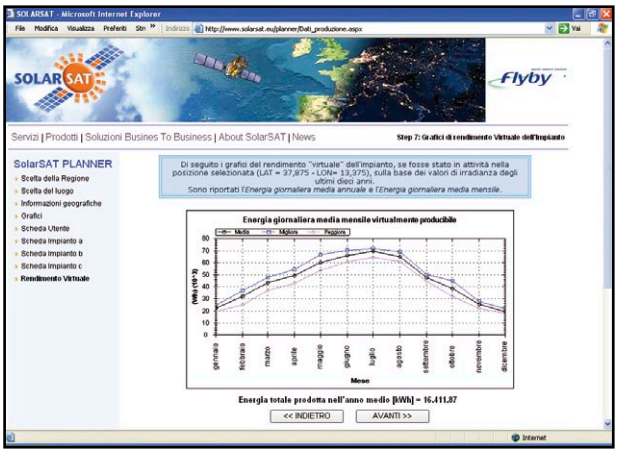
PV-Planner

Web-satellite integrated system for the analysis of solar radiation and for the design and cost estimation of photovoltaic plants

SOLAR SAT

www.solarsat.eu

PV-Planner



SolarSAT PV-Planner is an innovative web service that can be integrated into the websites of PV modules manufacturers, of inverters manufacturers, of companies and organizations which provide services concerning the design, production and financing management of new PV plants.

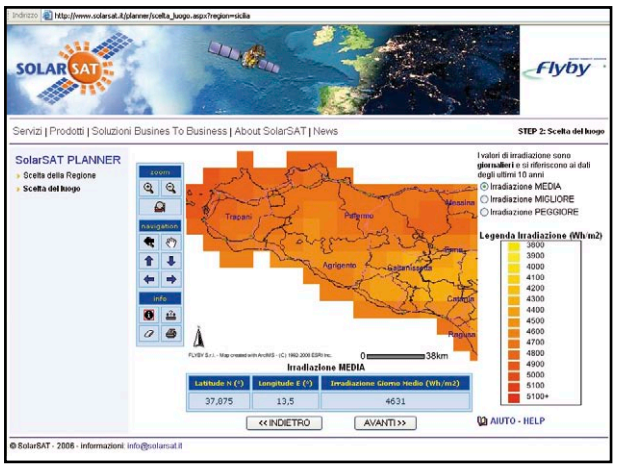
SolarSAT **PV-Planner** has been developed in collaboration with the European Space Agency (ESA) and the Ecole de Mines of Paris. The product combines satellite technology for the analysis of ground solar radiation with the availability of accurate solar radiation models and opto-electronic models for the simulation of a photovoltaic plant, thus consenting to perform an on-line analysis of producible energy, to design a new PV plant and to estimate how profitable it could be.

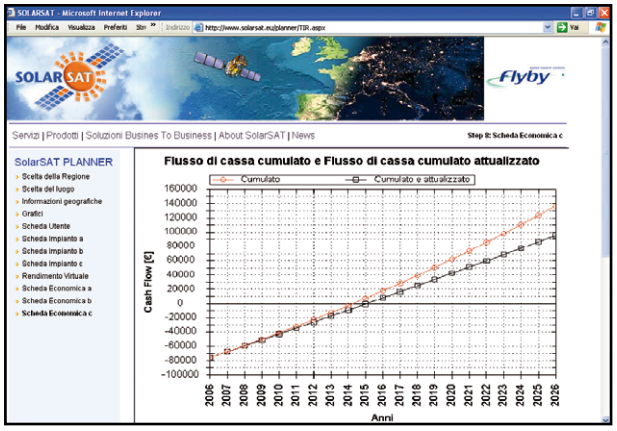
On-line sharing of projects and cost estimations

PV-Planner supports the job of all PV company operators (designers, distributors, marketers) by providing a common standard within a single web tool.
PV-Planner allows the sharing of technical and commercial information regarding several plants by accessing a single database.

Web-GIS technology

PV-Planner exploits the potential offered by web-GIS (Geographic Information System) technology, which allows to store geo-referenced information via web in a common database (e.g. regarding plant location, solar irradiance, temperature, wind speed and direction, but also technical information concerning the plant, like orientation and inclination of PV modules, modules features, inverters features, plant architecture, …). The system also allows to interact with geographical maps, like solar irradiance ones.





Advanced functionalities for design and marketing

The **PV-Planner** service offers the following integrated functionalities:

- analysis of solar irradiance on both the selected site location and on the PV module plane through navigation in an interactive geographical map. The analysis is based on both solar irradiance data (derived from satellite archive) and on the features of the surrounding environment (e.g. albedo, shadowing, ...)
- PV plant dimensioning and preliminary characterization according to final user energy needs
- PV plant detailed design by choice of components (modules and inverters), optimization of their electric coupling in terms of strings and sub-fields, definition of solutions for the supporting structures (retrofit, flat roof, ...)
- analysis of plant producibility on the basis of its technical characteristics and of solar irradiance statistics deduced from satellite observations
- economical analysis: in order to evaluate the investment convenience, the most important economical parameters are calculated (e.g. Net Present Value, Internal Rate of Return, breakeven point, etc.). The estimation takes into account costs, incentive tariffs, taxes, inflation rate, weighted average cost of capital, etc.) all related to the final user specific case

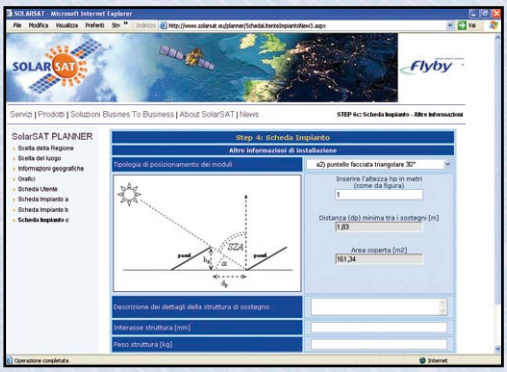
Advantages offered by satellite analysis

Several factors make satellite archive data advantageous with respect to conventional databases:

- spatial resolution: the one used by SolarSAT is about 12 km and is based on last 10 years observations (20 years available on request). This identifies the typical climatic status of the deputy locality and hence the actual limit for producible energy of that plant. Such characteristics of SolarSAT appear unique if compared to data regarding the Italian UNI 10349 regulation, which are limited to about 100 Italian provinces, or with respect to Solar European Atlas data which have 50–100 km resolution. Moreover these latter ones do not take into account microclimatic effects and local orography as they are derived by interpolating local on-ground measurements.
- precision: solar irradiance estimation complies with the European standards (Joint Research Centre) over visible and infrared spectra, while data related to Italian UNI 10349 regulation are conceived to calculate energy fluxes for the building industry and tend to overestimate irradiance.
- area coverage: satellite observations cover the whole earth surface. SolarSAT exploits a coverage up to whole Europe and the Mediterranean basin, including facing African countries.

A customizable system for different applications

PV-Planner integrates together the satellite data and the opto-electronic models of the PV plant into a single user-friendly web interface. **PV-Planner** can be combined with PV-Controller system to allow a smooth transition towards the control of the working status of existing plants and their maintenance (e.g. by sharing the database). **PV-Planner** is configurable as an application devised for the promotion of PV products (e.g. PV modules, inverters) or as an application for the spreading and promotion of solar PV energy. For such purposes, simplified user interfaces and intuitive functions can be realized for the use of the system by non-expert people.
The SolarSAT system is fully customizable for the company or institution which intends to offer such web services to its clients. SolarSAT can be integrated into existing web portals in outsourcing.



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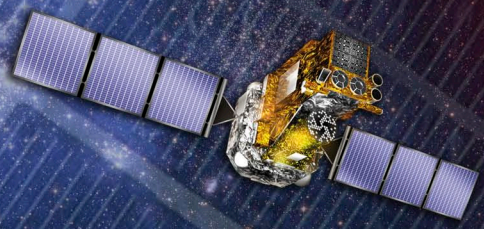
SolarSAT PV-Planner

SolarSAT PV-Planner: the integration of web and satellite archive data for the design and marketing of solar photovoltaic plants:



- solar irradiation analysis
- PV plant dimensioning and characterization
- design and optimization of PV plant components
- PV plant producibility analysis
- economical analysis
- production of commercial cost estimation
- on-line sharing of data, technical projects and cost estimations

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