

Welcome to the first newsletter of the Integrated Project BIOSYNERGY on biorefineries, co-funded under the 6th Framework Programme for Research and Technological Development of the European Communities.

Why BIOSYNERGY?

The sustainable exploitation of European natural resources for the production of fuels and chemicals is the key driver for the BIOSYNERGY team. The production of fuels for transport and – to a lesser extent – of power and heat from biomass is still more expensive than from conventional fossil resources. The goal of BIOSYNERGY is to develop a sound techno-economic process for integrated production of fuels, chemicals, power and heat from biomass. These products should have similar or equal properties as those obtained from fossil resources.

BIOSYNERGY seems to come just at the right time. The June 2006 Transport, Tele-communications and Energy Council (10042/06) welcomed the Commission Communication on a Biomass Action Plan /COM(2005) 628/ and identified research, development and demonstration on second-generation biofuels and biorefineries as a particular priority. The Spring 2007 European Council (7224/07) endorsed the ambitious quantitative targets on energy efficiency, renewable energies and use of biofuels in the EU, proposed in the Commission's Integrated Energy and Climate Change Package "Energy for a Changing World", and stressed the importance of commercial availability of second-generation biofuels by 2020.

What is BIOSYNERGY?

BIOSYNERGY stands for **BIOM**ass for market competitive and environmentally friendly **SYN**thesis of bio-products – chemicals and materials – and production of ancillary **ENERGY** products – fuels for transport, power and heat – through a biorefinery approach, using advanced fractionation and conversion processes, combining biochemical and thermo-chemical pathways, and process development from lab-scale to demonstration at pilot-scale. BIOSYNERGY will serve as a demo-concept for later construction of larger facilities for integrated production of industrial-scale volumes of fuels, chemicals, power and heat from a range of biomass feedstocks. BIOSYNERGY will investigate the most promising

technologies for a "bioethanol side-streams" biorefinery, building on the ligno-cellulose-to-bioethanol pilot plant of Grencell S.A., currently under construction in Salamanca (Spain).



Grencell's bioethanol pilot-plant under construction at Babilafuente (Salamanca, Spain)

BIOSYNERGY's objectives and approach

BIOSYNERGY aims to develop advanced technologies for physical/chemical fractionation of various biomass feedstocks for further downstream processing. The biomass feedstocks assessed will be pre-treated straw, dried distillers grains with solubles (DDGS) from Abengoa's conventional ethanol plant, as well as straw and clean wood (as typical European biomass streams). Innovative technologies for thermo-chemical and biochemical conversion of biomass feedstocks into intermediate products (butanol, phenolic oils, furfural, etc.) will be investigated. Finally, the downstream processing of biomass-derived intermediates into value-added chemicals and fuels will be researched applying integrated biomass-to-products chain design, analysis and optimisation.

To meet these research goals, the project team will perform lab-scale experiments and pilot-scale demonstrations of biorefinery sub-processes – physical/chemical fractionation, thermo-chemical and bio-chemical conversion and fuel and product synthesis. The fundamentals of an innovative biorefinery process, based on cellulose-derived ethanol, where the residues are upgraded to value-added products (chemicals, power, heat), will be unveiled. These scientific achievements will be widely disseminated e.g. by training people in

relevant industries, research institutes and universities, organisation of workshops, etc. All in all, the BIOSYNERGY team intends to design a pathway to integrated refinery processes for co-production of fuels for transport, chemicals, power and heat from biomass by performing integral biomass-to-products chain design, analysis and optimisation. The analysis will cover the techno-economic, environmental and social aspects of biorefinery processes.

The work in the project is divided into nine inter-related Work Packages (WP):

- WP0:** Management activities
- WP1:** Advanced physical / chemical fractionation
- WP2:** Innovative thermo-chemical conversion
- WP3:** Advanced biochemical conversion
- WP4:** Innovative chemical conversion and synthesis
- WP5:** Conceptual design of Greencell's biorefinery pilot plant in Salamanca
- WP6:** Integral biomass-to-products chain design, analysis and optimisation
- WP7:** Demonstration at pilot-scale
- WP8:** Training of people and knowledge dissemination

The total budget of BIOSYNERGY is 13.4 M€. The project receives financial support from the Sixth Framework Programme for Research and Technological Development of the European Communities (Contract No. 038994 / SES6). The Communities' financial contribution is up to 7.0 M€ in the form of a grant to the budget.

BIOSYNERGY started on 01.01.2007 and will last for four years, until the end of 2010.

The participants in BIOSYNERGY

The project consortium includes 17 partners from industry, academia and research from 10 EU countries:

- ECN** – Energy research Centre of the Netherlands (NL) – project coordinator
- GREENCELL** – Abengoa Bioenergy through its subsidiary Greencell S.A. (ES)
- CEPSA** – Compania Espanola de Petroles S.A. (ES)
- DOW** – DOW Benelux B.V. (NL)
- VTT** – VTT Technical Research Centre of Finland (FI)
- ASTON** – Aston University (UK)
- A&F** – WUR Agrotechnology and Food Innovations B.V. (NL)
- ARD** – Agro Industrie Recherches et Developpements (FR)
- IFP** – Institut Français du Pétrole (FR)
- CRES** – Centre for Renewable Energy Sources (GR)
- BTG** – Biomass Technology Group (NL)
- JR** – Joanneum Research (AU)
- BIOREFINERY** – Biorefinery.de (DE)

- GIG** – Central Mining Institute (PL)
- JRC** – Joint Research Centre – Institute for Energy (NL)
- CHIMAR** – Chimar Hellas S.A. (GR)
- TUD** – Delft University of Technology (NL)

Current status of BIOSYNERGY

The kick-off meeting of BIOSYNERGY, on 6 and 7 March 2007, Brussels, gathered all project partners and involved Commission officials. The emphasis in the presentations and discussions during the kick-off meeting was on the work to be performed over the first 18 months of the project



Participants in the BIOSYNERGY kick-off meeting

After the initial start up phase the R&D is well underway in particular in the 'upstream' Work Packages 1 and 2 and in Work Packages 5 and 6.

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