



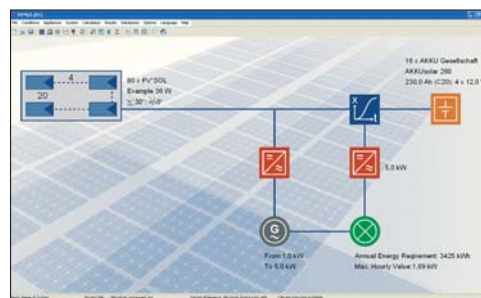
## The Dynamic Simulation Programme for the Design and Calculation of Stand-Alone Photovoltaic Systems

### Concept

PV\*SOL standalone is a programme for the design and simulation of stand-alone photovoltaic systems.

After entering the data for the appliances to be supplied, the programme determines the required PV generator output and the size of battery, according to the usual sizing criteria. The simulation that is then carried out determines the solar fraction and other relevant parameters.

The programme has been developed for engineers, planners and PV system manufacturers.

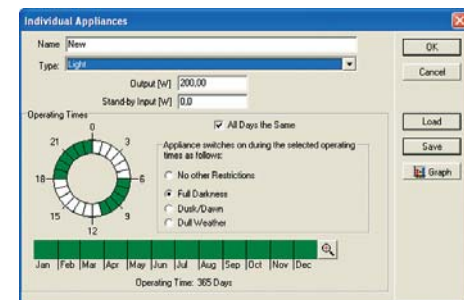


### System Configuration

Stand-alone PV systems can be designed according to the following criteria: the PV array can either be controlled by direct battery coupling or by MPP tracking operation. Both direct and alternating current appliances are allowed. In addition, backup operation with a diesel generator can be simulated.

### Determining the Energy Requirement

With PV\*SOL standalone, the energy requirement can be determined in two different ways. For appliances where the electricity consumption over a long period of time is known, the energy requirement for the period is automatically determined by a pre-defined consumption profile and entering the annual electricity consumption.



Consumption profiles can also be created by the user and saved. For appliances with low electricity consumption, the energy requirement over a period of time is determined by entering the parameters for the individual appliances. Individual appliances can be classified by four different types of appliance. For example, with the appliance type "Light" a selection can be made that the appliance switches on automatically depending on the levels of sunlight.

### Quick Design

The Quick Design facility allows system dimensioning with the entry of just a few parameters, which means that the programme determines the required PV array output and the battery capacity for a defined case. The energy requirement is determined by the entry of individual appliances, the selection of the climate data record and the parameters for the installation of the PV modules. After the user has selected the PV module and battery types, the programme determines the number of modules and batteries, based on the period of autonomy and the system recovery period.

## Simulation

The calculations are based on hourly balances. The output of a PV system, which is determined by the simulation of a period of one year, is based on a mathematical model which allows the exact reproduction of the characteristic curve for each of the PV modules contained in the database. This also allows the precise calculation of outputs for thin-film modules. If different module types or differently oriented arrays are used within a PV system, the programme simulates this by combining module groups into PV sub-arrays.



## Climate Data

Climate data for irradiation and air temperature in hourly intervals for a period of one year is delivered with the programme for approximately 650 European locations. The integrated module MeteoSyn contains a further 2000 international locations and can also generate hourly values from monthly data entered by the user. In addition, the German Weather Service's TRY format climate files can be imported into the programme. And with the Swiss programme METEONORM worldwide climate data can be created and imported into PV\*SOL standalone.

## Shade Editor

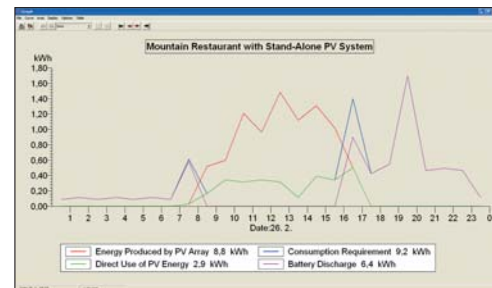
PV\*SOL's shade editor can be used to make the corresponding entries for each sub-array in respect of possible shading by the horizon and by buildings or trees.

## Results

The following results can be produced in graphical format, in a comprehensive project report with illustrations for presentation to customers, or in a results overview:

- Projected Specific Annual Yield
- Final Yield
- Performance Ratio
- System Efficiency
- PV Generator Efficiency
- Solar Fraction
- Energy and Other Values in Graph and Table Format
- Economic Efficiency Calculation

Further detailed results for system analysis can also be selected.



Free demo versions of all our programmes are available to download from [www.valentin.de](http://www.valentin.de)



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