

A UTAR Solar Energy Project on the Launching Pad

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THE PHOTOVOLTAIC PHENOMENON

When a photon hits a piece of silicon, one of three things can happen:

- (a) the photon can pass straight through the silicon;
- (b) the photon can reflect off the surface;
- (c) the photon can be absorbed by the silicon which either:
 - (i) generates heat, OR
 - (ii) generates electricity if the photon energy is higher than the silicon band gap value.

The photovoltaic (PV) phenomenon, (c)(ii) has been widely investigated by researchers throughout the world and the photogeneration of electrical power has the potential to be a key player for the sustainability of humankind.

THE EVOLUTION OF PHOTOVOLTAIC CELLS/ MATERIALS

Solar cell efficiencies vary greatly and can be as low as 6% for amorphous silicon-based devices. Recent rapid improvements in

Year	PV solar cells	Efficiency	Developed at
1994	Silicon	24.7%	UNSW, Australia
2002	CdTe	18%	Sheffield Hallam, UK
-	Copper Indium Gallium Selenide	19.5%	NREL, USA
2006	Triple junction	40.7%	NREL, USA
2007	Multi-junction	42.8%	University of Delaware, USA

efficiency are shown in the table below: However, the selection of PV solar cells for use is not based solely on efficiency as shown. In fact, the cost per installed watt is more crucial in determining the system that is to be installed.

WHY IS THE UTAR PROJECT SIGNIFICANT FOR THE NATION?

Almost all electrical power generation in Malaysia uses oil, gas or coal. Hydroelectric power is limited while power generation using biomass and wind power are still in their infancies. Nuclear is still a taboo.

Solar power has been given a boost with the recent launching of the Suria 1000 project by the Ministry of Energy, Water and Communications where BiPV systems for selected residential buildings can be partially financed by the Government of Malaysia.

On the local scene, what is worrisome is the fact that oil and gas in Malaysia could be exhausted quite soon if no new field is discovered. Furthermore, prices of these commodities are still skyrocketing with no sign of stabilising.

Problems associated with the burning of fossil fuel, such as acid rain and global warming, have escalated to such an extent that further delay in capping the use of fossil fuel would be disastrous.

SOME FACTS AND FIGURES ON THE SOLAR PROJECT IN UTAR LED BY DR CHONG KOK KEONG

- (a) Akaun Amanah Industri Bekalan Elektrik (AAIBE) research fund – RM382,900.00
- (b) Objective 1 – to construct a prototype 5kW power generation system using Concentrator PV (CPV) technology and a non-imaging focusing heliostat
- (c) Objective 2 – to investigate the viability of building a 10MW power plant using the same technology
- (d) Objective 3 – to investigate the efficiency of the CPV system under local conditions in the Klang Valley ■

