EUBIA position paper on European transportation biofuels market perspective

After ILUC put in force, the development of second generation lignocellulosic biofuels produced from agro-forestry residues and other sustainable raw materials is being highly supported by European Commission (EC) and, in the global context, the International Energy Agency (IEA) highlighted in its Technology Roadmap Scenario that by 2050 second generation biofuels should provide 27% of total transport fuel, and avoid around 2.1 Gt CO_2 emissions per year.

To this end target, Biomass to liquids (BtL) technologies play a crucial role, as they allow to produce biofuels, like petroleum-derived fuels, starting from low quality, lignocellulosic material. Producing such biofuels from lignocellulosic residues, like agroforestry biomass, is now demonstrating to be advantageous not only to reduce the GHG emissions of transportation sector, but also to increase the valorisation rate of farm wastes and to bring a new income opportunity to the European farmers.

However, despite lignocellulosic biofuels production technologies have been operating at high TRL already for some years in Europe, there haven't been a real commercial development of the advanced biofuel sector. Nowadays, biochemical treatment technologies are the most developed at commercial level due to the lower cost achievable and to the technical development in the biomass fractionation sector. However, this sector presents important limits which hinder a further market growth. Two well-known limits of the present lignocellulosic fuels value chain can be summarized as:

The high feedstock market cost. The lack of economic competitiveness of lignocellulosic/advanced biofuels is mainly due to the raw feedstock collection and supply costs (low quality residual biomass costs from 40 to 70 €/t). Most of European companies working on lignocellulosic biofuels based their success not only on innovative fractionation, processing or upgrading technologies, but also on efficient supply chain able to secure a low-cost feedstock. This aspect limited the large-scale exploitation of the industrial plants.

The non-homogeneity of the feedstock. Many advanced biofuels dedicated production processes are strongly related to a restricted feedstock quality range. For this reason, the replicability of the innovative technologies and the related commercial plants is difficult and usually not convenient for producer companies. This brings to a slow commercial development of the process.

The high costs of the enzymes and the slow processes. Enzymes market cost, which achieve about 15 €/kg, represent 7-9 c€ per litre in the final product. Additionally, the fermentation process takes 30-90 hours and this represents a further limit for the industrial competitiveness.

The limits of this sector are well known by the Automotive industry, which is giving clear information regarding its approach to the future of transportation sector. The signal is represented by the great success registered by electric vehicles during the last years. This fast rate growth demonstrates that the present direction is not considered as a promising solution for a sustainable transportation

sector and the competition with electric cars, able to avoid not only CO_2 emissions but also PM production, is not feasible. For this reason, a specific change in the market strategy is needed.

In this context, EUBIA promotes the advanced biofuels sector and supports the target promoted by the European Commission regarding the 25 TWh (2.15 Mtoe) of biofuels production to be achieved by 2020. The target proposed in the Action 8 can be achieved through different production pathways and strategies, which could solve basic problems like the biofuels mixing rate with fossil fuels and the fuel availability.

EUBIA believes that the target expected for 2020 could be exceeded if the European Commission will start fostering the production of advanced biofuels from food waste and high value organic fraction of municipal solid waste. The valorisation of these types of residues into high value biofuels for transportation is feasible under specific conditions. This solution could bring to a new market, based on new advanced high quality pre-treatment technologies like hydrothermal carbonization, which will play a crucial role to make the feedstock homogenous and stable. Of course, it should be supported by specific action plan, focused on new incentives for food waste pre-treatment and upgrading companies, able to obtain adequate gate fee to produce competitive advanced biofuels through thermochemical conversion technologies.

The syngas obtained by thermochemical conversion of organic wastes is usually considered as an intermediate product to be postprocessed in F.T. reactors, or by gas fermentation to produce advanced liquid fuels. However, EUBIA believes that biofuels market sector could have great benefits with the introduction of upgraded syngas as advanced gaseous biofuel. The great success of fossil gaseous fuels like GPL and CNG in automotive sector should represent an opportunity for European biofuel industry. Additionally, the introduction of a new gaseous biofuels market in Europe could contribute to achieve the targets, mentioned in the Action 8. A dedicated Action plan, aimed to introduce gaseous biofuels as new advanced biofuels in Europe would open the gate to new opportunities for the biofuels sector.

The impact of this new strategy, in the context of EU targets, could be summarized as follows:

1. Increase conversion efficiency and facilitate the utilization in I.C. engines.

Gaseous biofuels could be 100% mixed in present natural gas engines after a due upgrading of the producer gas. The high mixing rate will contribute to the above-mentioned target of 2.15 MToe biofuels to be achieved by 2020.

The conversion efficiency to be increased of 30% by 2030 is a very ambitious target for the present industry sector. However, this objective can be achieved by thermochemical conversion technologies. Global process efficiency could be increased from 60 to 80% by avoiding the fermentation steps and considering syn-gas as the end marketable product. Of course, a dedicated value chain must be developed to avoid too high gas transportation and storage costs.

2. Reduce the advanced biofuels production costs

Targets reported in the Action plan are the following:

- Liquid or gaseous advanced biofuels by thermochemical or biochemical processing: <50 €/MWh in 2020 and <35 €/MWh in 2030 e.g. at least by 30% from 2020 levels
- Algae based advanced biofuels <70 €/MWh in 2020 and <35 €/MWh in 2030 e.g. at least by 50% from 2020 levels

EUBIA agrees on the estimated advanced biofuels costs reduction, however, we strongly believe that it can be achieved only with a market direction change. We consider that the lower market cost for biochemical treatment produced biofuels won't decrease under the threshold of 40€/MWh, and that this target could be achieved not before 2050.

At the contrary, gaseous fuels could achieve a competitive production cost if produced large scale plants (about 400 MWth), which could be around 30-35 €/MWh within 2030.

Algae based advanced biofuels can be considered sustainable only if produced by low temperature fermentation in large scale anaerobic digestion facilities and commercialized as gaseous biofuel. Otherwise, EUBIA doesn't consider liquid biofuels from algae a sustainable solution for the future European transportation sector.

3. Reduce the GHG production related to the use of liquid biofuels.

The organic waste-based gaseous fuel production strategy could bring to a strong reduction of GHG emission in transport sector. The utilization of humid organic wastes which are usually landfilled or burned for advanced gaseous biofuels production could bring to negative CO2 emission, thus avoiding CO2 from the atmosphere.