



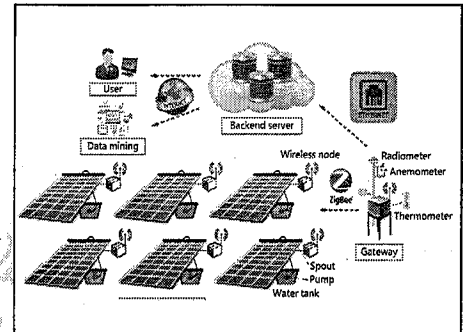
## Wireless Technology based Surface Temperature Estimation and Cooling Technology for Photovoltaic System

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**Experience:**

Director of Education & Research Center for Bio-Industrial Automation, NTU (2012/8 ~)



**Market Needs:**

Multi-crystalline silicon is commonly used for Photovoltaic (PV) modules in practice. A PV module is expensive, but the average conversion efficiency of the module only reaches about 20%, which is relatively low. The efficiency of PV power generation may be worse after taking environmental factors into account, so the promotion of using PV modules becomes more difficult in reality. From an economic perspective, it is necessary to develop strategies that improve the power generation efficiency of PV modules while reducing the cost of PV power generation. Thus, in addition to increasing the efficiency of the conversion, it will bring considerable benefits if the efficiency of PV power generation can be improved.

**Our Technology:**

This project develops a water cooling system for PV modules based on wireless technology to increase the efficiency of PV power generation. This cooling system uses weather information to estimate the output power of a PV module remotely. An automated water cooling mechanism is established to avoid the temperature of the PV module reaching saturation so that the power generation declines in summer. With this novel system, the goal of increasing the power output by 3-5% can be eventually achieved.

**Strength:**

The automated cooling system does not require installing a temperature sensor. Using weather information, the system can quickly and accurately estimate the output power of a PV module and be remotely managed by a control platform. The use of wireless technology increases the convenience and scalability when employing the system. The costs associated with using front-end sensors (sensor purchasing, labor, and wiring) can be largely reduced, when the invention is applied to a large-scale solar generation plant. Furthermore, this invention can be directly installed on existing PV modules without destroying the architecture of the systems.

**Competing Products:**

Liquid cooling system of PV cells @ has been developed by GDS. Accessed May, 30, 2016.

<http://goo.gl/U0KbZv>.

Virtu™ has been developed by Naked Energy Ltd. Accessed May 30, 2016.

<http://goo.gl/CHf5os>.

**Intellectual Properties:**

We have accessed the website of Intellectual Property Office MOEA, R.O.C. to search the related patents.

The keywords are solar panel AND cooling. The results is shown as following.

Patent/Publication Number	Issued/Publication Date	Application Number	Name
M474815	2014/03/21	102222279	水冷却太陽能板
M431443	2012/06/11	100212871	具散熱模組之太陽能光電模組

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