

Biofuels

Greenhouse and energy dependence, these are the issues that underlie the conference organized by the Club Donegani at the Sala Leonardo East Sesia on May 19th, which saw as speaker the director of Eni Donegani ofi Novara Dr Carlo Perego.

The exponential growth of CO₂ emitted into the atmosphere by human activities over the last decade (from 27 billion tonnes in 2004 to 34 in 2012) seriously worries industrial economies around the world. Europe, to limit the increase of CO₂ to fuels for cars traction, has issued a series of directives that require blending of traditional fossil fuels (gasoline and diesel), with similar fuels derived from plant biomass, provided are not obtained at the expense of crops and land under food market.

Which the response of the research and technology ENI?

Dr Perego says: "In Europe, following the gradual spread of the diesel engine, the ratio diesel / gasoline is constantly increasing. For this reason Eni research efforts in biofuels field are mainly aimed at the biodiesel. "

Contrary to bioethanol produced by M & G Tortona by fermentation of sugars derived from cellulose residues, biodiesel currently additive to conventional diesel is obtained from vegetable oils (canola, palm etc.), the same that we use at the table, by chemical reactions of transesterification. This fuel, however, has some defects which limit the percentage of additives added. ENI in collaboration with the American company UOP has developed a technology called Ecofining that allows, through a chemical process of hydrogenation of vegetable oils themselves, to get the Greendiesel, a fuel with properties far superior which make it compatible with traditional diesel and allow unlimited amount of addition, more than the 10% indicated by the European legislation. This technology has landed in Venice refinery, which was recently converted into a green bio-refinery with a full production of 600,000 tons of Greendiesel. While the raw material is still made up of vegetable oils of first generation, namely food, and most imported, on the other hand the great flexibility of the process allows to exploit in perspective fats resulting from the most disparate materials and overcome these limitations. To achieve the purpose, Eni research has fielded a portfolio of projects conducted in part or totally in Donegani Institute to find materials and alternative processes which produce the fat to be worked in biorefinery. A first approach provides for the transformation of plant biomass, agricultural wastes etc., into sugars which can then be fermented to oil by suitable microorganisms. Alternatively, the biomass can be treated with thermal processes which include both the liquefaction and pyrolysis to obtain bio-oils, complex mixtures of products which can then be processed into fuel, both the gasification and subsequent reaction of the Fischer-Tropsch to obtain hydrocarbon fuels . Finally, another source of oils suitable for processing into diesel fuel can be derived from microalgae grown in tanks and fed with CO₂ and industrial waste water which consequently are partially purified. An exciting development of these projects is the transformation of organic waste into bio-oil and fuel. Currently Italy produces about 23 million tons of organic waste, of which only 45% is recycled or converted into energy against a ca 99% of Germany, now become the standard. The industrial-scale application of these processes, which is still at the stage of laboratory and / or pilot plant, thus represents in perspective a viable solution to alleviate the burden of three fundamental emergencies: waste disposal, reducing greenhouse gas emissions and energy independence.

By Abis Luigi