

Fuels from Biomass

Agreed resolution of the General Assembly of the Climate Alliance on 3rd April 2008 in the city of Aachen

Text of the Resolution

The members of Climate Alliance call the representatives of European Parliament, European Commission and the national governments to include in their principles and guidelines regarding the use of fuels from biomass¹, social, ecological and economic criteria to avoid the harmful consequences on it in Europe and in developing countries.

Furthermore the following aspects must be taken into consideration:

- Measures for reducing energy usage and raising energy efficiency in transport are must be given top priority to reduce CO₂ emissions (also refer to the Climate Alliance Targets).
- The import and the use of biomass fuels in particular from developing and threshold countries should be avoided as long as no internationally accepted label has been established that includes both ecological and socio-political criteria.
- The use of biogenous waste and recycled material as fuels (bio methane) must be given preference over the promotion of agricultural cultivation of energy crops.

Arguments

Biomass is, along with wind, sun and geothermal power, a promising alternative to fossil energy sources. Until recently agricultural cultivation of energy crops to add biomass to the future's energy mix had not been given serious consideration. In 2004 at the International Conference for Renewable Energies in Bonn, which represents the European Climate Alliance's indigenous partners, initially criticised this fact. In a joint statement they pointed out that the use of biomass as renewable energy endangered fragile ecosystems as well as the living space still being used by indigenous populations in ecologically sustainable ways.

Cities have often led the way concerning energy and climate policy because ecological problems are often concentrated within small areas. The existing position paper highlights the ecological and social effects combined with the fuel production. It is meant to be an aid to decision makers in the Climate Alliance's member cities when considering the use of such fuels (e. g. as a guideline for reducing the CO₂ emissions of the city-owned car pool).



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¹ The specifications are correspondingly valid for biomass fuels that can prior be used in combined heat and power plants.

Climate Policy Frame

The discussion of climate change and increasing scarcity of fossil energy sources (crude oil, natural gas, coal, etc.) have led to a strong demand for renewable, preferably CO₂-neutral, energy sources. In this context the use of biomass has gained in importance, especially the production of fuels made of agricultural crops. Since agricultural crops grow in a very short period of time and absorb CO₂ in the same amount that it is later released during combustion, fuels made of crops (biomass) are considered to be CO₂-neutral and for this reason they are an ideal renewable energy source. In the last few years, the fuels of the first generation² known as "bio ethanol" (mainly made of cereal, corn and sugar cane) and "biodiesel" (mainly made of palm oil, soya or rapeseed) experienced a boom. That boom was due to government aid, for example tax exemptions and subsidies, for [corresponding?] fuels. Furthermore, in view of nationally and internationally agreed CO₂ reduction targets, specifications for the part played by renewable energies will be set, which is expected to result in a massive increase in the use of bio-fuels. The defined target of the EU is to achieve a share of 5.75 % of the total fuel consumption with renewable fuels by 2010. This share should be increased to 10% by 2020.



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Environmental and Socio-Political Frame

The advantages of the use of biomass as fuel seem to be obvious at first view:

- lower CO₂ emissions through the substitution for fossil fuels
- higher availability of biomass
- better cost-benefit-ratio compared to alternative energy forms

However, it has become clear that the promotion of the use of biomass for the production of fuels can have ecologically harmful impacts and can cause or intensify social problems in developing countries.

- The cultivation of energy crops occupies large areas. The involved plantation (usually large properties) often leads to a displacement of small farmers and a corresponding pressure on the living space (often rain forests) of the indigenous population.
- The mechanisation of cultivation, the needed irrigation of fields and the increased use of fertiliser and pesticides result in pollution of the environment and endangerment of the local peoples.
- The cultivation of energy crops competes increasingly with the cultivation of food crops. In developing countries this can have a negative impact on food security as well as increasing staple food prices, e. g. corn and soya.
- Agricultural plantations are often linked with severe violations of human rights. The cultivation of energy crops, e. g. palm oil, promises a high profit. This leads, especially in Asia and Latin America, to heavy land conflicts (e.g. with the paramilitary groups) and is often linked with disastrous social and work conditions (day labourers).
- Government aid for fuels made of biomass sends wrong signals not only regarding the increasing of mobility but also for technology development. Money that is invested in the development of ethanol or biodiesel technology is tied up for long periods and can retard sustainable strategy and policy development.

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² Biomass fuels can be distinguished between fuels of the first and the second generation. First generation fuels only use the plant in direct energy form of oils, sugar or starch. Future technologies (second generation fuels) promise a higher energy efficiency, which uses the leftover of the plant mass (cellulose), e. g. straw.

Ecological Valuation

From the general ecological view, fuels from biomass have fewer advantages than would be expected with regards to their contribution to CO₂ emissions reduction. This conclusion was reached by a Swiss analysis ("Ecological valuation of bio-fuel", EMPA, 22 May 2007). The study shows that, on the one hand, CO₂ emissions of fuels from biomass can be reduced by 80 % (at best) in comparison to oil or diesel, depending on the energy crop. On the other hand, the agricultural cultivation results in higher impacts on other environments. In temperate zones of Europe, the USA and Asia, the low yield per hectare, the intensive use of pesticides and the high energy consumption of agricultural equipment play a significant role in the overall negative ecological evaluation. In tropical agriculture the slash-and-burn of primeval forests creates air pollution as well as the loss of biodiversity. The use of pesticides is another major element contributing to the negative ecological balance. In an ecological overall view the performance of fuels made of agriculturally cultivated crops is worse than fossil fuels like oil or diesel. By contrast fuel produced from waste and residual material as well as used cooking oil, biogenous waste (organic waste) or liquid waste are assessed as positive. There are no environmental impacts on the agricultural cultivation by these products. The use of wood (gasification) seems to be promising whereas the technology for the so called second generation fuels is not fully developed yet.

The biomass boom builds the basis for the broad implementation of genetically modified crops in agriculture. The dropping of barrier's to the use of genetic engineering that is linked to the cultivation of ["powerful" ?] crops is problematic and harms especially the smallholder agriculture, which is mainly responsible for the food security in developing countries.

The German Advisory Council on the Environment (SRU), the scientific expert advisory board of the German Federal Government, established in their current report (SRU special report Climate Change Mitigation by Biomass, July 2007) that the degree of energy efficiency in the conversion to fuel (app. 30%) is too low and does not support this method of using biomass. Biomass should be better used for power and heat generation (90% degree of energy efficiency).

Evaluation of Social Compatibility

There is a lack of research to make a comprehensive evaluation of the social compatibility of fuels from biomass, especially in developing and emerging countries. But the negative impact of the promotion of fuels from biomass can already be noticed. The increased demand for vegetable raw material for the fuel production has quadrupled prices for staple food corn in Mexico within a short period of time. The same effect can be seen with soya and palm oil, which are used increasingly as a basis for renewable fuels. Another critical aspect of the promotion of energy crops in developing countries is the relation to "large-area" cultivation as well as the repression and expulsion of smallholders and local indigenous communities and the exploitation of day-labouring plantation workers. Beside the often sub-standard working and social conditions, plantation workers are exposed to health risks, e. g. through the usage of agrochemicals or through the pollutants released when fields are burned down (e. g. sugarcane harvest).



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The cultivation of energy crops in developing countries involves a cash flow into these countries with the corresponding impacts on the economy. However the profit for the local population is mostly very low with the promotion of energy crops like palm oil often actually increasing the impoverishment of the local population. Resources currently used for energy crop cultivation in developing and emerging countries could well be used more effectively. With the use of locally produced energy you can substitute expensive imports of natural gas and crude oil and can build local value-added chains.



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Conclusion

- The CO₂ reduction potential and the overall ecological effect of biomass fuels strongly depend on the basic material and production conditions. The greatest advantages come from fuels that are made of waste and residual material (e. g. methane/biogas).
- The cultivation of energy crops in developing countries, where this cultivation competes with the food production, leads to the exploitation of ecologically valuable uncultivated land or to the displacement and the exploitation of local populations (e.g. cultivation of oil palms) which must be viewed critically. Fuels made of staple food like corn or soya must be strictly rejected.
- Fuels of agricultural cultivation not only have to meet ecological requirements but also social criteria. The socio-political impact in developing countries has to be analysed with the target to create an internationally accepted quality label, which includes ecological and social criteria equally.
- The use of biomass fuels is not the solution that paves the way for sustainable vehicle traffic. Top priority still needs to be given to reducing traffic volume and traffic performance, respectively, and to the use of energy efficient vehicles.
- It is too early for an evaluation of second generation fuels, which are based on the use of cellulose. They promise higher energy efficiency and compete less with the food production. These technologies are only in the laboratory stage.

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