## **Preface**

EESD series provides a forum for accessing to the most up-to-date and authoritative knowledge from both industrial and academic worlds, sharing best practice in the field of energy and environment. The first EESD2011 was held in Shanghai, the second EESD2012 in Jilin, China and the third EESD 2013 was held in Shanghai. The fourth conference EESD2014 was held in Nanjing, October 25-26, 2014 and was organized by Jiangsu University of Science and Technology and Shanghai University of Electric Power. The conference program covered invited, oral, and poster presentations from scientists working in similar areas to establish platforms for collaborative research projects in this field. This conference brought together academicians, researchers, engineers, policy makers, governmental officials, end users, and people involved in the energy and environmental industries and provided a platform to the participants to present their papers, share their expertise, establish new contacts, and discuss a range of energy and environmental technologies for sustainable development.

This book contains the selected accepted manuscripts from the subject areas of Environmental Chemistry and Biology; Environmental Materials and Processing Technology; Environmental Safety and Health; Environmental Planning and Assessment; Environmental Analysis and Monitoring; Environmental Restoration Engineering; Pollution Control Engineering; Waste Disposal and Recycling: Disaster Prevention and Mitigation: Vibration and Noise Analysis and Control: Water Supply and Drainage; Hydrology, Water Resources Engineering, Soil and Water Conservation; Ecological Environment and Architectural Environment Protection; Forest Cultivation, Protection and Plant Protection; Geographic Information Science and Remote Sensing; Urban and Regional Planning, Land Resources Planning; Mineral Prospecting and Exploration; Mining, Mineral Processing and Metallurgical Engineering; Oil and Gas Well Development Projects; Agricultural Products Processing and Biological Pharmaceutical; Low-carbon Logistics and Transportation Planning; Energy Saving, Environmental Protection, Low Carbon Ideas, and Sustainable; Environmental Protection and Economic Development; Global Climate Change and Carbon Emissions; Eco-Economy, Circular Economy, Low Carbon Economy; etc. This book provides new information/methods on possibilities of managing the energy crisis and protecting the environment sustainably in the growing economies to the broader public, especially students and researchers who are interested to involve in the research in this area.

We express our gratitude to the members of the International Scientific Committee for their significant support in organizing the Conference and for reviewing the papers of the participants. We are also grateful to the all invited reviewers as well as to the participants.

#### The editors

### The 4th International Conference on

# **Energy, Environment and Sustainable Development**

### (EESD 2014)

## **Conference Organization**

### Chairman

Prof. Danhong Chen, Shanghai University of Electric Power, China

#### Co-Chairmen

Prof. Yubin Tang, Jiangsu University of Science and Technology, China

Prof. Weiguo Pan, Shanghai University of Electric Power, China

### **International Scientific Committee**

Academician Prof. Kefa Cen ,Zhejiang University, China

Prof. Hexing Li, Shanghai University of Electric Power, China

Prof. Jun Ma, Harbin Institute of Technology, China

Prof. Dongming Ren, Energy Res. Insti. Nat. Development and Reform Commission

Prof. Guangjun Wang, Chongqing University, China

Prof. Peihong Wang, Southeast University, China

Prof. Jingli Xu, Shanghai University of Engineering Science, China

Prof. Jinglong Bu, Hebei United University, China

Prof. Wenbin Cai, Fudan University, China

Prof. Zhenqian Chen, Southeast University, China

Prof. Haozhong Cheng, Shanghai Jiao Tong University, China

Prof. Ming Dong, Shanghai Jiao Tong University, China

Prof. Boxue Du, Tianjin University, China

Prof. Yang Fu, Shanghai University of Electric Power, China

Prof. Honghua Ge, Shanghai University of Electric Power, China

Prof. Jingtao Han, University of Science & Technology Beijing, China

Prof. George A. O'Doherty, Northeastern University, USA

- Prof. Tetsuro Majima, Osaka University, Japan
- Prof. Zhongyang Luo, Zhejiang University, China
- Prof. Yunfeng Lu, University of California, Los Angeles, USA
- Prof. Jummy C. Yu, The Chinese University of Hong Kong, HK
- Prof. Zhengyi Jiang, University of Wollongong, AU
- Prof. Yongguang Li, Shanghai University of Electric Power, China
- Prof. Boqiang Lin, Xiamen University, China
- Prof. Yongdi Liu, East China University of Science and Technology, China
- Prof. Lianguang Liu, North China Electric Power University, China
- Prof. Xiaoming Jia, Hebei United University, China
- Prof. Jianmin Chen, Fudan University, China
- Prof. Jinping Jia, Shanghai Jiaotong University, China
- Prof. Xuesong Jin, Southwest Jiaotong University, China
- Prof. Yongfa Zhu, Qinghua University, China
- Prof. Yiming Xu, Zhejiang University, China
- Prof. Shaojian Ma, Guangxi University, China
- Prof. Sihai Jiao, Research Institute, Baosteel, China
- Prof. Dongdong Li, Shanghai University of Electric Power, China
- Prof. Yungang Li, Hebei United University, China
- Prof. Shanqing Li, Research Institute, Baosteel, China
- Prof. Yongchen Lin, Central South University, China
- Prof. Xianghua Liu, Northeastern University, China
- Prof. Lian'guang Liu, South China Electric Power University
- Prof. Zifeng Ma, Shanghai Jiao Tong University, China
- Prof. Weiguo Pan, Shanghai University of Electric Power, China
- Prof. Jianxing Ren, Shanghai University of Electric Power, China
- Prof. Shigang Sun, Xiamen University, China
- Prof. Wenlei Sun, Xinjiang University, China
- Prof. Zhong Tang, Shanghai University of Electric Power, China
- Prof. Kaiming Wu, Wuhan University of Science and Technology, China
- Prof. Jun Wang, Northeastern University, China

- Prof. Fushuan Wen, Zhejiang University, China
- Prof. Qiang Wang, Jinan University, China
- Prof. Jiang Wu, Shanghai University of Electric Power, China
- Prof. Yongyao Xia, Fudan University, China
- Prof. Qunjie Xu, Shanghai University of Electric Power, China
- Prof. Gang Xu, Guangzhou Institute of Energy Conversion, CAS
- Prof. Yongping Yang, South China Electric Power University
- Prof. Shaohui Yin, Hunan University, China
- Prof. Bo Zhang, South China University of China, China
- Prof. Hong Zhang, Nanjing University of Technology, China
- Prof. Hao Zhang, Shanghai University of Electric Power, China
- Prof. Guohua Zhao, Tongji University, China
- Prof. Feng Zhao, Institute of Urban Environment, Chinese Academy of Sciences, China
- Prof. Daquan Zhang, Shanghai University of Electric Power, China
- Prof. Jianmin Zeng, Guangxi University, China
- Prof. Qunzhi Zhu, Shanghai University of Electric Power, China
- Prof. Qi Zhou, Tongji University, China
- Prof. Hui Li, Shanghai Normal University, China
- Prof. Xibin Yu, Shanghai Normal University, China
- Prof. Shiping Yang, Shanghai Normal University, China
- Prof. Biao Wang, Donghua University, China
- Prof. Jianhui Fang, Shanghai University, China
- Prof. Junxi Zhang, Shanghai University of Electric Power, China
- Prof. Heinz-Gunter, Brokmeier, Technische Universitat Clausthal, Germany
- Prof. Sagar Kamarthi, Northeastern University, USA
- Prof. Christian Kloc, Nanyang Technological University, Singapore
- Prof. George A. O'Doherty, Northeastern University, USA.
- Prof. Tetsuro Majima, Osaka University, Japan
- Prof. Yunfeng Lu, University of California, Los Angeles, USA
- Prof. Jimmy C. Yu, The Chineses University of Hong Kong, Hong Kong
- Prof. AKM Nurul Amin, International Islamic University, Malaysia

- Dr. Chunsheng Lu, Curtin University of Technology, Australia
- Prof. Geun Jo Han, Dong-A Univeristy, Korea
- Prof. Ken-ichi Manabe, Tokyo Metropolitan University, Japan
- Prof. Indra Putra Almanar, Universiti Sains Malaysia
- Prof. Kyung-Man Moon, Korea Maritime University, Korea
- Prof. Walid Mahmoud Shewakh, Beni Suef university, Egypt
- Prof. Christian Kloc, Nanyang Technological University, Singapore
- Prof. Jacques Noudem, CRISMAT laboratory, France
- Dr. Khaled Habib, Fellow of the SPIE, IRE Program, EBR Center, KISR, Kuwait

## **Local Organizing Committee**

Prof. Yubin Tang, Jiangsu University of Science and Technology, China