



# **RECENT ADVANCES in ENERGY and ENVIRONMENT TECHNOLOGIES and EQUIPMENT**

**Proceedings of the International Conference on ENERGY and  
ENVIRONMENT TECHNOLOGIES and EQUIPMENT  
(EEETE '10)**

**Universitatea Politehnica  
Bucharest, Romania, April 20-22, 2010**

**SPONSOR and ORGANIZER:  
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**Preface**

This year the International Conference on ENERGY and ENVIRONMENT TECHNOLOGIES and EQUIPMENT (EEETE '10) was held at Universitatea Politehnica, Bucharest, Romania, April 20-22, 2010. The conference remains faithful to its original idea of providing a platform to discuss new trends in energy production in classical plants, equipment for renewable sources of energy production, energy production impact on ecological systems, waste management equipment, equipment for ecological rehabilitation of contaminated sites, polluted waters rehabilitation equipment, technologies and equipment for air cleaning, energy efficiency, eco-labeling and energy labeling of equipment, equipment for waters and gases transportation, technological transfer in energy and environment equipment, energy equipment impact on climate changes, equipment for energy transportation and storage etc. with participants from all over the world, both from academia and from industry.

Its 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 this conference 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.

A Conference such as this 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





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## Plenary Lecture 1

### An Overview of How to Make Properly Harmonics Distortions Measurements in Medium Voltage Distribution System



#### Professor Liviu E. Petrean

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**Abstract:** In this paper we present an overview on how to conduct properly measurements and analysis to obtain accurate results in harmonic distortions propagation. Distortion of sinusoidal voltage and current waveforms caused by harmonics is one of the major power quality concerns in electric power system. With the widespread proliferation of power electronics loads significant amounts of harmonic distortion currents are being injected into power system. The distribution system impedance, the presence of a power factor improvement capacitor bank and the amount of resistive loads in the system are three primary variables affecting the system response characteristic. Current amplifications occur at frequencies different of the resonant frequencies; three maximum values corresponding to three oscillatory frequencies were found. In order to differentiate harmonic currents due to nonsinusoidal loads from harmonic currents due to resonance involving capacitor bank a frequency-domain analysis has been performed. It presents useful recommendations on how, where and under what conditions to make measurements of harmonic distortions.

#### Brief Biography of the Speaker:

Liviu Emil PETREAN was born in Romania on 15 September 1946. He received the B.Sc. "Diploma of Merit" in Power Engineering in 1969 and the Ph. D. degree in Electromagnetic Fields in 1983 from the "Politehnica" University of Timisoara. He worked first 6 years in power engineering area. Liviu Emil Petrean is currently Professor in Electrotechnics, Protective Relaying and Power Quality in the Faculty of Engineering, North University of Baia Mare and is director of Electrical Engineering Department. His main research interests concern finite elements method in Electromagnetic Fields, Electromagnetic separation of minerals, Energy Efficiency and Power Quality. In these fields, he authored over 80 scientific papers published or presented at international or national conferences. He has extensive experience in experimental research work certified by over 30 scientific research projects, from which he coordinated 11. He is IEEE affiliate member and technical reviewer for the PIERS Progress in Electromagnetics Research Symposium.

## Plenary Lecture 2

### The Use of Iron Oxide Nanostructures for Arsenic Removal from Drinking Water



**Dr. Arturo I. Martinez**

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**Abstract:** Arsenic has been classified as one of the most toxic and carcinogenic element. Arsenic contamination of water is a important problem in several countries around the world. This pollutant has been recorded by the World Health Organization as a first priority issue, and maximum concentration limit in drinking water has been reduced to 10 mg/L by several organizations. Iron oxides are very active materials for arsenic removal from waters. In order to maximize the arsenic adsorptive properties of iron oxides, the use of nanostructures is described. Iron oxide thin films and nanoparticles have been prepared by different methods, such as spray pyrolysis, co-precipitation, and thermal decomposition. Thin films were deposited on glass substrates with the hematite phase, whereas synthesized nanoparticles shown the magnetite and maghemite phases. The influence of the temperature is related with the structural, optical and morphological characteristic, and its role on the arsenic removal properties of iron oxide nanostructures is studied. Also, their stability, re-use, and long term use of the nanostructures is described in this paper.

**Brief Biography of the Speaker:**

Arturo I. Martinez received the Ph. D. degree in Physical Chemistry from the National Autonomous University of Mexico. Currently, he is a Scientist at the Center for Research and Advanced Studies of the National Polytechnic Institute in Saltillo, Mexico. His research interests are in preparation and haracterization of thin films and nanostructures of metal oxides, which include those of transition and main group metal ions. The classes of materials on which his research has focused include metal oxide thin films and semiconductors, for applications in photocatalysts, radiation detectors, electrochromism and water remediation. He has integrated students into his research projects to the extent that many of them have been included as co-authors on research papers given at international research meetings and published in peer reviewed research journals. He is the author and co-author of over 50 contributed and invited scientific presentations, refereed journal publications, book chapters, and invited seminars at universities.

## Plenary Lecture 3

### Criteria for the Performance Improvement of the Hydro Energetic Investments



**Dr. Alexandru Viorel Popescu**  
Director of Hydro Division of S.C. ENERGOMONTAJ S.A.  
Bucharest  
ROMANIA

**Abstract:** Generally, hydropower investments involve impressive investment, large quantities of materials and work power. For each of them, there are several steps of development, from the first decision of considering the idea, to the practical put in function. One of the most important phases is the decision of the general solution of the construction.

Presently, there are considered the technical acceptance of the solution and the economic evaluation, based on the actualized investments principle. The paper proposes some other criteria to evaluate the investments opportunity and extension, in the context of the technical and operational necessities.

The criterion are presented in a general form and particularized for hydropower plants investments. There are special mentions for small or micro- hydropower.

All the scientific conclusions should be supported by laboratories experiences, practical confirmations or integrated and trusty measurements. The criterion efficacy is confirmed by a practical study of a rehabilitation work evaluation.

#### **Brief Biography of the Speaker:**

Mr. Alexandru Viorel POPESCU is the Director of Hydro Division of S.C. ENERGOMONTAJ S.A. Bucharest, the most important company in Romania developing production, design and research activities in energy field.

From 1983 until present, Ms. Popescu dedicates all his efforts to hydropower installations development, by his work in production and also by developing specific researches in cooperation with the most prestigious institutions form Romania and other countries (France, Austria, and Japan).

Besides the production and design work, Mr.Popescu is involved in scientific researches, publishing more the 10 articles, high level indexed, in different scientific reviews and conferences proceedings.

Presently, Mr. Popescu just finalized the doctoral thesis with the title: Criteria for the performance improvement of the hydro energetic investments. By this work, he is valuating his large technical and scientific experience.

One of the most important scientific contributions he has in the energy field is referred to the micro hydro plants construction and autoimmunization.

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