



**Editors: Nicu Gavriluta, Razvan Raducanu, Mihaiela Iliescu,  
Hariton Costin, Nikos Mastorakis, Vladimír Olej, Jiri Strouhal**

# **Recent Researches in Environment, Energy Planning & Pollution**

- **Proceedings of the 5<sup>th</sup> WSEAS International Conference on Renewable Energy Sources (RES '11)**
- **Proceedings of the 5<sup>th</sup> WSEAS International Conference on Energy Planning, Energy Saving, Environmental Education (EPESE '11)**
- **Proceedings of the 5<sup>th</sup> WSEAS International Conference on Waste Management, Water Pollution, Air Pollution, Indoor Climate (YWA1 '11)**

**Sponsor and Host:**

**The Alexandru Ioan Cuza University of Iasi**



**Iasi, Romania, July 1-3, 2011**



**ISBN: 978-1-61804-012-1**



# **RECENT RESEARCHES in ENVIRONMENT, ENERGY PLANNING and POLLUTION**

**Proceedings of the 5th WSEAS International Conference on  
RENEWABLE ENERGY SOURCES (RES '11)**

**Proceedings of the 5th WSEAS International Conference on  
ENERGY PLANNING, ENERGY SAVING, ENVIRONMENTAL  
EDUCATION (EPESE '11)**

**Proceedings of the 5th WSEAS International Conference on WASTE  
MANAGEMENT, WATER POLLUTION, AIR POLLUTION,  
INDOOR CLIMATE (WWAI '11)**

**Iasi, Romania  
July 1-3, 2011**

# **RECENT RESEARCHES in ENVIRONMENT, ENERGY PLANNING and POLLUTION**

**Proceedings of the 5th WSEAS International Conference on  
RENEWABLE ENERGY SOURCES (RES '11)**

**Proceedings of the 5th WSEAS International Conference on  
ENERGY PLANNING, ENERGY SAVING, ENVIRONMENTAL  
EDUCATION (EPESE '11)**

**Proceedings of the 5th WSEAS International Conference on WASTE  
MANAGEMENT, WATER POLLUTION, AIR POLLUTION,  
INDOOR CLIMATE (WWAI '11)**

**Iasi, Romania  
July 1-3, 2011**

Published by WSEAS Press

[www.wseas.org](http://www.wseas.org)

**Copyright © 2011, by WSEAS Press**

All the copyright of the present book belongs to the World Scientific and Engineering Academy and Society Press. 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, or otherwise, without the prior written permission of the Editor of World Scientific and Engineering Academy and Society Press.

All papers of the present volume were peer reviewed by two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.  
See also: <http://www.worldses.org/review/index.html>

ISBN: 978-1-61804-012-1



World Scientific and Engineering Academy and Society



The Alexandru Ioan Cuza University of Iasi

# **RECENT RESEARCHES in ENVIRONMENT, ENERGY PLANNING and POLLUTION**

**Proceedings of the 5th WSEAS International Conference on  
RENEWABLE ENERGY SOURCES (RES '11)**

**Proceedings of the 5th WSEAS International Conference on  
ENERGY PLANNING, ENERGY SAVING, ENVIRONMENTAL  
EDUCATION (EPESE '11)**

**Proceedings of the 5th WSEAS International Conference on WASTE  
MANAGEMENT, WATER POLLUTION, AIR POLLUTION,  
INDOOR CLIMATE (WWAI '11)**

**Iasi, Romania  
July 1-3, 2011**



**Editors:**

Prof. Nicu Gavriluta, The Alexandru Ioan Cuza University of Iasi, Romania  
Prof. Razvan Raducanu, The Alexandru Ioan Cuza University of Iasi, Romania  
Prof. Mihaela Iliescu, Politehnica University of Bucharest, Romania  
Prof. Hariton Costin, 'Gr.T. Popa' University of Medicine and Pharmacy, Romania  
Prof. Nikos Mastorakis, Technical University of Sofia, Bulgaria  
Prof. Vladimir Olej, University of Pardubice, Czech Republic  
Dr. Jiri Strouhal, University of Economics Prague, Czech Republic

**International Program Committee Members:**

C. Helmis, GREECE	G. Wolf, GERMANY
D. Perkins, USA	G. Wisniewski, POLAND
A. Stamou, GREECE	A. Van Zyl, BELGIUM
Marco Ceccarelli, ITALY	Z. A. Vale, GREECE
Dionysios (Dion) D. Dionysiou, USA	K. R. Rao, USA
Leon Trilling, USA	Bimal K. Bose, USA
D. L. Russell, USA	Joseph Sifakis, FRANCE
Leonid Perlovsky, USA	Paul E. Dimotakis, USA
John W. Lund, USA	Sidney Burrus, USA
Kent Davey, USA	Steven Collicott, USA
David Landgrebe, USA	Panos Pardalos, USA
Miguel A. Marino, USA	Olga Martin, ROMANIA
F. Rigas, GREECE	Periklis Papadopoulos, USA
Hamido Fujita, JAPAN	
N. Afgan, PORTUGAL	
Lena Valavani, USA	
Steven H. Collicott, USA	
F. Akgun, TURKEY	
Omar Badran, JORDAN	
Y. Baudoin, BELGIUM	
L. Boch-Andersen, BELGIUM	
M. Versan Kok, TURKEY	
G. Kolb, DENMARK	
A. Kurbatskiy, RUSSIA	
S. Linderoth, DENMARK	
P. Lunghi, ITALY	
C. Machens, GERMANY	
A. Midilli, CANADA	
Vijayan Iyer Gurumurthy, INDIA	
Helmut Jaberg, AUSTRIA	
Leonid G. Kazovsky, USA	
Leon O. Chua, USA	
Ar. Zuhairuse Md Darus, MALAYSIA	
Ioana Diaconescu, ROMANIA	
Hj Kamaruzaman Jusoff, USA	
J. Torres Farinha, PORTUGAL	
Bogdan Zygmunt, POLAND	
Lajos Barna, HUNGARY	
I. Stathopoulos, GREECE	
J. Van Mierlo, BELGIUM	
S. Ozdogan, TURKEY	
M. Reijalt, ITALY	
J. Rogut, POLAND	
E. Smole, AUSTRIA	
R. Tamme, GERMANY	
Brian A. Barsky, USA	
M. Teixeira, PORTUGAL	
R. Vigotti, ITALY	



**Preface**

This year the 5th WSEAS International Conference on RENEWABLE ENERGY SOURCES (RES '11), the 5th WSEAS International Conference on ENERGY PLANNING, ENERGY SAVING, ENVIRONMENTAL EDUCATION (EPESE '11) and the 5th WSEAS International Conference on WASTE MANAGEMENT, WATER POLLUTION, AIR POLLUTION, INDOOR CLIMATE (WWAI '11) were held in Iasi, Romania, July 1-3, 2011. The conferences provided a platform to discuss wind energy, hydrogen energy, biomass, solar energy, photovoltaic systems, geothermal energy, hydroelectric energy -- small hydro plants, energy planning studies, bio-diversity, materials chemistry, forestation, education on ecosystems, waste management, water pollution, air pollution, indoor climate etc. with participants from all over the world, both from academia and from industry.

Their success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of these conferences are published in this Book that will be indexed by ISI. Please, check it: [www.worldses.org/indexes](http://www.worldses.org/indexes) as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

Conferences such as these can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors





## Table of Contents

<b>Indoor Air Quality in Apartment Buildings of Estonia</b>	13
<i>Alo Mikola, Teet-Andrus Koiv</i>	
<b>Study of Soil Erosion and Sediment Transport in Small Watersheds</b>	18
<i>E. B. M. Beilicci, R. F. Beilicci, C. A. Girbaci</i>	
<b>Reactive Power Payments Employing Generation Distribution</b>	26
<i>Francisco David Moya Chaves</i>	
<b>Occupational Injuries Among the Workers of Tema oil Refinery and Safety Issues</b>	33
<i>Toseafa Hero, Ebo Tawiah Quartey</i>	
<b>Industrial Landfill Source of Air Pollution in Mitrovica</b>	37
<i>Ferat Shala, Milaim Sadiku, Blerim Rexha, Bedri Dragusha, Sala Berisha Shala</i>	
<b>Sediments Contaminated by Non-Polar Extractable Substances and Health Risks</b>	43
<i>Milos Bozek, Jiri Dvorak, Frantisek Bozek, Ilona Obrsalova</i>	
<b>Air Quality Assessment using Neural Networks and Fuzzy Logic</b>	49
<i>Petr Hajek, Vladimir Olej</i>	
<b>Analysis of Data on Hearing-Handicapped People at the Regional Level</b>	55
<i>Pavel Jirava, Jiri Krupka, Miloslava Kasparova, Jan Mandys</i>	
<b>Air Quality Modelling with Uncertainty</b>	60
<i>Vladimir Olej, Petr Hajek</i>	
<b>Development of Real-time Demand Resources Market Operating System in Korea</b>	66
<i>Don Hur</i>	
<b>Studies Regarding Water Treatment Efficiency</b>	71
<i>Gheorghe Gamaneci, Camelia Capatina, Daniela Cirtina</i>	
<b>A Study on Effective Factors in Environmental Alterations in Mega Cities. Case Study: Tehran Mega City</b>	77
<i>Alireza Estelaji, Mahnaz Allah Gholi Nejad</i>	
<b>Input – Output Model Reconsidered: Towards a Stochastic Version</b>	82
<i>Jan Suchacek, Petr Seda</i>	
<b>Temperature Distribution and Thermal Sensation in Classrooms Heated with Two Heating Systems in Winter Time</b>	88
<i>Sebastian Dorhoi, Ioan Borza, Olga Bancea, Mihai Cinca</i>	

<b>Fine Particle Collection Performance of a Glass Microfiber Filtering Unit as Tail End Device Polishing Flue Gas from Waste Incineration</b>	93
<i>E. Bemporad, N. Verdone, D. Zuccoli, M. Lodi, G. Liuzzo</i>	
<b>Effect of Irrigation with Dairy Factory Effluent on Soil Chemical, Physical and Microbial Properties</b>	99
<i>Y-Y. Liu, R. J. Haynes</i>	
<b>The Sustainability Science –a Challenge for an Education for Sustainable Development</b>	105
<i>Andrei Octavian Paraschivescu, Dumitru Bontas , Carmen Elena Radu, Mihai Florin Caprioara</i>	
<b>Water Quality Assessment using Benthic Macroinvertebrates in Wetlands and Ponds: Preliminary Study Case of Jijia and Miletin Ponds (ROSPA0042)</b>	111
<i>Diana Ghetu, Hariton Costin</i>	
<b>Linking Resource Depletion to Economic Performance of the Coal-Mining Regions</b>	115
<i>Egor Sidorov, Iva Ritschelova</i>	
<b>Logistics Model for Industrial Waste Treatment Processes</b>	121
<i>Ioan C. Dima, Valentin Radu, Janusz K. Grabara, Vladimir Modrak, Mircea Bunaciu</i>	
<b>Logistics Costs Estimation in Case of Industrial Waste Management</b>	127
<i>Ioan C. Dima, Marta Starostka-Patyk, Florin Radu, Jozef Novak-Marcincin, Alina I. Tabirca</i>	
<b>Environmental Health Effects of Unsafe Pollution Lead - A Synergistic Modeling Approach to Find Environmental Impacts</b>	132
<i>Vijayan Gurumurthy Iyer, Nikos E. Mastorakis</i>	
<b>Tools to Foster Synthesis of Environmental, Economic and Social Aspects in Region Development</b>	140
<i>Striteska Michaela, Svoboda Ondrej</i>	
<b>Balanced Scorecard for Sustainable Regional Development</b>	146
<i>Kozena Marcela, Striteska Michaela, Svoboda Ondrej</i>	
<b>Energy and Sustainable Development</b>	152
<i>Bohuslav Sekerka, Robert Bata</i>	
<b>Monitoring of Air Pollution Concentrations of CO<sub>2</sub> in Densely Populated Area of Eastern Bohemia – City of Pardubice</b>	158
<i>Jaromira Chylkova, Tomas Brunclik, Ilona Obrsalova, Miloslav Flegl, Renata Selesovska</i>	
<b>Choosing Alternative Regional Energy Sources from an Economic, Environmental and Social Aspects</b>	164
<i>Ilona Obrsalova, Renata Myskova, Petr Langasek</i>	
<b>Emission of Particulate Matter While Applying the Envirox™ Additive</b>	170
<i>Frantisek Bozek, Jaromir Mares, Milos Bozek, Jiri Huzlik</i>	

<b>Light Sensors for Solar Trackers</b>	176
<i>J. Rizk, A. Hellany, M. Nagrial</i>	
<b>Tourism Sustainable Development in Romania: South-West Development Region Oltenia</b>	182
<i>Ana Maria Marinoiu, Andreea Raluca Viciu</i>	
<b>Aspects of the Heating Medium Voltage Bus Bars, from Power Plants and Power Stations</b>	188
<i>Cristinel Popescu, Cristinel Racoceanu</i>	
<b>Reflectors and Concentrators for Solar Panels</b>	194
<i>J. Rizk, A. Hellany, M. Nagrial</i>	
<b>Briquetting Agricultural Waste as an Energy Source in Ghana</b>	200
<i>Ebo Tawiah Quartey</i>	
<b>Aspects Regarding the Impact on the Environment of the Flue-Gas Utilization in an Industrial Contour</b>	205
<i>Roxana Patrascu, Eduard Minciuc, George Darie, Ioan Bitir-Istrate</i>	
<b>Aspects Regarding the Somes Plateau Rural Settlements Water Supply</b>	210
<i>Victor Sorocovschi, Stefan Bilasco, Csaba Horvat</i>	
<b>Roughness Parameter of the Land Verification of Values Based on Measurements Obtained Through the Use of Anemometers Poles</b>	216
<i>Ioan Ion, Viorel Campian, Adrian Cuzmos, Cosmin Dumbrava</i>	
<b>Analysis of an Outer Bearing Bush of a Hydropower Plant Kaplan Turbine Using Finite Element Method</b>	221
<i>Calin-Octavian Miclosina, Constantin Viorel Campian, Doina Frunzaverde, Vasile Cojocar</i>	
<b>Residual Stresses Analysis of Weld Overlays Coatings Used for the Repairs at Kaplan Turbine Runner Blades Areas Damaged by Cavitation Erosion</b>	225
<i>Vasile Cojocar, Constantin-Viorel Campian, Doina Frunzaverde, Calin-Octavian Miclosina</i>	
<b>The Indoor Climate and Ventilation of Elderly Homes</b>	229
<i>Teet-Andrus Koiv, Hendrik Voll, Alo Mikola, Dmitri Lukjanov</i>	
<b>An AHP Approach to Evaluate the Implementation of WEEE Management Systems</b>	233
<i>Carmen Nadia Ciocoiu, Sofia Elena Colesca, Stefan Burcea</i>	
<b>Analysis of Selected Regional Quantitative Indicators</b>	239
<i>Jiri Krupka, Pavel Jirava, Jan Mandys, Filip Mezera</i>	
<b>Managing through Pollutant Vector the Wastewaters from a Chain of Coal-Fired Power Plants Discharging into Jiu River</b>	244
<i>Cornelia A. Bulucea, Andreea Jeles, Nikos E. Mastorakis, Carmen A. Bulucea, Constantin Brindusa</i>	

<b>Research Concerning the Use of Solar Energy in Romanian Anti-Hail System</b>	252
<i>Ionel Laurentiu Alboteanu, Constantin Sulea, Gheorghe Manolea, Aida Cornelia Bulucea</i>	
<b>Authors Index</b>	257

## Authors Index

Adrian Cuzmos	216	Flegl, M.	158	Moya Chaves, F. D.	26
Alboteanu, I. L.	252	Frunzaverde, D.	221, 225	Myskova, R.	164
Bancea, O.	88	Gamaneci, G.	71	Nagrial, M.	176, 194
Bata, R.	152	Gheteu, D.	111	Novak-Marcincin, J.	127
Beilicci, E. B. M.	18	Gholi Nejad, M. A.	77	Obrsalova, I.	43, 158, 164
Beilicci, R. F.	18	Girbaciuc, C. A.	18	Olej, V.	49, 60
Bemporad, E.	93	Grabara, J. K.	121	Ondrej, S.	140, 146
Bilasco, S.	210	Hajek, P.	49, 60	Paraschivescu, A. O.	105
Bitir-Istrate, I.	205	Haynes, R. J.	99	Patrascu, R.	205
Bontas, D.	105	Hellany, A.	176, 194	Popescu, C.	188
Borza, I.	88	Hero, T.	33	Quartey, E. T.	33, 200
Bozek, F.	43, 170	Horvat, C.	210	Racoceanu, C.	188
Bozek, M.	43, 170	Hur, D.	66	Radu, C. E.	105
Brindusa, C.	244	Huzlik, J.	170	Radu, F.	127
Brunclik, T.	158	Ion, I.	216	Radu, V.	121
Bulucea, A. C.	252	Iyer, V. G.	132	Rexha, B.	37
Bulucea, Ca. A.	244	Jeles, A.	244	Ritschelova, I.	115
Bulucea, Co. A.	244	Jirava, P.	55, 239	Rizk, J.	176, 194
Bunaciu, M.	121	Kasparova, M.	55	Sadiku, M.	37
Burcea, S.	233	Koiv, T.-A.	13, 229	Seda, P.	82
Campion, C. V.	216, 221, 225	Kozena, M.	146	Sekerka, B.	152
Capatina, C.	71	Krupka, J.	55, 239	Selesovska, R.	158
Caprioara, M. F.	105	Langasek, P.	164	Shala, F.	37
Chylkova, J.	158	Liu, Y.-Y.	99	Shala, S. B.	37
Cinca, M.	88	Liuzzo, G.	93	Sidorov, E.	115
Ciocioiu, C. N.	233	Lodi, M.	93	Sorocovschi, V.	210
Cirtina, D.	71	Lukjanov, D.	229	Starostka-Patyk, M.	127
Cojocar, V.	221, 225	Mandys, J.	55, 239	Striteska, M.	140, 146
Colesca, S. E.	233	Manolea, G.	252	Suchacek, J.	82
Costin, H.	111	Mares, J.	170	Sulea, C.	252
Darie, G.	205	Marinoiu, A. M.	182	Tabirca, A. I.	127
Dima, I. C.	121, 127	Mastorakis, N. E.	132, 244	Verdone, N.	93
Dorhoi, S.	88	Mezera, F.	239	Viciu, A. R.	182
Dragusha, B.	37	Miclosina, C.-O.	221, 225	Voll, H.	229
Dumbrava, C.	216	Mikola, A.	13, 229	Zuccoli, D.	93
Dvorak, J.	43	Minciuc, E.	205		
Estelaji, A.	77	Modrak, V.	121		