

Abstract: Sizing and Design of PV Power Plants

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The countries of the Mediterranean area face the same specific energy reality: The increase in the energy price and the weakness of the electrical grid (impossibility of having increase in the power supply, interruptions, etc.), which reduces the security of supply in critical facilities such as hospital and schools as well as the proper development of the small and medium size industries.

In order to overcome these problems, MED-Solar (Machrek Energy Development - Solar) project, funded by the EU, was carried out. These problems are common to the target countries of MED-Solar project (Lebanon, Jordan and Palestine) where all the population is actually connected to the grid, but with scarce quality and regular interruptions and cuts-off. Instead of using exclusively polluting and expensive fuel generators against electricity interruption, the project proposes to provide the generators with a solar photovoltaic system for energy backup. With the achievement of MED-Solar, the energy situation in the three target countries will improve by reducing energy costs, decreasing the dependence on imported fuel and improving the security of supply through the use of clean energy resources.

In the frame of the MED-Solar project, this lecture presents the systematic method to sizing and design stand-alone and grid-connected PV systems. The method allows to know with good accuracy the sizing of the main elements that can be found in a typical PV facility (storage and PV generator subsystems, inverters, charge regulators, etc.) as a function of the design specifications and some input data such as radiation energy, energy demand, etc.