



BECOOOL

Brazil-EU Cooperation for Development
of Advanced Lignocellulosic Biofuels

BECOOOL is a new Horizon 2020 project that will foster cooperation between Europe and Brazil in the development of advanced biofuels from sustainable agricultural value chains, based on lignocellulosic biomass.

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Coordinated by the University of Bologna, Department of Agricultural Sciences, the four-year BECOOL project will be carried-out by a consortium of thirteen partners from seven EU countries, including universities, research institutes, industries and SMEs.

A TWIN PROJECT IN BRAZIL

The activities of BECOOL will be aligned those of BioVALUE, a twin project in Brazil, funded by five State Foundations (FAPESP from São Paulo state, FAPEMIG from Minas Gerais state, FAPERJ from Rio de Janeiro state, FACEPE from Pernambuco state, and FAPERGS from Rio Grande do Sul state) and five Industrial Companies (Petrobras, Fibria, Klabin, Boeing, and Embraer), with 12 research institutions and universities partners, coordinated by the Brazilian Bioethanol Science and Technology Laboratory (CTBE) of the Brazilian Center for Research in Energy and Materials (CNPEM).

Building on existing complementarities in scientific expertise and experience between EU and Brazil in the development of advanced biofuels, the two projects will adopt a synergistic work programme, to develop a series of research and demonstration activities, covering the entire value chain in a balanced way: from innovative biomass production and logistics, to efficient conversion pathways and exploitation.

The cooperation between Europe and Brazil on advanced biofuels will bring mutual benefits and will create synergies at scientific level that will help to exploit the full economic potential of advanced biofuel value chains, while creating unique opportunities for both Brazilian and European companies.

OPTIMIZED BIOMASS VALUE CHAINS

A lesson learned from existing biofuel value chains, both in Europe and in Brazil, is that sustainable, reliable, and affordable biomass production logistics are often a big conundrum.



In the EU, advanced biofuels can be produced from annual and perennial lignocellulosic crops and from crop residues such as cereal straw. Crop residues have a large potential in Europe, however using only crop residues often creates problems of logistics and of biomass supply to large industrial plants, due to fluctuations in yields, local availability and prices. Land pressure of biofuel plants could be reduced by adopting different and complementary cropping strategies that integrate food and biofuel crops production aimed at increasing the productivity of lignocellulosic biomass and at improving the logistics of the value chains.

Brazil is speeding up the commercial implementation of advanced biofuel production, currently focused on sugarcane bagasse, with short-term perspectives to diversify the feedstock with eucalyptus, energy cane and sugarcane residues. Using sugarcane bagasse and straw to produce cellulosic ethanol would dramatically increase the total ethanol yield per unit land. It has been estimated, for example, that by transforming only half of the available bagasse and straw into ethanol, the Brazilian ethanol output would increase by at least 50%.

Harmonizing and optimizing the entire value chains by improving the logistics and the efficiency of conversion processes, would dramatically increase the sustainability and profitability of advanced biofuels. In this context, one of the main objectives of BECOOL and BioVALUE is to demonstrate a realistic approach of integrated and logistically efficient supply systems, based on the use of both crop residues and high-yield lignocellulosic crops. The two projects will set up innovative cropping systems based on annual and perennial lignocellulosic crops, to increase feedstock availability for advanced biofuel plants without competing for land with food crops.

INCREASED CONVERSION EFFICIENCY

In parallel, the two projects will develop ways to increase the conversion efficiency of biomass to advanced biofuels, by optimizing and integrating thermochemical processes to convert the lignin-rich by-products of advanced biofuel plants, into bio-oil, syngas and into additional fuel products. This will represent a major process improvement, for example, in second generation ethanol plants, where currently lignin is a still a low-value by-product, which is utilized only for power generation.

Another project component will develop innovations in the pre-treatment and in the fermentation of lignocellulosic feedstock, to increase the ethanol yield while at the same time improving the chemical-physical characteristics of the lignin rich co-product, for its further upgrading to advanced biofuels.

Finally, the two projects will perform a detailed sustainability assessment of the value chains and an integrated market analysis in order to foster the scientific and commercial exploitation of the results.

MEMBERS

The members of BECOOL consortium are:

University of Bologna (Italy, coordinator)

Biochemtex s.p.a. (Italy)

Biomass Technology Group (The Netherlands)

Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain)

Centre for Renewable Energy Sources and Saving (Greece),

Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria (Italy)

Deutsches Biomasseforschungszentrum Gemeinnützige GmbH - DBFZ (Germany)

Energy Research Centre of the Netherlands (The Netherlands)

ETA-Florence Renewable Energies (Italy)

Internationales Institut für angewandte Systemanalyse (Germany)

Consorzio per la Ricerca e la Dimostrazione sulle Energie Rinnovabili (Italy)

Wageningen University & Research (The Netherlands)

Teknologian tutkimuskeskus VTT Oy (Finland)



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