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Biodiesel and bioethanol are not as green as it seems

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The biofuel hype in Europe and the United States

Recently the demand for fuels made from plants has increased considerably. This is due to the United States' desire to become independent of oil-exporting countries that are perceived as a threat, but also to European legislation increasing the amount of bio fuels in order to fight climate change. People have also become more and more aware of the fact that fossil resources are limited and will not last forever. At the moment, however, the United States and Europe are unable to cover demand through their own production. They depend on biofuel imports from countries such as Brazil or Indonesia.

Brazil already has a long experience in bioethanol production. It has a well developed ethanol industry as it started to use ethanol in cars as early as the 70's and today many cars in this country even run only on ethanol (Vernier, 2005). Nearly half of the country's fuel comes from its own bioethanol production based on sugarcane (Wüst, 2007). Today, Brazil is the biggest exporter of ethanol, delivering 70 % of the worldwide supply and the US is the country's biggest client as it imported 1.74 billion litres in 2006, which represents 58% of Brazil's exports (Kenfield, 2007). In addition to this, the interest in palm oil has increased as it can be used as a resource for biodiesel. Indonesia and Malaysia are the main producers of palm oil providing together 86 % of the worldwide supply and 91% of global exports (Patzek, 2007). Recently, several other Southeast Asian countries, such as Thailand and the Philippines, are also starting to plant oil palms in order to profit from the biofuel boom.

Are biodiesel and bioethanol really that much better than fossil fuels?

No one denies nowadays that alternatives to fossil fuels have to be found. However, due to the sharp increase in demand for biofuels we need to have a closer look at their alleged advantages. When, some years ago, interest in biofuels suddenly increased, people first focused on canola oil as the seemingly ideal solution. The golden colour of the canola fields seemed to be the beginning of a new era. However, for the cultivation of canola a lot of

energy is needed and the high usage of fertilizer often has a negative impact on the ground water (Wüst, 2007). The energy balance of biodiesel from canola is simply too low to make it an interesting alternative to fossil fuels.

The energy outcome of bioethanol depends on the base product used for production. Bioethanol made from sugarcane has a much better energy outcome than bioethanol made from corn or cereals. In comparison to the United States, Brazil has a major advantage here. Whereas, the U.S. has to use corn and other cereals due to the rougher climate, Brazil produces its bioethanol from sugarcane. Cereals or corn deliver only 1000 litres of bioethanol per hectare, sugarcane 6000 litres. This means that the United States needs for nearly the same quantity of bioethanol as Brazil, namely 17 billion litres per year, more land and energy (Wüst, 2007). The energy required for tilling the fields, harvesting and production needs to be considered and may sometimes even result in a negative energy balance as found in the case of bioethanol made from corn.

Another important point is that biofuel might not reduce the emission of greenhouse gases as much as previously assumed. According to an analysis conducted by the University of California, Berkeley, the reduction of greenhouse gas emissions thanks to corn ethanol only makes up 10 – 15 % (Green Car Congress, 2006). In addition, a lot of space would be necessary to satisfy the increasing demand all over the world and neither Europe nor the U.S. will have enough land to produce a sufficient amount of biofuels to cover their own consumption. The huge amount of water needed for the cultivation of biofuel plants should also not be neglected.

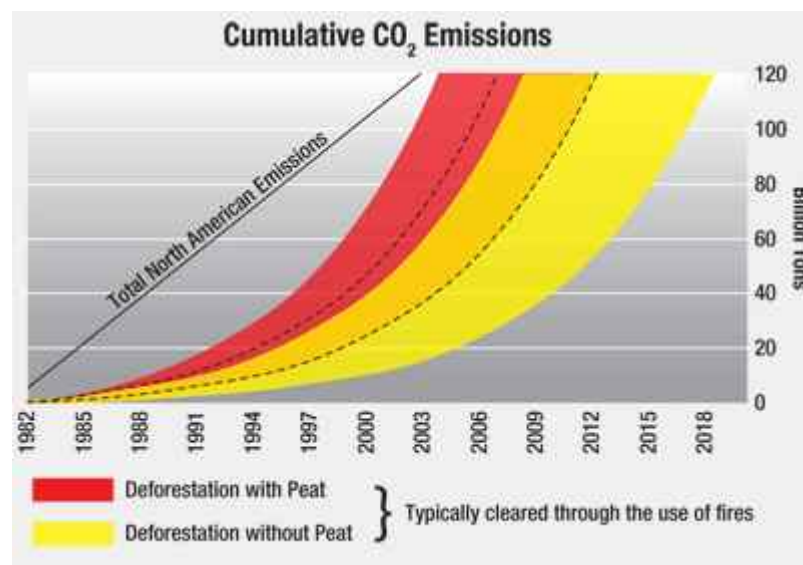
Problems arising from biofuel production in developing or newly industrialized countries

Apart from criticism of biofuels' efficiency, severe problems are emerging due to the heavy rise of production. One of the dangers present in biofuel producing countries includes the increase of monocultures. This means that these countries will depend heavily on biofuel exports while also experiencing a negative impact on biodiversity of plants and animals. Indonesia, for example, represents 1.3% of global land surface, but hosts 11 % of global plant species, 10% of mammal species, and 16% of bird species (Patzek, 2007), which risk disappearance.

In addition, large areas of forest will be destroyed in order to make room for harvesting fields. In Brazil "[...] only 2.5 percent of the original forest of the sugarcane region remains. In order to satisfy future global demand, Brazil will need to clear an additional 148 million acres of forest, says Eric Holt-Gimenez of the NGO FoodFirst, based in Oakland, CA." (Kenfield, 2007) Meanwhile, in Indonesia, forests are set on fire in order to prepare the land for plantation. These fires are difficult to keep under control and they spread easily to surrounding areas in the region. "In 1997 and 1998 fires raged through 6 percent of Indonesia, burning 11.7 million hectares of land. The majority of the fires

occurred on plantation company land, and three-quarters were oil palm plantations.” (Patzek, 2007) In 1950, Indonesia still had 162 million hectares of forest, but in 2000, only 98 million hectares remained (Patzek, 2007). The deforestation of these vast areas also leads to increased soil erosion.

These forest clearings through fire produce large amounts of CO₂ (see picture), which hinders the overall reduction of greenhouse gas emissions through the use of biofuels. Specifically, the carbon emissions of Indonesia have increased heavily due to the forest clearing fires, especially in the 21st century.



From: PATZEK, L. and PATZEK, T. (2007) The Disastrous Local and Global Impacts of Tropical Biofuel Production. *Energy Tribune* [online]

As a result of monocultures and deforestation, local communities in Indonesia will no longer be self-sufficient living on the fruits, vegetables and meat that the forest and its abundant biodiversity previously provided. The result, therefore, becomes dependency on the palm oil industry and a decrease in their country's sovereignty. Currently, many Indonesians depend on the jobs this industry offers in order to gain the means to put food on the table. Another issue faced by numerous countries except those within the EU, includes the problem of available land for the production of food and grazing fields for the cattle. Therefore, the use of land to grow biofuels satisfies an external demand, but meanwhile often increases food scarcity amongst the local population. Farmers are often faced with the choice of either working in the palm oil industry or moving to another region. This can result in a disturbance of the balance of farmers in these regions as well. The strong interest in biofuels has also forced prices for corn to increase in certain countries. For example, in Mexico, corn is one of the staple foods and many people can no

longer afford to buy it due to the price increase.

Similarly, the sugarcane industry also reinforces already existing inequalities within the population. In this case, local communities often do not have anything to gain from the biofuels. Only those few people who are in possession of the land to produce biofuels will profit from it. "Brazil's high rate of income inequality is inseparable from the fact that it also has one of the most unequal rates of land distribution. The sugar industry is a classic example of Brazil's land and income inequality." (Kenfield, 2007) The general trend of concentration in today's globalized world will lead to a domination of the sugarcane sector by a few multinational companies.

Many local communities come to realize that the biofuel business is threatening their livelihood. But to the attempt to fight the spread of biofuel production can be a dangerous undertaking as it often results in imprisonment or even death for various activists.

The future of biofuels

When we hear the words "renewable energies," the term "unlimited" often simultaneously comes to mind, but this, however, is often not the case. It is true that, in contrast to fossil fuels, biofuels will always be available. However, in order to grow them we also need a lot of space, and here lies its limitations. Despite the fact that they are called "bio" fuels, they represent some dangers to environment and society as well. Unfortunately, "bio" and "renewable" are not synonyms for "all good". There exists no miracle solution to our climate change problems and every alternative has its limits. The fact that the conditions of production of resources like sugarcane and oil palms are best in some developing countries does not always improve the economic and social situation in these countries and give them influence in industrialised countries. The South stays dependant on the North, and the North's need for biofuels often serves as a disadvantage to the South.

Nevertheless, biofuels could contribute to the fight for climate control in a positive way. Permanent research and the development of new technologies will help improve biofuels' energy balance, so that less land will be needed for higher profit. Some biofuels, like biogas, already deliver higher energy efficiency. Considering the fact that European farmers are paid for leaving their fields fallow in order to avoid overproduction of food, biofuels production, in this instance, would be a good alternative for which food production would not simultaneously be hindered. In order to avoid the problems related to mass production of biofuels in countries like Brazil or Indonesia, the United States and Europe should perhaps stop importing biofuels and only use the supplies they are able to internally produce. After all, it would be impossible to satisfy the entire fuel demand through biofuels. In order to reduce greenhouse gas emissions from cars, a variety of solutions have to be considered on a collaborative scale. One of the best options, we tend to forget sometimes, is a considerable reduction of consumption. Fighting climate change is one of the world's current priorities, but the developed states must keep in mind the outcome and effects of alternative energies and their production on developing countries.

References:

---- (2006) UC Berkeley Study: Corn Ethanol is Better than Gasoline, But Not by A Lot. *Green Car Congress* [online]

Available from:

[Accessed: 21st March, 2007]

KENFIELD, I. (2007) Is Ethanol the Solution or the Problem? *AlterNet* [online]

Available from: <http://www.alternet.org>

[Accessed: 26th March, 2007]

PATZEK, L. and PATZEK, T. (2007) The Disastrous Local and Global Impacts of Tropical Biofuel Production. *Energy Tribune* [online]

Available from: <http://www.energytribune.com>

[Accessed: 26th March, 2007]

VERNIER, J. (2005) *Les Energies Renouvelables*. 3rd ed. Presses Universitaires de Frances

WÜST, C. (2007) Erntedank im Autotank. Kraftstoff aus Biomasse kann das Öl ersetzen – wenn bessere Technik zum Einsatz kommt. *Der Spiegel*, Vol. 8, pp 104-111