SAM – Solar Advisor Module
CSP and PV Simulation Software Training

presented by
Paul Gillman and Riaan Meyer

Tuesday 1 June – Wednesday 2 June 2010
Stellenbosch and Pretoria

Synopsis

This two-day workshop covers the most important aspects of the SAM software. Each participant will have access to a computer and will use SAM in a practical session to model CSP and PV plants. After completing this course a participant will be able to:

- Describe SAM's capabilities and limitations
- Navigate the software's user interface
- Set up and simulate a Parabolic trough CSP plant and compare the performance between wet and dry cooled condensers
- Be aware of SAM's capabilities on other CSP technologies (Tower, Stirling Dish, Linear Fresnel)
- Set up and simulate a PV plant's performance
- Choose the appropriate finance options for a project
- Display annual, monthly and annual results in different formats
- Describe the simulation options, including parametric, sensitivity, optimization, and Excel exchange

Who should attend?

This is a technical training course and should be attended by engineers, CSP and PV project developers and technologists active in the solar energy sector. No prior experience of SAM is required but a basic knowledge of thermodynamics and electricity will be advantageous. An overview of CSP and PV plants and their components will be presented on day one.

Venue and Time

This **two day** workshop will be **simultaneously** presented at the Department of Electrical Engineering, Room S203 at Stellenbosch and the Department of Mechanical and Aeronautical Engineering, Computer Network Labs, Third Floor, Room K3-6 at the University of Pretoria from 08h00 – 17h00 on both days.

Travel and Accommodation

Delegates are requested to make their own travel and accommodation arrangements.

Registration

The workshop is designed for a limited number of participants so as to personalise and maximise the learning experience. Bookings will be taken on a first come first serve basis.

Bookings will only be considered as "confirmed" once the completed, signed registration form as well as payment has been received.

The registration form and directions are attached separately. For enquiries contact Jos Liebenberg at: Tel: 021-808 4069 Fax: 021-808 4277 or E mail: crses@sun.ac.za or visit: www.sun.ac.za/crses

Registrations close on Tuesday 18 May 2010.

Registration Fees

- The registration fee for this event is R500 and is non-refundable.
- Attendance without registration will not be permitted.
- In the case of unforeseen circumstances Stellenbosch University reserve the right to cancel the course.
- A copy of presentations will be made available afterwards in electronic format.
- Lunch will be served.
- No certificates of attendance will be issued to delegates.

Presenters

Paul Gilman is a renewable energy training and analysis consultant. His current and recent clients include the National Renewable Energy Laboratory, HOMER Energy LLC, and Mistaya Engineering. Mr. Gilman has worked on projects for NREL since 2002, providing user support, training, and documentation services for the Solar Advisor Model, EnergyPlus, and BEopt software. He also designs and leads NREL renewable energy training workshops under the USAID South Asia Regional Initiative for Energy (SARI/E) program for energy professionals from countries in the program's region of interest. Mr. Gilman has assisted renewable energy project developers in the use of computer models for feasibility studies and resource assessment in Brazil, the Maldives, Mexico, and the United States. He is trained in electrical engineering and has over ten years of work experience in international development.

Riaan Meyer holds a BEng in Electrical Engineering and an MScEng in Mechanical Engineering, both from Stellenbosch University. He has worked for 18 months as site Electrical Engineer at an experimental tin smelter in Rwanda. His main research interests are energy efficient building methods and design, solar thermally driven cooling techniques and bulk solar thermal electricity generation and solar resource assessment and mapping. He is currently a research engineer and part-time lecturer at the Centre for Renewable and Sustainable Energy Studies, Stellenbosch University.

Sponsor
The workshop is sponsored by the United Nations Environment Program (UNEP).

Programme Overview:

Tuesday Morning
Registration, background lecture on concentrated solar power (CSP) plants, background lecture on PV plants.

Tuesday Afternoon
Introduction to SAM. How to use SAM to model CSP and PV plants.

Wednesday Morning
Tutorial on CSP plant and PV plant.

Wednesday Afternoon
Additional capabilities and simulation with SAM.

Additional Information on the Solar Advisor Module (SAM)
The National Renewable Energy Laboratory (NREL), in conjunction with Sandia National Laboratory and in partnership with the U.S. Department of Energy (DOE) Solar Energy Technologies Program (SETP), developed the Solar Advisor Model (SAM) starting in 2004 with ongoing efforts today.

The Solar Advisor Model combines a detailed performance model with several types of financing (from residential to utility-scale) for most solar technologies. The solar technologies currently represented in SAM include concentrating solar power (CSP) parabolic trough, dish-Stirling, and power tower systems, as well as flat plate and concentrating photovoltaic technologies. SAM incorporates the best available models to allow analysis of the impact of changes to the physical system on the overall economics (including the levelised cost of energy). SAM development continues to add additional financing models and performance models to meet the needs of a growing community of users.

This comprehensive solar technology systems analysis model supports the implementation of the program's Solar America Initiative (SAI) as well as general planning for the Solar Energy Technologies Program (SETP). Use of the SAM software – together with technology and cost benchmarking, market penetration analysis, and other relevant considerations – supports development of program priorities and direction, and the subsequent investment needed to support solar R&D activities.

But, most important, it promotes the use of a consistent methodology for analysis across all solar technologies, including financing and cost assumptions.

SAM allows users to investigate the impact of variations in physical, cost, and financial parameters to better understand their impact on key figures of merit. Figures of merit related to the cost and performance of these systems include, but aren't limited to:

- System output
- Peak and annual system efficiency
- Levelized cost of electricity
- System capital and operating and maintenance (O&M) costs
- Hourly system production

The Solar Advisor Model uses a systems-driven approach (SDA) to establish the connection between market requirements and R&D efforts and how specific R&D improvements contribute to the overall system cost and performance. This SDA allows managers to allocate resources more efficiently.

For additional information and to download a free copy of SAM visit: **www.nrel.gov/analysis/sam**

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