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Comparison of bio-ethanol and biogas: Net energy ratio, total yield, and greenhouse gas emissions

Wolfgang Bauer
McMaster University, Canada

Liquid and gaseous biofuels can have a significant impact on the reduction of fossil transportation fuels and thus make a large contribution to reducing global CO₂ emissions. Examples for these biofuels include ethanol produced from sugarcane, sweet sorghum, corn, switchgrass, and other energy crops, but also biogas/methane produced from the same energy crops or algae cultures. However, it is of fundamental importance to consider all fossil fuel based inputs into the biofuel production in a life-cycle analysis. In addition, we need to optimize the total yield of biofuels per area of energy crops in order to minimize the conflict of fuel versus food, we need to reduce the use of artificial fertilizers as much as possible, and we need to minimize the net emissions of greenhouse gases in the biofuel production process. In this presentation I will evaluate different biofuels and compare them to each other, taking all of the above considerations into account.



Biography

Wolfgang Bauer is a University Distinguished Professor at Michigan State University (MSU). He received his Ph.D. in physics from the University of Giessen in Germany in 1987. After a one-year postdoctoral appointment at the California Institute of Technology, he joined the faculty at MSU in 1988. From 2001 to 2013 he served as chairperson of the Department of Physics of Astronomy, and in 2009 he became the Founding Director of the Institute for Cyber-Enabled Research. He has consulted on energy issues for hedge funds and oil companies, and he is co-owner of several companies in the renewable energy sector.

bauer@pa.msu.edu

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