

Media communiqué

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Science Apéro on Biofuels stimulates strong resonance

The Better Fuels Debate: and the Winner is «Greater Energy Efficiency»!

«The Utility or Futility of Biofuels» – the title of the Science Apéro at Empa in St. Gall and Duebendorf was intentionally provocative, the theme being, of course, whether energy derived from sustainable raw materials – “biogenic” fuels, to use the correct designation – makes sense from the ecological, economic and political points of view as a solution to the problem of CO₂-neutral mobility.

Until recently the use of fuels produced using sustainable, cultivated raw plant material was considered to be a magic bullet to cure all the problems associated with achieving climate-neutral mobility. The image of these “biofuels” has, however, undergone a dramatic negative shift since the occurrence of food shortages in many parts of the world as a result, for example, of maize being diverted to ethanol production instead of being used as food for humans or fodder for cattle. This transformation in the perceived usefulness of biofuels is well founded, for in addition to competing with food resources, not all biogenic fuels make sense from the ecological standpoint, as an Empa study showed last year.

How topical and controversial the subject is was demonstrated by the size of the audiences at the two science apéros, which were held last Monday in Duebendorf and a week earlier in St. Gall. Despite the sunny weather and feverish enthusiasm for the football European Cup, the total of more than 300 visitors boosted the audience size to well over average.

Agrofuels versus those from biogenic waste

It is now about a year since the Empa Ecobalance study, conducted at the joint behest of the Swiss Federal Offices for Energy, the Environment and Agriculture, was published and caused headlines. During the science apéro Rainer Zah, an Empa member of staff, biofuels expert and one of the authors of the study, considered in detail the question of what role biogenic fuels might play in the future energy supply landscape. Among other things the study showed that in the manufacture of biogenic fuels it is in particular the cultivation of the plants which has a negative effect on the ecobalance, while transport and treatment processes are significantly less important. It is primarily for this reason that, in Zah’s opinion, so-called agro-fuels based on maize, potatoes or cereals are ecologically questionable.

Despite this it is possible, according to the Empa expert, "...to produce biofuels sustainably and without competing with other land usage activities." In the case of fuels derived from biological waste, for example, costly cultivation processes to produce the raw materials are unnecessary, and there are other special "energy plants" which can be cultivated as energy sources which show comparatively good energy life cycle values. An example of the latter is *Jatropha*, a tropical plant of the spurge family which is frugal in its growth needs and yet gives an "energy rich" harvest. Zah added that an additional advantage is that these methods do not compete with food production processes since these plants can be grown on land which is unsuitable for agricultural purposes.

Second generation biofuels for higher energy efficiency

Improvements are also to be expected in the production of biofuels, and the difference between those of the first and second generations is already enormous. The first group, which is currently commercially available, includes for example biodiesel derived from rape seed or bioethanol from sugarcane. During the manufacture of these products, however, only part of the vegetative matter used as the raw material is converted to biofuel. With biofuels of the second generation, on the other hand, more plant mass can be converted to the end product, so that wood and waste vegetative matter can be used as raw materials. This allows biofuel to be produced by such techniques as the environmentally friendly gasification of wood-to-methane process or the biomass-to-liquid (BTL) method. For these reasons 2nd generation biofuels boast significantly better life cycle balance values than their predecessors of the 1st generation.

One cannot, however, simply rely on biogenic fuels alone in order to ensure a low CO₂, climate neutral energy supply, regardless of how efficiently they can be manufactured, Zah warns. "Energy efficiency and other forms of renewable energy are at least as important in the future." Thus significantly greater usage of solar energy should, for example, be encouraged than has been hitherto the case.

Biofuels – the whipping boy for food price increases

Lukas Gutzwiller of the Swiss Federal Office of Energy (SFOE) also underlined the point that measures to improve energy efficiency are more important than renewable fuels. Gutzwiller, who analyses the pros and cons of biofuel usage from the government energy policy point of view, is of the opinion that the rise in food prices is due only in small measure to the increase in biofuel usage. "The real reasons are poor harvests due to drought, the changing nutritional requirements of many newly industrialized countries, high oil prices, falling food reserves and, in particular, speculation on the international agricultural commodities markets. The speaker suggested that, at a strategic energy policy level, both biofuels and sustainable biomass energy sources should be certified on the basis of a "renewable energy guideline". Gutzwiller preferred to leave open the question of whether or not Switzerland should encourage the production and use of biofuels in general. Instead he added his voice to those of the other speakers; "Climate change cannot be stopped by the use of biofuels! Energy efficiency is needed!"

The contribution of local agriculture to the Swiss fuel supply was the theme of the final presentation by Heinz Haenni, representing the Swiss Farmers Union. He too called for "realism" in the current, sometimes heated discussion. "Two years ago politicians and the media had nothing but praise for biofuels," he reminded the audience. "And now bioenergy is being condemned for being responsible for the world food shortage."

In Haenni's opinion the national potential for the production of biogenic fuels is in any case limited. Even if all available land were to be used for this purpose, at most ten percent of the current fuel consumed could be replaced by biogenic products. Of far more interest to him, on the other hand, is the idea that just six percent of the agricultural land of the country could be exploited to produce all the fuel requirements of the national farming community.

During both science apéros the discussions were very animated, and above all in St. Gall some participants expressed critical viewpoints. For example it was paradoxical to one participant that "...biofuels are subsidized, while at the same time people are encouraged to use their cars less!" In Duebendorf one member of the audience called for other power train systems to be encouraged instead of relying on biofuels.

Further information

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What is an Empa Science Apéro?

The EMPA Academy provides a forum for debating current scientific and socially relevant issues through its Science Apéros. Held at regular intervals, these usually involve three or four speakers with backgrounds in research, politics and commerce, who present results and trends relevant to the selected topic seen from their particular point of view. After the round of presentations, a lively discussion usually ensues involving the audience who may or may not be well versed in the theme under consideration. This continues during the aperitif after the formal proceedings come to a close.

Science Apéros are open to specialists and the public alike. Entry is free and no prior registration is necessary.

The current calendar of events can be viewed at: www.empa-akademie.ch/veranstaltungen

The next Science Apéro will take place on November 24th in the Empa Academy Building in Duebendorf on the topic «Nanotechnology – the risks and side effects»



Rainer Zah, Empa expert on biofuels, explains the role biogenic fuels might play in future energy supply scenarios.