

An illustration of an explorer in silhouette, wearing a hat and carrying a large backpack, looking through a telescope. The explorer is standing on a dark, rounded mound. The background is a solid blue color with stylized white clouds and a large, multi-lined white circle that frames the central text. A thin white line extends from the explorer's telescope towards the circle.

RCA Explore Circularity Day

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

Session 3: Regulatory Frameworks

- **Moderator:** Sheri Praski, SWANA NLC
- **Government of Alberta Regulatory Overview:** Kate Rich, AEPA
- **Real World Examples:**
 - **Navigating WTE Regulations:** Sean Collins, Varme Energy
 - **Living with the Reality of Regulations:** Jule Asterisk, REAC

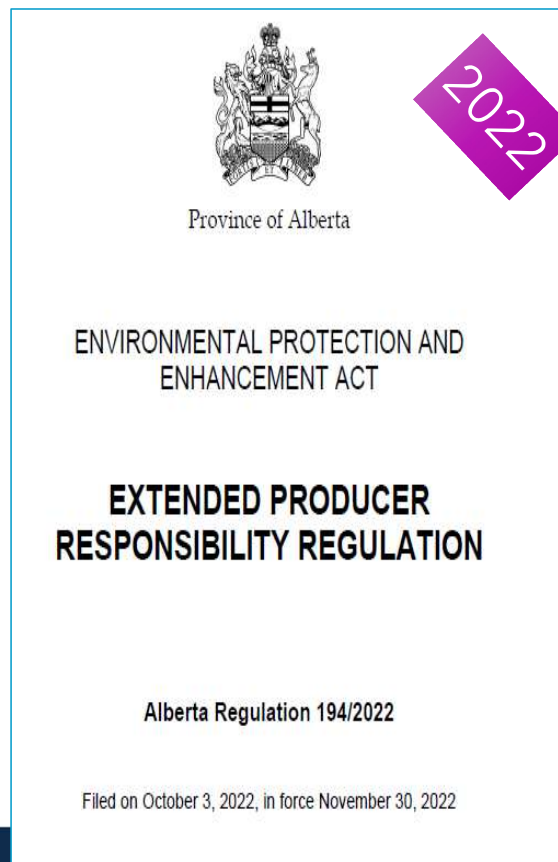
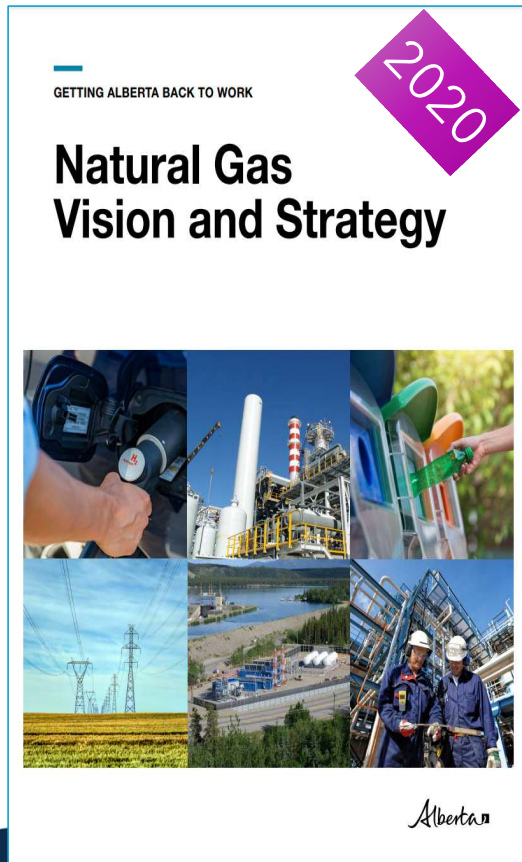
Session 3: Regulatory Frameworks

- **Kate Rich, AEPA**

Outline

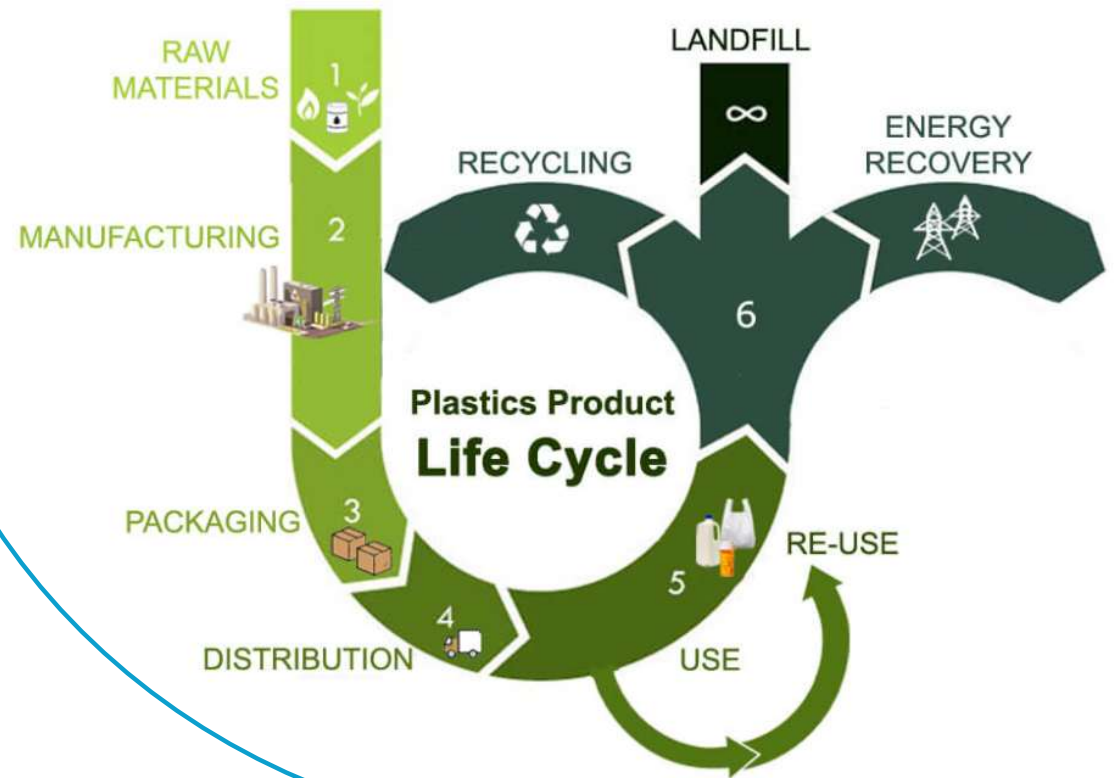
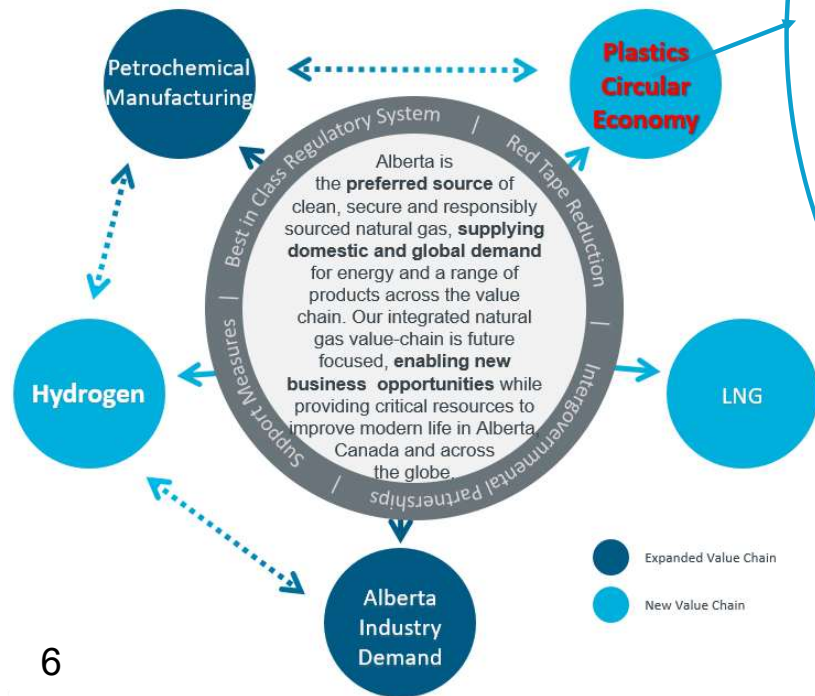
- Plastic Circular Economy Shift
- Extended Producer Responsibility Regulation
- Waste-to-Energy Regulatory Framework
- Waste-to-Energy Under TIER and Carbon Offsets

Enabling Strategies and Policies



Natural Gas Vision and Strategy

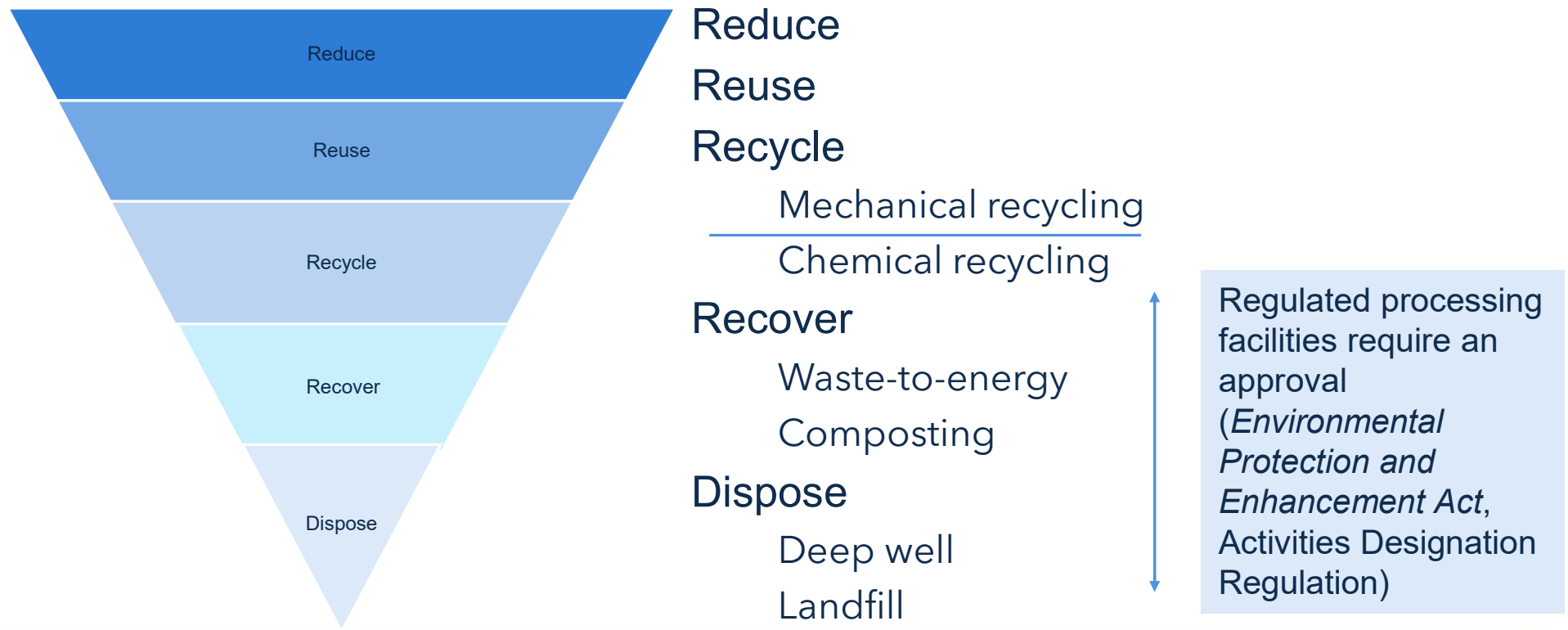
Plastics Circular Economy Shift



Extended Producer Responsibility (EPR) Regulation

- EPR systems become operational on April 1, 2025
 - single-use products, packaging and printed paper products (PPP)
 - hazardous and special products (HSP)
- Shifting the responsibility for managing materials from municipalities and taxpayers to the producers
- Encourage innovation in recycling and reduce packaging waste
- Material management requirements for producers
 - Recycling, downcycling, and advanced chemical recycling
 - No more than 15% can be met through downcycling
 - Downcycling includes waste-to-energy, aggregate substitution, land application and composting

Waste and Recycling Regulatory Framework



Environmental Approvals & Permitting

- Waste-to-energy facilities in Alberta are owned and operated by private companies and municipalities.
- Local governments issue development permits for WTE projects
- Waste management facilities require an *Environmental Protection and Enhancement Act* (EPEA) approval
 - WTE technologies must be able to demonstrate that the process does not release emissions harmful to the environment
 - Government does not endorse specific technologies (rather is outcomes-focused)

EPEA Approval Requirements

- Waste-to-energy facilities need to:
 - Be located at a willing host community
 - Secure a reliable source of feedstock
 - Meet provincial emissions requirements
 - Obtain local development permits
 - Ensure proper disposal of resulting by-products
- Challenges
 - Securing a willing host community remains a barrier
 - Higher construction and operation costs may be uncompetitive compared to other management options

Technology Innovation and Emissions Reduction (TIER) Regulation

- TIER Regulation applies:
 - direct emissions exceed 100,000 tonnes CO₂e per year
 - facility chooses to opt-in
- Annual compliance requirements based on production of regulated products (electricity)
- Waste-to-energy facility would receive product allocations based on the electricity high-performance benchmark,



Province of Alberta

EMISSIONS MANAGEMENT AND
CLIMATE RESILIENCE ACT

TECHNOLOGY INNOVATION AND EMISSIONS REDUCTION REGULATION

Alberta Regulation 133/2019

With amendments up to and including Alberta Regulation 98/2023
Current as of June 9, 2023

Office Consolidation

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TIER - Carbon Offsets

- TIER enables emissions trading
 - Carbon offsets can be used for compliance
- Projects are voluntary, follow carbon offset system and protocol rules, occur in Alberta
- Currently 18 protocols
 - Energy Generation from the Combustion of Biomass Waste
 - Biogas Production and Combustion protocol

Session 3: Regulatory Frameworks

- **Sean Collins, Varme**

Our Growing Waste Problem

Drivers of waste

Rising living standards

Life expectancy and GDP per capita have been rising for a number of years and continue to do so, they are currently at c.73 years² and US\$13,920³ respectively

Population growth

The global population reached 8 billion in November 2022 and is expected to reach 9.7 billion by 2050¹

Technology

Technology has caused a shift from natural goods towards non-biodegradable products

Corporations

Corporations' waste production is increasing e.g. single-use plastic waste is at its highest level, increasing by 6 million metric tons from 2019 to 2021⁴

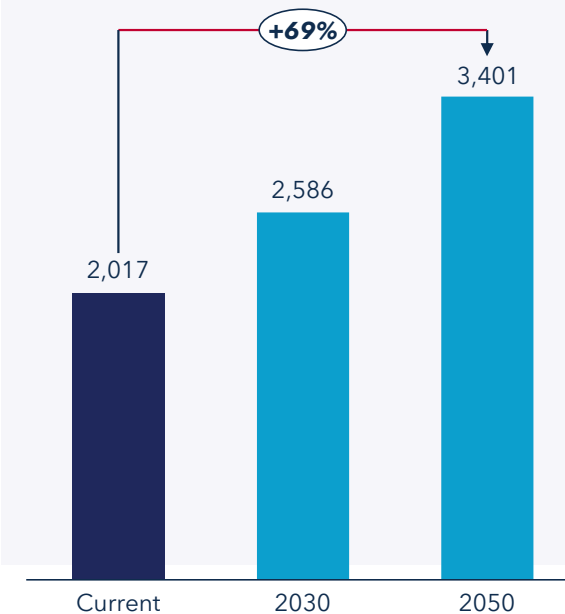
Note (1): United Nations; 2) Source: macrorends.net; 3) IMF; 4) Minderoo Plastic Waste Makers Index 2023

Waste is increasing globally



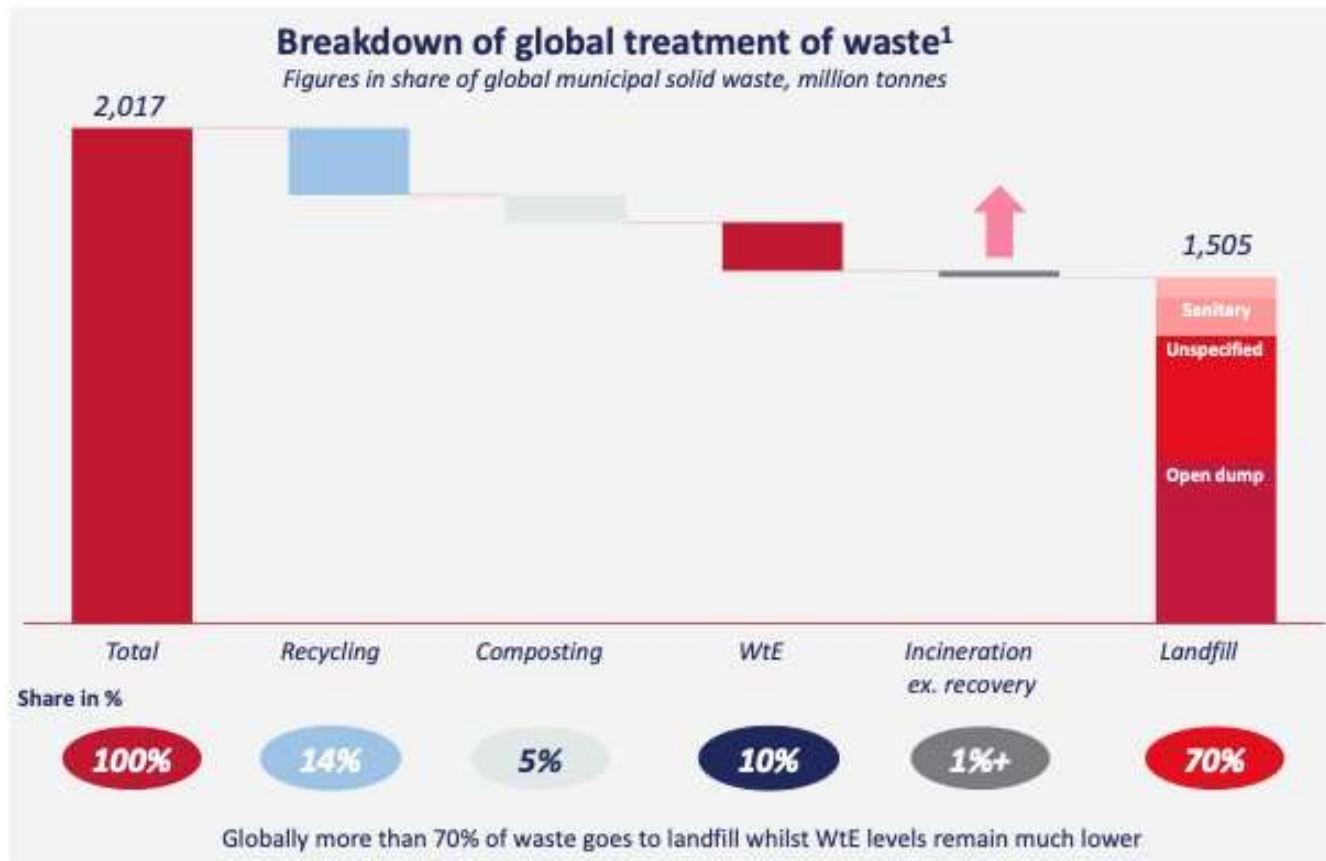
Global municipal waste production

Million tonnes per year



A key waste treatment solution

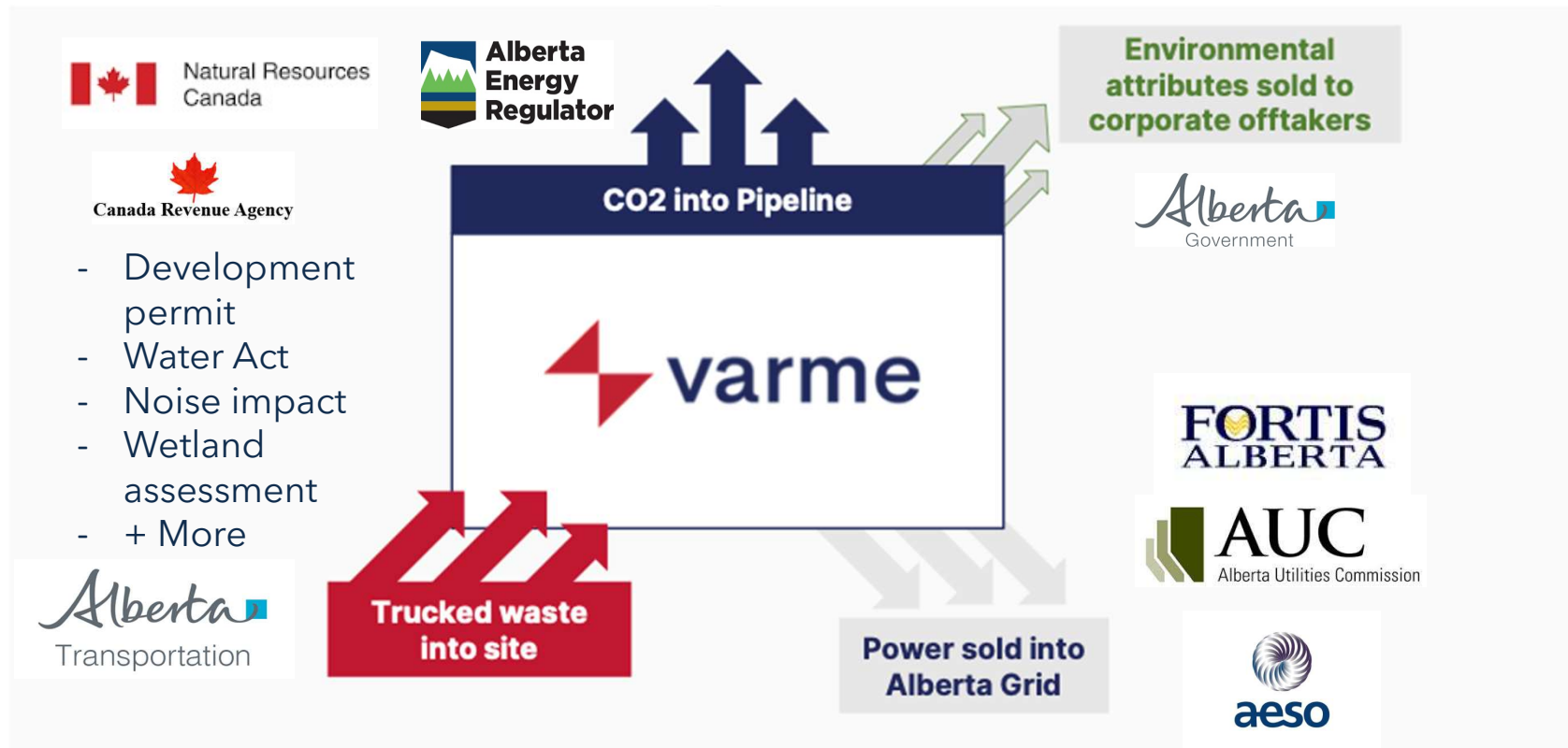
WtE has an underplayed role in reducing greenhouse emissions, growth is necessary

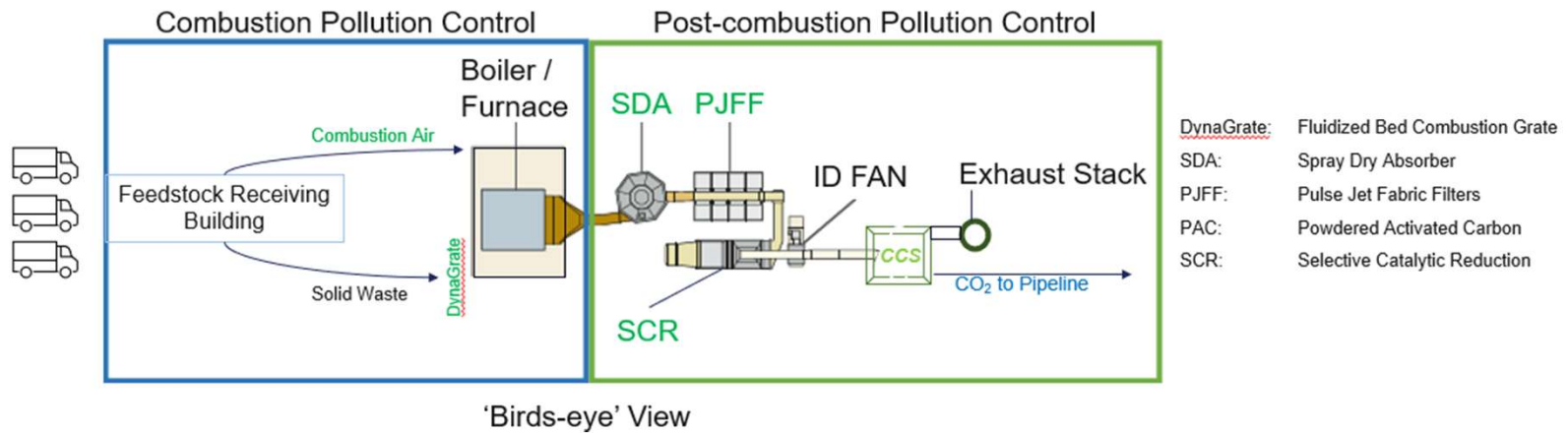


Key WtE growth drivers historically

-  Increasing regulatory resistance to landfill
-  Increasing residues from recycling
-  Net WtE capacity investment
-  Waste export restrictions

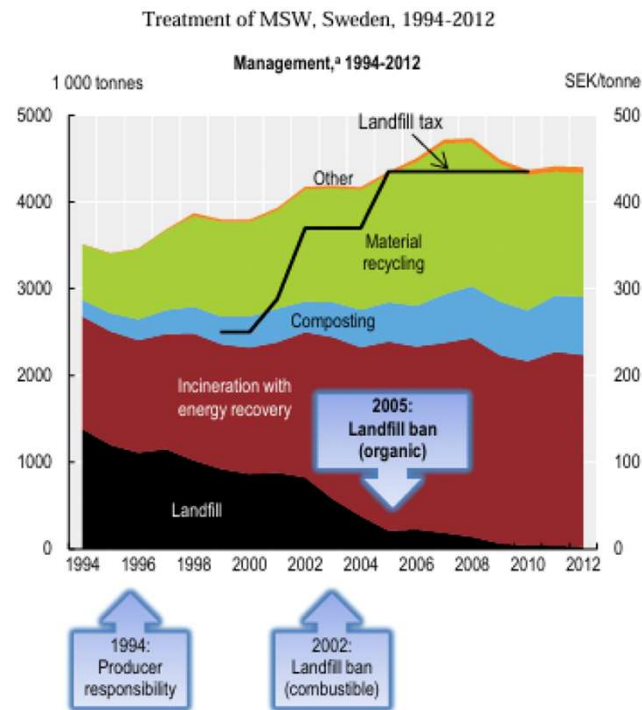
Waste to Energy Regulation & Policy Sandbox





Component	Name	Pollution Reduction
Combustion Air Intake	Air Intake - Storage Building	Odours (waste storage)
DynaGrate	Fluidized Bed Combustion Grate	NO _x , CO, Dioxins & Furans
SDA	Spray Dry Absorber (Flue Gas Desulphurization)	SO ₂ , Acid Gasses (H ₂ SO ₄ , HCl, HF), Mercury, Heavy Metals, Dioxins & Furans, PM _{2.5} .
PJFF	Pulse Jet Fabric Filters	Particulate Matter
PAC	Powdered Activated Carbon Injection	Mercury, Dioxins/Furans
SCR	Selective Catalytic Reduction	NO _x

Many Regulatory Tools Available



Areas for Policy & Regulatory Engagement

- Provincial circular economy strategy
- National landfill elimination strategy
- TIER streamlining (Alberta carbon market)
- International carbon credit harmonization
- Restructured energy market
- Extended producer responsibility

Session 3: Regulatory Frameworks

- **REAC**

Why do we have regulations?

◆ AI Overview

The Alberta government uses regulations to achieve a variety of goals, including protecting people, the environment, and businesses, while also supporting economic growth. [↗](#)

Purpose

- **Protect people:** Regulations can help create safer workplaces and products [↗](#)
- **Protect the environment:** Regulations can help clean up water and air [↗](#)
- **Support economic growth:** Regulations can help businesses and consumers get better and cheaper goods and services [↗](#)
- **Protect existing firms:** Regulations can help protect firms from unfair competition [↗](#)

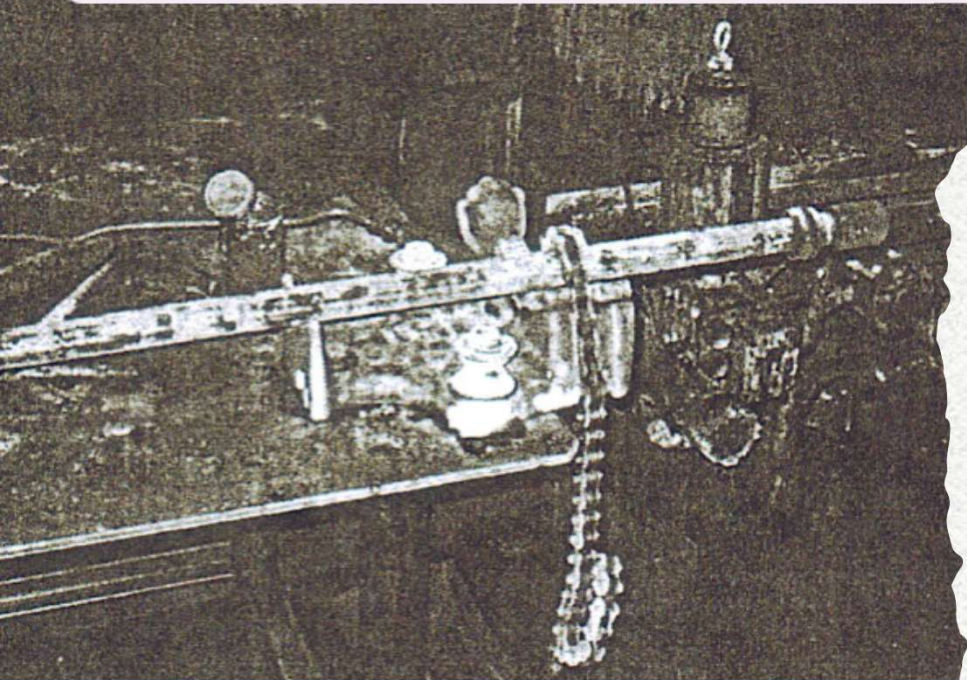
How does Alberta describe regulations?

- As an 'environmental tool'
- To 'restrict or direct the activities of regulated parties'
- Divided into 4 categories:
 - Regulatory
 - Market based
 - Cooperative management
 - Information disclosure
 - Voluntary stewardship

The screenshot shows the Alberta.ca website interface. At the top left is the 'Alberta' logo. To the right is a search bar labeled 'Search Alberta.ca'. Below the search bar is a breadcrumb trail: Home > Environmental education > Environmental Tools Guide > Regulatory approaches. The main content area is titled 'Part of Environmental Tools Guide' and features a large heading 'Regulatory approaches' with a vertical bar to its left. Below the heading is the text 'General information and applications for using this environmental tool.' At the bottom of the page, under the heading 'On this page:', there are four links: Overview, Tool list, Tool strengths, and Tool limitations.

July 11, 2009 - incinerator fire at the Swan Hills Treatment Centre

About 1,000 litres of PCB waste went up in smoke, with the wind direction N x NE, putting this smoke roughly over the Lesser Slave Lake. The plant was closed for 10 months, and sustained millions of dollars in damages. Another 7,900 litres of PCB waste leaked during the incident.



23

What happens
when
regulations
fail?

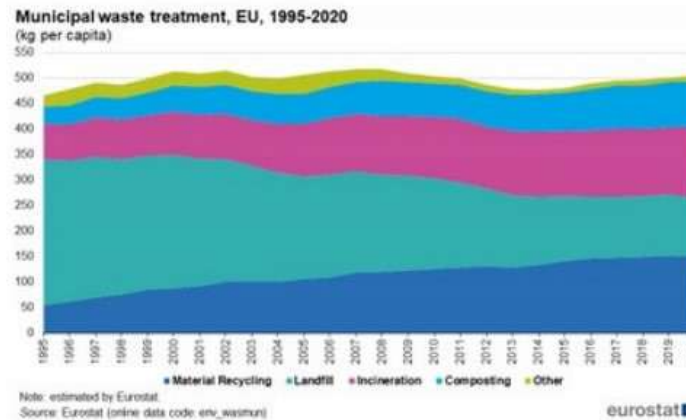
Considerations for municipalities

- Contaminants of concern are similar for hazardous waste incineration and waste to energy:
- Dioxins and furans, Nitrous oxide, Sulfur dioxide, heavy metals
- Health concerns include: • increased risk of cancer • developmental problems in children • Diabetes • cardiovascular disease • harm to the immune system • Endometriosis • hormonal disruption (can have generational effects)
- **Up to 1/3 of W2E material must be landfilled as (highly toxic) ash**
- **Please consider continual air monitoring, and a text notification for locals when unplanned releases take place**

Extended Producer Responsibility and Incineration (W2E) - a European story

EPR - 25 years in the European Union

- People in the EU generated an average of 505 kilogrammes of waste in 2020, up nearly 10% since 1995 (when EPR was reinforced)
- The share of waste reaching **landfill sites fell rapidly** and **recycling almost tripled**.



- The share of EU's waste going **into landfill sites fell to 23% in 2020** from 61% in 1995
- At the same time, **recycling almost tripled** in the EU, rising to 241kg per person in 2020 from 37kg in 1995 (in absolute numbers)
- But, **incineration rose very sharply**, too and this data only takes municipal waste into account which **is responsible for around 27% of the total waste**



Our Precious non-renewable resources

- Precious Plastic began in Holland in 2012
- Small scale plastics remanufacture equipment
- Now over 3,000 companies worldwide use their open-source equipment
- Buying clean plastics from the community, they make new things, like indoor decorations, tiles, clipboards, furniture, instruments, jewelry, planters, toys, and 3D printer filament

Enjoy lunch!
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