# International Conference on Advances in Renewable Energy and Technologies (ICARET 2016)

# Sustaining a Green Future

IOP Conference Series: Earth and Environmental Science Volume 32

Putrajaya, Malaysia 23 – 25 February 2016

## **Editors:**

Abd Halim Shamsuddin Adlansyah Abd Rahman Halina Misran

ISBN: 978-1-5108-2273-3

ISSN: 1755-1307

### Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2016) by the Institute of Physics All rights reserved. The material featured in this book is subject to IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2016)

For permission requests, please contact the Institute of Physics at the address below.

Institute of Physics Dirac House, Temple Back Bristol BS1 6BE UK

Phone: 44 1 17 929 7481 Fax: 44 1 17 920 0979

techtracking@iop.org

### Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA

Phone: 845-758-0400 Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

# **Table of contents**

# Volume 32

International Conference on Advances in Renewable Energy and Technologies (ICARET 2016)23–25 February 2016, Putrajaya, Malaysia

Accepted papers received: 15 March 2016Published online: 19 April 2016Preface

011001 OPEN ACCESS Cover Page

011002 OPEN ACCESS Organising Committee

011003 OPEN ACCESS Welcome Remarks

011004 OPEN ACCESS Foreword

011005 OPEN ACCESS Introduction

011006 OPEN ACCESS Programme Schedule

011007
OPEN ACCESS
Acknowledgements and Sponsors

011008 OPEN ACCESS Peer Review Statement

### **Papers**

012001

OPEN ACCESS

<u>Gravitational search algorithm based tuning of a PI speed controller for an induction</u> motor drive

Jamal Abd Ali, M A Hannan and Azah Mohamed pg. 1

012002

**OPEN ACCESS** 

A new fuzzy self-tuning PD load frequency controller for micro-hydropower system

M Reyasudin Basir Khan, Razali Jidin and Jagadeesh Pasupuleti pg. 5

012003

OPEN ACCESS

A micro-hydropower system model with PD load frequency controller for Resort Islands in the South China Sea

M Reyasudin Basir Khan, Jagadeesh Pasupuleti and Razali Jidin pg. 9

012004

**OPEN ACCESS** 

Influence of Continuous Flow Microwave Pre-Treatment on Anaerobic Digestion of Secondary Thickened Sludge for Sustainable Energy Recovery in Sewage Treatment Plant

D Hephzibah, P Kumaran and N M Saifuddin pg. 13

012005

**OPEN ACCESS** 

Application of Moving Bed Biofilm Reactor (MBBR) and Integrated Fixed Activated Sludge (IFAS) for Biological River Water Purification System: A Short Review

M S Lariyah, H A Mohiyaden, G Hayder, G Hayder, A Hussein, H Basri, A F Sabri and MN Noh pg. 18

**OPEN ACCESS** 

<u>Performance evaluation of cognitive radio in advanced metering infrastructure</u> communication

Yik-Kuan Hiew, Norazizah Mohd Aripin and Norashidah Md Din pg. 33

012007

**OPEN ACCESS** 

Artificial Intelligence Application in Power Generation Industry: Initial considerations

Rahmat Izaizi B. Ismail, Firas B. Ismail Alnaimi and Haidar F. AL-Qrimli pg. 42

012008

**OPEN ACCESS** 

Biogas Production Modelling: A Control System Engineering Approach

D Stollenwerk, C Rieke, M Dahmen and M Pieper pg. 46

012009

**OPEN ACCESS** 

Biogas Production on Demand Regulated by Butyric Acid Addition

K Kasper, J Schiffels, S Krafft, I Kuperjans, G Elbers and T Selmer pg. 50

012010

OPEN ACCESS

Water Quality Improvement through Reductions of Pollutant Loads on Small Scale of Bioretention System

Norshafa Elyza Muha, Lariyah Mohd Sidek and Milad Jajarmizadeh pg. 54

012011

**OPEN ACCESS** 

<u>Sustainable Approach of Reusing Open Dumping Area by Predicting Long-Term</u> Settlement of Waste Soil

Ahmad Sulaimi Shariffuddin, Nur Irfah Mohd Pauzi and Goh Yu Hao pg. 58

OPEN ACCESS

An Integrated Numerical Hydrodynamic Shallow Flow-Solute Transport Model for Urban Area

N A Alias and L Mohd Sidek pg. 63

012013

**OPEN ACCESS** 

Effect on Ca(OH)<sub>2</sub> pretreatment to enhance biogas production of organic food waste

H Junoh, CH Yip and P Kumaran pg. 68

012014

**OPEN ACCESS** 

A comparative study of artificial intelligent-based maximum power point tracking for photovoltaic systems

Ammar Hussain Mutlag, Azah Mohamed and Hussain Shareef pg. 73

012015

**OPEN ACCESS** 

Wet Load Study of Gross Pollutant Traps; Kemensah River, Malaysia

N. M. Zahari, L. M. Sidek, H. Basri, N. F. Md Said, M. S. F. Md Noor, M. Jajarmizadeh, M. R. Zainal Abidin and N. Mohd. Dom pg. 77

012016

**OPEN ACCESS** 

<u>Development of High Efficiency and Low Emission Low Temperature Combustion</u> <u>Diesel Engine with Direct EGR Injection</u>

R J Ho, P. Kumaran and M Z Yusoff pg. 81

012017

**OPEN ACCESS** 

Impact Resistance Behaviour of Banana Fiber Reinforced Slabs

Zakaria Che Muda, Agusril Syamsir, Kamal Nasharuddin Mustapha, Muhamad Rifdy Samsudin, Sivadass Thiruchelvam, Fathoni Usman, Salmia Beddu, Nur Liyana Mohd Kamal, Md Ashraful Alam, Ahmed H Birima and O S Zaroog pg. 86

**OPEN ACCESS** 

<u>Introduction of an Emergency Response Plan for flood loading of Sultan Abu Bakar Dam</u> in Malaysia

N. F. Md Said, L M Sidek, H Basri, R S Muda and A. Z. Abdul Razad pg. 90

012019

**OPEN ACCESS** 

Impact Resistance Performance of Kenaf Fibre Reinforced Concrete

Zakaria Che Muda, Nur Liyana Mohd Kamal, Agusril Syamsir, Chiam Yung Sheng, Salmia Beddu, Kamal Nasharuddin Mustapha, Sivadass Thiruchelvam, Fathoni Usman, Md Ashraful Alam, Ahmed H Birima and O S Zaroog pg. 95

012020

**OPEN ACCESS** 

Impact Resistance Behaviour of Light Weight Rice Husk Concrete with Bamboo Reinforcement

Zakaria Che Muda, Salmia Beddu, Agusril Syamsir, Joshua Sigar Ating, Nur Liyana Mohd Kamal, Kamal Nasharuddin Mustapha, Sivadass Thiruchelvam, Fathoni Usman, Md Ashraful Alam, Ahmed H Birima and O S Zaroog pg. 99

012021

**OPEN ACCESS** 

The Semantic Network of Flood Hydrological Data for Kelantan, Malaysia

Aziyati Yusoff, Norashidah Md Din, Salman Yussof and Samee Ullah Khan pg. 103

012022

**OPEN ACCESS** 

<u>Urban Stormwater Management Model and Tools for Designing Stormwater Management of Green Infrastructure Practices</u>

H Haris, M F Chow, F Usman, L M Sidek, Z A Roseli and M D Norlida pg. 107

**OPEN ACCESS** 

Development of Flood Forecasting Using Statistical Method in Four River Basins in Terengganu, Malaysia

M S F M Noor, L M Sidek, H Basri, M M M Husni, A S Jaafar, M H Kamaluddin, W H A W A Majid, A H Mohammad and S Osman pg. 125

012024

**OPEN ACCESS** 

Enhancing a Distributed Rainfall Intensity for Flood Analysis within a GIS Framework in an Urban Area (Kajang Flood)

S H M Salleh and L M Sidek pg. 129

012025

**OPEN ACCESS** 

Effect of Mesh Distribution on Impact Resistance Performance of Kenaf Fibre Reinforced Concrete

Zakaria Che Muda, Sivadass Thiruchelvam, Agusril Syamsir, Chiam Yung Sheng, Salmia Beddu, Kamal Nasharuddin Mustapha, Fathoni Usman, Nur Liyana Mohd Kamal, Md Ashraful Alam, Ahmed H Birima and O S Zaroog pg. 133

012026

**OPEN ACCESS** 

Effect of Thickness and Fibre Volume Fraction on Impact Resistance of Steel Fibre Reinforced Concrete (SFRC)

Zakaria Che Muda, Fathoni Usman, Agusril Syamsir, Chen Shao Yang, Kamal Nasharuddin Mustapha, Salmia Beddu, Sivadass Thiruchelvam, Nur Liyana Mohd Kamal, Md Ashraful Alam, Ahmed H Birima, Zarina Itam and O S Zaroog pg. 137

012027

**OPEN ACCESS** 

The Effect of Thickness and Mesh Spacing on the Impact Resistance of Ferrocement Slab

Zakaria Che Muda, Md Ashraful Alam, Agusril Syamsir, Sorefan Sulleman, Salmia Beddu, Kamal Nasharuddin Mustapha, Sivadass Thiruchelvam, Firas B. Ismail, Fathoni Usman, Nur Liyana Mohd Kamal, Ahmed H Birima, Zarina Itam and O S Zaroog pg. 141

**OPEN ACCESS** 

Effect of Steel Fibres Distribution on Impact Resistance Performance of Steel Fibre Reinforced Concrete (SFRC)

Zakaria Che Muda, Nur Liyana Mohd Kamal, Agusril Syamsir, Chen Shao Yang, Salmia Beddu, Kamal Nasharuddin Mustapha, Sivadass Thiruchelvam, Fathoni Usman, Zarina Itam, Md Ashraful Alam, Ahmed H Birima and O S Zaroog pg. 145

012029

**OPEN ACCESS** 

The Effect of Mortar Grade and Thickness on the Impact Resistance of Ferrocement Slab

Zakaria Che Muda, Agusril Syamsir, Kamal Nasharuddin Mustapha, Sorefan Sulleman, Salmia Beddu, Sivadass Thiruchelvam, Firas B. Ismail, Fathoni Usman, Nur Liyana Mohd Kamal, Md Ashraful Alam, Ahmed H Birima, Zarina Itam and O S Zaroog pg. 149

012030

**OPEN ACCESS** 

Impact of Sedimentation hazard at Jor Reservoir, Batang Padang Hydroelectric Scheme in Malaysia

Jansen Luis, Lariyah Mohd Sidek and Milad Jajarmizadeh pg. 153

012031

OPEN ACCESS

Conceptualization of a Collaborative Decision Making for Flood Disaster Management

Siti Nur Aishah Zubir, Sivadass Thiruchelvam, Kamal Nasharuddin Mustapha, Zakaria Che Muda, Azrul Ghazali, Hazlinda Hakimie, Normy Norfiza Abdul Razak, Abdul Aziz Mat Isa, Hasril Hasini, Khairul Salleh Mohamed Sahari, Norhayati Mat Husin, Mohd Ezanee Rusli, Rahsidi Sabri Muda, Lariyah Mohd Sidek, Hidayah Basri and Izawati Tukiman pg. 157

012032

OPEN ACCESS

Formulation of an Integrated Community Based Disaster Management for Hydroelectric facilities: The Malaysia Case

Norshamirra Hijazzi, Sivadass Thiruchelvam, Rahsidi Sabri Muda, Kamal Nasharuddin Mustapha, Zakaria Che Muda, Azrul Ghazali, Ahmad Kamal Kadir, Hazlinda Hakimie, Khairul Salleh Mohamed Sahari, Hasril Hasini, Lariyah Mohd Sidek, Zarina Itam, Mohd Fadhli Mohamad and Azwin Zailti Abdul Razad pg. 162

**OPEN ACCESS** 

Encapsulation of a Decision-Making Model to Optimize Supplier Selection via Structural Equation Modeling (SEM)

Ruzanna Sahul Hameed, Sivadass Thiruchelvam, Kamal Nasharuddin Mustapha, Zakaria Che Muda, Norhayati Mat Husin, Mohd Ezanee Rusli, Lee Choon Yong, Azrul Ghazali, Zarina Itam, Hazlinda Hakimie, Salmia Beddu and Nur Liyana Mohd Kamal pg. 167

012034

OPEN ACCESS

A Conceptual Framework for Procurement Decision Making Model to Optimize Supplier Selection: The Case of Malaysian Construction Industry

Ngam Min Chuan, Sivadass Thiruchelvam, Kamal Nasharuddin Mustapha, Zakaria Che Muda, Norhayati Mat Husin, Lee Choon Yong, Azrul Ghazali, Mohd Ezanee Rusli, Zarina Binti Itam, Salmia Beddu and Nur Liyana Mohd Kamal pg. 171

012035

OPEN ACCESS

Nuclear Power Acceptance Among University Staffs and Students

G Hayder and M S Ab Rahim pg. 175

012036

**OPEN ACCESS** 

Solar Resource Mapping of AL Dugm Industrial Area

Yousuf AL-Hatmi, C. S. Tan, Sultan al Al-Yahyai and Abdullah Al-Badi pg. 183

012037

OPEN ACCESS

Effect of H<sub>2</sub> and CO contents in syngas during combustion using Micro Gas Turbine

N F Othman and M H Boosroh pg. 187

012038

**OPEN ACCESS** 

Numerical analysis of Al coating using different particle shape in LPCS

S N A Yusof, A Manap and N F Afandi pg. 192

**OPEN ACCESS** 

The Production of Biodiesel and Bio-kerosene from Coconut Oil Using Microwave Assisted Reaction

N. SAIFUDDIN, A. SITI FAZLILI, P. KUMARAN, N. PEI-JUA and P. PRIATHASHINI pg. 196

012040

**OPEN ACCESS** 

The Feasibility of Palm Kernel Shell as a Replacement for Coarse Aggregate in Lightweight Concrete

Zarina Itam, Salmia Beddu, Nur Liyana Mohd Kamal, Md Ashraful Alam and Usama Issa Ayash pg. 201

012041

**OPEN ACCESS** 

The drivers to adopt renewable energy among residential users.

Zahari Abdul Rahman and Esa Elinda pg. 205

012042

**OPEN ACCESS** 

Evaluating the Effect of Syngas Composition on Micro gas turbine Performance

N. Fareeza, E.S. Tan, P. Kumaran, T.M. Indra, N. Fadzilah and K. Yoshikawa pg. 212

012043

**OPEN ACCESS** 

Flood Forecasting via Time Lag Forward Network; Kelantan, Malaysia

Milad Jajarmizadeh, Lariyah Mohd Sidek, Hidayah Bte Basri and Aminah Shakira Jaffar pg. 217

012044

**OPEN ACCESS** 

Finite Element Analysis of the Maximum Stress at the Joints of the Transmission Tower

Zarina Itam, Salmia Beddu, Nur Liyana Mohd Kamal and Khaled H. Bamashmos pg. 221

012045 OPEN ACCESS

The Potential of Heat Collection from Solar Radiation in Asphalt Solar Collectors in Malaysia

Salmia Beddu, Siti Hidayah Abdul Talib and Zarina Itam pg. 225

012046

**OPEN ACCESS** 

<u>Light irradiance and spectral distribution effects on cyanobacterial hydrogen production</u>

Siti Fatihah Salleh, Azlina Kamaruddin, Mohamad Hekarl Uzir, Abdul Rahman Mohamed and Abdul Halim Shamsuddin pg. 229

012047

**OPEN ACCESS** 

Thermal Analysis for Improving Fuel Characteristics of Empty Fruit Bunch (EFB) Fibers

M.S. Hafiz, K. Horst and M.A. Md. Ariffin pg. 233

012048

**OPEN ACCESS** 

<u>Techno-economic analysis of bioethanol production from rice straw by liquid-state fermentation</u>

M H M Hidayata, S F Salleh, T M I Riayatsyahb, H B Aditiyac, T M I Mahliaa and A H Shamsuddina pg. 238

012049

**OPEN ACCESS** 

Sustainability and business: what is green corporate image?

Vathana Bathmanathan and Chikako Hironaka pg. 242

012050

**OPEN ACCESS** 

Energy Reporting Practices among Top Energy Intensive Industries in Malaysia

N E Tasrip, N Mat Husin and B Alrazi pg. 246

012051 OPEN ACCESS

Rapid Economic Growth and Natural Gas Consumption Nexus: Looking forward from Perspective of 11<sup>th</sup> Malaysian Plan

H A Bekhet and T Yasmin pg. 250

012052

**OPEN ACCESS** 

A proposed model of factors influencing hydrogen fuel cell vehicle acceptance

N H Noor Imanina, Tan Kwe Lu and A R Fadhilah pg. 254

012053

**OPEN ACCESS** 

Liquid cooled plate heat exchanger for battery cooling of an electric vehicle (EV)

M M Rahman, H Y Rahman, T M I Mahlia and J L Y Sheng pg. 258

012054

**OPEN ACCESS** 

Is MLQ Instrument Applicable to Verify the Blue Ocean Leadership Traits?

Wan Noordiana Wan Hanafi, Salina Daud and Nur Lyana Baharin pg. 262

012055

**OPEN ACCESS** 

What Is Green Growth Strategy for Government Link Company?

Maryam Jamilah Asha'ari, Salina Daud and Hasmaizan Hassan pg. 266

012056

**OPEN ACCESS** 

<u>Institutionalising Human Governance Determinant: Steering Organizations towards</u> <u>Sustainability</u>

Zulkefli Muhamad Hanapiyah, Salina Daud and Wan Mohammad Taufik Wan Abdullah pg. 270

**OPEN ACCESS** 

<u>GSM Web-Based Centralized Remote Wireless Automatic Controlling and Monitoring of Aquafeeder</u>

C L Wong, A Idris and Z Hasan pg. 274

012058

OPEN ACCESS

The effect of dilute acid pre-treatment process in bioethanol production from durian (*Durio zibethinus*) seeds waste

K A Ghazali, S F Salleh, T M I Riayatsyah, H B Aditiya and T M I Mahlia pg. 278

012059

OPEN ACCESS

<u>Comparison of an Electromagnetic Energy Harvester Performance using Wound Coil</u> Wire and PCB Coil

MSM Resali and H Salleh pg. 282

012060

**OPEN ACCESS** 

Effect of Synthesis Methods Using Renewable PODFA on Structural Characteristics of Metal-Organic Framework (MOF-5)

S Z Othman, H Misran, W A Affendy and N F Mahadi pg. 286

012061

**OPEN ACCESS** 

A virtual laboratory for the simulation of sustainable energy systems in a low energy building: A case study

M Breen, A O'Donovan, M D Murphy, F Delaney, M Hill and P D O Sullivan pg. 290

012062

**OPEN ACCESS** 

Numerical analysis of single particle impact in the context of Cold Spray: a new adhesion model

P Profizi, A Combescure and K Ogawa pg. 297

**OPEN ACCESS** 

Institutional Governance Framework for Determining Carbon-related Accounting Practices: An Exploratory Study of Electricity Generating Companies in Malaysia

B Alrazi and N Mat Husin pg. 301

012064

**OPEN ACCESS** 

<u>Time Series Analysis of Heavy Metal Concentrations along the Watershed Gradient in</u> Cameron Highlands: Geospatial Approaches

S H Haron, B S Ismail, M R Mispan, N F Abd Rahman, K Khalid, M Z Abdul Rasid and L M Sidek pg. 307

012065

**OPEN ACCESS** 

Gross Pollutant Traps: Wet Load Assessment at Sungai Kerayong, Malaysia

M R Mohd Shah, N M Zahari, N. F. Md Said, L M Sidek, H Basri, M S F Md Noor, M M Mohammad Husni, Milad Jajarmizadeh, ZA Roseli and N Mohd. Dom pg. 312

012066

**OPEN ACCESS** 

Evaluation of Gross Pollutant Wet Load in Sungai Sering, Malaysia

M S F M Noor, L M Sidek, H Basri, N M Zahari, N F M Said, ZA Roseli and N Mohd. Dom pg. 316

012067

**OPEN ACCESS** 

Hydrological Analysis for Inflow Forecasting into Temengor Dam

MI Najid, LM Sidek, B Hidayah and ZA Roseli pg. 320

012068

**OPEN ACCESS** 

<u>Decision Support System (DSS) for MSMA Integrated Stormwater Management</u> Ecohydrology for Sustainable Green Infrastructure

L M Sidek, H A Mohiyaden, H Haris, H Basri, Z C Muda, Z A Roseli and M D Norlida pg. 324

**OPEN ACCESS** 

Hydrology Analysis and Modelling for Klang River Basin Flood Hazard Map

L M Sidek, N.E. Rostam, B. Hidayah, ZA Roseli, W.H.A.W.A. Majid, N.Z. Zahari, S.H.M. Salleh, R.D.R. Ahmad and M.N. Ahmad pg. 330

012070

**OPEN ACCESS** 

A Review on Flood Events for Kelantan River Watershed in Malaysia for Last Decade (2001-2010)

J Aminah Shakirah, L M Sidek, B Hidayah, M.Z. Nazirul, M. Jajarmizadeh, F.C. Ros and ZA Roseli pg. 336

012071

**OPEN ACCESS** 

A Factorial Analysis Study on Enzymatic Hydrolysis of Fiber Pressed Oil Palm Frond for Bioethanol Production

F S Hashim, H W Yussof, M A K M Zahari, R M Illias and R A Rahman pg. 340

012072

OPEN ACCESS

<u>Devolatilization Studies of Oil Palm Biomass for Torrefaction Process through Scanning Electron Microscopy</u>

D. Daud, A. Abd. Rahman and A.H. Shamsuddin pg. 345

012073

**OPEN ACCESS** 

CFD Investigation of Pollutant Emission in Can-Type Combustor Firing Natural Gas, LNG and Syngas

H Hasini, SSA Fadhil, N Mat Zian and NI Om pg. 350

012074

**OPEN ACCESS** 

The Application of Waiting Lines System in Improving Customer Service Management: The Examination of Malaysia Fast Food Restaurants Industry

Zurina Ismail and Shahrul Suhaimi AB Shokor pg. 354