

3rd International Conference on Environmental, Industrial and Energy Engineering

EI2E 2019 Conference Program

<http://www.ei2e.org/>

Conference organized by
Asia Pacific Institute of Science and Engineering (APISE)

2019.09.19-21 • Yinchuan • China

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WELCOME MESSAGE

Dear Participants,

Welcome to Yinchuan, China! Welcome to participate in 2019 3rd International Conference on Environmental, Industrial and Energy Engineering (EI2E 2019) and 3rd International Workshop on Energy Conservation Technologies (IWECT 2019). EI2E 2019 and IWECT 2019 are organized by Asia Pacific Institute of Science and Engineering (APISE). All the registered and presented papers will be published in IOP Conference Series: Earth and Environmental Science (ISSN: 1755-1307), which will be indexed by EI Compendex, Scopus, Inspec, and other databases.

EI2E 2019 and IWECT 2019 aim to present the latest research and results of scientists related to Environmental, Industrial and Energy Engineering and other topics. This conference provides opportunities for the delegates to exchange new ideas face-to-face, to establish business or research relations as well as to find global partners for future collaborations. We hope that the conference results will lead to significant contributions to the knowledge in these up-to-date scientific fields.

We would like to thank our outstanding Keynote Speakers and Invited Speaker: Prof. Gordon Huang, University of Regina, Canada; Dr. Mike Monea, President/CEO, International CCS Knowledge Centre, Canada; Prof. NESIMI ERTUGRUL, University of Adelaide, Australia; Dr. Zewei Yu; Consultant, International CCS Knowledge Centre, Canada, for sharing their deep insights on future challenges and trends in.

We would like to thank all the committees for their great support on organizing the conference. We also would like to thank all the reviewers for their great effort on reviewing the papers submitted to EI2E 2019 and IWECT 2019. Special thanks to all the researchers and students who with their work and participate in the conference.

We hope you enjoy the conference, the food, the hospitality, and the beautiful and charming city of Yinchuan.

Conference Committee Chair of EI2E 2019

Prof. NESIMI ERTUGRUL, University of Adelaide, Australia

CONFERENCE SPEAKERS

Keynote Speakers



Prof. Gordon Huang
University of Regina, Canada

Biography: Dr. Gordon Huang is a Tier 1 Canada Research Chair in Energy and Environment, and Executive Director of the Institute for Energy, Environment and Sustainable Communities at the University of Regina, Canada. He holds BSc from Peking University (China), MSc from Simon Fraser University (Canada) and PhD from McMaster University (Canada).

Since the 1990s, Huang has led over 150 environment-related research projects, produced over 900 peer-refereed international journal papers (with an SCI-based H-index of 60 in Science Citation Index under Thomson Reuters' Web of Science), and supervised over 100 Master/PhD students. He is a Fellow of the Canadian Academy of Engineering, and the President of the International Society for Environmental Information Sciences. He also acts (or acted) as editor-in-chief for 2 international journals and editorial board member for over 10 journals, and was conference chair or keynote speaker at over 40 international events. He has also served the United Nations Development Programme as Chief Scientist for its Program of Chinese Rural Water Resources Management and Drinking Water Safety. His pioneering work in environmental risk management has been recognized as a significant innovation, and has influenced government and business approaches for tackling environmental challenges and formulating related policies. Over 30 of his PhD graduates were appointed as faculty members at universities in Canada, USA, UK, Singapore, Hongkong and China.

Keynote Lecture: Environmental and Economic Analysis for the Development of Small Modular Reactors under Climate Change

The world has been suffering frequent extremes due to climate change. Fossil-fuel power plants are currently facing stricter greenhouse gas emission limitations. As an emerging energy alternative, small modular reactors (SMRs) have the potential to provide a clean solution to relieve environmental pressure while satisfying future energy demands over the world. In developing SMRs, analysis on its necessity and feasibility is essential. In this study, environmental and economic impacts of SMRs are examined to support its future development. A case study for the Province of Saskatchewan, Canada is conducted based on the proposed approach to evaluate the potential benefits of SMR development. In detail, dynamically-downscaled climate projections at a resolution of 25 km under Representative Concentration Pathways 4.5 is conducted to project the spatial distributions of various factors that affect SMR-related long-term decisions. A RAS-based environmental input-output (REIO) model is developed to simulate the socio-economic systems and analyze the related environmental and economic consequences under various scenarios. Furthermore, based on the REIO modeling results, a site screening study is proposed to explore and evaluate potential SMR locations in consideration of costs, public acceptance and safety under climate change.



Dr. Mike Monea

President/CEO, International CCS Knowledge Centre, Canada

Biography: Michael Monea was appointed as the President of the International CCS Knowledge Centre in the summer of 2016. The independent non-profit international centre has been created under a partnership between BHP-Billiton and SaskPower with a mandate to accelerate the development and application of CCS globally, bring down the costs of CCS technology and assist in the management of development risk, by transfer of the knowledge and experiences from commercial CCUS project.

Since 2000, Michael Monea has led the success of both the largest CCUS-EOR storage and monitoring research & demonstration project in Weyburn oilfield as Executive Director of the Petroleum Technology Research Centre in Regina and later was appointed Chairman of the Board; and the world's first of a kind operating large-scaled commercial integrated coal-fired power plant carbon capture and storage demonstration project (Boundary Dam 3) in the world (2008-), making him a rare innovation leader crossing the petroleum and coal power industries, with highly respected career of operating private energy business, executing technology innovation projects with large government owned enterprise and non-profit research institution. He has been frequently invited to international forums to share his experiences and visions on CCUS innovation, across the continents including China. He has recently been invited to present at the Technical Expert Meeting hosted by the UNFCCC secretariat. He served In 2008 he was appointed to the Society of Petroleum Engineers Distinguished Lecture program as an expert in enhanced oil recovery. Monea holds professional engineer and geoscientist designations and is a member of the Canadian Institute of Corporate Directors.

Keynote Lecture: Building on the Operation Experiences of Carbon Capture, Utilization and Storage

Saskatchewan's expertise in Carbon Capture, Utilization and Storage (CCUS) technologies projects is a good example of how to "green up" conventional energy resources. Saskatchewan, Canada provides a viable business case for commercial-scaled CCUS demonstration integrated with enhanced oil recovery (EOR) operations, and for continued clean use of coal as a sustainable energy source, in context of expected uncertainty.

In the province the following projects have been implemented: the IEA Weyburn-Midale (oilfields) CO₂ Monitoring and Storage Project--- the world's largest monitored and verified commercial scaled CCUS-EOR operations since 2000, and the world's first large-scaled CCUS facility at Boundary Dam power station (1 million tonnes of CO₂/ year) and the world's largest deep (3400m) geological CO₂ storage project since 2014, the first open carbon capture technology test facility established through international partnership since 2015. Since 2000, 30 million tonnes of fresh anthropogenic CO₂ have been stored on oil fields through enhanced oil recovery using CO₂. About 10 million tonnes of incremental oil have been recovered using CO₂, which otherwise could not have been extracted.

The International CCS Knowledge Centre (Knowledge Centre) was mandated to advance the global understanding and deployment of large-scale carbon capture and storage (CCS/CCUS) to reduce global greenhouse gas (GHG) emissions and to secure sustainable energy supply. The Knowledge Centre provides the know-how to implement large-scale CCS projects as well as CCS optimization through the base learnings from both the fully-integrated Boundary Dam 3 CCS Facility (BD3) and the comprehensive second-generation CCS study.



Prof. NESIMI ERTUGRUL
University of Adelaide, Australia

Biography: Nesimi Ertugrul received the B.Sc. degree in electrical engineering and the M.Sc. degree in electronic and communication engineering in 1985 and 1989, respectively, and the Ph.D. degree in electrical and electronic engineering from the University of Newcastle, Newcastle upon Tyne, U.K., in 1993. Since 1994, he has been with The University of Adelaide, Australia, where he is currently an Associate Professor.

His primary research interests include control of brushless permanent magnet machines, emerging magnetic materials (amorphous magnetic materials and soft magnetic composites) in high efficiency rotating electrical machines, renewable energy (PV and Wind) systems, autonomous and electric vehicle technologies, grid scale battery storage systems, and power quality and condition monitoring in power system and electrical machines.

Dr. Ertugrul leads the Power Electronics and Electrical Machines research group in the School of EEE, which currently accommodates a number of postgraduate students. He has been successful of obtaining large and mainly industrial-linked competitive grants.

Dr. Ertugrul has published 2 sole authored books and 4 book chapters. He has been the guest editor of 2 journals and key note speakers in various international conferences. He has also been the author of over 140 international conference and journal articles and 4 patents.

Keynote Lecture: Future Grid, Energy Security and Community Level Battery Storage with PVs

A disruption-proof and low-cost grid has been the primary aim in any electricity power grid. However, the changes in load characteristics since the invention of Power Electronics (PE) have gradually introduced disruptors at a pace unmatched within the last decade. Although the power grid is inherently vulnerable to disturbances, it reached to a state (after the high concentration of renewable energy sources) presenting systemic impacts affecting the wellbeing of societies and economies.

The transformation in the power grid indicates that we are now shifting from decentralised to more decentralised structures. The future is likely to involve autonomous multiple microgrids with distributed energy resources. Such systems can function either in the presence of grid, or as an independent/standalone isolated system, and it can provide power at a higher level of reliability while offering low variable cost and low maintenance cost. Moreover, it can offer higher capacity factor (suitable for future demand increase due to electric vehicles) and reducing overall electricity cost. Furthermore, this approach reduces fossil fuel usage, reduce carbon footprints, improve household level electricity affordability and sell excess solar electricity at a low price to attract industries and create jobs.

This keynote will address the above issues and present the status of developments and highlight the associated road blocks.

Invited Speakers



Dr. Zewei Yu

Consultant, International CCS Knowledge Centre, Canada

Biography: In 1990s, as a consultant, Zewei facilitated the contract awarding process for the Canadian Crown atomic energy corporation to build the CANDU nuclear power plant in Qishan, China - the largest overseas turn-key project undertaken and financed by Canada.

Also drawing on his public service experiences in climate change planning, Zewei has effectively presented Canadian CCUS achievements and expertise on the international forums involving international governments and industries, financial institutions and think tanks. Under Zewei's oversight, the Knowledge Centre has been able to make accessible to China the important learnings in the IEAGHG report "Integrated Carbon Capture and Storage Project at SaskPower's Boundary Dam Power Station" and other reports on commercial demonstration. He has helped inform a wide range of key CCUS shareholders of the evolving trends, issues, and the complex challenges associated with large-scaled CCUS technology development and deployment. Zewei Yu obtained his graduate degree in Canada on sustainable development and environmental policy.

Keynote Lecture: CCUS's Role for Clean Energy

It is challenging to integrated the renewable energies such as solar and wind with fossil fuel dependent industry infrastructures in China and other Asian countries, in particular, for their characteristics of variability to achieve GHG emission reduction goals. Other energy intensive industry sectors such as cement and metallurgy, even replacing fossil thermal fuel with electricity are limited for the process technology restrictions.

While hydrogen is touted as clean energy (may be produced using renewable power that left off line), majority hydrogen are made from GHG intensive fossil fuels processes. Even hydrogen may be used for energy in large scaled in the future, the GHG emissions may remain to be reduced during its GHG intensive making process at source. For power generation sector alone among other intensive GHG emission industry sectors in China, for example, coal fired power generation has been greatly reduced in terms of use factor (below 50%), it still provides close to 70% of power supply with 50% total installed capacity as valuable infrastructure. Non-emission power sources, provide only 30% of power supply, sharing carbon foot prints with the emissive peaking power sources. To allow more renewable power to come on grid in the low-carbon emission scenario, it requires well coordination with base load generation capacity and peaking capacity at lower emission.

Opportunity emerge for CCUS, which has been proven viable through commercial scaled demonstration in Canada, to be applied to reduce emission at source with coal fired power plants and other GHG intensive industry sectors to make these process sustainable; allow low-carbon peaking capacity to coordinate well with variable energy sources; to allow green hydrogen making possible.

PROGRAMME OVERVIEW

Date	Time	Programme	Location	
Sept. 19, 2019	14:00-17:00	Registration	Hotel Lobby at Merlinhod Hotel	
Sept. 20, 2019	9:00-9:10	Opening Ceremony	No.2 Conference Room 2 nd floor	
	9:10-9:50	Keynote Lecture Dr. Mike Monea		
	09:50-10:30	Keynote Lecture Prof. NESIMI ERTUGRUL		
	10:30-10:50	Group Photo + Coffee Break		
	10:50-11:30	Keynote Lecture Prof. Gordon Huang		
	11:30-12:00	Invited Lecture Dr. Zewei Yu	No.2 Conference Room 2 nd floor	
	12:00-14:00	Lunch		3 rd floor
	14:00-15:15	Technical Session		No.2 Conference Room 2 nd floor
	15:15-15:45	Coffee Break		
	15:45-17:00	Poster Session		
18:00-19:00	Dinner	3 rd floor		
Sept. 21, 2019		Technical Tour	Pending	

TECHNICAL SESSION

Keynote Lecture			
Sept. 20, Friday, No.2 Conference Room (2nd floor)			
Time	No.	Content	Page
09:10-09:50	K1	Building on the Operation Experiences of Carbon Capture, Utilization and Storage <i>Dr. Mike Monea</i> , President/CEO, International CCS Knowledge Centre, Canada	3
09:50-10:30	K2	Future Grid, Energy Security and Community Level Battery Storage with PVs <i>Prof. NESIMI ERTUGRUL</i> , University of Adelaide, Australia	4
10:30-10:50	Group Photo + Coffee Break		
10:50-11:30	K3	Environmental and Economic Analysis for the Development of Small Modular Reactors under Climate Change <i>Prof. Gordon Huang</i> , University of Regina, Canada	2
11:30-12:00	I1	CCUS's Role for Clean Energy <i>Dr. Zewei Yu</i> , Consultant, International CCS Knowledge Centre, Canada	5
12:00-14:00	Lunch		
Technical Session			
Session Chair: Dr. Mike Monea			
Sept. 20, Friday, No.2 Conference Room (2nd floor)			
14:00-14:15	E005	Mapping Electronic Waste Flows in Depok, West Java <i>Finna Handafiah</i> , Universitas Indonesia, Indonesia	9
14:15-14:30	E010	Environmental Impact of Mixing Biofuel with Gasoline in Spark Ignition Engine <i>ESAM I JASSIM</i> , Prince Mohammad Bin Fahd University, Saudi Arabia	9
14:30-14:45	E1010	DOMIRISK: a user-friendly domino effect decision support system <i>Yang Yang</i> , Nanjing University, China	10
14:45-15:00	E1011	Bioremediation of chromium smelting slag by sulfate-reducing bacteria (SRB) <i>Yan Xiao</i> , GRINM Group Corporation Limited, China	10

15:00-15:15	E1028	Coal Chemical Wastewater Heterogeneous Catalytic Oxidation Pretreatment Pilot Scale Test <i>Zhenglin Zhou</i> , Sichuan TOP Environmental Protection Technology Co.,Ltd, China	11
15:15-15:45	Coffee Break		

Poster Session	
15:45-17:00, Sept. 20, Friday, No.2 Conference Room (2nd floor)	
E001	Effect of Low Temperatures on Battery Recharge and Discharge Voltage <i>Hongwei Wang</i> , Chinese Academy of Inspection and Quarantine, China
E003	Reliability analysis of external optimized control system for thermal power unit <i>Xiaoxing ZHU</i> , State Grid Hunan Electric Power Company Limited Research Institute, Changsha, China
E004	Considering value chain and techno-economic analysis for hydrotreated vegetable oil production from palm oil <i>Yu-Hsuan Chang</i> , NCKU ESIL(Energy system and integration laboratory,)ROC
E009	Biodegradable polymer composite based on recycled polyurethane and finished leather waste <i>ALEXANDRESCU LAURENTIA</i> , National Research and Development Institute for Textile and Leather - Division Leather and Footwear Research Institute ROMANIA–INCDTP-ICPI
E011	A Study on Ecological Redline Delineation of Land Areas in Shenzhen <i>Xu Yali</i> , Urban Planning & Design Institute of Shenzhen, China
E1003	Thermal Degradation and Kinetic Study of Cassava Rhizome for Torrefaction Application <i>P Sirinwaranon</i> , Chulalongkorn University, Bangkok, Thailand
E1004	The relationship between environment characteristics and old citizens physical activates in residential area, Harbin, China <i>YE YANG</i> , Harbin Institute of Technology, China
E1006	Economical study of a boiler fueled with DME <i>Chen Xiaoyu</i> , Laboratory of Electromagnetic Processes of Materials, Northeastern University, China
E1007	A review of mineral carbonation from industrial waste <i>Xiao Song</i> , School of Mechanical & Vehicle Engineering, Linyi University, China
E1008	Study on the effect of “ash core” on the performance of catalysts in the preparation of SCR honeycomb denitration catalyst <i>Chao Lu</i> , Huadian Electric Power Research Institute Co., Ltd, China

E1009	Research on Evolutionary Game of China's Environmental Governance System <i>Lan Zhou</i> , Northwestern Polytechnical University, China
E1024	Relation and network externality based on asymmetric interest flow theory with the case of health damage caused by PPV's energy consumption <i>Yanjie Jiang</i> , Shandong University, China
E1025	Research progress and development trend of Water quality index Based on Bigdata and Visualization of knowledge graph <i>Zhang lei</i> , Graduate School of Global Environmental Studies, Sophia University, Japan
E1026	Pollutant emission and energy consumption analysis of environmental protection facilities in ultra-low emission coal-fired power units <i>Jiang Mingchao</i> , Huadian Electric Power Research Institute Co.,LTD, China

ABSTRACT

Technical Session	
Time	Content
14:00-14:15 Sept. 20	<p>E005: Mapping Electronic Waste Flows in Depok, West Java</p> <p>Presenter: Finna Handafiah, Universitas Indonesia, Indonesia</p> <p>Abstract: Electronic waste (e-waste) is a relatively new issue in Indonesia. Policies and regulations regarding electronic waste in Indonesia are still under development and preparation. Also, the physical presence of electronic waste, except used batteries, is not managed yet, especially in the waste management chain. In some regions, especially in Java, the recovery and the handling of electronic waste such as demolition, separation of parts, old product restoration, and metal recovery are carried out by the informal sector. The informal sector handles almost 90% of the total waste produced, mainly from households, offices, commercial areas, recovery materials, and reconditioned products. Nevertheless, e-waste was not commonly found in public landfills, indicative of its valued nature. Previous studies have figured out that e-waste is flowing through several informal processes with rudimentary technology. This study aimed to understand the role of formal and informal actors in the flow and fate of e-waste in Depok, as well as how various actors interacted and differentially benefited from these flows. The results indicated that informal actors were the predominant force in the collection and sorting of e-waste from households. This research suggests that informal actors, who play such an essential role in the current system, should be incorporated into any new regulatory and management schemes, as is currently being developed by the Indonesian government.</p>
14:15-14:30 Sept. 20	<p>E010: Environmental Impact of Mixing Biofuel with Gasoline in Spark Ignition Engine</p> <p>Presenter: ESAM I JASSIM, Prince Mohammad Bin Fahd University, Saudi Arabia</p>

	<p>Abstract: Biomass materials—such as crop and forest residues, dedicated energy crops, and plant oils— are recently receiving much attention due to their carbon-neutral emission. The process of transesterification is used for the conversion of triglycerides (the main component of vegetable oils and animal fats) to engines fuel. Computational fluid dynamics (CFD) simulation has emerged as an efficient design tool to analyze engine reacting flow processes and develop next generation engines. The aim of this paper is to investigate the emissions of spark ignition engines running on a spectrum of blends of biofuels. CFD analysis of the combustion of gasoline-biofuel mixtures is implemented using ANSYS 18.2. The effect of blending different types and ratios of biofuels on the combustion characteristics in Spark ignition (SI) engine is investigated. The fuel considered for the study is pure gasoline mixed with 5%, 10%, 15% and 25% by volume with ethanol, methanol and propanol. The experimental and simulated outcome of performance of spark ignition engine is presented using different blends and percentage of biomass fuels with conventional engine fuel. Results of the study shows that adding additives to the conventional gasoline would augment the reaction rate of the gasoline, reduce the undesired greenhouse gas emission, and improve the temperature distribution in the combustion zone. The analysis also concludes that increasing the volume fraction of the biofuel results in alleviating in the CO_x and NO_x constituents disposing with the exhaust gases.</p>
<p>14:30-14:45 Sept. 20</p>	<p>E1010: DOMIRISK: a user-friendly domino effect decision support system Presenter: Yang Yang, Nanjing University, China</p> <p>Abstract: The continuous development of modern industry has potential hazard, of which domino effect is a major threat that could result in catastrophe. Moreover, domino accidents will endanger the environment and human health. Some decision support systems for preventing the domino effect have been developed, while most of them are too theoretical and have obvious limitations, such as ignoring the influence of personnel, operational, and other real factors in the actual industrial production process. This paper emphasizes the causes of potential domino accidents and the construction of the accident chain. A system called DOMIRISK is designed which can: 1) quantify the domino effect of the entire plant; 2) identify the root cause of potential domino accidents; 3) build the accident chain of domino effect; 4) assess the environmental risk of the domino accident. A chemical plant is used as an example to illustrate how the system provides practical decision support for controlling the occurrence and spread of domino accidents and protecting environment.</p>
<p>14:45-15:00 Sept. 20</p>	<p>E1011: Bioremediation of chromium smelting slag by sulfate-reducing bacteria (SRB) Presenter: Yan Xiao, GRINM Group Corporation Limited, China</p> <p>Abstract: The remediation of chromium smelting slag was investigated by mixed microbe. such as sulfate-reducing bacteria (SRB), Stenotrophomonas, Ochrobactrum, Pseudomonas. This research showed that removal rate of Cr(VI) was 49.78% and 4.21% in remediation group and control group for 60 days, respectively. Analysis of the physiochemical index, chemical speciation and microbial community, the result indicated that redox potential decreased to -246mV and pH value changed to neutral in remediation process. After the</p>

	<p>remediation of 60 days, chemical fractions of chromium had a noticeable change from dissolved state (water-soluble, exchangeable fraction and carbonate fractions) to stable state, chromium was most in the fraction of organics and residuals, which meant chromium was stable and would not be released into environment; simultaneously, microbial community structure had also significant different between remediation group and control group, sulfate-reducing bacteria (SRB) increased and became dominant microbial on the ratio of remediation group, therefore, the treatment of chromium contaminated soil by microbial remediation both removed Cr(VI) and decreased its environmental risks.</p>
<p>15:00-15:15 Sept. 20</p>	<p>E1028: Coal Chemical Wastewater Heterogeneous Catalytic Oxidation Pretreatment Pilot Scale Test</p> <p>Presenter: Zhenglin Zhou, Sichuan TOP Environmental Protection Technology Co.,Ltd, China</p> <p>Abstract: A chemical enterprise in northwest China mainly produces 1, 4-butanediol, PTMEG and other chemical raw materials, with high concentration of waste water pollutants, low biochemical properties, strong biological toxicity and difficult to biodegrade. The pilot system constructed a chemical flocculation precipitation - heterogeneous catalytic oxidation -UASB- multistage aerobic -MBR system for treating BDO and PTMEG wastewater. The pilot system operates stably and efficiently, and the effluent meets the national sewage comprehensive discharge standard (GB8978-2002) grade A standard.</p>

CONFERENCE VENUE

Merlinhod Hotel (Yinchuan)

美丽豪酒店(银川店)

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Transportation Information

1. Yinchuan Hedong International Airport → Merlinhod Hotel (Yinchuan)

银川河东机场→ 美丽豪酒店(银川店)

Taxi (出租车)

About 37 mins, 27 kilometers

约 37 分钟, 27 公里

2. Yinchuan Railway Station→ Merlinhod Hotel (Yinchuan)

银川火车站→ 美丽豪酒店(银川店)

A. Taxi (出租车)

About 30 mins, 11.9 kilometers

约 30 分钟, 11.9 公里

CONFERENCE COMMITTEE

Conference Committee Co-Chair

Gordon Huang, University of Regina, Canada

NESIMI ERTUGRUL, University of Adelaide, Australia

Qudaih Yaser, American University of Madaba (AUM) - Jordan

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