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RENUEL Propane Extraction Technology Achieves Refinery-Grade Yields, Catalyzing New Partnership with NREL

Breakthrough Advances Sustainable Aviation Fuel Toward Commercial Scale

Council Bluffs, Iowa — October 30, 2025 —

The **RENUEL Sustaining Flight Initiative**, a collaboration led by **Refuel Americas** and **Illuminated Extractors**, today announced a major breakthrough in the development of its **propane-based oilseed extraction technology** — a critical innovation designed to accelerate the global adoption of **Sustainable Aviation Fuel (SAF)**.

Recent independent testing conducted by the **National Renewable Energy Laboratory (NREL)** has confirmed that RENUEL's modular extraction process delivers **refinery-grade Fatty Acid Methyl Ester (FAME) yields** exceeding 94%, marking a significant step toward commercial readiness and positioning the technology as a potential game-changer for the aviation industry.

Independent Validation by NREL Confirms Breakthrough Efficiency

In the recently completed **NREL251006_FAME_BB analysis**, canola oil samples processed using the RENUEL propane extraction system achieved **FAME yields of 92.40% and 94.71%** — demonstrating exceptional triglyceride-to-ester conversion efficiency and purity.

These results confirm that RENUEL's extracted oil meets the **stringent feedstock specifications required for Hydroprocessed Esters and Fatty Acids (HEFA)**, the leading pathway for SAF production under **ASTM D7566** standards.

"Achieving refinery-grade conversion yields in an early-stage modular system validates years of engineering and research," said **Frank Montalvo**, Founder and CEO of **RENUEL Sustaining Flight**. "It confirms that RENUEL's IE Process can compete directly with large-scale extraction systems — but with far lower energy input, greater flexibility, and a smaller carbon footprint."

NREL Steps Forward as a Strategic Partner

Following the test results, **Dr. Robert (Bob) Baldwin, Ph.D.**, *Principal Scientist, Bioenergy Science and Technology at NREL*, personally initiated deeper collaboration with the RENUEL team.

NREL has now proposed a co-sponsored program to advance the technology through:

- **Comprehensive Feedstock Characterization** – Detailed compositional and chemical analyses of RENUEL's extracted oil.
- **Techno-Economic Analysis (TEA)** – Evaluation of the system's cost-effectiveness and commercial scalability.
- **Life Cycle Assessment (LCA)** – Full environmental impact modeling aligned with CORSIA and GREET methodologies.

The engagement formalizes NREL's support and accelerates the transition from laboratory validation to commercial implementation.

"This collaboration with NREL represents a turning point," said **Dr. Baldwin**. "RENUEL's IE propane extraction process has demonstrated outstanding efficiency and holds strong promise

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for sustainable, decentralized feedstock production — an area essential to scaling SAF."

Accelerating Commercialization

Building on NREL's validation, RENUEL will now advance toward pilot-scale refinery integration and regulatory testing.

The next official **joint working session with NREL** is scheduled for **November 4, 2025**, to define project milestones, partnership terms, and data-sharing frameworks under DOE's Bioenergy Technologies Office (BETO) initiatives.

The results will be incorporated into RENUEL's upcoming **ICAO feasibility report** and related investment submissions to the **oneworld BEV Fund** and **U.S.**

Department of Energy.

"Our mission is to make sustainable flight a reality by bringing feedstock processing closer to the source," added Montalvo. "NREL's engagement confirms that our technology is ready to move from a promising prototype to a globally deployable SAF solution."

🌱 **About the RENUEL Sustaining Flight Initiative**

The **RENUEL Sustaining Flight Initiative** is an international collaboration of scientists, fuel technologists, and industry leaders dedicated to accelerating the adoption of Sustainable Aviation Fuel (SAF) through modular, decentralized extraction systems.

Led by **Refuel Americas (Council Bluffs, IA)** and **Illuminated Extractors (Fort Collins, CO)**, the initiative focuses on developing scalable technologies that reduce logistics emissions, enhance rural economic participation, and enable on-farm production of refinery-ready bio-intermediates.

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FORWARD-LOOKING STATEMENTS:

This release contains forward-looking statements regarding future events and the potential performance of the RENUEL technology. These statements are based on current expectations and assumptions and are subject to risks and uncertainties. Actual results may differ materially due to factors including market conditions, regulatory developments, and technological readiness.

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