2017 HKCBEES ROME CONFERENCE ABSTRACT

July 18-20, 2017

The Conference is Co-organized with SAPIENZA University - Faculty of Architecture, Rome, Italy

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2017 HKCBEES Rome Conference Introductions

Welcome to 2017 HKCBEES Rome conference. This conference is co-organized by Sapienza University of Rome - Faculty of Architecture in Rome, Italy and HKCBEES. The objective of the Rome conference is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Green Energy Technology, Environmental Engineering and Applications and Water Pollution and Treatment.

2017 2nd International Conference on Green Energy Technology (ICGET 2017)

Papers will be published in the following conference proceeding:

IOP Conference Series: Earth and Environmental Science (EES) (ISSN: 1755-1315), which is indexed by EI Compendex, Scopus, Thomson Reuters (WoS), INSPEC, et al;

Conference website and email: http://www.icget.org/; icget@cbees.net

2017 8th International Conference on Environmental Engineering and Applications (ICEEA 2017)

Papers will be published in the following journal or the conference proceeding:

Environmental Science and Development (IJESD, ISSN:2010-0264), which will be included in the Engineering & Technology Digital Library, and indexed by WorldCat, Google Scholar, Cross ref, ProQuest , CABI.

IOP Conference Series: Earth and Environmental Science (EES) (ISSN: 1755-1315), which is indexed by EI Compendex, Scopus, Thomson Reuters (WoS), INSPEC, et al;

Conference website and email: http://www.iceea.org/; iceea@cbees.org

2017 2nd International Conference on Water Pollution and Treatment (ICWPT 2017)

Papers will be published in one of the following journals:

International Proceedings of Chemical, Biological and Environmental Engineering (IPCBEE, ISSN: 2010-4618), which is indexed by EBSCO, Chemical Abstracts Services (CAS), CABI, CNKI, WorldCat, Google Scholar, Ulrich's Periodicals Directory, Crossref, and Engineering & Technology Digital Library.

Conference website and email: http://www.icwpt.net/; icwpt@cbees.net

Presentation Instructions

Instructions for Oral Presentations

Devices Provided by the Conference Organizer:

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)
Digital Projectors and Screen
Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

Duration of each Presentation (Tentatively):

Regular Oral Presentation: about **12** Minutes of Presentation and **3** Minutes of Question and Answer
Keynote Speech: about **35** Minutes of Presentation and **5** Minutes of Question and Answer
Plenary Speech: about **15** Minutes of Presentation and **5** Minutes of Question and Answer

Instructions for Poster Presentation

Materials Provided by the Conference Organizer:

The place to put poster

Materials Provided by the Presenters:

Home-made Posters
Maximum poster size is A1
Load Capacity: Holds up to 0.5 kg

Best Presentation Award

One Best Oral Presentation will be selected from each presentation session, and the Certificate for Best Oral Presentation will be awarded at the end of each session on July 19, 2017.

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I

Prof. Hossam A.Gabbar

University of Ontario Institute of Technology (UOIT), Canada

Dr. Gabbar is a full Professor in the University of Ontario Institute of Technology (UOIT) in the Faculty of Energy Systems and Nuclear Science, and cross appointed in the Faculty of Engineering and Applied Science, where he has established both the Energy Safety and Control Lab (ESCL) and Advanced Plasma Engineering Lab. He is the recipient of the Senior Research Excellence Aware for 2016, UOIT. He is leading national and international research in the areas of smart energy grids, safety and control systems, advanced plasma systems and their applications on nuclear, clean energy and production systems. He is leading research in Canada with international recognition in energy safety and control for nuclear and energy production facilities. Dr. Gabbar obtained his B.Sc. degree in 1988 with first class of honor from the Faculty of Engineering, Alexandria University (Egypt). In 2001, he obtained his Ph.D. degree from Okayama University (Japan) in the area of Safety Engineering. From 2001 till 2004, he joined Tokyo Institute of Technology (Japan), as a research associate in the area of process systems engineering. From 2004 till 2008, he joined Okayama University (Japan) as a tenured Associate Professor, in the Division of Industrial Innovation Sciences. From 2007 till 2008, he was a Visiting Professor at the University of Toronto, in the Mechanical Engineering Department.

He has more than 210 publications, including patents, books / chapters, journal and conference papers. He been invited and participated in world-known conferences and delivered plenary talks on number of scientific events and through invitations to international universities, including: Alexandria University-Egypt, Helwan University-Egypt, Qatar University-Qatar, PI-UAE, Mayor of Nanjing-China, Tsinghua University-China, China University of Petroleum-China, UTM-Malaysia, Oil & Gas Industry-UAE / Kuwait, University of New Mexico-USA, Durham Strategic Energy Alliance (DSEA)-Canada, R&D Priorities to Integrate Natural Gas and Electricity infrastructure to Maintain Flexible-Canada, Canada Mission to China, Energy Hearing Committee in the House of Commons in Ottawa-Canada, and Canadian Workshop on Fusion Energy-Canada.

Dr. Gabbar has been active in developing and conducting educational and training courses and workshops for undergraduate, graduate students as well as for professionals from industry in the areas of energy safety and control engineering for nuclear, energy, and oil & gas facilities, including shutdown systems, safety design, safety verification, intelligent control and protection systems, integrity management, risk management, disaster management, and resilient energy infrastructures.

Dr. Gabbar has been active in leading national and international scientific and community events and activities, including: Nuclear Safety Standards within CSA – Canadian Standard Association, IEEE Annual Conference on Smart Energy Grid Engineering (SEGE), IEEE Nuclear and Plasma Sciences Society (NPSS) Symposium on Real Time Measurement, Instrumentation, and Control (RTMIC), IEEE Nuclear and Plasma Sciences Society Symposium on Plasma and Nuclear Systems (SPANS), and other international events. He is the Editor-in-Chief of the International Journal of Process Systems Engineering (IJPSE), and member of IEEE Smart Grid Committees.

Topic: “Advances in Micro Energy Grids with Energy Conservation Strategies and Applications on Infrastructures and Clean Transportation Systems”

Prof. Hossam A.Gabbar

University of Ontario Institute of Technology (UOIT), Canada

Abstract—This talk will present advances in research and technologies in interconnected micro energy grids with energy conservation strategies.

Energy in residential, commercial, and industrial buildings and transportation infrastructures represents major energy consumption in urban, cities and communities. The increase in number of buildings and towers in most of the major cities worldwide led to several initiatives for energy conservation programs with the main objective to achieve energy savings. In addition, with the expansion in societal development led to increase in production capacities and hence energy demands. Most energy strategies include energy conservation beside the increase in the penetration of renewable energy technologies. This talk shows business model and engineering design framework for practical implementation of energy conservation in infrastructures such as buildings, hotels, public facilities, industrial facilities, transportation, and water / energy supply infrastructures. Key performance indicators are modelled and used to evaluate energy conservation strategies and energy supply scenarios as part of the design and operation of energy systems in infrastructures. The proposed system approach shows effective management of building energy knowledge, which supports the simulation, evaluation, and optimization of several building energy conservation scenarios. Case studies are used to illustrate the proposed energy conservation framework, practices, methods, engineering designs, control, and technologies.

Keynote Speaker II

Prof. Jim P. Zheng

Florida State University, Florida, USA

Dr. Jim P. Zheng is a Professor and Sprint Eminent Scholar Chair at the Department of Electrical and Computer Engineering of Florida A&M University and Florida State University. He is the recipient of National Academy of Inventors Fellow, National Research Council Fellow, Army Research & Development Achievement Award, NASA Faculty Research Award, and Progress Energy Professional Development Award. He has published more than 120 articles in scholarly journals, and 110 papers in conference proceedings in the fields of energy storage, fuel cells, nano-sensors, photonics, and thin film growth, and been awarded 18 patents, and 5 patents have been licensed by a private companies. He is the founder of General Capacitor LLC and a co-founder of Bing Energy International Inc. He serves as editorial board of the Journal of Materials. Zheng is a senior member of the Institute of Electrical and Electronic Engineers and member of the Electrochemical Society.

Topic: “High Performance of Lithium-ion Capacitors and Internal Lithium-ion Capacitor/Lithium-ion Battery Hybrid Cells”

Prof. Jim P. Zheng

Florida State University, Florida, USA

Abstract—Lithium-ion capacitor (LIC) is a new energy storage device which consists of an electric double layer capacitance (EDLC) cathode and a lithium-ion battery (LIB) anode, between which the ions shuttle during charge and discharge processes. The LIC not only retained all the advantages of EDLC such as specific power >5 kW/kg and cycle life >100,000 cycles; but also had higher specific energy of 15-30 Wh/kg and higher maximum cell voltage of 4.0 V than that of EDLC. The LIC has a wide operating temperature range from -40 to 70o C.

Because the potentials of anode and cathode as well as the maximum cell voltage of LIC is comparable to that of LIB, it allows the LIC and LIB to be assembled in one package as a monolithic LIB and LIC hybrid cell. The energy density and power density of the hybrid cell will be designed to meet the requirements by a reasonable distribution of the ratio between LIB and LIC electrodes in a hybrid cell.

We have demonstrated a new hybrid energy storage device that combines the advantages of both the LIB and the LIC thereby avoiding their inherent defects in each. The voltage profiles for cells shows that, at low current, the new device has a higher energy density than LIC. In a hybrid cell, the cathode electrode is an inner combination of LIB material (e.g. LiCoO2, LiFePO4 or LiNiMnCoO2 (NMC)) and LIC material (activated carbon), and anode electrode is Li intercalating carbon such graphite, hard carbon, soft carbon, and their mixture. The advantage of this hybrid cell is that, at a low output, it will reflect the characteristics of LIB and provide a high energy density, while, at a high output, the hybrid cell may exhibit the feature of LIC and provide a high power density. As a result of this new breakthrough, both a high power density and a high energy density can be achieved.

Coffee Break & Group Photo Taking	**10:15~10:35**

Keynote Speaker III

Prof. Pierluigi Siano

Department of Industrial Engineering, University of Salerno, Italy

Pierluigi Siano received the M.Sc. degree in electronic engineering and the Ph.D. degree in information and electrical engineering from the University of Salerno, Salerno, Italy, in 2001 and 2006, respectively.

He is an Associate Professor (with accreditation for Full Professor) of Electrical Energy Engineering with the Department of Industrial Engineering, University of Salerno.

His research activities are centered on the integration of distributed energy resources in smart distribution systems and on planning and management of power systems.

He has co-authored more than 300 papers including more than 150 international journal papers. He is Chair of the Technical Committee on Smart Grids and a member of the Technical Committee on Renewable Energy Systems of the IEEE IES.

He is Editor of Intelligent Industrial Systems, Springer, an Associate Editor of the IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS, member of the editorial board of more than thirty International Journals.

Topic: “Active Demand Response for Residential Electrical Loads”

Prof. Pierluigi Siano

Department of Industrial Engineering, University of Salerno, Italy

Abstract—In the last decades, the innovation in the new renewable energy technologies, the incentives to renewable sources usage and the introduction of the Information and Communication Technologies (ICTs) have been some of the drivers to the restructuring of the electric power industry. One of the main innovations in the electrical energy management has been the introduction of smart grids, which are electric grids integrating advanced sensing technologies, control methodologies and communication infrastructures. In this way the interaction of all connected users with the objective of efficiently managing the variation of load demand is facilitated. At the distribution level, the smart grid concept is realized by microgrids, electrical networks composed of small scale independent power producers, Distributed Generators (DGs), local storage devices and controllable loads managed by hierarchical system control architecture in a small geographical area.

In this complex environment, an essential role is played by Demand Response (DR) which, according to the US Department of Energy, denotes variations of the electric consumption by users in response to the energy price changes over the time, or in the presence of financial incentives and reliability signals. In particular, a DR classification has reported a distinction between incentive-based programs (Direct Load Control, ancillary Service Markets, etc.) and time-based ones (among the others, Real Time (RT) pricing), which are beginning to be explored at the distribution level.

In the field of residential load management, studies have been focused on the control of specific “responsive” appliances, like HVAC (Heating Ventilation and Air Conditioning), electrical water heater or shiftable loads (for example dishwashers and washing machines), both with RT bids on the market and with day-ahead mathematical optimization algorithms.

The keynote will highlight the challenges for DR initiatives for residential loads in smart grids and will focus on the key developments in design and implementation of DR for residential loads. Residential end-users may bid for energy by means of a demand aggregator while considering uncertainties related to load demand, environmental conditions, house thermal behaviour and electricity market trends.

Keynote Speaker IV

Prof. Eng. PhD Marco Casini

SAPIENZA University of Rome, Italy

Prof. Marco Casini is a leading academic in the Green and Smart Building sector with over 20 years experiences in Building Sciences.

He is an environmental engineer, PhD in Environmental Engineering and Research Fellow in Architecture Technology at Sapienza University of Rome, Department of Urban Planning, Design and Architecture Technology. Since 2002 he has been Professor of Architecture Technology and of Environmental Certification of Buildings at the Faculty of Architecture of Sapienza University where he also teaches in several Master's, PhD and Graduate schools on subjects pertaining to Energy and Environmental Sustainability for Buildings. Dr. Casini's research activities cover a wide spectrum of topics within sustainable architectural design and energy efficiency of buildings, focusing on advanced materials and nanotechnologies for smart building envelopes as well as integrated renewable energy systems. He worked as scientific coordinator on major projects including the development of "Italian regional system for the certification of environmental sustainability of buildings - Protocollo ITACA Lazio" (2014) and the preparation of the "Sustainable Energy Action Plan of Rome" within the European Covenant of Mayors for Climate and Energy (2012). Dr. Casini's professional activity has included scientific and technical consultancy on technological, environmental and energy aspects related to the design and construction of complex building structures worldwide, as well as training on Green Building and Smart Cities strategies and policy making for Italian public authorities (Prime Minister's Cabinet, Ministry of Internal affairs, Regione Lazio).

Topic: “Renewable Energy and Smart Cities: Developments and Future Perspectives”

Prof. Eng. PhD Marco Casini

Department of Urban planning, Design and Architecture Technology, SAPIENZA University of Rome, Italy

Abstract—The integration of renewable resources at urban and building scale is one of the major challenges that the cities of the XXI century will face in reducing greenhouse gases emissions and becoming Smart cities. In view of the enormous social and environmental changes at the global level, more and more cities worldwide have directed their development strategies towards smart policies aimed at sustainable mobility, energy upgrading of the building stock, increase of energy production from renewable sources, improvement of waste management and implementation of ICT infrastructures. From solar systems, small wind turbines and in-pipe hydro systems, to Heat pumps and Micro Combined Heat and Power Fuel-Cell Systems, up to energy harvesting systems from roads, pavements, urban furniture and electric vehicles, there are more and more successful cases of application of these clean technologies on new and existing buildings and districts in order to achieve zero energy buildings (ZEB) and to reduce the consumption of fossil energy in urban areas.

After an overview of the role of cities in climate changes and environmental pollution worldwide, here is presented an overview of the different types of renewable energy sources in development, or already available, and illustrated their possible integration at the urban and building scale, showing the benefits achievable in terms of energy production, environmental impacts and architectural quality, taking into account demand response, energy storage and electric grid integration issues. An analysis of the most interesting initiatives at the international level pursued by cities is also provided within the current legislative framework.

Plenary Speaker Introductions

Plenary Speaker I

Prof. Piotr Stepnowski

Department of Environmental Analysis, Faculty of Chemistry, University of Gdańsk, Wita Stwosza 63, 80-308 Gdańsk, Poland

Professor Piotr Stepnowski of Environmental Chemistry at the University of Gdańsk. His scientific interest covers evaluation of distribution and transformation mechanisms of chemical pollutants in the environment, as well as their ecotoxicological assessment and analytical methods to detect them. He has published over 240 original and review articles in journals from JCR list. He was an editor of 8 books, author and coauthor of 3 handbooks for students. He gave over 50 lectures. His work was cited over 4100 times and his Hirsch index is 34. He has actively solicited for funding of his research project, both from domestic as well as international agencies, receiving funding for over 30 projects. He has supervised 9 doctoral thesis. He has initiated and held a position of the first director of the Institute of Environmental Protection and Human Health UG. He also held a position of Dean of Faculty of Chemistry UG. Currently he is v-ce Rector for Science and International Cooperation UG.

Topic: “Analytical tools for assessment of presence, effects and distribution of some pharmaceuticals in natural- and wastewaters”

Prof. Piotr Stepnowski

University of Gdańsk, Wita Stwosza 63, 80-308 Gdańsk, Poland

Abstract—Detection, quantification and fate assessment of residual pharmaceuticals in the aqueous environments presents one of the major challenges in contemporary analytical and environmental chemistry. The presentation will give an outline of our recent achievements in the field of sample preparation and final determination of selected pharmaceuticals such as antibiotics, beta blockers, estrogenic hormones and non steroidal anti-inflammatory drugs. The developed methods utilize following analytical techniques: SPE, SPME, ASE, MAE, UAE, GC-MS and LC-MS. Additionally original solutions in regard to derivatisation of analytes and their extraction with use of ionic liquids or carbon nanotubes will be presented. Finally the application of the developed methodologies in the determination of the levels and distribution of pharmaceuticals in water and wastewater samples will be presented.

Brief Schedule for Conference

<table>
<tr><td>Day 1</td><td colspan="3">July 18, 2017 (Tuesday) 10:00~17:00
Venue: SAPIENZA University of Rome, Italy
Participants Onsite Registration & Conference Materials Collection</td></tr>
<tr><td rowspan="8">Day 2</td><td colspan="3">July 19, 2017 (Wednesday) 8:45~18:20
Venue: SAPIENZA University of Rome, Italy
Registration, Keynote Speech, Plenary Speech and Conference Presentation</td></tr>
<tr><td colspan="3">Morning Conference
Venue: Aula Magna</td></tr>
<tr><td colspan="3">Opening Remarks 8:45~8:55
Prof. Eng. PhD Marco Casini
SAPIENZA University of Rome, Italy
Keynote Speech I 8:55~9:35
Topic: “Advances in Micro Energy Grids with Energy Conservation Strategies and Applications on Infrastructures and Clean Transportation Systems”
(Prof. Hossam A.Gabbar, University of Ontario Institute of Technology (UOIT), Canada)
Keynote Speech II 9:35~10:15
Topic: “High Performance of Lithium-ion Capacitors and Internal Lithium-ion Capacitor/Lithium-ion Battery Hybrid Cells”
(Prof. Jim P. Zheng, Florida State University, Florida, USA)</td></tr>
<tr><td colspan="3">Coffee Break & Group Photo Taking 10:15~10:35</td></tr>
<tr><td colspan="3">Keynote Speech III 10:35~11:15
Topic: “Active Demand Response for Residential Electrical Loads”
(Prof. Pierluigi Siano, Department of Industrial Engineering, University of Salerno, Italy)
Keynote Speech IV 11:15~11:55
Topic: “Renewable Energy and Smart Cities: Developments and Future Perspectives”
(Prof. Eng. PhD Marco Casini, Department of Urban planning, Design and Architecture Technology, SAPIENZA University of Rome, Italy)
Plenary Speech I 11:55~12:15
Topic: “Analytical tools for assessment of presence, effects and distribution of some pharmaceuticals in natural- and wastewaters”
(Prof. Piotr Stepnowski, University of Gdańsk, Wita Stwosza 63, 80-308 Gdańsk, Poland)</td></tr>
<tr><td colspan="3">Lunch 12:15~13:30</td></tr>
<tr><td colspan="3">Afternoon Conference
Venue: Conference Room 5/Conference Room 4/Conference Room 7</td></tr>
<tr><td>Session 1:13:30~15:15
Venue: Conference Room 5
7 presentations-Topic: “Power System Management”</td><td>Session 2: 13:30~15:30
Venue: Conference Room 4
8 presentations-Topic: “Water Resources Management and Wastewater Treatment”</td><td>Session 3: 13:30~15:30
Venue: Conference Room 7
8 presentations-Topic: “Environmental Adaptation and Ecosystem</td></tr>
</table>

			Management"
	Coffee Break 15:30~15:50		
	Session 4:15:50~17:50 **Venue: Conference Room 5** 8 presentations-Topic: "Renewable Energy & Energy Conservation and Emission Reduction"	**Session 5:** 15:50~17:05 **Venue: Conference Room 4** 5 presentations-Topic: "Electrochemistry and Energy Storage"	**Session 6:** 15:50~18:20 **Venue: Conference Room 7** 10 presentations-Topic: "Environmental Pollution Control and Resource Management"
	Dinner 18:30		
Day 3	**July 20, 2017 (Thursday) 9:00-17:00** **One-Day Visit**		

Tips: Please arrive at the conference to upload or copy PPT into the laptop room 10 minutes before the session begins.

Detailed Schedule for Conference

July 19, 2017 (Wednesday)

Venue: Aula Magna/Conference Room 5/Conference Room 4/ Conference Room 7

8:45~8:55	 **Opening Remarks** Prof. Eng. PhD Marco Casini SAPIENZA University of Rome, Italy
8:55~9:35	 **Keynote Speech I** Prof. Hossam A.Gabbar University of Ontario Institute of Technology (UOIT), Canada Topic: "Advances in Micro Energy Grids with Energy Conservation Strategies and Applications on Infrastructures and Clean Transportation Systems"
9:35~10:15	 **Keynote Speech II** Prof. Jim P. Zheng Florida State University, Florida, USA Topic: "High Performance of Lithium-ion Capacitors and Internal Lithium-ion Capacitor/Lithium-ion Battery Hybrid Cells"
10:15~10:35	**Coffee Break & Group Photo Taking**
10:35~11:15	 **Keynote Speech III** Prof. Pierluigi Siano Department of Industrial Engineering, University of Salerno, Italy Topic: "Active Demand Response for Residential Electrical Loads"
11:15~11:55	 **Keynote Speech IV** Prof. Eng. PhD Marco Casini Department of Urban planning, Design and Architecture Technology, SAPIENZA University of Rome, Italy Topic: "Renewable Energy and Smart Cities: Developments and Future Perspectives"
11:55~12:15	 **Plenary Speech I** Prof. Piotr Stepnowski University of Gdańsk, Wita Stwosza 63, 80-308 Gdańsk, Poland Topic: "Analytical tools for assessment of presence, effects and distribution of some pharmaceuticals in natural- and wastewaters"
12:15~13:30	**Lunch**

13:30~15:15	**Session 1** 7 presentations-Topic: "Power System Management"
13:30~15:30	**Session 2** 8 presentations-Topic: "Water Resources Management and Wastewater Treatment"
13:30~15:30	**Session 3** 8 presentations-Topic: "Environmental Adaptation and Ecosystem Management"
15:30~15:50	**Coffee Break**
15:50~17:50	**Session 4** 8 presentations-Topic: "Renewable Energy & Energy Conservation and Emission Reduction"
15:50~17:05	**Session 5** 5 presentations-Topic: "Electrochemistry and Energy Storage"
15:50~18:20	**Session 6** 10 presentations-Topic: "Environmental Pollution Control and Resource Management"
18:30~20:00	**Dinner**

Note: (1) The registration can also be done at any time during the conference.
(2) The organizer doesn't provide accommodation, and we suggest you make an early reservation.
(3) One Best Oral Presentation will be selected from each oral presentation session, and the Certificate for Best Oral Presentation will be awarded at the end of each session on July 19, 2017.

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:15

Venue: Conference Room 5

7 presentations- Topic: "Power System Management"

Session Chair: Prof. Pierluigi Siano and Prof. Turhan Koyuncu

T0004 Presentation 1 (13:30~13:45)

A comparison of prediction Methods for Design of Pump as Turbine for Small Hydro Plant: Implemented Plant

Hossein Naeimi, Mina Nayebi Shahabi

Water and Wastewater Co., Urmia, Iran

Abstract—In developing countries, small and micro hydropower plants are very effective source for electricity generation with energy pay-back time (EPBT) less than other conventional electricity generation systems. Using pump as turbine (PAT) is an attractive, significant and cost-effective alternative. Pump manufacturers do not normally provide the characteristic curves of their pumps working as turbines. Therefore, choosing an appropriate Pump to work as a turbine is essential in implementing the small-hydro plants. In this paper, in order to find the best fitting method to choose a PAT, the results of a small-hydro plant implemented on the by-pass of a Pressure Reducing Valve (PRV) in Urmia city in Iran are presented. Some of the prediction methods of Best Efficiency Point of PATs are derived. Then, the results of implemented project have been compared to the prediction methods results and the deviation of from measured data were considered and discussed and the best method that predicts the specifications of PAT more accurately determined. Finally, the energy pay-back time for the plant is calculated.

Session 1

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:15

Venue: Conference Room 5

7 presentations- Topic: "Power System Management"

Session Chair: Prof. Pierluigi Siano and Prof. Turhan Koyuncu

T2001 Presentation 2 (13:45~14:00)

Conceptual design and efficiency evaluation of a hybrid power plant based on biomass co-gasification

Po-Chih Kuo, Wei Wu

Department of Chemical Engineering, National Cheng Kung University, Taiwan

Abstract—Torrefied biomass is a potential alternative fuel to replace raw biomass or coal in power plants. This study develops a hybrid power plant by integrating torrefied biomass co-gasification (TBCG) with solid oxide fuel cell (SOFC) systems. The calcium looping (CaL) CO2 capture process is also implemented into the hybrid power system. Two configurations for the proposed hybrid power plant are designed and compared each other, namely, pre-SOFC and post-SOFC. Thermodynamic analysis is adopted to examine the performance of hybrid power generation system using Aspen Plus. Three different scenarios of the energy efficiency indexes are taken into account to evaluate the performance of hybrid power plant. The simulation results show that the maximum net system efficiency of pre-SOFC and post-SOFC are 40.73 and 36.56%, respectively. In order to improve the maximum net system efficiency of hybrid power generation system, the heat recovery approach is performed. Through the heat integration design, the maximum net system efficiency of pre-SOFC and post-SOFC are 45.72 % and 44.63 %, respectively. Overall, pre-SOFC is superior to post-SOFC in terms of energy efficiency. However, post-SOFC can pursue the hybrid power plant with zero CO2 emissions.

Session 1

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:15

Venue: Conference Room 5

7 presentations- Topic: "Power System Management"

Session Chair: Prof. Pierluigi Siano and Prof. Turhan Koyuncu

T0030 Presentation 3 (14:00~14:15)

Techno-economical analysis of Rooftop Grid-connected PV dairy farms; *Case study of Urmia university dairy farm*

A M Nikbakht, N Aste, H J Sarnavi and F Leonforte

Department of Mechanical Engineering of Biosystems, Urmia University, Iran.

Abstract—The global trends indicate a growing commitment to renewable energy development because of declining fossil fuels and environmental threats. Moreover, the global demographic growth coupled with rising demands for food has escalated the rate of energy consumption in food section. This study aims to investigate the techno-economic impacts of a grid-connected rooftop PV plan applied for a educational dairy farm in Urmia university, with total estimated annual electrical energy consumption of 18,283 kWh, located at the north west part of Iran. Based on the current feed-in tariff and tremendously low electricity price in agriculture section in Iran, the plants with size ranged from 14.4 to 19.7 kWp (initial investment ranged from 26,000 to 36,000 USD) would be satisfied economically.

Session 1

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:15

Venue: Conference Room 5

7 presentations- Topic: "Power System Management"

Session Chair: Prof. Pierluigi Siano and Prof. Turhan Koyuncu

T0049 Presentation 4 (14:15~14:30)

Practical Efficiency of Photovoltaic Panel Used for Solar Vehicles

Turhan Koyuncu

University of Adiyaman, Faculty of Technology, Adiyaman, Turkey

Abstract—In this experimental investigation, practical efficiency of semi-flexible monocrystalline silicon solar panel used for a solar powered car called "Firat Force" and a solar powered minibus called "Commagene" was determined. Firat Force has 6 solar PV modules, a maintenance free long life gel battery pack, a regenerative brushless DC electric motor and Commagene has 12 solar PV modules, a maintenance free long life gel battery pack, a regenerative brushless DC electric motor. In addition, both solar vehicles have MPPT (Maximum power point tracker), ECU (Electronic control unit), differential, instrument panel, steering system, brake system, brake and gas pedals, mechanical equipments, chassis and frame. These two solar vehicles were used for people transportation in Adiyaman city, Turkey, during one year (June 2010-May 2011) of test. As a result, the practical efficiency of semi-flexible monocrystalline silicon solar panel used for Firat Force and Commagene was determined as 13% in despite of efficiency value of 18% (at 1000 W/m2 and 25 ℃) given by the producer company. Besides, the total efficiency (from PV panels to vehicle wheel) of the system was also defined as 9%.

Session 1

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:15

Venue: Conference Room 5

7 presentations- Topic: "Power System Management"

Session Chair: Prof. Pierluigi Siano and Prof. Turhan Koyuncu

T0057 Presentation 6 (14:45~15:00)

An intelligent approach to strengthening of the rural electrical power supply using renewable energy resources

F C Robert, G S Sisodia and S Gopalan

Department of Electronics and Communication Engineering, Amrita School of Engineering, Amritapuri, Amrita Vishwa Vidyapeetham, Amrita University, India

Abstract—The healthy growth of economy lies in the balance between rural and urban development. Several developing countries have achieved a successful growth of urban areas, yet rural infrastructure has been neglected until recently. The rural electrical grids are weak with heavy losses and low capacity. Renewable energy represents an efficient way to generate electricity locally. However, the renewable energy generation may be limited by the low grid capacity. The current solutions focus on grid reinforcement only. This article presents a model for improving renewable energy integration in rural grids with the intelligent combination of three strategies: 1) grid reinforcement, 2) use of storage and 3) renewable energy curtailments. Such approach provides a solution to integrate a maximum of renewable energy generation on low capacity grids while minimising project cost and increasing the percentage of utilisation of assets. The test cases show that a grid connection agreement and a main inverter sized at 60 kW (resp. 80 kW) can accommodate a 100 kWp solar park (resp. 100 kW wind turbine) with minimal storage.

Session 1

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:15

Venue: Conference Room 5

7 presentations- Topic: "Power System Management"

Session Chair: Prof. Pierluigi Siano and Prof. Turhan Koyuncu

T0065 Presentation 7 (15:00~15:15)

State-of-The-Art of Modeling Methodologies and Optimization Operations in Integrated Energy System

Yongjun Zhang and **Zhan Zheng**

School of Electric Power, South China University of Technology,Guangzhou, China

Abstract—Rapid advances in low carbon technologies and smart energy communities are reshaping future patterns.Uncertainty in energy productions and demand sides are paving the way towards decentralization management. Current energy infrastructures could not meet with supply and consumption challenges, along with emerging environment and economic requirements.Integrated Energy System(IES) whereby electric power,natural gas,heating couples with each other demonstrates that such a significant technique would gradually become one of main comprehensive and optimal energy solutions with high flexibility,friendly renewables absorption and improving efficiency. In these global energy trends, we summarize this literature review. Firstly the accurate definition and characteristics of IES have been presented. With details descriptions,each independent energy network and coupling elements modeling issues are analyzed. It is pointed out that decomposed and integrated analysis methods are the key algorithms for IES optimization operations problems,followed by exploring the IES market mechanisms.Finally several future research tendencies of IES,such as dynamic modeling,peer-to-peer trading,couple market design,are under discussion.

Coffee Break	**15:30~15:50**

Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 4

8 presentations- Topic: "Water Resources Management and Wastewater Treatment"

Session Chair: Prof. Piotr Stepnowski

H0018 Presentation 1 (13:30~13:45)

Sorption capacity measure of Chlorella vulgaris and Scenedesmus acutus to remove chromium from tannery waste water

Liliana Ardila Forero, Rubén Godoy and Luis Montenegro

National University of Colombia – ECCI University, South America

Abstract—The tanning process is a polluting activity due to the release of toxic agents into the environment. One of the most important of those toxic chemicals is trivalent chromium, used as a tanning agent, because it could lead several health problems in the skin and some organs like liver or kidney damage, but the worst effect, is when trivalent chromium is oxidized to hexavalent chromium because it could induce to different types of cancer and DNA disturbance.

For that, different alternatives have been proposed for the removal of this metal from the waste water of the tanning process which include the optimization of the processes and operations inside the tanneries, and end tube solutions such as the physicochemical processes like adsorption and alkaline precipitation. As alternative, this project investigated the aspects related to the biological process of metal adsorption in aqueous phase through two types of native green microalga, called Chlorella vulgaris and Scenedesmus acutus. This, considering that cellular wall of microalgae may has elements or chemical functions like amines and carboxyl that might bind with trivalent chromium.

The characterization of the biological adsorption process of trivalent chromium was carried out in synthetic water and waste water from a tanning process in the sector of San Benito, in the south of Bogota - Colombia. The bioadsorption process was also carried out with free algae and algae immobilized in polyvinyl alcohol to facilitate algae removal after biosorption to identify the significance of variables as temperature, chromium and algae concentrations and pH. Another part of the project was the estimation of biosorption kinetics and biosorption equilibrium to establish how much chromium can be remove from different types of water and kind of bioadsorbent, to finally determine if the biosorption process is a competitive alternative comparing to other processes of removal of chromium and other heavy metals.

Session 2

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 4

8 presentations- Topic: "Water Resources Management and Wastewater Treatment"

Session Chair: Prof. Piotr Stepnowski

H0041 Presentation 2 (13:45~14:00)

An analysis of Water Features in Persian gardens; Bagh-e Shahzadeh

PARISA GOKER

Bilecik Seyh Edebali University, Turkey

Abstract—Persian garden is included among the most characteristic and crucial elements in Iranian landscape. The significance of the art of erecting gardens for Iranians can be seen as far as the hot and dry climate of Iran and its water deficiency for plantation are concerned. Water is an important element in Persian garden and it can be purported that gardens would lose their meaning without it. Water is used in garden applications due to its capabilities including life, brightness, cleanliness, light, inertia and motion causing many sensations in the human soul and elevating mental comfort. Furthermore, its various running structures including basins, streams, water creeks and fountains enable mental comfort and technical functions. In this research, water features (pools, fountains, Qanat, waterfalls) situated in Bagh-e Shahzadeh (Shahzadeh Garden), Kerman-Iran, built as the palace garden by Abd-ol Hamid Mirza Nasser-al Dawleh Farman Farma during the rule of Qajars in 1160 AH, will be investigated. Design and structural characteristics of water features that survived till present and are situated in the palace gardens will be discussed based on the collected data, and suggestions will be made for the current preservation issues.

Session 2

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 4

8 presentations- Topic: "Water Resources Management and Wastewater Treatment"

Session Chair: Prof. Piotr Stepnowski

H0043 Presentation 3 (14:00~14:15)

Spatial and temporal analysis of natural drainage in the Ressacada aquifer (Florianopolis, Brazil)

Fabrizio Rama, Davide Franco and Henry Corseuil

UNIVERSIDADE FEDERAL DE SANTA CATARINA, BRAZIL

Abstract—This paper proposes an in-depth statistical exploration of the available hydraulic head data concerning the Ressacada aquifer (Florianopolis, Brazil). By means of this approach, the study aims to obtain a complete picture of the natural drainage in the domain. This intent supports the understanding of the relationship between rainfalls and aquifer level fluctuations in this coastal region. In a broader perspective, the drainage term can be used in the application of the water table fluctuation method, in order to explain the seepage behavior and recharge phenomena. The chosen study area was a shallow coastal aquifer surrounded by mangrove swamp in a humid subtropical climate region. In view of the cited features, it represented a complex domain to assess both groundwater and surface processes. Besides, the co-occurrence of numerous anthropogenic factors, and the presence of strategic interest areas (International Airport, Military base camp), have further complicated the vertical infiltration and the natural drainage. Finally, results showed two main groups of piezometers with a typical drainage behavior. It seems to depend on the well position in the flow field and, therefore, on the distance from surface receptors. In each group, two distinct drainage conditions were also detached in terms of the water table level.

Session 2

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 4

8 presentations- Topic: "Water Resources Management and Wastewater Treatment"

Session Chair: Prof. Piotr Stepnowski

Y0001 Presentation 4 (14:15~14:30)

The Chemical and Isotope Methods Application for Risk Assessment Contamination of the Main Tributaries of the Transboundary Amudarya River

Inom Normatov, Abulqosim Muminov, Parviz Normatov, Robiya Normatova

Hydropower and Ecology of the AS Republic of Tajikistan, Tajikistan

Abstract—The results of chemical and isotopic analyses of the Transboundary Zeravshan River waters, the Vakhsh River and its tributaries are presented. As an indicator of impact of the mining enterprise wastewater in the basin of the Zeravshan River on the quality of water, a differential method of changing the chemical composition of water before and after the tailings dams' wastewater was applied. The lack of heavy metals excess levels (Zn, Cd, and Hg, As, Pb) above the maximum permissible concentration of the corresponding elements in the Zeravshan River are observed. Detected change (heavier) of the Zeravshan River and its tributaries isotopic composition (δ^2H, $\delta^{18}O$) from upstream to the downstream of the river is associated with the evaporation process. The individuality ensuring of the Vakhsh River each tributary can be achieved by the sampling in points until the confluence of the respective tributary with the main river or another tributary. The exchanges of groundwater and surface waters in Muksu river basin were observed. The groundwater reservoirs of the Muksu River Basin (a tributary of the Vakhsh River) in dry periods nourishes the river Muksu. It is established that the chemical composition of the Zeravshan and Vakhsh Rivers is formed in the leaching process of rocks.

Session 2

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 4

8 presentations- Topic: “Water Resources Management and Wastewater Treatment”

Session Chair: Prof. Piotr Stepnowski

Y0002 Presentation 5 (14:30~14:45)

Performance of Anaerobic Sludge under Microcosm Experiments Treating Municipal Wastewater with Low Concentration of Heavy Metals

R. C. Vaishya, Kanhaiya Kumar Singh and Arnav Gupta

Motilal Nehru National Institute of Technology-Allahabad, India

Abstract—Low concentration of heavy metals in municipal wastewater comes from pipe sediments and domestic products including; Medicine, Caulking Products, Cleaners, Cosmetics and Auto Products. At certain concentrations, heavy metals showtoxicity and/or inhibition effect onto microorganisms in biological treatment systems. In this study, the effect of five heavy metals (Cr, Cu, Zn, Ni andPb) at low concentrations onto treating performance of anaerobic sludge were investigated using municipal wastewateras carbon source and electron donor in a batch experiments (serum bottle assays). The six concentrations of heavy metals were added to municipal wastewater; 0.35, 0.75, 1.25, 3, 5 and 10mg/l.The descending order of toxicity/inhibition activity of heavy metals were found Cr (most toxic), Cu, Ni, Zn and Pb (least toxic) respectively.In general, cumulative methane production (ml) decreased with increasing heavy metal concentrations above 1.25 mg/l. Inhibition effects of heavy metal values (0.35-1.25mg/l) were low on COD removal. Heavy metals in influent and effluent into serum bottles were also compared. Effluent heavy metal concentrations from low to high were found to be Pb, Cu, Zn,Ni and Cr. As a conclusion, heavy metals addition in municipal wastewater influent at low concentrations affected adversely performance of anaerobic sludge; although, did not cause complete inhibition to anaerobic microorganisms. The inhibition effects of heavy metal counted on type of metal, characteristics of sludge and hydraulic retention time.

Session 2

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 4

8 presentations- Topic: "Water Resources Management and Wastewater Treatment"

Session Chair: Prof. Piotr Stepnowski

Y0009 Presentation 6 (14:45~15:00)

Temporal and Spatial Distribution Characteristics and Tendency of Water Pollution Incidents in China

Zhang Kun, Hu Mingming and Xiang Pengcheng

Chongqing University, Chongqing, China

Abstract—Collect the water pollution data published in the Journal of Safety and Environment, and count China's water pollution incidents with a clear spatial and temporal location to 945 during 2007 to 2016. Take the province as the basic unit to describe the temporal and spatial distribution characteristics of water pollution incidents and measure water pollution incidents concentration. Then based on this, draw the map of Chinese water pollution incidents distribution to analysis of the changes of water pollution trend, and puts forward some corresponding preventive measures. It is found that the total amount of water pollution incidents in China in the last 10 years are gradually increasing, and the distribution of water pollution incidents has obvious regional differences that water pollution incidents are frequently seen in Guangdong Province, Zhejiang Province, Hubei Province and so on. From the time dimension, the dispersion distribution and the accumulation distribution about the provinces with high incidence of water pollution incidents have occurred one by one, with the accumulation trend of the central provinces. Therefore, the water pollution incidents in China have the characteristics of regional distribution, and it is necessary to set up a cross-regional linkage mechanism and experience exchange platform for preventing and controlling water pollution in different areas.

Session 2

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 4

8 presentations- Topic: "Water Resources Management and Wastewater Treatment"

Session Chair: Prof. Piotr Stepnowski

Y3001 Presentation 7 (15:00~15:15)

Removal of Microbiology from E.coli(8099)-Polluted Water Using Natural Ore

Xin-zhu Pang, Rong-ji Dai, Jin-sheng Feng, Yi-bing Zhang, Juan-juan Xu

Beijing Institute of Technology, Beijing, China

Abstract—Drinking water has been supplied in a central water supply mode in most Chinese area. Among all the water treatment technology for drinking water, disinfection plays most vital role. Generally, the main method used for practical water disinfection is chlorine disinfection. However, this method has been limited by the intrinsic disadvantage, such as the remaining chlorine in the water should cause long-term hurt toward the human health.
Here, we report the use of ores to simulate the formation of natural mineral water path. The ores are regarded as quartz sand, pumice, zeolite, medical stone, owning typical anion balls. The unique porous structure of the ores endows them special ability of adsorbing bacterial. Moreover, anion balls should form weak current in water and could be used remove the bacterial. We used the national standard method to develop E.coli(8099), then prepared the microbial contaminated water with E.coli. The microbial containing water was treated with the ores in a series of experiments. The results showed that the all the ores can remove bacteria from the water. Specifically, the stone ball and anion ion exhibited the best disinfection effect. Furthermore, the disinfection effect was enhanced after more cycles. We also found that the multi-mineral-ores system showed a series disinfection and promisingly enhanced disinfection effect.

Session 2

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 4

8 presentations- Topic: "Water Resources Management and Wastewater Treatment"

Session Chair: Prof. Piotr Stepnowski

Y2001 Presentation 8 (15:15~15:30)

Effect of calcination on the photocatalytic properties of Ag_3PO_4 photocatalysts

Nur Athirah Jusoh, Akmal Hisham Ariffin, **Abdul Halim Abdullah**

Department of Chemistry, Faculty of Science, Universiti Putra Malaysia, Malaysia

Abstract—Water pollution due to effluents from textile industries, especially dyes cause serious impact to the aquatic ecosystem. Although several techniques such as chemical oxidation, ozonation, adsorption and coagulation are available to treat the coloured effluents, these are non- destructive techniques which can cause incompleteness of purification, creating secondary pollution. Semiconductor mediated photocatalysis provides a better alternative method as it is able to mineralise the organic compounds to carbon dioxide, water and other nontoxic compounds. In this work, Ag_3PO_4 photocatalysts were prepared via precipitation and then subjected to calcination at different temperature and time. The prepared photocatalysts were used in the photodegradation of methyl orange (MO) under visible light irradiation. The photocatalyst that was calcined at 400 ℃ for 4 hours (AP-44) exhibits the highest percentage of methyl orange degradation (94 %) There was approximately 70% enhancement in photocatalytic activity for the removal of MO when using AP-44 as compared to that of uncalcined Ag_3PO_4 (54%). These improvements in photocatalytic activity may be due to induced changes of the Ag_3PO_4 physical properties during the calcination process. The effect of MO concentration, photocatalyst loading and pH of the MO solution on the photocatalytic performance of AP-44 was studied to optimize the photocatalytic degradation of MO. It was found that AP-44 exhibited the highest photodegradation efficiency (96%) when 0.3 g of AP-44 was used to degrade 10 ppm of MO solution at the natural pH of the MO solution.

Coffee Break	**15:30~15:50**

Session 3

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 7

8 presentations- Topic: "Environmental Adaptation and Ecosystem Management"

Session Chair: Prof. Panagiotis Dimitrakopoulos

H0007 Presentation 1 (13:30~13:45)

Recent Climate Change Adaptation Practices in Various Countries

Aysegul Tanik and Deniz Tekten

Istanbul Technical University (ITU), Turkey

Abstract—The paper will be a review work on the recent strategies of EU in general, and will underline the inspected sectoral based adaptation practices and action plans of 7 countries; namely Germany, France, Spain, Italy, Denmark, USA and Kenya from Africa continent. Although every countries' action plan have some similarities on sectoral analysis, each country in accordance with the specific nature of the problem seems to create its own sectoral analysis. Within this context, green and white documents of EU adaptation to climate change, EU strategy on climate change, EU targets of 2020 on climate change and EU adaptation support tools are investigated.

Session 3

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 7

8 presentations- Topic: "Environmental Adaptation and Ecosystem Management"

Session Chair: Prof. Panagiotis Dimitrakopoulos

H0008 Presentation 2 (13:45~14:00)

Development of Landscape Architecture through Geo-Eco-Tourism in Tropical Karst Area to Avoid Extractive Cement Industry for Dignified and Sustainable Environment and Life

Pita Cahyanti and Cahyono Agus

Universitas Gadjah Mada Yogyakarta Indonesia, Indonesia

Abstract—Karst areas in Indonesia amounted to 154,000 km2, potentially for extractive cement and wall paint industries. Exploitation of karst caused serious problems on the environment, health and social culture of the local community. Even though, karst region as a natural and cultural world heritage also have potential environmental services such as water resources, carbon sink, biodiversity, unique landscapes, natural caves, natural attractions, archaeological sites and mystic areas. Landscape architectural management of in the concept of blue revolution through the empowerment of land resources (soil, water, minerals) and biological resources (plant, animal, human), not only have adding value of economy aspect but also our dignified and sustainable environment and life through health, environmental, social, cultural, technological and management aspects. Geo-eco-tourism offers the efficiency of investment, increased creative innovation, increased funding, job creation, social capital development, stimulation of the socio-entrepreneurship in community. Community based geo-eco-tourism in Gunung Kidul Yogyakarta rapidly growing lately due to the local government banned the exploitation of karst. Landscape architecture at the caves, white sand beaches, cliffs in karst areas that beautiful, artistic and have special rare natural architecture form of stalactite and stalagmite, become the new phenomenal interested object of geo-eco-tourism. Many hidden nature objects that had been deserted and creepy could be visited by many local and foreign tourists. Landscape architectural management on hilltops with a wide view of the universe and fresh, sunset and sunrise, the clouds country are a rare sight for modern community. Local cultural attractions, local culinary, home stay with local

communities will be an added attraction, but the infrastructure and human resources should be developed. Traveler photographs that widespread rapidly through social media and mass media became a great and effective promotion. With geo-eco-tourism, people can empowering natural resource to gain harmonization of economic, environment and social-culture aspect, without destroy it.

Session 3

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 7

8 presentations- Topic: "Environmental Adaptation and Ecosystem Management"

Session Chair: Prof. Panagiotis Dimitrakopoulos

H0015 Presentation 3 (14:00~14:15)

Explorations of Public Participation Approach to the Framing of Resilient Urbanism

Wei-Kuang Liu, Yi-Shiang Shiu, Yang-Ting Shen, Feng-Cheng Lin and Hua-Hsuan Hsieh

Architecture, Feng Chia University, Taiwan

Abstract—Under the framework of developing resilient and livable cities, this study was aimed at engaging local communities to achieve the goal of public participation. Given the prevalence of smart mobile devices, an interactive app called "Citizen Probe" was designed to guide users to participate in building resilient and livable urban spaces by enabling users to report the condition of their living environment. The app collects feedback from users regarding the perceived condition of the urban environment, and this information is used to further develop an open online index system. The index system serves as a guide for the public to actively transform their city into a resilient and livable urban environment. The app was designed for the reporting of flood incidents with the objective of resilient disaster prevention, which can be achieved by enabling users to identify disaster conditions in order to develop a database for basic disaster information. The database can be used in the prevention and mitigation of disasters and to provide a foundation for developing indices for assessing the resilience and livability of urban areas.

Three communities in Taichung, Taiwan, participated in the study. Residents of these communities were requested to use the app and identify local environmental conditions to obtain spatial data according to four stages in disaster response: assessment, readiness, response, and recovery. A volunteered geographic information database was developed to display maps for providing users with current reports of predisaster risk assessment, disaster response capacity, real-time disaster conditions, and overall disaster recovery. In addition, the database can be used as a useful tool for researchers to conduct GIS analyses and initiate related discussions. The interactive app raises public awareness on disaster prevention and

makes disaster prevention a daily norm. Further discussion between the public and experts will be initiated to assist in policy management pertaining to the ongoing development of cities in addition to improving disaster prevention and response measures.

Session 3

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 7

8 presentations- Topic: "Environmental Adaptation and Ecosystem Management"

Session Chair: Prof. Panagiotis Dimitrakopoulos

H0029 Presentation 4 (14:15~14:30)

The geodiversity of the Ligurian DOC vineyards and its relationships with the terroir

Gerardo Brancucci, Michele Brancucci, Pietro Marescotti, Monica Solimano, **Ilda Vagge** and Roberto Vegnuti

University of Milan, Italy

Abstract—The Liguria region (NW Italy) is characterized by a wide geodiversity, which is strictly correlated with a huge variety of landscapes. This article reports and discusses the results of a multidisciplinary research performed to investigate the relationships among the "geological fingerprint" of soils and the quality of wines, going beyond the classical italian quality labels, such as the DOC (Controlled Designation of Origin), the DOP (Protected Designation of Origin) and the IGP (Protected Geographical Indication) labels. We applied an innovative multidisciplinary approach aimed to demonstrate the close relationships between the "geological fingerprint" of an area and the organoleptic properties of agricultural products. This approach involved the investigation of the geological, geomorphological, geochemical, mineralogical, ecological and vegetational features of selected DOC vineyards occurring in the ligurian terraced landscape. The analytical protocol included routine pedological and minero-petrographical investigations as well as innovative geochemical analyses by means of Field Portable X-ray Fluorescence Spectrometer (FP-EDXRF). Geomorphological evaluation as well as analysis of structural condition of the terraced vineyard were also performed. The results of this research evidenced that phenotypic differences can be observed in the same vineyard and even in a same cultivar (same genotypes) as a response to local variation of the geo-pedological and ecological features. These results might be the key for the protection of the uniqueness of high-quality local wines and can contrast the outsourcing of these typical agricultural products. Moreover, the valorization of local production should be also one of the

necessary strategies for the protection and the conservation of the ligurian terraced landscape. Finally, the high-quality wines can become an effective promotional tool for the different ligurian landscapes. Besides being a marketing tool, the “geological label of the wine” might tell us the the history and the geography of the terraced landscape of Liguria, thus representing an important instrument for the territorial safeguard, promotion, and valorization.

Session 3

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 7

8 presentations- Topic: "Environmental Adaptation and Ecosystem Management"

Session Chair: Prof. Panagiotis Dimitrakopoulos

H3002 Presentation 5 (14:30~14:45)

Green Economy as a Vision to Sustainable Path for Achieving Real Prosperity

Nora Mohamed Rehan Hussien

Head of Architecture Department, Faculty of Engineering, Ahram, Canadian University-Egypt

Abstract—Emerging global threats to "Our Common Future" require much greater collective action, improved benefit sharing from natural resource development and greater financing to enable transformative action. We need a new moral imperative linked to equitable outcomes, shared concerns, and equal claims, including the rights of future generations. We need to evolve to a new economic model, and achieving the goals of sustainable development, and one that matches the ambition of countries Green Economy. A Green Economy can be thought of as an alternative vision for growth and development; one that can generate growth and improvements in people's lives in ways consistent with sustainable development. A Green Economy promotes a triple bottom line: sustaining and advancing economic, environmental and social well-being. The green economy approach is an effort to focus sustainable development and poverty reduction. a green economy is low carbon, resource efficient, and socially inclusive. In a green economy, growth in income and employment should be driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. The economic growth is focused on increasing GDP above all other goals. Which improved incomes and reduced poverty for hundreds of millions, it comes with significant social, environmental and economic costs. Since the United Nations Conference on Environment and Development of 1992 (also known as the Rio Conference), the development community has focused its efforts on achieving sustainable development, but the economy in general and

green economy in particular.

The transition to a Green Economy has a long way to go, and there are many examples of successful, large-scale programs that increase growth or productivity.by adopting national “green growth” or “low carbon” economic strategies. And do so in a sustainable manner. The research will shed light on The Republic of Korea which has adopted a national strategy and a five-year plan for green growth for the period 2009–2013, allocating 2 percent of its gross domestic product to investment in several green sectors such as renewable energy, energy efficiency, clean technology and water.

Session 3

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 7

8 presentations- Topic: "Environmental Adaptation and Ecosystem Management"

Session Chair: Prof. Panagiotis Dimitrakopoulos

H0022 Presentation 6 (14:45~15:00)

Adsorption of nickel removal from aqueous solutions using natural and modified montmorillonite clays: Factorial design analysis

Yusuf TİBET, **Semra ÇORUH**

OndokuzMayis University, Environmental Engineering Dept., Samsun, Turkey

Abstract—In this study removal of dye ions from aqueous solutions using monmorillonite clay was studied. A 2_3 full factorial design analysis was performed to screen the variables affecting nickel removal efficiency. The effects of pH, initial dye concentration and adsorbent dosage on nickel removal efficiency were examined in a batch system. Factorial design of experiments is employed to study the effect of three factors pH (3-7), initial metal concentration (25-250 mg/L), and adsorbent dosage (1.25-10g/L), at two levels low and high. The results were statistically analyzed by using the student's t-test, analysis of variance (ANOVA) and an F-test to define important experimental factors and their levels. A regression model that considers the significant main and interaction effects was suggested. The results showed that initial nickel concentration is the most significant factor that affects the removal of nickel ions.

Session 3

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 7

8 presentations- Topic: "Environmental Adaptation and Ecosystem Management"

Session Chair: Prof. Panagiotis Dimitrakopoulos

H2001 Presentation 7 (15:00~15:15)

Ecological engineering for humid systems polluted by atrazine: bioturbation and phytoremediation coupled

HOANG Trung Kien, LAURENT Francois, ORANGE Didier, DUONG Thi Thuy, BASSIL Sabina, GERINO Magali

Vietnam Academy of Science and Technology, Vietnam

Abstract—The ecological processes of phytoremediation and bioturbation have been studied independently and are known to be efficient within ecological engineering to promote pollutant fluxes in aquatic sediments. The present work aims to create an innovative bioremediation strategy for polluted aquatic sites based on the combination of these two processes to enhance the efficiency of contaminant removal. The invertebrate Oligochaeta *Tubifex tubifex* were used as active ecological engineers as a source of bioturbation. The associate phytoremediation is conducted by an aquatic plant *Typha latifolia* known for its ability to remove organic pollutants from sediments by accumulation into their biomass. This strategy benefits are tested in controlled laboratory conditions under a series of microcosms reproducing each a portion of water/sediment interface such as in wetland areas. Luminophores, as luminescent sediment particules are used as conservative tracers to quantify bioturbation. The experiment has been starting with homogeneously contaminated sediment with radiolabeled-^{14}C atrazine with initial concentration of 2µg/g wet sediment, as a non-conservative and organic pollutant to be followed in the aquatic environment during 26 days of the experiment. The influence biodiversity and related processes on radiolabeled-^{14}C atrazine quantities in the multi-compartments setup (water, sediment, and plant) are explored to achieve a precise material balance of this pollutant with multi degradation pathways. The bioadvection rate was estimated to be between 21 and 35 cm.year^{-1} for 13,500 worms.m^{-2} for

Tubifex tubifex in the same order of magnitude in the previous literature. Our experiment also permitted to quantify pollutants into the 1-4 cm layers of the microcosm column in the proximity of the plant root systems. In the same time, the significant depletion of ^{14}C-[atrazine + metabolites] concentration in the first 2cm of sediment is explained by sediment porosity increase under the bioturbation in the surface layers. Although the total concentrations of ^{14}C-[atrazine + metabolites] in the *Typha latifolia* seems to be not different when the worms were occurring in the microcosms, the number of metabolites molecules increased in the plant's root system in treatment with bioturbation.

Session 3

Afternoon, July 19, 2017 (Wednesday)

Time: 13:30~15:30

Venue: Conference Room 7

8 presentations- Topic: "Environmental Adaptation and Ecosystem Management"

Session Chair: Prof. Panagiotis Dimitrakopoulos

H0051 Presentation 8 (15:15~15:30)

Assessing the impact of ant nests in the barley farms of dry lands in northern Qarah-doong, Golestan Province, Iran

Ameneh Sobhani, Sahar behnoodi and Soheila Ebrahimi

Watershed and Arid Zone Management Department, Gorgan University of Agricultural Sciences & Natural Resources, Iran

Abstract—Ants play an important role in ecosystems, especially in desert areas. However, few studies have been done on ants in the steppes and deserts of Iran. We observed that in the agricultural land under barley cultivation in the dry lands of Qarah-doong, in northern Iran, on average, on the ant nests, by the comparison of the adjacent plots, the barley stem length and density were increased, with the height of 15-20 centimetres and 30 stalks of barley at 0.5 in plot of 0.5, respectively. This was such that with observing the dispersion patterns of barley, we could simply identify ant nests. In this study, we investigated several soil parameters sampled from 10 ant nests and the adjacent (control) plots in some agriculture lands located in the dry lands of Qarah-doong basin, Iran. We found the increased concentrations of available P and K and N, as well as organic matter, in the nests, in comparison to the surrounding samples, and soil salinity was to a large extent mitigated. The differences found between the soil nests and control plots were assumed to be entirely a product of ants' activity, not due to the initial soil differences during nest establishment. This confirmed that ants modified soil and increased the soil fertility in the barley farms of dry lands.

Coffee Break	**15:30~15:50**

Session 4

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:50

Venue: Conference Room 5

8 presentations- Topic: "Renewable Energy & Energy Conservation and Emission Reduction"

Session Chair: Prof. Hossam A.Gabbar and Prof. Ali Elkamel

T2003 Presentation 1 (15:50~16:05)

Key barriers to the implementation of solar energy in Nigeria: A critical analysis

D Abdullahi, S Suresh, S Renukappa and D Oloke

School of Architecture and Built Environment, Faculty of Science and Engineering, University of Wolverhampton, WV1 1LY

Abstract—Nigeria, potentially, has abundant sunshine throughout the year, making it full thirst for solar energy generation. Even though, the country's solar energy projects have not realised a fair result over the years, due to many barriers associated with initiatives implementation. Therefore, the entire power sector remains incapacitated to generate, transmit and distribute a clean, affordable and sustainable energy to assist economic growth. The research integrated five African counterpart's solar energy initiatives, barriers, policies and strategies adopted as a lesson learned to Nigeria. Inadequate solar initiative's research, lack of technological know-how, short-term policies, lack of awareness and political instability are the major barriers that made the implementation of solar initiatives almost impossible in Nigeria. The shock of the barriers therefore, constitutes a major negative contribution to the crippling of the power sector in the state. Future research will concentrate on initiatives for mitigating solar and other renewable energy barriers.

Session 4

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:50

Venue: Conference Room 5

8 presentations- Topic: “Renewable Energy & Energy Conservation and Emission Reduction”

Session Chair: Prof. Hossam A.Gabbar and Prof. Ali Elkamel

T0025 Presentation 2 (16:05~16:20)

Study of a combined power and ejector refrigeration cycle with low-temperature heat sources by applying various working fluids

Samad Jafarmadar and Amin Habibzadeh

Mechanical Engineering Department, Urmia University, Urmia, Iran

Abstract—A power and cooling cycle which combines the organic Rankine cycle and the ejector refrigeration cycle supplied by waste heat energy sources is discussed in this paper. Thirteen working fluids including one wet, eight dry and four isentropic fluids are studied in order to find their performances on the combined cycle. First and second law analysis has been performed by using a computer program in order to investigate various operating conditions’ effects on the proposed cycle by fixing power/refrigeration ratio and varying waste heat source and evaporator temperature. According to the results, in general, dry and isentropic ORC fluids have better performance compared with wet fluids. The increase in evaporator temperature leads to the decrease in exergy efficiency. On the other hand, exergy efficiency rises with the turbine inlet temperature decrease and an increase of heat source temperature. Rising expansion ratio and inlet temperature of the turbine causes an increase in the thermal efficiency of the cycle.

Session 4

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:50

Venue: Conference Room 5

8 presentations- Topic: “Renewable Energy & Energy Conservation and Emission Reduction”

Session Chair: Prof. Hossam A.Gabbar and Prof. Ali Elkamel

T0002 Presentation 3 (16:20~16:35)

Renewable energy power generation estimation using consensus algorithm

Jehanzeb Ahmad, M. Najm-ul-Islam and Salman Ahmed

Bahria University Islamabad, Pakistan

Abstract—At the small consumer level, Photo Voltaic (PV) panel based grid tied systems are the most common form of Distributed Energy Resources (DER). Unlike wind which is suitable for only selected locations, PV panels can generate electricity almost anywhere. Pakistan is currently one of the most energy deficient countries in the world. In order to mitigate this shortage the Government has recently announced a policy of net-metering for residential consumers. After wide spread adoption of DERs, one of the issues that will be faced by load management centers would be accurate estimate of the amount of electricity being injected in the grid at any given time through these DERs. This becomes a critical issue once the penetration of DER increases beyond a certain limit. Grid stability and management of harmonics becomes an important consideration where electricity is being injected at the distribution level and through solid state controllers instead of rotating machinery. This paper presents a solution using graph theoretic methods for the estimation of total electricity being injected in the grid in a wide spread geographical area. An agent based consensus approach for distributed computation is being used to provide an estimate under varying generation conditions.

Session 4

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:50

Venue: Conference Room 5

8 presentations- Topic: "Renewable Energy & Energy Conservation and Emission Reduction"

Session Chair: Prof. Hossam A.Gabbar and Prof. Ali Elkamel

T0032 Presentation 4 (16:35~16:50)

Optimal renewable energy integration into refinery with CO2 emissions consideration: *An economic feasibility study*

M Alnifro, S T Taqvi, M S Ahmad, **K Bensaida** and A Elkamel

Department of Chemical Engineering, University of Waterloo, 200 University Avenue W, Waterloo, ON

Abstract—With increasing global energy demand and declining energy return on energy invested (EROEI) of crude oil, global energy consumption by the O&G industry has increased drastically over the past few years. In addition, this energy increase has led to an increase GHG emissions, resulting in adverse environmental effects. On the other hand, electricity generation through renewable resources have become relatively cost competitive to fossil based energy sources in a much 'cleaner' way. In this study, renewable energy is integrated optimally into a refinery considering costs and CO2 emissions. Using Aspen HYSYS, a refinery in the Middle East was simulated to estimate the energy demand by different processing units. An LP problem was formulated based on existing solar energy systems and wind potential in the region. The multi- objective function, minimizing cost as well as CO2 emissions, was solved using GAMS to determine optimal energy distribution from each energy source to units within the refinery. Additionally, an economic feasibility study was carried out to determine the viability of renewable energy technology project implementation to overcome energy requirement of the refinery. Electricity generation through all renewable energy sources considered (i.e. solar PV, solar CSP and wind) were found feasible based on their low levelized cost of electricity (LCOE). The payback period for a Solar CSP project, with an annual capacity of about 411 GWh and a lifetime of 30 years, was found to be 10 years. In contrast, the payback period for Solar PV and Wind were calculated to be 7 and 6 years, respectively. This opens up possibilities for integrating renewables into the refining sector as well as optimizing multiple energy carrier systems within the crudeoil industry.

Session 4

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:50

Venue: Conference Room 5

8 presentations- Topic: "Renewable Energy & Energy Conservation and Emission Reduction"

Session Chair: Prof. Hossam A.Gabbar and Prof. Ali Elkamel

T0033 Presentation 5 (16:50~17:05)

Assessing CO2 Mitigation Options Utilizing Detailed Electricity Characteristics and Including Renewable Generatio

K Bensaida, Colin Alie, **A Elkamel** and A Almansoori

Department of Chemical Engineering, The Petroleum Institute, Khalifa University, UAE

Abstract—This paper presents a novel techno-economic optimization model for assessing the effectiveness of CO2 mitigation options for the electricity generation sub-sector that includes renewable energy generation. The optimization problem was formulated as a MINLP model using the GAMS modeling system. The model seeks the minimization of the power generation costs under CO2 emission constraints by dispatching power from low CO2 emission–intensity units. The model considers the detailed operation of the electricity system to effectively assess the performance of GHG mitigation strategies and integrates load balancing, carbon capture and carbon taxes as methods for reducing CO2 emissions. Two case studies are discussed to analyze the benefits and challenges of the CO2 reduction methods in the electricity system. The proposed mitigations options would not only benefit the environment, but they will as well improve the marginal cost of producing energy which represents an advantage for stakeholders.

Session 4

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:50

Venue: Conference Room 5

8 presentations- Topic: "Renewable Energy & Energy Conservation and Emission Reduction"

Session Chair: Prof. Hossam A.Gabbar and Prof. Ali Elkamel

T0050 Presentation 6 (17:05~17:20)

From Smart-Eco Building to High-Performance Architecture: Optimization of Energy Consumption in Architecture of Developing Countries

M Mahdavinejad and **N Bitaab**

Department of Architecture, Tarbiat Modares University, Tehran, Iran

Abstract—Search for high-performance architecture and dreams of future architecture resulted in attempts towards meeting energy efficient architecture and planning in different aspects. Recent trends as a mean to meet future legacy in architecture are based on the idea of innovative technologies for resource efficient buildings, performative design, bio-inspired technologies etc. while there are meaningful differences between architecture of developed and developing countries. Significance of issue might be understood when the emerging cities are found interested in Dubaization and other related booming development doctrines. This paper is to analyze the level of developing countries' success to achieve smart-eco buildings' goals and objectives. Emerging cities of West of Asia are selected as case studies of the paper. The results of the paper show that the concept of high-performance architecture and smart-eco buildings are different in developing countries in comparison with developed countries. The paper is to mention five essential issues in order to improve future architecture of developing countries: 1- Integrated Strategies for Energy Efficiency, 2- Contextual Solutions, 3- Embedded and Initial Energy Assessment, 4- Staff and Occupancy Wellbeing, 5- Life-Cycle Monitoring.

Session 4

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:50

Venue: Conference Room 5

8 presentations- Topic: “Renewable Energy & Energy Conservation and Emission Reduction”

Session Chair: Prof. Hossam A.Gabbar and Prof. Ali Elkamel

T0016 Presentation 7 (17:20~17:35)

New Trends on Green Buildings: Investigation of the Feasibility of Using Plastic Members in RC Buildings with SWs

M H Arslan and H D Arslan

Selcuk University, Konya, Turkey

Abstract—Shear walled (SW) reinforced concrete (RC) buildings are considered to be a type of high seismic safety building. Although this structural system has an important seismic advantage, it also has some disadvantages, especially in acoustic and thermal comfort. In this study, experimental studies have been conducted on RC members produced with plastic material having circular sections to determine structural performance. RC members have been produced with and without 6 cm diameter balls to analyze the structural behaviour under loading and to investigate the thermal performance and sound absorption behaviour of the members. In the study, structural parameters have been determined for RC members such as slabs and SWs produced with and without balls to discover the feasibility of the research and discuss the findings comparatively. The results obtained from the experimental studies show that PB used in RC with suitable positions do not significantly decrease strength but improve the thermal and acoustic features. It has been also seen that using plastic balls reduce the total concrete materials.

Session 4

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:50

Venue: Conference Room 5

8 presentations- Topic: "Renewable Energy & Energy Conservation and Emission Reduction"

Session Chair: Prof. Hossam A.Gabbar and Prof. Ali Elkamel

T0019 Presentation 8 (17:35~17:50)

Evaluation of a School Building in Turkey According to the Basic Sustainable Design Criteria

H D Arslan

Necmettin Erbakan University, Konya, Turkey

Abstract—In Turkey, as well as many other developing countries, the significance of sustainable education buildings has only recently become recognized and the issue of sustainability issue has not been sufficiently involved in laws and regulations. In this study, first of all architectural sustainability with basic design criteria has been explained. After that selected type primary school project in Turkey has been evaluated according to the sustainable design criteria. Type project of school buildings significantly limits the sustainability performance expected from buildings. It is clear that type projects shorten the planning time as they include a designing process that is independent of settlement and they are repeated in various places with different characteristics, indeed. On the other hand; abundance of disadvantages such as the overlook of the natural physical and structural properties of the location mostly restricts the sustainable design of the building. For sustainable buildings, several factors such as the environment, land, climate, insolation, direction etc. shall be taken into consideration at the beginning stage. Therefore; implementation of type projects can be deemed to be inappropriate for sustainability.

Session 5

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:05

Venue: Conference Room 4

5 presentations- Topic: “Electrochemistry and Energy Storage”

Session Chair: Prof. Eng. PhD Marco Casini

T0015 Presentation 1 (15:50~16:05)

Engineering advanced antimony (Sb) based nanostructure for promising Na-ion battery anode

Wen Luo, Feng Li, Jean-Jacques Gaumet and Liqiang Mai

University of Lorraine, France

Abstract—The interest for alternative sources dedicated to energy storage has significantly increased. Na-ion batteries gain increasing attention due to sodium environmental friendly nature and abundance. The aim of this work is, through novel nano engineering strategies, to obtain new antimony (Sb) based hybrid materials which can be successfully used as anodes for Na-ion batteries.

A novel composite with Sb nanoparticles anchored in three-dimensional carbon network (SbNPs@3D-C) is synthesized via a NaCl template-assisted strategy, followed by freeze-drying and in-situ carbonization. Through nanostructure engineering, the robust SbNPs@3D-C anode exhibit a high reversible capacity and stable cycling performance.

Moreover, Sb-based chalcogenides, namely, Sb_2S_3 and Sb_2Se_3, have captured research interests due to their higher theoretical capacities relative to that of Sb. A free-standing membrane based on ultralong Sb_2Se_3 nanowires was fabricated via a hydrothermal synthesis combined with a subsequent vacuum filtration treatment. The membrane anode exhibits good flexibility, integrity and promising Na storage performance.

A Sb_2S_3 coated with polypyrrole coaxial nanorod (Sb_2S_3@PPy) was fabricated and employed as anode for Na-ion batteries. The polymer coating can not only stabilize the architecture and buffer the volume expansion for Sb_2S_3 nanorods, but also provide high electrical conductivity for the whole electrode.

Session 5

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:05

Venue: Conference Room 4

5 presentations- Topic: "Electrochemistry and Energy Storage"

Session Chair: Prof. Eng. PhD Marco Casini

T0017 Presentation 2 (16:05~16:20)

MOF-reduced graphene oxide composites with enhanced electrocatalytic activity for oxygen reduction reaction

Yuan Zhao, Rong Fan, Chuanxiang Zhang, Haijun Tao and Jianjun Xue

Nanjing University of Aeronautics and Astronautics, China

Abstract—Development of inexpensive and scalable cathode catalysts that can efficiently catalyze the oxygen reduction reaction (ORR) is of significance in practical application of fuel cells. The oxygen reduction activity of the MOF-based catalyst is much lower than that of Pt, which is mainly due to the high overpotential. In this work, we designed a superior composite named Co@Co_3O_4-reduced graphene oxide (Co@Co_3O_4-rGO) derived from MOF-rGO by an in-situ synthetic method which gathered both the advantages of MOF and rGO. The Co^{2+} which belongs to the MOF provides the metal source, while the N sources are supplied by the organic ligands benzimidazole. With the combination of rGO, Co@Co_3O_4-rGO has got a higher specific surface area and much better transport pathways for oxygen and the electrolyte than Co@Co_3O_4-C derived from the pure MOF. The half-wave potential, onset potential of Co@Co_3O_4-rGO are close to the superior commercial Pt/C catalyst. The number of electron transfer in the process of catalytic oxygen reduction is close to 4, the excellent properties benefited from the synergistic effect of rGO and MOF.

Session 5

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:05

Venue: Conference Room 4

5 presentations- Topic: “Electrochemistry and Energy Storage”

Session Chair: Prof. Eng. PhD Marco Casini

T0064 Presentation 4 (16:35~16:50)

Comparison of iron and tungsten based oxygen carriers for hydrogen production using chemical looping reforming

M N Khan and T Shamim

Institute Center for Energy (iEnergy), Department of Mechanical and Materials Engineering, Masdar Institute of Science and Technology, P.O. Box 54224, Abu Dhabi, United Arab Emirates

Abstract—Hydrogen production by using a three reactor chemical looping reforming (TRCLR) technology is an innovative and attractive process. Fossil fuels such as methane are the feedstocks used. This process is similar to a conventional steam-methane reforming but occurs in three steps utilizing an oxygen carrier. As the oxygen carrier plays an important role, its selection should be done carefully. In this study, two oxygen carrier materials of base metal iron (Fe) and tungsten (W) are analysed using a thermodynamic model of a three reactor chemical looping reforming plant in Aspen plus. The results indicate that iron oxide has moderate oxygen carrying capacity and is cheaper since it is abundantly available. In terms of hydrogen production efficiency, tungsten oxide gives 4% better efficiency than iron oxide. While in terms of electrical power efficiency, iron oxide gives 4.6% better results than tungsten oxide. Overall, a TRCLR system with iron oxide is 2.6% more efficient and is cost effective than the TRCLR system with tungsten oxide.

Session 5

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:05

Venue: Conference Room 4

5 presentations- Topic: “Electrochemistry and Energy Storage”

Session Chair: Prof. Eng. PhD Marco Casini

T4001 Presentation 5 (16:50~17:05)

Piezoelectric cylindrical design for harvesting energy in multi-directional vibration source

M S Nguyen, S H Ng, P Kim and Y J Yoon

Energy Research Institute @ NTU, Interdisciplinary Graduate School, Nanyang Technological University, Singapore 639798, Singapore

Abstract—Vibration Energy Harvester (VEH) has attracted a great attention recently both in academia and industry. One of the most challenging issues in VEH is the possibility to harvest vibration energy in multiple directions. In fact, Conventional VEH (CVEH) using cantilever beam’s structure may possibly become inefficient for the application under multi-directional vibration sources. To overcome this shortcoming of CVEH, this paper proposes a novel design of piezoelectric cylindrical energy harvester (PCEH) which is using patches of piezoelectric material attached to the surface of a cylindrical structure. The Finite Element Method (FEM) analysis using COMSOL Multiphysics software package showed that PCEH has a great potential for the applicability of VEH in the multi-directional vibrating applications such as wearable devices and biomedical devices.

Session 5

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~17:05

Venue: Conference Room 4

5 presentations- Topic: “Electrochemistry and Energy Storage”

Session Chair: Prof. Eng. PhD Marco Casini

T0069 Presentation 6 (17:05~17:2 0)

A fast evaluation method for energy building consumption based on the design of experiments

HOCINE BELAHYA, ABDELGHANI BOUBEKRI, ABDELOUAHED KRIKER

Universit éKasdi Merbah Ouargla, Algeria

Abstract—Building sector is one of the effective consumer energy by 42% in Algeria. The need for energy has continued to grow, in inordinate way, due to lack of legislation on energy performance in this large consumer sector. Another reason is the simultaneous change of users' requirements to maintain their comfort, especially summer in dry lands and parts of southern Algeria, where the town of Ouargla presents a typical example which leads to a large amount of electricity consumption through the use of air conditioning. In order to achieve a high performance envelope of the building, an optimization of major parameters building envelope is required, using design of experiments (DOE), can determine the most effective parameters and eliminate the less importance. The study building is often complex and time consuming due to the large number of parameters to consider. This study focuses on reducing the computing time and determines the major parameters of building energy consumption, such as area of building, factor shape, orientation, ration walls to windows 6etc to make some proposal models in order to minimize the seasonal energy consumption due to air conditioning needs.

Session 6

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~18:20

Venue: Conference Room 7

10 presentations- Topic: "Environmental Pollution Control and Resource Management"

Session Chair: Prof. ILDA VAGGE

H0003 Presentation 1 (15:50~16:05)

Interfacial Spectral Boundary Element Algorithms for Environmental Applications

Panagiotis Dimitrakopoulos

University of Maryland, USA

Abstract—In many environmental applications, engineers have to deal with the flow dynamics of droplets in confined geometries under low-Reynolds-number conditions. Common applications include hydrology, geophysics, biofuels, wetlands, ground water remediation and management, bio-engineering, water resources and river basin management, water quality and regulatory practice. The computational investigation of such interfacial problems is facilitated via the solution of boundary integral equations which has developed considerably in the last decades. The main benefits of this approach are the reduction of the problem dimensionality by one and the great parallel scalability. In this talk we will present our efforts to study efficiently multi-length interfacial dynamics in Stokes flow, such as the drop coalescence process, droplets and cells in close proximity to microchannel walls as well as tips and necks during large interfacial deformations. For the accurate determination of these challenging three-dimensional problems, we have developed a series of efficient and highly-accurate interfacial algorithms based on our Spectral Boundary Element implementation for Stokes flow. As applications for multi-length interfacial systems, we will present our investigation of large deformation of soft particles, involving pointed tips and tails in micro-channels. We will also present our investigation of dye particles which can be orders of magnitude smaller than the channel size.

Session 6

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~18:20

Venue: Conference Room 7

10 presentations- Topic: “Environmental Pollution Control and Resource Management”

Session Chair: Prof. ILDA VAGGE

H0009 Presentation 2 (16:05~16:20)

Methodological guide for the determination of the impacts on the atmospheric component by the transit of vehicles in unpaved roads in hydrocarbons exploration projects

Miguel De Luque

Universidad de Cundinamarca, Colombia

Abstract—In this study was founded a methodology to determine the impacts in unpaved roads for hydrocarbons exploration projects. By means of the software Calpuff different scenarios were modeled, this information was adjusted to different types of distributions of probability using the software for adjustment of distributions EasyFit, in which were evaluated near 55 distributions within which are distribution Normal, Gamma, Weibull, Log-Pearson, Lognormal, Burr, Beta. The results showed that the distribution that best fits the dispersion of particulate material in unpaved roads was the Beta distribution. Based on the above, a methodology was generated for the calculation of the area of influence in unpaved roads for hydrocarbons exploration projects. The tool was used for the environmental licensing process of a hydrocarbon exploration block, where a 6 m buffer was found on the side and side of the axis of the unpaved roads to be used by the project.

Session 6

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~18:20

Venue: Conference Room 7

10 presentations- Topic: "Environmental Pollution Control and Resource Management"

Session Chair: Prof. ILDA VAGGE

H0012 Presentation 3 (16:20~16:35)

Performance evaluation of V2O5-WO3-TiO2 catalyst supported on a sheet type ceramic filter for simultaneous treatment of NOx and particulate

Joo Hong Choi and Jin Hyung Kim

Gyeoungsang National University, Korea

Abstract—Catalysts based on V2O5-WO3-TiO2 have been successfully commercialized for the reduction of NOx with ammonia. Most of the SCR catalyst has been used in the forms of the coated-monolith or honeycomb. However, the plugging the gaps of a monolith catalyst causes one of the serious operational problems and leads to the limited-application of SCR catalyst working at the dust-free stream only. In order to overcome this problem, highly effective catalytic filter in the form of rigid filter elements (such as ceramic filter sheet) was prepared to prevent the plugging problem as it provides a low pressure drop system while maintaining control over particulate and nitric oxide emissions simultaneously. Sheet filter provides intensive surface area for the catalyst support in its pores with keeping the high permeability.

Experimental works were discussed on to prepare the high performance catalytic filter of sheet type using rotational infiltration coating method and to demonstrate the catalytic performances of NO reduction and particulate removal in an experimental unit. Catalytic filter maintains its original performance more than 95% after duration of 3 months in an actual boiler flue gas stream containing SO2 gas of 300 ppm.

Acknowledgement

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Session 6

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~18:20

Venue: Conference Room 7

10 presentations- Topic: "Environmental Pollution Control and Resource Management"

Session Chair: Prof. ILDA VAGGE

H0016 Presentation 4 (16:35~16:50)

THE ROLE OF SOIL AMENDMENT ON TROPICAL POST TIN MINING AREA IN BANGKA ISLAND INDONESIA FOR DIGNIFIED AND SUSTAINABLE ENVIRONMENT AND LIFE

Cahyono Agus, Dewi Wulandari, Enggal Primananda, Abel Hendryan and Victory Harianja

UGM Yogyakarta Indonesia, Indonesia

Abstract—Openly tropical tin mining in Bangka Island Indonesia expose heavy metal that had been buried became a part of our environment and life. This has become a major cause of land degradation and severe local-global environmental damages. This study aims to accelerate reconsolidation of degraded ecosystems on the former tin mine land, to increase land productivity and dignified environment through appropriate rehabilitation technology on marginal land that is inexpensive, environmentally friendly and sustainable. This study is a part of a roadmap research activities on the rehabilitation of degraded land in tropical ecosystem, that consist of (a) characterization of degraded tin mining lands through the determination of chemistry, physics, biology and mineral soil properties, (b) introducing multi-function pioneers plant for acceleration of peak pioneer plant in the reestablishment of degraded tin mining ecosystem (c) management of natural soil amendment (volcanic ash, organic waste materials and legume cover crop as a material for soil amelioration to increase land productivity, (d) role of biotechnology through the application of local bio-fertilizer (mycorrhizae, phosphate soluble bacteria, rhizobium). Soil from post tropical tin mining acid soil (pH 4.97) that dominated by sand particles (88%) with very low cation exchange capacity, very low nutrient contents (available and total-N, P, K, Ca, Mg) and high toxicity of Zn, Cu, B, Cd and Ti, but still have low toxicity of Al, Fe, Mn, Mo, Pb, As. Soil amendment of biogas and volcanic ash could improve soil quality by increasing of better pH, high available-P and

cation exchange capacity and maintained their low toxicity. The growth (high, diameter, biomass, top-root ratio) of exotic pioneer plant of Kemiri sunan (Reutealis trisperma) increased in the better soil quality that caused by application of proper soil amendment. The grand concept and appropriate technology for rehabilitation of degraded tin-mining land ecosystems in tropical regions which are the lungs of the world have a high contribution for development of our dignified and sustainable environment and life.

Session 6

Afternoon, July 19, 2017 (Wednesday)

Time: 15:50~18:20

Venue: Conference Room 7

10 presentations- Topic: “Environmental Pollution Control and Resource Management”

Session Chair: Prof. ILDA VAGGE

H0027 Presentation 5 (16:50~17:05)

Indentification and Mapping of Submerged Aquatic Vegetation in the Shallow Lake with Multispectral Satellite Remote Sensing

Shweta Yadav, Minoru Yoneda, Junichi Susaki and Yosuke Alexandre Yamashiki

Kyoto University, Japan

Abstract—Submerged Aquatic Vegetation (SAV) plays a central role in stabilizing the lake ecosystem. When present, extensive SAV bed often leads to macrophyte dominated clear water state from plankton dominated turbid water. However, monitoring of the aquatic macrophytes is commonly hindered by limited accessibility and the cost involved in sitespecific monitoring by boats. Remote sensing can be an important tool in monitoring the distribution and abundance of aquatic macrophyte for large lakes. In this study, the monitoring and mapping of SAV using multispectral satellite image for a shallow lake is presented. In shallow lakes, the complex interaction of optically active substances makes it difficult to identify the bottom substrate reflectance. Therefore, a spectral decomposition algorithm was first used to estimate the concentration of optically active substances (mainly, Chlorophyll and Non-phytoplankton suspended solids), using the Landsat-8 image. The image was then used to classify and map the SAV coverage area, using the endmembers and the spectral mixture analysis along with spectral angle mapper approach. Obtained results were validated by the in-situ water quality data and SAV reflectance data measured using FieldSpec Pro Spectroradiometer for Lake Biwa in Japan.

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10 presentations- Topic: "Environmental Pollution Control and Resource Management"

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H0033 Presentation 6 (17:05~17:20)

Characteristics of Particle and Gaseous Emissions Derived from Rice Straw Burning in Controlled Chamber

James Lee, Yu-Chen Yang, Xue-Fang Sang and Ming-Hsuan Liu

National Yunlin University of Science and Technology, Taiwan

Abstract—Previous biomass burning studies mostly focused on particle emissions rather than on gaseous emissions. The study attempts to investigate both gas and particle emissions derived from rice straw burning in a controlled chamber. The experiments, conducted by an annular denuder sampler, applied on differing combustion conditions (flaming or smoldering) with two common rice straws (subspecies of Japonica or Indica, covered ~95% of world's rice production). The characteristics of emissions, included PM2.5, anhydrosugar levoglucosan, water-soluble ions, as well as inorganic and organic gases have been discussed.

The results indicated that mass concentration of PM2.5 in smoldering condition was distinctively 4.0 ~ 6.1 times higher than that in flaming, and the emission of fine particle from Indica subspecies demonstrated a lower value comparing to Japonica, which might be due to the constituent of strew. Meanwhile, the emission of levoglucosan in fine particle from straws presented a similar trend as its concentration in fine particle. For the Ions, major species of PM2.5 from two burning conditions were K+, Cl-, NH4+, and SO42-. Significant potassium and chloride ions as burning tracers exhibited in flaming condition, and fluoride ion showed a relatively high quantity in smoldering. On the other hand, gas emissions from straw burning were composed of various inorganic gases (HONO, H2SO4, NH3, and HF) and organic gases (RCOOH and H2C2O4) depending on the burning condition of combustions. Sulfuric acid and organic gases were mainly released from smoldering condition, and abundance of nitrous acid (HONO) was observed (~ 50% of total gases) from flaming condition. HONO possesses

a high photolysis property, and it is a dominant precursor of OH radicals in atmosphere. Hydroxyl radical always plays a major driving force on photochemical reaction to form the secondary aerosol of PM2.5. Therefore, the study concludes that the burning condition of combustions and native constitute of straws will influence on the characteristics of emission profiles. The results also reveal a higher gas emission of HONO directly deriving from strew burnings, which may enhance aerosol concentration of PM2.5 to impact local or regional air quality.

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10 presentations- Topic: "Environmental Pollution Control and Resource Management"

Session Chair: Prof. ILDA VAGGE

H0044 Presentation 7 (17:20~17:35)

Technologies combination for oil hydrocarbons removal using the earthworm Pontoscolex corethrurus and a bacterial consortium in contaminated soil

Maribel Contreras Ramos, Andrea Perales-Garcia, Janett Hernande-Carballo, Luis Alfredo Gomez-Guzman, Froylan Martinez-Rabelo, Jacobo Rodriguez-Campos, Isabelle Barois and **Benito Hernandez-Castellanos**

Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco A.C. (CIATEJ), Tecnología Ambiental, México

Abstract—The vermiremediation is a technology used earthworms for the contaminants removal of soil. Earthworms has a strong relationship with bacterial in the contaminant removal. The use of endogeic earthworms could be an alternative for contaminated sites in combination with specialized bacterial consortium. In this study, the aim was evaluating the removal of oil hydrocarbons from contaminated soil using the endogeic earthworms Pontoscolex corethrurus alone or combined with a bacterial remover consortium. Earthworms and oil contaminated soil were collected from a closed oil extraction field and greenhouse experiment was stablished with consortium bacterial (B), earthworms (E) and their combination (E+B) on soil-cow manure-agrolite (1.8:0.1:0.1 w/w) in sterilized and not sterilized treatments during 112 days. A control (natural attenuation) without treatment was stablished in same conditions. Bacterial consortium was selected and mixed to growth as consortium for after be encapsulated with liposome in a permeable matrix of sustained release. Total hydrocarbons (TPH) was recorded at 0, 28, 56 and 112 days and determinated by GC-MS. Additionally, the earthworm's biomass (begin-end) and mortality were recorded at the end experiment. The earthworm biomass increased significantly in treatments with earthworms (E), and combined with the bacterial consortium (E+B) and eggs were found in

these treatments after 112 days. The higher oil hydrocarbons removal was observed in the treatment with earthworms (87%) followed by combined E+B (86%) and bacterial consortium (80%) than natural attenuation (15%). The vermiremediation with Pontoscolex corethrurus demonstrated be successful in oil hydrocarbon removal.

Session 6

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H0025 Presentation 8 (17:35~17:50)

Low-temperature selective catalytic reduction of NO with NH3 over Mn-Ni oxides supported on m-Al2O3 catalyst

Zhanggen Huang, Yongjin Liu, Xiaojin Han and Yulin Li

State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, China

Abstract—Nitrogen oxides exhausted from automobiles and industrial combustion of fossil fuel have been leading to a great number of environmental problems including ground level ozone, photo chemical smog and acid rain, and which is highly toxic to human health. Selective catalytic reduction with ammonia (NH3-SCR) in the presence of excess O2 continues to be one of the most efficient and popular technologies to reduce NOX. V2O5-WO3(MoO3)/TiO2 is the representative and efficient commercial catalyst for SCR of NOx in a relatively high temperature range of 300 ℃ to 400 ℃ . Therefore, it is necessary to develop a superior SCR catalyst with high activity at low-temperature(＜250 ℃) to avoid reheating the flue gas. Mn-based catalysts showed higher reactivity than other metals in NOx reduction at low-temperatures, which was attributed to labile surface oxygen or lattice oxygen and especially the multivalent nature of manganese. Alumina with a mesostructure possesses many excellent properties including highly uniform channels, large surface area, narrow pore-size distribution, tunable pore sizes over a wide range, large amounts of Lewis acid sites, promising potential applications in catalyst supports for heterogeneous catalysis. In this work, we were inspired to investigate the SCR behaviors of m-Al2O3 supported Mn-Ni oxides, as a comparison we also explored the SCR behaviors of Al2O3 supported Mn-Ni oxides.

Mesoporous alumina supports were synthesized by evaporation-induced self-assembly (EISA) method. Mn-Ni oxides were supported on Al2O3 and m-Al2O3 by adopting incipient

wetness impregnation technique and investigated for the low-temperature (90~240 ℃) selective catalytic reduction (SCR) of NO with NH3 in the presence of excess oxygen. SCR activity measurements were carried out at ambient pressure in a fixed-bed quartz reactor with an inner diameter of 12mm over a temperature window of 90~240 ℃. Before test, all the samples were crushed and sieved using a 20~40 mesh. The reaction conditions were designed as follows: 2mL of sample, 500 ppm NO, 500 ppm NH3, 6.5 vol% O2 and balance as N2 with a total flow rate of 400 mL/min, and gas hourly space velocities (GHSV) of 12000 h−1. Mn-Ni/m-Al2O3 showed a relatively higher SCR activity than Mn-Ni/Al2O3 at the temperature range of 90~240 ℃.

N2-adsorption/desorption, XRD, TEM, NH3-TPD, Pyridine-IR, XPS, H2-TPR and in situ DRIFTs were conducted to analyze the properties of these samples. Small-angle XRD, TEM and nitrogen adsorption/desorption results showed that the mesoporous alumina possess a highly ordered mesostructure. NH3-TPD and Pyridine-IR studies proved that Mn-Ni/m-Al2O3 and Mn-Ni/Al2O3 were mainly Lewis acid sites, meanwhile, the amounts of Lewis acid sites on Mn-Ni/m-Al2O3(10.70μmol/g) is far more than that of Mn-Ni/Al2O3(0.97μmol/g). These acid sites play an important role in SCR according to in situ DRIFTs analysis of NH3 adsorption/desorption. The XPS results illustrated that the MnO2 is the dominant phase with respect to the Mn2O3 phase (Mn4+/Mn3+ = 12.50, 67.85%), thus leading to a large number of Mn4+ species over the Mn–Ni/m-Al2O3 catalyst. It is remarkable to note that the SCR performance of all the Mn-Ni/Al2O3 and Mn–Ni/m-Al2O3 catalysts is accurately associated with the surface Mn4+ concentrations. The m-Al2O3 supported Mn-Ni oxides promotes the formation of surface MnO2 phase and inhibits the formation of surface Mn2O3 sites. The TPR results revealed that m-Al2O3 supported Mn-Ni oxides results in the stabilization of the former in the form of MnO2 rather than Mn2O3. The TPR data results are in agreement with XPS results that the absence of the high-temperature (455 ℃) peak indicates that the dominant phase in the Mn–Ni/m-Al2O3 catalysts is MnO2. The low-temperature reduction peak is shifted to much lower temperatures in Mn–Ni/m-Al2O3 catalysts. This increase in reducibility, the extremely dominant MnO2 phase and many more Lewis acid sites seem to be the reason for the high SCR activity of the Mn–Ni/m-Al2O3 catalysts.

Session 6

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10 presentations- Topic: "Environmental Pollution Control and Resource Management"

Session Chair: Prof. ILDA VAGGE

H0037 Presentation 9 (17:50~18:05)

Impact of an abandoned mine on surrounding soils, surface water and stream sediment: Case of SOMIAF Gold mine, Côte d'Ivoire

Kouadio Assemien François Yao, David Salze, Olivier Belcourt, Théophile Lasm, Blaise Koffi Yao, Miguel Lopez-Ferber and Kouassi Ernest Ahoussi

Ecole des Mines d'Alès, France

Abstract—The old gold mine of Somiaf in Afema district (Southern of Côte d'Ivoire) ceased operating in 1998 without real site rehabilitation. In 2016, geochemical analyses of the soils, stream sediments and Hydrochemical characterization of waters of the surrounding area were carried out to assess the environmental impact of this mining site.
The chemical analyses of surface water revealed that almost all the studied water are of poor quality based on the water quality index (WQI). On soils and stream sediments samples the chemical analyses showed Cd, Pb and As pollution. While soil contamination by Pb may be due to mining activity as shown in the water case, Cd and As seems to be coming from agricultural activities due to the widespread contamination. This study allowed us to get an overall view of the state of the environment after the end of the mining activity with the focus on the state of the quality of water consumed by the populations. A more detailed study must be carried out in order to accurately characterize the origin of the metal pollution in the waters.

Session 6

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Session Chair: Prof. ILDA VAGGE

H0047 Presentation 10 (18:05~18:20)

The Implications of Civil Society in Waste Management: Case of Study Skikda, Algeria

Ouissem Khorief and **Aissa Mahimoud**

Management de Projet Urbain Durable, Laboratoire Ville, Architecture, Métiers et Formation (LVAMF), Faculté d'architecture et d'Urbanisme, Algeria

Abstract—This paper aims at examining the role civil societies in waste management in Skikda and evaluating their implications and results. This study provides the information needed to evaluate the rate of their participation and the ways to improve it. The data for this study were collected through a survey questionnaire conducted on the environmental associations of Skikda. The survey took into account a variety of criteria including the frequency of participation of the association, the theme(s) they focus on, the distribution of their efforts, the utilized tools, etc. The quantitative data gathered are then statistically analyzed using Statistical Package for Social Sciences (SPSS). Finally, the results show a passive participation of associations in waste management on several levels.

Session 6

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10 presentations- Topic: "Environmental Pollution Control and Resource Management"

Session Chair: Prof. ILDA VAGGE

H0014 Presentation 11 (18:20~18:35)

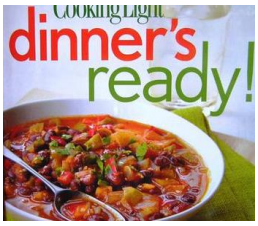
Field Applicability of BWRO based Decentralized Water Treatment Package System for Small-scale Water Supply Facility

Ju-Suk An, Woosik Jung, Ji Young Park, and Hyun Je Oh

Korea Institute of Civil engineering and building Technology (KICT), Korea

Abstract—Decentralized water treatment systems are an important element in small-scale water supply facilities. For application in small-scale water facilities, important boundary conditions for decentralized systems include low costs, low maintenance, sustainability. Although some low-cost systems are available, their application is limited by time-consuming daily operation and maintenance. On the other hand, membrane systems are attractive since they provide an absolute barrier for organic and inorganic compounds. The costs of membrane have decreased rapidly during the last decades and therefore membrane systems have also become within reach for application in low-cost applications. Brackish water are any water sources with TDS(Total Dissolved Solid) between 1,000 and 15,000 mg/L. Brackish water cannot be consumed by us directly due to its high salinity. According to World Health Organization (WHO), water with salinity below 500 mg/L is acceptable as drinking water. There are quite a large number of research that had been done on BWRO. Accordingly, in this study we developed the BWRO(Brackish Water Reverse Osmosis) membrane based water treatment package system for small-scale water supply facilities, and its applicability was examined. The decentralized water treatment package system consisted of activated carbon filter unit (ACF), three of reverse osmosis membrane filter unit (BWRO), and ultraviolet unit (UV). Each unit combination was made to ensure the processing capacity of 100 m3 per day. In addition, a decentralized water treatment package system was manufactured using containers compliant with IOS standards due to limitation of grounds at small-scale water supply facility. In case of small-town in Korea, underground water is mainly used as raw water. Therefore, this

package system was installed and operated at the upper region of the Gyeonggi-Do small-town in Korea. This pilot plant is a region where the concentration of fluorine in the groundwater is as high as 8.0 ppm. Four items including temperature, pH, conductivity, turbidity, were monitored to analyze treated water quality. In addition, the water treated by the system was analyzed to identify whether it satisfies drinking water quality standards. After the examination of applicability, on the basis of water usage per capita per day (about 335 LPCD in Korea), the system was able to produce enough water for 300 people. During the operation, the produced water satisfied all 48 items of drinking water quality standards. Thus it is surmised that the system could be used for small-scale water supply facilities.



Dinner	**18:30**

One-Day Visit in Rome

July 20, 2017 (Thursday) 9:00-17:00

(Assembling at SAPIENZA University)

<table>
<tr><td>Morning</td><td>
SAPIENZA University of Rome, Italy
http://en.uniroma1.it/

The Sapienza University of Rome, officially Sapienza – Università di Roma, also called simply Sapienza or the “University of Rome”, is a collegiate research university located in Rome, Italy. Formerly known as Università degli studi di Roma “La Sapienza”, it is the largest European university by enrollments (the third if considering also the distance learning schools) and one of the oldest in the history, founded in 1303.
Sapienza University of Rome is one of the most reputable universities and among the most prestigious European universities.
La Sapienza educated numerous notable alumni, including many Nobel laureates, presidents of the European Parliament, heads of several nations, notable religious figures, scientists and astronauts.
</td></tr>
<tr><td rowspan="2">Afternoon</td><td>
Colosseum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Roman Forum


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We will assemble at SAPIENZA University at 9:00am, please arrive on time.
The above route is just for reference, the final tour will be given on site.

Conference Venue

SAPIENZA University of Rome - Faculty of Architecture

Detailed address: Facoltà di Architettura - Sapienza Universita' di Roma, Piazza Borghese 9, 00186 Rome - Italy

FACOLTÀ DI ARCHITETTURA

SAPIENZA
UNIVERSITÀ DI ROMA

With over 700 years of history and 115,000 students, Sapienza University of Rome - founded in 1303 - is one of the oldest universities in the world, the largest University in Europe and a top performer in international university rankings.

Sapienza is a public University that employs over 4,500 professors and 5,000 administrative and technical staff and offers a wide choice of courses including over 300 degree programs and 250 1st and 2nd level specialized qualifications along with 59 libraries, 20 museums and many support services at the disposal of its students coming from Italy and abroad, also providing a wide range of international opportunities, such as double-title degrees, scholarships for writing theses abroad, apprenticeships and internships in European and non-European countries, and international doctorates.

Sapienza is member of several international interuniversity networks and carries out leading scientific investigations in almost all disciplines, achieving high-standard results both on a national and an international level with its 11 Faculties, 63 Departments, 24 Research Centers and over 150 PhDs programs in all fields of knowledge.

Sapienza plays an active role in research, international rankings, PhDs and mobility programmes in order to develop the exchange of professors and researchers, new partnerships and projects, that enrich its international panorama.

The University annually funds hundreds of projects that meet rigorous criteria of scientific excellence and innovation. The University also promotes the active management of its patent portfolio, securing licenses and development contracts in the pursuit of innovative entrepreneurship, registering every year several patents which are sold to national and international companies for commercial application. Innovative start-up companies are also continuously launched, with a turnover of about 2 M€ per year, mainly in chemistry, energy and environment. In an effective and continuous link between research and industry. Sapienza stipulates agreements with industrial associations that bring together thousands of business working at local level.

Among its huge fields of academic activity, Sapienza is very active in Building Sciences research and design through its Faculty of Architecture.

Sapienza's Building Sciences research and design activities are focused on Energy efficiency and Renewable energy, Advanced materials, Industrial Design, Green Buildings and Smart Cities and include scientific and technical consultancy to Italian Public Authorities on policy making and for the development of specific standards on environmentally sustainable construction. In the last decade alone, Sapienza has successfully lead or took part in a large portfolio of relevant international and national projects on Energy Efficiency of Buildings and Smart Cities and Communities, focusing on the definition and experimentation of theories, methods, and technical and operational tools to innovate, change, and transform the built environment, carrying out important innovative projects at the building and district scale, promoting the technological culture of design and actively involving industrial partners for successful technology transfer.

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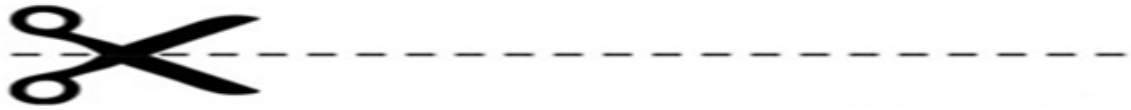

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Did the conference fulfill your reason for attending?	Yes– Absolutely □ Yes- But not to my full extent □ No□ (If "No", please tell us the main reason)

Would you please list the top 3 to 5 universities in your city?	
Other Field of Interest	
Any Other Suggestions/Comments	

Thank you for taking time to participate in this conference evaluation. Your comments will enable us to execute future conferences better and tailor them to your needs! More conference information could be found in http://www.cbees.org/list-15-1.html