Study finds net energy of biofuels comes at a high cost

by Bend Weekly News Sources

A new economic analysis of biofuels by Oregon State University sets a cautionary tone for the large-scale production of biofuels in Oregon. Results of the study suggest that the â€œnet energyâ€• of biofuel is expensive when all costs of its production and delivery are taken into account.

The study was released this week by a team of economists in OSUâ€™s College of Agricultural Sciences that included William Jaeger, Robin Cross and Thorsten Egelkraut.

By subtracting the energy spent to produce raw materials and to process and transport the biofuel, the researchers found that the cost of the net gain in energy for these biofuels may be more than seven times higher in some cases when compared to gasoline.

â€œThere is a commercial market for biofuels in Oregon given current subsidies,â€• Jaeger said. â€œBut success in the marketplace doesnâ€™t mean cost-effectiveness in achieving the stateâ€™s goals of energy independence and reducing greenhouse emissions.â€•

The study was prompted by increasing interest in domestically grown biofuels as an alternative to foreign imports of oil. The economists examined three biofuel options for Oregon: ethanol made from corn, ethanol made from wood cellulose, and biodiesel made from canola.

For each option, the researchers examined the cost of production, its contribution to energy independence and its environmental impact in terms of greenhouse gas emissions. They calculated â€œnet energyâ€• as the amount of energy in the biofuel minus the amount of energy it takes to produce, process, and transport the biofuel.

Their results suggest that ethanol made from wood cellulose produced the greatest net energy, netting 84 percent of its energy after production fuel costs were subtracted. Biodiesel made from canola netted 69 percent of its energy after subtracting production fuel costs. And ethanol made from corn netted a mere 20 percent of its energy after subtracting the energy spent to produce it.

The economists combined net energy calculations with estimates of production costs and greenhouse gas emissions and compared the results with similar calculations for gasoline and diesel. They found that each of the three biofuel options would reduce greenhouse gas emissions, but at a significant cost. For example, the cost of reducing greenhouse gas emissions by switching to corn-based ethanol was calculated to be more than 200 times higher than other existing policy options to reduce greenhouse gas emissions.

A number of factors limit the economic viability of biofuels in Oregon, Jaeger explained. For example, relatively little corn is grown in Oregon compared to the Midwest, so corn for ethanol would need to be imported from other parts of the country. Canola and wood-based cellulose are both available in Oregon and Washington; however the production of canola is limited and the production of wood-based ethanol is not yet commercially viable.

The co-products or byproducts created during biofuel production add another variable to the economic picture.

â€œMany of these products â€“ meal, glycerin or lignin â€“ have energy and market value in their own right,â€• Jaeger said. â€œCanola meal left over after extracting the oil can be fed to livestock. But, if canola were to contribute just one percent of Oregonâ€™s current petroleum energy consumption, enough canola meal would be produced to feed five times the number of cows we currently raise in the state.â€•

For comparison, the authors calculated that the net energy benefits from increasing automobile fuel efficiency by one mile per gallon would be equivalent to three or four corn ethanol plants or 13 biodiesel plants like those evaluated in their report.

The study focused on three large-scale biofuels options, but did not evaluate on-farm or small-scale production and distribution. The authors point out that their estimates are based on current technologies and prices, and that future trends could shift the prospects for these biofuels positively or negatively.

Based on their analysis, the authors concluded that these three biofuel options appear to be a costly way to achieve limited progress toward energy independence or reduce greenhouse emissions in Oregon.

â€œBiofuels and bioproducts have an important role to play in Oregonâ€™s future, but Oregonâ€™s approach will be different than the Midwestâ€™s,â€• said Bill Boggess, executive associate dean of OSUâ€™s College of Agricultural Sciences. â€œWe need to carefully consider what bioproducts make sense in Oregon for the long-term and focus research on economically sustainable bio-based energy systems.â€•

To view the entire report, â€œBiofuel Potential in Oregon: Background and Evaluation Optionsâ€• and its summary, go to: arec.oregonstate.edu

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