BIO-ENERGY CHAINS FROM PERENNIAL CROPS IN SOUTH EUROPE

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THE ''BIOENERGY CHAINS'' PROJECT

THE AIM of the project is: to evaluate, in terms of technical, financial /economic and environmental feasibility, the whole bioenergy chain from biomass production to thermochemical conversion for a number of perennial energy crops carefully selected to ensure, by successive harvesting, a year-round availability of raw material"

THE CONSORTIUM		AREAS OF RESEARCH
CRES - Center for Renewable Energy Sources	Greece	Biomass production
UPM - Politechnic University of Madrid	Spain	"
INRA	France	"
UNIBO –University of Bologna	Italy	"
ASTON University	U.K	Thermochemical conversion
VT-TUG	Austria	"
BTG	Netherlands	"
AUA – Agricultural University of Athens	Greece	Financial/economic assessment
IUS	Germany	Environmental assessment
IFEU	Germany	"

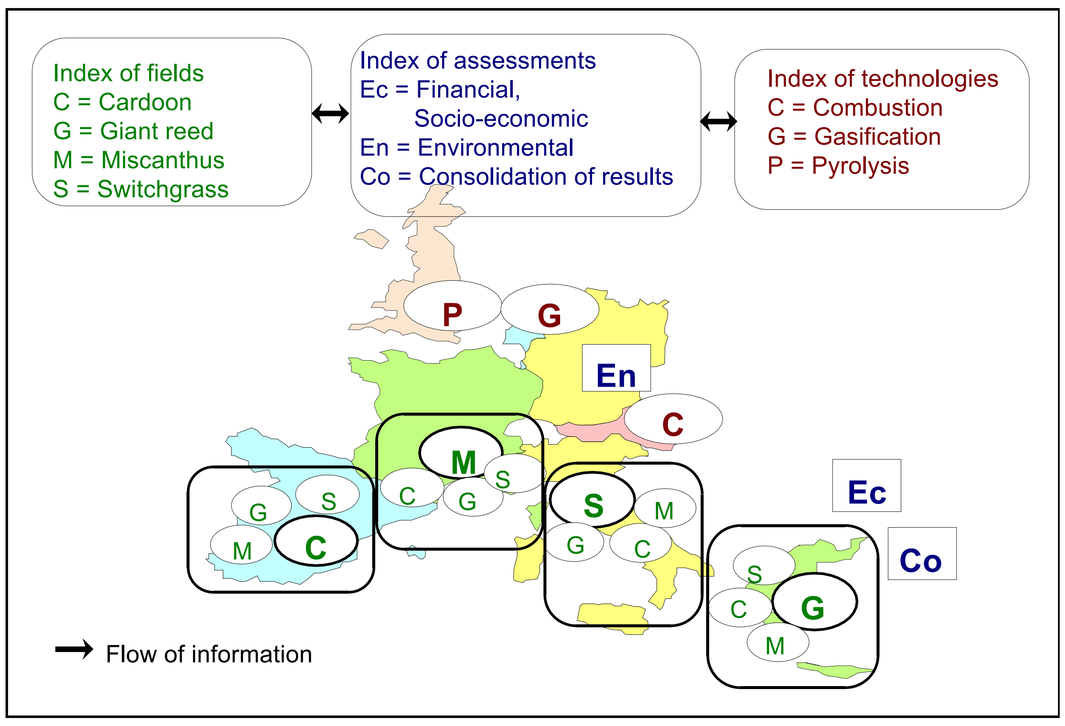

Figure 1: Index of field trials, technologies tested and assessments.

BIOMASS PRODUCTION

4 perennial crops will be cultivated in 4 south European countries, in large fields of 10 ha:

Arundo donax (giant reed) in Xanthi, Greece (by CRES)
Cynara cardunculus (cardoon) in Madrid, Spain (by UPM)
Miscanthusxgiganteus (miscanthus) in France (by INRA)
Panicum virgatum (switchgrass) in Italy (by UNIBO)

Three smaller fields of about 0.25 ha each will additionally be cultivated in each country, with all set of crops.

The selected perennial crops exhibit one critical advantage: in the climatic conditions of the south Europe they can be harvested successively, covering thus up to a period of 9 months (Figure 2). This offers the potential for a year round availability without the need to store large quantities of material.

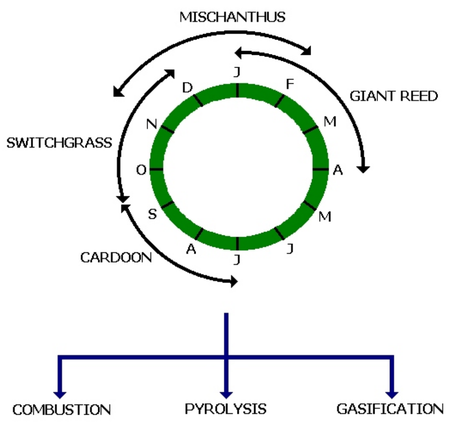

Figure 2: Successive harvesting

Switchgrass

Giant reed

THERMOCHEMICAL CONVERSION

The harvested biomass from the four perennial crops will then be used as a feedstock for:

COMBUSTION TESTS at the lab-scale furnace of VT-TUG and in a pilot scale combustion unit,
PYROLYSIS TESTS in Aston University, and
GASIFICATION TESTS at laboratory and pilot-scale gasifiers of BTG.

Miscanthus

Cardoon

FINANCIAL/ECONOMIC ANALYSIS OF CROPPING SYSTEMS will cover:

Economic analysis of cropping systems.

Economics of transport, supply and energy generation.

Analysis of all direct and indirect energy costs associated with growing the crops and generating the electricity.

Financial analysis of all combinations of crops in each site.

ENVIRONMENTAL ANALYSIS will involve:

Assessment of environmental impacts using Environmental Impact Assessment and Life Cycle Assessment.

Modelling of dependencies and sensitivities.

Identification of the best options.

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