TEXBIAG

Decision-making tools to support the development of bioenergy in agriculture

DURATION OF THE PROJECT
Phase 1: 15/12/2006 – 31/01/2009
Phase 2: 01/02/2009 – 31/01/2011

BUDGET
767.473 €

KEYWORDS
Bioenergy, agriculture, environment, socio-economic impacts, computer modeling, prediction tool

CONTEXT

Bioenergy from agriculture is today in the heart of sustainable development, integrating its key components: environment and climate change, energy economics and energy supply, agriculture, rural and social development.
Fighting against climate change imposes the mitigation of greenhouse gases. Considerable efforts have to be pursued, especially in the field of energy production and use. Recent energy crises have reminded our policy and economic decision makers of the importance of energy, of a secure and diversified energy supply in our economies. Agriculture in Europe is at a turning point, leading to important questions about the diversification of agricultural productions and sources of incomes for farmers, the use of rural and arable lands for food and non-food crops, the contribution of agriculture to climate change fighting and renewable energy supply.

PROJECT DESCRIPTION

Objectives

The final objective of the project is to lead to an actual and significant contribution of bioenergy from agriculture to the mitigation of greenhouse gases emission, to a secure and diversified energy supply and to farmers' incomes and rural development.
To reach this final objective, the TEXBIAG project will develop three specific tools:

1. A database of primary quantitative data related to environmental and socio-economic impacts of bioenergy from agriculture integrating biomass logistics;
2. A mathematical model "monetarizing" bioenergy externalities from agriculture;
3. A prediction tool assessing the impacts of political decisions made in the framework of the development of bioenergy from agriculture on different economic sectors (energy, agriculture, industry, and environment).

Methodologies

Applying the principles of the systemic methodology, the project implementation is structured as follows :

Task 1. Database construction:
- Conception of the database, in collaboration with the partners in charge of the development of the decision-making tools;
- Data and model collection from literature and measurements for missing data and filling the database with collected information and operation;
- Survey and analysis of existing studies carried out on logistics of biomass supply chain from agriculture;
- Feed-back from the decision-making tools and adaptation/ updating of the database.

Task 2. Externalities monetary value model:
- Contribution to database construction through a continuously improved model;
- Analysis of existing studies and models, comparison and evaluation;
- Building of a qualitative model to put in evidence causal relationships (detection of induced effects);
- Costs / revenues analysis in order to reach monetary valuation;
- Building of a quantitative externalities monetary value model.

Task 3. Policy prediction tool, based on an existing model:
- Addition to the existing tool of new targets, such as job creation (direct and indirect employment), rural development, energy supply security, added value, and other externalities;
- Addition of technology routes not yet considered in the previous model (DME, hydrogen, biogas, biorefineries, etc.);
- Addition of missing commodities such as water and other relevant externalities;
- Modelling of non-linear perturbations effects: electricity system, refineries, secondary products such as animals feeds, agro market perturbation, etc;
- Addition of the externalities monetary value model;
- Addition of potential policy measures in the existing model (quotas, subsidies, other measures,..).

Task 4. Dissemination and valorisation of the results of the project:
- Making a user friendly interface to use the software tool (data access & update, policy measures, sensitivity analysis);

TEXBIAG

Decision-making tools to support the development of bioenergy in agriculture

- Dissemination of the results through communications tools (brochures, posters, website, conferences, workshops, etc).

CRA-W is task leader for Tasks 1 and 4 and is coordinator of the project.
VUB is task leader of Task 3.
FUNDP is task leader of Task 2.
KUL assists VUB in the execution of Task 3.
VUB, FUNDP, KUL assist CRA-W in the execution of Task 4.

LINKS WITH INTERNATIONAL PROGRAMMES

The project is directly related with the Bioenergy Agreement of the International Energy Agency (IEA Bioenergy), whose work, focusing on research, development and demonstration, is now increasingly also emphasizing on a large-scale and worldwide deployment. The project will especially operate along with the following horizontal tasks :

Task 29 : Socio-economic drivers in implementing bioenergy projects
Task 38 : Greenhouse gas balances of biomass and bioenergy systems
Task 40 : Sustainable bioenergy markets, trade and resources.

EXPECTED RESULTS

The long-term impacts of the project are expected to be:

1. An increase of the level of awareness among policy makers regarding policy gaps and policy implementation issues in Belgium regarding bioenergy from agriculture;
2. The implementation of policy reinforcement and policy implementation guidelines in renewable energy;
3. Stimulation of rural development by creating employment opportunities in relation to the implementation of bioenergy projects from agriculture;
4. An improvement of the local environment and living conditions through the introduction of modern and efficient bioenergy technologies;
5. An improvement of the global and local environment through the introduction of modern and efficient bioenergy technologies by reducing the air emissions associated to fossil fuels combustion hereby reducing the amount of Greenhouse Gases (CH_4 and CO_2) emissions.

PARTNERS

CRA-W is a public research institution founded in 1872 active in agricultural and natural resources R&D as well as scientific and analytical services. CRA-W is a leading institution in bioenergy R&D projects for more than 25 years.

The dept. of Mechanical Engineering at the VUB has been active in the field of bioenergy for some 15 years. Study of liquid biofuels has been initiated in 2002. The dept. has participated in several projects at European, national and regional level. Besides technical projects, the dept. has been continuously involved in technology assessment and policy making projects.

The University of Namur (FUNDP) is a Jesuit University founded 175 years ago. Besides a recognized high-level pedagogy, the university has developed recognized research centres. Among them, several are dedicated to economical and managerial sciences.

The research group ELECTA from the Electrical Engineering Department from the KULeuven conducts research on the production, transmission, distribution and intelligent consumption of electrical energy. The group is also part of the KUL Energy Institute. They are involved in many different technological and policy oriented research projects linked to liberalisation of the electricity market, including the move to more sustainable electricity production.

CONTACT INFORMATION

Coordinators

Yves Schenkel & Florence Van Stappen
Centre wallon de Recherches agronomiques (CRA-W)
Département Génie rural – DGR
Chaussée de Namur, 146
B-5030 Gembloux
Tel : +32 (0)81 627 148 or 081 627 185
Fax : +32 (0)81 615 847
schenkel@cra.wallonie.be
vanstappen@cra.wallonie.be
www.cra.wallonie.be

Promoters

Jacques Deruyck, Svend Bram & Thomas Neven
Vrije Universiteit Brussel (VUB)
Pleinlaan, 2
B-1050 Brussel
Tel : 02 629 2393
Fax : 02 629 2865
jdruyck@vub.ac.be

Annick Castiaux & Isabelle Brose
Facultés Universitaires Notre Dame de la Paix (FUNDP)
Business Administration Department
Rempart de la Vierge, 8
B-5000 Namur
Tel :+32 (0)8172 48 80 or (0)8172 53 15
Fax +32 (0)8172 48 40
annick.castiaux@fundp.ac.be
isabelle.brose@fundp.ac.be
www.fundp.ac.be

Johan Driesen
Katholieke Universiteit Leuven (K.U.Leuven)
Department Electrical Engineering
Research group Electrical Energy
ESAT-ELECTA
Kasteelpark Arenberg 10
B-3001 Heverlee - Belgium
Tel: +32 (0)16 32.10.20 or (0)16 32.10.24
Fax: +32 (0)16 32.19.85
johan.driesen@esat.kuleuven.be
http://www.esat.kuleuven.be/electa

Follow-up Committee

For the complete and most up-to-date composition of the Follow-up Committee, please consult our Federal Research Actions Database (FEDRA) by visiting http://www.belspo.be/fedra or http://www.belspo.be/ssd

SSD SCIENCE FOR A SUSTAINABLE DEVELOPMENT

Belgian Science Policy • Wetenschapsstraat 8 Rue de la Science • B-1000 Brussels
Tel. +32 (0)2 238 34 11 • Fax +32 (0)2 230 59 12 • www.belspo.be/ssd
Contact: Anne Fierens

ENO5

ENERGY