

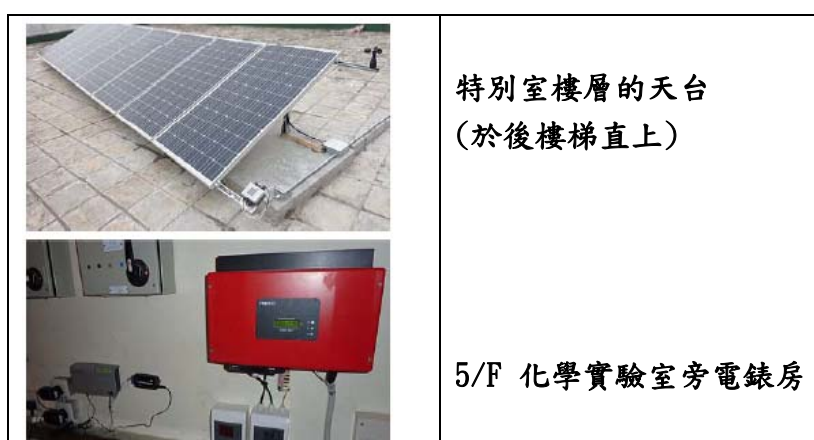
## 東華三院盧幹庭紀念中學光伏系統

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|---|---|--------------------------|--|
|  <p>ENVIRONMENTAL<br/>CAMPAIGN COMMITTEE<br/>環境保護運動委員會</p> | 鳴謝環境保護運動委員會<br>Environmental Campaign Committee | 是項工程由環<br>境及自然保<br>育基金資助 |  <p>環境及自然保育基金<br/>ENVIRONMENT AND CONSERVATION<br/>FUND</p> |
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### 1. 位置:

本校天台於 2012 年 11 月內完成安裝太陽能發電系統環保工程，經 5/F 樓電錶房接駁至本校供電系統。

圖:



### 2. 瀏覽網址及供同學使用的密碼:

2.1 瀏覽網址 <https://www.sunnyportal.com/Login>

2.2 供同學使用的密碼: 登入名稱- [1ktsolarpanel@gamil.com](mailto:1ktsolarpanel@gamil.com)  
登入密碼- kenuhovo

### 3. 登入後主要選擇:

Visualization → Plant overview (可查閱 1. 能量總產量 2. 二氧化碳減排量 3. 可節省的電費)

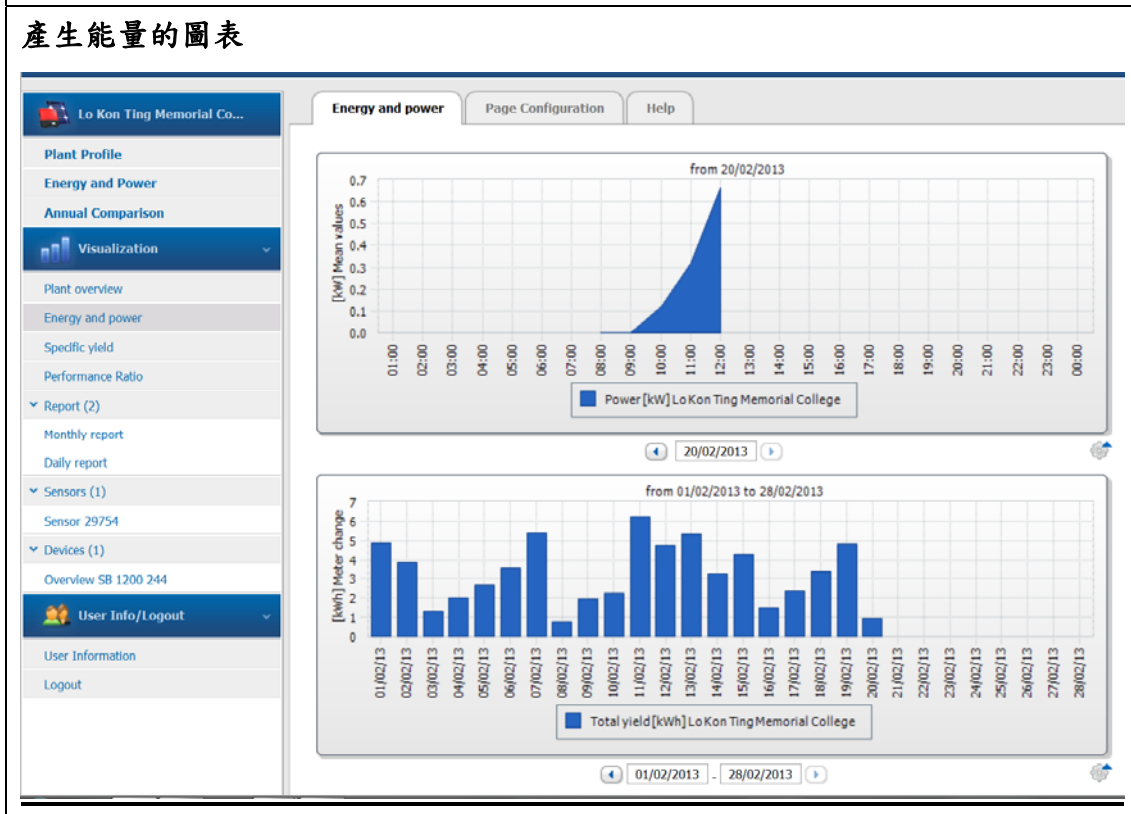
尚可瀏覽其他 分別按年及按月的「報告」 / 光伏板「表現指標」 / 「監察器」數據 等資料。

### 4. 光伏系統的雙語簡介參看第三至第七頁。

### 產生電量, 減排的二氧化碳及可慳電費



### 產生能量的圖表

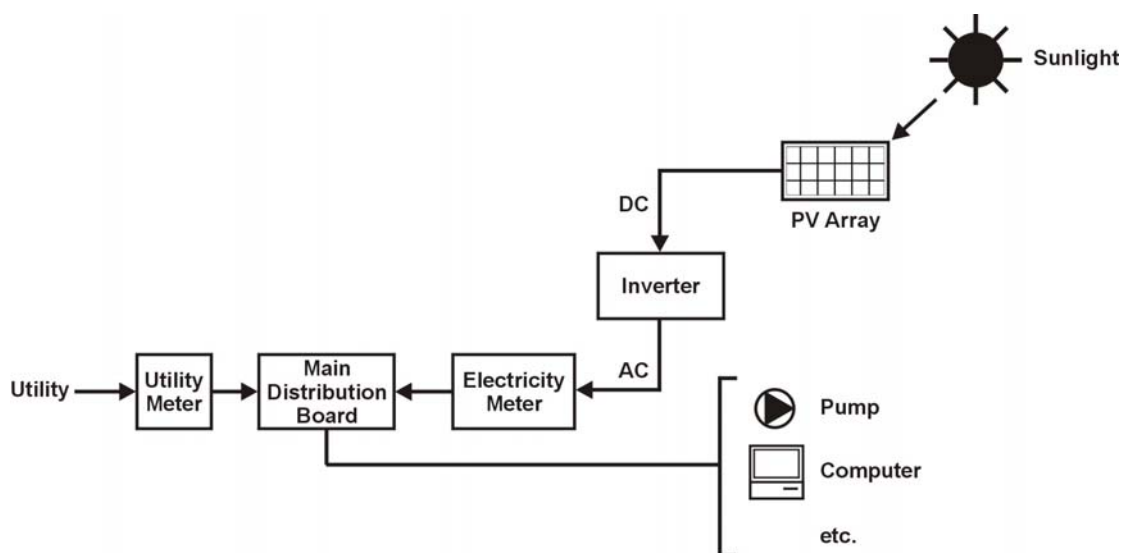


## Introduction of the PV system

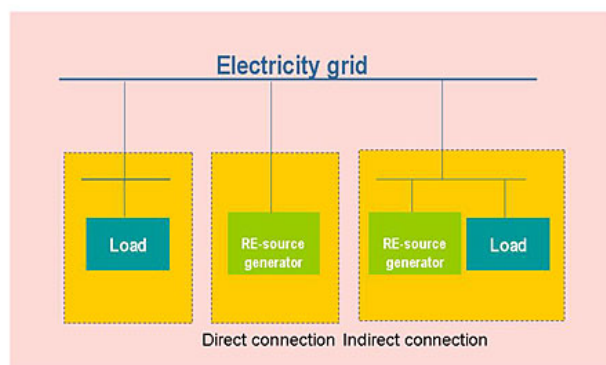
The function of a PV system is to generate electricity from sunlight, either in the form of DC or AC, to meet the demand of electrical loads. A PV system is made up of a PV array and the balance-of-system equipment such as inverters, electric cables and switchgear, surge arrestors, etc.

PV arrays at locations in the northern hemisphere such as Hong Kong are usually installed facing south with a tilt angle near to the latitude of the location, so as to maximize the amount of electricity generated over the course of a year.

Grid-connected (or grid-tied) PV systems in Hong Kong are connected to grid indirectly. The AC output of the PV system is connected to the electrical distribution system of a site or a building, and therefore the PV system operates in parallel with the electricity supply from the grid to meet the electricity consumption of the site or building. In this way, storage batteries are not required.



Direct and Indirect Connection to Electricity Grid



## **Main PV System Components for TWGHs Schools**

### 1. PV Panel

The system has eight pieces of monocrystalline modules. The modules can generate DC from sunlight.



### 2. Inverter

An inverter is a device to convert electricity from DC to AC. Since PV panel output is DC, an inverter is needed in a PV system intended to supply AC loads. A grid-tie inverter is used in the system.



### 3. Weather Station

This includes an anemometer and a sensor device. The sensor device detects module temperature, ambient temperature and irradiation.



### 4. Monitoring Device

The monitoring device collects the PV system data. Since the device is connected to the intranet of the school, teachers and students can view the performance of the system in every computer that is connected to the intranet.

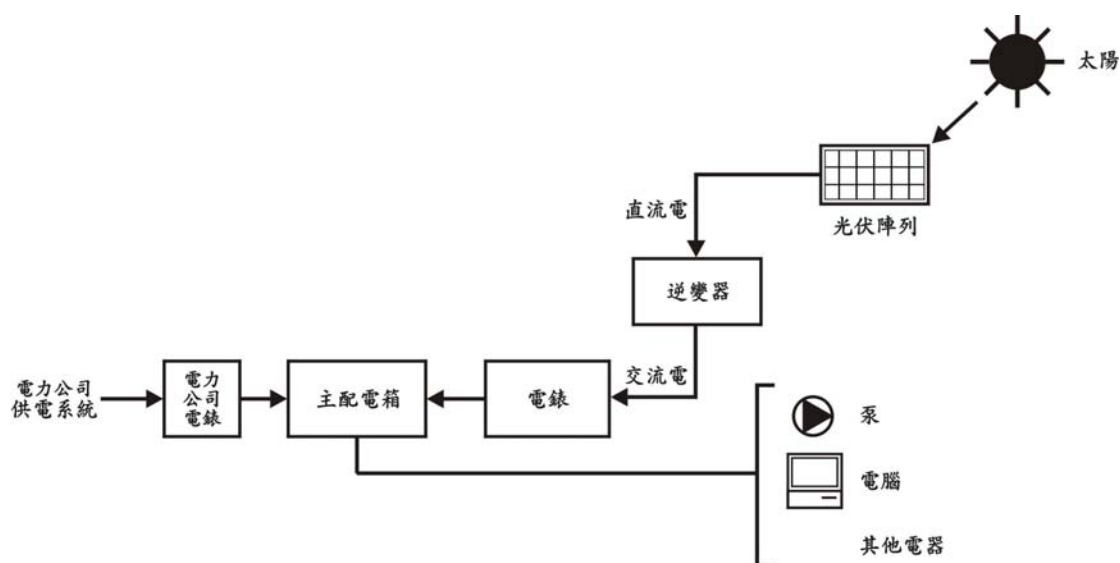


### 簡介

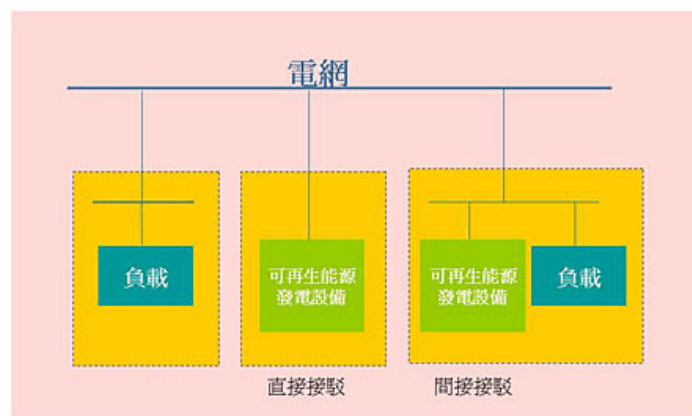
光伏系統的功能是把太陽光能轉化為直流或者交流電能，以供應負載的用電需求。光伏系統由光伏陣列和其他系統配件所組成，其他系統配件包括逆變器、電線和開關設備以及避雷器等等。

光伏方陣在北半球（如香港）通常須要朝南，並以接近當地緯度的傾斜角度來安裝。這樣才能得到以全年計最大產電量。

與電網接駁的光伏系統，在香港主要是以間接接駁的方式接入電網的。這種方式下，某一場地或者建築物中的光伏系統的交流電輸出，會接上該地的配電系統，與電網同時供電，以滿足場地或者建築物的用電需求。在這種情況下，不需用蓄電池。



## 直接與電網接駁及間接與電網接駁



## 東華三院光伏系統主要配件

### 1. 光伏板

系統設有八塊單晶硅組件，組件於太陽光下可以產生直流電。



### 2. 逆變器

逆變器指的是能將直流電轉化為交流電的設備。因為光伏板輸出的是直流電，在系統對外提供交流電的時候就必須有一個逆變器。在這套系統裝置的是接駁電網式逆變器。



### 3. 氣象站

這套系統包括了風速計及感應器。感應器用來偵測組件溫度，環境溫度及日照光度。



### 4. 監察器

監察器收集光伏系統數據。由於監察器已經連上學校的內聯網，師生可以使用任何一部在內聯網內的電腦查閱系統數據。



## Case Study

### Use of solar power in Hong Kong

You may have learnt that energy from the Sun can be used to generate electricity. Are there any real-life examples in Hong Kong that use solar panels to convert solar energy into electrical energy?

In fact, solar panels have been used to provide electricity for *weather monitoring stations* (氣象站) in Hong Kong since the 1980s. Nowadays, some new buildings use solar panels to provide part of the electricity needed. For example, solar panels are set up in *Hong Kong Science Park* (香港科學園) and the new *EMSD* (EMSD=Electrical and Mechanical Services Department 機電工程署) Headquarters.



Fig. 1 Solar panels outside a building in Hong Kong Science Park



Fig. 2 Solar panels on the roof of the EMSD Headquarters

### Part I A visit to Hong Kong Science Park

Visit Hong Kong Science Park and find the building shown in Fig. 1.

#### ***Tips:***

Hong Kong Science Park is located on the Tolo Harbour waterfront in Pak Shek Kok, New Territories. Refer to its website for more details:

<http://www.hkstp.org>



Find where the solar panels are installed outside the building shown below. Circle them.



2. Observe the solar panels carefully and answer the following questions.

(a) What is the energy conversion in a solar panel?

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(b) In which direction do the solar panels face? You may use a compass to find it out.

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(c) What is the purpose of installing the solar panels in this direction?

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(d) What is the colour of the solar panels?

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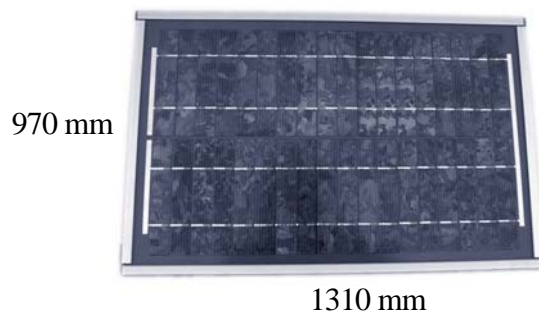
(e) Try to guess why the solar panels are designed in this colour. (Find the answer from the library or the internet if necessary.)

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## Part II Is solar power practical in Hong Kong?

The photo on the right shows a typical solar panel. The electricity it generates is just enough to light up about three light bulbs. To provide more electricity, multiple solar panels need to be installed.

Based on the above information, do you think solar panel is a practical source of energy for each of the following purposes? Explain your answer in each case.



(a) Provide electricity to a residential building in Mongkok.

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(b) Provide electricity to a weather monitoring station at the top of Tai Mo Shan.

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(c) Provide electricity to a factory.

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(d) Provide electricity to a small house at the hillside.

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