太陽光電/熱能熱泵熱水器設計研究

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摘 要

本文所提出的太陽光電/熱能熱泵熱水器(Photovoltaic/thermal heat pump water heater, PVT- HPWH)，利用一種新型太陽光電/熱能模組設計，讓模組所發的電力與熱收集器所收集的熱皆提供給熱泵熱水器運作上所需的功率消耗及製造熱水，由於冷媒帶走了發電產生的廢熱，讓PV的效率也跟著增加了，模型是使用MATLAB/Simulink軟體建立，友善的圖形使用者介面及模塊資料庫使建模過程較為容易，為了考量日照強度和周遭環境條件對PVT模組的影響，在模型中加入了熱動力學的部分來計算PVT模組溫度，PVT模組的電氣輸出特性如輸出電流與功率即可更準確的得到，使用模組提供的規格表及文獻裡的相關數據資料，輸入模型模擬出PVT的 及 特性曲線與熱泵熱水器的熱量運用狀態，並用圖表的方式表現出結果，經計算熱泵的效能參數(Coefficient of performance, COP)達到9.68，效果非常不錯。

關鍵詞 : 太陽光電/熱能、熱泵熱水器、MATLAB/Simulink

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