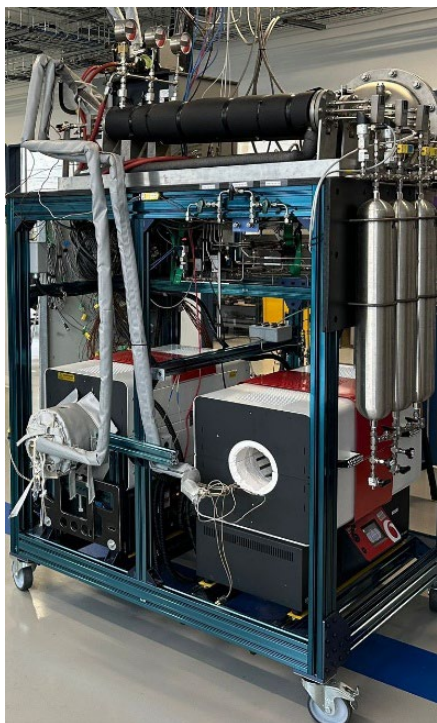


## Carbon Nanofiber Based Composites Optimization

Carbon nanofibers (CNF) are ultrathin, pure carbon fibers that are known to be stronger but lighter than steel. Carbonova, a Calgary-based clean technology company spun out from University of Calgary has patented a unique process to generate high-purity CNF using two greenhouse gases, CO<sub>2</sub> and methane. Its circular process and negative carbon footprint makes Carbonova's product appealing to many potential customers. This project will blend Carbonova's CNF with different recycled plastics to yield new composite products with properties that are the same or better than fresh plastics.



**RECIPIENT:**

**Carbonova**



**PARTNERS:**

**Global Health & Beauty Company; Alberta Oil & Gas Company with downhole application**



**TOTAL BUDGET:**

**\$2,000,000**



**AI FUNDING:**

**\$700,000**



**PROJECT DATES:**

**JAN 2025 –  
AUG 2026**



**PROJECT TRL:**

**Start: 6  
End: 7**

## APPLICATION

This project focuses on the industrial plastics polypropylene and polyketone. Polypropylene is one of the most used plastics in the world, but with extremely low recycling rates. Polyketone is a high-performance plastic used for heavy industrial applications including in the Alberta oil and gas industry, but large quantities of polyketone discard are simply sent to landfill instead of remelting and reusing it. Carbonova's partners on this project include two large end-users of these plastics.

# ALBERTA INNOVATES CLEAN ENERGY

## ADVANCED HYDROCARBONS

### BITUMEN ADVANCED MATERIALS

## PROJECT GOALS

- Produce different grades of CNF in Carbonova's existing pilot plant in northeast Calgary.
- Blend different percentages of CNF grades into recycled polypropylene and polyketone samples.
- Using standard testing methods, measure the strength and thermal properties of the composite samples to determine the optimal CNF grade / concentration that meet the key performance indicators for our project partners.
- Benchmark the performance of Carbonova CNF in plastic composites versus competitors' carbon nanofiller products.
- Transfer masterbatches of optimized CNF + plastic composites to Carbonova's partners for use in their manufacturing processes.

## BENEFITS TO ALBERTA

During the 2-year project duration:

- Greater than \$1 million spent in the local economy in the form of staff and contractor wages and purchases of materials and supplies.
- 4 new jobs created, and 11 high-skilled jobs retained.
- \$1.6 million positive impact on GDP based on based on open model economic multipliers

Supporting development of new technology that utilizes CO<sub>2</sub> in the circular economy to make high-value carbon products. 2 years post-project Carbonova's commercial rollout plan estimates:

- Nearly \$8 million spent in the local economy
- 21 new high-skilled jobs and 15 jobs retained
- \$15.7 million impact on output
- \$5.8 million impact on GDP



**2 Students  
Trained**



**4 Patents**



**1 to 10 Project  
Jobs**



**4 New  
Products/Services**



**100-1000 Future  
Jobs**



**2,800 kt/yr Future  
GHGs Reduced**

## CURRENT STATUS

### JUN 2025

Characterization of pure polypropylene and pure polyketone for their thermal and strength properties has been completed. CNF + polypropylene and CNF + polyketone composites have been successfully blended using baseline CNF product from Carbonova's pilot plant. The composites exhibited improved thermal stability and enhanced elasticity over the pure plastics. Tensile strength demonstrated non-linear variation with CNF concentration. Work is ongoing to better understand this behavior.