APAC Agricultural Policy Analysis Center
The University of Tennessee

PolicyPennings by Dr. Daryll E. Ray

# Bioenergy: Ethanol, biodiesel, and a bunch of other stuff

The high prices that many of us are paying at the pumps these last several months is a reminder of the importance of energy to all that we do. For farmers an increase in the cost of energy supplies boosts the cost of everything from diesel fuel, to fertilizer, to heating oil, to the LP that will be needed by many in the upper Midwest to dry their corn crop. At present supplies of crude oil are tight enough that nearly every time there is a disturbance in an oil producing county around the world crude oil prices increase.

One of the justifications for the programs that promote the production of ethanol from corn and biodiesel from soybeans is to reduce the U.S.'s dependence on imported oil. Hardly a month goes by that we read about another ethanol plant coming online. An additional benefit of ethanol production is the fact that it uses up corn in a market that over the most of the last six years has been plagued by low prices in a market that perceives an oversupply of grain.

In addition to ethanol and biodiesel, there is an additional potential source of farm provided energy. That source is biomass, the remains of plant and animals. Raw biomass materials range from corn stover, switchgrass, woody-plant residue to tough straw from rice and flax. This biomass can be used to produce energy in the form of heat, fuels or electricity. One of the advantages of biomass is that unlike oil and coal it is renewable. In addition the use of biomass does not introduce additional fossil-derived carbon dioxide into the biosphere.

University of Tennessee agricultural economists Burton English and Daniel De La Torre Ugarte are working on a $1 million project to research the feasibility of growing switchgrass as an energy-producing crop. Recently funded by the Department of Energy, the researchers are heading a team effort to examine producer interest in the crop, its economic potential in the region and nationally and production systems necessary to provide a high-quality harvest.

The first research plots are expected to be harvested this fall. The Tennessee Valley Authority will serve as a partner to convert the switchgrass to a fuel for use as a combustion agent in coal-fired power plants.

While plenty of research supports the potential to convert biomass into energy, a principle difficulty is developing the specific technology to separate the physical and chemical components of the raw biomass material into consistent and economical products. The USDA recently awarded Alvin Womac, a University of Tennessee professor in biosystems engineering and environmental science, and a team of his colleagues more than $700,000 to research the characteristics of different biomass sources and to develop working small-scale models of appropriate grinding and processing units.

Womac's team will collaborate with researchers from the Oak Ridge National Laboratory and First American Scientific Company. If all goes well, First American Scientific Company will build industrial-scale versions of the models.

Womac believes that biomass applications will fuel more than just the energy sector of the economy. Others think so, too. Enhancing the nation's rural economies through the production and processing of commodities for non-food uses is the goal of a new federal program. If funded in the FY 2005 federal budget, the Sun Grant Initiative will create five regional centers for university based-research, Extension and educational programs. These centers would each receive approximately $5 million to manage regional biomass programs on a competitive basis. UT would coordinate research throughout the Southeast. Other Sun Grant centers include South Dakota State University, Oklahoma State University, Oregon State University and Cornell University.

While the use of biomass may not eliminate the need for the U.S. to import crude oil, it may lessen our reliance on unpredictable energy sources. In a world that is energy dependent, it is certainly an avenue well worth continuing to explore.

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