

The background is a solid blue color. On the left, there is a white silhouette of an explorer wearing a hat and a backpack, holding a telescope to their eye. The explorer is standing on a dark blue, rounded mound. In the center, a large, white, hand-drawn circular graphic is composed of multiple overlapping lines. To the right of the explorer, there are several white, stylized clouds of various shapes. A thin white line extends from the explorer's telescope, passing through the circular graphic and ending on the right side of the image. The overall style is clean and modern.

RCA Explore Circularity Day

This Year's Topic of Exploration:
Waste-to-Energy

Session 2: The Basics

- **Moderator:** Shawn Samborsky, CORE Recycling
- **Circular Economy Basics:** Helga Vanthournout, University of Calgary
- **Waste-to-Energy Basics:** Blair Shoniker, GHD Consultants
- **CE + WTE Basics:** Jennifer Koole, Recycling Council of Alberta

Circular Economy Basics

- Helga Vanthournout,
University of Calgary

Principles for a better economy

- 1 Eliminate waste and pollution (and don't forget wastage!)
- 2 Circulate products, parts, and materials
- 3 Regenerate nature

→ **A regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops**

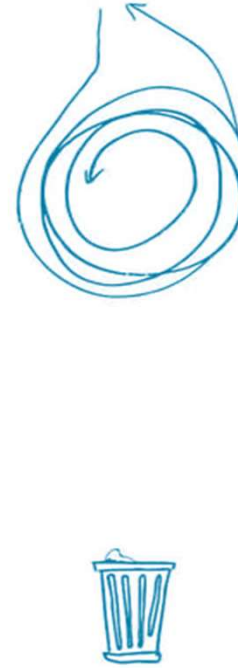
LINEAR ECONOMY

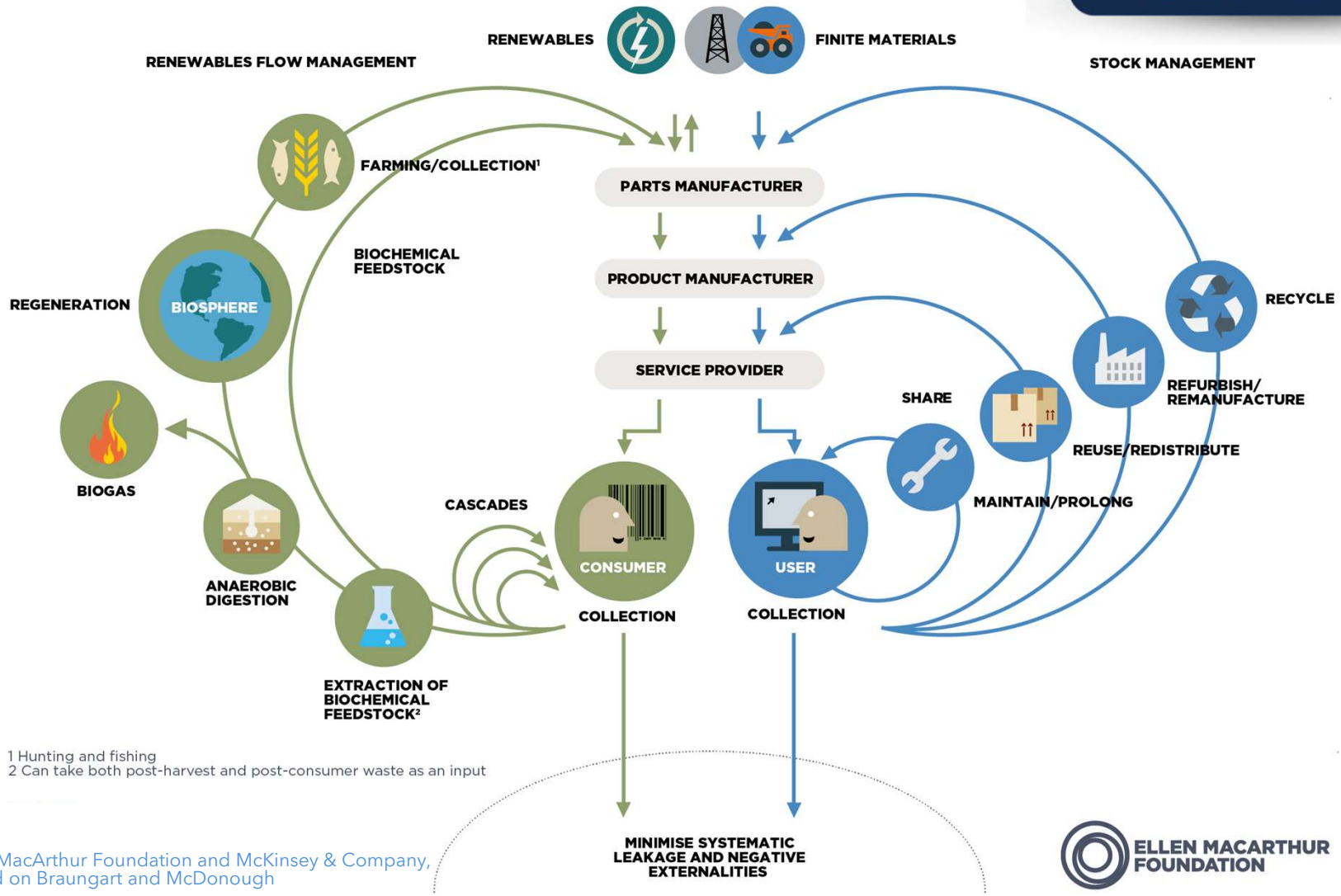


RECYCLING
ECONOMY



CIRCULAR
ECONOMY





SOURCE: Ellen MacArthur Foundation and McKinsey & Company, drawing based on Braungart and McDonough



Wastage
is more than
just waste

Structural waste is rampant, too

Land utilization example

5% of the time do roads reach peak throughput

10% of the road surface is covered with cars during those moments of peak throughput

50% of most city land is dedicated to streets and roads, parking, service stations, driveways, signals, and traffic signs

Waste-to-Energy Basics

- Blair Shoniker, GHD



→ Blair Shoniker
Senior Waste & Environmental
Planner
GHD

Waste to Energy Basics

Welcome

What is Waste to Energy (WTE)?

➔ Waste treatment technologies (thermogenic rather than biogenic) that convert non-recyclable waste into usable forms of energy, such as electricity, heat, or cooling

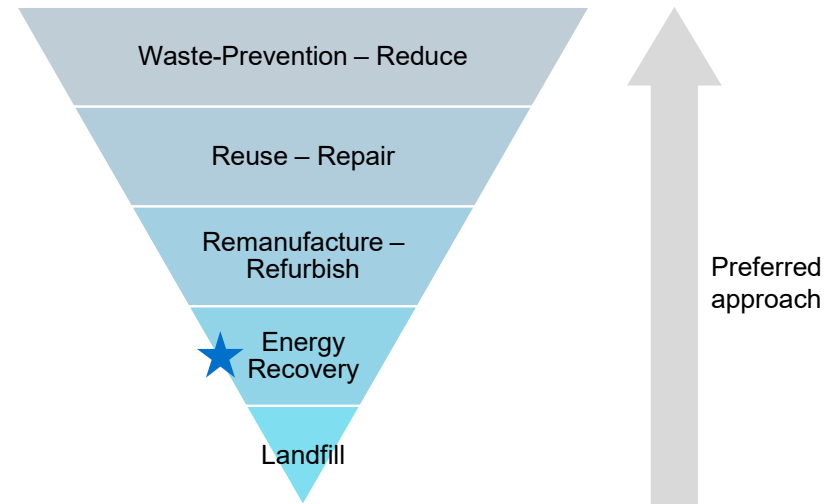


Figure adapted from Environment and Climate Change Canada

- A **sustainable alternative** to landfilling, transforming solid waste into energy
- Globally, the most used technology is **combustion** – burns waste in the presence of O₂ in a controlled environment
- Other technologies include **gasification & pyrolysis**

Canadian Examples



Durham-York Energy Centre Clarington, Ontario

- Processes 140,000 tonnes of waste annually
- Generates enough electricity to power 10,000 homes
- Metal recovery



Emerald Energy from Waste Brampton, Ontario

- Processes 180,000 tonnes of waste annually
- Generates enough electricity to power 6,000 homes & delivers heat to one manufacturer



L'incinérateur de la ville de Québec

Québec City, Québec

- Annual processing capacity of 245,000 tonnes of waste
- Produces steam for industry & delivers heat to a hospital
- Metal recovery



Metro Vancouver Waste-to- Energy Facility

Burnaby, British Columbia

- Processes 240,000 tonnes of waste annually
- Produces enough electricity to power 16,000 homes
- Metal recovery

Common Challenges

➔ In comparison to other jurisdictions, the utilization of WTE in Canada is still in its infancy.



Source: ©2024 Eclipse Digital Imaging, Inc.

There are several common barriers to WTE implementation in Canada:

Approvals Process

- Can be complex, lengthy, and uncertain.

Public Perception

- Perceived environmental and health concerns lead to opposition.

High Costs/Risks

- Expensive to build, maintain, and refurbish (in comparison to traditional landfill), with typically higher tipping fees.
- Who should take on the technology and financial risk – Municipalities or Private Sector? And with what type of Procurement/Contract Model? DBB/DBOM/IPD?

Energy Offtake/Byproducts

- Challenges securing long-term contracts and grid integration.

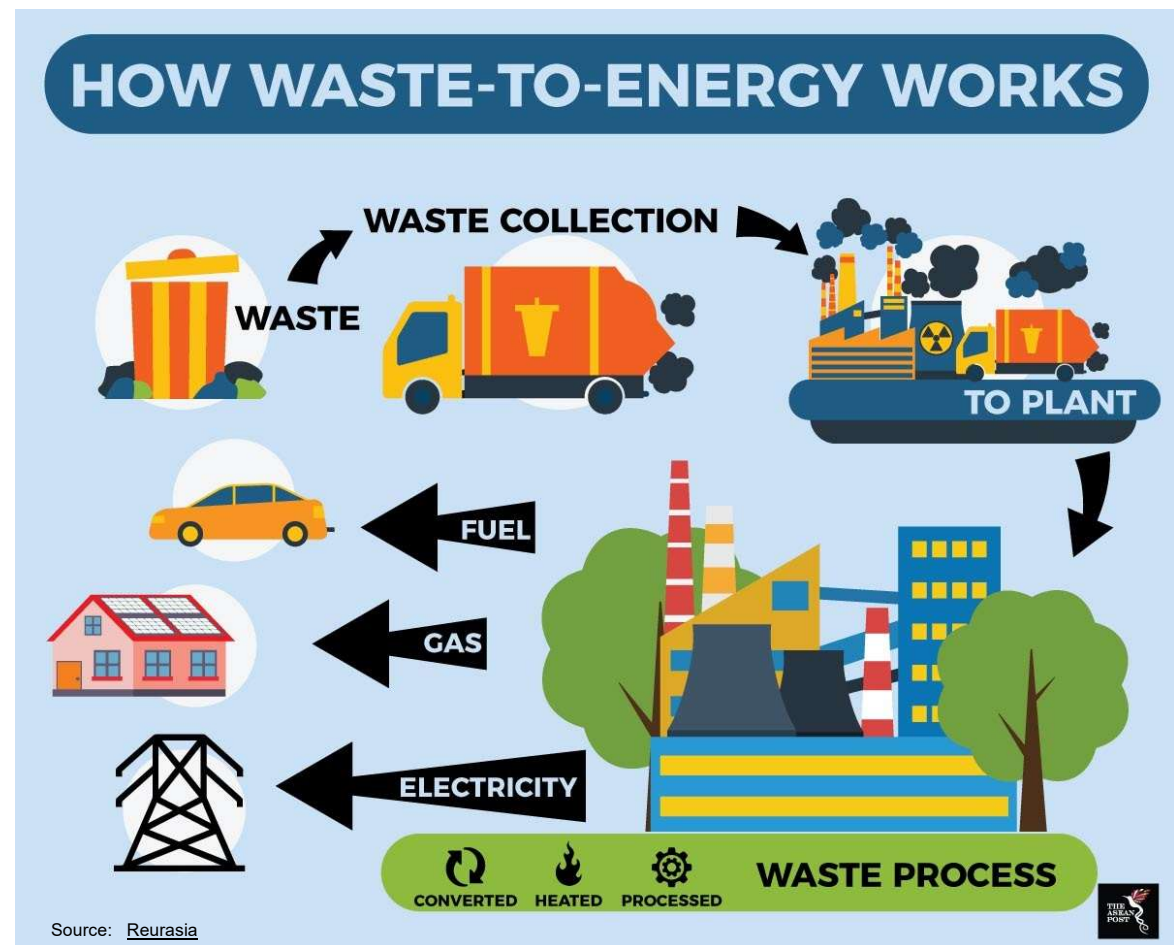
“Proven Technology”

- Apprehension towards unfamiliar systems.

The Role of WTE in the Circular Economy

WTE supports the circular economy by recovering energy, reducing waste, and enabling material reuse while lowering carbon emissions.

- **Energy Recovery** → Renewable electricity, heat & cooling
- **Material Recovery** → Metals & bottom ash applications
- **Waste Reduction** → Minimizes landfill use
- **Carbon Reduction** → Lowers greenhouse gases (GHGs)





*** Thank You**

→ ghd.com

Circular Economy + Recovery

- Jennifer Koole, Recycling Council of Alberta

Circular Economy + Recovery + RCA



This Year's Topic of Exploration:
Waste-to-Energy

RCA Vision and Mission

Vision 2030:

"A WASTE-FREE WORLD"

Our Mission is:

"TO ADVANCE THE CIRCULAR ECONOMY IN ALBERTA"

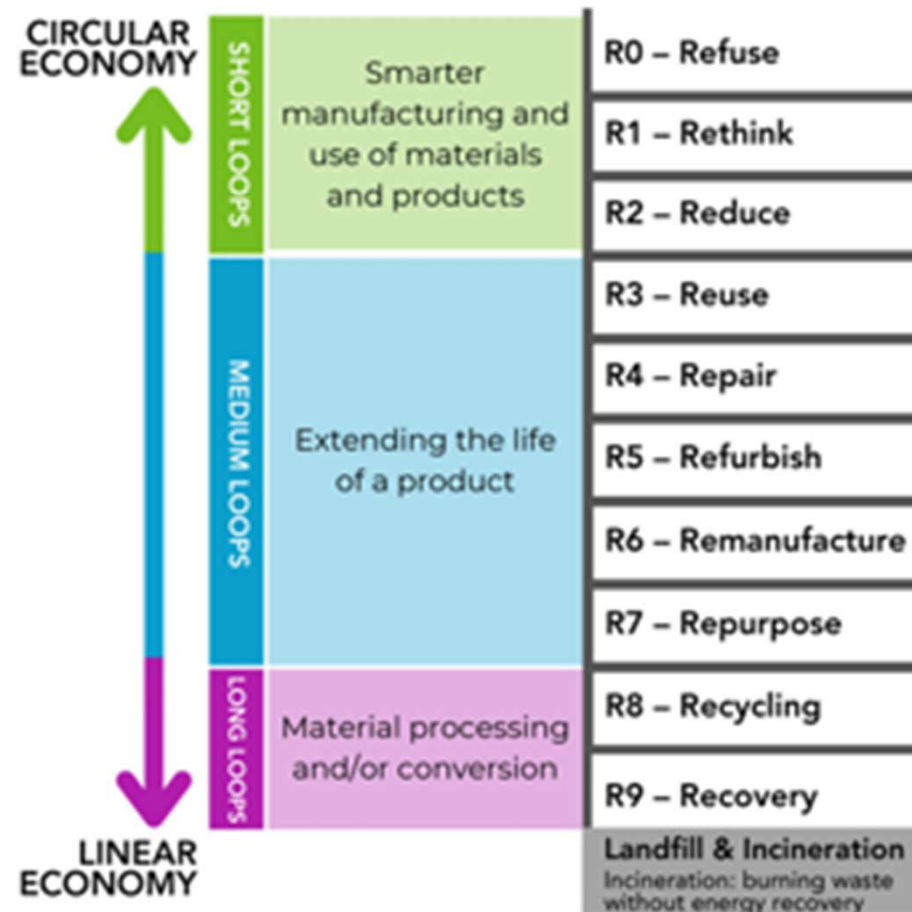
The **Circular** Economy

Materials never
become waste
and nature
is regenerated

- Reduces or eliminates both waste and pollution
- Circulates products, packaging and materials at their highest value for as long as possible
- Shifts production away from resource extraction to practices that allow nature to return to itself

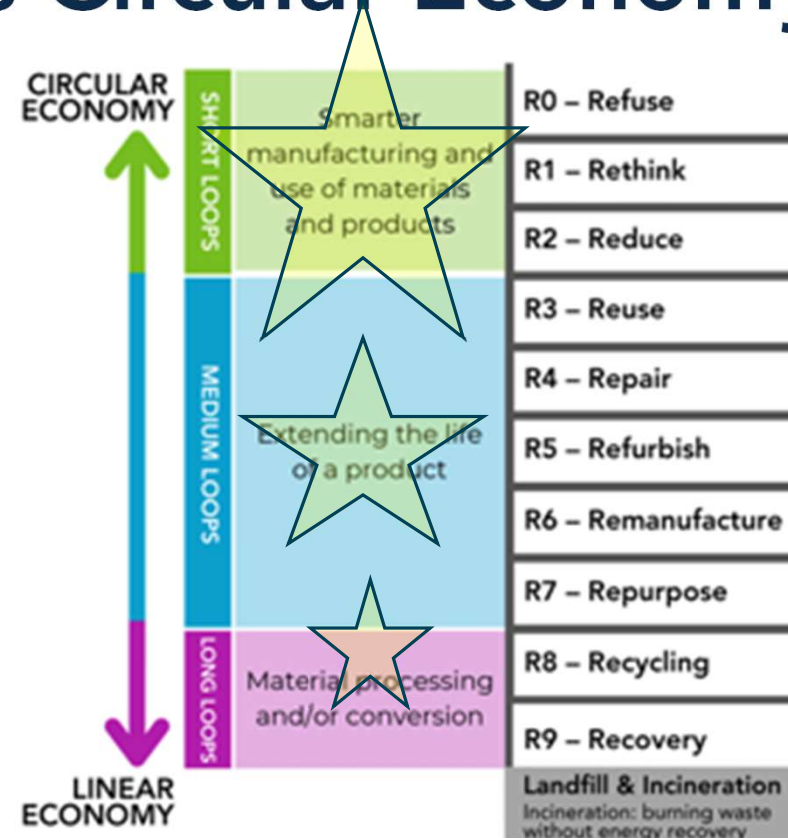
Adapted from the Ellen MacArthur Foundation

R-Ladder or R-Hierarchy



Advancing Alberta's Circular Economy

The RCA will advocate for policy, strategy, investments and other aspects of materials management approaches as close as possible to the top of the R-Ladder.



Recovery (R9)

- Aims to extract value, such as energy, from end-of-life materials and products
- Is not part of the Circular Economy
 - Can complement the Circular Economy by gaining value from **non-recyclable** materials.
 - Can support transition to the Circular Economy after other R-Strategies have been considered or employed.

Recovery (R9)

Advancements in design, technology, consumer purchasing habits and more are likely to reduce the feedstock for Recovery activities through the transition to the Circular Economy.

Please enjoy the refreshment break!
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**Our Future
is Circular.**

Contact Us



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