

# Design for PV/Thermal Heat Pump Water Heating System

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## ABSTRACT

The solar generated PV/thermal heat pump water heater (PVT-HPWH) system that is mentioned in this paper utilizes a new solar power and thermal module design, which collects the heat to provide PVT-HPWH power consumption and manufacturing hot water for the operational purpose. Due to the Freon, it would bring away the heat that forms in the generation process. Additionally, this makes the increase of PV efficacy. The model is established by MATLAB/Simulink software containing friendly-used picture interface. The difficulty of constructing module process is reduced by the modular database. Concerning the effect on PVT module, sunshine intensity and environmental conditions should be taken into consideration. Therefore, partial thermodynamics is added to computerize the temperature of PVT module. The characteristics of output's voltage and power could be precisely calculated. By using PVT module's table, relevant data in the literature and inputting PVT's I-V, P-V, special curving line and the state of operational PVT-HPWH that drafted in the module, next chart is used to illustrate the results. Through calculation, the calculated COP achieve 9.68, the outcome of efficacy is very satisfactory.

Keywords : photovoltaic/thermal, heat pump water heater, MATLAB/Simulink

## Table of Contents

封面內頁 簽名頁 中文摘要.....	iii	英文摘要.....	iv	誌謝.....	v	目錄.....	vi	圖目錄.....	ix	表目錄.....	xi	符號說明.....	xii														
第一章 緒論.....	1	1.1 研究背景與動機.....	1	1.2 研究流程.....	3	1.3 文獻回顧.....	4	1.4 文獻回顧事件表.....	8	1.5 論文架構.....	9																
第二章 系統架構.....	10	2.1 太陽能電池簡介.....	10	2.1.1 太陽能電池種類.....	11	2.1.2 太陽能電池原理.....	12	2.2 太陽光電/熱能收集器簡介.....	12	2.2.1 太陽光電/熱能收集器種類.....	12	2.3 熱泵熱水器簡介.....	14	2.3.1 熱泵熱水器種類.....	14	2.4 太陽光電/熱能蒸發器.....	15	2.5 太陽光電/熱能熱泵熱水器.....	16								
第三章 理論基礎.....	18	3.1 太陽能電池.....	18	3.2 PVT蒸發器.....	20	3.3 熱泵熱水器.....	23	3.4 太陽光電/熱能熱泵熱水器效率評估.....	26																		
第四章 太陽光電/熱能熱泵熱水器模型建立與模擬分析.....	27	4.1 模型建立.....	27	4.2 SIMULINK方塊建立.....	28	4.2.1 多重輸入.....	30	4.2.2 條件判斷.....	31	4.2.3 代數迴圈.....	32	4.3 SIMULINK模型建立.....	33	4.3.1 太陽光電模型建立.....	34	4.3.2 太陽熱能模型建立.....	35	4.3.3 熱泵熱水器模型建立.....	35	4.3.4 完整模型.....	36	4.4 模型遮罩.....	39	4.5 PVT模組模擬.....	41	4.6 模擬結果.....	42
第五章 結論與展望.....	45	5.1 結論.....	45	5.2 成果貢獻.....	45	5.3 未來發展.....	46	參考文獻.....	47	附錄.....	51																

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