2015 SCIEI
Lisbon, Portugal
CONFERENCES PROGRAM

2015 The 2nd International Conference on Energy and Environment Research (ICEER 2015)

2015 International Conference on Material Sciences (ICOMS 2015)

2015 4th International Conference on Smart Grid Systems (ICSGS 2015)

July 13-14, 2015

Novotel Lisboa

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ANNOUNCEMENT

***ICEER 2015 conference papers were selected and will get published on relevant journals, which will not be available on conference site, and will be delivered to authors' address after conference.**

***ICOMS 2015 conference papers were selected and will get published on relevant journals, which will not be available on conference site, and will be delivered to authors' address after conference.**

***ICSGS 2015 conference papers were selected and will get published on relevant journals, which will not be available on conference site, and will be delivered to authors' address after conference.**

***One best presentation will be selected from each session, the best one will be announced at the end of each Session, and awarded the certificate over the Dinner. The winners' photos will be updated on SCIEI official website: www.sciei.org.**

The Best Presentation will be evaluated from: Originality; Applicability; Technical Merit; PPT; English.

***If you didn't put a formal photo in your registration from, please take a formal one inch photo.**

SCIEI Publication committee

INSTRUCTIONS FOR ORAL PRESENTATIONS

Devices Provided by the Conference Organizer:

Laptops (with MS-Office & Adobe Reader)
Projectors & Screen
Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF files
(Files shall be copied to the Conference Computer 10 minutes earlier before each Session)
Duration of each Presentation (Tentatively):
Regular Oral Session: about 15 Minutes of Presentation, including Q&A

Dress code

Please wearing formal clothes or national characteristics of clothing

Conference Chair & Keynote Speaker

Prof. Manuel Carlos Felgueiras
Polytechnic Institute of Porto, Portugal

About Prof. Manuel Carlos Felgueiras:

Manuel Carlos Felgueiras received the B.S. and Ph.D. degrees in electrical and computer engineering from the Faculty of Engineering, University of Porto, Porto, Portugal, in 1987 and 2008, respectively.

He started is professional in 1987 as electronic designer for automation systems. Later was invited to supervise a test laboratory for verifying the accomplishment of European Standards in thermoelectric household appliances. He started the teaching activity in 1994 as Assistant Professor and later on as Adjunct Professor and researcher with the Department of Electrical Engineering, School of Engineering, Polytechnic Institute of Porto (IPP), Porto, Portugal. His research interests include design for debug and test of mixed-signals, remote experimentation in e-learning and renewable energy sources.

Prof. Felgueiras is member of the Portuguese Engineers Association and also the Global Online Laboratory Consortium (GOLC). He has published about 35 papers and includes the scientific committee of several conferences.

Topic: Buildings Sustainability – The Non-intrusive Load-identification System Contribution

Abstract: Buildings are responsible for an important share of the global energy consumed with the associated consequences at economic and environmental level. To overcome this actual concern several objectives were put in perspective, being one of them the energetic performance of systems and appliances. Efficiency depends on working on optimal conditions and user behavior. Monitoring of the energy consumption of each electric load is important but the use of decentralized energy is not feasible at present due to the huge number of loads connected to the electric grid. An alternative consists on the use of a centralized measurement device able to identify loads. This work presents a measurement infrastructure that have, among others, the possibility to make the identification of electrical loads data will be used to improve the energetic performance of households and buildings and increase the sustainability of the energy system.

Keynote Speaker

Prof. Florinda Martins
Polytechnic Institute of Porto, Portugal

About Prof. Florinda Martins:

Florinda Martins got her PhD in Chemical and Biological Engineering, Master in Environmental Engineering and a degree in Chemical Engineering from the Faculty of Engineering, University of Porto, Porto, Portugal, obtained in 2007, 1998 and 1989, respectively. Dr. Florinda Martins worked in industry as a process engineer and in the development of engineering projects. Further she was the director of a wastewater treatment plant. Nowadays is Adjunct Professor at Instituto Superior de Engenharia do Porto (ISEP), School of Engineering, Polytechnic Institute of Porto (IPP), Porto, Portugal. She has supervised several Master thesis and is the co-author of a book, several papers in international journals and conferences and has presented several oral and poster communications in conferences. She has also participated in several conference scientific committees. Her research interests include sustainability, environment, energy and optimization.

Topic: Indicators Used in the Energy Sector

Abstract: World energy mix still depends heavily on fossil fuels but the foreseen increase demand, the scarcity of those resources, their unevenly distribution as well as other factors such as economic burdens due to fossil fuel prices and climate change concerns contributed to the establishment and implementation of new policies in the energy sector. Renewable energy sources are being promoted worldwide as a pathway to reduce external energy dependency, moving towards lower carbon energy systems. It is important to policy makers, investors and other stakeholders to have tools for deciding which policies, investments and measures should be implemented in the future. Thus indicators play very important role for fulfilling that task.
This work present a structured presentation of several indicators commonly used to compare solutions in the energy domain.

Keynote Speaker

Prof. Nidia Caetano
Polytechcnic of Porto, Portugal

About Prof. Nidia Caetano:

Nídia de Sá Caetano B.S. and Ph.D. in Chemical Engineering, Faculty of Engineering of the University of Porto (FEUP), Portugal, in 1987 and 1996, respectively. She started the teaching activity in 1992 as Assistant Professor and is today Coordinator Professor with the CED, School of Engineering (ISEP), Polytechnic Institute of Porto (IPP), Portugal. She is sub director of the CED, having been laboratory director for ten years. From March 2013 she has been the director of the Master Course on Sustainable Energies of ISEP, in the MED.

Co-funder of the LEPAE of FEUP (nowadays LEPABE), where she is senior researcher, she is also collaborator of the CIETI/ISEP R&D center. Her research interests include biofuels; microalgae; wastes valorization and wastewater treatment, always using a sustainability based approach, having participated in several projects with the industry.

She has supervised several Master thesis and is the co-author of several book chapters and papers in international journals and conferences. She has also participated in several conference, organizing and scientific committees, having presented several communications. She has been the reviewer of numerous scientific publications in international journals and conferences and projects evaluator.

Title: Biorefineries: A Sustainable Approach for Biomass Valorisation

Abstract: Oil refineries were built to recover the maximum content of fossil petroleum, whose reserves are not evenly distributed all over the world, are scarce and becoming harder to extract. The result was that, associated to these processes, there has been an enormous production of emissions that are harmful to the environment.

Although in nature biomass is a renewable source, its availability is also limited due to the need for land or water. Therefore a similar concept to the one used for petroleum transformation and use should be applied to biomass. When a set of industrial units are built and linked together, it is possible to recover all of the interesting compounds from biomass, incorporating more value to a commonly low valued resource, and making the global process economically viable. On the other hand, the negative impacts on environment can be minimized and the positive impacts maximized, while contributing to new jobs creation, better opportunities and nation's independence.

This is the biorefinery concept that has been gaining importance in the last few years and will most certainly allow for a more sustainable world.

Plenary Speaker

Assoc. Prof. Vladimir Shurenkov
National Research Nuclear University, Russian Federation

About Assoc. Prof. Vladimir Shurenkov:

Vladimir V. Shurenkov, Ph.D., Associate Professor, Vice Dean of Department of Microelectronic, National Research Nuclear University "MEPhI" (Moscow Engineering Physics Institute), Moscow, Russian Federation. Research Interests: Radiation induced effects, durability and resistance to radiation in semiconductor devices and materials, electromagnetic compatibility of semiconductor electronic components and devices.

Title: The Review of the Induced Physical Effects on the Semiconductor Electronics under the Electromagnetic Pulse

Abstract: The response of the electronic devices subjected to the Electromagnetic Pulse (EMP) effect is a complex problem. The damage to the electronic device due to the EMP is one of the main failure mechanisms in the modern semiconductor electronic systems. The study of the induced physical effects on the semiconductor electronics in this particular aspect of damage is applicable not only to EMP problems but is also applicable when the high transient voltages appear in the circuits whether the pulse origin is EMP, or a transient transform within the system itself, which we will also address briefly.

Plenary Speaker

Prof. Ziaul Huque
Prairie View A&M University, USA

About Prof. Ziaul Huque:

Ziaul Huque received his BS degree in mechanical engineering from Bangladesh University of Engineering and Technology, Bangladesh, MS in mechanical engineering from Clemson University, USA and Ph.D. degree in mechanical engineering from Oregon State University, USA. He is currently a professor in the department of Mechanical Engineering and the Director of Computational Fluid Dynamics Institute at Prairie View A&M University. His current research interests are wind turbine noise reduction, fluid-structure interaction, propulsion, inlet-ejector system of rocket based combined cycle engines, clean coal technology, and self-propagating high-temperature synthesis. He received several excellence in teaching and service awards from Roy G. Perry College of Engineering, Lockheed-Martin Tactical Aircraft Systems Teaching Excellence Award, Welliver Summer Faculty Fellowship from Boeing in 2002 and NASA Summer Faculty Fellowship in 2003. Professor Huque published over 65 journal and conference articles.

Topic: Advanced New Design Process for Wind Turbine

Abstract: This presentation demonstrates an advanced new design process for wind turbine. The National Renewable Energy Laboratory (NREL) Phase VI wind turbine was selected to show the validity of the proposed methods. The wind turbine, which includes the tower, nacelle, rotor and blades, has complicated structural and fluid behaviors. The steady and unsteady aerodynamic forces are developed on the structural blade surface, and the aerodynamically induced acoustic sound noises are emitted from the rotating blade. Therefore, there are multi-physical phenomena on a wind turbine. To get accurate information of a wind turbine in multi-physical field, the advanced analysis processes are considered in the overall design process which combine and interact between each physical field. In the presentation, the new design process of wind turbine which including CFD, FEM (Fatigue), FSI, CAA will be demonstrated, and finally the discussion for the future works will also be presented.

Onsite Registration-July 13th (Monday)

Date	July 13th (Monday)
Time	10:00am-16:00pm
Venue	Lobby of Novotel Lisboa
Staff	Cindy Lau & Amanda Wu
Add & Tel	Novotel Lisboa Av Jose Malhoa 1-1A, Lisbon 1099-051, Portugal. (Tel: +351 217 244 846 l Fax: +351 217 244 891)
Note	*Collecting conference materials **Delegates will get the certificate at the registration desk. ***The organizer won't provide accommodation, and we suggest you make an early reservation.

Oral Presentations-July 14th (Tuesday)

Venue **Belem+Campolide**	9:00am-9:05am	Opening Remarks **Prof. Manuel Carlos Felgueiras** **Polytechnic Institute of Porto, Portugal**
	9:05am-9:45am	Keynote Speech I **Prof. Florinda Martins** **Polytechnic Institute of Porto, Portugal** "Indicators Used in the Energy Sector"
	9:45am-10:25am	Keynote Speech II **Prof. Manuel Carlos Felgueiras** **Polytechnic Institute of Porto, Portugal** "Buildings Sustainability – The Non-intrusive Load-identification System Contribution"
	10:25am-10:55am	***Coffee Break & Group Photo***
	10:55am-11:35am	Keynote Speech III **Prof. Nidia Caetano** **Polytechnic of Porto, Portugal** "Biorefineries: A Sustainable Approach for Biomass Valorisation"
12:00-13:00 Lunch at restaurant		
Venue **Belem**	13:00pm-13:25pm	Plenary Speech I **Assoc. Prof. Vladimir V. Shurenkov** **National Research Nuclear University, Russian Federation** "The Review of the Induced Physical Effects on the Semiconductor Electronics under the Electromagnetic Pulse"
	13:25pm-15:00pm	**Session 1**-- Power and Electrical Engineering
	15:00pm-15:15pm	***Coffee Break***
	15:20pm-18:30pm	**Session 2--** Energy Engineering
Venue **Campolide**	13:00pm-15:00pm	**Session 3--** Smart Grid Design and Application
	15:00pm-15:15pm	***Coffee Break***
	15:20pm-15:45pm	Plenary Speech II **Prof. Ziaul Huque** **Prairie View A&M University, USA** "Advanced New Design Process for Wind Turbine"
	15:45pm-18:30pm	**Session 4--** Materials Engineering and Industrial Applications
19:00-20:00 Dinner at restaurant		

July 14th (Tuesday Morning)

Invited Speeches

Venue: Belem+Campolide

Chair: Prof. Manuel Carlos Felgueiras
Polytechnic Institute of Porto, Portugal
Time: 9:00am-11:35am

9:00am-9:05am	Opening Remarks **Prof. Manuel Carlos Felgueiras** **Polytechnic Institute of Porto, Portugal**
9:05am-9:45am	Keynote Speech I **Prof. Florinda Martins** **Polytechnic Institute of Porto, Portugal** "Indicators Used in the Energy Sector"
9:45am-10:25am	Keynote Speech II **Prof. Manuel Carlos Felgueiras** **Polytechnic Institute of Porto, Portugal** "Buildings Sustainability – The Non-intrusive Load-identification System Contribution"
10:25am-10:55am	**Coffee Break & Group Photo**
10:55am-11:35am	Keynote Speech III **Prof. Nidia Caetano** **Polytechnic of Porto, Portugal** "Biorefineries: A Sustainable Approach for Biomass Valorisation"
12:00pm-13:00pm	**Lunch at restaurant**
13:00pm-13:25pm	Plenary Speech I **Assoc. Prof. Vladimir V. Shurenkov** **National Research Nuclear University, Russian Federation** "The Review of the Induced Physical Effects on the Semiconductor Electronics under the Electromagnetic Pulse"
15:20pm-15:45pm	Plenary Speech II **Prof. Ziaul Huque** **Prairie View A&M University, USA** "Advanced New Design Process for Wind Turbine"

*The Group Photo will be updated on the conference webpage and SCIEI official website: www.sciei.org

**One best presentation will be selected from each session, the best one will be announced and awarded the certificate during the dinner, and the winners' photos will be updated on SCIEI official website: www.sciei.org.

***Best Presentation will be evaluated from: Originality; Applicability; Technical Merit; PPT; English.

**** Please arrive at the conference room 10 minutes earlier before the session starts, copy your PPT to the laptop.

July 14th (Tuesday Afternoon)
Oral Presentations Schedule

Session 1-- Power and Electrical Engineering

Chair: **Assoc. Prof. Vladimir V. Shurenkov**

National Research Nuclear University, Russian Federation

Time: 13:25pm-15:00pm

Venue: **Belem**

R0013 	Techno-Economic Analysis of Energy Efficiency Potentials in Industrial Steam Systems and Energy Policy Implications **Dr. Ali Hasanbeigi**, Greg Harrell, Bettina Schreck, and Pradeep Monga China Energy Group, Energy Analysis and Environmental Impacts Division, Lawrence Berkeley National Laboratory, U.S.A. Abstract The industrial sector dominates China's total energy consumption, accounting for about 70% of primary energy use in 2012. On average, industrial steam systems account for around 30% of manufacturing industry energy use worldwide. The goal of this study is to develop, for the first time, and apply a steam system energy efficiency cost curve modeling framework to quantify the energy saving potential and associated costs of implementation of an array of steam system optimization measures on coal-fired boilers and steam systems in China's industrial sector. This study found that total cost-effective (i.e. the cost of saving a unit of energy is lower than purchasing a unit of energy) and technically feasible fuel savings potential in industrial coal-fired steam systems in China in 2012 was 1,687 PJ and 2,047 PJ, respectively. These account for 23% and 28% of the total fuel used in industrial coal-fired steam systems in China in that year, respectively. The CO2 emission reduction potential associated with the cost-effective and total technical potential is equal to 165.82 MtCO2 and 201.23 MtCO2, respectively. By comparison, the calculated technical fuel saving potential for industrial coal-fired steam systems in China is approximately 9% of the total coal plus coke used in Chinese manufacturing in 2012. Several sensitivity analyses were conducted and energy policy implications of the results are discussed.
S3004	A Practical Setting Method for Over-Current Relay and Automatic Recloser in Distribution Network with Photovoltaic Station Zaibin Jiao, **Mr. Jiliang Jin,** Lin Liu, Yu Wang, Qi Wang, Zhao Wang Xi'an Jiaotong University, China Abstract Over-current protection in distribution network is easy to be influenced by the additional injected power at the measuring point. In this paper a practical setting method for the over-current relay considering the injected power is proposed. The proposed strategy is based on the bus maximum injected power, and the basic principle of the method is to prevent the over-current protection from mal-operation when there has injection current or branching current. In addition, coordination between grid automatic reclosing time (GART) and photovoltaic (PV) low voltage ride through (LVRT) is also studied in this paper. By using exact experimental analysis, the grid maximum automatic reclosing time under common faults is given. Simulation results show that reclosing within the maximum reclosing time can guarantee the successful operation of LVRT for the PV, which would be a guiding value for the safe operation of large-scale grid-connected photovoltaic (GCPV).

R0016

Stochastic Optimal Control Problem of Linear Switching Systems With Delay

Assoc. Prof. Charkaz Aghayeva
Anadolu University, Turkey

Abstract

Delay and uncertainty are associated with many real phenomena, and often they are sources of complicated dynamics. Switched systems have numerous applications in control of real systems as mechanical systems, the automotive industry, aircraft and air traffic control, switching power converters, and many other fields. Optimal control problems for switching systems, which require the decision of both the optimal solutions and optimal switching sequences, are actual at present. The optimal control problem of delayed linear switching systems with quadratic cost function is investigated. The contribution of this paper is to present a necessary and sufficient condition of optimality for considered switching systems with constraints. It is expected that methodology used in this study will be beneficial of power generation systems, thermal power technologies, new technologies and design for energy efficiency and other sustainable energy systems.

R0004

Green Building Materials Market- Growth, Trend and Opportunity: South Asian Perspective

Mr. Mridu Pavan Chakrabarty and **Mr. Nitin Lekhwani**
Pandit Deendayal Petroleum University, India

Abstract

Selection of building material is an important issue in building design and construction decision-making and environmental issues need to be incorporated into the evaluation process. Prices vary for different types of green building materials. South Asian Green Building material market has lots of challenges and opportunities ahead. The future prospects are bright, but the South Asian (particularly Indian) customers are yet to get through the Rubicon of opting for Green Building instead of conventional buildings. Greener building standards and the rising energy costs are the market's main propellants. Unfortunately, enforcement of energy standards is uneven and customers are highly price sensitive. There is tremendous potential for construction of Green Building in India. The main objective to concentrate in Green Building is that, green building has a potential to save 30%-40% energy with reduction of operating cost and enhance good health. Through this report, authors studied the Green Building material market in relation to embodied energy and CO_2 emission from building material and analyzed the growth and trend of the materials in South Asian perspective over a period. For analysis authors have considered the city of Ahmedabad in India.

S0014

Influence Study of Concentrated Photovoltaic Location on Voltage Stability

Erhab Youssef, Amr Mohammed Abdelhalim Amin and Rasha El-Azab
Helwan University, Egypt

Abstract

Concentrated Photovoltaic modules (CPV) use optics, such as lenses to concentrate a large amount of sunlight onto a small area of solar photovoltaic materials to generate electricity. The solar irradiance level and landscape area are considered as main factors in CPV site on the network. These factors are not sufficient for improving the CPV performance and grid integration .The coupling point of CPV to the grid is an important role and affects the network stability. This paper focuses on the influence study of CPV location on voltage stability .PSS/E has been used as a tool for simulation and validation the integration of CPV to 14-IEEE network as benchmark test. Ac contingency analysis tool is used to study the voltage stability at different cases and locations of CPV. Results indicate that the distributed CPV improves the voltage stability of the network, rather than centralized CPV. Distributed CPV connects at

	different locations and near to the load. Therefore, the impact of distributed CPV is minimized with respect to voltage stability issue.
R3004 	Estimation of the High Resolution Wind Field at Galway Bay **Mr. Lei Ren**, Jerome Sheahan, Stephen Nash, Diarmuid Nagle, Michael Hartnett Ryan Institute, National University of Ireland, Galway Abstract Hydrodynamic circulation in estuaries is primarily driven by tides, surface wind and river inflows. While tidal and river data can be quite easily obtained for input to hydrodynamic models, sourcing accurate surface wind data are problematic. Firstly, the wind data used in hydrodynamic models are usually measured on land and can be quite different in magnitude and direction from real offshore wind. Secondly, surface wind is spatially-varying but due to a lack of data, usually a non-varying wind speed and direction are specified across the full extents of a model domain. These problems can lead to inaccuracies in the surface currents computed by two-dimensional or three-dimensional hydrodynamic models. In the present research, a wind forecast model was used to generate a high resolution wind field at a marine renewable energy test site, Galway Bay. These predicted high resolution wind date can be used to investigate the effect of surface wind data resolution on model accuracy.

Session 2-- Energy Engineering
Chair: **Prof. Elias Stathatos**
University of Patras, Greece
Time: 15:20pm-18:30pm
Venue: **Belem**

R0007 	Energy Saving Measures obtained from Large-Scale Power Monitoring Experiments in Convenience Stores **Prof. Jun Fujimoto** Chiba Institute of Technology, Japan Abstract Discussed here are energy saving measures obtained from power monitoring experiments conducted in 2,000 conveniences stores (CVS) from 2010 to 2014 in order to achieve a 10% electric power reduction in convenience stores. Around 20,000 wireless sensor nodes, which monitored electric current, temperature& humidity were installed into individual stores. The comparison of electric current values between individual stores revealed whether similar kinds of equipment such as refrigerators worked normally, and rules regarding store operation were observed. This comparison was a first step towards the reduction of power consumption in CVS. From these activities, difficulties and pitfalls that lay behind "power saving measures" were discussed in general. For example, even when we know the value or profile of power consumption, we can't usually determine whether it is high or low because we don't have the reference value i.e., a standard level of power consumption of equipment in the everyday condition of the store. This reference value is strongly required in order to decide whether individual power consumption is wasteful. Finally, our power saving measures were conducted by considering "proper temperature control" in stores and equipment as the "essential function" of the convenience store, and enabled average10% power reduction of the level before our experiments start at 2011 in 2,000 stores.

R2006

Renewable Energy Support Mechanisms – Present Status

Prof. F. Martins, C. Felgueiras, and M. Smitková
Polytechnic Institute of Porto, Portugal

Abstract

Renewable energy production is important to solve problems related to security of supply, economic competitiveness, reduction of the economic energy burden to citizens and environmental impacts such as CO_2 emissions and pollution. Besides this the scenarios for the future foresee an increase in energy demand mainly due emerging economies and by this reason all the above mentioned issues will be crucial for EU Member States and many other countries around the world. Due to the inability of market to move to more sustainable energy systems, using a higher share of energy from renewable energy sources, it was necessary public action, creating RES support mechanisms in the majority of countries.

R0017

Dye-Sensitized Solar Cells with Zinc Oxide Nanostructured Films made with Amine Oligomers as Organic Templates and Gel Electrolytes

Andigoni Apostolopoulou, Dimitris Karageorgopoulos, Andreas Rapsomanikis, and **Prof. Elias Stathatos**
University of Patras, Greece.

Abstract

The demand for energy led to clean, renewable and cheap energy sources, while solar energy is the most abundant. Dye sensitized solar cells (DSSCs) are proposed as low cost alternatives to the conventional photovoltaics. These cells have been widely examined due to their low cost and high conversion efficiency. Several mesoporous metal oxides have been examined, where ZnO nanostructures have been taken much attention last years.
At the present work, we examine the use of nanostructured ZnO films as photoanodes in DSSCs. The simplicity of the ZnO films synthesis is demonstrated while solar cells are constructed and tested. In particular, we demonstrate a simple method combining $Zn(NO_3)_2$ as zinc precursor with different organic templates. Besides, the structural properties of the ZnO films are examined with porosimetry, microscopy methods and X-Ray diffractograms. Their electrical behavior is examined in terms of current-voltage characteristic curves under simulated solar light while electrochemical impedance spectroscopy is also used for measuring charge transfer across the ZnO-electrolyte interface and free electron lifetimes. We finally obtained an overall efficiency of 0.6% for DSSCs based on ZnO films and a commercial dye as sensitizer. It seems that ZnO films constitute promising nanostructures for DSSCs that can be further improved.

R0024

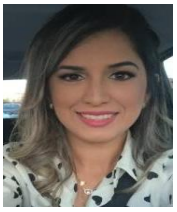
Photovoltaic Didactic System

Prof. Clovis A. Petry, Hugo Marcondes, Vinicius K. D. Costa
Federal Institute of Science and Technology of Santa Catarina, Brazil

Abstract

This work intends to describe the development of a photovoltaic didactic system, designed for teaching the concepts of the technology for Junior High School, Under-Graduate and Graduate School students. The proposed system is composed by a hardware structure and a software for accessing the measurement variables and manage the elements. The hardware allows modifying the angle that a solar panel receives light from lamps and also the intensity of emitted light. These parameters can be controlled by the student. The Qt software library was used to develop an application that shows the panel curve, voltage, current, power and other important characteristic for a photovoltaic system.

R0020



Reuse of Waste Sugarcane Agribusiness and Green Power Generation

Ms. L. R. Holanda and F. S. Ramos
Federal University of Pernambuco, Brazil.

Abstract

Currently, the biggest challenge is to maintain the productive sector and increase competitiveness while serving the needs of stakeholders, and is clearly more complicated with the inclusion of the environmental variable. Within a highly competitive environment, the waste of sugarcane production ends up being a waste of money, they represent a part of the investment that does not generate revenue. This paper presents through a literature review, a study of the entire production process of the sugar and alcohol industry, identifying the waste that it produces in the process, such as straw and sugarcane bagasse, wash water from sugarcane, filter cake, vinasse and carbon dioxide. And, with the result that management of such waste through the determination of possible alternatives to the use of these, producing byproducts, and generating a new green energy source, maximizing their productivity and profit as well as improving the environmental awareness of the company.

R3006

Buildings Sustainability: The HVAC Contribution

Prof. Manuel C. Felgueiras, Rute Santos, Luís M. Fonseca and Nídia S. Caetano
Polytechnic Institute of Porto, Portugal

Abstract

A very important part of the globally produced energy is consumed in buildings, being an important share frequently used in the HVAC systems. These ones are increasing both in performance and in complexity, taking advantage from the use of the recent advances in mechanical and power electronic devices, particularly in the speed variation field. However the improved efficiency only occurs while the HVAC unit is working in the conditions specified by the manufacturer, otherwise the energy consumption raises to values considerably higher than the nominal ones. The adequate maintenance enforces the system to run on its nominal performance and the contrary has undesirable impact both in the performance and in the system expected life time. Therefore, HVAC field maintenance assumes a very important role in the global building sustainability concept.
This work presents some results of an incorrect use of HVAC and the associated electric energy overconsumption that can assume values 50% higher than those that occur when the installation is operated according to the adequate maintenance plan.

R0005

Energy Consumption and Growth in Agriculture Sector

Prof. Saeed Yazdani and F. Nekoofar
University of Tehran, Ministry of Education, The Islamic Republic of Iran

Abstract

This paper tries to examine the short-run and long-run relationship between Energy consumption in agriculture and agricultural growth in Iran over period of 1976-2012 with using Vector Auto Regressive and Vector Error Correction Model. We establish that there is unidirectional causality running from agriculture Energy consumption to agriculture value added. Results show that energy consumption has a significant positive long-run impact on Iran agricultural growth. This study also evaluates relationship between agriculture energy consumption per capita and agriculture growth by implication of Environmental Kuznets Curve Hypothesis. Results show that during the considered period, energy consumption per capita as an indicator of environmental problem keeps on growing in time as long as the agriculture sector keeps on growing.

R0010

Exergy Analysis of Absorption Power Cycle Depending on Source Temperatures

Prof. Kyoung Hoon Kim
Kumoh National Institute of Technology, Republic of Korea

Abstract

The absorption power generation systems using ammonia–water mixture as a working fluid are proven to be the feasible method for utilizing a low-temperature heat source in the form of sensible energy. In this paper, an exergy analysis is carried out for an absorption power generation system of Kalina cycle using ammonia-water mixture as the working fluid for efficient conversion of low-temperature heat source. Effects of the ammonia mass fraction and the heat source temperature are parametrically investigated on the exergy destruction of each component of the system and the exergy efficiency of the system. Results show that the exergetical performance is greatly affected by the heat source temperature and the ammonia mass fraction of the working fluid.

R0014

Thermal Analysis of the Performance of Linear Fresnel Solar Concentrator

Assoc. Prof. Mohamed H. Ahmed and Amr M. A. Amin
Academy of Scientific Research and Technology, Egypt

Abstract

The Linear Fresnel Concentrator (LFC) took a significant attention in the recent decades from the researchers and the stakeholders. This attention can be attributed to possessing this type of concentrator several features enable it to overcome some of the problems facing other types of concentrators. Numerical simulation for the LFC along one year has been carried out for a given design. The results illustrate the effect of the Incidence Angle Modifier (IAM) and the operating parameters such as, the fluid mass flow rate and the inlet temperature on the thermal performance of the LFC. The results show a significant effect of the daily and seasonal changing in the incidence angle of the direct radiation on the IAM consequently the thermal performance and the collector efficiency. Maximum output thermal energy of about 40 to 96 KW was recorded for December and June respectively. This paper presents a numerical model that can be used for design optimization to get the maximum efficiency.

R0025

Proposal for Use of Indoor Cells for Supply Electronic Loads Remotely

Dyego de Campos, Bryan D. Pinheiro, Diego L. da Silva, and **Prof. Clovis A. Petry**
Federal Institute of Science and Technology of Santa Catarina, Brazil

Abstract

This work presents the development of an indoors capitation processing storage circuit of light energy for. To begin, it describing the components of the project, such as photovoltaic panels for indoor, dc-dc converter and super capacitors. Then, propose a low power and high performance processing energy circuit, associate a new energy storage technology. As well as, realized a comparative study of different thin film photovoltaic cells under different lighting characteristics. The laboratory prototype was implemented to verify the proposed system functionality containing a panel of 7 V x 1 mA, associated super capacitors 6 F x 11 V to feed variable current presence sensor of 18 uA at 4.5 mA and 9 V.

R0006

Investigating the Long-Run Relationship between Energy Losses and Energy Supply Surplus

Ms. Sevil Hatamifard
Islamic Azad University, The Islamic Republic of Iran

Abstract

	Energy is an important input in agricultural production and economics growth. This paper attempts to investigate the long-run relationship between energy losses and supply surplus. A Vector Error Correction Model (VECM) was used to examine the long run relationship between energy losses and supply surplus. According to the study results, energy supply surplus is among the major reason of energy losses in Iran. The results indicate that an increase in the energy supply surplus would increase the energy losses by 0.0275 units. However, estimation of error correction term shows that without an energy supply management program, after 1.2 periods the energy losses will revert to its previous mode. Therefore, political solutions are needed to be included in the long-run planning such as implementation of economics development plans with adequate management in order to reduce the energy losses.
R3008 	Design Aspects and Experimental Performance Test of a Wastewater Heat Pump for the Mediterranean Climate **Assoc. Prof. O. Ekren**, M. Araz, A. Hepbasli, E. Biyik, and H. Gunerhan Department of Energy Systems Engineering, Yasar University, Turkey Abstract In this study, the performance of a wastewater heat pump system, which was designed and installed in Izmir, Turkey, is experimentally assessed. The wastewater temperatures utilized are about 9-14^{o}C and 26-29^{o}C in winter and summer seasons, respectively. It may be concluded that a wastewater source heat pump is more efficient than an air source heat pump in Izmir, Turkey, of which western coast has a Mediterranean climate. According to the results, by using wastewater source heat pump can provide heating and cooling efficiency up to 44% because of lower condensing and higher evaporation temperatures. Also wastewater source heat pump can use bigger portion of theoretical energy potential than air source heat pumps.
R3016 	Sustainable Development and Exploitation of Semi-mountainous Area in Greece Vasileios C. Drosos, **Mr. Liampas Sarantis – Angelos**, and Christos C. Stamatiou Democritus University of Thrace, Greece Abstract Sustainable development of semi-mountainous regions supports an increase in economic investments in order to profit the residents of region, without however having drastic negative influences on the natural environment. Green Infrastructure (GI) can be broadly defined as a strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity. The objective of this study is the specification of strategic directions for an integrated development of semi-mountainous areas through global measures in relation to zoning policies and also proposals regarding specialized production activities, according to a proper typology that characterizes the differentiation of regional problems, needs, and perspectives. The sustainable development of the semi-mountainous areas of Greece targets regional and social cohesion in the framework of especial strategic targets.
R3015	Case Study Assessment of Wind Energy Potential as a Power Generation Source in Iran **Mr. Kaveh Derakhshan**, Rojin Derakhshan, **Dr. Hassan Ahmady Talesh**, **Mr. Vorya Derakhshan** Islamic Azad University-South Tehran Branch, Iran/Baniyan Tarh & Andisheh Co.,Iran Abstract The selection and ranking of alternative locations for wind power plant is a strategic decision, which has significant impact on generation capacity and economic operation of the plant. The purpose of this

	paper is to present an assessment and evaluation of four proposed wind farms in Iran, in order to construct a feasible wind power plant in a suitable place. The prediction is based on a full year data set measured in 40 m height and in close distance for each proposed wind farm. Data are recorded in 10 min intervals as mean values (for all parameters) as well as maximum instantaneous values and standard deviation (for the wind speed) within the recording interval. In order to deduce the special wind conditions at an individual site from measurements taken at any location in the closer vicinity the Wind Atlas model is applied. The wind speed distribution is described by the so called Weibull Distribution which is characterized by two parameters the scale parameter A and the shape Parameter k. The dynamic generation costs estimated based on technical and financial assumptions, and a life cycle analysis has been carried out in order to determine the economic feasibility of the wind farms, while the additional income through the sales of carbon credits (carbon emission rights) in the framework of the CDM has been taken into consideration.

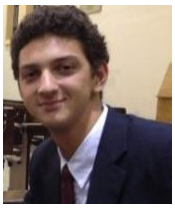
Session 3-- Smart Grid Design and Application

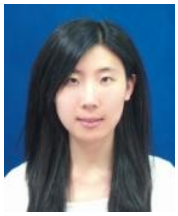
Chair: **Prof. Clovis A. Petry**

Federal Institute of Science and Technology of Santa Catarina, Brazil

Time: 13:00pm-15:00pm

Venue: **Campolide**

S0003	A Game Theory Approach with Dynamic Pricing to Optimize Smart Grid Operation **Mr. Makhlouf Hadji**, Marc Girod-Genet and Hossam Affifi IRT System X, France Abstract Smart Grids components include scalable metering, energy prediction (both production and consumption) and pricing. One of their goals consists to attract consumers to use green energy, to promote periods of low consumption and to dissuade customers from using their greedy devices during peak periods. The objective consists to determine the optimal suggested prices by the energy operator and the optimal demands of consumers. In this paper, we propose a theoretical model based on Stackelberg game to adjust prices of green energy. The proposed game is composed by a leader represented by the operator, and multiple followers represented by consumers. A Nash/Stackelberg equilibrium solution is found. Performance results confirm the uniqueness of Nash equilibrium and that a "best reply" dynamics for the repeated game converges to this equilibrium.
R0026  	Capacitive Wireless Power Transfer System Applied to Low-Power Mobile Device Charging **Mr. Guilherme G. da Silva** and **Prof. Clovis A. Petry** Science and Technology of Santa Catarina / DAELN, Brazil Abstract Wireless power transfer (WPT) technologies are most popularly based on inductive coupling (IPT), using magnetic fields as transfer interface. Recently, studies have been published on capacitive coupling (CPT), through electric fields. CPT has small power density, due to low coupling capacitance, however, it also features reduced EMI shielding requirements, coupling through metal barriers, simpler coupling structure, lightweight and lower cost. This paper presents a mobile device charging application for the capacitive WPT technology. Using LC resonance, the system achieves 90% simulated

	efficiency with 5.7 pF coupling capacitance. The power level for this application is 5W.
S0010 	Analytical Hierarchy Process Based Flexibility Measurement Tool to Integrate Concentrated Photovoltaic in Smart Grid **Ahmed Shetaya**, Rasha El-Azab and Amr Mohammed Abdelhalim Amin Helwan University, Egypt Abstract Sustainable Energy Sources have many challenges that significantly depend on the specific features of each renewable variable type as wind, Photovoltaic (PV), Concentrated Solar Power (CSP) and Concentrated Photovoltaic (CPV). These new generation technologies have many complications that linked with power system integration as variability and uncertainty environment. This paper introduces a new process based on Analytical Hierarchy Process (AHP) to aid the integrating of CPV in Smart Grids. New smart power systems behavior is affected by the new composite CPV generation and loads that have uncertain and variable nature. The recommended technique measures current grid flexibility index, and checks its capability to operate grid securely based on Smart Grid wide area measurements. It also determines the desired storage that must be added to enhance the system flexibility for real time dispatching.
R3002 	Demand Side Management of Electricity aiming to Minimize Cost of Residential Consumers **Prof. Rubipiara Cavalcante Fernandes**, Ricardo de Avila Geisler, Daniel Tenfen, Samuel Luna Abreu, Fabricio Y. K. Takigawa, and Edison A. C. Aranha Neto Federal Institute of Santa Catarina – IFSC - DAE / Centro - Florianopolis - SC – Brazil Abstract The main objective of this study is to analyze the photovoltaic generation of electric energy by the consumer and to show possible energy management of his consumption. Different kinds of tariffs depending on the hour of use and system capacity are analyzed. In addition, it is intended to show the benefits of the renewable energy of micro photovoltaic plants in residences, combined with practices of a better energy use through equipment/materials more intelligent/efficient, in other words, the possibility of a demand side management. In this way, initially it was listed the chances to promote the energy-efficiency by the analyses of the technology availability and a more efficient use of equipment. This study aims the development of residential projects that contemplate energetic optimization since its creation and enable the consumer to manage his consumption according with his priority in energy use. It is also taken into consideration the possibility to attend part of the consume using photovoltaic solar generation and the different values of energy tariff. For this, it was conducted a comparative study that verified the photovoltaic solar microgeneration technical-economic viability in residential dwellings considering the option of "Time-of-use Tariffs", that can provide to the residential consumer a better management on the use of electric energy and implies changes in consumption habits.
S0006 	System-State-Free False Data Injection Attack for Nonlinear State Estimation in Smart Grid **Ms. Jingxuan Wang**, Lucas C. K. Hui and S.M. Yiu The University of Hong Kong, Hong Kong Abstract Cyber-physical security of smart grid under attacks is a serious issue today. The technique of state estimation has been employed in such a large-scale system to ensure the reliability. Successful attacks on tampering these readings were shown for *linear* state estimation. For the more realistic *nonlinear* state estimation are used in real systems, the attack that requires the knowledge of system states (which are difficult to obtain, even for insiders) was proposed. Up to our best knowledge, there are no

	research results that are able to give an attack to any buses without the knowledge of system states. This research paper provides such an attack. Demonstrations on IEEE test system show that the smart grid can be exploited by launching such attacks even without system state information. The strategy to generate such an attack is simple and easy to implement. Thus, the results in this paper show that a more realistic threat to the smart grid system. Hopefully the community could revisit the tampered reading detection algorithms to come up with a more sophisticated solution to avoid this vulnerability.
S0011	Stability of DC Micro-Grid for Urban Railway Systems **Ms. Sarah Nasr**, Marc Petit, Marius Iordache and Olivier Langlois Alstom Transport SA, France Abstract This paper studies the stability of a DC Micro-grid integrated in urban railway systems in order to recover trains braking energy. It is a green solution based on storing the excess of braking energy in a hybrid storage system and re-using it in non-railway applications such as auxiliary loads in a station or electric vehicles in proximity, which will increase the global energy efficiency. The risk of instability caused by constant power loads is detailed and solved using backstepping approach. It is shown that this problem can be solved by controlling the energy storage system.
S2001  	Potential for Active, Flexible and Responsive Tertiary Prosumers in the Future Smart Grid **Mr. Dan-Eric Archer** and **Jon Solheim** ETC Elhandel AB Stockholm, Sweden Abstract The characteristics of the contemporary European energy market and the vision to decarbonize the European economy calls for new initiatives to ensure effective and renewable energy production along with reduced consumption. The INERTIA project aims at integrating active, flexible and responsive tertiary prosumers (actors simultaneously being producers and consumers) in a Smart Grid. The market potential for the initiative offers several distinct areas of exploration and continued efforts.
S3001	Smart Grid Infrastructure in Ireland: Facilitating the Energy Transition **Dr. Orla Nic Suibhne** and Margaret Tallott Growing Renewable Energy Applications and Technologies Project, Ireland Abstract The twenty-first century is expected to bring many challenges for energy systems across the globe. Most significantly the continued growth in worldwide population and increased use of consumer goods will create significantly greater electricity demand requirements, which must be met amidst pressures to reduce carbon emissions, retain security of supply and improve national cost competitiveness. It is indeed these challenges that have highlighted the importance of a clean, reliable electricity supply and encouraged many countries to invest in electricity grid infrastructure in an effort to move towards the development of a 'Smart Grid'. The requirement to develop an Irish smart grid, which will enable increased control over the electricity system and consequently improve the overall efficiency and reliability of the electricity supply, has therefore been pushed up the energy policy agenda and has resulted in significant national commitments to investment in electricity system infrastructure. The world is currently looking at Ireland as a leader in the Smart Grid arena, having a favourable base to become such a leader: excellent renewable energy resources; a strong engineering and ICT sector; a vibrant entrepreneurial spirit; an active research sector; a propitious corporation tax rate; a

	well-educated, adaptable workforce; and the convenience of having a single state owned commercial TSO (Transmission System Operator) and a single semi-state DSO (Distribution System Operator); compare this to for example Germany that has 4 private TSOs and 896 DSOs. DSOs will play a key role as neutral facilitators of tomorrow's more decentralised energy system which the Smart Grid facilitates; and Irelands DSO, ESB Networks, is considered a world leader and promises dynamically managed networks that will minimise losses by 2017. This paper investigates the current state of play with Smart Grid in Ireland, including the changing landscape in which distributed energy generation is emerging. It will consider how these global challenges are affecting Ireland and also the policy issues surrounding smart grid, renewable energy and distributive generation development in Ireland. The paper will conclude that Ireland is currently well placed within the global smart grid industry and will continue to demonstrate its capability in relation to smart grid, renewable energies and distributive generation markets.

Session 4-- Materials Engineering and Industrial Applications

Chair: **Prof. Ziaul Huque**

Prairie View A&M University, USA

Time: 15:45pm-18:30pm

Venue: **Campolide**

R3012 	Comparative Evaluation of Acid and Basic Thermo-chemical Treatments in the Production of Adsorbents Based on Biodiesel Production Solid Residue Tatiana M. Barbosa, **Prof. Adriana S. Franca***, Leandro S. Oliveira, and Ramon M. Valle Universidade Federal de Minas Gerais, Brazil Abstract Raphanus sativus press cake, a solid residue from biodiesel production, was evaluated as precursor material for the production of adsorbents. A comparative evaluation of acid and basic activating agents is presented, as well as conventional and microwave carbonization. The treatment that provided best adsorption performance was microwave activation employing KOH. Characterization results pointed to a homogeneous and porous adsorbent surface, and results from both kinetics and equilibrium essays indicated that methylene blue adsorption was probably taking place at the surface. Adsorption kinetics and equilibrium were satisfactorily described by the pseudo second-order and Langmuir models, respectively. Adsorption tests showed that the prepared adsorbents presented higher adsorption capacity than activated carbons produced from other agricultural residues, confirming that this type of waste material is a suitable candidate for use in the production of adsorbents.
K002 	Influence of nano Al2O3 particles on the adhesion, hardness and wear resistance of electroless NiP coatings **Mr. S. Karthikeyan**, L.Vijayaraghavan IIT Madras, Chennai, India Abstract In this present study electroless NiP coatings and NiP-Al_2O_3 coatings had been deposited on a mild steel substrate. The surface morphology of both the coatings had studied using scanning electron microscope (SEM), energy dispersive spectroscopy (EDS) and X-ray diffraction technique. Adhesion, hardness and wear behavior were investigated and compared for NiP and NiP-Al_2O_3 coatings. Optical micrograph

	images were used for the evaluation of adhesion of coatings which found sufficient and acceptable according to VDI 3198 standard. Hardness of the coating had been evaluated based on depth sensing techniques and substrate effect had avoided by maintaining depth to coating thickness ratio less than 0.1. Due to co-deposition of Al_2O_3 particles the hardness of NiP coatings increased by 20.5% (7.8 GPa to 9.4 GPa). Dry sliding wear tests were conducted on PLINT TE66 micro scale tester against steel ball of hardness 800 HV. Wear resistance of NiP coatings increased with increase in sliding distance. The co-deposition of Al_2O_3 particles in NiP matrix arrest the deformation during sliding of steel ball and thus wear resistance of NiP-Al_2O_3 coatings is superior to NiP coatings. Wear crater morphology were studied using SEM and EDS. Adhesive wear mechanics was observed in NiP coatings and combination of adhesive and abrasive wear mechanism were found in NiP-Al_2O_3 coatings.
R1004 	Experimental Study of an Evaporator Heat Exchanger for a Rankine Cycle Vehicle Waste Heat Recovery System **Prof. H. Santos**, N. Pires, D. Caseiro, J. Morgado, J. F. Pereira, and N. Martinho School of Technology and Management, Polytechnic Institute of Leiria, Portugal. Abstract This article presents a Rankine cycle (RC) system as an additional power generation process, which uses the waste heat of a vehicle equipped with an internal combustion engine (ICE). A brief review of different heat recovery technologies leads to the identification of the RC system as a favorable solution for vehicle applications. The paper focuses on the performance evaluation of the evaporator heat exchanger (HEX) that is suitable for ICE waste heat recovery. The HEX performance depends on several parameters such as its structure, heat transfer area and temperature difference between hot gas and the RC working fluid. The investigated HEX is a cross-flow heat exchanger, simple and robust, with the working fluid circulating inside the tubes. A test bench that includes the vehicle and the RC system that uses water as working fluid, has been built in order to measure the HEX performance. A detailed description of the experimental setup is presented. Finally, test bench measurements of the applied vehicle coupled with the HEX fitted on the RC system were carried out.
R0003 	Industrial Waste Valorization to Produce Eco-materials for Construction Applications **Prof. Isabel Brás**, Ricardo Almeida, P. Costeira Silva, and Luís Marques Escola Superior de Tecnologia, Portugal. Abstract The increasing concerns regarding buildings' sustainability throughout their lifecycle is a decisive criterion for systems and materials selection, both for new construction and rehabilitation. The valorization of regional industries wastes, namely fly ashes and pulp mill sludge, in bonding and rendering mortars, partially replacing the mortar's binder, was tested. The main goal was to study the ability to minimize the production costs and the environmental impact of mortar production with the development of an eco-material. To evaluate the wastes and cement chemical characteristics, leaching procedures were performed, previous to mortar manufacture. Mortars, with and without waste incorporation, were made allowing comparative analyses of the adhesive capacity of the materials under study. The mechanical strength was also evaluated by compressive and flexural strength tests at different ages. Chemical stability of mortars was tested at 28-day samples. Results showed that the incorporation of small amounts of ashes from biomass and lime mud from a paper mill in the mortars did not decrease significantly the mechanical strength and had no negative effect in the chemical behavior of the mixtures.

K010

The Dependence of Material Removal Rate on Annealing Treatment in Polysilicon CMP

Mr. Sungmin Park, Haedo Jeong and Sang-Hee Yoon
Inha University, The Republic of Korea

Abstract

Chemical mechanical polishing (CMP) of polysilicon (poly-Si) films is an essential process in fabricating integrated circuit (IC) devices for high-performance dynamic random access memory (DRAM) and microelectromechanical systems (MEMS) with multi-level structures. Poly-Si films can have changes in surface roughness and grain boundary density (or Young's modulus) through thermal annealing treatment, which exerts a strong influence on poly-Si polishing performance (i.e., uniformity). Here, poly-Si films, after annealing for half hour at 1,050°C under nitrogen atmosphere, are polished to characterize the effect of annealing treatment on their material removal rate (MRR). The dependence of the surface roughness, grain boundary density, and Young's modulus of poly-Si films on annealing treatment is also intensively discussed. The results from this study will help us to establish optimal conditions for poly-Si CMP process.

R0011

Black Carbon and Particulate Organic Toxics Emitted by Sugarcane Burning in Veracruz, México

Prof. Violeta Mugica-Álvarez, Sandra Ramos-Guízar, Naxieli Santiago-de la Rosa, Miguel Torres-Rodríguez, and Luis Noreña-Franco
Universidad Autónoma Metropolitana-Azcapotzalco, México

Abstract

Sugar cane industry signifies a very important income for the Mexican economy; nevertheless, the inadequate agricultural practices, promote the emission of tons of atmospheric particles (PM). In order to have a better understanding about the toxics contained in the particle emission from sugarcane burning, two sampling campaigns to collect fine particles ($PM_{2.5}$) and respirable particles (PM_{10}) during and after the harvest season, were performed in the municipality of Córdoba, Veracruz, México, a small city next to many sugarcane crops. Results showed that particles concentrations increased around 41% for PM_{10} and 32% for $PM_{2.5}$, whereas black carbon concentrations increased 25% and 28% respectively. The high $PM_{2.5}/PM_{10}$ ratio of 0.7 during harvest shows that most of the particles and toxic are contained in the fine fraction, in addition, the sum of carcinogenic polycyclic aromatic hydrocarbons (PAHs) was around 50% of total PAHs, with a BAPeq of 996 pg m^{-3} during harvesting; these results represents an important risk for the neighboring population, consequently authorities and decision makers should attend and implement control strategies.

R2005

Effect of Air/Biomass Ratio on the Gasification of Olive Bagasse Particles

Ms. Ana Filipa Almeida, Mónica S. Vieira, Albina M. Ribeiro, Isabel. M. Pereira, Maria P. Neto, and **Prof. Rosa Maria Barbosa Rodrigues Pilão**
Instituto Superior de Engenharia do Porto, Portugal.

Abstract

In this experimental study the evolution of gas characteristics during the gasification of olive bagasse particles was investigated using a semi-batch fluidized-bed gasifier. Sand particles with a mean diameter of 375 μm were used as bed material and an air flow was used as the fluidizing agent. Experimental tests were conducted with particles of diameter ranging from in 1.25 to 2 mm. The material was characterised through elemental and proximate analysis, and the higher heating value was also measured. In each run, the major components of the gas phase were identified as CO, CO_2, H_2, CH_4, O_2 and N_2. Gaseous samples were collected and analysed by gas chromatography (Dani 1000 DPC). The effect of air/biomass ratio on gasification performance was studied. The tests were

	conducted at three different air flow rates and the load of biomass was also changed. The results show that the of air flow increases the H_2, CO and CH_4 content in the producer gas. Results also show an increase in the dry gas yield, carbon conversion and the gas heating values as air flow rate decreases. Findings reveal as well that the increase of biomass load reduces the composition in H_2 CO and CH_4 of the producer gas, leading to the decrease of the gasification performance parameters.
K007 	Investigation of Single and Dual Step Shot Peening Effects on Mechanical and Metallurgical Properties of 18CrNiMo7-6 Steel Using Artificial Neural Network **Mr. Erfan Maleki** and K. Sherafatnia Sharif University of Technology-International Campus, Kish Island Iran Abstract Shot peening is a process of cold working a part that increase its resistance to metal fatigue and some forms of stress corrosion. Shot peening causes plastic deformation in the surface of the peened part and leads some changes in mechanical and metallurgical properties of it. Artificial intelligence (AI) systems such as artificial neural networks (ANNs) have found many applications to predict and optimize the engineering problems in the last few years. In present study effects of SP on mechanical and metallurgical properties of 18CrNiMo7-6 are investigated by ANN. Network has been developed based on back propagation error algorithm. In order to train the network data of experimental tests results were used. Experimental tests were concluding different SP types: single step SP and dual step SP with different SP intensities. Testing of the ANN is accomplished using experimental data not used during networks training. Distance from the surface and Almen intensity are considered as input parameters and residual stress, remnant austenite content, Cauchy breath, domain size and microhardness are regarded as output parameters of the network. The comparison of obtained results of ANN's response and experimental values indicates that the networks are tuned well and the ANN can be used to predict the SP effects on mechanical and metallurgical properties of materials.
R3007	Recycling Lignite Fly Ash and EAFD Mixtures as the Raw Materials into Ceramics towards Sustainability **Assoc. Prof. Vayos G. Karayannis**, Angeliki K. Moutsatsou, Asimina E. Domopoulou, Eleni L. Katsika Technological Education Institute of Western Macedonia, Greece Abstract The recycling of industrial solid by-products as the raw materials in the manufacturing of standard ceramics using established techniques can contribute both to sustainable management of these secondary resources and economic benefits from the development of value-added products. Fly ash, in particular, is a fine powder obtained by the electrostatic precipitation of dust-like particles from the flue gases of lignite/coal-fed boilers in power generation units. On the other side, EAFD (electric arc furnace dust) is generated from the volatilization of metals when steel scrap is melted for steel making. Volatilized metals are oxidized and subsequently solidified and detained in form of fine powder in specially designed filters. In the present study, lignite fly ash/EAFD mixtures were compacted into 13mm (diam.) disc-shaped specimens and fired for final densification/consolidation (at 1050°C or 1150°C). The characterization of the ceramic microstructures obtained, conducted by scanning electron microscopy (SEM) coupled with energy dispersive X-ray spectroscopy (EDX) analysis as well as determination of shrinkage, density and Vickers microhardness, confirms that industrial secondary resources such as fly ash and EAFD mixtures can effectively be used as the raw materials in the sustainable development of ceramics to contribute to natural resources conservation and environmental protection.

R0012

Wet Oxidation of Formaldehyde with Heterogeneous Catalytic Materials

Gutiérrez-Arzaluz M., Torres-Rodríguez M., **Prof. Mugica-Álvarez V.**, Aguilar-Pliego, and J. Romero-Romo M.

Universidad Autónoma Metropolitana Azcapotzalco, México

Abstract

This work addresses the activity of the catalytic performance of Pt and Ce-Mn-based materials, during the catalytic wet formaldehyde oxidation reaction at ppm concentrations. The comparison of Pt supported in alumina vs. Ce-Mn-based catalysts is presented. The total conversion was 80% with Pt/Al_2O_3 at 80°C, which turned out to be more effective in removing the organic pollutant compared with the mixed oxide. By-products formation such as acetic and oxalic acids was determined along with carbonaceous deposits.

K3004

Tribological Behavior of Ultrafine-Grained Titanium Processed by High Pressure Torsion

Dr. Nong Gao, Chuan Ting Wang, Robert K. J. Wood, Terence G. Langdon

University of Southampton, Southampton, UK

Abstract

Over the last two decades, bulk ultrafine-grained (UFG) materials processed via severe plastic deformation (SPD) technologies have attracted wide interest due to their extraordinary functional and mechanical properties. One of the promising applications of SPD technology is processing UFG Ti for biomedical use. In this study, a grade 2 pure Ti was processed by high pressure torsion (HPT), one of the most effective SPD processing techniques, under 3.0 GPa for 10 revolutions to achieve an improved strength. Wear tests revealed that HPT only slightly improved the wear resistance of pure Ti. Subsequently, a TiN coating with a thickness of 2.5 lm was deposited on different Ti substrates to improve the wear resistance. Both indentation and scratch testing demonstrated a much improved load-bearing capacity when ultrafine-grained Ti was chosen as the substrate compared with coarse-grained Ti. All results indicated that pure Ti processed by HPT, when combined with a subsequent coating, represents a good candidate material for bio-implant applications. An improved bio-implant design was proposed for total joint replacement applications. This design involves fabricating the main body of the bio-implant from UFG pure Ti processed by SPD and subsequently applying a hard thin coating to protect the head of the implant. It is anticipated this design will provide the implant with high strength, good fatigue life, good corrosion resistance, together with good wear and tribo-corrosion resistance from the coating and a non-toxic ion release.

R3014

Comparative Evaluation of Kinetic Model of Chromium and Lead Uptake from Aqueous Solution by Activated *Balanitesaegyptiaca* Seeds

Mr. Mohammed Umar Manko and Jonathan Yisa

Federal College of Education, Nigeria.

Abstract

A series of batch experiments were conducted in order to investigate the feasibility of *Balanitesaegyptiaca* seeds based activated carbon for the removal of chromium and lead ions from aqueous solution by the adsorption process within 30 to 150 minutes contact time. The activated samples were prepared using zinc chloride and tetraoxophophate(VI) acid and used aling with industrial activated carbon. The results obtained showed that the activated carbon of *Balanitesaegyptiaca* seeds studied had relatively high adsorption capacities for these heavy metal ions compared with industrial Activated Carbon. The percentage removal of Cr (VI) and lead (II) ions by the three activated carbon samples were: 64%, 70%; 71%, 60%, and 66%, 60% respectively. Adsorption equilibrium was

	established in 90 minutes for the heavy metal ions. The equilibrium data fitted the pseudo second order out of the pseudo first, pseudo second, Elovich, Natarajan and Khalaf models tested. The result showed that the adsorbents can effectively remove metal ions from similar wastewater and aqueous media as with industrial activated carbon.

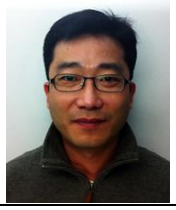
Poster

Time: 10:00am-18:00pm

R0009 	Liquefied Natural Gas as a Fuel in Inland Navigation: Barriers to be overcome on Rhine-Main-Danube **Ms. L. Simmer**, S. Pfoser and O. Schauer University of Applied Sciences Upper Austria, Austria Abstract The shipping industry is committed to further reducing its emissions of air pollutants and greenhouse gases. Alternative fuels play a key role in achieving this goal. Liquefied Natural Gas (LNG) may offer an effective solution towards low-emission shipping. However, for the uptake of LNG in inland navigation, especially in the Danube region, there are numerous hindrances to be overcome, such as the lack of infrastructure or high investment costs. Therefore, the aim of this paper is a detailed analysis and assessment of the different aspects influencing LNG implementation in the inland waterway sector in the near future. An extensive literature research was carried out in a first step. Afterwards findings were subsequently discussed with experts and adapted. The results of this paper should point to the problem areas for the introduction of LNG as fuel with a view to making significant contribution for further implementation steps.
R0008 	A Well-to-wheel Hazard Analysis to Encourage the Use of LNG as an Alternative Fuel **Ms. Sarah Pfoser**, Laura Simmer, and Oliver Schauer University of Applied Sciences Upper Austria, Austria Abstract Liquefied Natural Gas (LNG) is increasingly used as alternative fuel for heavy-duty vehicles and vessels. However, the specific requirements for handling this cryogenic liquid are sometimes causing uncertainty. To encourage the application of LNG, a deliberate hazard analysis has been carried out in order to determine potential risks and illustrate protective measures. On this basis, required competences for personnel involved in LNG activities have been defined to facilitate safe operations in this industry. Empirical evidence has been gathered by means of online questionnaires and confirmed the relevance of the stated competences. The aim of the study is to raise awareness and knowledge about the safety concerns related to LNG in order to promote its use as an alternative fuel.
S0001	Image Processing as an Integration Tool of Dam Safety System to the Smart Grid Alex Lopes de Oliveira, **Dr. Luiz Carlos Magrini**, Hae Yong Kim, Edvaldo Fábio Carneiro and Júlio Cesar Pinfari Fundação para o Desenvolvimento Tecnológico da Engenharia (FDTE), Brazil Abstract

	A widely used configuration to monitor minor displacements in concrete dams of hydroelectric power plants is based on the joint use of direct and inverted pendulums. By measuring the degree of inclination of the pendulum wire in both the X and Y axis, it is possible to measure the amount of displacement. In this work, a system capable of performing automated readings of the pendulum wires inclination, through the image processing technique, is presented. A processing methodology combining the calculation of the x component, the gradient signal and the Hough transform, was adopted for this purpose.
S0002 	Substation Smartizing: An IEC Based Approach for Utility Smart Analytics Development Luiz Carlos Magrini, Jose Luis Pereira Brittes, Osvaldo Rein Junior, Jose Antonio Jardini, Paula S. D. Kayano, Ferdinando Crispino, **Prof. Wagner S. Hokama,** and Luiz G. F. S. Fernandez CPFL, Brazil Abstract Recognizing that to survive in 21th century, utilities must take advantages of smart platforms, IEC has provided a homogeneous IT landscape based on CIM/XLM standardized data format for source data. It allows utilities to vitally combine their large number of autonomous IT systems, with great potential for optimizing their core processes. But this landscape itself will not be enough, unless utility actually and smartly connects IEDs and systems at that surviving critical level. This article presents an approach that tries to make easier the utility improve core processes, based on substation "smartizing", by means of creating in smart substations, key-value operating and functional data, information and knowledge, in a continuous upstream add-value process, making them suited to each IED, System and decision maker at every utility level. "Smartizing" architecture is fully IEC compliant. The approach is being applied in a 25 MVA distribution substation in Brazil, in a 10 GW demand peak utility group.
S0015 	Transient Stability Analysis of Distributed Generation Connected with Distribution Network **Mr. Wei Huang**, Zhipeng Li and Zehu Zhang North China Electric Power University, China Abstract The transient stability problem of distributed generations (DGs) has become one of the constraints for the inter-connection between a large number of DGs and the distribution network. In this paper, DGs connected to the distribution network are divided into DGs based on synchronous generator interface, induction generator interface and inverter interface according to the different DG interface types, and the mathematical models of DG are established based on different interface types. Then through the simulation on the typical one machine infinite bus systems, the paper analyses the transient process and the corresponding fault critical clearing time of DGs under the terminal fault conditions. Finally on the basis of the transient stability analysis of DGs, it puts forward corresponding measures for DGs based on different interface types to improve transient stability.

Listener

L001 	**Assoc. Prof. Sang-Hee Yoon** Inha University, The Republic of Korea
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