1.1 Solar Energy

太阳能

Solar energy in one form or another is the source of nearly all energy on the earth. Humans, like all other animals and plants, rely on the sun for warmth and food. However, people also harness the sun's energy in many other different ways. For example, fossil fuels, plant matter from a past geological age, is used for transportation and electricity generation and is essentially just stored solar energy from millions of years ago. Similarly, biomass converts the sun's energy into a fuel, which can then be used for heat, transport or electricity. Wind energy, used for hundred of years to provide mechanical energy or for transportation, uses air currents that are created by solar heated air and the rotation of the earth. Today wind turbines convert wind power into electricity as well as its traditional uses. Even hydroelectricity is derived from the sun. Hydropower depends on the evaporation of water by the sun, and its subsequent return to the Earth as rain to provide water in dams. Photovoltaics (often abbreviated as PV) is a simple and elegant method of harnessing the sun's energy. PV devices (solar cells) are unique in that they directly convert the incident solar radiation into electricity, with no noise, pollution or moving parts, making them robust, reliable and long lasting. Solar cells are based on the same principles and materials behind the communications and computer revolutions, and this CDROM covers the operation, use and applications of photovoltaic devices and systems.

地球上各种各样能量的来源是几乎都是太阳能。人类和其他动植物一样，需要依靠太阳提供的温暖和食物。但人类在很多其他方面也使用了太阳能。举个例子来说，被应用于交通和发电的化石能源，来源于古地质时代的植物，但它实质上是几百万年前太阳能的一种存储形式。同样，生物质把太阳能转化为燃料，后者被用于取暖，交通和发电。人类对风能的使用已经有几百年的历史了，风的来源是太阳对大气的加热和地球自转产生所产生的气流，人们把风能转化为机械能或者利用风航行。今天，除了传统的使用方式，风力涡轮机还能够把风能转化为电能。即使是水力发电，它的能量来源也是太阳。水力发电的基础是太阳对水分的蒸发，而后水分通过降雨的形式回到地面，在大坝中被储存起来。光生伏打技术（通常被简称为 PV）是一种简单便捷的利用太阳能的方式。PV 设备（比如太阳能电池）的特殊之处在于它们能够把入射的太阳能转直接变为电能，转换过程不需要活动的部件，也不会产生噪音和污染，因此非常稳固、持久耐用。太阳能电池和通讯、计算机产业的变革所依托的理论和材料相同，这个 CDROM 教程将涵盖光伏设备和系统的运行，使用及用途。

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Solar powered light house at Montague Island, a National Parks and Wildlife sanctuary on the East coast of Australia. The small panel on the left powers the light house. The large panel on the right powers the cottages which can partially be seen in the background. The cottages contain facilities for the National Parks' caretaker and facilities for researchers on the island.

图片为位于澳大利亚东海岸国家公园和野生动物保护区中蒙塔古岛上的太阳能灯塔。图中左边的小太阳能板用于供给灯塔的电力使用。右边的大太阳能板用于供给图中部分可见的小屋的电力使用。小屋中包括了国家公园管理员和岛上研究人员所需的设备。

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