

Smart Grid and Renewable Energy



www.scirp.org/journal/sgre



Journal Editorial Board

ISSN Print: 2151-481X ISSN Online: 2151-4844 http://www.scirp.org/journal/sgre

Editors-in-Chief

| Prof. Victor Sreeram | University of Western Australia, Australia |
|----------------------|--|
| Prof. Yuanzhang Sun | Wuhan University, China |

Editorial Advisory Board

| Prof. Ching Chuen Chan | University of Hong Kong, China |
|------------------------|---|
| Prof. Yusheng Xue | State Grid Electric Power Research Institute, China |
| Prof. Ryuichi Yokoyama | Tokyo Metropolitan University, Japan |
| Dr. Xiaoxin Zhou | Chinese Society of Electrical Engineering, China |

Editorial Board

| Prof. Emanuele CalabróInstitute of Industrial Technology, ItalyProf. Ho ChangNational Taipei University of Technology, Chinese TaipeiDr. Seokheun ChoiBinghamton University, USAProf. Kalyanmoy DebIndian Institute of Technology, IndiaProf. Volkmar DierolfLehigh University, USADr. Daniel GarraínSpanish Ministry of Science and Innovation, SpainDr. Katerina IoakeimidiStanford University, USADr. Herbert IuUniversity of Western Australia, AustraliaDr. Sanchit KhuranaBloom Energy, USAProf. Chunxiang LiShanghai University, ChinaDr. Jalan Dah-Chuan LuUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Genoa, ItalyDr. Yang ShiUniversity of Science, ItalyProf. Igor I. StrakovskyThe George Washington University, USAProf. Huiming WeeChung Yuan Christian University, Chinase TaipeiProf. Daniele De WrachienState University of Milan, ItalyProf. Changhui YeChinese Academy of Sciences, ChinaProf. Weiping ZhangShanghai Jiao Tong University, China | Prof. Gholam Hossein Bordbar | Shiraz University, Iran |
|---|------------------------------|--|
| Dr. Seokheun ChoiBinghamton University, USAProf. Kalyanmoy DebIndian Institute of Technology, IndiaProf. Volkmar DierolfLehigh University, USADr. Daniel GarraínSpanish Ministry of Science and Innovation, SpainDr. Katerina IoakeimidiStanford University, USADr. Herbert IuUniversity of Western Australia, AustraliaDr. Sanchit KhuranaBloom Energy, USAProf. Chunxiang LiShanghai University, ChinaDr. Jylan Dah-Chuan LuUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Genoa, ItalyDr. Yang ShiUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USAProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Huiming WeeChung Yuan Christian University, USAProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyPr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Prof. Emanuele Calabrò | Institute of Industrial Technology, Italy |
| Prof. Kalyanmoy DebIndian Institute of Technology, IndiaProf. Volkmar DierolfLehigh University, USADr. Daniel GarraínSpanish Ministry of Science and Innovation, SpainDr. Katerina IoakeimidiStanford University, USADr. Herbert IuUniversity of Western Australia, AustraliaDr. Sanchit KhuranaBloom Energy, USAProf. Chunxiang LiShanghai University, ChinaDr. Jylan Dah-Chuan LuUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Genoa, ItalyDr. Yang ShiUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USAProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Prof. Ho Chang | National Taipei University of Technology, Chinese Taipei |
| Prof. Volkmar DierolfLehigh University, USADr. Daniel GarraínSpanish Ministry of Science and Innovation, SpainDr. Katerina IoakeimidiStanford University, USADr. Herbert IuUniversity of Western Australia, AustraliaDr. Sanchit KhuranaBloom Energy, USAProf. Chunxiang LiShanghai University, ChinaDr. Fof. D. Subbaram NaiduUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Genoa, ItalyDr. Yang ShiUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USAProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyProf. Changhui YeChinese Academy of Sciences, China | Dr. Seokheun Choi | Binghamton University, USA |
| Dr. Daniel GarraínSpanish Ministry of Science and Innovation, SpainDr. Katerina IoakeimidiStanford University, USADr. Herbert IuUniversity of Western Australia, AustraliaDr. Sanchit KhuranaBloom Energy, USAProf. Chunxiang LiShanghai University, ChinaDr. Dylan Dah-Chuan LuUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Genoa, ItalyDr. Yang ShiUniversity of Victoria, AustraliaDr. Pierluigi SianoUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Daniele De WrachienState University of Milan, ItalyProf. Changhui YeChinese Academy of Sciences, China | Prof. Kalyanmoy Deb | Indian Institute of Technology, India |
| Dr. Katerina IoakeimidiStanford University, USADr. Herbert IuUniversity of Western Australia, AustraliaDr. Sanchit KhuranaBloom Energy, USAProf. Chunxiang LiShanghai University, ChinaDr. Dylan Dah-Chuan LuUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Genoa, ItalyDr. Federico ScarpaUniversity of Victoria, AustraliaDr. Yang ShiUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USAProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyProf. Changhui YeChinese Academy of Sciences, China | Prof. Volkmar Dierolf | Lehigh University, USA |
| Dr. Herbert IuUniversity of Western Australia, AustraliaDr. Sanchit KhuranaBloom Energy, USAProf. Chunxiang LiShanghai University, ChinaDr. Dylan Dah-Chuan LuUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Minnesota, USADr. Federico ScarpaUniversity of Genoa, ItalyDr. Yang ShiUniversity of Victoria, AustraliaDr. Pierluigi SianoUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Dr. Daniel Garraín | Spanish Ministry of Science and Innovation, Spain |
| Dr. Sanchit KhuranaBloom Energy, USAProf. Chunxiang LiShanghai University, ChinaDr. Dylan Dah-Chuan LuUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Minnesota, USADr. Federico ScarpaUniversity of Genoa, ItalyDr. Yang ShiUniversity of Victoria, AustraliaDr. Pierluigi SianoUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Dr. Katerina Ioakeimidi | Stanford University, USA |
| Prof. Chunxiang LiShanghai University, ChinaDr. Dylan Dah-Chuan LuUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Minnesota, USADr. Federico ScarpaUniversity of Genoa, ItalyDr. Yang ShiUniversity of Victoria, AustraliaDr. Pierluigi SianoUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyPr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Dr. Herbert Iu | University of Western Australia, Australia |
| Dr. Dylan Dah-Chuan LuUniversity of Sydney, AustraliaProf. D. Subbaram NaiduUniversity of Minnesota, USADr. Federico ScarpaUniversity of Genoa, ItalyDr. Yang ShiUniversity of Victoria, AustraliaDr. Pierluigi SianoUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyProf. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Dr. Sanchit Khurana | Bloom Energy, USA |
| Prof. D. Subbaram NaiduUniversity of Minnesota, USADr. Federico ScarpaUniversity of Genoa, ItalyDr. Yang ShiUniversity of Victoria, AustraliaDr. Pierluigi SianoUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Prof. Chunxiang Li | Shanghai University, China |
| Dr. Federico ScarpaUniversity of Genoa, ItalyDr. Yang ShiUniversity of Victoria, AustraliaDr. Pierluigi SianoUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Dr. Dylan Dah-Chuan Lu | University of Sydney, Australia |
| Dr. Yang ShiUniversity of Victoria, AustraliaDr. Pierluigi SianoUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Prof. D. Subbaram Naidu | University of Minnesota, USA |
| Dr. Pierluigi SianoUniversity of Salerno, ItalyProf. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Dr. Federico Scarpa | University of Genoa, Italy |
| Prof. Igor I. StrakovskyThe George Washington University, USADr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Dr. Yang Shi | University of Victoria, Australia |
| Dr. Salahadin VaisiUniversity of Kurdistan, IranProf. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Dr. Pierluigi Siano | University of Salerno, Italy |
| Prof. Huiming WeeChung Yuan Christian University, Chinese TaipeiProf. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Prof. Igor I. Strakovsky | The George Washington University, USA |
| Prof. Daniele De WrachienState University of Milan, ItalyDr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Dr. Salahadin Vaisi | University of Kurdistan, Iran |
| Dr. Fuqian YangUniversity of Kentucky, USAProf. Changhui YeChinese Academy of Sciences, China | Prof. Huiming Wee | Chung Yuan Christian University, Chinese Taipei |
| Prof. Changhui Ye Chinese Academy of Sciences, China | Prof. Daniele De Wrachien | State University of Milan, Italy |
| | Dr. Fuqian Yang | University of Kentucky, USA |
| Prof. Weiping ZhangShanghai Jiao Tong University, China | Prof. Changhui Ye | Chinese Academy of Sciences, China |
| | Prof. Weiping Zhang | Shanghai Jiao Tong University, China |



Table of Contents

Volume 8 Number 10

October 2017

| Distributed Renewable Energy under the Guidance of Price Autonomous | |
|--|--|
| Operation Technology | |
| A. Habib, A. Arshad, R. Khan | |
| Effect of Incidence Angle of Magnetic Field on the Performance of a Polycrystalline Silicon Solar Cell under Multispectral Illumination | |
| I. Sourabié, I. Zerbo, M. Zoungrana, D. U. Combari, D. J. Bathiebo | |

Smart Grid and Renewable Energy (SGRE) Journal Information

SUBSCRIPTIONS

The *Smart Grid and Renewable Energy* (Online at Scientific Research Publishing, <u>www.SciRP.org</u>) is published monthly by Scientific Research Publishing, Inc., USA.

Subscription rates: Print: \$79 per copy. To subscribe, please contact Journals Subscriptions Department, E-mail: <u>sub@scirp.org</u>

SERVICES

Advertisements Advertisement Sales Department, E-mail: service@scirp.org

Reprints (minimum quantity 100 copies) Reprints Co-ordinator, Scientific Research Publishing, Inc., USA. E-mail: <u>sub@scirp.org</u>

COPYRIGHT

Copyright and reuse rights for the front matter of the journal:

Copyright © 2017 by Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY). http://creativecommons.org/licenses/by/4.0/

Copyright for individual papers of the journal:

Copyright © 2017 by author(s) and Scientific Research Publishing Inc.

Reuse rights for individual papers:

Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

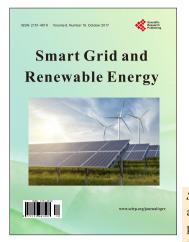
Disclaimer of liability

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinion of Scientific Research Publishing, Inc. We assume no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. We expressly disclaim any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

PRODUCTION INFORMATION

For manuscripts that have been accepted for publication, please contact: E-mail: sgre@scirp.org

Call for Papers



Smart Grid and Renewable Energy

ISSN Print: 2151-481X ISSN Online: 2151-4844 http://www.scirp.org/journal/sgre

Smart Grid and Renewable Energy (SGRE) is an international journal dedicated to the latest advancement of smart grid and renewable energy. The goal of this journal is to provide a platform for scientists and academicians all over the world to promote, share, and discuss various new issues and developments in different areas of smart grid and renewable energy.

Editors-in-Chief

Prof. Victor Sreeram Prof. Yuanzhang Sun University of Western Australia, Australia Wuhan University, China

Editorial Advisory Board

| Prof. Ching Chuen Chan | University of Hong Kong, China |
|------------------------|---|
| Prof. Yusheng Xue | State Grid Electric Power Research Institute, China |
| Prof. Ryuichi Yokoyama | Tokyo Metropolitan University, Japan |
| Dr. Xiaoxin Zhou | Chinese Society of Electrical Engineering, China |

Subject Coverage

All manuscripts submitted to SGRE must be previously unpublished and may not be considered for publication elsewhere at any time during SGRE's review period. Additionally, accepted ones will immediately appear online followed by printed hard copy. The topics to be covered by Smart Grid and Renewable Energy include, but are not limited to:

- Bio-Energy Technologies, Process and Utilization
- Concept and Structure of Smart Grid
- Decision Making under Uncertainty in the Integration of Renewable Energy Systems
- Design of Sustainable Product-Service Business Models
- Development of Smart Grid
- Environmental-Friendly Technologies for Power Generation
- Geothermal and Tidal Wave Energy
- Hydropower Technologies and Applications
- Information and Smart Meter Reading
- Integrated Energy and Communications

- MEMS & NEMS and Their Applications for Power Generation
- New Technologies and Design for Energy Efficiency
- New Technologies for Minimizing CO₂ Generation
- Operations Research for Green Logistics
- Photovoltaic for Solar Power Applications
- Power System Analysis and Optimization
- Power System Planning and Operation
- Service Optimization for Renewable Energy Supply
- Solar Energy Utilization—Heat and Mass Transfer Technology
- Wind Power Generation and Utilization

We are also interested in short papers (letters) that clearly address a specific problem, and short survey or position papers that sketch the results or problems on a specific topic. Authors of selected short papers would be invited to write a regular paper on the same topic for future issues of the SGRE.

Notes for Intending Authors

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Paper submission will be handled electronically through the website. All papers are refereed through a peer review process. For more details about the submissions, please access the website.

Website and E-Mail

http://www.scirp.org/journal/sgre

E-mail: sgre@scirp.org

What is SCIRP?

Scientific Research Publishing (SCIRP) is one of the largest Open Access journal publishers. It is currently publishing more than 200 open access, online, peer-reviewed journals covering a wide range of academic disciplines. SCIRP serves the worldwide academic communities and contributes to the progress and application of science with its publication.

What is Open Access?

Art and Design Review

Advances in

dvances in Biological bemistry Entomolog

Applied Mathematics

Engineering

uitit e

All original research papers published by SCIRP are made freely and permanently accessible online immediately upon publication. To be able to provide open access journals, SCIRP defrays operation costs from authors and subscription charges only for its printed version. Open access publishing allows an immediate, worldwide, barrier-free, open access to the full text of research papers, which is in the best interests of the scientific community.

• High visibility for maximum global exposure with open access publishing model

Soft

- Rigorous peer review of research papers
- Prompt faster publication with less cost
- Guaranteed targeted, multidisciplinary audience



Website: http://www.scirp.org Subscription: sub@scirp.org Advertisement: service@scirp.org