

ENEA

Italian – Egyptian Workshop
Second Generation Biofuels

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Via Giulio Romano, 41

Final remarks

by Giuseppe Caserta,

Vice Chairman, Italian Biofuels Technology Platform

Thanks

First of all I wish to thank Enea for inviting me to this very stimulating workshop, and for giving me the chance to come back to my old house where some decades ago I started my adventure with biomass, biofuels, bioenergy together with a skilled team of researchers. Thanks a lot.

The Italian Biofuels Technology Platform

A few words about the Italian Platform. Following the EU Platforms, the Italian Platform was established two years ago by most of the national stakeholders which include Universities, research institutions, industries, non profit associations. The mission is twofold: (i) clarifying the present situation of biofuels for transport in Italy; (ii) pointing out the road map for the future development in close co-operation with national and international organizations. Of course, nowadays, the activity of the Platform is focused on providing the bases for writing a sustainable national action plan on biofuels for transport in the context of other RES.

The questions today

At the present, all over the world, many disputes, controversies, oppositions have been arising around the first generation biofuels, owing to some misunderstandings of the available data and of the real meanings of the question. The fundamental question is: how can we mitigate the negative environmental impact of transport fuels which contribute by more than one fourth to the GHG emission, as well as other noxious pollutants? It is proven that bioethanol and biodiesel are more environmentally-friendly than gasoline or gasoil. But how can we obtain them in a sustainable manner?

Data provided by many organisations are contradictory. The main reason for discrepancies lies on the fact that the results heavily depend on the conditions (land, climate, agricultural practices etc.) in which they are obtained. So, the first point to bear in mind is: no generalization is possible, that is, what is feasible in a given location may not be valid in another one. This leads to the concept that: (i) biofuels must be produced where it is possible, combining technical, agronomic and environmental concerns; (ii) the trade from producer countries to user countries should be favoured, flattening the barriers to import/export and harmonizing the trading rules.

As an example I would like to mention the Italian case.

Given the growth in transport fuel consumption, around 40 million tons of fuel may be used by 2020. In order to replace 10% (as energy content) of fossil fuels with biofuels, 5.5 million tons of biofuels (equivalent to 4.2 Mtoe) need to be provided, that is, 5 million hectares of agricultural land

would be used for dedicated energy crops, which represents 16.7% of the country's territory and to 60% of the currently crop growing land. Italy could produce maximum 800,000 -1,000,000 tons a years, using 600,000 hectares of agricultural land. This corresponds to 25,600 TJ, or 0.61 Mtoe (15%). The gap to achieve 4.2 Mtoe should be bridged by import.

Moving back to the world situation, the second point to be disproved is the statement that the biofuels are detrimental for the stability and accessibility of food-stuffs. By now, it should be clear that other socio-economic factors had influenced the price and the availability of commodities, since at the present only a small percentage of agricultural produces have been used for obtained biofuels. For the moment there is no threat for shortening foodstuffs or other primary products: in fact, only 1.5% of arable lands and 0.4% of the total agricultural lands are currently used for biofuels. The present warm disputes are, therefore, ungrounded.

The questions tomorrow

The compatibility of agro-fuels with agro-food could arise in the next decades when, according to some projections, the consumption of biofuels could reach 100-200 Mt/y (all over the world) in order to replace 20-25 % of fossil fuels for transport. As a matter of fact, the present production of biofuels relies worldwide on resources which are of use primarily for food, animal feed, forestry products etc. How could this huge amount be obtained without heavily interfere with non energy sectors?

This is the challenge of the so called "second", and also "third", generation of biofuels. What can we expect from these new approaches? The way forward is to exploit:

- waste material,
- abandoned agriculture lands,
- non food terrestrial plants,
- algae.

Each of these options has **pros** and **cons**.

Waste material, such as ligno-cellulosic residues or animal and urban sewage, are largely available, but they are currently used for generating thermal and electric energy which represent the major contribution of bioenergy (10-12%) to the present world primary energy need. Anyway, through a bio-refinery processes a multi-chains approach is possible.

A great unexploited resource is the abandoned agricultural lands. Last year the results of an investigation performed by the Stanford University of California – jointly with the Carnegie Institute for Research - was published showing that the planet is covered by an huge amount of abandoned agricultural lands which span from 385-472 Mha, – excluding those converted in new pastures or urban settlement - and which could provide additional 6-8% to the global primary energy balance, and may be sufficient for producing biofuels for the future needs. Last month I had the privilege to chair a Session - "Production of biomass for energy in abandoned agricultural lands and degraded lands"- of the World Bioenergy Clean Vehicle Fuels Congress in Stockholm; six speakers from Asia (Vietnam, India) Africa (Zambia, Gabon) and North Europe (Sweden) explained their programmes for recovering those lands with the main object to obtained biofuels from crops not used for human or animal feed.

Algae, are experiencing a renewed interest as feedstock for biofuels. According recent information gathered from many sources, about 100 organisations all around the world (industries, transport companies including aviations, scientific organisations) from New Zealand to the Netherlands are involved in this field. A recent news from Biofuels Digest reports that more than \$1 billion US

dollars have been privately invested into the development of algae technology companies in the past 24 months by companies like ExxonMobil, Shell, Chevron, Valero, Dow Chemical, ARCH Venture Partners, Wellcome Trust, Cascade, Venrock, Roda, Harris and Harris, Braemar Energy, Lightspeed, VantagePoint, Biofields, Valens, Laurus, Oak Investment Partners, Noventi Ventures, Gabriel Venture Partners, Valero, Shanghai Alliance Investment, Southern Utes, Infield Capital, I2BF, Bohemian Asset, and Quercus.

The main drawbacks are the production cost and the installation place: where can we install the algae factories? ponds on the ground? natural lagoons? brackish? bioreactors fed with waste water? The enormous number of algal species and strains will answer adequately the questions.

The pre-conditions for a successful development

I am pleased to report here some Recommendations for biofuels deployment by Veronique Hervouet, who chairs the Steering Committee of European Biofuels Technology Platform.

Veronique recommends:

- a) *A coherent, long term and harmonised political and open market framework to secure confidence of investors in capital-intensive innovative technologies;*
- b) *Joint public/private financing for R&D and Demonstration of new biofuels production routes and end-use applications;*
- c) *Biofuels quality standards based on sound science while not creating unnecessary barriers for biofuels deployment;*
- d) *Social awareness and acceptance gained by open communication on benefits as well as on potential limitations of biofuels;*
- e) *A simple, coherent and global certification system to ensure environmental, economic and social sustainability of biofuels production chains.*

I totally agree with the sentences of Veronique, and I would like to conclude my remarks saying that:

1. The next generation of biofuels looks promising and sustainable. But, it is obvious that, also in the future, the possible negative impacts that the use of biofuels could have on food chains should be carefully evaluated and analysed site-by-site, taking into account that for more than one or two decades the second generation of biofuels will be used together with the first generation.
2. Furthermore, when analysing demand, the possible evolution of the road transport sector ought to be taken into account, favouring the use of increasingly efficient engines and promoting policies for more competitive public transport services. These two factors may reduce the fuel demand and thus the demand for biofuels.
3. The success of biofuel policy will be assured only if a huge amount of investment on R&DD will be guaranteed. In 2007 a Report from UNFCCC estimates that, for reducing the global emissions of CO₂ by 2030, the quota of investment that might be ascribed to biofuels for transport is 158 bln \$ per year.
4. A close co-operation must be established at continental, as well as global level. In 2006 Italy promoted, and is managing very successful, the Global Bioenergy Partnership which include governmental bodies and is highly active in defining strategies, supporting measures, promoting projects in all bioenergy sectors, with special emphasis on biofuels for transport.
5. Together with the global view, territorial intervention policies are mandatory, based on the selection and diffusion of best practices as shown by ITABIA (Italian Biomass Association) through the EU Project called BITES (Biofuels Technology European Showcase). Matching the global vision with local actions is the key for the success, according to the slogan "Thinking globally, acting locally".

