Assessing environmental and economic factors to determine greenhouse gas reductions for varying forms of bioenergy

October 28 2015

A study published in the journal *Biomass & Bioenergy* sets out to calculate the true costs and benefits associated with replacing fossil fuels with bioenergy in varying forms for numerous s applications. The life cycle assessment (LCA) approach takes into account entire bioenergy systems, including every step along the supply chain.

The study led by Patricia Thornley of the Tyndall Centre for Climate Change Research at the University of Manchester has been selected for Elsevier's Atlas Award.

"The cost of bioenergy systems per unit of greenhouse gas reduced is really important because we all want to do the sensible environmental thing, but we don't want excessive cost attached to it," Thornley explained. "In this paper we brought environmental and economic factors together to then showcase how different bioenergy systems contribute to future energy systems."

Their assessment takes all of the hidden costs of bioenergy's production into account, including greenhouse gas emissions associated with the production and transport of bioenergy resources, to provide a solid foundation for making decisions about the future of energy.

The results confirm that bioenergy can deliver substantial and cost-effective greenhouse gas reductions, however the most sensible use of

limited bioenergy resources is also heavily dependent on how one frames the goals. For instance, the assessment shows that large-scale electricity systems are best in terms of absolute greenhouse gas reductions per unit of energy generated. Wood chips used in medium-scale district heating boilers on the other hand, deliver the highest greenhouse gas reductions per unit of harvested biomass.

The findings of the study are especially well timed as the European Union is currently reviewing its bioenergy policy.

More information: Patricia Thornley et al. Maximizing the greenhouse gas reductions from biomass: The role of life cycle assessment, *Biomass and Bioenergy* (2015). DOI: 10.1016/j.biombioe.2015.05.002

Provided by Elsevier