

Photovoltaic Software

Any private individual or a professional or a solar energy enthusiast like me can use different software tools to simulate and analyse a photovoltaic system. In world market there is apparent extent of solar database and software programs for analysing solar photovoltaic systems, either available commercially or not.

Solar photovoltaic software simulators on the market are designed with different goals in mind and have various limitations for solving certain problems. The features of the software depend upon the purpose of their use. Each software works in its specific application area in a solar photovoltaic system.

On basis of their application the major photovoltaic software can be classified as:

- Simulation Software
- Economic Evaluation Software
- Analysis and planning Software

Simulation Software

INSEL: INSEL stands for **IN**tegrated **S**imulation **E**nvironment **L**anguage. It is software for planning, monitoring and visualising energy systems. It provides functions in the form of blocks that can be linked to form a system and can be simulated for electrical, thermal energy components. It is available for a 30 days trail from the website: <http://www.insel.eu/> . It supports windows 7, vista and xp. Mac and Linux versions are yet to be released.

TRNSYS: TRNSYS stands for A **TR**AnSient **S**ystems **S**imulation Program. It is an energy simulation program whose modular system approach makes it one of the most flexible tools available. It includes a graphical interface, a simulation engine, and a library of components that range from various building models to renewable energy components and emerging technologies. A special library of components is available to simulate renewable energy based power generation: PV system, batteries, wind turbines and fuel cells. Now the latest demo version of TRNSYS 17 is available at: <http://sel.me.wisc.edu/trnsys/demos/demo.html> and expires on September 1st 2013.

Economic Evaluation Software

HOMER: HOMER stands for **H**ybrid **O**ptimization **M**odel for **E**lectric **R**enewables. Developed by NREL in 1992 to assist in design of micro-power systems and to facilitate the comparison of power generation technologies across wide range of applications. HOMER models a power system's physical behaviour and its life-cycle cost, which is the total cost of installation and operation over its life span. It gives comparisons of different systems based on their technical and economic merits. HOMER is available for a 14 day trail from the website: http://homerenergy.com/Pre_DL.html and with 6 month subscription at \$99.99.

SAM: SAM stands for **S**ystem **A**dvisor **M**odel. It is also developed by NREL. The SAM is a performance and economic model designed to facilitate decision making for people involved in the renewable energy industry. It is available to download at: <https://sam.nrel.gov/content/downloads>. It runs on both 32 bit and 64 bit operating systems.

RETScreen: RETScreen is an Excel-based clean energy project analysis software tool that helps decision makers quickly and inexpensively determine the technical and financial viability of potential renewable energy, energy efficiency and cogeneration projects. RETScreen Software Suite is available free at: <http://www.etscreen.net/ang/download.php>. To use the RETScreen suite we need to download to separate programs RETScreen 4 and RETScreen plus.

Analysing and Planning Software

PV*SOL: PV*SOL is a multi-product suite of software for the design, simulation and financial analysis of photovoltaic systems ranging from small off-grid residential systems to large commercial grid-connected and utility-scale systems. The range of PV*SOL programs include: PV*SOL basic for the quick design, financial analysis and creation of customer proposals for residential and small commercial PV systems up to 300kW. It gives dynamic simulation program with 3D visualization and detailed shading analysis of roof-integrated or mounted grid-connected photovoltaic systems. Different versions of PV*SOL can be downloaded from: <http://www.valentin.de/en/downloads>.

SOLARPRO: The software calculates the amount of generated electricity based on the latitudes, longitudes, and the weather conditions of the installation site. This leads precise simulation results. Simulation including the shadow influence by surrounding buildings and objects allows users to check optimal settings and module designs before system installation. The software calculates also the I-V curve of solar modules accurately and quickly based on the electric characteristics of each manufacture's product. It can be downloaded at: www.lapsys.co.jp/english/products/download.html

Thus above mentioned packages are some major software currently used extensively in photovoltaic industry. Though there are several software packages available in the market. The individual must first identify the requirement before choosing any software for use.

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