

A Study of Green Energy Conversion Efficiency Design

張之謙、胡永楠

E-mail: 9805449@mail.dyu.edu.tw

ABSTRACT

Sustainable energy is one of the important energy policies for every country in the 21th century. As the nucleon is an energy adopted by few countries to generate electric power, the fossil fuel is the main energy utilized by most of countries or even uses both energies to provide electric power. However, the fossil fuel usages not only have resulted in widespread environmental contaminations but also should concern its limited storage. That is, the price is getting higher due to decreased storage. Thus, instead of exploring new energy, how to promote the power conversion efficiency of renewable energy is becoming a critical issue. Especially, in order to achieve the highest power conversion efficiency, the better the power conversion system, the better the energy conversion. Consequently, this study attempts to explore the utilization of ZVT-BOOST in the solar system. The most important feature is that this ZVT-BOOST can decrease the power loss by use of the switch control. This design not only can increase the power efficiency and helps the solar energy produces the highest efficiency. Accordingly, the ultimate goal of energy efficiency and carbon reduction is achieved.

Keywords : issue、 system、 design、 Sustainable energy、 solar energy、 ZVT-BOOST

Table of Contents

封面內頁	
簽名頁	
授權書	iii
中文摘要	iv
ABSTRACT	v
誌謝	vi
目錄	viii
圖目錄	x
表目錄	xii
第一章 緒論	1
1.1 前言	1
1.2 研究動機與目的	2
1.3 相關論文	6
1.4 研究方向	7
1.5 論文架構	7
第二章 綠色能源的形式	9
2.1 前言	9
2.2 電的原理	10
2.3 能源概論	10
2.4 能源的分類	12
第三章 太陽能發電系統	16
3.1 前言	16
3.2 太陽電池特性	16
3.2.1 基本原理	16
3.2.2 特性介紹	17
3.3 電力轉換器	21
3.3.1 傳統電力轉換器	21
3.3.2 柔性切換電力轉換器	24
3.3.3 諧振電路的基本概念	26

3.4 零電壓電力轉換器的轉換器原理與設計	35
3.5 儲能電感 L1之計算	40
3.6 結語	42
第四章 研究驗證轉換器之轉換效率	43
4.1 前言	43
4.2 電氣規格部分	45
4.3 特性	45
4.4 操作說明	46
4.5 實驗結果說明：	47
第五章 結論與未來方向	52
5.1 實驗成果	52
5.2 未來方向	52
5.2.1 提升太陽能轉換器效率	52
5.2.2 提高電?電子技術方面	53
參考文獻	56

REFERENCES

1. Daniel W. Hart 著, 王順忠 譯, “電力電子學”, 台灣東華股份有限公司, 1998.
2. Elasser, and D. A. Torrey, “Soft Switching Active Snubbers for DC/DC Converter,” IEEE Transactions on Power Electronics, Vol. 11, No. 5, September 1996, pp. 710-722.
3. G. Hua, and F. C. Lee, “Soft-Switching Techniques in PWM Converter,” IEEE Transactions on Industrial Electronics, Vol. 42, No. 6, December 1995, pp. 595-603.
4. G. Hua, C. S. Leu, Y. Jiang, and F. C. Y. Lee, “Novel Zero-Voltage-Transition PWM Converters,” IEEE Transactions on Power Electronics, Vol. 9, No. 2, March 1994, pp. 213-219.
5. G. Hua, E. X. Yang, Y. Jiang, and F. C. Lee, “Novel Zero-Current-Transition PWM Converters,” IEEE Transactions on Power Electronics, Vol. 9, No. 6, November 1994, pp. 601-606.
6. K. H. Liu, and F. C. Lee, “Zero-Voltage Switching Technique in DC/DC Converter,” IEEE Transactions on Power Electronics, Vol. 5, No. 3, July 1990, pp. 293-304.
7. M. Wang, C. H. Su, and C. H. Yang, “ZVS-PWM Flyback Converter with a Simple Auxiliary Circuit,” IEE roceedings-Electric Power Applications, Vol. 153, No. 1, January 2006, pp. 116-122.
8. Y. Xi, and P. K. Jain, “A Forward Converter Topology Employing a Resonant Auxiliary Circuit to Achieve Soft Switching and Power Transformer Resetting,” IEEE Transactions on Industrial Electronics, Vol. 50, No. 1, February 2003, pp. 132-140.
9. Y. Xi, P. K. Jain, and G. Joos, “A Zero Voltage Switching Flyback Converter Topology,” IEEE Power Electronics Specialists Conference, Vol. 2, 1997, pp. 93 951-957.
10. Y. Xi, P. K. Jain, and G. Joos, “An Improved Zero Voltage Switching Flyback Converter Topology,” IEEE Power Electronics Specialists Conference, Vol. 2, 1998, pp. 923-929.
11. 王信雄, “返馳式功率轉換器分析與設計實務”, 工業技術人才培訓計畫講義, 1999.
12. 王秋豐, 新型零電壓切換推挽式DC/DC電力轉換器之分析與研製, 碩士論文, 國立成功大學工程科學系, 2005.
13. 唐碩甫, 零電壓柔性切換半橋式DC/DC電力轉換器之分析研製及控制器設計, 碩士論文, 國立成功大學工程科學系, 2004.
14. 張銘智, 斬新單級隔離式高功因電力轉換器之分析與控制器之設計, 碩士論文, 國立成功大學工程科學系, 2002.
15. 梁適安, 交換式電源供給器之理論與實務設計”, 全華科技圖書股份有限公司, 2004.
16. 楊宗憲, 具柔切技術之高功因電力轉換器: 新型零電壓轉移單級高功因反馳式, 碩士論文, 國立成功大學工程科學系, 2007.
17. 葉怡君, 新型零電壓零電壓轉移柔切式高功因 AC/DC 整流器, 碩士論文, 國立成功大學工程科學系, 2003.
18. 葉淙益, 具同步整流技術之倍流整流零電壓柔性切換非對稱半橋式DC/DC電力轉換器之分析與研製, 國立成功大學工程科學系, 2005.
19. 鄭振東 編譯, “新型柔性切換式電源技術入門”, 全華科技圖書股份有限公司, 2003.
20. 賴建志, 具有同步整流技術之零電壓零電壓柔切轉移順向式 DC/DC 電力轉換器之研製, 碩士論文, 國立成功大學工程科學系, 2004.
21. 蘇豪斌, 具同步整流技術之新型零電壓切換對角半橋型順向式 DC/DC 電力轉換器之分析與研製, 碩士論文, 國立成功大學工程科學系, 2006.
22. 綠色能源特展 <http://www3.nstm.gov.tw/green/index.html>.
23. 21世紀再生能源政策協會 <http://stock.yam.com/rsh/article.php>.
24. 台中高工綠色能源網 <http://ge.tcivs.tc.edu.tw/>.