



Biosit - GIS-based planning tool for greenhouse gases emission reduction through biomass exploitation

LIFE00 ENV/IT/000054



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#### Contact details:

Project Manager: Francesco MARTELLI  
Tel: +39 055 47 96 237  
Fax: +39 055 47 96 342  
Email: [martelli@ing.unifi.it](mailto:martelli@ing.unifi.it)

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#### Project description:

##### Background

The scientific community has come to the conclusion that greenhouse gas concentrations in the atmosphere due to anthropogenic activities, will increase the average planetary temperature with serious consequences for the stability and balance of the climate. A key priority of the 6th Environment Action Programme of the European Community will be the implementation of the Kyoto Protocol to cut greenhouse gas emissions by 8% over 1990 levels by 2008-2012. This must be considered as a first step to the long-term target of a 70% cut. The combustion of fossil fuels is one of the main sources of greenhouse gas emissions. On the contrary, the cycle of growth and combustion of biomass is short enough to be considered a zero level carbon dioxide production. Promoting the use of renewable energy instead of fossil fuels is one of the areas of action of the European Community to combat climate change. This project targets the reduction of greenhouse gas emissions, by implementing and validating a GIS-based planning tool for biomass exploitation in thermal plants.

##### Objectives

The aim of the project was to design, implement and validate an innovative GIS tool to optimise land-use development and planning for the effective exploitation of biomass resources as combustible in thermal power plants. The

project was to promote the efficient management of forestry and agricultural land, and the integration of agriculture with industrial activities, thus contributing to sustainable and socio-economic development. Furthermore, it would evaluate biomass productivity as well as the optimal locations for biomass plants in Tuscany. The tool would also calculate the expected CO<sub>2</sub> emission reduction from bioenergy. The GIS, integrated with the Regional Energy Plan, would support the local authorities (regional department, energy agencies) involved in environmental management and energy planning, to define and implement a strategy in support of clean and green energy production.

## Results

The project designed, implemented and validated a GIS tool to optimise land-use development and planning for the effective exploitation of biomass resources as combustible in thermal power plants. The project promoted, through dissemination at the regional level, the efficient management of forestry and agricultural land, and the integration of agriculture with industrial activities, thus contributing to sustainable and socio-economic development. The project evaluated biomass productivity as well as the optimal locations for hypothetical biomass plants in Tuscany. The tool can also calculate the expected CO<sub>2</sub> emission reduction from the utilisation of bio-energy. The intention was that the GIS, integrated with the Regional Energy Plan, would support the local authorities (regional department, energy agencies) involved in environmental management and energy planning, to define and implement strategy in support of clean and green energy production. This tool was made available to the Regional Authorities, however to date it has not been included in the Regional Energy Plan.

2. Environmental policy and legislation implications The EU directive 2001/77 – Promotion of electric power produced by using renewable energy sources - is of particular relevance to the activities of the project.

3. Innovation, demonstration value The innovative aspect of the project is a practical application of the territorial data processing system (GIS) for planning policies regarding biomass exploitation. To date GIS use for biomass has always been applied by resources institutes and universities but never by the public bodies interested in getting a real benefit from the state of the art technologies. However, since the project does not use a new technology, the innovation can be described as being average. Progress in relation to the present situation is also described as average: supplementary activities are required, independent of the LIFE programme, in order to bring lasting and significant changes to the state of environment. The potential for reproducing the project methodology is considerable (biomass is one major option for CO<sub>2</sub> reduction) and the dissemination of activities is therefore a key aspect.

4. Socio-economic effects The impact of bio-energy on employment is a peculiar feature of this type of renewable energy. It is estimated that biomass can generate at the EU level: · 8 new jobs per Mwe (short rotation forestry) · 5,5 new jobs per Mwe (herbaceous crops) (source: EUBIA, European Biomass Industry Association) These jobs are permanent (more than 400.000 potentially net new jobs). In Tuscany, the expected new jobs created by the potential exploitation of biomass is estimated to be around 5.700 new jobs.

5. The future: sustainability and continuation of the project + remaining threats The future development of the project methodology depends on the practical application by the Regional Authorities of the BIOSIT tools within their Energy Plan. All the elements to do so were made available by the LIFE project however

the actual implementation was beyond the actual scope and objective of the project and is more a case of the political willingness of the public administrators. The project partner, ETA, organised the 2nd World Conference and Technology Exhibition on Biomass for Energy, Industry and Climate Protection on 10-14 May 2004. At that occasion, the project results were disseminated. 6. Long term monitoring indicators (for ex-post evaluations) The actual use of the tools developed by the project and their integration in the regional energy plans will be the main long-term indicators. According to latest information from the LIFE external monitoring team in 2005, project partner, ETA Renewable Energies, a privately-owned company in Florence, organised the 2nd World Conference and Technology Exhibition on Biomass for Energy, Industry and Climate Protection held on 10-14 May 2004, in Rome, Italy. The LIFE project results were disseminated at this important international gathering. More recently, following the localisation of biomass resources in Tuscany, two more power plants are to be built in the Mugello area. The size of the plants < 0.5 MW has been set according to local energy demand. See the project website, which remains active at: <http://www.etaflorence.it/biosit/>.

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Environmental issues addressed:

Themes

Land-use & Planning - Forest management

Energy - Supply

Land-use & Planning - Spatial planning

Keywords

land use planning, geographic information system, emission reduction, forestry, greenhouse gas, biomass energy

Target EU Legislation

- Climate Change & Energy efficiency
- COM(2000)87 - "Green Paper on greenhouse gas emissions trading within the European Union" (08.03.2 ...
- COM(2000)88 - "Towards a European Climate Change Programme (ECCP)" (08.03.2000)
- "Kyoto Protocol to the United Nations Framework Convention on Climate Change - Declaration Offici ...

Natura 2000 sites

Not applicable

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Beneficiaries:

Coordinator	Universita' di Firenze Dipartimento di Energetica
Type of organisation	Research institution
Description	The Department of Energetics (DE) of the University of Florence was founded in 1983 thanks to the efforts of Professor Sergio Stecco. Prof. Stecco's scientific proposal to constitute a group which would develop and coordinate scientific research in the field of the energy conversion, power plants and machinery used within these processes, linked together the sectors of Power Plants, Heat Transfer and Thermodynamics, Mechanical Plants and a part of the sectors of Numerical Analysis, Chemistry and Physics. All these different skills and knowledge are necessary to study all the aspects of energy conversion in their whole complexity and differences. The activity has recently been extended to consider the environmental impact of power plants, modelling and control of environmental integration of energy system and energy/environment optimisation strategy.
Partners	DEART ( <a href="http://www.deart.unifi.it">http://www.deart.unifi.it</a> ) Dep. of Agricultural and Land Economy Florence University ETA Energie Rinnovabili (ETA Renewable Energies, private company located in Florence)

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Administrative data:

Project reference	LIFE00 ENV/IT/000054
Duration	01-OCT-2001 to 01-OCT -2003
Total budget	442,488.00 €
EU contribution	215,390.00 €
Project location	Toscana(Italia)

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Read more:

Publication: Book

Title: BIOSIT: Una metodologia GIS per lo sfruttamento efficiente e sostenibile della "risorsa biomassa" a fini energetici. Author: LIFE Biosit Project Year: 2003 Editor: Iacopo Bernetti and Claudio Fagarazzi No of pages: 290

Publication: Layman report

Title: BIOSIT/ A GIS based methodology for a sustainable and efficient exploitation of biomass for energy use/BIOSIT: Una metodologia GIS per lo sfruttamento efficiente e sostenibile della "risorsa biomassa" a fini energetici. Author: LIFE Biosit Project Year: 2003 Editor: ETA Energie Rinnovabili, Italia No of pages: 28

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