

太陽能發電技術探討
An Introduction to Solar Generation Technology

朱記民; 黃裕煒

中文摘要

太陽能是乾淨、安全及無所不在的能源。面對地球環境惡化、能源日漸枯竭等因素，發展太陽能是勢在必行的。臺灣地區位處亞熱帶，夏季日照強烈，近年來因各種因素影響，電源開發常常受阻礙，年年夏季尖峰負載迭創新高，備載容量瀕於不足，太陽能發電正可改善此一困境。因太陽能發電需要強烈日照，太陽光愈強則發電效能愈大，就技術觀點而言，正可用以降低尖峰負載，增加備載容量，將來太陽能發電成本若能大幅降低，太陽能發電應是值得考慮的方向。本文將針對太陽能作分析，並介紹太陽能發電應用技術，即太陽能發電機及光伏電池兩種，依其原理、應用技術及目前瓶頸等逐一探討。最後將介紹歐、美、日等先進國家推展太陽能發電的現況及措施，以供臺灣電源開發之參考。

關鍵字：光伏元件；太陽常數；輻射；郎肯循環；單晶矽；多晶矽

Abstract

In the recent years, Taipower's power development projects have been hampered by opposition from various environmental protection movements. As a result, the capacity of power supply cannot grow quickly enough to maintain parity with the rapid economic growth. The system reserve margin has therefore been low, causing power rationing crises during Summer peak hours. In order to balance system load, while at the same time taking account of growing concerns about environmental protection and limited energy resources, solar energy was then considered an alternative for power generation. Beginning with an introduction to the solar energy and solar energy technologies, this paper then made a detailed description of the principles, applied technologies and bottle-neck of both solar power plants and photovoltaic solar cells. Finally, the conditions and strategies of solar generation in EU, USA and Japan were briefly presented for reference.

Key words : Solar cell; Solar constant; Radiation; Rankine cycle; Single crystal silicon; Multi crystal silicon; Polycrystalline silicon