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Reducing Emissions in the Supply Chain and Diversifying the Feedstocks of the Future

Competing in a low carbon economy is driving the public and private sectors to invest in technologies that will support the energy transition. LanzaTech has partnered on a next-generation bioreactor demonstration facility at the City of Edmonton's Waste Management Centre that is expected to improve the economic viability of an integrated biorefinery. The first-of-a-kind demonstration facility is expected to show a new intensified bioreactor design with greater efficiency and lower operating costs. The demonstration facility, operated by Suncor, is providing data to support future commercial deployment.

The demonstration facility will convert waste-based feedstock, including municipal waste and forestry-residues, into ethanol and other chemicals necessary to make petroleum-free materials and goods. The ethanol produced from the biorefinery can be further processed into other products, including sustainable aviation fuel (SAF), using the LanzaJet™ alcohol to jet technology. The forestry residues are comprised of woody biomass material that is left after forestry operations (small diameter trees, branches, etc.). If handled through traditional waste management practices, forestry residues and municipal waste will eventually decompose, and emit climate harming gases, CO_2 and methane into the atmosphere. This project is a significant step in widening the pool of waste gases that can be transformed into the chemicals necessary to make petroleum-free materials and goods.

LanzaTech, working with Suncor and with the support of the Government of Alberta and the Technology Innovation and Emissions Reduction (TIER) Fund through Emissions Reduction Alberta (ERA) and Alberta Innovates, expects to expand the breadth of waste feedstocks that can be economically used for gas fermentation. The demonstration facility was constructed by Suncor and has been producing ethanol since July 2022. Additional test campaigns are planned to demonstrate the robustness of the platform using a wide range of waste-based feedstocks.

"We are coupling engineering with biology to widen the feedstock pool and enable a new carbon economy," said Dr. Jennifer Holmgren, Chief Executive Officer, LanzaTech. "We expect that this demonstration facility with Suncor and the support from ERA will demonstrate that the next wave of gas fermentation will promote the utilization of more waste streams, including CO_2, an important part of what we call a "Post Pollution Future."

This technology for converting forestry and municipal solid waste streams into fuels and power could be used across several municipalities in Alberta. Making ethanol from waste-based feedstocks can reduce emissions by 97% relative to fossil gasoline.

"This demonstration facility is another example of how we're making targeted investments to progress and scale up renewable fuel technologies to commercial readiness that will provide us with an early mover advantage," says Andrea Decore, Vice President, Low Carbon Fuels & Offsets, Suncor. "We have over 15 years of experience in the renewable fuels business and have invested in areas that complement our existing business and will expand our energy offering in areas we understand well."

“Biofuels made from a waste-based feedstock reduce emissions, promote a circular economy, and provide economic opportunities for Albertans. These benefits are the result of extensive collaboration between all three levels of government, innovators, and the energy industry” said Dr. John Zhou, Alberta Innovates Chief Cleantech Officer.

“Innovation tested right here in Alberta—with a technology developer partnering with a major energy company and collaborating with a municipality—is turning carbon waste into low-emission products used in our day-to-day lives, from things like clothing to sustainable aviation fuel,” said Justin Riemer, CEO, ERA. “ERA is proud to support these kinds of partnerships that are critical in achieving our environmental and economic aspirations.”

A short video produced by ERA about the project can be found here, https://www.eralberta.ca/story/lanzatechs-carbon-recycling-technology-turns-waste-into-saleable-products/