iAREEE
International Academy for Renewable Energy & Energy efficiency

SOLAR ELECTRIC DESIGN AND INSTALLATION FOR GRID-TIED SYSTEMS

	Day1	Day2	Day3	Day4	Day5
04.00 –6.00	**Introduction To Renewable Energy & Fundamentals in solar energy and photovoltaics [SCP01]**	**Type of PV Systems [SCP 03]**	**PV cells and modules [SCP 04]**	**grid-connected Inverters in PV systems [SCP 05]**	**Software simulation & Egyptian Code [SCP 09]** **Grid-tie System Design [SCP 08]**
	• Welcome and overview on the training • Why Renewable Energy? • Global renewable indicators • Solar radiation • Overview of solar energy technologies and systems • Solar radiation collection: the photovoltaic effect • Grid-connected, off-grid PV and solar pumping; typical applications and topologies.	• Overview PV Systems • Grid-tied PV systems, Island (off-grid) PV systems (DC and AC) • PV back-up systems (grid-tied), PV plant examples	• Different PV technologies and their advantages (wafer-based versus thin-film) • Testing of PV modules • Quality requirements, certificates and warranty • Energy payback times	• Inverter technologies • Inverter concepts • String vs. central inverters • Voltage/frequency regulation and grid fault behavior • Installation requirements, international certificates and grid-connection in compliance with grid standards • PV array - inverter sizing	• Design of an Grid-tied system calculation. • Simulating the output of a simple PV system with software. • Egyptian Code for conneting PV plant on national Grid
	Break	**Break**	**Break**	**Break**	**Break**
06.15 – 8.00	**Basics of Solar Electricity [SCP02]**	**PV cells and modules [SCP 04]**	**Hands-on exercise on photovoltaic training simulator rig**	**• Site Analysis [SCP 06]** **Balance Of System components of grid-tied PV-systems [SCP 07]**	**End-of-course test** **End of seminar**
	• Basics of Solar Electricity • Power, Energy, Electricity (voltage, current, resistance), • Connections (series and parallel; • summation of power), Open and short circuit, Bypass diodes, • Direct Current (DC)/ Alternating Current (AC), Power transmition	• Electrical characteristics of a solar cell • From single cells to PV arrays (series/parallel connection) • Module variety and specifications	• Exercise of Open-circuit voltage and short-circuit current with different levels of irradiation • Exercise of Influence of the arrival angle and azimuth angle on the power of PV cell. • Exercise of Wiring solar cells to modules. • Exercise of Shading. • Exercise of Using bypass diodes.	• Introducing the structure of the design of a PV plant from A to Z: Customer consultation, site visit, collection of information • Cables • Electrical safety devices • Mounting structures • Installation on open land and industrial roofs. • Safety during construction • Earthing system.	• Case Study: Guided step by step calculation of an real system. • Evaluation of the seminar by participants