## FOR FURTHER INFORMATION

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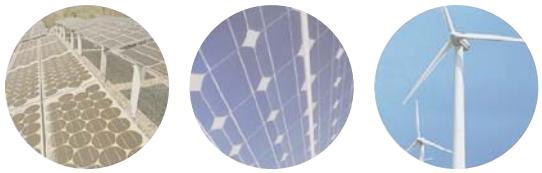
## NOTE

For more information on the workshop, view the latest details on COMSATS' website: www.comsats.org



(UNESCO); and the Commission on Science and Technology for Sustainable Development in the South (COMSATS).

## OBJECTIVES OF THE SCHOOL

The objectives of the School are to:

a) promote the use of environment-friendly technologies in the developing countries of Asia;

b) create awareness among policy-makers, academicians and professionals of developing Asian countries on the concept of sustainable energy technologies on solar energy, wind, biomass, fuel cell and hydrogen;

c) present reviews on the state-of-the-art renewable energy technologies for micropower generation;

d) present case studies and design tools for micropower system sizing and costing;

e) introduce micro-financing schemes for mircopower technologies;

f) present the participants' international perspectives and experiences in solar energy applications and relevant policies in rural areas; and

g) introduce the participants to practical aspects of micropower system applications.

## WHO SHOULD ATTEND?

Scientists, researchers, engineers, industrialists, technicians and academicians from various institutions of the developing countries are encouraged to participate in the Workshop. Partial or full financial support will be provided to a limited number of participants at the discretion of the organizers.

# The 5th Asian School on Renewable Energy: Advanced Micropower Systems

***July 9 - 13, 2012***

***Puri Pujangga, Universiti Kebangsaan Malaysia (UKM)***
***Bangi, Selangor, Malaysia***

***Organized by***

SERI, UKM ISESCO COMSATS UNESCO

## INTRODUCTION

Renewable energy is being recognised and accepted as the most environment-friendly option to address the present world's energy crises. Presently, the demand of energy is predominantly met using fossil-fuels (i.e. coal, petroleum and natural gas). Casting a glance at the world energy scenario, it is seen that the distribution of fossil-fuels is non-uniform, wherein 81% of world's crude oil reserves belong to 8 countries only, 6 countries have 70% of all natural gas reserves and 8 countries have 89% of the world's coal reserves. More than half of the commercial energy needs of Africa, Asia and Latin America are being met through imports. This problem is worsened by the fact that demand of power generation is continuously increasing in these countries, especially in the most populous countries like China and India. At the current rate of energy consumption, the world's resources of fossil-fuels will be drastically reduced in the near future.

Moreover, the emissions of greenhouse gases from anthropogenic activities, especially those involving the use of fossil-fuels, have adverse effects on the environment and pose grave challenges to sustainable development. The unchecked combustion of fossil-fuels not only leads to the over-consumption of these limited energy resources of the world, but also results in environmental degradation, in the form of pollution, acid rains and global warming. An obvious manifestation of these adverse effects on the global environmental conditions is the fact that our planet has experienced the record highest temperatures during the last two decades. These resulted in unpredicted weather patterns across the globe. To overcome these global implications of the generally prevalent energy-consumption practices, sustainable, clean and safe energy policies have to be made and implemented that would satisfy the energy demands of the twenty-first century. Renewable energy resources should, therefore, be made a key component of our energy mix for meeting the future energy needs.

Use of solar energy through micropower systems needs to be promoted. A micropower system is one that generates electricity, and possibly heat, to serve the energy needs of a nearby load. Such a system may employ any combination of electricity generation and storage technologies and may be grid-connected or autonomous – separate from any transmission grid. Some examples of micropower systems are a solar-battery system serving a remote load, a wind-diesel system serving an isolated village, and a grid-connected natural gas microturbine providing electricity and heat to a factory. Power plants that supply electricity to a high-voltage transmission system do not qualify to be called micropower systems because they are not dedicated to a particular load. A grid-connected and off-grid micropower system, serving electric and thermal loads, may comprise any combination of photovoltaic (PV) modules, wind turbines, small hydro, biomass power, reciprocating engine generators, microturbines, fuel cells, batteries, and hydrogen storage.

The analysis and design of micropower systems can be challenging, due to the large number of design options and the uncertainty in key parameters, such as load sizes and future fuel prices. Renewable power sources add further complexity because their power output may be intermittent, seasonal, and non-dispatchable, and the availability of renewable resources may be uncertain.

The 5th Asian School on Renewable Energy: Advanced Micropower Systems is being organized by the Solar Energy Research Institute (SERI) of Universiti Kebangsaan Malaysia (UKM), from 9th to 13th July 2012, in collaboration with the Islamic Educational, Scientific and Cultural Organization (ISESCO); the United Nations Educational, Scientific and Cultural Organization

# REGISTRATION FORM

## The 5th Asian School on Renewable Energy: Advanced Micropower Systems

*July 9 - 13, 2012*
*Puri Pujangga, Universiti Kebangsaan Malaysia (UKM), Bangi, Selangor, Malaysia*

Name: _____

Designation: _____

Institution/Organization: _____

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Highest Qualification: _____

Postal Address: _____

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City: _____ Country: _____

Tel.: _____ Fax: _____

Email: _____

Signature: _____

Date: _____