While oil refineries have long been able to produce two categories of products — fuels and chemicals — existing technologies currently limit most biorefineries to fuels only.

That’s why the University of Kansas is developing new biorefining technologies that would convert biomass — such as switchgrass and mixed prairie grasses — into valuable chemicals.

University of Kansas researchers are developing new biorefining technologies that would convert biomass — such as switchgrass and mixed prairie grasses — into valuable chemicals.

“Our technologies would enable biorefineries to produce valuable bio-based chemicals,” said Bala Subramaniam, director of the Center for Environmentally Beneficial Catalysis at KU. “Since biorefineries need to be near sources of raw materials, this would create jobs near farms and in small towns across Kansas.”

If the state captured a modest 1 percent of the current U.S. chemicals market, it would represent a $7.2 billion annual industry in Kansas, Subramaniam said. It would also create an estimated 8,100 direct jobs and 32,000 indirect jobs.

“This industry could be the next big thing for rural Kansas.”

KU researchers are developing new biorefining technologies that would convert biomass — such as switchgrass and mixed prairie grasses — into valuable chemicals.
TELEMEDICINE IN SALINA AND GARDEN CITY

- Salina Regional Health Center uses telemedicine for Tumor Board meetings, which are consultations about the best treatment options available for cancer patients.
- In Garden City, telemedicine services are offered at facilities such as Sleep Resolutions, a lab that treats patients suffering from sleep disorders, and at the Garden City Area Health Education Center.

GARDEN CITY & SALINA

Closer to Home
Telemedicine delivers health care to patients statewide

Over the past 20 years, the University of Kansas Medical Center has delivered telemedicine to tens of thousands of Kansans through its Center for Telemedicine and Telehealth. Today, KUMC provides clinical telemedicine services in 42 Kansas counties, with sites in the state's largest cities and smallest communities — including Garden City and Salina.

“we've come a long way in the past 20 years,” said Ryan Spaulding, the Center’s director. “Today we use telemedicine to treat patients with cancer, diagnose autism, and educate adults about healthy lifestyle options. Looking ahead, we want to continue using video but also expand access through mobile technologies such as smartphones and tablets.”

Over the past 20 years, the University of Kansas Medical Center began working with these tools in 1991, making Kansas one of the first states with telemedicine.

Making Classrooms Come to Life
KU program empowers Kansas teachers to expand curriculum, tackle key issues

The Research Experience for Teachers program at the University of Kansas enables teachers like Jenny Gartner to work on real-world projects and lesson plans designed to encourage students to pursue careers in engineering.

Labette County High School Science Teacher
Jenny Gartner is always looking for new ways to engage her students. She found exactly what she was looking for thanks to the Research Experiences for Teachers (RET) program at the University of Kansas.

Funded by the National Science Foundation, the RET program brings Kansas science teachers to Lawrence for six weeks to work with KU faculty and develop lesson plans on topics such as transportation, energy, and the environment. Last summer at KU, Gartner researched potential uses of glycerol — a biodiesel byproduct — including using it to dampen dust on gravel roads, or spraying it on farmland to prevent herbicides and pesticides from washing off crops and into groundwater.

In the fall, Gartner brought her new research and lesson plans back to the classroom — and the results have been outstanding.

“The most of my students help work the family farm,” said Gartner, who teaches chemistry and physics. “With the lesson plans we developed at KU, I’ve seen more of my students interested in chemical-based careers because they see how it can impact their farms and their communities.”

More information
www2.kumc.edu/telemedicine

Research Experiences for Teachers

- The Research Experiences for Teachers (RET) program helps teachers develop lesson plans and acquire materials to demonstrate real-world scientific applications in their classrooms.
- The RET program has two separate initiatives at KU: Bioengineering Toolkits for Teachers (BET 4 Teachers) for middle school teachers, and Shaping Inquiry from Feedstock to Tailpipe (SHIFT) for high school and community college educators.
- Participants work with researchers from various KU departments. The program also partners with the Southeast Kansas Educational Service Center-Greenbush in Girard, Kan.

More information
cebc.ku.edu, berc.ku.edu

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Digging for Solutions
KU researchers study feasibility of storing carbon dioxide underground in Kansas

HOW DO YOU KEEP INDUSTRIAL byproduct carbon dioxide (CO₂) out of the atmosphere and perhaps reach previously inaccessible oil reserves at the same time?

The answer could lie beneath the plains of Kansas, where University of Kansas researchers are drilling deep into ancient rock and attempting to store CO₂, a greenhouse gas that’s been linked to climate change. In addition, KU researchers are determining whether targeted CO₂ injections can release trapped oil unreachable by traditional methods. The technique has been used extensively in West Texas oil fields and in a Russell County demonstration project.

The researchers are focusing their CO₂ sequestration efforts on the Wellington oil field in Sumner County while studying subsurface structures in Ellis County north of Hays to determine storage prospects there. The projects are funded largely by the Department of Energy.

“Imagine the dual benefits of storing carbon dioxide underground and using it to reach previously inaccessible oil reserves,” said Lynn Watney, a Kansas Geological Survey geologist at KU. “This would simultaneously address a variety of environmental and energy issues and could lead to significant economic benefits for rural Kansas.”

KU researchers are developing detailed maps of subsurface structures in Kansas to determine whether they can store carbon dioxide and use it to release trapped oil reserves.

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Sustaining the PLANET

Powering the WORLD

“The task ahead is to find ways of living securely and justly within the limits of the planet.”

DONALD WORSTER
Hall Distinguished Professor of U.S. History
The University of Kansas

We all demand more energy. But we all need a healthy environment, too. Achieving both is a delicate balance.

At the University of Kansas, researchers work to develop renewable sources of fuel and chemicals, while also inventing ways to extend the life of oil and gas fields. We collaborate with industry to turn farm waste into plastics, sunshine into electricity, and cooking grease into biodiesel. Just as important, we’re translating our breakthroughs into marketplace innovations and training the next generation of research leaders. These are some of the many ways KU works for Kansas.

“The task ahead is to find ways of living securely and justly within the limits of the planet.”

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KU RESEARCH & GRADUATE STUDIES
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