Ethanol Production Methods More Efficient Now: Study

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(PhysOrg.com) -- A new University of Illinois at Chicago study of facilities that produce most of the nation's ethanol found that the energy needed to make a gallon of the corn-based fuel decreased on average by about 30 percent within the past decade.

Steffen Mueller, principal research economist at UIC's Energy Resources Center, surveyed the nation's 150 "dry mill" ethanol plants -- the type that produce about 85 percent of the ethanol for energy use -- between November 2009 and January 2010.

The findings may prove useful to state and federal energy policy makers studying the pros and cons of fuels based on their "full life-cycle" -- the total energy needed to create a fuel compared to its energy output, the greenhouse gases emitted during production, the water used in production, and other factors.

"Policy makers rightfully pay attention to life cycle greenhouse gas emissions of fuels," said Mueller. "Biofuel refineries, including corn ethanol plants, are in a rapid innovation phase."

He said his survey shows that adoption of new technologies reduces energy production needs.

"The challenge for policy makers will be to keep up with these developments so that regulations are meaningful and reflect state-of-the-art industry practices," he said.

Mueller received 90 responses -- about 60 percent of the plants contacted. But those responding produce about 66 percent of the 35 billion or so liters of ethanol distilled yearly in the U.S.

Mueller said the high response should provide a sound statistical basis for policy makers, environmental groups, and researchers who will help design new energy-efficient and eco-friendly fuel production methods.

Mueller found plants use 28 percent less thermal energy -- mostly natural gas, but some coal, biomass and landfill gas -- and 32 percent less electricity to turn corn into ethanol. The savings may be due to more efficient equipment being used by new plants and older ones undergoing energy efficiency retrofits, he said.

The 24-question survey was developed with ethanol industry input. Senior or operations plant managers at all 150 U.S. dry mill plants operating during 2008 were contacted. The web-based survey was created by the University of Illinois Survey Research Laboratory, which also collected the data.

Mueller's findings were compared to the last comprehensive survey taken in 2001, commissioned by the U.S. Department of Agriculture. Since that time there has been a nearly 10-fold increase in the number of U.S. ethanol plants.

The findings are published online in the May 15 issue of *Biotechnology Letters*.

Provided by University of Illinois at Chicago