



ENERGY 2016

The Sixth International Conference on Smart Grids, Green Communications and IT
Energy-aware Technologies

June 26 - 30, 2016

Lisbon, Portugal

ENERGY 2016 Editors

Steffen Fries, Siemens AG, Germany

Claus-Peter Rückemann, Leibniz Universität Hannover / Westfälische Wilhelms-
Universität Münster / North-German Supercomputing Alliance (HLRN), Germany

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2016) by International Academy, Research, and Industry Association (IARIA)
Please refer to the Copyright Information page.

Printed by Curran Associates, Inc. (2016)

International Academy, Research, and Industry Association (IARIA)
412 Derby Way
Wilmington, DE 19810

Phone: (408) 893-6407
Fax: (408) 527-6351

petre@iaria.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

| | |
|---|----|
| Energy Saving Potential of Adaptive, Networked, Embedded Systems - A Case Study <i>Patrick Heinrich, Erik Oswald, and Rudi Knorr</i> | 1 |
| The TUCool Project - Low-cost, Energy-efficient Cooling for Conventional Data Centres <i>Matthias Vodel and Marc Ritter</i> | 10 |
| Ensuring Secure Communication in Critical Infrastructures <i>Steffen Fries and Rainer Falk</i> | 15 |
| Aggregators Efficiency in Distributed Power Networks <i>Alain Tcheukam Siwe and Hamidou Tembine</i> | 21 |
| Optimization of Power Usage Effectiveness for Heterogenous Modular Data Centers using Neural Network <i>Vishal Kumar Singh and Jinhua Guo</i> | 27 |
| SmartEnergyHub - A Big-data Approach for the Optimization of Energy-intensive Infrastructures <i>Florian Maier, Andreas Wohlfrom, Falko Koetter, Sabrina Merkel-Malkowski, and Daniel Zech</i> | 33 |
| Study of a Smart Energy Community PV and Storage Requirements. A Modeling Approach Towards Net-Zero Energy. <i>Emilio J. Palacios-Garcia, Antonio Moreno-Munoz, Isabel Santiago, Isabel M. Moreno-Garcia, and Rafael J. Real-Calvo</i> | 37 |
| Finding Needles in a Haystack: Line Event Detection on Smart Grid PMU Data Streams <i>Duc Nguyen, Scott Wallace, and Xinghui Zhao</i> | 42 |
| Transforming Utilities: Turning Data into Intelligence with Data Analytics <i>Vanesa Cackovic and Zeljko Popovic</i> | 48 |
| Multi-objective Optimization of Energy Hubs at the Crossroad of Three Energy Distribution Networks <i>Giuseppe Paterno, Diego Arnone, Alessandro Rossi, Massimo Bertoncini, Eleonora Riva Sanseverino, and Mariano Giuseppe Ippolito</i> | 54 |