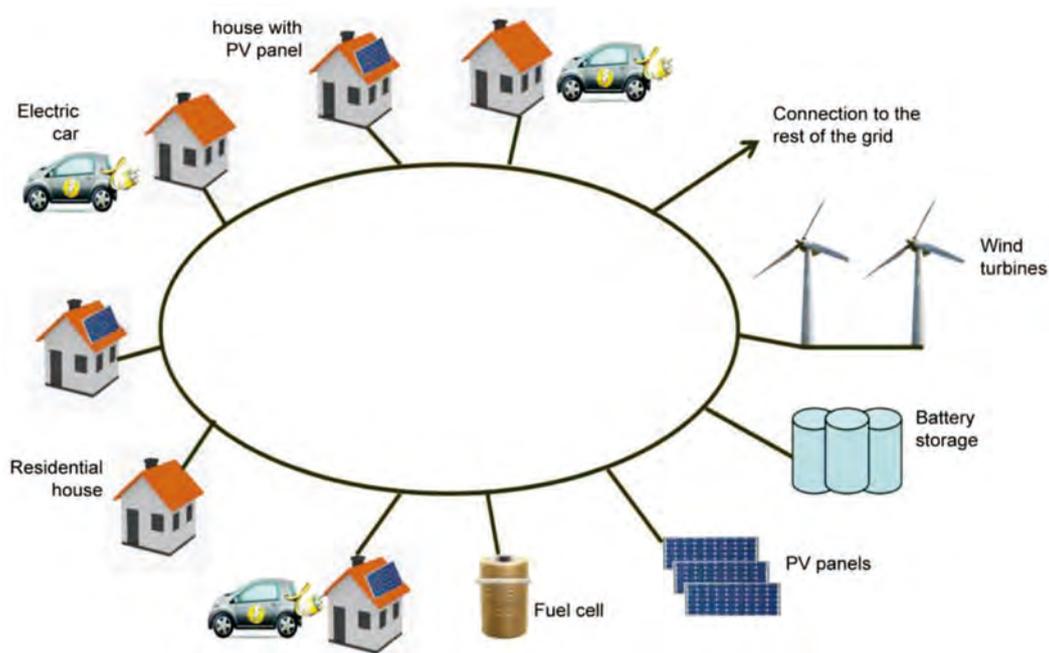


Smart Grid and Renewable Energy



ISSN: 2151-481X



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

Dr. 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. Gholam Hossein Bordbar

Shiraz University, Iran

Prof. Ho Chang

National Taipei University of Technology, Chinese Taipei

Dr. Seokheun Choi

Binghamton University, USA

Prof. Kalyanmoy Deb

Indian Institute of Technology, India

Prof. Volkmar Dierolf

Lehigh University, USA

Dr. Daniel Garraín

Spanish Ministry of Science and Innovation, Spain

Dr. Katerina Ioakeimidi

Stanford University, USA

Dr. Herbert Iu

The University of Western Australia, Australia

Prof. Chunxiang Li

Shanghai University, China

Dr. Dylan Dah-Chuan Lu

University of Sydney, Australia

Dr. Federico Scarpa

University of Genoa, Italy

Dr. Yang Shi

University of Victoria, Australia

Dr. Pierluigi Siano

University of Salerno, Italy

Prof. Igor I. Strakovsky

The George Washington University, USA

Dr. Salahadin Vaisi

University of Kurdistan, Iran

Prof. Huiming Wee

Chung Yuan Christian University, Chinese Taipei

Prof. Daniele De Wrachien

State University of Milan, Italy

Dr. Fuqian Yang

University of Kentucky, USA

Prof. Changhui Ye

Chinese Academy of Sciences, China

Prof. Weiping Zhang

Shanghai Jiao Tong University, China

TABLE OF CONTENTS

Volume 4 Number 5

August 2013

Smart Grid Technology and Its Possible Applications to the Nigeria 330 kV Power System

O. Patrick, O. Tolulope, O. Sunny.....391

Model-Based Quantification of Load Shift Potentials and Optimized Charging of Electric Vehicles

T. Hahn, M. Schönfelder, P. Jochem, V. Heuveline, W. Fichtner.....398

PV-Grid Tie System Energizing Water Pump

S. Khader, A.-K. Daud.....409

Valuation Model for Adding Energy Resource into Autonomous Energy Cluster

E. de Kok, E. Negeri, A. van Wijk, N. Baken.....419

The figure on the front cover is from the article published in Smart Grid and Renewable Energy, 2013, Vol. 4, No. 5, pp. 419-427 by Ewoud de Kok, *et al.*

Smart Grid and Renewable Energy (SGRE)

Journal Information

SUBSCRIPTIONS

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

Subscription rates:

Print: \$59 per copy.

To subscribe, please contact Journals Subscriptions Department, E-mail: sub@scirp.org

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: sub@scirp.org

COPYRIGHT

Copyright©2013 Scientific Research Publishing, Inc.

All Rights Reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as described below, without the permission in writing of the Publisher.

Copying of articles is not permitted except for personal and internal use, to the extent permitted by national copyright law, or under the terms of a license issued by the national Reproduction Rights Organization.

Requests for permission for other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works or for resale, and other enquiries should be addressed to the Publisher.

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

ability, availability, controllability, responsiveness, and -convenience. Moreover, comprehensive set of performance indicators of a cluster, that relate to environmental, economical and social values, are considered and modeled.

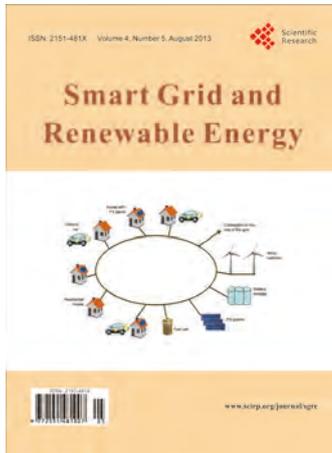
Based on this model, the impacts of adding an energy resource into a cluster is analyzed. We also presented a case study to test our proposed theoretical model which endorsed the strength of the model to evaluate the value an energy resource adds to a cluster. Our model also reveals that the value added by an energy resource depends both on the composition of the cluster and the precedence of the usage of energy resources in the cluster.

Developing appropriate stochastic data that better capture the behaviors of the energy resources could help to analyze the benefits of the valuation model more thoroughly. Further, more realistic and synthetic test cases could be employed to evaluate the proposed valuation model.

Our proposed valuation model can be used as a basis to design optimal composition of a cluster, whereby certain energy resources are added to or removed from the cluster depending on their impact on the desirable performance indicators.

REFERENCES

- [1] OECD/IEA, "Medium-Term Renewable Energy Market Report," 2012.
<http://www.iea.org/Textbase/npsum/MTrenew2012SUM.pdf>
- [2] International Energy Agency, "Distributed Generation in Liberalized Electricity Markets," 2002.
<http://gasunie.eldoc.ub.rug.nl/FILES/root/2002/3125958/3125958.pdf>
- [3] N. Hatzigiorgiou, N. Jenkins, G. Strbac, J. A. P. Lopes, J. Ruela and A. Engler, "MICROGRIDS—Large Scale Integration of Micro-Generation to Low Voltage Grids," CIGRE C6-309, Paris, 2006.
- [4] European Parliament, "All New Buildings to Be Zero Energy from 2019," Committee on Industry, Research and Energy, Brussels, 2009.
<http://www.europarl.europa.eu/sides/getDoc.do?language=en&type=IM-PRESS&reference=20090330IPR52892>
- [5] IEA-ETSAP and IRENA, "Electricity Storage Technology," 2012.
<http://www.irena.org/DocumentDownloads/Publications/IRENA-ETSAP%20Tech%20Brief%20E18%20Electricity-Storage.pdf>
- [6] D. Kottick, M. Blau and D. EEdelstein, "Battery Energy Storage for Frequency Regulation in an Island Power System," *IEEE Transactions on Energy Conversion*, Vol. 8, No. 3, 1993, pp. 455-459. [doi:10.1109/60.257059](https://doi.org/10.1109/60.257059)
- [7] G. Mulder, F. D. Ridder and D. Six, "Electricity Storage for Grid-connected Household Dwellings with PV Panels," *Solar Energy*, Vol. 84, 2010, pp. 1284-1293.
[doi:10.1016/j.solener.2010.04.005](https://doi.org/10.1016/j.solener.2010.04.005)
- [8] P. F. Ribeiro, B. K. Johnson, M. L. Crow, A. Arsoy and Y. Liu, "Energy Storage Systems for Advanced Power Applications," *Proceedings of the IEEE*, Vol. 89, No. 12, December 2001, pp. 1744-1756. [doi:10.1109/5.975900](https://doi.org/10.1109/5.975900)
- [9] E. Negeri and N. Baken, "Distributed Storage Management Using Dynamic Pricing in a Self-Organized Energy Community," *Self-Organizing Systems*, Springer, Berlin Heidelberg, 2012, pp. 1-12.
- [10] International Energy Agency, "Technology Roadmap: Electric and Plug-In Hybrid Electric Vehicles," 2011.
http://www.iea.org/publications/freepublications/publication/EV_PHEV_Roadmap.pdf
- [11] J. P. Lopes, F. J. Soares and P. R. Almeida, "Integration of Electric Vehicles in the Electric Power System," *Proceedings of the IEEE*, Vol. 99, No. 1, 2011, pp. 168-183.
[doi:10.1109/JPROC.2010.2066250](https://doi.org/10.1109/JPROC.2010.2066250)
- [12] E. Negeri and N. Baken, "Smart Integration of Electric Vehicles in an Energy Community," *Proceedings of the 1st International Conference on Smart Grids and Green IT Systems*, Porto, Portugal, SciTePress, 2012, pp. 25-32.
- [13] H. Farhangi, "The Path of the Smart Grid," *IEEE Power and Energy Magazine*, Vol. 8, No. 1, 2010, pp. 18-28.
[doi:10.1109/MPE.2009.934876](https://doi.org/10.1109/MPE.2009.934876)
- [14] Y.X. Yu and W. Luan. "Smart Grid and Its Implementations," *Proceedings of the CSEE*, Vol. 29, No. 34, 2009, pp. 1-8.
- [15] K. Dielmann and A. van der Velden, "Virtual Power Plants (VPP)—A New Perspective for Energy Generation?" *Proceedings of the 9th International Scientific and Practical Conference on Modern Techniques and Technologies*, April 2003, pp. 18-20.
- [16] F. Provoost, J. Myrzik and W. Kling, "Setting Up Autonomous Controlled Networks," *39th International Universities Power Engineering Conference (UPEC)*, Vol. 3, 2004, pp. 1190-1194.
- [17] E. Negeri, N. Baken and M. Popov, "Holonc Architecture of the Smart Grid," *Smart Grid and Renewable Energy*, Vol. 4, No. 2, 2013, pp. 202-212.
[doi:10.4236/sgre.2013.42025](https://doi.org/10.4236/sgre.2013.42025)
- [18] A. Alarcon-Rodriguez, G. Ault and S. Galloway, "Multi-Objective Planning of Distributed Energy Resources: A Review of the State-of-the-Art," *Renewable and Sustainable Energy Reviews*, Vol. 14, No. 5, 2010, pp. 1353-1366. [doi:10.1016/j.rser.2010.01.006](https://doi.org/10.1016/j.rser.2010.01.006)
- [19] J. B. machowski, "Power System Dynamics: Stability and Control," Wiley, Hoboken, USA, 2011.
- [20] A. Van Wijk, "Welcome to the Green Village," IOS Press, Delft 2013.
<http://www.thegreenvillage.org>
- [21] The Renewable Energy Grids Simulator Tool.
<http://arnekaas.nl/REGS/?id=1>



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

University of Western Australia, Australia

Prof. Yuanzhang Sun

Wuhan University, China

Editorial Advisory Board

Prof. Ching Chuen Chan

University of Hong Kong, China

Dr. 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 in 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

