

FORWARD

“Solar Cells and Water Pumping Systems”

Why the Photoenergy Centre?

ICS-UNIDO selected the PHOTOENERGY CENTER as hosting institution for the Workshop on “Solar Cells and Water Pumping Systems”, Cairo, Egypt. This is because:

- The Photoenergy Center at the Ain Shams University is a research and development organization that deals with light interactions with matter and the development of new PV products and systems.
- Promising achievements would be expected by using the facilities available at the Photoenergy Center. The Center is also well connected with leading research institutions all over the world. The Center will make use of its scientific connections in realizing and complementing research to be carried out for the development of new low cost and more efficient PV products and systems.
- At a national level, the Center also has very good contacts with local industries that will enable the identification of industrial partners for close collaboration in the project. In this area, the final goal of the Center is in the identification of technologically developed products, which should be correctly integrated and adapted to market conditions.
- Furthermore, we have already collaborated with ICS on numerous occasions. The authorities of ICS and UNIDO described our role as “very professional and active in all aspects. Moreover, the Center is the most suitable focal point as a regional center due to its excellent activities and facilities for the training of PV systems and applications and to its geographic position.”

The Problem?

Many regions of the world suffer from severe shortages of rain and surface water, and must depend on underground aquifers for their daily supply. Traditional pumping and irrigation systems, employing diesel engines and electric-grid powered motors, represent a partial solution for some water delivery needs. But the cost of fuel and electricity, spare parts and service—or the equivalent in time and labor of hand pumping systems— make water-pumping technologies prohibitively expensive for many rural towns and villages . . . the populations that need them most.

The Solution is Moving Water with Sunlight!

Clean, silent, maintenance-free solar electric power is a technology made for the water pumping requirements of the developed and developing world.

Studies show that on the village level, photovoltaic systems are less expensive to purchase and operate than similar systems powered by diesel engines. A 480Wp array will provide electricity for a water pumping system that will provide 1,000+ gallons of water per day with a 100' lift.

Nearly 2 billion persons — or 30% of the world's population— lack access to water for drinking, livestock, and irrigation. And for those who have water, many spend inordinate amounts of time collecting and transporting it.

Solar water pumping systems are an efficient, clean and inexpensive way to deliver steady supplies of water for drinking and farming applications during daylight hours.

Who should care and finance PVP systems?

On the international level, ICS-UNIDO, with its access to laboratories, and its international network clearly provides an ideal mechanism for developing relevant skills and diffusing among international industrial communities, interesting research issues and building industrial capacity. ICS through its international connections and activities could promote good projects and find out potential donors for offering funds. This workshop is a good opportunity for ICS to build a database of information on countries needs, promising projects including manufacture of PV modules, system design, application and performance to permit process optimization.

The suggested main objectives of the workshop are:

- To provide an understanding of the necessary prerequisites to establish a sustainable cell manufacturing capacity for PV market developments.
- To develop critical skills in PV conversion and provide to the industry a development forecast for the new technology.
- Update engineers, scientist/technicians in the basic field of planning and designing of efficient cells for more efficient systems.
- Help developing countries to improve their awareness of tools relating to cells research and to the development of new techniques to realize more efficient cells and modules.
- Initiate contacts and promote co-operation between industries, important research institutions and governments.
- To know if it is possible to separate the PV cell production line from the electronic silicon industry.
- To select the best promising cell for the future and to build cell information databases.
- To analyze the specific site working conditions of PV Water Pumping Systems in Africa and Middle East.
- To revue critically the design of a PV Water Pumping System and optimize a standard project that overcome the running problems of installed systems.

The expected outputs are:

- Lecture notes, case studies and basic information on photovoltaic cells.
- Approximately 15 delegates from Europe, Africa and Middle East will meet to discuss PV cell technologies, manufacturing procedure; statistics on working conditions of existing PV Water Pumping Systems in each country, actual running problems and how to cope with.
- Accomplishment of the state of the art in the field of cell efficiency, production and possible cost reduction; state of the art in the field of PV Water Pumping Systems.

Who we are?

The participants of our workshop are a good mix of academicians, expert engineers, laboratory researchers, technicians and high rank (directors) government employees all of whom are involved, in a way or another, in the research and development of PV cells and in the management or responsibility of running a PV Water Pumping System. High-level engineers, scientists and experienced economists and researchers in PV cell development are gathered from different Egyptian institutions. Most of who are specialists in the field of photovoltaic cell research and production and management of PV Water Pumping Systems.

The following topics will be covered and discussed:

- PV market characteristics, and growth scenarios concerning cells availability.
- Cells for a cheaper PV power module and for a more affordable PV Water Pumping Systems.
- Cells production specifications, performance testing, and results.
- Cells quality control techniques and standards.
- Cell factory quality control – Site visit.
- PV cell technology, history, future directions.
- PV cell manufacturing procedures.
- How to better use cells in a module: case study.
- Polycrystalline thin-film silicon solar cells on glass, a pathway towards lowering the cost of solar cells.
- Parallel multijunction thin-film silicon solar cell, aluminium-induced crystallisation (AIC).
- How are running the existing PV Water Pumping Systems in some African countries especially in North Africa and Middle East?
- How can we improve these Systems?
- Identification of the region needs and develop projects.

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I wish you all very sucessful meeting and a nice stay in our sunny country.

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