

**Quieting the 'Fuel-or-Food Debate': Advanced Cellulosic Biofuels from Non-Foodstock Acreage via the Black Liquor Gasification Route**

**DEERFIELD, IL, July 14, 2009** -- While first-generation biofuels will likely continue to play a role in America's drive to be energy independent, their consumption of foodstock as their raw material concerns many: To what extent will food production acreage be lost to energy-production and how will this loss impact food supplies and food costs?

Fortunately, second-generation biofuels today can be produced from a range of non-foodstock cellulosic materials such as crop residues, certain grasses, wood chips, harvest forestry biomass, and even organic municipal wastes.

One proven second-generation cellulosic biofuels technology showing outstanding environmental, land-use efficiency and motor fuels performance is the gasification biorefinery process that uses as its raw material a pulp and paper mill production waste stream called black liquor.

"This renewable energy technology eliminates the emotionally charged food-or-fuels debate and can produce a variety of bio-motor fuels including mixed alcohols and ethanol, methanol, dimethyl ether and synthetic diesel, as well as green heat and power and green chemicals," said Richard J. LeBlanc, CEO of Chemrec AB and its U.S. subsidiary, Chemrec USA. Chemrec, which developed the black liquor gasification biorefinery, has proven the technology in demonstration scale operations in Sweden and is now progressing with commercial scale development.

Gasification has since long been used to convert coal, oil and natural gas into syngas containing the building blocks of valuable fuels and chemicals. Black liquor is a byproduct of the kraft pulp production process and also an excellent gasification feedstock for syngas production. Black liquor consists of dissolved wood substance, mostly lignin, and spent pulping chemicals. It is traditionally burned by pulp mills in a Tomlinson-type recovery boiler to produce steam to drive the pulp mill processes and to recover the spent pulping chemicals. A gasification-based biofuels unit added to an existing pulp mill includes the patented Chemrec process and other technology extensively used in the petrochemicals industry.

Swedish truck manufacturer AB Volvo, in a biofuels study, showed that the production of synthetic diesel and dimethyl ether from harvest forestry woody biomass using the black liquor gasification process yields the highest miles per acre per year than biofuels produced by most other processes (see chart). Other studies show that the technology also yields the highest well-to-wheel greenhouse gas reduction and energy efficiency.

The black liquor gasification woody biomass to produce bio-energies, along with other second-generation biofuels technologies, promises to contribute significantly to America's goal of meeting

more of its energy demand from renewable energies. By 2022, U.S. energy law requires 21 billion gallons of advanced biofuels to be part of the U.S. motor fuel supply.

To facilitate its ability to ramp-up commercial scale black liquor gasification biorefineries at U.S. pulp mills, Chemrec is actively pursuing federal and state grants and loan guarantees. When full developed, Chemrec technology also will help revitalize the paper industry and create green jobs.

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