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Restoration Institute, Savannah River National Laboratory partner to develop bioenergy

NORTH CHARLESTON — In a move that will advance development of alternative energy in South Carolina, the state's leading bioenergy researchers have teamed to study how South Carolina's agricultural resources can help reduce the state's and nation's dependence on fossil fuels.

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The Clemson University Restoration Institute and the U.S. Department of Energy's Savannah River National Laboratory are founding members of the S.C. BioEnergy Research Collaborative, which was formed last year.

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This new agreement will enhance the exchange of ideas and the development and use of new technologies. As part of the agreement, the Restoration Institute and the laboratory will:

- Research crop development and harvesting, including switchgrass, sweet sorghum and pine;
- Study emerging energy alternatives, such as algae; and
- Research crop-processing techniques to yield viable energy and chemical products, including ethanol, biodiesel and energy briquettes.

A member of the laboratory's research team will be housed at the Restoration Institute in North Charleston to help promote the free exchange of ideas and advance technical developments.

Savannah River National Laboratory is bringing its environmental and biological research and development capabilities to the effort, said Tom French, its Bioenergy Programs manager. This includes its expertise in microbial and enzyme technologies to break down chemical compounds.

The laboratory is playing a lead role in research into the pretreatment of plant matter prior to fermentation and in the discovery of effective new cellulose enzymes.

"We're combining the national lab's unique expertise with the Restoration Institute's significant research capabilities in a program that will benefit the entire state," French said.

The collaborative's other partners are:
South Carolina State University's James E. Clyburn University Transportation Center
Dyadic International (USA) Inc., a global biotechnology development company
Fagen Engineering LLC, a full-service biofuels and alternative energy-systems design company
The Spinx Co. Inc., one of the East Coast's largest ethanol distributors
The Clyburn Transportation Center is developing transportation models for how to efficiently bring raw

material to the plant and distribute the ethanol to the marketplace.

The private partners — Dyadic, Fagen and Spinx — represent key sectors of the alternative fuels industry. Together, their expertise will advance research and development of the pilot plant and the cellulose-to-ethanol process and clear avenues for rapid commercialization of the final product.

In October, the parties announced plans to build a biofuels pilot plant at the Restoration Institute. The $14 million plant will be used to investigate commercial bioethanol production using feedstocks available in South Carolina.

The project has the potential not only to enhance South Carolina's reputation as a leading alternative-energy researcher, but also boost Palmetto State agriculture, said Karl Kelly, director of corporate operations at the Restoration Institute.

The pilot plant will allow researchers to "scale up" new biofuel technologies, a crucial step between small laboratory experiments and full-scale production, he said.

"It's a project that addresses the entire process, from the field to the production of ethanol," Kelly said. "We'll look for gaps in the technology and fill them."

Initial funding was provided by a $1.2 million grant from the U.S. Department of Energy. The collaborative is actively seeking funding for construction of the plant, which will take about 12 months to build.

"All of this work is to develop a process, and to do that we need a pilot plant," Kelly said.

In addition to the public-private partners, the intent is that students will visit the Restoration Institute to work at the pilot plant as part of their studies.

The entire senior class of Clemson chemical engineering professor Charles Gooding is working on a project to design a switchgrass-to-ethanol plant. Thirty-four students are looking at alternatives to the process, which could prove useful to the plant design, Gooding said.

Future students, too, could benefit from the facility, Gooding said.

"There could be interaction with the entire class," he said. "We like to do things that are real-world projects."

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Online resources

Clemson University Restoration Institute: http://www.clemson.edu/restoration/
Savannah River National Laboratory: http://srnl.doe.gov/
S.C. State University James E. Clyburn University Transportation Center: http://utc.scsu.edu/
Clemson University Pee Dee Research and Education Center switchgrass research: http://agroecology.clemson.edu/switchgrass/sg.htm
Fagen Engineering: http://www.fageninc.com/
Dyadic International: http://www.dyadic.com/
The Spinx Co.: http://www.myspinx.com/

The Clemson University Restoration Institute

The mission of the Clemson University Restoration Institute is to advance knowledge in integrative approaches to the restoration and sustainability of historic, ecological and urban infrastructure resources and drive economic growth. The institute's vision is to build a sustainable future through education, collaborative restoration research and strategic partnerships.

Savannah River National Laboratory

The laboratory is the U.S. Department of Energy's applied research and development national laboratory at the Savannah River Site near Aiken, S.C. It puts science to work to support DOE and the nation in the areas of environmental management, national and homeland security and energy security. The management and operating contractor for SRS and the laboratory is Savannah River Nuclear Solutions LLC.

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