



**Circular  
Matters**

# The Complementary Role of Chemical Recycling

Recycling Council of Alberta Conference  
September 2021



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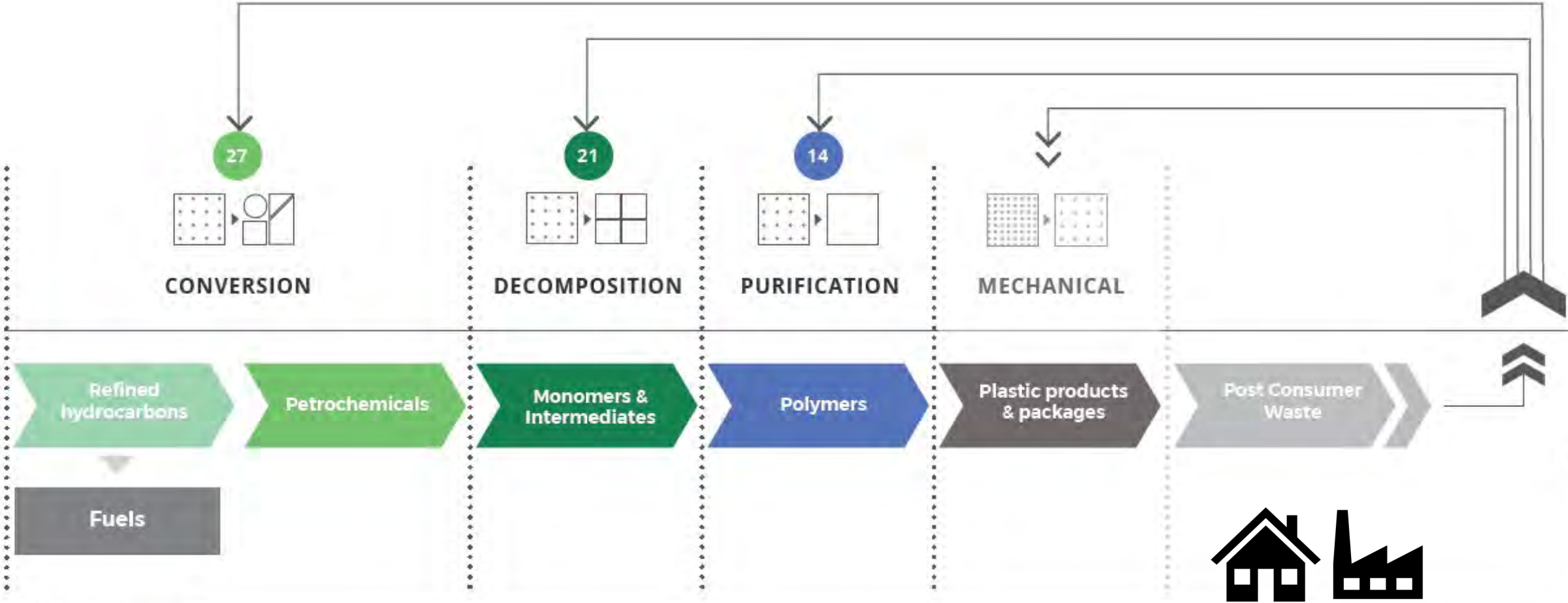


# About Circular Matters

- Mission: to help our clients achieve their sustainable materials management and circular economy goals
- We are dedicated to bringing about the circular economy
- We assist clients with
  - Policy analysis
  - Stakeholder analysis and position mapping
  - Strategy development
  - Materials composition, capture, and MRF flow analyses



# What is Chemical Recycling of Plastics



# Wasted Plastic – An Opportunity

- 91% of Canadian plastics is disposed or leaked into the environment
- 8% is mechanically recycled
- 1% is chemically recycled
- Lost opportunity of CA\$7.8 billion based on virgin resin value



Source: "Economic Study of the Canadian Plastic Industry, Markets, and Waste," Environment and Climate Change Canada, 2019.

# Is the Current Approach Acceptable?

- Mechanical recycling has plateaued
- Climate change is continuing



Athabasca Glacier, Alberta, June 2019

# The Circularity Problem

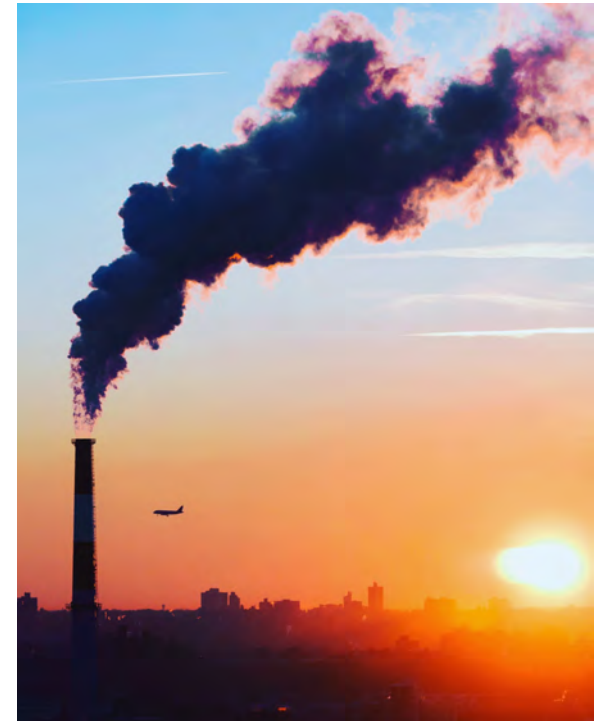
- Plastic used in packaging, including recycled plastic, must meet high standards of food safety, product protection, and brand image
- Producing virgin-equivalent quality from mechanically recycled plastics is difficult and costly
- Resin quality diminishes with each cycle
  - Dirt, inks, pigments, labels, barrier layers build up
  - Plastic degrades each time it is melted
- Chemical recycling can overcome these challenges



# NGO Concerns

## Greenpeace and GAIA Make Claims about Chemical Recycling

- Chemical recycling results in fuels/petrochemicals, and should not be considered recycling
- Chemical recycling exists to keep plastics resin companies in business and is greenwashing
- Plastic-to-plastic technologies show little promise/ have not proven to be viable at scale
- Chemical recycling results in pollution and excessive use of energy
- Chemical recycling competes with mechanical recycling and does not fit in a circular economy



Sources: Greenpeace, "Deception by the Numbers," 2020 GAIA, "All Talk and No Recycling," 2020.

# Organizations Supportive of Chemical Recycling

- Chemistry Industry Association of Canada
- Association of Plastics Recyclers
- Alliance to End Plastic Waste
- Ellen MacArthur Foundation and Canada Plastics Pact
- Ocean Conservancy
- Global consumer packaged goods companies
- Virgin resin producers
  - NOVA Chemicals: "Advanced recycling technologies are a necessary component of moving to zero plastic waste by creating valuable new feedstocks from post-use plastics that cannot be easily mechanically recycled."



Photo courtesy of Plastics Today



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# Canadian Chemical Recycling Companies

- Enerkem Alberta Biofuels, Edmonton Alberta – gasification of mixed waste including plastics
- Green Mantra, Ontario – pyrolysis of clean resin streams into waxes
- Sustane Technologies, Nova Scotia – pyrolysis of plastics into fuels and feedstock for chemical recycling
- Loop Industries, Quebec – developmental company with technology for depolymerization of PET
- Pyrowave, Quebec – developmental company with microwave depolymerization of PS

# Chemical Recycling and Mechanical Recycling in Perspective

- Mechanical recycling is preferred over chemical recycling from LCA studies
- Mechanical recycling needs continued progress in design for recycling
- Purification technology needs to continue to advance – PureCycle Technologies
- Expansion of LNO resins to PP and LDPE reclaimers, use of PCR in tubes
- We need to support commercialization of chemical recycling of plastics
  - Particularly important for the growing flexible plastic packaging segment due to technical challenges using PCR from mechanical recycling
  - PET depolymerization – carpet/textiles upcycled into packaging resins, PET thermoforms
  - Removal of regulatory barriers – chemical recycling is not energy-from-waste
  - Acceptance of mass balance accounting





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Thank You

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