer. Circular economy concepts can be applied in communities and in businesses, at a diversity of scales, in multiple sectors, and at various stages throughout supply chains.

Circular economy and Organic Material processing

In the context of Organic Material, a circular economy approach recognizes the nutrient and energy values in food scraps and organic material (e.g. cores, peals, paper products). Conversion processes, namely composting or anaerobic digestion, avoid costs and environmental issues arising from landfill disposal, and provide access to nutrient and energy value by allowing waste to re-enter the market as a resource.

Furthermore, a circular economy approach to Organic Material processing also focuses on regenerating biological systems. Rather than only taking resources from the planet, a circular economy approach restores resources to the land through practices that support natural processes and biological systems. The nutrient value obtained from Organic Material is a resource and, with a circular economy mindset, should therefore be used in a way that maximizes its potential by having it applied to soils in the most beneficial way possible. When the nutrient value derived from Organic Material is applied locally for agricultural production, it can also achieve the social, economic and environmental benefits associated with local agricultural and food distribution practices.

A showcase example: How Toronto's Green Bin Program 'Closes the Loop'

The Green Bin program demonstrates the City's commitment to the circular economy through its investments in facilities, Contracts and resident education that keep Organic Material out of landfill and convert it into nutrient-rich Beneficial Use End Products.

Furthermore, through investments in City-owned organic processing facilities, Toronto is working to achieve a closed loop system in its waste management operation. The City is implementing a project to generate renewable natural gas (RNG) at its Dufferin organic processing facility and has invested in collection trucks powered by compressed natural gas (CNG). These investments mean that the City will be able to power its fleet of vehicles with the waste product they collect. As well as demonstrating the closed loop concept, RNG can be utilized to displace fossilized natural gas in a broad range of applications, reducing emissions and achieving the goals

Results:

- Fostered dialogue with the market
- Generated data for CE evaluation
- Generated lessons learned for a more streamlined approach to embed circular criteria in future RFP/RFQs for processing services
- Enhanced CE outcomes from public spending

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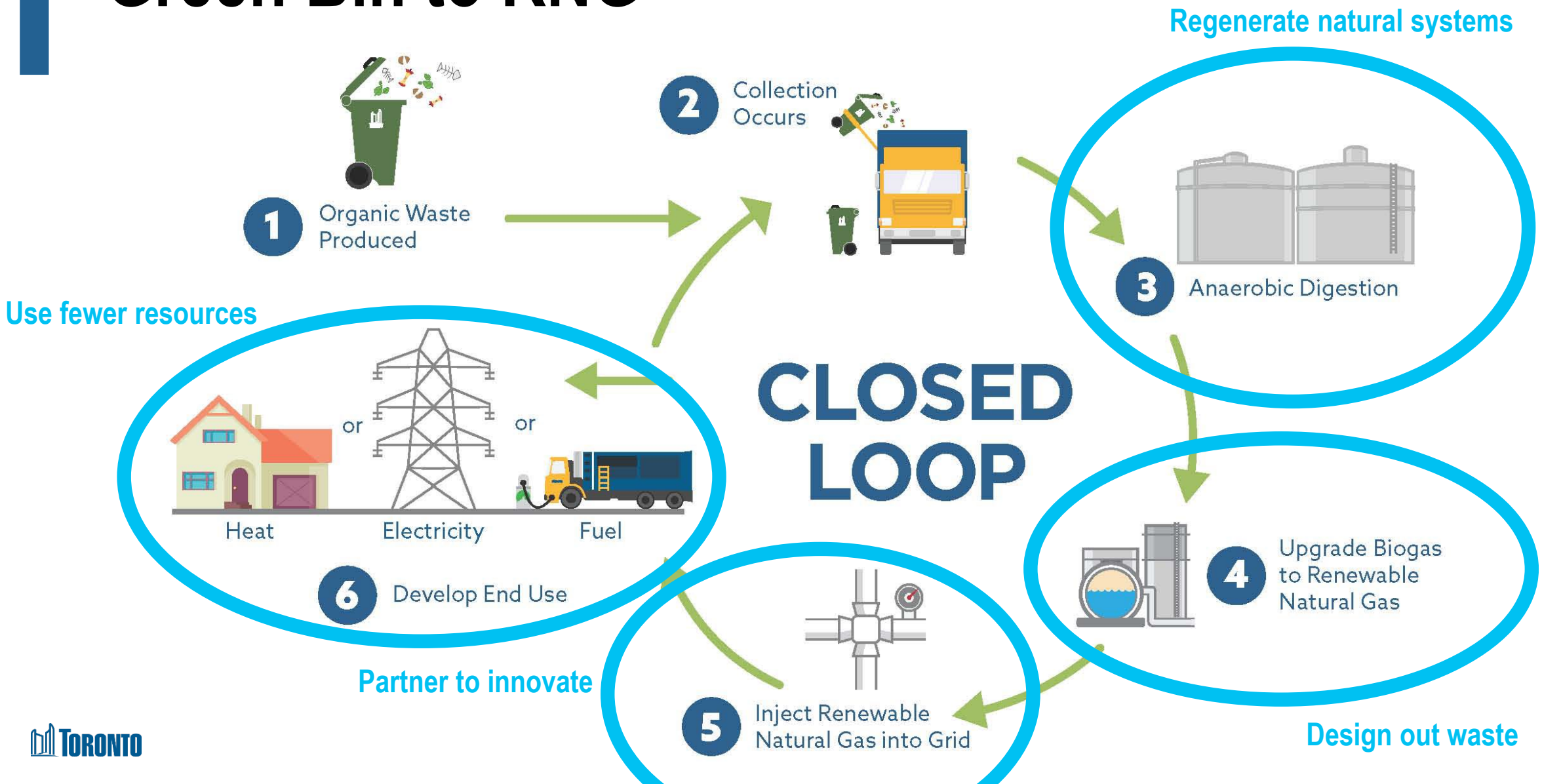
Green Bin to RNG



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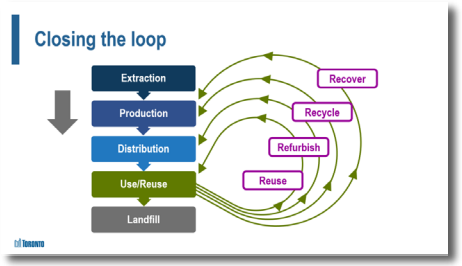
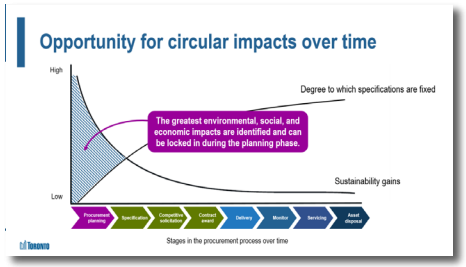
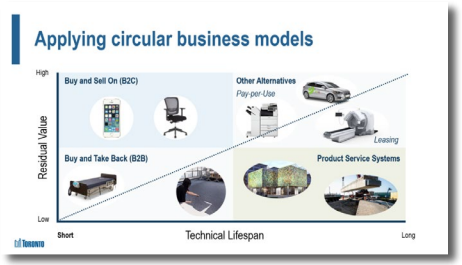
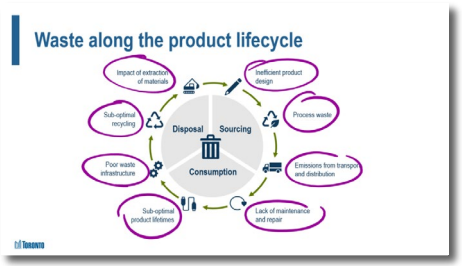
Circular Capacity Building

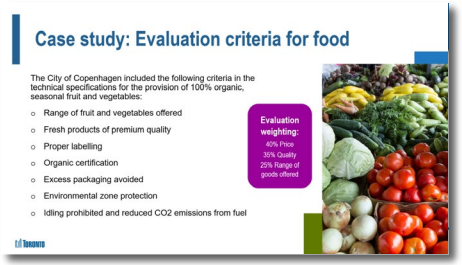
- In 2022, the City of Toronto launched a suite of **online training modules** to enhance staff capacity to adopt circular principles in their purchasing decisions
- Curriculum consists of **5 core modules** and **4 supplementary modules** for key spend categories
- Circular procurement is an **opportunity for all staff** to contribute to the City of Toronto's corporate strategic priorities
- Over time, CEI will be **updating** the training and **introducing new content** and resources based on staff feedback and results of implementing circular procurement

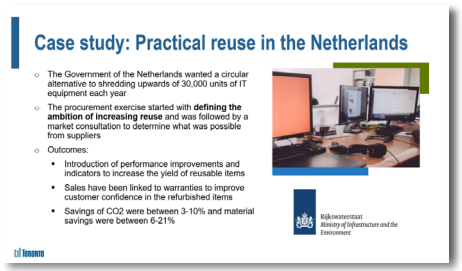


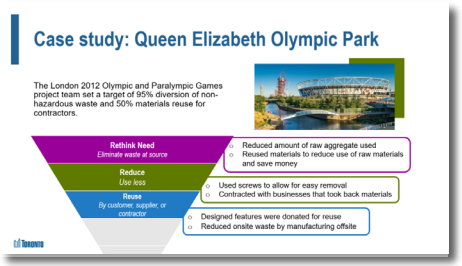


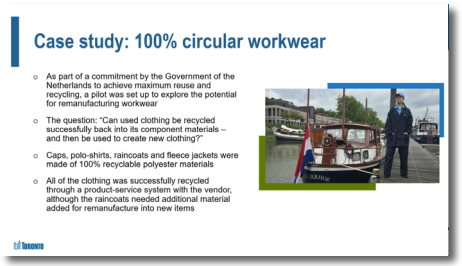












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What’s Next for Toronto

A City-Wide Approach

- Solid Waste Management Services Division has been directed to develop a strategy and policy framework for the circular economy, as well as a governance structure to provide oversight and accountability.
- The TransformTO Net Zero Strategy directs City staff to develop a governance structure that will set Toronto on the path to becoming the first circular city in Ontario.

	Actions for implementation 2022-2025	Divisions & Agencies Lead is listed first. Legend* below.	Description of action	Why it matters	Benefits			
					Health	Equity	Resilience	Prosperity
	A) Develop a City-wide governance structure, strategy and policy framework to establish a path to make the City the first municipality in the Province of Ontario with a circular economy and to align with the Provincial goal as part of the Waste Free Ontario Act	SWMS, other City divisions	SWMS, with involvement and leadership from other City Divisions, will develop a Circular Economy Road Map for Toronto that will help guide the City in becoming the first municipality in the province with a circular economy. Once finalized, Toronto's Circular Economy Road Map will inform policy and program changes to advance the City's aspirational circular economy goals.	Circular economy strategies consider sustainable resource consumption and material efficiency for their potential impacts on climate change, environmental degradation, and social outcomes. Continued relationship building and partnerships will be important to accelerate the City of Toronto's progress toward its aspirational circular economy outcomes and climate action targets.				

TransformTO Net Zero Strategy Short-term Implementation Plan 2022-2025 *(IE26.16, adopted Dec. 15, 2021)*

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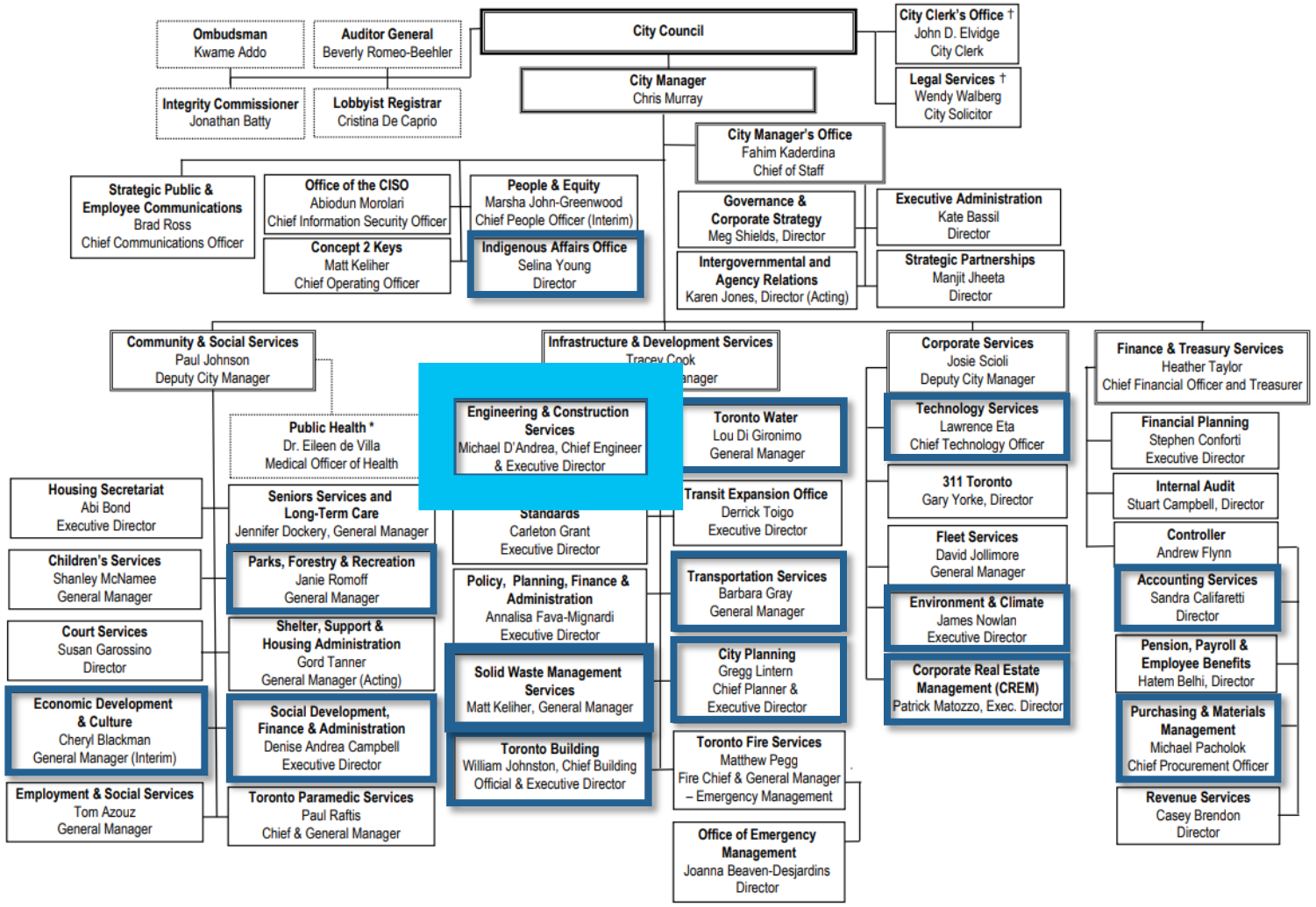
A City-Wide Approach



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ROLE OF THE CITY AND PARTNERS

CITY OF TORONTO

The City of Toronto can play a leading role in the transition toward a more circular economy by creating an environment in which circular innovation can flourish by:

- **Mobilizing** stakeholders around circular goals
- **Educating** and improving the understanding of opportunities for circularity, including through City services and business processes
- **Managing** the City's assets in a circular way, including through circular procurement
- **Incentivizing** and regulating Toronto's circular business ecosystem

CIVIL SOCIETY

- **Individuals** can reduce overconsumption and drive demand for circular products and services.
- **Civil society organizations** can support a more equitable transition through participation in decision-making.
- **Social partners**, such as trade and labour unions, can represent the interests of workers and employers during the transition.
- **Standards authorities** can establish international circular metrics and indicators to measure progress toward the circular economy.

INDIGENOUS COMMUNITIES & EQUITY DESERVING GROUPS

Transitioning toward a circular Toronto is an opportunity to make space for different perspectives and ways of knowing and to address historical and systemic injustices. This will be necessary to create a more resilient, inclusive future. To this end, the City can continue to explore ways to work with and learn from Indigenous Peoples (as Rights Holders) and equity-deserving communities in the circular transition, including by removing barriers to participation.

BUSINESSES

Companies can unlock the potential of circular finance and business models and prioritize innovative design and production, finding new ways to access, use and reuse materials.

EDUCATION & RESEARCH INSTITUTES

Institutes and professional accreditation bodies can drive knowledge creation and equip workers with the skills required for a just circular transition.

PROVINCIAL & FEDERAL GOVERNMENTS

Governments can work together to create the enabling conditions for businesses, industry, and communities to embark on a circular transition.

Thank you!

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