2nd European Energy Conference 2012

EPJ Web of Conferences Volume 33 (2012)

Maastricht, The Netherlands
17-20 April 2012

Editors:

A. McEvoy

# TABLE OF CONTENTS

## SYSTEMS ASPECTS

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>How a Future Energy World Could Look?</td>
<td>1</td>
</tr>
<tr>
<td>M. Ewert</td>
<td></td>
</tr>
<tr>
<td>MOSES – A Modelling Tool for the Analysis of Scenarios of the European Electricity Supply System</td>
<td>7</td>
</tr>
<tr>
<td>S. Weitemeyer, T. Feck, C. Agert</td>
<td></td>
</tr>
<tr>
<td>Estimating Renewable Energy Resources of Russia: Goals and Perspectives</td>
<td>11</td>
</tr>
<tr>
<td>S. Kiseleva, J. Rafikova, V. Shakun</td>
<td></td>
</tr>
<tr>
<td>Sociotechnical Scenarios for the Austrian Energy System</td>
<td>17</td>
</tr>
<tr>
<td>Michael Ornetzeder, Harald Rohracher, Petra Wächter</td>
<td></td>
</tr>
<tr>
<td>Is Advanced Real-Time Energy Metering Sufficient to Persuade People to Save Energy?</td>
<td>26</td>
</tr>
<tr>
<td>L. Ting, H. Leite, T. Ponce De Leão</td>
<td></td>
</tr>
<tr>
<td>Analysing the Role of Fusion Power in the Future Global Energy System</td>
<td>32</td>
</tr>
<tr>
<td>Evaluation of Solar Thermal Storage for Base Load Electricity Generation</td>
<td>40</td>
</tr>
<tr>
<td>R. Adinberg</td>
<td></td>
</tr>
<tr>
<td>Evaluation of the Impact of Wind Generation on the Electricity Market Prices and on the Profitability of New Wind Investments</td>
<td>47</td>
</tr>
<tr>
<td>A. J. Pereira, J. T. Saraiva</td>
<td></td>
</tr>
<tr>
<td>Global Warming Potential Impact of Bioenergy Systems</td>
<td>67</td>
</tr>
<tr>
<td>D. Tonini, L. Hamelin, H. Wenzel, T. Astrup</td>
<td></td>
</tr>
<tr>
<td>The Method of Assessment of Solar Potential for Selected Area with Use Geographical Information Systems</td>
<td>73</td>
</tr>
<tr>
<td>M. Pietras, P. Netzel</td>
<td></td>
</tr>
<tr>
<td>A Price Mechanism for Supply Demand Matching in Local Grid of Households with Micro-CHP</td>
<td>81</td>
</tr>
<tr>
<td>G. K. H. Larsen, N. D. Van Foreest, J. M. A. Scherpen</td>
<td></td>
</tr>
<tr>
<td>The Governance of Innovation Diffusion – A Socio-technical Analysis of Energy Policy</td>
<td>89</td>
</tr>
<tr>
<td>C. Nolden</td>
<td></td>
</tr>
<tr>
<td>RESRO: A Spatio-Temporal Model to Optimise Regional Energy Systems Emphasising Renewable Energies</td>
<td>97</td>
</tr>
<tr>
<td>S. Hausl, M. Biberacher, S. Gadocha</td>
<td></td>
</tr>
</tbody>
</table>

## SCIENCES FOR ENERGY

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBCs for Gas Turbines under Thermomechanical Loadings: Failure Behaviour and Life Prediction</td>
<td>105</td>
</tr>
<tr>
<td>T. Beck, O. Trunova, R. Herzog, L. Singheiser</td>
<td></td>
</tr>
<tr>
<td>Materials for Organic Photovoltaics: Insights from Detailed Structural Models and Molecular Simulations</td>
<td>113</td>
</tr>
<tr>
<td>Mose Casalegno, Alberto Baggio, Antonino Famulari, Stefano V. Meille, Tommaso Nicolini, Riccardo Po, Guido Raos</td>
<td></td>
</tr>
<tr>
<td>Luminescent Solar Concentrators – A Low Cost Photovoltaics Alternative</td>
<td>121</td>
</tr>
<tr>
<td>W. G. J. H. M. Van Sark</td>
<td></td>
</tr>
<tr>
<td>Electrolytically Deposited Cadmium Selenide Films for Photovoltaic Applications</td>
<td>129</td>
</tr>
<tr>
<td>C. T. Dervos, M. D. Palaiologopoulou</td>
<td></td>
</tr>
<tr>
<td>Basic Density and Moisture Content of Coniferous Branches and Wood in Northern Norway</td>
<td>137</td>
</tr>
<tr>
<td>J. Dibdikova, K. Vadla</td>
<td></td>
</tr>
<tr>
<td>Energy and Greenhouse Balance of Photocatalytic CO₂ Conversion to Methanol</td>
<td>143</td>
</tr>
<tr>
<td>D. Hausmann, G. Goettlicher, W. Muench</td>
<td></td>
</tr>
<tr>
<td>Electrochemical Preparation of Hematite Nanostructured Films for Solar Hydrogen Production</td>
<td>158</td>
</tr>
<tr>
<td>N. Kazemi, A. Maghsoudipour, T. Ebudzadeh</td>
<td></td>
</tr>
<tr>
<td>Nanostructured LiMPO₄ (M = Fe, Mn, Co, Ni) – Carbon Composites As Cathode Materials for Li-Ion Battery</td>
<td>165</td>
</tr>
<tr>
<td>Determination of Physical Properties of Fibrous Thermal Insulation</td>
<td>172</td>
</tr>
<tr>
<td>A. Tilioua, L. Libessart, A. Joulin, S. Lassue, B. Monod, G. Jeandel</td>
<td></td>
</tr>
</tbody>
</table>
New DRIE-Patterned Electrets for Vibration Energy Harvesting ................................................................. 180
S. Boisseau, A.-B. Duret, J.-J. Chaillout, G. Despesse

Ion Motion in Salt Water Flowing Under a Transverse Magnetic Field ..................................................... 188
R. De Luca

Structural Engineering of Vacancy Defected Bismuth Tellurides for Thermo-electric Applications .............. 195
K. Termentzidis, A. Pokropivny, S.-Y. Xiong, Y. Chumakov, P. Cortona, S. Volz

PRIMARY ENERGY

Interdisciplinary Design Study of a High-Rise Integrated Roof Wind Energy System .................................... 200

Integrated Roof Wind Energy System ........................................................................................................ 208
A. B. Suma, R. M. Ferraro, B. Dano, S. P. G. Moonen

Application of Liquid Metals for Solar Energy Systems .................................................................................. 216
W. Hering, R. Stieglitz, Th. Wetzel

Concentrating Solar Power in Europe, the Middle East and North Africa: Achieving Its Potential .............. 223

Microemulsions As Model Fluids for Enhanced Oil Recovery: Dynamics Adjacent to Planar
Hydrophilic Walls ............................................................................................................................................. 231
H. Frielinghaus, O. Holderer, F. Lipfert, M. Kerscher, S. Mattauch, D. Richter

Shale Gas in Europe: Pragmatic Perspectives and Actions ........................................................................ 238
A. Hubner, B. Horsfield, I. Kapp

Increasing Nuclear Power at Liberalised Energy Markets – Case Finland .................................................... 243
S. Syri, T. Kurki-Suonio, Y. Satka

Comparison of Radiation Hazard of HLW in Several Spent Nuclear Fuel Reprocessing Scenarios .............. 249
A. Ochkin, D. Gladilov, S. Stefanovsky

Adapting Computational Optimization Concepts from Aeronautics to Nuclear Fusion Reactor Design ....... 253
W. Dekeyser, D. Reiter, M. Baelmans

Polarization: A Must for Fusion ..................................................................................................................... 261
J. P. Didelez, C. Deutsch, M. Guidal

NETWORKS

Fundamental Properties of and Transition to a Fully Renewable Pan-European Power System .................. 266
G. B. Andresen, M. G. Rasmussen, R. A. Rodriguez, S. Becker, M. Greiner

Smart Thermal Networks for Smart Cities – Introduction of Concepts and Measures .................................... 273
R. R. Schmidt, O. Pol, D. Basciotti, J. Page

Transmission Expansion Planning – A Multiyear Dynamic Approach Using a Discrete Evolutionary Particle Swarm Optimization Algorithm ................................................................. 281
M. C. Rocha, J. T. Saraiva

Environmental Effects of Electrically-Stressed Sulfur Hexafluoride .......................................................... 295
Constantine T. Dervos, John A. Mergos, Maria D. Palaiologopoulou

Travelling Wave Based Fault Location Analysis for Transmission Lines ..................................................... 303
L. De Andrade, T. Ponce De Leão

Cryogenic Thermal Storage System for Discontinuous Industrial Vacuum Processes .................................. 312
M. Bruzzi, A. Chesl, A. Baldi, F. Turani, R. Mori, M. Scaringella, E. Carnevale

S. Abermann

Plug-in Hybrid Electric Vehicles in the Smart Grid Environment: An Economic Model of Load
Management by Demand Response ................................................................................................................. 326
R. Poudineh

Application of Hybrid-Electric Power Supply System in Fishing Vessels ................................................... 335
C. Gutiérrez, D. Meana

Flat-Land Large-Scale Electricity Storage (FLES) ........................................................................................... 343
J. Huynen, R. Schalij, T. Arts
END USE OF ENERGY

Dynamic Simulation As a Tool to Improve the Efficiency of Energy Systems. Applications in the Steel Industry ................................................................. 351
T. Henrion, A. Werber, R. Kitzber, M. Haider

A Low Carbon City Action Plan for One of China’s Low Carbon Pilot Cities ................................................................. 360
D. Jakutyte-Walangitang, J. Page

Life Cycle Analysis of a Geothermal Heatpump Installation and Comparison with a Conventional Fuel Boiler System in a Nursery School in Galicia (Spain) ......................................................... 367
J. Rodriguez, I. Bangueses, M. Castro

Monitoring of Building Heating and Cooling Systems Based on Geothermal Heat Pump in Galicia (Spain) ................................................................. 375
M. Iglesias, J. Rodriguez, D. Franco

Integrated Management of Residential Energy Resources ......................................................................................................................... 382
A. Soares, A. Gomes, C. H. Antunes

Passive Method to Reduce Solar Energy Effect on the Cooling Load in Buildings ................................................................. 390
A. A. Mohamad, H. Alansary, J. Orfi

Detailed Dynamic Heat Transfer in Thick Brick Walls Typical of Lille Metropolis ................................................................. 399
E. Sassine, Z. Younsi, A. B. Chérif, E. Antczak

Upgrade Opportunities for Buildings in City Centres ......................................................................................................................... 408
N. Brito, M. Silva

Building Lighting Energy Consumption Modelling with Hybrid Neural-Statistic Approaches ........................................................................................................ 416
F. Lauro, C. Meloni, S. Pizzuti

Technical and Economic Analysis of a Smart Public Lighting Model ........................................................................................................ 424
F. Bucci, M. Annunziato, F. Moretti

Analytical Method for Estimating Energy Output of Small Wind Turbines Integrated in Urban Areas ................................................................. 432
M. Popovac

Author Index