

Green fuel versus black gold: Is bioethanol more environmentally benign option to petroleum-derived fuels?

24 February 2012

A life cycle assessment of growing crops for fuel as opposed to refining and using fossil fuels has revealed that substitution of gasoline by bioethanol converted from energy crops has considerable potential for rendering our society more sustainable, according to a Japanese study published in the *International Journal of Foresight and Innovation Policy*.

Kiyotada Hayashi of the National Agriculture and Food Research Organisation in Tsukuba and colleagues explain how biomass derived from sugarcane, sugar beet and other crops, has emerged as one of the most promising [renewable energy sources](#). Some observers suggest that it makes an excellent substitute for oil-derived fuels and it is being used widely in certain parts of the world already. However, there are concerns about land use and the overall life-cycle impact on raising [fuel crops](#) and the energy required to process and exploit biomass compared with fossil fuels. The Japanese team has now put to rest some of those concerns in a [life cycle assessment](#) of energy crop production for bioethanol in Japan.

The team hoped to clarify the potential of biomass utilisation while taking into account the cumulative fossil energy demand and [climate change impact](#). They looked at two scenarios: one in which cultivation technologies improves and breeding of new crop varieties is made possible. The second scenario looked at how the establishment of regional biomass utilisation systems that used biomass resources from various industries might function mutually and effectively and again reduce fossil fuel demand and reduce carbon emissions.

"We proved that the improvement in cultivation technologies and the establishment of regional biomass utilisation systems have large potential for saving fossil fuel resources and reducing

[greenhouse gas emissions](#)," the team concludes. The researchers concede that their results largely depend on scenarios including the lifetime and coverage area of agricultural machinery, and types of biomass utilisation, but point out that the substitution of gasoline with bioethanol converted from [energy crops](#) has considerable potential for rendering our society more sustainable.

More information: "Life cycle assessment of energy crop production with special attention to the establishment of regional biomass utilisation systems" in *Int. J. Foresight and Innovation Policy*, 2012, 8, 143-172

Provided by Inderscience Publishers

APA citation: Green fuel versus black gold: Is bioethanol more environmentally benign option to petroleum-derived fuels? (2012, February 24) retrieved 23 October 2020 from <https://phys.org/news/2012-02-green-fuel-black-gold-bioethanol.html>

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