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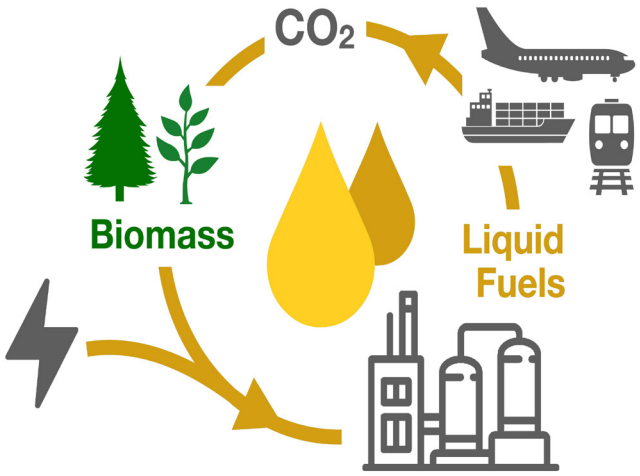
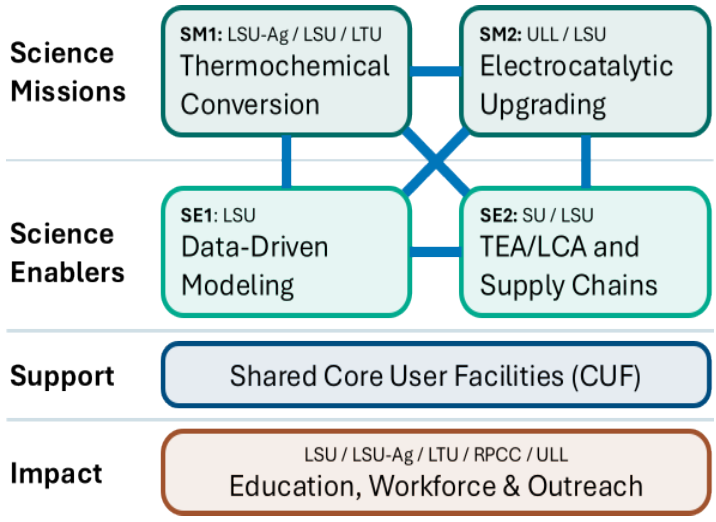
Louisiana Launches E-RISE Bio-Electric Fuel Incubator

Louisiana researchers, educators, and workforce partners have launched a major new collaborative initiative focused on transforming agricultural and forestry residues into sustainable transportation fuels through advanced research, workforce development, and STEM outreach.

The project, titled "Louisiana Bio-Electric Fuel Incubator: Creating Liquid Transportation Fuels from Agricultural Residues," is supported through the National Science Foundation's EPSCoR Research Incubators for STEM Excellence (E-RISE) program. The effort brings together six Louisiana institutions of higher education and 17 senior personnel in a coordinated statewide research and workforce development initiative focused on biomass conversion technologies, sustainable fuel systems, and regional innovation capacity.

At the scientific core of the project is the challenge of converting agricultural and forestry residues into sustainable liquid transportation fuels through thermochemical conversion and electrocatalytic upgrading. Researchers are investigating how biomass feedstocks such as sugarcane bagasse, rice husks, and wood residues can be transformed through fast pyrolysis and hydrothermal processing into bio-oils and chemical intermediates, then upgraded using advanced catalytic and electrochemical systems into cleaner, higher-value fuel products. **The opportunity for discovery lies in addressing fundamental scientific questions related to catalyst design, reaction pathways, process efficiency, fuel properties, and scalability using integrated approaches that combine experimental chemistry, materials science, computational modeling, and machine learning.** By linking these discoveries with techno-economic and supply chain analysis, the project aims to advance both the scientific understanding and practical deployment of sustainable fuels and bio-based energy systems.





Above: The Louisiana Bio-Electric Fuel Incubator program structure builds on a foundation of shared facilities to support two science enablers. Top Right: bio-fuel diagram.

The Louisiana Bio-Electric Fuel Incubator team at their strategic planning meeting. The team is led by researchers from Louisiana State University A&M, University of Louisiana at Lafayette, Louisiana Tech University, River Parishes Community College, and the Southern University Agricultural Research and Extension Center.

In addition to its research mission, the project places strong emphasis on workforce readiness and educational engagement. Planned efforts include:

Workforce training and professional development programs, undergraduate curriculum and course development, student research engagement and mentoring, K–12 outreach and STEM enrichment activities, and cross-training opportunities in energy fundamentals and biomass technologies.

A major workforce development component is being implemented through River Parishes Community College, where new instructional and laboratory content related to biomass fuel production, electrocatalysis, and technology characterization will be integrated into technical education pathways. Early activities include development of NCCER-aligned coursework, internship exploration, and collaborative industry engagement.

The project also supports STEM outreach initiatives for younger students through collaborations with the Southern University Agricultural Research and Extension Center and regional education partners. Year-one activities included biofuel-focused learning experiences for elementary students, professional development for afterschool educators, and planning for biotechnology-focused summer camp and career exploration programs.

To support statewide research access and collaboration, the initiative is also developing Shared Core User Facilities that will expand access to fuel characterization equipment, analytical tools, and training resources across participating institutions.

By combining research innovation, workforce preparation, and statewide collaboration, the Louisiana Bio-Electric Fuel Incubator represents a significant investment in Louisiana's future STEM ecosystem and clean energy economy. The project's integrated model reflects the broader goals of NSF E-RISE by building sustainable research capacity while preparing students and workers for emerging opportunities in advanced energy and transportation sectors.

To stay informed about the Louisiana Bio-Electric Fuel Incubator, click on the icon below.

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