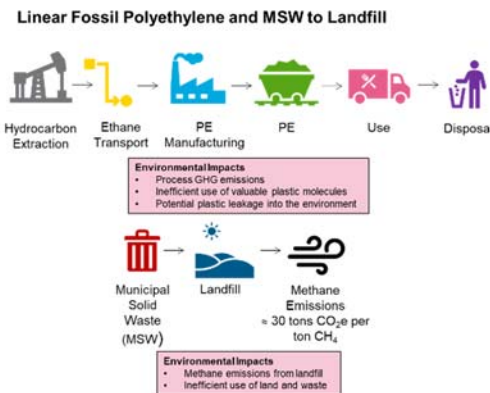


Scale-up and Production of Circular Plastics in Alberta

Following successful bench and catalytic work as well as pilot design, this project will lead to a demonstration at the pilot scale (TRL-7) of waste-to-plastic (W2P) conversion using waste-derived syngas. This will lead to an advanced recycling solution that produces ethylene and other co-products from non-recyclable waste, including mixed plastic waste. This is a game-changing solution since it increases plastic recycling rates by producing a circular virgin plastic with the same properties, but with a lower carbon footprint. The integrated solution leverages Enerkem gasification expertise and NOVA Chemicals' petrochemicals and plastic manufacturing and marketing experience. If successful, Alberta can be a leader in the circular economy by leveraging this innovative technology platform to divert waste from landfills, create value-added products, and reduce GHG emissions.



RECIPIENT:
Enerkem Inc.



PARTNERS:
NOVA Chemicals,
Government of
Alberta, Mitacs



TOTAL BUDGET:
\$9,757,200



AI FUNDING:
\$4,500,000
[TIER ERP]



PROJECT DATES:
MAR 2021 –
MAR 2023



PROJECT TRL:
Start: 4
End: 7

APPLICATION

The current plastic recycling rate in Canada is less than 10%. This technology opens the door to a circular economy by enabling chemical recycling of plastics into a sustainable ethylene building block without chemical and physical limitations of mechanical recycling. The project will help in achieving a projected 60% market share of recycled and renewable content in plastics by 2050. NOVA Chemicals and Enerkem aim to fast-track this advanced recycling solution. The project will address a major challenge faced by the plastics industry and provide an economically viable solution for sustainable circular plastic production.

PROJECT GOALS

- Developing an ‘advanced recycling’ opportunity in Alberta that will divert 230,000 tonnes of waste (including over 100,000 tons of mixed plastic waste) per year from landfills, while producing circular ethylene at a lower carbon intensity compared to the incumbent method. This ethylene will be converted to polyethylene at NOVA Chemicals’ manufacturing facility, thereby creating a full circular plastic economy.
- Validating the inventive aspects of this technology by piloting an integrated and efficient process for syngas to olefin production (from TRL 4 to TRL 7).
- Scale up of a highly active and selective catalyst.
- Estimation of production cost of circular olefins.
- Maximize sustainability by reducing GHG emissions associated with plastic production and disposal.

BENEFITS TO ALBERTA

- The successful implementation of this technology in Alberta could result in reduction of local CO₂ emissions by approximately 165,000 tCO₂e per year or about 3 million tonnes of CO₂e over the asset lifetime of 20 years, while diverting waste from the environment (i.e. landfills).
- This project aims to divert about 230 kt annually dry basis of waste containing about 100 kt annually of plastic waste (or 3% of Canadian plastic waste) which equates to recouping \$300M per year in avoided value loss.
- Built around the idea of developing a cost-effective syngas conversion technology for implementation in Alberta as a joint development project between NOVA Chemicals and Enerkem to address the circular economy and improve plastic sustainability.
- This made-in-Alberta solution has immense potential to emerge as the world-leading technology in the space.



**4 Students
Trained**



10 Project Jobs



**150 Future
Permanent Jobs**



**>80% Net GHG Reduction of
1.3 kg CO₂ e/kg of ethylene**



**165 kt/yr Future GHG
Net Reduction**

**CURRENT
STATUS**

OCT 2021

This project formally started in February 2021. Testing and catalyst development is in progress.