

\$30 Million DOE Grant Awarded to Adapt UMaine Research to Commercial Biorefinery

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A innovative partnership involving University of Maine (UMaine), Red Shield Environmental (RSE) and American Process Incorporated (API) has been awarded a grant of up to \$30 million from the US Department of Energy to design, build and operate a small scale commercial biorefinery. This biorefinery will produce ethanol, acetic acid and other by- products along with market pulp in the RSE Pulp & Chemical's existing mill located in Old Town, Maine. Construction is expected to begin in 2009 and a fully integrated biorefinery will be operation in 2011.

This award is the largest grant ever involving University of Maine research and certainly one of the largest for any academic or research organization in the state. In announcing the grant in April 2008, DOE Secretary Samuel Bodman said the funding will "further President Bush's goal of making cellulosic ethanol cost-competitive by 2012."

The Old Town biorefinery project continues the work of a 2006 National Science Foundation EPSCoR grant, "Investing in Maine Research Infrastructure: Sustainable Forest Bioproducts.." Known as the Forests Bioproducts Research Initiative (FBRI) the grant's research is designed to address the pressing issues of our time: replacements for fossil fuels, renewable energy, green chemicals — and creative uses of sustainable resources: in this case, trees. The current DOE award moves forest based cellulosic ethanol and bioproducts research from UMaine's labs to commercial mill operations and fulfills the original FBRI goal of "building research infrastructure that creates a forest biorefinery."

"Advances in science, coupled with better understanding of the ecosystem, the biology of tree growth and the chemistry of breaking down wood, allow us to approach biorefining more efficiently than we have in the past," explains UMaine's Stephen Shaler, FBRI's Science Director.

This project will continue the work of FBRI collaborating Professors van Heiningen, Genco and Pendse in UMaine's Chemical and Biological Engineering Department. "This is the biorefinery that we have been talking about for the last four years," said FBRI's Administrative Director, Hemant Pendse, "Maine is in the lead."

In December of 2007, Red Shield Environmental began preparing its mill to use the "van Heiningen process." The mill converted its existing one-vessel pulping system into a two-vessel system able to accommodate both production of pulp and the extraction of

hemicellulose from wood chips. The extracted hemicellulose fibers are necessary to provide a new feedstock for ethanol production. These vessels now function like two pressure cookers piped together to allow various ingredients to flow in several different directions. Wood chips are fed into the first vessel used for extraction and sluiced into the second (pulp producing) vessel. The DOE grant will allow the mill to supply hemicellulose-rich extract streams for the ethanol production process while also continuing to produce the pulp that is currently manufactured on site.

"This is tremendously exciting news, which demonstrates the quality and relevance of UMaine research," says UMaine President Robert Kennedy. "The development of new, renewable energy sources is critical to our future, and this grant demonstrates the great potential for creating fuel from forest bioproducts."