

Environmental-Energy-Plan (EEP) of the province of Cremona (Northern Italy)

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The purpose of the project, carried out in 2003-04 for the local government of the province, is to outline the local energy budget, analyse energy resources (one of the most important indicator of economic trend), evaluate related environmental aspects (indicators of life quality) and define the sectors where the local government can intervene to foster sustainable development. The project has been carried out following the Local Agenda21 process: all the stakeholders (from energy experts, to representatives of local organizations to interested private citizens) have been involved since the beginning, during the Agenda21 forums and the software was used by a variety of people to support discussions and reach a consensus on the development plans. It is being also used to monitor the development and execution of the selected plan, targeting the emissions of the Kyoto Protocol.

The database, enriched during all the procedure, contains the information about local energy and environmental resources as well as many other related topics (land morphology, hydrography and meteorology, environmental indexes, such as concentrations of pollutants, demographic indexes, forestry and agricultural asset, descriptors of productive activities as numbers of farms, factories and tertiary activities, road network, vehicle fleets, traffic, and fuel consumption). All the data have been documented including metadata such as data provider and storage date.

The spreadsheets calculates and represents all the aspects of the plan retrieving information from the database and managing it according to the logical scheme shown in Figure 4, which is also part of the user interface. It shows data tables, calculation sheets (with intermediate results), and the parameters necessary to define an energy scenario (again represented by ovals). The main output of the system are the energy and CO₂ emission balances till 2020. The deficit of energy production, and the distance from the target of emission are also computed (Figure 1).

The spreadsheets can be browsed to obtain intermediate information or to add new indexes. For instance, one of the users added the calculation of the ecological footprint of each scenario.

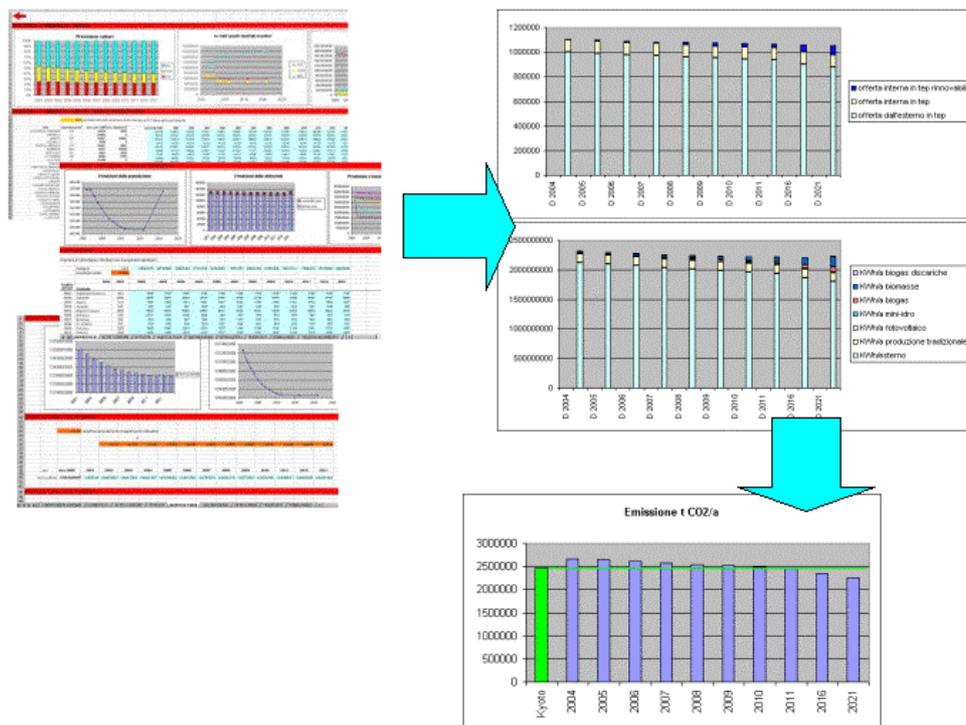


Figure 1. Spreadsheet calculation: distance from the Kyoto emission target.

The exploitation of biomass potential, one of the key development issues identified by the provincial government, requires the solution of an optimal plant location problem. This has been formulated as a mixed integer linear programming problem, considering biomass cultivation and transportation costs and pollution, and has been solved off-line for different hypotheses on biomass availability. In particular, different assumptions on the area dedicated to short rotation forestry (SRF), typically poplars, have been analyzed. These solutions have then been plugged into the overall system, in such a way that, for each scenario defined by the user, the closest solution obtained off-line is used.

The EEP support tool is complemented by the hypertext containing laws, system and data descriptions, selected scenarios, and approved conclusions, directly available on-line to disseminate all the information (Figure 2). This mechanism has proved very useful to encourage public awareness and participation. It can be accessed from <http://www.provincia.cremona.it/Agenda21>, but has also been distributed as CD-ROM.

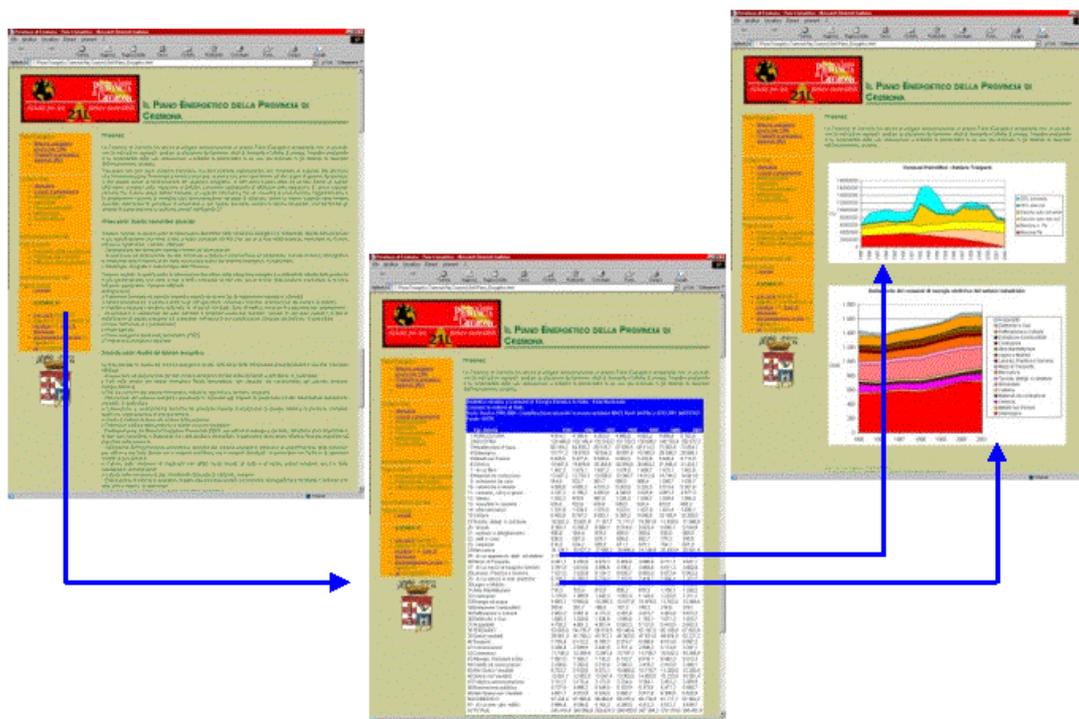


Figure 2. Online hypertext for data and result presentation