Editorial
Special Issue on Green Power Supplies

A TRADITIONAL field for power Electronics, Power supply technology is still the key application area that covers computing, telecommunication, server, data center, industry, automobile, electric vehicles (EVs), medical, appliance, solar inverters, and so on. Recent advances have made power supplies greener than before, as they become more energy efficient, cost effective, and environment friendly. Recent development in silicon power device and in wide bandgap devices has improved power density and conversion efficiency. These emerging devices, together with improvements in topologies, cooling, and passive components, are shrinking the size. Magnetic material, passive component design, and integration have contributed to miniaturization with improved manufacturability. Digital control, with low-cost DSP and other control ICs, has advanced the overall performance significantly.

As an echo to these power supply emerging developments, IEEE Power Electronics Society and China Power Supply Society initiated a successful collaboration on International Power Electronics and Application Conference and Exposition (PEAC 2014) in Shanghai, China, November 5–8, 2014, which was mainly focused on green power supply industry in Asia. Based on the success of PEAC 2014, we proposed this special issue for the emerging power supply technologies. This special issue received 66 original submissions of which 17 were accepted to present the latest and most advanced technologies of green power supply. The special issue is classified into four groups: dc–dc converters, grid inverters for photovoltaic (PV), stability and control of grid inverters, and reliability of power converters.

The first group deals with dc–dc converters. The first paper provides the variable frequency multiplier concept to enable LLC converters adapted to wide input and/or output voltage ranges. The second paper presents an active snubber cell which can be inserted in N-phase interleaved dc–dc converters to realize the soft switching condition. The third and fourth papers propose high step-up zero-voltage-switching (ZVS) dc–dc converters. The fifth paper introduces high voltage dc–dc converter for X-ray application. The sixth paper discusses the reduction of the output filter size for the dc–dc converter by using the saturation-gap biasing topology.

The second group deals with grid inverters for PV. The first paper presents multimodule converter (MMC)-based solar inverter topology by replacing arm inductor of MMC with an open-end transformer so as to reduce cell capacitor. The second paper provides a common mode filter design method for transformerless ZVS full-bridge inverter for residential application with high power density. The third paper provides a two-level control strategy for distributed PV inverters with the upper level using cooperative control and the lower level using model predictive control. The fourth paper introduces a push–pull high-frequency-link single-phase inverter. The fifth paper presents sliding mode control for a cascaded two-level inverter for the PV application.

The third group deals with stability and control of the grid inverters. The first paper discusses the impact of the ac-bus voltage control on the stability of dc-bus voltage control in voltage source converter (VSC) connected to weak grid. The second paper provides resonance suppression scheme for a single-phase grid inverter with the $LLCL$ filters. The third paper provides neutral-point balancing control method for VIENNA-type three-level rectifier. The fourth paper introduces a reactive power control strategy to reduce the capacity of the charger for EVs on single-phase three-wire distribution feeders. The fifth paper describes a current-source high-frequency-link inverter, which comprises two dc–dc isolated converters connected in a differential-mode configuration, thereby yielding an inverter output.

The fourth group deals with the reliability of power converters. This paper presents lifetime prediction of MMC based on the fatigue load according to the working condition and the mission profile.

I would like to acknowledge the valuable work and kind effort by the editorial team: Jaeho Choi, Johann Kolar, Tsorng-Juu Liang, Hao Ma, Alan Mantooth, Dragan Maksimovic, Sudip K. Mazumder, Xinbo Ruan, John Shen, Toshihisa Shimizu, and Jinfa Zhang. We are also gratified to all the reviewers who have spent their precious time and helped tremendously in finalizing the paper selection process.

We would also like to thank JESTPE's Editor-in-Chief, Dr. Don Tan, and his assistant, Feng Bo, for the kind support during the course of the special issue development. From the call for papers to ScholarOne operations to interfacing with authors and the final editing, their efforts have made our work a lot easier.

MARK DEHONG XU, *Guest Editor*
Zhejiang University
E-mail: xdh@cee.zju.edu.cn

YAN-FEI LIU, *Guest Editor*
Queen's University
E-mail: yanfei.liu@queensu.ca

Digital Object Identifier 10.1109/JESTPE.2016.2550639

Mark Dehong Xu (M'94–SM'09–F'13) received the Ph.D. degree from the Department of Electrical Engineering, Zhejiang University, Hangzhou, China, in 1989.

He has been a Full Professor with Zhejiang University since 1996. He was a Visiting Professor with the Department of Electrical Engineering, University of Tokyo, Tokyo, Japan, from 1995 to 1996, the Center of Power Electronics System, Virginia Tech, Blacksburg, VA, USA, in 2000, and the Power Electronics Laboratory, ETH Zurich, Zürich, Switzerland, in 2006. He has authored six books and more than 200 IEEE journal or conference papers. He holds more than 30 Chinese patents and three U.S. patents. His current research interests include power electronics topology, control, and applications to renewable energy and energy efficiency.

Dr. Xu was an Adcom Member-at-Large of the IEEE Power Electronics Society from 2006 to 2008. He received four IEEE journal or conference prize paper awards. He is an Associate Editor of the IEEE TRANSACTIONS ON POWER ELECTRONICS and the IEEE TRANSACTIONS ON SUSTAINABLE ENERGY. He was the General Chair of the IEEE International Symposium on Industrial Electronics, Hangzhou, in 2012, the IEEE International Symposium on Power Electronics for Distributed Generation Systems, Rogers, AR, USA, in 2013, the IEEE Power Electronics and Applications, Shanghai, China, in 2014, and the International Future Energy Challenge Competition in 2015. He was an IEEE PELS Distinguish Lecturer in 2015. Since 2013, he has been the President of the China Power Supply Society.

Yan-Fei Liu (M'94–SM'97–F'13) received the Ph.D. degree from the Department of Electrical and Computer Engineering, Queen's University, Kingston, ON, Canada, in 1994.

He was a Technical Advisor with the Advanced Power System Division, Nortel Networks, Mississauga, ON, Canada, from 1994 to 1999. Since 1999, he has been with Queen's University, where he is currently a Professor with the Department of Electrical and Computer Engineering. He holds 22 U.S. patents and has authored over 160 technical papers in the IEEE TRANSACTIONS and conferences. His current research interests include digital control technologies for high efficiency, fast dynamic response dc–dc switching converter and ac–dc converter with power factor correction, resonant converters and server power supplies, and LED drivers.

Dr. Liu has served as an Editor of the IEEE JOURNAL OF EMERGING AND SELECTED TOPICS IN POWER ELECTRONICS since 2013, and an Associate Editor of the IEEE TRANSACTIONS ON POWER ELECTRONICS since 2001. He has been the Chair of the PELS Technical Committee on Modeling and Control Core Technology since 2013. He served as the General Co-Chair of the Energy Conversion Congress and Exhibition (ECCE), Montreal, QC, Canada, in 2015. He also served as the Technical Program Co-Chair of ECCE in 2011 and a Chair of the IEEE PELS Technical Committee on Power Conversion Systems and Components from 2009 to 2012. He is also a Principal Contributor for two IEEE standards.