5th INTERNATIONAL CONFERENCE ON ENERGY & ENVIRONMENT

ICEE 2019

ORGANIZED BY

YAYASAN CANSELOR UNITEN & UNIVERSITI TENAGA NASIONAL

PROGRAMME AGENDA

Wednesday, July 10, 2019

Bangi Resort Hotel, Bandar Baru Bangi, Selangor, Malaysia

8.00 a.m	Participants Registration & Reception
9.00 a.m	Arrival of Invited Guest
9.15 a.m	Keynote Speaker I YBhg. Prof. Dato' Kamaruzzaman Sopian *Professor, Universiti Kebangsaan Malaysia*
10.15 a.m	Morning Tea Break
10.30 a.m	Arrival of VIPs
10.45 a.m	Malaysia National Anthem 'Negaraku' & 'UNITEN Terbilang' Song Doa Recitation
11.00 a.m	Welcoming Speech By YBhg. Dato' Prof. Ir. Dr. Kamal Nasharuddin Bin Mustapha *Vice Chancellor, UNITEN*
11.10 a.m	Officiating Speech By YBhg. Dato' Seri Ir. Dr. Zaini Ujang *Board of Director, UNITEN* Multimedia's Presentation / Photography Session
11.45 a.m	Keynote Speaker II YBhg. Datuk Shamsul Ahmad *Managing Director, TNB Janamanju*ng
12.45 p.m	Lunch Break
2.00 p.m	Parallel Presentation Session 6 rooms (8 presentations / room)
4.00 p.m	Evening Tea Break
4.15 p.m	Parallel Presentation Session 6 rooms (7 presentations / room)
6.00 p.m	End of Day 1

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PROGRAMME AGENDA

Thursday, July 11, 2019

Bangi Resort Hotel, Bandar Baru Bangi,
Selangor, Malaysia

9.00 a.m	Parallel Presentation session 6 rooms (6 presentations / room)
10.30 a.m	Morning Tea Break
10.45 a.m	Parallel Presentation Session 6 rooms (7 presentations / room)
12.30 p.m	Lunch Break
2.00 p.m	Prize-giving & Closing Ceremonies - "Best Presenter Award" For Parallel Presentation Session - "Best Paper Award" For "Environment and Waste Management" Track. - "Best Paper Award" For "Green & Sustainable Energy Track: Theme 1". - "Best Paper Award" For "Green & Sustainable Energy Track: Theme 2". - "Best Paper Award" For "Green & Sustainable Energy Track: Theme 3".
3.00 p.m	Evening Tea Break
3.30 p.m	UNITEN campus tour
4.30 p.m	End of Conference

List of Papers in Parallel Sessions

Parallel session 1(10th July 2019: 2.00-4.00pm) – Power Generation

Venue: Dahlia II

Time slot	Paper ID	Paper Title
2.00pm	1570484476	Effect of Radiation Shield Parameter on Rowen's Model Performance for Dry-Low Emission Gas Turbine Representation
2.15pm	1570538179	Performance Analysis of Memristor Based Ring Oscillators True Random Number Generator for Energy Technology
2.30pm	1570550444	Modelling and Simulation of 1.2 MWp Tenaga Suria Brunei Photovoltaic Power Plant
2.45pm	1570550501	Hydropower Potential on Agricultural Dam: A Case Study for Pedu Dam
3.00pm	1570550767	Numerical Investigation of Subcooled Boiling Heat Transfer in Helically-coiled Tube
3.15pm	1570551218	Hydropower Potential on Agriculture Dam in Bukit Merah
3.30pm	1570552459	Feasibility Study of Micro-Hydropower System Generation for Different Types of Sewage Treatment Plants
3.45pm	1570550393	Comparative study between waste heat recovery systems using Steam Rankine Cycle and Organic Rankine Cycle for power generation

Parallel session 2(10th July 2019: 2.00-4.00pm) – Solar & related Applications

Venue: Dahlia III

Time slot	Paper ID	Paper Title
2.00pm	1570550435	A Light Weight Solar Powered Mini Quadcopter for Environmental Monitoring
2.15pm	1570550669	Solar Tower Power: The Impact of External Receiver on Optimal Performance and Energy Storage. A Review
2.30pm	1570539948	Design and Development of Smart Solar Grass Gutter
2.45pm	1570542262	Solar Powered LED Street Lighting Based on Vehicle Motion Detection for Sustainable Energy Utilization
3.00pm	1570551226	Performance Comparison of V-Trough Solar Concentrator Photovoltaic Systems at Varying Panel Surface Temperatures
3.15pm	1570550304	Solar Powered Autonomous Emergency Road Signing Waterlogged system in Highways
3.30pm	1570544320	A Review and Simulation of Photovoltaic Modules using Matlab/Simulink
3.45pm	1570541424	Advanced Photovoltaic Thermal (PV/T) Collectors

Parallel session 3(10th July 2019: 2.00-4.00pm) – Solar & related Applications

Venue: Dahlia IV

Time slot	Paper ID	Paper Title
2.00pm	1570540613	Performance Evaluation of the RACPC for BIPV System under Diffuse Radiation
2.15pm	1570542000	Design and Fabrication of Solar Panel with Sun Position Tracker
2.30pm	1570550777	Geomagnetic Induced Current Analysis In Hybrid PV-Wind System Transformers
2.45pm	1570551035	A simplified method: System size and cost estimation of Grid Connected Photovoltaic (GCPV) system
3.00pm	1570551198	Optimum Design Consideration of a Battery Charger Prototype using Photovoltaic-Thermoelectric Hybrid Generators
3.15pm	1570551240	Fault detection in photovoltaic systems using one electrical parameter
3.30pm	1570554649	Design and Monitoring of A Solar Charge Controller for Stand-alone Photovoltaic Systems
3.45pm	1570556684	Decoupled Control of Three Phase Grid Connected Solar PV System

Parallel session 4(10th July 2019: 2.00-4.00pm) – Energy Efficiency

Venue: Melati I

Time slot	Paper ID	Paper Title
2.00pm	1570541717	Power Consumption of a Refrigerator with Variable Speed Compressor; Profile Analysis and Performance Comparison
2.15pm	1570542003	Simulation of Charged Air Cooling System with Air Conditioner Refrigerant
2.30pm	1570544332	Energy Efficient Operation of Light Rail Transit (LRT) System for Kelana Jaya Line Via Train Headway Time: A Malaysia Case Study
2.45pm	1570544361	Energy Efficient Bandgap Reference Generator for RFID Transponder EEPROM 130 nm CMOS Process
3.00pm	1570544427	Potential Electricity Bills Savings Based on Customer Load Profile with Solar PV: A Case Study
3.15pm	1570549082	Demand Response Programs in Conventional and Smart Grid Electricity Networks: a Review on Chronological Development in Different Regions
3.30pm	1570549617	Cooling Load Calculation for Efficient Cold Storage of Fresh-cut Yam Bean
3.45pm	1570457075	Evaluation of Energy Efficiency and Economic Impact of the application of Air Conditioning in Governmental Building

Parallel session 5(10th July 2019: 2.00-4.00pm) – Applications of Artificial Intelligence I

Venue: Mrlati II

Time slot	Paper ID	Paper Title
2.00pm	1570538402	Application of artificial neural networks on analysis of gas hydrates in pipelines
2.15pm	1570539439	Methods for Forecast Water Used and Electricity Produced At Hydropower Plant
2.30pm	1570540878	Improving Day-Ahead Load Forecasting using Fuzzy Interference System
2.45pm	1570543895	Extreme Learning Machine with Multi-Agent System for Data Regression
3.00pm	1570544161	Genetic Rules Induction Fuzzy Inference System for Classification and Regression Application in Energy Industry
3.15pm	1570549098	Distracted Driver Detection with Deep Convolutional Neural Network
3.30pm	1570549320	Malaysian Traffic Sign Recognition using Pretrained Deep Convolutional Neural Networks
3.45pm	1570550418	Malaysian Sign Gesture Recognition with Deep Learning

Parallel session 6(10th July 2019: 2.00-4.00pm) – High Voltage / Lightning / Electromagnetics I

Venue: Melati III

Time slot	Paper ID	Paper Title
2.00pm	1570547239	Life Cycle Cost Estimation of Distribution Transformer Failure from Life Data Analysis
2.15pm	1570543863	Condition Monitoring Through Temperature, Vibration and Radio Frequency Emission: A Review
2.30pm	1570550883	The Impact of Geomagnetically Induced Current on Single- Phase Saturable Transformer
2.45pm	1570552373	Performance of Clustering Techniques of Multiple Partial Discharge Sources in High Voltage Transformer Windings
3.00pm	1570551022	Assessment of Electric and Magnetic Fields Exposures for Different Types of Street Lights
3.15pm	1570551265	Design and Evaluation of Finite and Small Antennas at 0.97 GHz for Lightning Remote Sensing
3.30pm	1570551280	Temporal Analysis of Microwave Radiation Emitted by Stepped Leaders of a Cloud-to-Ground Flash
3.45pm	1570551291	The evaluation of parallel plate antenna with variation of air gap separation and copper plate area

Parallel session 7(10th July 2019: 4.15-6.00pm) – Applied Sciences & Materials I

Venue: Dahlia II

Time slot	Paper ID	Paper Title
4.15pm	1570550496	High Efficiency CdTe Thin Film Solar Cells with CdSe as a Prospective Window Layer from Numerical Optimization
4.30pm	1570550515	Impact of Back Surface Field (BSF) Layers in Cadmium Telluride (CdTe) Solar Cells from Numerical Analysis
4.45pm	1570543437	Unidirectional ring cavity Raman fiber laser with continuous wave operation for the potential integration in optical communication system
5.00pm	1570556839	Performance Analysis of Gallium Arsenide (GaAs) Based Solar Cells from Numerical Simulation
5.15pm	1570550907	Impact of Electron Irradiation on Transition Temperature of Pb-Substituted Bi-2223 Superconductor
5.30pm	1570550900	Antibacterial effect of the ethanolic leave extracts of Musa paradisiaca, Musa acuminata and Musa sapientum against MSSA and MRSA
5.45pm	1570551087	Antibacterial activity of Cymbopogon citratus against clinically important bacteria

Parallel session 8(10th July 2019: 4.15-6.00pm) – Applied Sciences & Materials II

Venue: Dahlia III

Time slot	Paper ID	Paper Title
4.15pm	1570537596	Density Measurement of Aqueous Tetraethylammonium Bromide and Tetraethylammonium Iodide Solutions at Different Temperatures and Concentrations
4.30pm	1570545758	Latent Heat Storage For Hot Beverages
4.45pm	1570545363	Effect of Pb exposure towards green microalgae, Chlorella vulgaris, on the changes of physicochemical parameters in water
5.00pm	1570550481	Using Cyanobacteria as Bioindicator for Heavy Metals in Aquatic Environment
5.15pm	1570550926	Current technology on nutrients removal, recovery and reuse from liquid fraction of digestate
5.30pm	1570560442	Water absorption properties of kenaf/glass reinforced unsaturated polyester composites used in insulator rods
5.45pm	1570550181	The Effect of Acid Treatment on the Characteristics and Physical Properties of Limestone for Calcium Looping Process

Parallel session 9(10th July 2019: 4.15-6.00pm) – Applied Sciences & Materials III

Venue: Dahlia IV

Time slot	Paper ID	Paper Title
4.15pm	1570540227	Completion time of CH4 hydrate formation in the presence of copper nanofluid
4.30pm	1570541035	The Effect of EMIM-Cl Water Based Mud on Methane Hydrate Phase Behaviour
4.45pm	1570541732	COSMO-RS Based Estimations Of Biomolecules For Gas Hydrate Application
5.00pm	1570542527	Evaluation of Hydrate Phase Boundary for Natural Gas Mixture with High CO2 content through Simulation Approach
5.15pm	1570550753	Chemical composition analysis of furanic compounds in transformer oil for preventive maintenance of power transformer
5.30pm	1570543884	Tetraethylammonium Acetate Based Deep Eutectic Solvents for Thermodynamic Gas Hydrate Inhibition
5.45pm	1570553657	A Review on Various Concentration Testing of an Essential Oil (Eucalyptus) to Knock Down Mosquitoes

Parallel session 10(10th July 2019: 4.15-6.00pm) – Applied Sciences & Materials IV

Venue: Melati I

Time slot	Paper ID	Paper Title
4.15pm	1570551072	Room Temperature Synthesis and Characterizations of Copper-based Metal-Organic Framework (Cu-MOF) using Natural Polysaccharide as Potential Organic Linker
4.30pm	1570552585	Evaluation Residual Stress Relaxation Induced by Shot Peening Parameters and Its Effect on Fatigue of 2024-T351 Aluminum Alloy
4.45pm	1570477051	The Influence of Soil Characteristics on Hydraulic Performance in Bioretention System
5.00pm	1570539341	Investigation of Nonionic Surfactants as Corrosion Inhibitors for C-Steel in HCL Medium
5.15pm	1570550963	Effect of heat exposure time on microstructures of CoNiCrAlY-2 wt.% Al2O3 powders by facile suspension route synthesis
5.30pm	1570550702	Flexural and Shear Bond Strength of Sediment Brick Masonry
5.45pm	1570551276	Effects of Reclaimed Asphalt Content (RAP) on Strength Properties of Emulsion Stabilized Mix

Parallel session 11(10th July 2019: 4.15-6.00pm) – Green / Smart Buildings I

Venue: Melati II

Time slot	Paper ID	Paper Title
4.15pm	1570539816	Building Energy Utilization Using LED Occupant Sensing System
4.30pm	1570539840	Investigation of Building Energy Management Toward Minimizing Energy Consumption and Carbon Emission
4.45pm	1570539920	Impact of electrical energy consumption and occupancy in university building
5.00pm	1570542291	Intelligent Home Automation System for Disable People
5.15pm	1570543860	Building Energy Efficiency (BEE): A Review on Conventional and Unconventional Techniques
5.30pm	1570549910	Feasibility Study of Hybrid Renewable Energy System Design for a Typical High-Rise Building in Malaysia
5.45pm	1570544714	Thermal Properties of Beef Tallow/Coconut Oil Bio PCM Using T-History Method for Wall Building Applications

Parallel session 12(10th July 2019: 4.15-6.00pm) – Green / Smart Buildings II

Venue: Melati III

Time slot	Paper ID	Paper Title
4.15pm	1570544811	Opportunities for the Development of Rooftop Solar electricity in Vietnam
4.30pm	1570548094	Finite element study in distortion energy and stress-strain analysis in creep test rig of full-scale crossarm
4.45pm	1570550785	Numerical Modelling of Glass Fiber Reinforced Polymer (GFRP) Cross Arm
5.00pm	1570550788	Design Enhancement of Glass Fiber Reinforced Polymer (GFRP) Cross Arm
5.15pm	1570539169	A review of performance of green roof integrated solar photovoltaic system
5.30pm	1570542205	Crashworthiness Design for Trapezoid Origami Crash Structure
5.45pm	1570542389	The Effect of Superplasticizer on Performance of Roller Compacted Concrete Pavement Containing High Volume Fly Ash

Parallel session 13(11th July 2019: 9.00-10.30am) – Biomass / Bioenergy

Venue: Dahlia II

Time slot	Paper ID	Paper Title
9.00am	1570540858	Callophyllum Inophyllum as Biodiesel Feedstock in Malaysia: Potential and Challenges
9.15am	1570549513	Talking Points of Green and Sustainable Palm Oil Mill System in Malaysia
9.30am	1570550791	Physiochemical Properties Evaluation of Calophyllum Inophyllum Biodiesel for Gas Turbine Application
9.45am	1570554019	Energy Saving Potential Using Elite Jatropha curcas Hybrid for Biodiesel Production in Malaysia
10.00am	1570554022	Optimization of Biodiesel Production from Mixed Ceiba Pentandra and Rice Bran Oil Assisted by Ultrasound
10.15am	1570537024	Acoustic Properties of Mixing Empty Fruit Bunch and Oil Palm Frond Natural Fibres

Parallel session 14(11th July 2019: 9.00-10.30am) – Optimizations in Power-related Applications

Venue: Dahlia III

Time slot	Paper ID	Paper Title
9.00am	1570543293	Electricity Tariff Structure Optimization
9.15am	1570546134	Analyzing Awareness Impact on Motivation with Satisfaction as Moderator: A PLS - SEM Approach
9.30am	1570549196	Optimal Placement and Sizing of Distributed Generation in Distribution System Using Analytical Approach
9.45am	1570551217	Swarm Intelligence Approach for Multi-Objective Oscillation Stability Enhancement
10.00am	1570551463	Some optimized energy and SLA-aware virtual machine placement strategies: study
10.15am	1570556707	Optimal Placement and Sizing of Multiple DG in Microgrid Systems: A review

Parallel session 15(11th July 2019: 9.00-10.30am) – Waste Management Syetems

Venue: Dahlia IV

Time slot	Paper ID	Paper Title
9.00am	1570550905	Characterization Studies on Iranian Agriculture Waste Via Thermogravimetric Analysis (TGA) as a Feedstock for Energy Recovery
9.15am	1570551180	Waste to Energy Production from Agricultural Waste of Paddy (Oryza sativa) Industry in Malaysia: Life Cycle Cost Analysis
9.30am	1570540257	Effect of lightweight waste-based aggregate on lightweight concrete
9.45am	1570550648	Effect of combined drink cans and steel fibers on the impact resistance and mechanical properties of concrete
10.00am	1570558047	Minimize Effluents of Aeration Process in Wastewater Treatment Plant
10.15am	1570562810	Estimating Arsenic Concentration In Compost Production Using Ann Model

Parallel session 16(11th July 2019: 9.00-10.30am) – IoT-related Applications

Venue: Melati I

Time slot	Paper ID	Paper Title
9.00am	1570549618	An Intelligent Following Sensor Shopping Cart
9.15am	1570550514	Design, Simulation and Fabrication of Quadrupedal Robot integrated using Five-Jointed Legs with Suspension Spring
9.30am	1570550670	Design and Dimensional Analysis of Interdigital Sensor For Blood Glucose Measurement Through NonInvasive Process
9.45am	1570557476	A Multi Platform for Utility using OpenFMBTM Reference Architecture: Challenges and Lessons Learned
10.00am	1570538928	SMART Water Quality IoT-Based System for Healthy Living
10.15am	1570550492	Microcontroller Based Portable Anemometer for Wind Monitoring System

Parallel session 17(11th July 2019: 9.00-10.30am) – Applications of Artificial Intelligence II

Venue: Melati II

Time slot	Paper ID	Paper Title
9.00am	1570546032	An Ensemble Classifier based Power Quality Disturbances Classification
9.15am	1570546410	Load Restoration in Distribution System by Using Minimum Spanning Tree - Prim's Algorithm
9.30am	1570549337	A Comparative Performance Evaluation of Neural Network Based State of Charge Estimation Algorithms for Lithium-ion battery
9.45am	1570550213	Comparative Study of Different Fault Features in Distribution System based on Wavelet Transform
10.00am	1570550641	Malicious Vehicle Detection Based on Beta Reputation and Trust Management for Secure Communication in Smart Automotive Cars Network
10.15am	1570552648	Early Fault Detection in Bearing with Fault Seeded on Outer Raceway at Three Different Positions: Orthogonal, Centered and Opposite

Parallel session 18(11th July 2019: 9.00-10.30am) – High Voltage / Lightning / Electromagnetics II

Venue: Melati III

Time slot	Paper ID	Paper Title
9.00am	1570550096	Fault Detection of a Medium Voltage Cable Joint Using Support Vector Machine Algorithm
9.15am	1570550137	Failure Region Estimation of Linear Voltage Regulator Using Circuit Model-Based Virtual Sensing
9.30am	1570539465	Evaluation of Transient Response of Different Earthing Configurations due to Lightning Impulses
9.45am	1570549197	The Electrical Behaviour of a Medium Voltage Polymer Insulator with Deposited Moss Layer on the Surface
10.00am	1570550285	Fault Analysis of HVDC Converter Based on Alternate Arm Converter Topology
10.15am	1570554248	Numerical Simulation of Charge Accumulation and Transport within Cross-Linked Polyethylene (XLPE) subjected to High Electrical Stresses

Parallel session 19(11th July 2019: 10.45am-12.30pm) – Sustainable Environment & Health I

Venue: Dahlia II

Time slot	Paper ID	Paper Title
10.45am	1570550476	Flood Risk Prediction for a Hydropower System Using Artificial Neural Network
11.00am	1570546439	Stormwater and Drainage Master Plan and Formulation of Best Management Practices for Cameron Highlands
11.15am	1570543458	Water Quality Index Score in River Water Treatment at Upper Klang and Gombak River Catchment
11.30am	1570546356	Fishermen's Perspectives and options for maintaining fishery production in the West Coast of the peninsular Malaysia
11.45am	1570547115	Landslide Susceptibility Modelling for Agricultural Activities in Hilly Areas
12.00pm	1570547181	Erosion and Sediment Control Best Management Practices in Agricultural Farms for Effective Reservoir Sedimentation Management at Cameron Highlands
12.15pm	1570552363	The Usage of Agent Based Model in Flood Evacuation due to Dam Related Disaster

Parallel session 20(11th July 2019: 10.45am-12.30pm) – Sustainable Environment & Health II

Venue: Dahlia III

Time slot	Paper ID	Paper Title
10.45am	1570550782	Perception of Graduates on University's Reputation (change title)
11.00am	1570550833	An Assessment of Green Quality of Work Life Dimensions: A Study at Public Institutions in Malaysia
11.15am	1570553645	Design and Development of Toilet Cistern with Tipping Mechanism for Quick Replacement
11.30am	1570535963	Smart Tyres: An Environmental-Friendly Solution to Road Accidents
11.45am	1570538930	Development of Environmental Accounting and Reporting Practices of Listed Companies
12.00pm	1570540267	Comparison of microwave-assisted extraction DLLME with conventional DLLME for the determination of PAHs in vegetables
12.15pm	1570541992	What Do We Know About Intention to Discard Single-Use Plastic? Empirical Evidence in Malaysia

Parallel session 21(11th July 2019: 10.45am-12.30pm) – Power Electronics & Telecommunications

Venue: Dahlia IV

Time slot	Paper ID	Paper Title
10.45am	1570546120	An estimation of the coupling coefficient of the series-to-series inductive resonant wireless power transfer coils
11.00am	1570551074	The load reliant power transfer of the series-to-series inductive resonant wireless power transfer
11.15am	1570552660	Design of Three Levels Electric Vehicle Charger Integrated PV System
11.30am	1570546483	Performance Evaluation of Wireless Router Testbed Using Raspberry Pi
11.45am	1570548149	Wireless Monitoring and Control of Automotive Battery using Mobile Application
12.00pm	1570550834	Optimisation of Directivity and Gain Performances on Circular Patch Antenna Design for 2.4GHz Applications
12.15pm	1570550987	Design an Ultra-Wide band Modified Wilkinson Power Divider Fed Balanced Antipodal Vivaldi Antenna Array

Parallel session 22(11th July 2019: 10.45am-12.30pm) – Energy Scavenging

Venue:Melati I

Time slot	Paper ID	Paper Title
10.45am	1570545113	Development Of Hybrid Contact Mode Triboelectric And Electromagnetic Energy Harvester
11.00am	1570550103	Developing a Hydropower Vortex Induced Vibration System in Slow Stream Water
11.15am	1570550640	Energy Harvesting From Piezoelectric Cantilever Beam with Different Shapes: A Review
11.30am	1570550727	Harvesting Sustainable Energy From Saltwater: Part II - Effect of Electrode Geometry
11.45am	1570550819	Design and Analysis of an Elliptical Patch Antenna for RF Energy Harvesting Application in 2.4 GHz Frequency band
12.00pm	1570550860	Orthogonal Piezoelectric Energy Harvester for Low Frequency Applications: Modeling and Experimental Validation
12.15pm	1570554009	Prototype Development Of Traffic Calming Solution: Replacing Speed Hump To Roller Electricity Generator Road

Parallel session 23(11th July 2019: 10.45am-12.30pm) – Energy & Environment Policies I

Venue: Melati II

Time slot	Paper ID	Paper Title
10.45am	1570534842	Standards and Requirements for the Development of Battery Energy Storage System (BESS) based Virtual Power Plant (VPP)
11.00am	1570540196	Development of Digital Hub to Inculcate Knowledge Sharing for Energy Company in Malaysia: A Pilot Study
11.15am	1570547317	Time of Use Period Determination for Residential Customers in Peninsular Malaysia: A Case Study
11.30am	1570550220	Role of Social Sciences in Fostering Renewable Energy Technologies Development
11.45am	1570552634	Electricity supply industry reform in Malaysia: Current state and way forward
12.00pm	1570551131	Renewable Energy and Energy Security in Malaysia
12.15pm	1570556841	The Effect of FDI on Renewable Energy Consumption in Malaysia

Parallel session 24(11th July 2019: 10.45am-12.30pm) – Energy & Environment Policies II

Venue: Melati III

Time slot	Paper ID	Paper Title
10.45am	1570521625	Dynamic Panel Oil Demand in Asia- Pacific: Comparative Impact of Developing and Developed Countries
11.00am	1570550439	Technical and Economic Feasibility Study of Solar Powered Air Conditioners in Brunei Darussalam
11.15am	1570542278	Highlighting the Dynamic Links between Economics Growth, Energy Use and Environmental Degradation in Afghanistan: Policy Implications for Afghanistan
11.30am	1570545891	Implementation of Effective Public Outreach Program (POP) in Cameron Highlands
11.45am	1570546723	The Local Public Policy with Planetary Health
12.00pm	1570551179	Design and Development of a Carbon Footprint Calculation Model for Universiti Tenaga Nasional
12.15pm	1570552423	Application of sustainable transport policies in areas of high frequent density Campus of Jadiriya - case study

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Paper ID: 1570457075

Evaluation of Energy Efficiency and Economic Impact of the application of Air Conditioning in Governmental Building

Abdel Rahman Kamel Al-Qawasmi

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Abstract: This paper investigates the energy efficiency and the economic impact provided by air conditioning in KSA governmental building (Majmaah University Administrative Building MUAB). The effect of air-conditioning parameters (including temperature, relative humidity and air velocity) and deposition dust on microbial growth in supply air duct, a complete test facility. The study evaluated under the request by the Scientific Research Deanship in Majmaah. Based on results, the old conditioners will be replaced for 113 rooms in three floors of the MUAB. The applied methodology uses Wireless Sensor and Actuator Networks (WSAN) for sensing and measuring technique characteristics of the conditioners and compare them with the available on the market, which were selected according to according to ASHRAE Standard 62.1-2007 specified by manufacturers [1]. Conditioning technician's results shows that conditioners with the same electric power presents different cooling performance. Electric parameters analysis demonstrate that operational conditioners have greater electric consumption and power factor comparing to the known standards. Replacing actions implemented in the MUAB, provided a saving of 10% in the average consumption of electric energy

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Paper ID: 1570477051

The Influence of Soil Characteristics on Hydraulic Performance in Bioretention System

Husna Takaijudin, Dato' Aminuddin Ab Ghani

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Abstract: The performance of a bioretention system to infiltrate the storm water runoff into the system and discharge the water to the required volume depends on its hydraulic characteristics and physical properties of the soil media. This study will determine the soil properties for selected soil media used in the bioretention system and examine the influence of soil properties on hydraulic performance of bioretention system by having different configuration of soil mix design. Soil configurations that were assessed in this study are the 50-90% sand and 10-50% topsoil by weight. The determination of hydraulic characteristics for each configuration was conducted by standard permeability test. The measured Ksat data for each soil mixtures were compared with previous studies. The Ksat increases as the proportion of the topsoil reduces in the soil configuration. The Ksat of 50S/50T, 60S/40T, 70S/30T, 80S/20T and 90S/10T soil configurations are 107.2 mm/hr, 244.8 mm/hr, 569.67 mm/hr, 765.36mm/hr and 1751.64 mm/hr respectively. It was found that the plotted data are fitted well to the best-fit line by using Breyer empirical formula as compared to Hazen and Kozeny-Carman formula. This indicated that a strong relationship between Ksat and soil properties mainly effective grain size (D10), n and Coefficient of Uniformity, (CU). This study also recommended the 50-60% sand and 40-50% topsoil of soil configuration for the bioretention design having the Ksat between 14 - 150 mm/hr met with the parameter required by local guidelines.

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Paper ID: 1570484476

Effect of Radiation Shield Parameter on Rowen's Model Performance for Dry-Low Emission Gas Turbine Representation

Madiah Binti Omar, Rosdiazli Ibrahim, Mohd Faris Abdullah, Mohammad Haizad Mohd Tarik

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Abstract: Eventhough renewable energy is the latest trend in the century, it is still unreliable due to intermittent resources and the distance from the consumer. Thus, a conventional way of producing energy such as gas turbine, has been upgraded to operate in almost zero emission to the atmosphere and called as Dry-Low Emission (DLE) gas turbine. Although Rowen's model is well established for a gas turbine model representation, the DLE representation is limited and not covered in the study. All 24 parameters of the turbine are simulated and it is found that, radiation shield parameter contributes a very high deviation of the result with the actual value. Thus, this paper aims to highlight the effect of the radiation shield parameter on Rowen's model performance for DLE gas turbine representation. It is found that, the DLE model experienced a drop in maintaining at 1p.u, which is the ideal operation, but the speed of the turbine managed to goes back to 1p.u after the significant drop in the system.

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Paper ID: 1570521625

Dynamic Panel Oil Demand in Asia- Pacific: Comparative Impact of Developing and Developed Countries

Aliasuddin Aliasuddin

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Abstract: This study contributes to the literature by supplying empirical evidence on demand elasticities for crude oil in the Asia-Pacific region. This study employs annual data of 11 developing countries and from 5 developed countries in the region. Using an asymmetric fixed effect model shows that GDP has a positive relationship and oil prices has a negative relationship with oil demand in all countries in the sample. Results from the Slutsky equation shows that the difference in magnitude of income elasticities of demand between developed and developing countries is 1.15. While the substitution effect due to crude oil price shock affects is 3.87 times stronger in developed countries than that of developing countries. Policy implication of this result is that all nations should gradually reduce oil consumption and substitute to renewable energy sources.

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Standards and Requirements for the Development of Battery Energy Storage System (BESS) based Virtual Power Plant (VPP)

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Abstract: The utility world has changed drastically over the last few years. New technologies like Battery Energy Storage System (BESS) and Virtual Power Plant (VPP) have made large inroads into the utility space and no one should want to be left behind. VPP is a combination of renewable sources, Battery Energy Storage System (BESS), solar Photovoltaic (PV) and other interruptible that can supply market needs as a single power plant. VPP is also a concept which includes a network of energy storages and/or distributed generation resources within an area often at the distribution side, linked together to meet utility and consumer challenges such as reduction of maximum demand, energy arbitrage, spinning reserve, frequency regulation, forecasting of sufficient supply to meet the demand, and reducing intermittency of renewable resources. With the current trend of increasing penetration of Renewable Energy (RE) such as solar energy and wind, the use of energy storage is very crucial in ensuring the stability and flexibility of the grid system. Penetration of RE in the power system is not a concern when the percentage is less than 10% but it will be significant once it reaches 20% of the total power generation.

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Smart Tyres: An Environmental-Friendly Solution to Road Accidents

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Abstract: The absence of the tyres monitoring system on vehicle has caused difficulty for driver to check the pressure and temperature of the tyres in real time. Besides that, due to the large geographical area of rural area where the distribution of petrol station with air pump might not be equally distributed, certain area is hard to access air pump. The abnormal pressure and increases in temperature on tyre lead to longer braking distance, tyre blowouts and related issues. The paper describes the deployment of IoT sensors for monitoring application in tyres and data is accessible on mobile app. This monitoring system consists of 2 sensors to measure the temperature and pressure of the tyre using ESP32 microcontroller board and uploaded into the cloud platform using Wi-Fi technology. While Blynk the mobile app is designed to collect the informative data from the cloud platform and the data is represented in graphical representation using open source Cloud platform. It is made available for real-time monitoring data. Apart from that, this system also incorporates alert system to provide a scalable monitoring system as well as alerting the user for any abnormal reading of the tyre.

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Acoustic Properties of Mixing Empty Fruit Bunch and Oil Palm Frond Natural Fibres

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Abstract: Natural fibre is being studied and used as sound absorber for its promising acoustic properties. For instance, Germany have commercial plants that are producing sound absorbers from natural fibre. Natural fibre is eco-friendly and has no harm on human health. This research reported the acoustic properties in different mixing ratio of natural fibres of empty fruit bunch (EFB) (50 %) and oil palm frond (OPF) (50 %). By using the palm biomass, the great saving on raw material cost during the fabrication. Four different thickness of different mixing ratio of EFB and OPF natural fibres have been fabricated (12 mm, 14 mm, 16 mm and 18 mm) to low density fibreboards (LDF) (120 kg/m3). The Sound Absorption Coefficient (SAC) was tested by using the Impedance Tube Method (ITM) according to ASTM E1050-98 standards at frequency from 0 Hz to 6400 Hz. The results show the values of SAC for all samples increase with increasing in thickness from frequency range of 0 Hz - 4500 Hz. Moreover, SAC values for all sample are found above 0.80 in frequency range of 4000 Hz to 6400 Hz. Sample with thickness 14 mm and 16 mm possess SAC values above 0.90 in frequency range of 4000 Hz - 6000 Hz. In addition, sample with thickness of 14 mm almost reach unity (~0.99) at frequency range of 5500 Hz to 6400 Hz. It is noteworthy that the LDF with thickness of 16 mm and 18 mm possess the SAC values of 0.8 and above at a wider frequency range, which is from 2500 Hz to 6400 Hz. Therefore, LDF with thickness of 16 mm and 18 mm can be classified as Class A sound absorbing material according to sound absorption classes table within the frequency range of 2500 Hz - 6400 Hz. The findings show the mixing of EFP and OPF natural fibres has a very promising and excellent performance in acoustic properties.

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Density Measurement of Aqueous Tetraethylammonium Bromide and Tetraethylammonium Iodide Solutions at Different Temperatures and Concentrations

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Abstract: In the flow assurance issues, compatible corrosion suppressor and hydrate inhibitor formulations are often difficult to put together, as the presence of one often has an adverse effect on the performance of another. Quaternary Ammonium Salts (QAS) show the property to be green hydrate and corrosion inhibitor. As the chemical has dual functioning property, it will be very sustainable application. Thermophysical property of the chemicals is necessary for characterization prior to application in the oil and gas pipelines. This paper discusses the density of Tetraethylammonium Bromide (TEAB) and Tetraethylammonium Iodide (TEAI) as the preliminary screening steps before implementing them in pipeline conditions. Densities of aqueous TEAB and TEAI solutions (0.5, 1.0, 2.5, 5.0 and 10.0 wt %) were investigated over a temperature range of 293.15 to 313.15 K and at atmospheric pressure. The relationship of density with temperature and concentration are discussed. For further analysis, molar volume of the solutions with respect to the temperature is calculated from the experimental value of the density.

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Performance Analysis of Memristor Based Ring Oscillators True Random Number Generator for Energy Technology

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Abstract: We are living in an era where everything is trying to be more connected in terms of the different physical entities and its surrounding environment. This new concept that is developing called the Internet of Things (IoT) has garnered a lot of attention [1]. There are a lot of applications and smart objects associates with the IoT and this leads to an increase in security challenges. IoT security is very important but getting harder to achieve. One example of utilization of IoT is in the smart grid infrastructure and this in turn increases the need for network security. An integrated internet-based smart grid and energy resources also called Energy Internet (EI) has a lot of security challenges that comes with the current smart grid [2].This paper presents a True Random Number Generator that uses memristor based ring oscillators in the design. The memristor based ring oscillators TRNG has great potential to be used for hardware security purposes. TRNGs uses samples of non-deterministic sources and gives an advantage of producing true randomness in applications of IoT that makes it secure. The designs are implemented in 0.18 µm complementary metal oxide semiconductor (CMOS) technology using LT SPICE IV. The proposed TRNG design produced output that passed 10 out of the 15 NIST tests, therefore showed that the TRNG produce a fairly random output.

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Application of artificial neural networks on analysis of gas hydrates in pipelines

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Abstract: In Transportation or transmission of Deepwater hydrocarbon transportation pipeline, the hydrocarbon flow can decrease due to the growth of gas hydrates which lead to additional operational cost and time constraints. The monitoring of Deepwater transmission pipelines is quite crucial as they are operated at high pressures and low temperatures. So, the risk of Gas hydrate formation conditions is highly prevalent and pose a major operational and safety challenge. In recent times, Artificial Neural Network (ANN) is very critically used over the research of hydrates because of its pros of high data simulation capacity and accurate curve fitting nature. Therefore, the aim of this work is to provide the latest review on application of Artificial. Neural Network (ANN) in the prediction of gas hydrate formation in Deepwater gas pipelines. Moreover, this study potentially paves the way for the knowledge of latest research carrying out in the prediction of gas hydrates which also helps in the development of advanced algorithms with respect to the work mentioned or discussed here.

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SMART Water Quality IoT-Based System for Healthy Living

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Abstract: In order to avoid the risk of drinking contaminated water, the information of drinking water quality must be available in real time. This paper presents the design and development of a real time monitoring system of drinking water quality using Internet of Thing (IoT). Several sensors IoT water sensors are used to measure and validate the water quality parameter values. These parameters include pH, turbidity and oxidation-reduction potential (ORP). The sensors are connected through an Arduino UNO controller. The Arduino UNO controller reads and sends sensor parameter values to an android mobile application which displays the measurements and concludes whether the quality of the water is safe to be drinkable or not.

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Development of Environmental Accounting and Reporting Practices of Listed Companies

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Abstract: There are several of optimization methods that have been studied by many researchers in order to ensure the efficiency companies in Malaysia now are moving toward to The Malaysia Development Plan and Vision 2020 which is targeting for the country to become a developed nation and focuses on the aspect of environmental sustainability. From the previous literatures, a sustainability report presents the organization's values and governance model, and demonstrates the link between its strategy and its commitment to a sustainable global economy. It also recognize under intellectual capital. Overall, the results of the study indicate that corporate managers have taken positive steps in implement environmental reporting practices. The results also disclose that companies engage in environmental reporting to enhance their corporate image.

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A review of performance of green roof integrated solar photovoltaic system

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Abstract: Green (vegetated) roofs and solar photovoltaics are among a range of solutions intended to meet environmental sustainability targets and transition to low-carbon communities. In urban environments, they are means to integrate onsite stormwater management and renewable energy. Research shows that the evaporative cooling from green roofs helps to keep photovoltaics near best operational temperature, while proving that vegetation can survive under variable shade and precipitation conditions. The objectives of this review paper are to synthesize the effects of the influential factors, including solar photovoltaic and green roof design, on solar power output efficiency. The review emphasises knowledge gap that prevail in green roof integrated solar photovoltaics system and highlights the desirable characteristics for each of these components. The review also suggests a guideline to construct practical green roofs integrated solar photovoltaics system. Some recommendations for future study are also proposed.

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Investigation of Nonionic Surfactants as Corrosion Inhibitors for C-Steel in HCL Medium

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Abstract: The utilization of surfactants is one of the several means for protecting a metallic surface from electrochemical oxidation or corrosion. The amphiphilic nature of these surfactants encourages the preparation of a self-protective layer on the metallic surface, adequately reducing the area of contact between the liquids and the metal, therefore preventing corrosion. Cationic surfactants like CTAB (Cetyltrimethylammonium bromide) has been most frequently used as a corrosion inhibitor, yet since it isn't eco-friendly its utilization has been depressed. As a substitute, the utilization of non-ionic surfactants like TritonX100, Tween 20, Tween 80 and Brij35 which are considerably more eco-friendly were observed as inhibitors. Carbon steel, a usual material of construction of mechanical vessels and equipment's, in interaction with hydrochloric acid (HCl) was used to deliberate their mechanism of action. The non-ionic surfactants indicated inhibition efficiencies around 91-92%, which is extremely nearer to that of CTAB (97%) at concentrations of 300-500 ppm with 1M HCl at 30°C. Tween20 and Tween80 demonstrated closer outcomes nearer to CTAB, intently pursued by TritonX100, while Brij35 slacked. The inhibiting effect of Tween 80 on corrosion of steel in 1M HCl was studied by weight loss technique. Meanwhile the concentrations of the non-ionic surfactants utilized are in ppm (parts per million), their utilization in coatings for carbon steel equipment is exceptionally cost-effective and is an exceptionally worthy substitute to CTAB.

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Methods for Forecast Water Used and Electricity Produced At Hydropower Plant

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Abstract: An energy system in a country has complex impacts on its economy. A retrenchment of energy supply influences economic activity such as distribution and saving of energy, as well as changes in technology to emphasize energy efficiency. Despite the advantages of hydropower developments in power generation over the past decades, highly controversial issues due to various social and environmental concerns are still debatable. A challenge for hydropower developers and operators, as well as government planners and regulators, is to develop tools that promote good practice and sustainable hydropower projects in energy security. In the future, both the scarcity of water and the cost of energy will likely to become limiting factors for economic and population growth, particularly in Malaysia, where the population is projected to grow dramatically. Various climate change models suggested that clean water supplies may decrease significantly. Therefore, integrated planning between the energy and water sectors will be essential to meet the rising demands of both resources. The purpose of this study is to review and identify the method that can deal with historical data and current practices at the hydropower plants to predict future electricity production due to the predicted water used in hydropower plants at the study areas. Various available methods to forecast water used and the electricity generated in hydropower plants have been identified and discussed in this paper.

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Evaluation of Transient Response of Different Earthing Configurations due to Lightning Impulses

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Abstract: Earthing system is very important in order to protect the electrical equipment as well as the human's safety against overvoltages. The main function of earthing system is to remove unwanted excessive electrical currents caused by unusual conditions such as fault and lightning or switching overvoltages by providing a low resistance path to the earth. Researchers had studied on the behaviour of earthing system to improve its performance for the past few years. There are few factors that influence the performance of the earthing system such as soil resistivity and soil ionization which need to be focused in order to improve the earthing. Thus, this paper evaluates on the factors that affect the behaviour of earthing system based on simulation works using MATLAB and Safe Grid Software. Some analytical calculations are used to obtain the soil resistivity and resistance as well as the touch and step voltages. The simulation results were validated based on comparison with other studies on the factors that influence the earthing system performance. The results reveal that the variation of soil resistivity, the configuration of electrodes, current magnitude and frequency dependence can result in a change of transient response of the systems.

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Building Energy Utilization Using LED Occupant Sensing System

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Abstract: To meet environmental-friendly requirements, Building Energy Management Systems (BEMS) is required for energy consumption monitoring and management. A new energy saving method based on BEMS is proposed in this paper. The proposed method is a smart LED lighting system based on an Arduino microcontroller, a simple motion sensor, and a camera. A complete design and implementation of the smart lighting system is presented in the paper. In addition, the proposed smart system is validated in the paper under various experimental conditions. The results show that simple installation of commercially available motion sensors and cameras can contribute significantly to reduce the electricity bill and CO2 emission.

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Investigation of Building Energy Management Toward Minimizing Energy Consumption and Carbon Emission

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Abstract: Up to 20% of the world's total energy is used for lighting. Thus, one of the available solution for minimizing energy consumption is by using smart lighting system. In the smart lighting system, the lights are calibrated according to space occupation and the outside natural lighting condition. Accordingly, this paper investigates the impact of using smart lighting systems on the amount of energy consumption and carbon emission reduction. Seven days' electricity consumption in the building of the College of Engineering (COE) at the Universiti Tenaga Nasional (UNITEN) was measured, these data were then used for the investigation in this paper. Based on the calculated results, up to 85% energy saving, carbon emission reduction, and bill saving can be obtained with using LED-based smart lighting system.

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Impact of electrical energy consumption and occupancy in university building

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Abstract: Energy wastage tends to occur in Malaysian Universities mainly due to inefficient use of energy and lack of awareness among the building occupancy. Most of the energy consumption are from the operation of HVAC and lighting system. However, the energy consumption remains the same during final exam week and semester break even though the occupancy in the college is low. This mainly due to the lack of ignorance and awareness in managing the electrical energy consumption of the buildings. Coupled with the hike in electricity bills to the University, therefore it is important that swift actions can be taken to reduce the bills via energy efficiency measures. This paper highlights preliminary results of the electrical energy consumption for 3 blocks in College of Engineering (COE), Universiti Tenaga Nasional (UNITEN). This paper also identifies potential areas of energy saving in those blocks. Finally, suggest ways to improve electrical energy usage of those buildings. This study indicates that by implementing no cost measurement into COE buildings, the university can save up to 40% of annual electrical bills.

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Design and Development of Smart Solar Grass Gutter

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Abstract: From time immemorial, the sun has been the major source of energy for life on earth and most of the energy used only for heat and lighting. Thus, to make it make it more useful or maximize the usage of this energy, sunlight can be used as the source of energy for renewable energy. Ever since the industrial revolutions' human has been dependent on fuels for electricity or source of energy, this project is using other alternative which is using renewable energy. The design and development of Smart Solar Grass cutter is using solar energy as the primary source as it can be used directly with the presence of solar panel. In addition, the use of solar may reduce air pollution. In this new era, it is suitable to integrate the technologies into daily life. Thus, smartphone is used in this project and acts as remote controller to control this Smart Solar Grass Cutter which is using Arduino UNO as the brain of the system.

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Development of Digital Hub to Inculcate Knowledge Sharing for Energy Company in Malaysia: A Pilot Study

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Abstract: Knowledge sharing practices, argued to be able to improve organizational performance and achieve competitive advantage for power utility company in Malaysia, is often not induced successfully. How energy sector in Malaysia should get the encouragement of using digital hub to inculcate knowledge sharing practices is still an important research question. This study proposes and examines the methodology flow process from brainstorming of predictors of knowledge sharing behavior within a power utility company in Malaysia to analyze raw data to study in depth human behavior and the reason governs such a behavior. In this paper, a detailed process will be discussed from the four major components of the research methodology. Four major components mentioned are setting up the questionnaire, distribution of questionnaire, collection of questionnaire answers and data analysis. Several factors have been selected as the main variables for both set of questionnaires. There are two phases of questionnaire distribution take place; first phase is through a softcopy distribution process for customer and hardcopy distribution for the staff. Future studies will focus on data analysis for related factors proposed in the questionnaire to identify knowledge behavior patterns from the relevant respondents. Preliminary results obtained from this pilot study have revealed that there is a need to develop a virtual platform, such as digital hub to inculcate knowledge sharing behavior that could enhance human skill, knowledge and competency in the energy sector.

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Completion time of CH4 hydrate formation in the presence of copper nanofluid

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Abstract: In this work, an experimental investigation on the effect of SDS and copper nanofluid on the kinetics of methane hydrate formation was studied. The experiments were done using stainless steel stirred reactor at a pressure of 5.1 MPa and temperature of 274.15 K. Completion time was reported to describe overall formation kinetic. The results revealed that SDS and nanofluid reduced the completion time significantly. Among all samples 0.05 wt% copper nanoparticles suspended in 0.03 wt% SDS solution achieved the maximum methane hydrate formation in the shortest time. Nanofluid contains 0.01 wt% and 0.1 wt% copper nanoparticles do not enhance the hydrate formation in compare to 0.03 wt% SDS solution.

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Effect of lightweight waste-based aggregate on lightweight concrete

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Abstract: This paper study the effectiveness of waste material from industrial by-product as lightweight self-cured concrete. Waste material involved in this study is coal bottom ash, oil palm boiler clinker and hydrogel from diapers. Coal bottom ash (CBA) used as a fine aggregate replacement whilst oil palm clinker (OPBC) added into the concrete mixture as partial replacement of coarse aggregate in order to produce lightweight concrete. In addition, hydrogel from disposable diapers was acted as self-curing agent. Different percentage of CBA as the fine aggregate replacement in concrete was used with the constant value of OPBC as coarse aggregate replacement. The result shows that the concrete sample containing 100% replacement of CBA has the lightest density as compared to other samples. In terms of compressive strength, the sample containing 40% replacement of CBA has similar compressive strength to control sample with reduction of the density of 22% when compared to the control sample. It is concluded that the recycling of CBA and OPBC as replacement material in lightweight concrete has good potential and also processing of CBA and OPBC to develop nano-material are the future of CBA and OPBC research for energy efficiency building.

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Comparison of microwave-assisted extraction DLLME with conventional DLLME for the determination of PAHs in vegetables

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Abstract: Microwave-assisted extraction coupled with dispersive liquid-liquid microextraction (MAE-DLLME) was developed for the determination of polycyclic aromatic hydrocarbons (PAHs) in vegetables followed by analysis using gas-chromatography-flame ionization detector (GC-FID). In this study, MAE was introduced to overcome the matrix interference problem of DLLME. The parameters affecting the MAE-DLLME performance have been developed and optimized in a previous work [1]. Pre-treatment was done by heating the sample with acetone under 200 W of microwave power for 1.5 minutes and followed by DLLME extraction using 30 uL of 1-bromo-3-methylbutane as extraction solvent and 800 uL of acetone as dispersive solvent for one minute extraction time. In this work, the analytical parameters, such as sensitivity, limits of detection (LOD), limits of quantification (LOQ), relative extraction recovery (ER) and relative standard deviation (RSD) were compared with those obtained from modified DLLME and conventional DLLME techniques. MAE-DLLME showed the highest sensitivity, lowest LOD and LOQ values, the best related extraction recovery with the low RSD compared to the modified DLLME and the conventional DLLME. The overall analytical performances of MAE-DLLME were improved due to the reduction of matrix interference after the MAE pre-treatment.

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Performance Evaluation of the RACPC for BIPV System under Diffuse Radiation

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Abstract: The world has added more Photovoltaic (PV) capacity than it had in the last four decades, becoming one of the renewable energy sources with a promising future; following the trend, solar power would become the world´s largest source of electricity by 2050. Concentrated solar power is a technology which through by concentrated photovoltaic (CPV) is implemented on Building Integrated Photovoltaic (BIPV) system which integrates PV panels as an integral part of the building by replacing conventional materials. In order to increase the cost efficiency of BIPV system, an optical concentrator is ideal to replace expensive PV material increasing the electrical output by concentrated the solar power. The rotationally asymmetrical compound parabolic concentrator (RACPC) was analyzed in this work under diffuse light conditions. A simulation and experimental work has been carried out to determine the optical concentration gain of the concentrator having the following results. Under diffuse light, the RACPC has an optical concentration gain of 2.12 obtained with ZEMAX OpticStudio software. The experimental work showed a value of 2.20, and increase of 3.8%.

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Callophyllum Inophyllum as Biodiesel Feedstock in Malaysia: Potential and Challenges

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Abstract: Higher global energy demand has led to significant concerns regarding energy sustainability, food security, global warming, pollution as well as fossil fuel depletion. Currently, biodiesel appears to be the key to clean energy that can be utilized immediately as biodiesel has potential to replace conventional diesel. Biodiesel has ability to penetrate transportation and energy generation market. However, 95% of world biodiesel production depends on first generation biodiesel feedstock which are edible feedstock such as palm, rapeseed, soybean and sunflower which are costly as well affect the food market equilibrium. In order to overcome issues with first generation edible feedstock, second generation non-edible feedstocks such as Callophyllum Inophyllum (CI) are introduced as new biodiesel feedstock. CI has high oil yield, high heating value and it also meets US American Society for Testing and Materials standard (ASTM) D6751 and European standards (EN) EN14214 biodiesel standard. Furthermore, CI has ability to produce high yield in barren land with low cost. Such feedstock can be used in transportation industry as well as energy generation. This study explores the potential and challenges of biodiesel from CI in Malaysia

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Improving Day-Ahead Load Forecasting using Fuzzy Interference System

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Abstract: The global demand for energy is growing and conventional energy sources such as coal and petroleum are depleting rapidly; therefore, it is predicted that the renewable resources will play a decisive role in the future. Hence this paper investigates the role of energy sources for electricity production in India from 2005 to 2014. An inclusive review on recent research, developments and strategies in energy systems has been presented. It has been investigated that the variable electricity output of the renewable energy sources is an important challenge for the electricity system designer. Therefore, a strategic co-ordination to improve the overall electricity infrastructure is proposed based on Fuzzy Interference System. A forecasting interval of 60 minutes was taken, by considering weather conditions and energy consumption. It identifies the classes for 24 hours for which the load has to be forecasted. The error between actual and forecasted load lies under ±5%. The proposed model is also compared with M. Rizwan et. al where the relative error was 6%.

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The Effect of EMIM-Cl Water Based Mud on Methane Hydrate Phase Behaviour

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Abstract: Gas hydrate sediments are known as future energy source and potential techniques for storing CO2. However, their drilling operations are challenged due to inappropriate drilling fluid systems. Ionic liquids have been introduced as novel drilling mud additives that has the ability to enhance the rheology of water-based mud and at the same time manage hydrate formation risk in the mud while drilling hydrate sediments. However, the disturbances of ionic liquids water-based mud filtrate on the hydrate formation is not well understood. To achieve this, the phase behaviour of methane hydrates in 1-Ethyl-3-methy-limidazolium chloride (EMIM-Cl) water-based mud at different EMIM-Cl concentrations was measured using the isochoric pressure search method in a sapphire hydrate cell within the pressures and temperatures ranges of 3.60 - 9.70 MPa and 273.68 - 286.10 K, respectively. The presence of EMIM-Cl had very minimal disturbances (less than 0.5 K shift) on methane hydrate at the studied concentrations. However, the presence of commercial hydrate additive (methanol) significantly disturbed the methane hydrate phase boundary. Suggesting that, using ionic liquids water-based mud to drill hydrate sediments will reduce the risk of releasing compacted methane gas into the borehole while drilling.

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Advanced Photovoltaic Thermal (PV/T) Collectors

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Abstract: The solar irradiance received by the solar cell is partially lost as heat which carries negative affect on its voltage and in turn, its generated power. This trapped heat within the photovoltaic module is considered waste energy. Hence, techniques to extract this heat to utilize it for thermal loads, such as water heating or drying, are presented throughout the literature. Most prominent technique is the hybrid photovoltaic thermal (PV/T) collector. This device will serve in cooling the solar cell and hence improving its efficiency during operation. Meanwhile, it will absorb the heat and transfer it into a working fluid. The fluid could be utilized directly or indirectly for thermal loads in moderate and low temperature range applications. The type of working fluid highly affects the PV/T performance and its physical design. This paper tracks the development of working fluids and analyzes highly-efficient PV/T's from the literature. Moreover, a lengthy discussion on state-of-the-art PV/T systems is presented and recommendations for future works are listed as well.

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Power Consumption of a Refrigerator with Variable Speed Compressor; Profile Analysis and Performance Comparison

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Abstract: The studying of energy conservation of a microgrid system requires to analyze the dynamical operation of its consumed-energy elements. One of the most important household appliances in the residential sector is the refrigerator, which needs to be analyzed in terms of its power consumption. Power consumption profile for recent refrigerators has not yet offered since the recent advances of such appliances change their operation technology, where they employ a speed controller to drive their compressors. This research analyses discusses and compares the power consumption pattern of such refrigerators to help for energy estimation in stand-alone PV systems. A wireless monitoring circuit has been used to access the current and the voltage measurements with a high sampling rate to cover the potential surge power. The results show better performance when using DC over AC supply in terms of consumed energy. These efforts can serve to model the refrigerator and other appliances that adopts speed controller technology to drive their motors.

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COSMO-RS Based Estimations Of Biomolecules For Gas Hydrate Application

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Abstract: Formation of gas hydrate causes a major flow assurance problem in gas transportation. Conventional hydrate inhibitors such as ionic liquids (ILs), salts, polymers and amino acids are being used to overcome the issues. The usage of conventional hydrate inhibitors has certain limitations in term of low biodegradability and high operational cost. Biomolecules such as pectin, sodium-based carboxymethyl cellulose (Na-CMC), starch, glycine and dextran are some of the biodegradable polysaccharides that can be used as the alternative inhibitors. These biomolecules are complex long chain structures therefore, prior to hydrate experiments their fundamental properties are simulated using Conductor-Like Screening Model for Real Solvents (COSMO-RS) software. Surface charge distribution, sigma potential, chemical potential and hydrogen-bonding energy of monomers with water and methane is estimated. By working as pre-screening tool the software predicted that Na-CMC, and dextran have higher electropositive distribution. While starch, pectin and glycine shows an almost equal distribution of electropositive and electronegative charges on their surfaces. Pectin, glycine, CMC-Na and dextran shows strong hydrogen-bonding with water molecules. Starch on the other hands shows less effective hydrogen-bonding activity with water.

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What Do We Know About Intention to Discard Single-Use Plastic? Empirical Evidence in Malaysia

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Abstract: The objective of this study is to identify the crucial factors that will influence the intention to discard single-use plastic in Malaysia. The underlying framework of this research model is based on the Theory of Planned Behavior (TPB). This empirical study is using an online questionnaire which is distributed to 364 respondents in Selangor and Federal Territories (Kuala Lumpur and Putrajaya). The research hypotheses are tested using linear regression-stepwise technique. The finding from this study revealed that for the case of Malaysia, intention to discard single-use plastic is predominantly influenced by Consumer Knowledge, Environmental Concern, Psychological Benefit, Social Influence and Willingness-to-Pay. Therefore, this paper provides valuable insight with regards to the predictors that influences the intention to discard the single-use plastics usage within the consumers in Malaysia. It offers information for policy makers with collaboration from industry players to look into better solution and appropriate policies intervention in order to embolden the usage of eco-friendly alternatives that could replace single-use plastics in Malaysia. Future study and improvements are proposed to be done to consider other possible predictors and improve the characterisation of respondents by extending the survey to a wider coverage within Malaysia.

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Design and Fabrication of Solar Panel with Sun Position Tracker

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Abstract: Timelessly, the sun has been paramount source of energy for life on earth and a large portion of the energy is utilized just for warmth and lighting. In this way, to make it increasingly helpful or expand the utilization of this energy, daylight can be utilized as the wellspring of sustainable power source. The objectives of this project are to increase the efficiency of solar panel harvesting while reducing the amount of space required. Three solar panels are stacked above one another without overshadowing the below ones. Solar concentrator is also employed to focus the sun radiation onto panels. To ensure maximum power harvested, solar panel need to be perpendicular to the sun's array. Therefore, solar panels are rotated using combination of servo motors, Real Time Clock (RTC) and Arduino Mega 2560 to certain angles at certain period of time. The result is then compared to conventional solar panel system and it found that the efficiency of the design is 21.24% higher than the static conventional system.

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Paper ID: 1570542003

Simulation of Charged Air Cooling System with Air Conditioner Refrigerant

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Abstract: The cooling system of charged air intake is important for engine performance. The cooling system came in two type which is air-to-air and air-to-liquid, for this research the cooling system will using the air conditioner refrigerant as the cooling agent. By having refrigerant fluid as the cooling agent, the engine performance can be increase in term of power, fuel consumption and exhaust emission. This research is consisting of design process of intercooler model to be used in the cooling system. The intercooler model consists of three main part which is coil, fin and body where the charged air and refrigerant will go through. The model of intercooler is generated in 3D model and 2D drawing using CAD software which is SolidWorks. The 3D model been integrated in CFD software for simulation process. The simulation process of the intercooler model done using ANSYS Fluent in order to measure the performance of the cooling system. From intercooler simulation result, the engine performance been measured using simulation process of engine by ANSYS Fluent. This engine simulation providing the combustion process inside the engine, engine performance, fuel consumption and exhaust emission.

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Crashworthiness Design for Trapezoid Origami Crash Structure

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Abstract: Corrugations can be considered to be one of the ways to improve mechanical properties of thin walled structure and save energy. However, this theory requires a further validation through experimentation of different materials. Although many researches have been done towards the corrugated shell structures, the flexibility of corrugated sheets of thermoset composite material remain unknown. This study will focus on the effects of trapezoid origami structure which is trapezoidal folded lobe shape on the tensile properties of epoxy reinforced with s-type fiberglass. The trapezoidal folded lobe shape design was drawn by using AutoCAD which consist of the design of the corrugated composite sheets and the design of trapezoidal folded lobe shape mould. Then, the fabrication of the aluminium mould is done by using CNC milling machine according to the drawing. A compression moulding machine will be used to form the corrugations on the composite material as it can deliver high temperature and pressure. In this study, there are some parameters that were controlled under constant parameters which are temperature, holding time and temperature. The vibration test was carried out to perform a study on the behavior of the trapezoidal folded lobe fiberglass sample. The vibration test results show that the trapezoidal folded lobe sample has higher stiffness than the flat sample. Then, the compression test was also performed to investigate their deformation behavior. Compression testing result indicate that the trapezoidal folded lobe absorbs 40% more energy in Y-axis direction than in X-axis direction.

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Solar Powered LED Street Lighting Based on Vehicle Motion Detection for Sustainable Energy Utilization

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Abstract: A large amount of energy can be saved by developing a smart street lighting system which essentially assuage the problem of power consumption and reduction of carbon footprint. The conventional process involves higher energy consumption because of longer and unnecessary operating hours of the street lights based on night hours. However, by controlling the intensity of the street lights based on the movement of traffic in the street saves a great deal of energy. In this research, a smart system for operating the street lights is developed for controlling brightness of the light bulb based on the motion of the movement of the vehicle. In this research, a prototype for smart street light system is developed based on the solar PV panel, battery, light dependent resistor (LDR), passive infrared sensors (PIR) and battery charge controller. Moreover, the control system is designed based on Arduino UNO as the microcontroller which provide the necessary pulse width modulated signal to control the light intensity. The research has been conducted based on four different simulation scenarios where the operating time and traffic condition is varied. In this study, the developed smart street lighting system is able to save up to 50% of energy than the conventional system per day during light traffic condition.

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Highlighting the Dynamic Links between Economics Growth, Energy Use and Environmental Degradation in Afghanistan: Policy Implications for Afghanistan

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Abstract: This study examines the dynamic relationship between energy use, income, and environment in Afghanistan using annual data from 1970 to 2016. The dynamic causal relationship among variables are being tested; grounded by four testable hypotheses (growth, conservation, feedback, and neutrality). The F-bounds test, Dynamic OLS, and VECM Granger causality are utilized. The empirical results confirm that there is a long-run relationship among the variables and the energy use and GDP both affects the environment via CO2 emissions in the long run, which would have important policy implications for Afghanistan. The conservation policies and environmental policies would have detrimental impact to economic growth of Afghanistan, as this country become an energy dependent country. In the short run analysis, there is bidirectional causality running from energy use and economic growth. These results support the "feedback hypothesis" and possesses some policy implications to Afghanistan which suggests that economic development and energy use may be jointly determined since economic growth is closely related to energy consumption.

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Intelligent Home Automation System for Disable People

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Abstract: This paper presents the intelligent Home Automation System (HAS) for disabled people, since still now facilities for disabled people are not sufficient around the world. Numerous researchers developed different technologies considering Bluetooth technology, ZigBee system, and Wifi technology. However, these topologies lack efficient support for disabled people. Therefore, to engage the disabled people with the modern technology and make their life safe, secure and comfortable, authors have introduced the Rasberry Pi 3 Model B with Blynk application which is able to control the home appliances from their smart android phone. In this research, the motion of the intruder has been considered as the key parameters and HOG method is used to detect the motion. Experimental validation of the proposed model implies that this process is more secure and user-friendly for disabled people compare to other existing technology. Therefore, the main contribution of this research is to develop a secured automated system, which will enable the disabled people to control the home appliances and thus overcome the limitation of the existing technology.

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The Effect of Superplasticizer on Performance of Roller Compacted Concrete Pavement Containing High Volume Fly Ash

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Abstract: The use of roller compacted concrete pavement (RCCP) has increased noticeably during the last few decades, due to its economic and environmental benefits. This type of concrete is known by its ability to incorporate natural wastes, such as fly ash. Moreover, to improve the performance and to enhance the workability of RCCP, superplasticizer also can be used. This study aims to investigate the effect of superplasticizer on the performance of the high volume fly ash in RCCP. For this purpose, different mixtures of RCCP were prepared, in which the fly ash replaced 50% of the cement content, in addition to adding superplasticizer in quantities equal to 0%, 0.25%, 0.50%, and 0.75% by weight of the cementitious content. The results showed improvements in the strength, the durability, and the workability of the RCCP when adding superplasticizer. The compressive strength, the tensile strength, and the flexural strength increases noticeably with the increase of the superplasticizer proportions. On the other hand, Vebe time, and porosity values decreased.

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Evaluation of Hydrate Phase Boundary for Natural Gas Mixture with High CO2 content through Simulation Approach

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Abstract: Gas hydrates are solid crystalline structures in which water molecules trap small guest gas molecules and encage them through hydrogen bonding. Gas hydrates are known to be problematic in flow assurance applications as they can form plug inside the pipelines during oil and gas production, transportation and processing. In order to inhibit hydrate formation thermodynamically, various chemicals including some alcohols e.g. methanol (MeOH), mono-ethylene glycol (MEG) are used as thermodynamic hydrate inhibitors (THIs). In this paper, a simulation study is performed using PVTsim software wherein it predicts the hydrate formation for pure CO2 solution mixture and CO2-MEG solution mixture systems using different equation of states. These equations of states include Soave-Redlich-Kwong (SRK), SRK-Peneloux, Peng-Robinson (PR) and Peng-Robinson Peneloux. The hydrate formation regions are determined in between the pressure range of 10 to 110 bara for natural gas mixture containing high percentage of CO2 in it. The results are found to be close and in good agreement.

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Electricity Tariff Structure Optimization

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Abstract: The design of electricity tariff can be very complex not only due to the regulatory policies factors but also the concern of satisfying various parties such as the utility firms and their respective customers. This paper addresses the optimized electricity tariff structure based on the 2014 electricity tariff structure in Peninsular of Malaysia by considering the customer and demand growth factors in next year forecast. Two optimization procedures are proposed namely, hybrid of goal programming and stochastic optimization and ILOG optimization system. In both estimation models, scenario-based influenced the current and forecast sale which mainly reflected by the tariff setting for each of the electricity customers including domestic, industrial, commercial, specific agriculture, mining as well as street lighting. In overall the findings revealed that, firstly, both optimization methodology approaches reveal the similar result with respect to the lifeline bands of tariff especially by ILOG produce on average value for each of the customer category that useful for further analysis. Secondly, the small changes in demand growth and customer growth across the scenarios don't significantly change in the tariff structure among electricity customer except for domestic.

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Unidirectional ring cavity Raman fiber laser with continuous wave operation for the potential integration in optical communication system

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Abstract: Raman fiber laser in C-band region has undeniable potential in optical communication systems due to the low attenuation at this wavelength band for signal processing and data transmission. Therefore, the extensive investigation for Raman fiber laser in terms of continuous wave and pulse regimes have been sought-after among the engineers and researchers. However, a simple design of the Raman fiber laser is always the merit to minimize the design complexity of the laser system. The main objective of this research work is to propose a simple design of Raman fiber laser which is designed with continuous wave operation. A unidirectional ring laser cavity is tailored by integrating an optical isolator within the Raman fiber laser configuration. The optical spectrum, power development, and the pulse validation for the Raman fiber laser will be thoroughly conducted in this work. The experimental result is expected with the absence of the pulse operation due to the continuous wave laser regime of the proposed Raman fiber laser scheme. The success of this work will contribute to a simple yet flexible design to a C-band Raman fiber laser for the potential development of optical communication system.

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Water Quality Index Score in River Water Treatment at Upper Klang and Gombak River Catchment

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Abstract: National River Water Plants are located along upper Klang and Gombak river catchment to purify the polluted river using direct contact methods. As current water quality situation in the study area is poor due to contribution of anthropogenic activities on the water quality degradation in these urban rivers, the investigation was performed using Water Quality Index Index. This paper gives the overall performance of RWTP using WQI calculation methods. The WQI act as the basis of environment assessment towards to pollution load classification under Malaysia National Water Quality Standards. As overall result, 57 percent from the total effluents achieve target Class II and above and the other 43 percent still not achieve project target. In spite of this excellent results, there two RWTP are under target from the average monitoring; RWTP Sg Gisir and RWTP Sg Sentul based on Table 5. However, the result for RWTP Sg Sentul is not yet conclusive since the monitoring duration is less than 2 years. Certainly, RWTP Sg Gisir need to be take into consideration for upgrading or frequent maintenance of the RWTP as suggested in several MBBR/IFAS operation. As to improve the RWTP performance to score higher WQI class, introduction of recycle sludge in the biological tank so it will be shorter reaction time. Additionally, the RWTP owner should implement a frequent maintenance work into RWTP component especially clarifier, sludge collector, biological oxidation tank and rubbish trap collector.

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Building Energy Efficiency (BEE): A Review on Conventional and Unconventional Techniques

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Abstract: In this review paper, a number of research studies and technical methods have been reviewed. Recently published papers related to the Building Energy Efficiency (BEE) have been cited in order to give readers information about latest applied approaches and technologies implemented to real scenarios for a different types of buildings under different conditions. In this paper, reviewed papers that consider BEE and energy-use are selected. For example, approaches that achieve high rate(s) of BEE and energy-use performance have been cited. However, methods applied to measure BEE and predict energy-use behavior for energy demand measurement purposes have been considered and reviewed. This paper aims to collect a number of papers whose their aims are to propose systems affecting the BEE and energy-use performance either in a direct or indirect way, thus retrofit systems significantly affect BEE therefore retrofit related papers have been reviewed. Also, light control systems related papers have been considered. On the other hand, solutions proposed by several studies e.g., adaptive lights, smart buildings and Internet of Things (IoT) used for smart services e.g., notifying occupants in regard to energy-use have been covered in this review. A comparison between different methods has been provided. Collected papers have been retrieved from top-tier publishers, which are: IEEE, Elsevier, PLOS, MDPI, and Emerald.

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Condition Monitoring Through Temperature, Vibration and Radio Frequency Emission: A Review

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Abstract: Condition monitoring (CM) has become an important topic for researchers dealing with electrical equipment and their performance. The condition and performance of electrical equipment can be monitored through analysis of their temperature, vibration or radio frequency (RF) emission. In the past decades, intensive research works have been conducted to study CM with the aim to improve reliability and performance of electrical systems and hence the state of art of this area is felt important to be reviewed. This paper reviews the most recent and popular approaches which intend to improve the CM performance through temperature, vibration, and RF emission methods. A brief overview on existing monitoring methods is presented and from the comparison between the existing methods, it is concluded that with proper analysis and reliable measurements, RF emission can present an excellent tool for monitoring electrical equipment. It is believed that this review would give the readers a good insight on various schemes and approaches of CM of electrical equipment.

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Tetraethylammonium Acetate Based Deep Eutectic Solvents for Thermodynamic Gas Hydrate Inhibition

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Abstract: In petroleum industry, gas hydrates are likely to be formed in a deep-water exploration and production of oil and gas region where all the condition for formation of gas hydrates occurred simultaneously. This pose a potential threat to the integrity of the pipeline in order to transport oil and gas to processing center which resulting in flow assurance issues. The conventional gas hydrates inhibitor has been widely applied to mitigate the problem. However, the conventional gas hydrates inhibitor possesses a few drawbacks which lead to research in ionic liquid for gas hydrate inhibition. Although ionic liquid can overcome the drawback possessed by conventional gas hydrate inhibitor, there are also disadvantages of ionic liquid. Thus, many researchers have been going towards Deep Eutectic Solvent (DES) as potential alternatives to replace ionic liquid in many applications. In this work, the effectiveness of DES as carbon dioxide hydrates inhibitor is investigated. Type III DES which is made up of Quaternary Ammonium Salts (QAS) + Hydrogen Bond Donor (HBD) has been explored for this purpose. Various combination of QAS+MEG has been investigated and the combinations of Tetraethylammonium acetate with Glycerol and Ethylene Glycol at 1:7 molar ratio respectively, are reported in this paper. The study on the phase equilibrium of 5wt% DES shows that TEAAC: Glycerol produce an almost similar inhibition effect to pure Ethylene Glycol, BMIM-BF4, EMMor-BF4 and EMMor-Br. This prove that DES is considered as one of the promising alternatives as carbon dioxide gas hydrates inhibitor.

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Extreme Learning Machine with Multi-Agent System for Data Regression

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Abstract: Extreme Learning Machine is widely known as an effective learning algorithm than the conventional learning methods from the point of learning speed as well as generalization. Basically, hidden neurons are not required in neuron alike, instead, weight is the parameter that would need to learn about the link in between output and hidden layers. The ensemble model to integrate every independent estimate of several ELMs to produce an output. The particular approach is included in a Multi-Agent System. A novel extreme learning machine based multi-agent system (ELM-MAS) is put forward in the paper for solving data regression problems. There are two layers of ELMs which are the individual agent layer and parent agent layer. The effectiveness of the ELM-MAS model is proved with some activation functions employing benchmark datasets (abalone, strike and space-ga) and real world application (NOx emission). The outcomes indicate that the proposed ELM-MAS model is able to achieve better results than other approaches.

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Genetic Rules Induction Fuzzy Inference System for Classification and Regression Application in Energy Industry

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Abstract: Genetic fuzzy system encompasses genetic algorithm and fuzzy logic. It divulges the advantage of optimization with ease of understanding for classification and regression of energy performance of buildings, transformer, and harmonic current in energy industry. This paper presents development of a new rules induction algorithm namely genetic rules induction fuzzy inference system for classification and regression (GRIFISCnR) that combines genetic algorithm with fuzzy logic to facilitate efficient design of building, transformer and harmonic current filter in energy industry using Pittsburgh approach. The GRIFISCnR possesses the rules induction capability over other algorithms for multi-class classification and regression problems without compromising on interpretability and accuracy. It manages to strike a balance between interpretability and accuracy, and yield better accuracy with lesser number of rules. It is easier to interpret and understand fuzzy rules as compared to numerical numbers.

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A Review and Simulation of Photovoltaic Modules using Matlab/Simulink

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Abstract: This paper performs a review on the simulation modules for photovoltaic cells. Mathematical modulation is used to simulate the photovoltaic cell and to perform both series and parallel connections. Simulation and analysis of photovoltaic modules is done under different weather conditions by varying the irradiance and temperature. The simulation model can be used to calculate the output power efficiency of photovoltaic cells. Research output can be used to predict the desired output power and also to suggest on suitable photovoltaic cells connection for different weather condition.

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Energy Efficient Operation of Light Rail Transit (LRT) System for Kelana Jaya Line Via Train Headway Time: A Malaysia Case Study

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Abstract: With the advancement of new technologies in the rail system, there is a possibility that the energy consumption in the rail system will increase if no efforts are taken to ensure sustainability in the Light Rail Transit (LRT). Therefore, efforts on reducing energy consumption in LRT through optimizing train operational with a good control strategy is crucial to achieve energy saving whilst ensuring efficient use of energy. Train operations such as unchanged dwelling time, increase in the length of journey and train weight are few factors that may increase the traction energy consumption of the LRT system. However, due to frequent changes in passengers commuting between stations, controlling energy consumption will be a challenge as energy consumption keeps fluctuating most of the time coupled with signal delays at intersection and unexpected problem occur along the line. One of the energy saving measures is to control the train headway time. In the context of this research, headway time is defined as the time interval of each train from one station to another. The regularity of the headway time can be improved by adjusting the dwell time or running time between stations for each train. This paper presents the energy efficient approach by having a regular headway time with variance speed at each station by using Monte Carlo Method. Based on the simulation data, there is a possibility to reduce 39% of energy consumption if the headway time is reduced

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Energy Efficient Bandgap Reference Generator for RFID Transponder EEPROM 130 nm CMOS Process

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Abstract: Reducing power dissipation of any circuit can make that circuit more energy efficient and at the same time promise stability. Recent researchers mainly focus on controlling and monitoring low power designs for different low power applications, wireless systems such as radio frequency identification (RFID) transponder. Therefore, generating an internal reference voltage for the power management unit is becoming one of the main design challenges of these systems. Therefore, bandgap reference (BGR) is required to provide temperature and supply independent reference voltages. In this research, an improved BGR is designed with the self-startup circuit, bandgap core and an operational amplifier (OP-AMP) to generate a stable reference voltage. A low-power BGR is simulated using Silterra 0.13 µm CMOS technology. The designed BGR generates a reference voltage of 1.1 V, and consumes only 1.4 µA power form 1.2 V power supply voltage. Moreover, it has the temperature coefficient of 41.6 ppm/℃.

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Potential Electricity Bills Savings Based on Customer Load Profile with Solar PV: A Case Study

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Abstract: With the high demand in electricity consumption nowadays, it is crucial for regulator and utilities to ensure sufficient energy supply to meet electricity demand. Electricity demand is influenced by several factors such as number of customers, customer behavior, working hours, weather condition and holidays. Integrating renewable energy technology as part of electricity generation for self consumption has indirectly provide an option to customer to reduce his electricity consumption from the grid and help to save his electricity bill. One of the simplest solutions to install renewable energy sources is by installing rooftop solar photovoltaic (PV). In this paper, the economic feasibility of installing solar PV is discussed based on commercial customer load profile. This paper also presents the suitable PV sizing based on the payback analysis based on customer load profile. A commercial customer in Petaling Jaya, Selangor is used as a case study for this analysis. This study indicates that customer will be able to reduce their electricity bill consumption with the integration of solar PV system on the rooftop of their building. Customer is able to save their monthly electricity up to 28% if a total solar PV capacity of 1256kW is installed. The payback from this study indicate the payback period is approximately around 9 years.

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Thermal Properties of Beef Tallow/Coconut Oil Bio PCM Using T-History Method for Wall Building Applications

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Abstract: Thermal energy storage using Phase Change Materials (PCM) is now widely applied to wall builds. Generally, PCM used for applications on walls building has a melting point of 0-65 oC. Beef tallow and coconut oil is a type of organic PCM known as Bio PCM needs to characterize by using the T-History Method. The T-History method is more accurate than DSC. This study aimed to determine the thermal properties of beef tallow/coconut oil PCM using the T-History method. The beef tallow and coconut oil as bio PCM material used in this study with the variation are respectively: 100%, 70+30%, 60+40%, and 50+50%. Tests are carried out using the T-History method. From the results of testing and analysis obtained supercooling temperature, melting temperature, specific heat, and latent heat for bio PCM beef tallow/coconut oil. The effect of adding coconut oil mixture to beef tallow caused a decrease in melting temperature and supercooling temperature, while the specific heat and latent heat of bio PCM of beef tallow/coconut oil ranged from 2.96-2.19 kJ/kg.oC and 101.05-72.32 kJ/kg. The result obtained that this bio PCM material of cow beef tallow/coconut oil can apply, as additional material in wall building applications.

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Opportunities for the Development of Rooftop Solar electricity in Vietnam

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Abstract: The majority power that generates from hydropower dams and coal in Vietnam causes many problems to the environment, such as deforestation and greenhouse-gas emission. In addition, power shortage will occur in the hot and sunny season. Rooftop solar power will help Vietnam to protect the environment and help people combat the problem of power voluntary delivery. With the high potential of solar energy, people in Vietnam can generate electricity themselves from their house by installing rooftop solar power. The study shows that Vietnam has many opportunities to develop rooftop solar power, especially high sunshine duration. The market share for developing solar rooftop is huge because up to February 2019, there are only 1,800 customers (include public & government offices, enterprises, and household) install rooftop solar power, while the total of households is 30 million. Moreover, rooftop solar power development in Vietnam also get opportunities from supports of the government, other foreign partners and rooftop solar provider companies

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Development Of Hybrid Contact Mode Triboelectric And Electromagnetic Energy Harvester

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Abstract: The fundamental goals of this research are to harvest enough power to power up the low power sensor mode by using vibration mechanism. Due to high demand of low power electronics, it is a need to create a self-sustained product for low power applications instead of keep changing batteries. Considering the importance of sustainable energy, thus, there is a need to develop the hybrid triboelectric (TENG) and electromagnetic (EMG) nanogenerator. The objectives are to design and fabricate hybrid nanogenerator and at the same time to test and analyze the performance of hybrid nanogenerator of triboelectric and electromagnetic energy harvester. This work focuses on characterizing the whole design into two main part, the triboelectric and the electromagnetic. The testing was done by considered the factors affecting the performance of triboelectric and electromagnetic nanogenerator. The testing for the TENG consists of varying the first parameter which is the air gap distance between the dielectric and the electrode by fixing the other parameter, surface area of the triboelectric layers into big and small surface area. While for the EMG consists of varying the number of coil turns for each big and small sized magnet. Last testing was converting the system's AC output into a DC output by using the ACDC rectifier alongside a variable resistor into the circuit with the DC output to get a range of closed-circuit voltage (Vcc) that leads to maximum power. At a frequency of 11Hz with and acceleration of 0.69 ms^{-2}, the optimum opened-circuit voltage, Voc achieved for TENG is 3.97V at an air gap distance of 20mm with the triboelectric layers' surface area of 3600mm2 whilst for the EMG, 1.85V was achieved with the use of 2303 number of coil turns and a Neodymium magnet size of Ø30 by 8mm. The hybrid of TENG and EMG produces 2mW power with an optimum resistance of 1kΩ, this is enough to power up a low power sensor node.

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Effect of Pb exposure towards green microalgae, Chlorella vulgaris, on the changes of physicochemical parameters in water

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Abstract: The release of pollutants such as Pb from factory, agriculture, domestic and other source into the environment has threatened the freshwater ecosystem. Therefore, the objective of this study the changes of physicochemical parameters (pH, conductivity and dissolve oxygen) caused Chlorella vulgaris due to Pb exposure as a mean of Pb bio-detection. The cell count of C.vulgaris is done by using hemocytometer and this microalga is exposed to different concentrations of heavy metals (lead and cadmium), light metals (aluminium and lithium) and pesticide (atrazine and parathion). The result was recorded before the exposure and 1 hour, 2 hours, 6 hours and 24 hours after exposure by using physical-chemical parameter kits. The results showed that the pH values of the water decreases as the concentration of metal exposure increases. On the other hand, the conductivity and dissolved oxygen showed a decreased in their values as the exposure time increases. These phenomenon could be attributed to the inhibition of the photosynthesis by the algae as well as the ability of the algae to accumulate Pb and thus lowering the physicochemical parameters. Therefore, C. vulgaris serves as a good bioindicator of Pb pollution.

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Latent Heat Storage For Hot Beverages

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Abstract: Latent heat storage has shown a great potential in many engineering applications. The utilization of latent heat storage has been extended from small scales to large scales of thermal engineering applications. In food industry, latent heat has been applied in food storage. Another potential application of latent heat storage is to maintain hot beverages at a reasonable drinking temperature for longer periods. In the present work, a numerical calculation was performed to investigate the impact of utilizing encapsulated phase change material PCM on the temperature of hot beverage. The PCM was encapsulated in rings inside the cup. The results showed that the encapsulated PCM reduced the coffee temperature to an acceptable temperature in shorter time. In addition, the PCM maintained the hot beverage temperature at an acceptable drinking temperature for rational time.

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Implementation of Effective Public Outreach Program (POP) in Cameron Highlands

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Abstract: Public Outreach Program is performed in Cameron Highlands with the goals of sharing and disseminating ongoing information and future infrastructural works, as well as encouraging the public to take responsibility in controlling erosion and sediment issues and protecting the environment. 150 contributors had been concerned in this program consisting of 50 personnel from related agencies and 100 members from the community. These contributors had been policymakers, resource managers, students, individuals of the public and specialists. This paper has explained the process and strategies involved along the process of Public Outreach Program. The finding and information obtained through this program are believed can contribute towards the better management practices in the future.

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An Ensemble Classifier based Power Quality Disturbances Classification

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Abstract: Evolution of the current modern era, demands a huge and good power quality supply day by day. Power utility suppliers and power trade service providers face a major challenge in distinguishing the sort of Power Quality Disturbances (PQD). This research paper illustrates the method of PQD classification by using wavelet signal decomposition and Ensemble classification. In the beginning, a normal wave without disturbance and the PQD events of single-type and hybrid-type were generated using MATLAB with the mathematical model as per the definition and parameters outlined by IEEE 1159 and IEC61000 customary. Discrete Wavelet Transform (DWT) is applied to the generated PQD signals to decompose the signal to get its illustration in time and frequency domain. In this research work, our database consists of 14000 generated signals of a normal wave and the PQDs, which were divided into 80% for the train set and 20% for the test set for each PQDs. An ensemble method for multiclass classification was selected as the classifier of the Power Quality Disturbances feature vector. Comparisons were also made with other types of classifiers and other types of mother wavelet filter functions to observe and analyze the performance difference. The results show that the combination of DWT and Ensemble Classifier managed to classify Power Quality Disturbances with an accuracy of 100% in both train and test set.

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An estimation of the coupling coefficient of the series-to-series inductive resonant wireless power transfer coils

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Abstract: Though the power transfer efficiency of the inductive resonant wireless power transfer is relatively high, the power transfer efficiency of the inductive resonant wireless power transfer is undoubtedly depending on the coupling coefficient. Coupled with the coupling coefficient, the highest possible power transfer efficiency can be achieved by controlling the operating frequency with impedance matching. Therefore, the relationship of the input impedance to the variation of the coupling coefficient is of paramount importance in maintaining the highest possible power transfer efficiency for a given coupling coefficient. This paper presents the relationship of the input impedance of the series-to-series inductive resonant WPT to the variations of the coupling coefficient. The analysis is carried out by using the T-equivalent circuit, producing analytical results for comparison and validation by equivalently obtained simulation results, guarantying the maximum power transfer efficiency for a typical series-to-series inductive resonant link. The modeling validity is shown by percentage error in between the analytical and simulation results. The novelty of this paper is in the simplicity of coupling coefficient estimation by reference to the input impedance.

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Analyzing Awareness Impact on Motivation with Satisfaction as Moderator: A PLS - SEM Approach

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Abstract: This paper discusses about consumer awareness as possible factors that could increase human motivation in conserving electrical energy. The study also looks at internal factor that may create modification in consumer behaviour towards the conservation of electrical energy. The study tested one hypothesis related to the study which is H1: Awareness is significant influence on Motivation. Based on the finding gathered using SmartPLS analysis with N=400 indicate that consumer awareness of monthly electrical bill and satisfaction towards energy efficient product have positive effect on person motivation about current energy issue. This may indicate that the higher the monthly bill the more consumer aware of the electrical consumption and the more consumer is satisfied towards the energy efficient product the better the motivation level that a person has the in modifying their behaviour towards electric conservation.

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Fishermen's Perspectives and options for maintaining fishery production in the West Coast of the peninsular Malaysia

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Abstract: The main source of fish production resides in fisheries, which eventually contributes to increasing in Malaysia's economy. Among the 13 states of Malaysia, Selangor is recorded as a huge landing for marine fish, which is the third largest in number for the West Coast of Peninsular Malaysia. As a result, the livelihood of Selangor rural community especially the fisheries have partly contributed to the income of these communities. However, these fisheries required to be maintained properly for sustainable fisheries development. Moreover, the problems, which are faced by this coastal area fisheries community, liabilities allied with environmental and social features, need to be identified. Thus. This study aims to conduct an in-depth interview session to collect data and determine the problem arises in this community in Selangor of the west coast of Peninsular Malaysia due to climate change. Finally, this FGD studies local communities observations on adaptive strategy and measures to alleviate the adverse effects of climate change such as floods, salinity intrusion, coastal erosion, and sea-level rise.

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Load Restoration in Distribution System by Using Minimum Spanning Tree - Prim's Algorithm

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Abstract: Power outage is detrimental to the grid system therefore solving the issue within a short amount of time is indeed compulsory. Load restoration is one the solution required in ensuring the load can be connected within short amount of time. This study proposes a methodology to solve the load restoration problem using minimum spanning tree by determining the switching sequence according to the Prim's algorithm. By using this algorithm, the switching is done based on the most minimum path which refer to the flow of power through the minimal value of weighted impedance. This method ensures that the losses is minimized and the voltage limit is not violated. The load restoration in this study focuses on re-configuring the tie-lines in the 33-bus radial distribution network. Results obtained shows that Prim's algorithm is effective in restoring the loads by re-configuring the network in a way that total active power losses is minimized. This algorithm is also compared with the Binary Particle Swarm Optimization (BPSO) to prove the effectiveness of this method thus enhancing the power system reliability

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Stormwater and Drainage Master Plan and Formulation of Best Management Practices for Cameron Highlands

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Abstract: One of the main ecotourism areas in Malaysia is Cameron Highlands and due to illegal farming and uncontrolled logging, the rivers are being polluted. The main problems lie in Cameron Highlands included stormwater management, water quantity and water quality issues, sedimentation problem, mud flood as well as erosion and landslide occurrence. Therefore, this research is generating the stormwater and drainage Master Plan for the Cameron Highlands. The research aims to minimize the flooding impacts due to inadequacies in stormwater and drainage systems in urban areas and agricultural farms and provide a holistic solution which cultivated a specific guideline for agricultural in hilly areas. The recommended stormwater management master plan is focused on providing quantity and quality control system, sedimentation basins and slope protection work. The master plan also takes into consideration non-structural measures such as public awareness programs and law enforcement scheme. Finally, the research shows the Erosion Induced Landslide Risk Maps for Cameron Highlands Catchment for the stakeholders and farmers. This research thus plays a big role in generating the ESCP Guidelines as one of the stormwater and drainage master plan component in Cameron Highlands for the related authority's agency.

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Performance Evaluation of Wireless Router Testbed Using Raspberry Pi

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Abstract: This paper proposed a programmable wireless router testbed designed using a microcontroller, Raspberry Pi. The proposed router provides a solution to the limitation of off-the-shelf wireless router on its ability to be configured and embedded with new algorithms. The proposed router testbed is designed to have one Header Pi and three Forwarding Pis which act to inject label and forward packet respectively. The evaluation of results is validated with off-the-shelf router. From the setup, it is proven that Raspberry Pi is suitable to be used as a testbed for academic experiment as it has the ability to be reprogrammed. In addition, it has a compact design which ease for laboratories use. Based on the performance evaluation results, both proposed Raspberry Pi router testbed and off-the-shelf router are in line with each other despite the expected differences in terms of throughput, delay and jitter performance. This proves that the designed programmable Raspberry Pi router testbed can be utilized for small-scale hardware experiment purposes rather than software simulation.

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The Local Public Policy with Planetary Health

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Abstract: This research aims to study the local policies formulation process that considers the planetary health at Makhamtia Sub-District, Muang District, Suratthani Province, Thailand for local administrative organization chief executive decision making. This work leads to the tool, called PH-EIS system, of local planning support, decision making and management to achieve a balance between human needs and sustainable planetary health. The presented tool apply information technology with web-based geographic information system to visualize data and to assist environmental monitoring before the real situation will happen by using the previous case learning. The implemented system was deployed in policy formulation of local administrative organization. This research has transformed PH-EIS system to people in community led to planetary health policies of local administrative organization for infrastructure development process and affected to the well-being of the local community. The presented system was tested and found that it easy to use and understand for presented information of environment impact and local public policy.

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Landslide Susceptibility Modelling for Agricultural Activities in Hilly Areas

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Abstract: The assessment preparation of the level of risk imposed by slope failure for a particular area or site involves the consideration of available data. Many attempts have been made to classify the risk where evaluations are made in rating or grading the slopes based on their characteristics and erosion problems. The assessments are done for geo-hazard such as erosion and landslide recognized in planning and guidance. Most of the hazard risk analyses require detailed knowledge of the geo-environmental predisposition factors and initial events that led to failure. The results of these analyses consist of the identification and mapping of all erosion induced landslide phenomenon and are often translated in the form of maps, which is the fundamental step of the hazard assessment. The ranking of areas of susceptibility and delineation of areas of probable failure are among essential features relevant to the production of these maps. In this study, Landslide Susceptibility Modelling was developed by taking into consideration all the factors of the landslide susceptibility for Cameron Highlands. The landslide susceptibility map was produced based on the historical records of a landslide in that area for 20 years and the frequency ratio model using map-overlaying techniques. The susceptibility map offers substantial benefits as a regional-scale tool over earlier susceptibility maps and Cameron Highland landslide-susceptible terrain zoning. The susceptibility map has the advantage of assisting with the implementation of suitable efforts to prevent landslides.

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Erosion and Sediment Control Best Management Practices in Agricultural Farms for Effective Reservoir Sedimentation Management at Cameron Highlands

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Abstract: The development of best management practices (BMPs) for agricultural activities is an important step towards minimizing the amount of soil erosion and landslide incidents in Cameron Highlands. While some version of erosion control guidelines does exist in the region, most do not discuss the contribution of agricultural activities to the increasing rate of soil erosion in detail. Therefore, this Erosion and Sediment Control Guideline for Agricultural Activities in Hilly Area aims to minimize erosion and sedimentation from the agricultural area in Cameron Highlands especially in the scope of reservoir sedimentation management. Land-disturbing activities such as agricultural operations that are conducted on regions with steep slopes (like Cameron Highland) will have a high potential of soil erosion, sedimentation and landslide occurrences. Field inspections and information sourced from local authorities and governmental bodies were used to come up with a set of parameters for the evaluation of soil erosion risk. Subsequently, various BMPs and erosion control techniques were developed to reduce the risk of soil erosion in hilly areas. This includes; open and sheltered farm control measures and rain-water harvesting methods.

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Life Cycle Cost Estimation of Distribution Transformer Failure from Life Data Analysis

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Abstract: Transformers are major equipment in a power system. Their reliability does not only affect the electric energy availability within a supplied area, but also the economical operation of a utility. Many power utilities in the world including Malaysia have distribution transformers that have been in operations for over 30 years. Aged distribution transformer will have higher risk of failure and increases the operational cost. Nevertheless, the occurrence of transformer failure can be predicted based on historical events. Since frequency of failures as a function of time from life data model varies with different manufacturers and affects the life cycle cost, both life data analysis and net present value concept were combined to establish a methodology for life cycle cost estimation of distribution transformer failure. Outcomes from the assessment would contribute to transformer life cycle management as one of the factor to consider in the decision making for asset replacement, maintenance and planning.

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Time of Use Period Determination for Residential Customers in Peninsular Malaysia: A Case Study

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Abstract: Time of Use is basically one of the demand response programs that encourage end-user customers to change their electricity usage in response with the changes in the price of electricity over a period of time with an incentive. Generally, Time-of-Use implementation is to reduce the system's maximum demand by transferring some of the demand into different hours. Time-of-Use also is a cost reflective electricity pricing scheme in which days are commonly split into two or three time periods such as peak, mid-peak and off-peak. The residential sector is expected to have the largest volume growth as there will be an increasing population, urbanization and rising living standards that can increase the number of households and the energy demand per household which allows the households and individuals to purchase more electrical appliances. This paper presented a new clustering method called Jenks Natural Breaks to determine the Time of Use period for the residential customers in Peninsular Malaysia. A comparison of KMeans clustering method and the proposed Jenks Natural Breaks method is presented in this paper. These two methods are carried out on the average of six actual residential customers load profile. In this paper, two periods (zones) time of use are used for analysis and discussions. The results indicate that the time of use Peak period using the K-Means clustering method is between 10.00am to 8.00pm while for a new proposed Jenks Natural Breaks method the time of use Peak period is between 9.00am to 8.00pm

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Finite element study in distortion energy and stress-strain analysis in creep test rig of full-scale crossarm

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Abstract: This study covers a computational simulation modelling and analysis of creep test rig for full-scale crossarm via examination using a finite element analysis (FEA) approach. A three dimensional model of actual size test rig was designed according to full-scale sized crossarm in 132kV of transmission tower. The FEA was carried out in static structural program via ANSYS WORKBENCH v14.5 software. The research was employed to inspect the maximum distortion energy resulted from Von Mises stress. The analysis also includes the stress-strain behaviour findings. Various loadings was executed on the simulated model from 10 to 35kN and 15 to 40kN for tie and main member's crossarm respectively. The outcomes was resulted that the distortion energy increased as the main members forces increased. However, the maximum distortion energy permitted was very low as comparing to the yield distortion energy of low carbon steel. The stress-strain behaviour of the structure is within the elastic region of low carbon steel. Hence, it is proved that the test rig is better in stability and structural integrity.

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Wireless Monitoring and Control of Automotive Battery using Mobile Application

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Abstract: The Car Battery in the Philippines can only last for an average span of 6 to 12 months. When a battery hits the 6 months margin, it will start showing unwanted responses such as unstable start up and quick discharge. These responses must be avoided specially in times that the car is significantly needed to be in good condition, such as during an emergency or a long drive. It is an inconceivable scenario to be stuck in a place far from people. As a solution, the proponents designed a device that can automatically checked for the temperature, load current, voltage level, number of hours left before reaching critical voltage level and state of charge of a car battery via wireless technology in a real time manner using a mobile application with a dedicated storage for recording data every given period. The recording interval can be adjusted to what is desired by the user. Furthermore, Algorithms on statistically analyzing the recorded data is executed by the device itself which will be a helpful information on what preventive actions the user must do to improve the performance of its car battery and therefore, avoid further problems. Also, the device uses a state estimation in achieving an almost zero steady state error of the parameters of the battery stated above that cannot be measured by a sensor such as the state of charge (SOC) and remaining battery hours. After several testing and validation, it was found that the device where able to accurately predict the level of the parameters at a plus or minus 0.38 % error. Moreover, the feature of this device was made more interesting by adding a flexibility on its mean to communicate wirelessly. The system (the device and the mobile app) communicates using GSM, internet and bluetooth to increase its reliability. The user therefore has the options to manually or remotely switch loads in the vehicle. If in the event that the communication is loss, and the vehicle is approaching critical level, the device can be set to an "auto-off" mode which automatically switch the loads off. There are instances that the loads is intended to be turned on purposively. This is why the user is given the option to enable this mode or not. Most importantly, the device is tied up with a

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Demand Response Programs in Conventional and Smart Grid Electricity Networks: a Review on Chronological Development in Different Regions

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Abstract: Nowadays countries around the world are using more renewable energies such as solar and wind energies. The most important issue of the renewable energies is that their output is intermittent. So, there has to be a way to make a balance between demand and production in different situations. Demand response programs are the key issue to overcome this problem. In electricity distribution, demand response programs can improve the satisfaction of customers by using bidirectional communication between supply and demand. These programs provide a variety of services from installation of load limiters to Direct Load Control (DLC) or many activities designed for influencing the habits of customers and their electricity consumption. This paper overviews the history of demand response programs and the practices of demand response in the United States as well as some other countries in Europe and Asia. Literature shows that the demand response program is successful in many countries to reduce the outage and control the demand in response to generation condition. However, there still exist some key issues such as equipment cost and lack of standardization.

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Distracted Driver Detection with Deep Convolutional Neural Network

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Abstract: According to the World Health Organization (WHO), over 1.3 million deaths occur worldwide each year due to traffic accidents alone. This figure elevates traffic mishaps to be the eight leading cause of death. According to another study the United States National Highway Traffic Safety Administration (NHTSA), the major cause of road deaths and injury is distracted drivers. Motivated by recent advancement of deep learning and computer vision in predicting drivers' behavior, this paper attempts to investigate the optimal deep learning network architecture to accurately detect distracted drivers over visual feed. Specifically, a thorough evaluation and detailed benchmark comparisons of pretrained deep convolutional neural network is carried out. Results indicate that the proposed VGG16 network architecture is capable of achieving 96% accuracy on the test dataset images.

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Optimal Placement and Sizing of Distributed Generation in Distribution System Using Analytical Approach

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Abstract: The reliability of distribution network can be improved with the penetration of small scale distributed generation (DG) unit to the distribution grid. Nevertheless, the location and sizing of the DG in the distribution network become a topic of debate where different capacity of DG at various location can affect the performance of the entire system. This paper presents an analytical approach with a fixed DG step size of 500 kW up to 4500 kW DG to analyses the effect of a single P-type DG in IEEE 33 bus system with consideration of system power loss and voltage profile. Four scenarios have been selected for discussions where Scenario 1: 3500 kW DG placed at node 3; Scenario 2: 2500 kW DG placed at node 6; Scenario 3: 1000 kW DG placed at node 18 and Scenario 4: 3000 kW DG placed at node 7. Results show that all the four scenarios are able to reduce the power loss and improve the voltage profile however Scenario 4 has better performance where it complies with minimum voltage requirement and minimizing the system power loss.

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The Electrical Behaviour of a Medium Voltage Polymer Insulator with Deposited Moss Layer on the Surface

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Abstract: This paper presents a study on the voltage and electric fields behaviours of a 10kV polymer insulator with moss deposited under dry (air) condition. The aim of this study is considering on the electrical behaviour of insulator by having a surface layer of moss on it that can change the withstand voltage of insulators. It should be mentioned that these moss layers are commonly crated in the jungles especially in the tropical countries. To study on the above mentioned case, simulations were carried out using ANSYS High Frequency Structure Simulator (HFSS). The simulation insulator modelling includes the computerized evaluation of voltage and electric field distribution at three different locations for both clean and moss contaminated insulators. Noted that the electric field and also voltage profiles at different parts of insulators has been determined using applied simulated model. The moss contamination polymer insulator displayed a discontinuous distribution of the electric field compared to the clean insulator and their voltage distribution decreased with distances from the source. The results indicated that electric field along the insulator surface were greatly affected by hydrophobicity characteristic of the polymer. Therefore, the surrounding air of the moss contaminated insulator was prone to initiate a flashover. This study can be helpful for designing the distribution lines especially in high risk areas to set a proper design from the point of view of insulation coordination.

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Malaysian Traffic Sign Recognition using Pretrained Deep Convolutional Neural Networks

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Abstract: Traffic sign recognition is a subsystem in advanced driver assistance system (ADAS) intended to assist the driver to recognize the traffic signs on the road during driving. Recently, deep convolutional neural network becomes popular in object detection because different kind of objects and scenarios can be adapted. In Malaysia, the traffic signs with Malay language are different compared with other countries and not yet generalized. Due to the scarcity of a curated dataset of the Malaysian traffic signs, training deep convolutional neural networks for traffic sign recognition is considered problematic. However, transfer learning opens up the possibility of training very deep networks even with little data. In this paper, we adopted the transfer learning scheme to train deep convolutional neural networks to recognize the Malaysian road traffic signs. The deep convolutional neural network models pretrained on the ImageNet dataset were chosen to retrain on a custom labeled image dataset consisting of the Malaysian traffic signs. By using these pretrained models, the recognition rate for each model are discussed and present a comparison. Experiment results indicate promising possibilities of using the pretrained deep convolutional neural networks on the Malaysian traffic signs.

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A Comparative Performance Evaluation of Neural Network Based State of Charge Estimation Algorithms for Lithium-ion battery

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Abstract: This work presents a comparative analysis of state of charge (SOC) estimation for lithium-ion battery using neural network algorithms. The lithium-ion battery has been operating successfully in the automotive industry due to the long-life cycles, low memory effect, high voltage, and high energy density. The numerous works have been conducted to examine SOC for lithium-ion battery. The conventional and model-based SOC estimation approaches have shortcomings including heavy computational calculation and highly depend on appropriate battery model permanents. Therefore, neural network algorithms have received huge attention on online SOC estimation since they only need sensors to measure current and voltage and have the adaptively to automatically adjust the network parameters without battery model. Three prominent neural network algorithms including back propagation neural network (BPNN), radial basis function neural network (RBFNN) and recurrent nonlinear autoregressive with exogenous inputs neural network (RNARXNN) are used to compare the SOC estimation results. The three methods are validated by battery experimental tests and electric vehicle (EV) drive cycles. The results show that RNARXNN is dominant to BPNN and RBFNN in obtaining high SOC accuracy with a fast computational cost.

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Talking Points of Green and Sustainable Palm Oil Mill System in Malaysia

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Abstract: Todays, the palm oil milling industry (POMI) has been given serious attention due to environmental issues that arise from the milling processes. Greenhouse gas emission, wastewater quality, waste management plan and energy efficiency are the main POMI issues that contribute to the environmental problems. Critically, this issues could bring a serious impact in sustaining Malaysia palm oil industry in current global economic competitiveness. Moreover, the stringent trading standard for palm oil industry has forced the palm oil producer to align and fulfilling the requirements accordingly. In this short article, the overview of POMI system in Malaysia were elaborated. Besides, the strength and weaknesses of the Malaysia POMI system were highlighted in giving understanding of current condition. Furthermore, the challenge and potential in greening POMI system were discussed in ensuring sustainable future of POMI in Malaysia.

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Cooling Load Calculation for Efficient Cold Storage of Fresh-cut Yam Bean

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Abstract: One of the classic vegetable-based snacks that have become increasingly popular in Asia is the fresh-cut yam bean. The fresh-cuts, however, are highly perishable after cutting. This requires them to be stored in a cold room that is maintained at 5°C and relative humidity of 90% to prolong its shelf-life and prevent microbial growth. Nonetheless, the cold storage can be an unnecessarily high energy user if the refrigeration equipment is not selected appropriately to match the actual cooling load. The refrigeration equipment maybe oversized or undersized, whereby both lead to high energy usage and cost. This is not favorable for the fresh-cut processors that are mostly small and medium enterprises (SMEs). In this study, the design of cold storage for the fresh-cut was presented with the correct calculation of the cooling load. The designated cold storage for 240 kg fresh-cuts has the dimension of 4.9 x 2.5 x 3 m in length, width and height and accommodates the necessary equipment as well as access for workers. The resulted cooling load was 53239.30 kW with 32% sourced from fresh-cuts, 19% from the transmission, 16% from infiltration, and the rest from workers, lighting, ventilation and defrosting. Hence, the required capacity for the refrigeration unit was 3.33 kW. The results show that efficient cold storage can be achieved when the actual cooling load is calculated for determining the correct refrigeration capacity based on the proper storage design specification. The study is expected to benefit the food industry by reducing the energy caused by refrigeration.

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An Intelligent Following Sensor Shopping Cart

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Abstract: This paper proposed an Intelligent Following Sensor Shopping Cart that follows selected color in a pre-made color detection Android app. The conventional trolley needs to be pushed physically around the building. When more items are placed in the trolley, the trolley becomes heavier and harder to navigate. In order to solve this problem, the paper proposes a modification made to the conventional trolley and discuss the viability of using color as the automatic following mechanism on the shopping cart. Two tests are conducted to investigate the performance of the intelligent shopping cart. The first test is to find the most suitable color whereas the second test is to evaluate the reliability of color to be used as the following mechanism. The assessment of results utilized Euclidean distance equation and Matlab/Simulink. The results show that the Red Green Blue (RGB) pixel value of the chosen colors are changing as the trolley moving around the building because of the lighting position and intensity around the building. The color detection apps can endure a limit of 18.03% of color difference from the original selected color before it loses the reference. The utilization of only color as following mechanism has a high tendency to be disrupted by noise because of an adjustment in light intensity and lighting position.

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Feasibility Study of Hybrid Renewable Energy System Design for a Typical High-Rise Building in Malaysia

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Abstract: This paper presents the feasibility study of Hybrid Renewable Energy System (HRES) design for high rise building in Malaysia. A building has been for this study since it represents a typical load profile for many high-rise buildings in Malaysia. A techno-economic analysis has been conducted to determine the feasibility of PV, and battery system installation to minimize grid dependency. The methodology started with data collection of load profile and solar resources at the selected location. Then, HOMER software was used to perform technical and economic analysis of hybrid configurations. Sensitivity analysis was conducted to analyze system performance under load and grid price changes. Results of analyses includes net present cost (NPC), Cost of Energy (COE) and Carbon Dioxide (CO2) emission. This feasibility study shows grid only connection system has the most promising results with lowest NPC, followed by PV-grid and battery-grid system.

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Fault Detection of a Medium Voltage Cable Joint Using Support Vector Machine Algorithm

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Abstract: Fault detection of the cable joints is one of significant problems in the electrical utilities and industrial companies to increase the network stability as the system interruption can make side effects for both power generation units, renewable energy generation units and other power sources beside of the costumers. In this paper, fault detection of a 20kV XLPE cable joint had been studied using the measured partial discharge (PD) signals and also support vector machine algorithm. In this study, the measured data had been classified based on proposed features as the indices of data classification and they had been used in the classifier algorithm to determine fault based on measured signals and the corresponding obtained features. The results show that the proposed features and applied algorithm could determine the faults in the cable joints with an appropriate range of accuracy. This study could develop the previous studies on a widely used cable joint. This research can be helpful for the electrical utilities to increase network stability.

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Developing a Hydropower Vortex Induced Vibration System in Slow Stream Water

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Abstract: Energy harvested from Vortex Induced Vibrations (VIV) in water with a continuous flow of more than 0.3m/s has the ability to replace conventional hydropower methods with a more cost efficient and environmental friendly way. This project managed to produce a prototype focused on using a spring system to maximize oscillations induced by the vortex in flowing water onto a cylinder shaped PVC pipe of a specific diameter. The energy harvesting method adapted in this system is a piezoelectric tape. Upon every oscillation, the designed system is able to flick the piezoelectric tape inducing a certain amount of voltage. Initial design of prototype was to discover the most adequate cylinder PVC pipe for vortex in water to produce oscillations. The best way to design the system was tested to maximize flow induced oscillations. The final prototype of this stage also found the best harvesting method for the transformation process of induced oscillation into electrical energy. At this stage the prototyping is detailed at combining the existing prototype and piezoelectric transducers. The end product successfully produced up to 0.2watts/second of power. However, the unstable flow conditions and small scale testing prototype incurred an inconsistent power generation. From this project, it was brought to conclusion that the prototype has to be of a larger scale for real life applications of vortex induced vibration hydropower system

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Failure Region Estimation of Linear Voltage Regulator Using Circuit Model-Based Virtual Sensing

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Abstract: Disturbance to the linear voltage regulator (LVR) output caused by the abrupt change of either output current or input voltage can be compensated using an output capacitor. The compensation can be performed by utilising the capacitor's internal parasitic resistance called the equivalent series resistance (ESR). The values of ESR vary due to aging and temperature change factors, so despite the benefits of ESR, it creates a failure region in LVR for a range of ESR and output current. Characterisation involving manual data acquisition and analysis is required to estimate accurately the failure region, but the process is time consuming and costly. In this study, the application of circuit model-based virtual sensing (CMBVS) to improve the efficiency of LVR failure region estimation (FRE) was investigated. CMBVS was developed to obtain the LVR circuit model through circuit analysis and linear regression before estimating the unmeasurable circuit parameters using simultaneous equation solution. The estimated failure region from CMBVS was then compared with the failure region benchmark, which was obtained from the manual FRE method. Findings showed that the failure region estimated using CMBVS produced MAE, MSE, RMSE and regression coefficient, R^2, of 1.16×10^(-6), 1.16×10^(-12), 1.22×10^(-6) and 0.9999, respectively. This investigation revealed that CMBVS is an efficient and effective LVR FRE method.

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The Effect of Acid Treatment on the Characteristics and Physical Properties of Limestone for Calcium Looping Process

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Abstract: Calcium Looping Process (CLP) is one of the carbon capturing technology, in which the sorbent material, CaO is absorbing CO2 from flue gases in power plant. However, good sorbent material have been facing several drawbacks such as low generability, and low absorption capacity. Acid treatment can improve the physical properties such as surface area of the sorbent material. This study was aim to synthesize and investigate the effect of acid treatment of limestone as sorbent material in order to maximize the CO2 carrying capacity. The result demonstrated that 6 ml of oxalic acid produces low particle size with the highest hardness hence improve the CO2 carrying capacity.

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Comparative Study of Different Fault Features in Distribution System based on Wavelet Transform

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Abstract: Nowadays, there are various signal processing methods that have been studied by many researchers in order to detect the fault in power lines. From the previous literature, the signal processing work based time frequency analysis have been proven to detect the fault at fast speed and accurate. In this study, wavelet transform is adopted to analyze fault occurrences on power line of distribution network. Three fault causes by lightning, switching, and short circuit fault are analyzed based on their voltage waveform performance. Daubechies 4 mother wavelet and four level decomposition are implemented to extract the features. Detail at level 1 (D1) coefficient is extracted to evaluate the energy, skewness, and kurtosis. Based on the result, lightning shows the highest energy, skewness, and kurtosis as comparison with the short-circuit and switching voltage waveform. The result indicate that these features offer the new parameters that can be evaluated from wavelet transform to detect the fault causes. This study can be helpful for designing a new sensor to protect the electrical system immediately and acknowledge the fault causes once it occurs.

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Role of Social Sciences in Fostering Renewable Energy Technologies Development

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Abstract: To stabilize carbon dioxide in atmosphere to diminish global warming it is critical to change the nations' energy basic structures. Although, even with an increasing matter of urgency, applying of different source of alternative energy and sources has been sluggish and unreliable. This article argues on the state of the energy studies and discuss the significance and critical role the social sciences could have in emerging energy technologies diffusion.

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Fault Analysis of HVDC Converter Based on Alternate Arm Converter Topology

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Abstract: Recent advancement of high voltage direct-current (HVDC) transmission based on alternate arm converter (AAC) draws the attention of researchers due to their unique structure. It is a hybrid converter as the characteristics of this converter varies between the modular multilevel converter (MMC), due to the presence of H-bridge cells, and the two-level converter, in the form of director switches in each arm of the converter. AAC presents the improved fault tolerant characteristics compare to traditional voltage source converter (VSC). It has gained much popularity in HVDC transmission because of its robustness against fault, ability of generating higher ac voltage compare to the dc terminal voltage which permits the converter to operate at the optimal point. At this point energy balance between the ac and dc terminal is equal. Therefore, the significant contribution of this paper is to analyze the performance of AAC model under normal condition and fault condition which proves the robustness of AAC converter against the faulty situation. Both AC and DC faults are considered in this study. Simulation is performed in Matlab/ Simulink environment.

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Solar Powered Autonomous Emergency Road Signing Waterlogged system in Highways

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Abstract: Emergency road signing systems help to prevent road mishaps, especially during unpredicted disastrous conditions. In this paper, we focused on the shallow depth of water-logging from 10cm to 30cm that can slow down the vehicles or even cause collisions on motorways. To develop this smart system, Arduino UNO microcontroller is used to detect the waterlogged areas with the depth of water to show on the road signs to allow the drivers to make a decision ahead for passing through at safe speed. ZigBee wireless module is used to interface the sensor and display to increase the movability and flexibility of the displays from the waterlogged location. The system is powered up by the optimum photovoltaic system to support green technology as well as sustainability. With some quantitative analysis, it has been found that placement of three signboards at three different distances ahead of the waterlogged location is much effective to avoid any possible accidents.

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Comparative study between waste heat recovery systems using Steam Rankine Cycle and Organic Rankine Cycle for power generation

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Abstract: This paper presents extensive modelling of an Organic Rankine Cycle (ORC) system for a combined cycle power plant and to compare and evaluate the performance of ORC and Steam Rankine Cycle (SRC). In addition, ORC as a second stage waste heat recovery system after Steam Rankine Cycle too was modelled. Conceptual design of an ORC was made to replace the SRC system used in the power plant and its performance was compared with that of the SRC above. Upon replacing the steam cycle with ORC, the system efficiency is 7.63 %. The total energy destruction is 5140.41 kW. The result shows that ORC delivers very low system efficiency. The steam cycle produces 202.5MW whereas the presented ORC produces just 1.016MW of power. On the other hand, if ORC is implemented on the chimney the system will produce 0.2% of extra power on top the current power production of 675MW. The efficiency of this system is 7.81%. It is recommended to add the ORC at the chimney to tap more useful energy from the otherwise waste energy rejected into the environment.

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Malaysian Sign Gesture Recognition with Deep Learning

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Abstract: Communication between hearing impaired person and a normal people is a challenging task because the sign language used by the deaf-and-dumb person for their communication is difficult to understand by the normal people. Malaysian Sign Language or also called as Bahasa Isyarat Malaysia (BIM) in Malay is the sign language of the deaf community of Malaysia. Although it is based on American Sign Language, but both are considered as different languages. In this paper, we investigate the potential of the wearable device for Malaysian Sign Language recognition and verification for communication for local deaf individuals. The objective of this work is to use a method of deep learning to recognize the sign gesture and later can be used to translate it into text. A friendly wearable device called MYO Gesture Control Armband are used to recognize the Malaysian Sign Language. The sign gestural dataset is collected from the wearable device based on two types of data which are electromyography (EMG) and spatial data. Furthermore, the parameters of spatial data consists of the accelerometer, gyroscope and magnetometer. For the training data in this work, there are only twelve codes of sign gesture are selected that involve combination of fingers and hand motion either in static gesture or dynamic gesture. Later, Long Short-Term Memory (LSTM) in deep learning is used to train the sign identification in the learning model. Throughout the model implementation result that have been conducted, the proposed approach of sign recognition achieved 98.3% accuracy in the electromyography sensor data. The results proved that the proposed approach can be further improved in the sign gesture recognition by using the wearable device that can benefit to the hearing and speaking impaired community. In future, the dataset will further expand to include more sign gestures in order to generate a completed sign gestures library with high accurate sign gesture recognition rate for Malaysian Sign Language.

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A Light Weight Solar Powered Mini Quadcopter for Environmental Monitoring

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Abstract: A flying quadcopter equipped with green and environmentally friendly solar energy is designed and implemented in this study for monitoring purposes. It is capable to operate with light-weight small solar panel generated power with designated lightweight boost converter integrated in the body of the flying model. A preliminary design of the solar powered quadcopter has been performed by calculating and estimating the maximum lifting weight of flying model, voltage rating of the solar panel, battery voltage rating and its capacity. A charging during operation has been supplemented to the quadcopter to facilitate the operation as well as charging at the same time. In addition, crash protection structure has also been equipped to the design to reduce the impact to the structure during improper landing. With the enhanced ability of providing self-sustaining energy source, the quadcopter is capable to carry out environmental sensing with proper sensor mounted on it.

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Technical and Economic Feasibility Study of Solar Powered Air Conditioners in Brunei Darussalam

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Abstract: On daily basis, a huge amount of fossil fuel is being burnt which results in a substantial amount of greenhouse gasses being released into the atmosphere. Air conditioners are becoming more common and are a major strain on energy demands especially in tropical climate countries like Brunei Darussalam. The photovoltaic electricity is a clean and sustainable. In this paper, we present a techno-economic feasibility study for solar powered air conditioning system in Brunei Darussalam. Four alternatives are investigated, 1) the PV system supplies 50% of the loads, 2) the PV system supplies 75% of the loads, 3) the PV system supplies 100% of the loads, and finally 4) the PV system supplies 125% of the loads. Where in the last two case the excess electricity is sold to the grid. With 0.3 $ feed-in tariff the best alternative is the grid-connected PV system with 125% capacity factor which was chosen due to its short payback time period as well as high profit rate over the lifetime of the project.

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Modelling and Simulation of 1.2 MWp Tenaga Suria Brunei Photovoltaic Power Plant

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Abstract: The energy demand in Brunei Darussalam will increase in near future. The renewable energy is one of the alternative energy sources that could satisfy the increasing energy demands. Brunei Darussalam depends heavily on fossil fuel to generate its electricity needs. Fossil fuels are depleted and main source of pollution. Photovoltaic (PV) systems generate electricity directly from the sunlight without any emission of global warming gases, and the fuel is free which the sunlight is. In order to optimize the performance of PV systems their operation should be well understood. In this paper, we present the modelling of a real 1.2 MWp photovoltaic system. The PV power plant is tied to the grid. The PV array, the DC/DC converter and the DC/AC inverter are modelled and implemented in Matlab/Simulink. The controller of the grid-connected inverter is modelled to achieve constant voltage, constant frequency and to be synchronized with the grid. The system is simulated under Brunei weather conditions and the results are acceptable.

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Flood Risk Prediction for a Hydropower System Using Artificial Neural Network

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Abstract: Hydropower scheme would experience issue relating to high flooding especially at low lying area due to extreme raining season. To mitigate the potential risk of flooding and improve the hydroelectric regulation, a flow prediction is needed to estimate the discharge of water flow at hydroelectric reservoirs. Artificial Neural Network (ANN) model were used in this research to forecast the water discharge of hydroelectric station. The discharge flow predictions were made based on fore bay elevation, inflow and the discharge of water flow. Elman Neural Network architecture were selected as ANN method and its performance was evaluated by considering the number of hidden nodes and training methods. ANN model performance were assessed using performance metrics such as Root Mean Square Error (RMSE), Mean Square Error (MSE), Mean Absolute Error (MAE) and Sum Square Error (SSE). The result indicate that ANN model showed the best applicability for discharge prediction with small performance metric.

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Using Cyanobacteria as Bioindicator for Heavy Metals in Aquatic Environment

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Abstract: Freshwater resources have been seriously threatened by metal pollutants, which are produced by anthropogenic activities. Thus a widely available naturally occurring bioindicator is an ideal candidate to be used to detect the presence of these pollutants. In this paper, the potential of using cyanobacteria for heavy metals detection in water bodies was determined. The cyanobacteria Anabaena cylindrica had been cultured, immobilized, and exposed to Cu, Pb, and Cd with the concentrations of 0.01 - 10.00 mg/L. The responses of the cells to the heavy metals were measured for 60 minutes. From this study, the effect of the cell culture age and cell density were determined as well. The cells with 7 days of culture age, and the amount of cell with density of OD= 0.5 A (measured at 700 nm wavelength) were found to be most conducive for the detection for all heavy metals. The cells were capable to provide detectable fluorescence emission within 5 minutes of exposure. Thus the cyanobacteria was identified as a good candidate to serve as bioindicator for the presence of heavy metals in aquatic environment.

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Microcontroller Based Portable Anemometer for Wind Monitoring System

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Abstract: Weather monitoring and forecasting system plays an important role nowadays in all the aspect of science, trade and other fields not limited to the field of cultivation, farming, fishery, naval trade, shipping, military operations, air navigation etc. Wind speed and wind direction is one of the most vital weather variables like moisture, pressure, temperature, density, rain forecast, solar radiation, clouds, air masses, fronts and storms. In this paper, a low cost PIC16F887 microcontroller based portable wind speed and wind direction monitoring system called an anemometer is designed & experimented. The designed anemometer is divided into two parts namely mechanical and electrical parts. Both parts are developed, designed and tested in this research work. Wind turns the cup of Anemometer and produced mechanical energy that converted to electrical energy or signal. The electrical signal or pulse intervals determine by the microcontroller and generates consequence pulses to find out the wind speed. The programming codes inside the microcontroller helps to extract the voltage drops measured from a potentiometer connected to the mechanical part of Anemometer and intellect the wind direction precisely. A lucrative 16x2 liquid crystal display (LCD) is used to display the wind speed and direction.

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High Efficiency CdTe Thin Film Solar Cells with CdSe as a Prospective Window Layer from Numerical Optimization

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Abstract: In this simulation, cadmium selenide (CdSe) has been utilized as a replacement for conventional cadmium sulfide (CdS) window layer by numerical simulation using Solar Cell Capacitance Simulator (SCAPS-1D). CdSe layer thickness, carrier concentration and band gap have been varied to investigate the optimum simulation parameters. An efficiency of 16.53% (with Jsc of 24.89 mA/cm2, Voc of 0.87 V and fill factor (FF) of 76.22%) has been obtained with CdS window layer as the reference case. The proposed structure of SnO2/CdSe/CdTe/Al showed the highest conversion efficiency of 16.13% (with Jsc of 24.32 mA/cm2, Voc of 0.87 V and FF of 76.19%). Furthermore, CdSe window layer exhibited almost similar results as the conventional CdS. All these simulation results specify that CdSe have the ideal prospects to be utilized as window layer for CdTe thin film solar cells.

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Hydropower Potential on Agricultural Dam: A Case Study for Pedu Dam

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Abstract: In line with its continuous GDP increase, the growth in electricity demand has shown a similar trend of annual increment for Malaysia. With the projected continuous increase of electricity demand, more fossil fuel-based power plants are committed to be built in the near future. To mitigate the resulting greenhouse gas emission from increasing demand, exploiting existing agricultural dam initially built for agricultural purposes for energy can be considered as an option. This study shows the potential of generating electricity from Pedu dam located in Kedah, initially built with the objective to harvest paddy twice annually. The study shows that there is a potential of 156,072MWh to be generated from the dam water release, with the power of 33,155kW and a capacity factor of 53.7%, using Kaplan type turbine.

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Design, Simulation and Fabrication of Quadrupedal Robot integrated using Five-Jointed Legs with Suspension Spring

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Abstract: Research and development of legged locomotion robots has attracted much attention from researchers in these two decades. Legged locomotion robots are more versatile compared to wheeled mobile robots where legged locomotion robots can traverse in different and inaccessible terrains. Design of legged robots are usually inspired by imitating the locomotion of humans, animals or insects into accomplishing a legged mechanism. However, there are several technical problems in the development of legged robots that need to be solved and optimized in term of mechanical design, stabilization, robustness, energy consumption and control strategy. In this paper, a complete description of the design process for a four-legged locomotion robot or also known as quadrupedal robot will be presented. The quadrupedal robot is purposely designed as the Messenger Robot 2 (MR2) to participate in Robocon 2019. Robocon is an annual robotic competition where robots have to complete specific tasks in different terrains within a set period of time. To overcome the challenges in Robocon 2019, each leg of the quadrupedal robot is designed with five joints integrated with a compression spring at the foot for suspension. The quadrupedal robot consists of a total sixteen standard servomotors where groups of four servos actuate leg joints of the quadrupedal robot. Furthermore, there are an additional three servomotors, where one servomotor is a joint at each front leg to allow the robot to rotate its orientation, and the last servo for an extension mechanism system. Finally, the simulation and experimental results demonstrated that the quadrupedal robot achieves a stable walking motion with the fastest locomotion of two legs contacting the ground at half walking cycle. In the future, the legged mechanism of the quadrupedal robot will be further improved and optimized toward the generalization of the dynamic legged locomotion in other challenging terrains.

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Impact of Back Surface Field (BSF) Layers in Cadmium Telluride (CdTe) Solar Cells from Numerical Analysis

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Abstract: Numerical simulation has been executed using Solar Cell Capacitance Simulator (SCAPS-1D) to study the possibility of favourable efficiency and stable CdS/CdTe cell in various cell configurations. A basic structure of CdS/CdTe cell is studied in this work with 4 μm CdTe absorber layer and 100 nm tin oxide (SnO2) as front contact, 25 nm cadmium sulfide (CdS) as buffer layer, zinc telluride (ZnTe) is used as back surface field (BSF) material compared with ZnTe:Cu, Cu2Te and MoTe2 in order to reduce the minority carrier recombination at back surface field (BSF). The cell structure of glass/SnO2/CdS/CdTe/MoTe2 has shown the highest conversion efficiency of 17.04% (Voc=0.91V, Jsc=24.79 mA/cm2, FF=75.41). These calculations have verified that SnO2 as buffer layer and MoTe2 as back contacts are suitable for an efficient CdS/CdTe cell. Also, it is found that a few nanometers (about 40 nm) of back surface layer is enough to achieve high conversion efficiency. When MoTe2 is used, high conversion efficiency of more than 17% has been achieved compared to other BSF materials.

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Energy Harvesting From Piezoelectric Cantilever Beam with Different Shapes: A Review

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Abstract: This paper reviews the piezoelectric energy harvesting from mechanical vibration. The recent development in the microelectronic devices and wireless sensor networks (WSNs) requires continuous power source for better performance. Many researches have been done to develop a permanent portable power source for microelectronic devices. Micro energy harvesting (MEH) consists of two basic elements; freely available energy and transducer. Energy is everywhere around us in different forms. The energy conversion ability of piezoelectric energy harvester is high among different MEH techniques. A cantilever type piezoelectric energy harvester under different shapes is mostly studied in the last few years. The output of piezoelectric harvester depends upon the deflection produced, more deflection led to more electrical output. The deflection in cantilever beam under different shapes is different. This review paper presents a comparison of different piezoelectric cantilever beam shapes and output generated analyzed in the last decade.

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Malicious Vehicle Detection Based on Beta Reputation and Trust Management for Secure Communication in Smart Automotive Cars Network

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Abstract: High reliance on wireless network connectivity makes the Vehicular Ad hoc Network (VANET) vulnerable to several kinds of cyber security threats. Malicious vehicles accessing the network can lead to hazardous situation by disseminating misleading information or data in the network or by performing cyber-attacks. Thus, it is a key requirement that the information that is exchanged among the vehicles in the network must be kept secret and the information must be from an authentic or authorized vehicle. In these circumstances, to protect the network from malicious vehicles we have proposed reputation system based on beta probability distribution with trust management model to identify trustworthy vehicles from malicious vehicles. The trust model is based on Adaptive Neuro Fuzzy Inference System (ANFIS) which takes trust metrics as input to evaluate the trustworthiness of the vehicles. Simulation has been conducted in MATLAB. Simulation results show that the proposed trust management model can effectively identify the trusted vehicles in the network.

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Effect of combined drink cans and steel fibers on the impact resistance and mechanical properties of concrete

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Abstract: This study investigated the influence of 0.2 % drink cans and steel fibers with various dosage of %, 0.5%, 1%, 1.5%, 2%, 2.5% and 3% to the mechanical properties and impact resistance of concrete. Hook steel fiber with 30-mm and 0.75 mm length and diameter, respectively was selected for this study. The drinks cans fibre were twisted manually in order to increase friction between fiber and concrete. The results of the experiment show that combination of steel fibers and drink cans fibers improve the strength performance of concrete, especially the compressive strength, flexural strength and indirect tensile strength. Moreover, the impact resistance of fiber reinforced concrete consistently gives better results as compared to non-fiber concretes. The fiber reinforced concrete turns more ductile as the dosage of fibers is increase and ductility starts to decrease slightly after optimum fiber dosage is reached. It is found that concrete with combination of 2% steel and 0.2% drink cans fibers show the highest compressive, split tensile, flexural as well as impact strength.

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Solar Tower Power: The Impact of External Receiver on Optimal Performance and Energy Storage. A Review

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Abstract: An external receiver was seen as a major component of the Solar Tower Power plant. This generated stable power from concentrated sunlight. However, the flux distribution on its surface was an issue related to the external receiver that could affect the performance and energy storage in STP. The heat flux increased during long-term use, failure reduction, receiver efficiency and performance. The main advantage of the STP structure was its substantial heat storage capacity which allowed the system to generate stable and continuous electric power. In this study, the researchers reviewed existing literature to investigate the effect of the STP external receiver on the optimum energy storage and performance of the STP; especially regarding the solar flux distribution and efficiency. The researchers aim to improve the external receiver's optimal performance without affecting the incident heat fluxes. The literature review indicates that ideal receiver conditions lead to solar energy flux distribution optimal performance. Therefore, system optimisation was necessary to satisfy all limitations; like loss occurring due to heliostat field, solar flux flow patterns, external tubular receiver designs, and HTF molten salt selection. These limitations, along with factors affecting these limitations, are reviewed in this study.

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Design and Dimensional Analysis of Interdigital Sensor For Blood Glucose Measurement Through NonInvasive Process

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Abstract: Diabetes has shown to be a chronic disease world over, mainly caused due to reduced physical activity and increased obesity. World health organization statistics show diabetes as a leading cause of disability universally. To avoid extreme medical conditions of subjects, regular monitoring of their glucose levels has been suggested. The most common method that has been in use is the pinprick method for glucose monitoring which carries the risk of contamination as well as irritation. One possible approach called noninvasive technique can be adopted to avoid this major concern. This paper presents designing Inter-Digital-Sensor (IDS) for non-invasive sensing of the glucose level. The sensor-based chip once mounted onto the upper arm or pinkie finger of diabetes subject, is able to sense different glucose levels concentration as impedance plots. A set of several simulation results has been obtained using COMSOL for getting optimized dimensions of the sensor digits. This research has presented the generation of an electric field and intensity by using electrode of known length with element spacing varying from 250µm to 600µm developed over 15mm x 20mm sensor area. An IDS of 475µm width spacing with ten (10) digits producing 2.33 pF of capacitance value with impedance resonating at 13 GHz of frequency is reported in this paper.

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Flexural and Shear Bond Strength of Sediment Brick Masonry

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Abstract: This paper presents an experimental investigation of shear and flexural bond strength of masonry prisms for newly developed sediment masonry bricks. The bond strengths of sediment brick masonry were tested accordance with RILEM TC 127-MS and ASTM E518 for shear and flexural strength respectively. The results were then compared to clay brick and cement-sand brick masonry. The results show that pre-wetted sediment brick masonry exhibits higher flexural and shear bond strengths of about 1.5 times and 5 times respectively compared to dry (non-wetted) sediment brick masonry. Using cement-lime mortar in pre-wetted sediment brick masonry leads to increment of the bond strengths and pre-wetting action is essential for sediment brick masonry to prevent failure of shear bond strength.

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Harvesting Sustainable Energy From Saltwater: Part II - Effect of Electrode Geometry

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Abstract: Green energy or renewable energy is a widely and commonly used terminology when depicting the energy generated from natural resources such as solar, wind, geothermal, biomass and hydropower. Malaysia is creating a greener future for the society by gradually promoting electric vehicles as well as continuous efforts on hydropower, solar energy, biomass and biogas. These incentives are aligned with the country's mission to facilitate 50% of energy transition from fossil fuel to renewable energy by 2050. One energy resource, in particular, has yet to unleash its potential is the saltwater energy. When salt is dissolved in the water, the ionic compounds of sodium and chlorine are separated, thus allowing the free movement of ions in the solution. This study is the second part of the development phase in producing a low cost saltwater lamp for rural and remote communities in Malaysia. This study specifically focuses on the dimension and geometry of the aluminium electrodes as well as the types of carbon electrodes used. It was found that the voltage and current output were affected by the geometry of electrodes and the types of carbon used. This is because the electrical properties of metals in the saltwater solution largely depend on the reactivity of the metal. Larger surface area of electrode that is submerged in the saltwater solution helps to promote the reaction between the free ions and the electrode's surface thus increases the current output. This study is important in determining the most cost effective electrodes to be used in the saltwater lamp.

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Chemical composition analysis of furanic compounds in transformer oil for preventive maintenance of power transformer

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Abstract: Power transformer is vital in the power transmission and distribution networks. Transformer oil and transformer insulation paper are two main components of the transformer insulation system of a power transformer. At normal operating temperatures, the transformer insulation system undergoes degradation and produces various chemical by products that further deteriorate the condition of the transformer. One of such by products is the furanic compounds that are formed due to the thermal degradation of the insulation paper. These compounds are found to be dissolved in the transformer oil. A high concentration of these compounds in the oil indicates high degradation of the insulation paper. In this experiment, we have presented a method of optically detecting the furanic compounds in transformer oil. The result of the experiment shows 4 peaks that can be observed with the presence of furanic compounds in transformer oil. The demonstration of these major peaks corresponding to the existence of furanic compounds in transformer oil gives an opportunity to develop a prototype that is able to directly detect the presence of furanic compounds in transformer oil in real time without any pre-preparation procedures. This study will also be a potential development that can overcome the limitations of the currently implied method of detecting furanic compounds in transformer oil.

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Numerical Investigation of Subcooled Boiling Heat Transfer in Helically-coiled Tube

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Abstract: This study was conducted to investigate the flow behavior and subcooled boiling heat transfer of water inside helically-coiled tube. A computational fluid dynamics model was developed and validated against previously published experimental results. The model was developed based on the Eulerian-Eulerian framework coupled with k-ε RNG turbulence model and Standard Wall-Function. Good agreement for the bulk fluid temperature and non-dimensional length between numerical prediction and experimental counterpart was achieved. The results indicated that the subcooled boiling tends to improve heat transfer performance and the value of pressure drop is estimated around 26.834 kPa. The result revealed that the subcooled boiling starts at the inner wall of the tube due to the presence of secondary flow induced by coil curvature. This study was intended to provide direction for future research of the subcooled boiling heat transfer in the helically-coiled tube.

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Geomagnetic Induced Current Analysis In Hybrid PV-Wind System Transformers

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Abstract: Geomagnetically induced currents (GICs) can cause saturation of the magnetic core of transformers in a power system. This saturation can conduce to generating harmonic currents, voltage-control problems and overheating of the transformer internal components, leading to gas relay alarm/operation and possible damage. In this paper, GICs effects have been analyzed on hybrid PV-wind system transformers by using PSCAD/EMTDC program. The system consists of 2 MW solar photovoltaic (PV) farm, 2.1 MW wind farm, energy storage system and load. The entire system is connected with the utility grid through a step-up delta/wye transformer. In addition, Pi-section has been used to represent the distance between different parts of the system. The GIC is modeled as a controlled DC voltage source and inserted into the system through a neutral point of a wind turbine transformer. The simulation results of reactive power, voltage and current waveforms, and non-linear behavior due to asymmetric saturation of the magnetic core in the transformer due to 500 A GIC current injection are obtained.

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Perception of Graduates on University's Reputation

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Abstract: Globalization and social media have made the world far more reachable than ever before. The changes have to be prepared on the technological, demographic, social, environmental, economic and political matters. This includes our educational structures. Thus, the questionnaires in the tracer survey prepared by the Ministry of Higher Education are carried out to get the perceptions and opinions of every graduating student on their experiences while they were studying in the institution. The purpose is to obtain the views and experiences on the program, facilities and services provided during the study in the institution. The feedback from graduates is important to bring any necessary changes to the strategic planning of the institution. Correlation and regression analysis are performed to determine the relationship between the components related to graduates' experiences while studying in Universiti Tenaga Nasional (UNITEN), the effectiveness of study programs and graduates' perception of the institution's reputation. The results revealed by the stepwise regression analysis that the stronger degree of the significance in terms of the contributing predictor for the graduates' perception of UNITEN's reputation starts with the effectiveness of the study program, facilities, assessment system, teaching staff, curriculum and lastly with the knowledge and skills.

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Numerical Modelling of Glass Fiber Reinforced Polymer (GFRP) Cross Arm

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Abstract: Composites are not isotropic like their metal counterparts, e.g. steel and aluminum, as they are made of two distinctive phases known as the matrix and the reinforcing phases. In addition, weight, fiber direction, fiber composition and even the manufacturing process are all critical factors in determining the strength, stiffness and the behaviour of a composite member. All of that create more challenging designing and manufacturing approaches. This paper shows how to model a GFRP cross arm using SOLIDWORKS to create the 3D geometrical model because it has an intuitive and easy to use user interface, and ANSYS to create the numerical model and the analysis for its great and comprehensive capabilities in the finite element analysis. The cross arm was found to be safe against the failure modes of fiber, matrix, in-plane shear, out-of-plane shear and delamination under all load cases which satisfies the ultimate limit state requirements but the concern was on the serviceability limit state which had a deflection of 34 mm

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Design Enhancement of Glass Fiber Reinforced Polymer (GFRP) Cross Arm

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Abstract: Fiber reinforced polymer (FRP) composites are being increasingly used in construction fields including repair, rehabilitation, strengthening and new constructions due to their very high strength-weight ratio, high corrosion resistance, high strength, low thermal conductivity and electrical insulation characteristics. However, these composites are not isotropic like their metal counterparts, which creates more challenging designing and manufacturing approaches in order to come up with an economical design that can withstand all kinds of loads. Therefore, this paper aimed to study and enhance a design of a transmission tower cross arm made of glass fiber reinforced polymer (GFRP) carrying a 275 kV cable by developing a numerical model of a GFRP cross arm. The results showed that stresses developed in the composites were within the safe range. In addition, the cross arm was shown to be governed by the serviceability requirement and it was safe against multiple failure criteria such as fibers and delamination failure. Furthermore, the results showed that the total deformation was reduced by 14.2% by adding 1-meter GFRP sleeves to all members near the cable and by 20.7% if CFRP sleeves were used.

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Physiochemical Properties Evaluation of Calophyllum Inophyllum Biodiesel for Gas Turbine Application

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Abstract: The devastating phenomenon of fuel shortage and environmental pollution have cause concern to find for other fuel resources that could meet human demand. With regards to these issues, biodiesel appears to be one of the plausible resources due the many advantages it provides compared to the conventional petroleum-diesel. Besides the application in the diesel engine, biodiesel could be a promising substitute to distillate fuel for power generation in gas turbine because of the chemical properties of biodiesel that closely match the distillate standards. Recently, non-edible oil receives worldwide attention compared to edible feedstock in producing biodiesel. Among the many privileges provided by this plant are useful by-products (glycerol), environmental friendly, ability to reduce the competition for food and more economical feedstock. Therefore, looking forward for a greener environment and sustainable fuel resources, this paper aims to evaluate the physiochemical properties of Calophyllum inophyllum (CI) biodiesel for gas turbine application. The conversion of crude Calophyllum inophyllum oil into methyl ester requires double transesterification reaction due to the high free fatty acid content in the crude oil. The properties of Calophyllum inophyllum methyl ester was obtained to evaluate its potential in gas turbine application according to the fuel selection standard for gas turbine; ASTM D2880. The result shows that the density and viscosity inherited by Calophyllum inophyllum biodiesel nearly match the distillate. However, the higher viscosity possessed by Calophyllum inophyllum biodiesel could impede the complete combustion. Besides, Calophyllum inophyllum biodiesel has lower calorific value compared to distillate which will eventually increase the specific fuel consumption in gas turbine. Nevertheless, these problems could be tackled by biodiesel-diesel blending and pre-heating of fuel. In addition, Calophyllum inophyllum biodiesel has high flash point which conveys no safety issues for handling and storing. This shows that Calophyllum inophyllum biodiesel may be the pursued alternative fuel in gas turbine.

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Design and Analysis of an Elliptical Patch Antenna for RF Energy Harvesting Application in 2.4 GHz Frequency band

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Abstract: In this paper, an elliptical patch antenna is presented, which operates at the frequency of 2.4 GHz frequency band. It allows energy harvesting from RF waves. The elliptical antenna has an antenna substrate made with FR4 board with dielectric constant of 3.95. The paper presents the simulation results of the basic parameters of the antenna such as: return loss, input impedance, bandwidth, gain, directivity and efficiency. The experimental results for return loss, band width and input impedance was also presented in the paper. The antenna has a gain of 5.84 dB, directivity of 6.25 dBi, return loss of -24.6 dB, bandwidth of 457 MHz and input impedance of 52.4Ω. The parameters makes the antenna eligible for energy harvesting application.

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An Assessment of Green Quality of Work Life Dimensions: A Study at Public Institutions in Malaysia

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Abstract: The aim of the study is to assess the perception of employees on green quality of work life at public organizations in the four zone states in Malaysia namely the eastern zone, northern zone, southern zone and middle zone state. In this study, the Green Quality of Work Life dimension consists of green job satisfaction, green job reward, green management support, green social relationship, green training and development and green team based practices. . The number of respondents involved in this study for the four zone states are 1985 respondents with overall average rate of response of 96 percent. Based on the results, the dimension of green job satisfaction, the middle zone state has scored the highest average of agreement with 58 percent, the green job reward also showed the middle zone state got the highest agreement score with 57 percent, the green management support dimensions also showed that the middle zone sate score the highest agreement with 57 percent, the dimension of green social relationship showed the northern zone score the highest agreement score with 56 percent, green training and development showed the highest agreement score was middle zone state with 55 percent and the green team based practices showed the highest average agreement score was middle zone state with 58 percent.

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Optimisation of Directivity and Gain Performances on Circular Patch Antenna Design for 2.4GHz Applications

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Abstract: In this paper, simulation and optimization analysis on circular patch antenna for 2.4GHz is presented. The performance that been specifically focused in this analysis is the improvement of the directivity and gain of the circular patch antenna design. Basically, the objective of this analysis is to compare the circular patch antenna of a single form with 1x2 antenna array formation. These antennas are designed with the proximity feeding technique. From the previous literature and findings, the optimization works of array arrangement have been proven will improve the directivity and gain performances. In this study, the array arrangement with proximity feeding technique of optimization work to improve the directivity and gain of a circular patch antenna has been explored. Comparison of a single and array of microstrip circular patch with proximity feeding technique as the FR-4 is the substrates with permittivity equal to 3.95 is presented. Based on the results, 1x2 array arrangements enhance the directivity and gain output compared to a single form circular patch antenna design. The directivity performance improves 29.5% and gain has been improved by 49.1% after optimization. The findings show that the array elements with proximity feeding technique design offer to improve and enhance the directivity and gain performances of an antenna.

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Orthogonal Piezoelectric Energy Harvester for Low Frequency Applications: Modeling and Experimental Validation

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Abstract: The use of piezoelectric energy harvesters in low frequency applications is a classic problem due to the high elastic modulus of currently available piezoelectric materials. Furthermore, the output power is proportional to the third power of the excitation frequency. Higher excitation amplitudes or an increase in the piezoelectric material can produce a high output power. However, this is not feasible for weak environmental vibration, and using more piezoelectric material would incur a higher cost so this is not an attractive option. This article proposes an L-shaped piezoelectric energy harvester that amplifies the excitation amplitude with the aid of an extension arm. The effects of bending and rotational inertia are considered when modelling the open-circuit voltage that can be generated by the harvester. Experimental validation is carried out using zinc, aluminium and galvanized steel extension arms. The prediction model provides a good estimation of the results with acceptable error percentages for linear elastic extension arms. It is found that the proposed harvester geometry generates more output voltage for all lengths of extension arm, and the optimum lengths are different for each material. The use of a zinc extension arm generated 290 μW at 49 Hz, which is 55% greater than the power generated by a harvester without an extension arm that had a power density of 1.41 μW/mm3.

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The Impact of Geomagnetically Induced Current on Single- Phase Saturable Transformer

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Abstract: Changing of magnetic fields, can cause electrical currents, known as geomagnetically induced currents that caused by solar storm. This current can affect power system especially power transformer as it can generate quasi direct current through the neutral of the transformer. Previous studies have shown that the risk is not just limited to high and mid-latitude locations, but extends to power grids at lower geographic latitude as well. This paper presents the simulation of GICs using a single-phase saturable transformer under steady state and operation with GIC in MATLAB SIMULINK. The simulation results illustrate that when transformers are under influence of GIC, magnitude of flux and magnetizing current are increase within time and distort the core of hysteresis curve. It indicates that GICs generated by solar storms can saturate the transformer, cause other effects such as transformer heating and creating large amount of harmonics. The findings have proven that GIC is a threat to the power transformer and can damaged power system network.

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Antibacterial effect of the ethanolic leave extracts of Musa paradisiaca, Musa acuminata and Musa sapientum against MSSA and MRSA

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Abstract: Plant extracts have been used widely to treat bacterial-related diseases due to the phytochemical compounds. Banana plants have contain antimicrobial, antiulcerogenic and antioxidant properties. Due to the limited effective antibacterial agents against the rising emergence of resistant bacteria, plant extracts are being investigated as alternatives to the existing antibacterial agents. Hence, the aim of this study was to investigate the antibacterial effect of the 80% ethanolic leave extracts of Musa paradisiaca, Musa acuminata and Musa sapientum against MRSA and MSSA. The leave extracts were prepared using aqueous extraction, soxhlet extraction and concentrated through rotary evaporator after the leaves were dried and ground finely. Based on the zone of inhibition formed in the agar well diffusion assay, the 80% ethanolic leave extract of M. paradisiaca (2.86g/mL) exhibited a higher inhibitory effect on MRSA isolates compared to M. acuminata. No zone of inhibition detected with the extracts of M. sapientum. Since, the zone of inhibition was comparable to the zones of inhibition formed by the positive control, clindamycin, the finding of this study strongly suggests the potential use of the leave extracts of M. paradisiaca and M. acuminata as effective antibacterial agents against against MSSA and MRSA.

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Characterization Studies on Iranian Agriculture Waste Via Thermogravimetric Analysis (TGA) as a Feedstock for Energy Recovery

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Abstract: The world generates millions of tons of agricultural waste every day. Alternatively, these agricultural and crop waste which is more than 20 megaton per year will be burned and this can cause pollution, and the released energy will be wasted. Instead, can be utilized as renewable energy biomass sources for power generation. A thermogravimetric analyzer measures the mass continuously over time while the temperature of the sample changed. TGA can be used to evaluate the thermal stability In this study, the behavior and characteristic of six different biomass (Date, Rice Husk, Apple, Corn, Grape, and Wheat) in pyrolysis process were characterized using thermogravimetric analysis (TGA). The agricultural samples were collected from variety of Iran based cultivation site. The particle size of collected pulverized samples for analyzation pre-condition was 0.5 to 1mm. By conducting the proximate analysis, moisture and ash content has been determined. For a better understanding of the characterization of these crops, based on thermogravimetric analysis (TGA) data and by using modified Arrhenius equation as the chosen kinetic modeling, the activation energy for each sample has been calculated. Also, determination of calorific value (CV) for all samples has been done by using bomb calorimeter. Finally, Percentage of the main five elements (carbon, oxygen, nitrogen, hydrogen, and sulfur) in each sample has been evaluated out using ultimate analysis. Based on the results obtained, Date has shown the utmost potential for energy recovery from biomass with low activation energy (18.54 KJ/mol) and high carbon content (67.78%) and reasonable calorific value (15.84Mj/kg) compared to other samples. However, the amount of ash content (16%) and moisture content (11%) was within the acceptance range compare to other biomass. Due to low calorific value of biomass, it can combined with coal as a supplementary fuel to be use in powerplant. In addition, Wheat can be considered as the second choice due to the huge amount of residue; however according to result, the activation energy, calorific value, ash content, and moisture content show average value.

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Impact of Electron Irradiation on Transition Temperature of Pb-Substituted Bi-2223 Superconductor

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Abstract: The synthesis of (Bi1-xPbx)2Sr2Ca2Cu3O8+σ (x=0 and 0.4) (Bi-2223) bulk samples, hereafter called as Bi/Pb (x=0) and Bi/Pb (x=0.4) were completed by using solid-state reaction method. The Bi-2223 samples were subjected to calcination for 24 hours at 840°C, Then, the pelletized powder for both samples were sintered at 865°C for 48 hours. The samples were then irradiated with electron sources with dosage of 100 kGray each. X-ray powder diffraction (XRD) patterns were used to determine the phases that present in the samples. Results of XRD patterns for both the non-irradiated and irradiated samples showed well-defined peaks all of which could be indexed based on the Bi-2223 phase structure. Besides, the XRD patterns indicate that electron irradiation did not affect the Bi-2223 superconducting phase structure. Measurements of the critical temperature, TC were conducted before and after irradiation using AC susceptibility technique and four-point probe. Bi/Pb (x=0.4) sample showed significant TC value compared to Bi/Pb (x=0) sample. Results of scanning electron microscopy (SEM) micrographs show improvement in the grain growth and texture in the electron irradiated samples of Bi/Pb (x=0.4) sample. In contrast, the impact of electron irradiation on its microstructure and consequently the TC was destructive in the Bi/Pb (x=0) sample.

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Current technology on nutrients removal, recovery and reuse from liquid fraction of digestate

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Abstract: Digestate is usually managed through several ways for optimal transport and application. The common practice for digestate management is through solid-liquid separation.Solid fraction of digestates are commonly used for land spreading where they are applied, directly or after composting, as organic fertilizer. New routes have been proposed for solid digestate valorization such as production of biochar, bio-fuel in domestic furnaces, bioethanol production after centrifugal milling as well as post treatments (thermal, alkaline and enzymatic) for methane recovery.Liquid fraction of digestates contain high concentration of nutrients; from 1.5 to 6.5 g/L total nitrogen and from 0.94 to 2.51 g/L total phosphorus (P2O5) as well as high ions concentrations from 0.5 to 3.1 g/L ammonium (NH4+), from 1.05 to 5.48 g/L potassium (K+), 0-2.13 g/L phosphate (PO43-). Besides it also contains other ions such as sodium, chloride, magnesium, calcium and sulfate. High ions concentration limits land application of 100kg/ha/y of potassium and 60 kg/ha/y of phosphate. Therefore, the removal of these nutrients are important before land application or disposal. In addition, these nutrients could be marketed to regions with nutrient demand or to the non-agricultural sector. The opportunities for nutrients marketing from digestate are largely unexploited and the marketing strategies is still immature. This paper reviews the current technology on nutrients removal, recovery and reuse from liquid fraction of digestate. The discussion on nutrients removal include ammonia stripping, anaerobic ammonium oxidation (ANNAMOX), direct contact membrane distillation, constructed wetland system and vapor pressure membrane contactor. Nutrients recovery technology discussed in this paper include vacuum evaporation, struvite recovery, vacuum thermal stripping with acid absorption, combined evaporation and reverse osmosis. Meanwhile, the current technology on nutrients reuse include cultivation with microalgal for biomass production, nutrients recycling back to digester, soil application and subsurface injection into soils.

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Effect of heat exposure time on microstructures of CoNiCrAlY-2 wt.% Al2O3 powders by facile suspension route synthesis

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Abstract: In this study the intermetallic-matrix composite powders CoNiCrAlY-2wt.%Al2O3 were characterized in order to investigate the effect of heat exposure time on morphologies, grain growth and phases formed by facile suspension route synthesis. The as-synthesized powders were examined by Scanning Electron Microscopy (SEM), Energy Dispersive X-ray (EDX) and X-ray diffraction (XRD). The formation of NiAl phase was noticed after 1 hour of heat treatment. The average particle size of intermetallic-matrix composite powders CoNiCrAlY-2wt.%Al2O3 increases as the heat exposure time increases. It is found that the reinforcement of alumina allows the particles to uniformly distribute when the sample is heated for 10 hours. The formation of NiAl starts when the sample is heated at 1 hour and NiAl continues to form when heated at 10 hours.

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Design an Ultra-Wide band Modified Wilkinson Power Divider Fed Balanced Antipodal Vivaldi Antenna Array

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Abstract: In this paper, a compact and modified geometrical structure of 1-to-4 way ultra-wideband Wilkinson power divider feed network for 4-element balanced antipodal Vivaldi antenna array has introduced. The proposed Wilkinson power divider has been designed and printed on low-cost Epoxy laminate substrate FR4 along with the thickness of 1.6mm and relative permittivity of εr =4.3 respectively. The transformation of power divider network which are based on bent corners as a replacement of sharp-edges used for reduction in unintended radiation and implementing one radial stub on each branch to meet the antenna specifications. Further some adjustments in the dimension of stubs matching in order to increase the reflection of the power divider network. The design presents the model of a power divider and maintains an equal power splitting at different ports with practical insertion loss and conventional return loss below -10dB. The reasonable impedance matching has achieved at every single port with acceptable isolation performance values over the (3 to 10 GHz) frequency range. The design and optimization are practicable via computer simulation technology (CST) simulation software. Measured results are revealed to meet the array specifications under ultra-wideband frequency range.

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Assessment of Electric and Magnetic Fields Exposures for Different Types of Street Lights

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Abstract: The use of solid state lighting using energy saving lights such as light emitting diodes (LEDs), High Pressure Sodium Vapour (HPSV) and induction light in the illumination has represented a major technological breakthrough in recent years. Several recent studies focus on the development and performance of energy saving street lighting systems such as LED, induction etc. This paper focuses on the study of electromagnetic field (EMF) and electric field exposure from three street lights systems; LED, HPSV and Induction lights. The EMF and electric field measurement are conducted at site in which represent the actual condition of street lighting setup and in the laboratory that represents the controlled environment. In this paper the in-lab experiments will be presented and results obtained from measurements will be utilized as references for measurement in open space that may have some interferences from other sources. The measurements are conducted using the hand held Aaronia SPECTRAN spectrum analyser model NF-5030 and in accordance to MS2230-2009 standard.

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Paper ID: 1570551035

A simplified method: System size and cost estimation of Grid Connected Photovoltaic (GCPV) system

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Abstract: There are various types of Renewable Energy (RE) that has been studied by many researchers in order to find a cost-effective energy generation in reducing the non-renewable energy source. In this study, the solar energy was suggested in order to apply the Net Energy Metering (NEM) scheme that has been introduced effective on 1st January 2019, by Malaysian government in achieving 20% national RE target in electricity power mix, reducing the dependency on imported fossil fuels. This new scheme improved the previous one which is the Feed in Tariff (FiT) by adopting the true net energy metering concept and this scheme will improve the return of investment of solar photovoltaic (PV). Based on the data and results, the suitable size of solar panel for a house can be determined based on the daily electricity usage. The findings show that the system size and the cost itself also depends on the estimated amount solar generated set by the consumer.

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Room Temperature Synthesis and Characterizations of Copper-based Metal-Organic Framework (Cu-MOF) using Natural Polysaccharide as Potential Organic Linker

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Abstract: Recovering and separating oil from water in any manufacturing process mean reducing water pollutants in wastewater. In this study, copper-based metal-organic framework was successfully synthesized using natural polysaccharide, gum Arabic (gA, Acacia Senegal) as potential organic linker by adopting the synthesis method from Misran et al. with some modifications. The copper-based metal-organic framework (Cu-MOF) was obtained from the combination of copper salt, natural polysaccharide, and terephthalic acid (H2BDC) at various ratio. The synthesis process was done with the addition of triethylamine (TEA) as catalyst. X-ray Diffraction (XRD) pattern exhibited the presence of a prominent peak assigned to (200), (400), (511), (731), (773), and (882) crystal plane almost similar to the octahedral copper-based MOF-199. Field Emission Scanning Electron Microscopy (FESEM) shown an agglomeration and flaky particle. Energy Dispersive X-Ray Spectrometry (EDX) shown three main elements exist inside the Cu-MOF which is carbon (C), copper (Cu), and oxygen (O). This study showed the possibility of natural polysaccharide as new, non-toxic, water soluble linker. Thermogravimetric Analysis (TGA) analyses of as-synthesized Cu-MOF exhibited three different weight losses when heated to ca. 600oC. The first step due to the loss of water content, the second step due to the loss of organic moieties inside the Cu-MOF framework and the last was due to the collapse of MOF's structure. The Fourier-Transform Infrared Spectroscopy (FTIR) spectra suggested strong absorption band at ca. 900 - 1200 cm-1 from C-O bonding, at ca. 1045 cm-1 from C-H bonding from gum Arabic, at ca. 1500 - 1600 cm-1 from the benzene ring, and at ca. 3200 - 3500 cm-1 from hydrogen bonding. These results suggested that natural polysaccharide of gum Arabic exhibited the possibility to become a new, non-toxic, renewable linker for the MOF materials and played a significant role in metal-organic framework formation.

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The load reliant power transfer of the series-to-series inductive resonant wireless power transfer

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Abstract: In this paper, the effect of the output impedance to the power transfer efficiency of the series-to-series inductive resonant wireless power transfer at the resonance frequency is reviewed in details. The analysis is carried out by utilizing the theoretical inductive resonance wireless power transfer model using the MATLAB ® package. In this paper, the experiment is designed to confirm the highest power transfer efficiency is obtained at the resonance frequency for the given value of the coupling coefficient. Besides that, the experiment is also conducted to find the optimum load impedance for all given value of coupling coefficient. The analysis shows that the maximum wireless power transfer efficiency for series-to-series inductive resonant wireless power transfer is at the maximum peak when operational at the resonance frequency. In addition, the power transfer efficiency is improved by working at the optimum load impedance. The experimental set up is presented and the analytical results are reported.

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Antibacterial activity of Cymbopogon citratus against clinically important bacteria

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Abstract: Antibiotic resistance has become a major problem worldwide, and has impacted patients emotionally and financially. In order to overcome this problem, alternative therapeutic agents should be investigated. Cymbopogon citratus possesses various pharmacological activities including antibacterial activity, which is useful in treating multidrug resistant bacterial infections. The antibacterial property is due to the presence of resistance modifying agents that are present in the plant. In this study, multidrug resistant bacterial isolates that have been collected from healthy individuals in Nilai were identified and confirmed. Aqueous and methanolic extracts of C. citratus were used in agar diffusion assays to determine the efficacy of C. citratus in treating multidrug resistant bacterial infections. Moreover, different parts of C. citratus were used to examine the difference in antimicrobial activity. The inhibition zones were measured and compared among the different extracts and C. citratus essential oil, which was used as the positive control. The extracts also compared with the antibiotics commonly used to treat multidrug resistant bacterial infections. In this experiment, C. citratus essential oil showed the greater antimicrobial activity than methanolic extract due to the fact that the methanolic extract was not concentrated enough while boiled extract did not exhibit any antimicrobial activity. The C. citratus extract also exhibited better antimicrobial activity in gram positive bacteria than in gram negative bacteria, with the exception of P. aeruginosa which showed a high susceptibility towards the methanolic extracts. Thus, C. citratus could have the potential use in the treatment of biofilm development related infections.

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Renewable Energy and Energy Security in Malaysia

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Abstract: Robust economic growth, increasing population and personal consumption are the main drivers for the rapid increase of energy demand in Malaysia. Increasing demand has compounded the issue of national energy security due over-dependence on fossil fuel, depleting indigenous domestic conventional energy resources which in turns has increased the country's energy import dependence. In order to improve its energy security, Malaysia has seriously embarked on a renewable energy journey. Many initiatives on renewable energy have been introduced in the past decade. These strategies have resulted in the exploding growth of renewable energy deployment in Malaysia. Therefore, this study investigated the impact of renewable energy deployment on energy security. Secondary data was used to calculate the energy security indicators. The study also compared the results of applying different energy security indicators namely Availability, Applicability, Affordability and Acceptability dimension of energy resources. The evaluation shows that Malaysia will experience improvement in Energy Security, particularly on Availability, Affordability and Acceptability dimensions of energy security. This study suggests that energy security level could be further enhance by efficient utilization of energy, reducing carbon content of energy and facilitating low-carbon industries.

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Design and Development of a Carbon Footprint Calculation Model for Universiti Tenaga Nasional

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Abstract: Carbon footprint is the amount of a greenhouse gas (GHG) produced as a result of human activities, usually expressed in equivalent kilograms of carbon dioxide (CO2). As the amount of greenhouse gases emission increases, the global temperature increases. In the context of a global awareness of the climate change, carbon footprint has recently become extensively calculated and ways to reduce it are proposed. The purpose of this research is to calculate the amount of carbon footprint discharged by students in College of Engineering (COE), Universiti Tenaga Nasional (UNITEN). From this research a model to calculate the carbon dioxide emission released from the activities done by the COE students particularly, is developed. Literature reviews are done leading to an explanation of what emission categories should be presented in a CO2 calculation for a university. This includes emission sources in each buildings, activities and services in COE particularly. Conducting survey is one of the methods to get the data from the students and staffs directly. From this data, the calculation is done and tabulated in the Excel template. From this template model, the carbon footprint for each or total students of COE can be known. Referring to this data, CO2 reduction strategy in COE particularly and UNITEN generally can be proposed.

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Waste to Energy Production from Agricultural Waste of Paddy (Oryza sativa) Industry in Malaysia: Life Cycle Cost Analysis

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Abstract: Transportation played an important role in energy sustainability and environmental quality. Due to significant growth in environmental pollution, more competent and feasible development of the transportation sector has raised the interest in many countries including Malaysia. Ethanol fuel is cleaner and sustainable compared to gasoline fuel. Although first generation bioethanol has been widely used in road transport globally, it raised the concern about food versus fuel issues. The solution for this is by utilizing agricultural waste as feedstock for bioethanol production. Therefore, this paper investigated the rice straw bioethanol production and its effect on economy and environment when rice straw bioethanol is utilized as a gasoline substitute in Malaysia. Approximately 6% of total gasoline consumption could be saved if rice straw is utilized for bioethanol production, while reducing 92% of air pollution. Based on the life cycle cost model, it was found that the total production cost for 50 ML rice straw bioethanol production plant with a projected lifetime of 20 years is nearly 200 million USD, which the unit production cost is 0.16 USD per liter of bioethanol, which is lower than the gasoline price. Therefore, Malaysia should consider second generation bioethanol as a potential alternative fuel to address the problem of depleting fossil sources and global warming.

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Optimum Design Consideration of a Battery Charger Prototype using Photovoltaic-Thermoelectric Hybrid Generators

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Abstract: The study focuses on the development of a battery charger from the combination of thermoelectric module (TEM) and solar cell. Owing to the maturity of the solar cell technology, the focus is attributed first on the design for the thermoelectric power generation (TEPG) through simulation and experiment. The impact of surface ratio between TEM and heat sink as well as fin height are investigated at various temperatures by using ANSYS software, while a number of experiments is carried out to study output characteristics of TEM. This investigation shows how the hot side temperature affects the output performance of TEM. Finally, the data from the simulation and the experiment is yielded the prototype with 256 cm2 heat sink capable of producing 1-4.5 W at 200 oC from TEMs, and 1.92 W from 128 cm2 crystalline silicon solar cell under the global AM1.5 spectra (1000 W/m2).

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Swarm Intelligence Approach for Multi-Objective Oscillation Stability Enhancement

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Abstract: This paper discussed the impact of multi objective function in oscillation stability improvement for single machine connected to an infinite bus system (SMIB). Commonly used minimum damping ratio, ξmin and maximum damping factor, σmax are merge in certain ratio to produce a multi-objective function, FMO. This new index has brought together the advantages of both indexes without compromising the weakness of the index involved. In this study, FMO is applied to tune parameters of Static Var Compensator with PID controller (SVC-PID) to improve damping efficiency in SMIB. The result is compared with a system that connected to Power System Stabilizer that attached with lead lag controller (PSS-LL). Both parameters of SVC-PID and PSS-LL are optimized by Particle Swarm Optimization (PSO) method. Validation based on speed response and determination of eigenvalues confirms that the proposed FMO is more effective for solving oscillation stability problems compared to single objective function.

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Hydropower Potential on Agriculture Dam in Bukit Merah

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Abstract: Malaysia, though has a good number of small to medium hydro power potential sites, has still not exploited all of them. The focus of this thesis is a feasibility study of the technical and financial viability of power generation from a medium hydropower potential site, the Bukit Merah Dam site, on the Terusan Besar irrigation canal in northern region of Malaysia. This study is carried out using flow data of 2016 from the main irrigation canal of Bukit Merah dam. The data obtained from Department of Irrigation and Drainage, Perak. The power capacity, yearly energy output, greenhouse gas reduction and financial feasibility of the potential hydro site are studied in this work. Technical analysis of the power output capacity and yearly energy output of three (3) hydro-turbine types (Kaplan, Propeller, and Francis) operable at the same given head and design flow were studied. The study shows that there is a potential capacity of 2.2 W and an annual energy generation capacity of 7028.47 MWh at a turbine peak efficiency of 92.8% at a design flow of 19.23 m3/s using Kaplan turbine.

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Performance Comparison of V-Trough Solar Concentrator Photovoltaic Systems at Varying Panel Surface Temperatures

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Abstract: This paper presents the performance of a stationary low concentration photovoltaic system using a V-trough concentrator. This study was conducted using two similar photovoltaic panels. One of the photovoltaic panels is attached with the selected and designed 60° V-trough solar concentrator. The second photovoltaic panel is without 60° V-Trough. In order to measure the system performance, both photovoltaic systems are placed side by side under similar weather conditions for two different days. Its panel surface temperature, panel back surface temperature, and short-circuit current readings are being recorded periodically. These readings are then presented in this paper.

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Fault detection in photovoltaic systems using one electrical parameter

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Abstract: Fault diagnosis of photovoltaic (PV) systems has received little attention as much of the research is focused on increasing the efficiency of photovoltaic power plants. In PV fault diagnosis, the performance monitoring and faults detection is indispensable. This paper deals with the development of a PV fault detection method based on one parameter only. The proposed method is able to find any number of faulty modules in a parallel combination of PV modules. Experiments are carried out and data analyzed to prove the accuracy of the method. The main aim of this work is the development of an effective fault detection method for photovoltaic electricity generating systems by using least number of parameters.

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Design and Evaluation of Finite and Small Antennas at 0.97 GHz for Lightning Remote Sensing

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Abstract: This paper presents the analysis of the UHF signature associated with positive and negative narrow bipolar events (+NBEs and -NBEs) captured by using a finite antenna (the largest dimension comparable to the wavelength of the incident electric field) and a small antenna (the largest dimension equals to one tenth of the wavelength of the incident electric field). Both antennas have been designed and simulated in CST simulator. The finite antenna was calibrated inside anechoic chamber and was found to have resonant frequency at 0.97 GHz with 20 MHz bandwidth and omnidirectional radiation pattern. Measurements have been conducted between November and December 2018 where 120 UHF samples and 69 UHF samples had been captured by small antenna and finite antenna, respectively, together with their corresponding low frequency records (lower than 1 MHz). In average, the UHF peak amplitudes of the finite antenna is 22% larger than the small antenna and the former has better SNR which would ease the characterization of the UHF signals.

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Effects of Reclaimed Asphalt Content (RAP) on Strength Properties of Emulsion Stabilized Mix

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Abstract: This paper presents the results of a laboratory investigation to determine the effects of reclaimed asphalt pavement (RAP) contents on the strength properties of emulsion stabilized mix. Samples prepared with different proportion of RAP and crusher run (CR) were tested for Indirect Tensile Strength Test (ITS). Two conditions of samples, unconditioned and conditioned samples were tested for ITS. The ITS results showed that the indirect tensile strength increases with increase in RAP proportion to a maximum value, further increase in RAP proportion results in a decrease in the tensile strength.

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Temporal Analysis of Microwave Radiation Emitted by Stepped Leaders of a Cloud-to-Ground Flash

Ammar Alkahtani, Shamsul Ammar Shamsul Baharin, Mona Riza Mohd Esa, Mohd Riduan Ahmad

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Abstract: We report observational study of characterization of microwave radiation emitted by lightning discharge process. The lightning measurement is conducted by using air-gap parallel plate antenna that could operate around 1 GHz with a bandwidth of 20 MHz. The recorded microwave radiation waveform is analyzed based on the reference waveform which is the fast field (FF) antenna. Microwave radiation is seen to initiate the stepped leader as the highest amplitude of burst is recorded during the phase between two stepped leaders which we named as quiet period (QP). The characteristic of the radiation waveforms is observed to be oscillating individual pulses during the period between the two stepped leaders and during the stepped leader but what differ is the amplitude of the bursts.

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The evaluation of parallel plate antenna with variation of air gap separation and copper plate area

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Abstract: Evaluation of four different designs of parallel capacitive Flame Retardant 4 (FR4) antenna acting as a sensor to the lightning detection system are studied. Three antennas with the same dimension of A3 size were fabricated with gaps of 3 cm, 5 cm, and 10 cm. A smaller area antenna with 10 cm gap were fabricated and placed inside a plastic box. Existing antenna used for lightning remote sensing has 3 cm air gap between the parallel plate. With the variations of air gaps and area, return strokes waveforms from real lightning were measured using the antennas with the same digitizer (Picoscope 4000). In this investigation, amplitude and shape of the waveform were analyzed. Cross correlation technique has been used to evaluate whether different air gap would alter the frequency component of a return stroke. It is found that the lagging is less than 4 which can be interpreted that all the waveforms are basically similar and no frequency shifting detected even when the air gap extended up to 10 cm.

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Some optimized energy and SLA-aware virtual machine placement strategies: study

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Abstract: Pay-as-you-go is the latest trend for most of the business applications and to suit it precisely a process should be followed which might be the Service Level Agreement (SLA). Cloud computing requires a clear agreed SLA signed by the service consumer and committed by service provider. The efficiency of a datacenter depends a lot on how virtual machines are provisioned and where they are located. Virtual machine placement is an optimization problem aiming for multiple goals. An efficient VM allocation policy will improve energy efficiency while limiting the degradation of quality of service (QoS) and alleviate hotspots, but will also reduce the operating costs of the data center. In this paper, we study strategies of optimal VM allocation policy to minimize power consumption in a datacenter while preserving QoS. CloudSim simulator is used to create the cloud environment. We evaluate and compare our algorithms corresponding to different approaches in order to find the one that optimize VM placement. Simulation result shows that some virtual machine placement strategies minimize the energy consumption and SLA violationsPay-as-you-go is the latest trend for most of the business applications and to suit it precisely a process should be followed which might be the Service Level Agreement (SLA). Cloud computing requires a clear agreed SLA signed by the service consumer and committed by service provider. The efficiency of a datacenter depends a lot on how virtual machines are provisioned and where they are located. Virtual machine placement is an optimization problem aiming for multiple goals. An efficient VM allocation policy will improve energy efficiency while limiting the degradation of quality of service (QoS) and alleviate hotspots, but will also reduce the operating costs of the data center. In this paper, we study strategies of optimal VM allocation policy to minimize power consumption in a datacenter while preserving QoS. CloudSim simulator is used to create the cloud environment. We evaluate and compare our algorithms corresponding to different approaches in order to find the one that optimize VM placement. Simulation result shows that some virtual machine

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The Usage of Agent Based Model in Flood Evacuation due to Dam Related Disaster

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Abstract: Nowadays, with the improvement and advance development of technology have given great benefits to the community. The usage of agent based model which can help in emergency management where it can help the dam owner to make a better decision based on the existing simulation. In dam safety the assessment, the number of loss of life during the flood events gave the level of severity of the flood. Therefore, it is important for the dam owner to estimate the warning time if the failure occur as a result to reduce the fatalities. In this paper, the objective of the research is to estimate the loss of life at the downstream area of the dam when Probable Maximum Flood (PMF) scenario to occur. The model use is known as 'Life Safety Model' which is an agent based model that use the concept of dynamic interaction between the 2d-hydrolic and the receptor. The usage of LSM have been implement in Cameron Highlands where the case study have been conducted. The result shows that the warning issues have been influence by the response rate by the people. It is shown that the response time might affect the fate of people during the evacuation. The application of Life Safety Models in this simulation shows that LSM is capable in estimating the loss of life from the actual events.

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Performance of Clustering Techniques of Multiple Partial Discharge Sources in High Voltage Transformer Windings

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Abstract: There are numerous of clustering techniques that have been exploited by researchers in many applications. Clustering technique is an unsupervised learning algorithm used to identify group structure in a set of data. Within a modern high voltage (HV) insulation system, there are multiple dielectric media, which contribute to multiple source of partial discharge (PD). Therefore, data discrimination for PD is required in order to determine the types of defects causing discharges in a HV insulation system. However, it is important that the technique used is able to produce a significant separation between the clustered data for further investigation such as for phase resolved partial discharge (PRPD) analysis. An experiment has been designed to simultaneously generate a pair of PD sources within an HV transformer winding. The PD pulses were extracted from two measurement points that were recorded by two wideband radio frequency current transformers (RFCTs) placed at the bushing tap-point to earth and the neutral to earth point. The performance of Principle Component Analysis (PCA), t-Distributed Stochastic Neighbour Embedding (t-SNE) and time-frequency mapping based on sparsity roughness at distinguishing between the PD sources is assessed and presented.

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Application of sustainable transport policies in areas of high frequent density Campus of Jadiriya - case study

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Abstract: . This research investigates and discusses the implementation of the master plan for transport and parking at the campus of University of Baghdad in 2017. Although the master plan emphasizes on economic benefits and revenue, it is benefit of environmental sustainability. Thus, there is a need to effectively implement the master plan and provide new proposals on sustainable transportation to reduce the number of private car parking spaces. The work began by analyzing the earlier designed general parking outline in university's master plan to determine if it meets the requirements of buildings after successive implementation. The success or failure of the master plan in relation to reduction in the demand for parking was also assessed. A statistical model was developed to represent the relationship between the area of roads required and the number of cars in parking, and the group of independent factors that are believed to have an impact on these numbers as well as to forecast future needs as regards parking spaces. The distribution of parking cars was found not be neither environmentally sustainable nor socially justifiable, given the clear variation in access time on foot from the nearest parking lot to the workplace. Nonetheless, the over 23% of non-users of vehicles on campus can contribute to the actualization of the concept of sustainable transport (walking). Therefore, this study recommends the preparation and implementation of detailed designs of sustainable transport and parking programs to reduce the planning, environmental, social and economic problems that exist in the master plan of the university campus

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Feasibility Study of Micro-Hydropower System Generation for Different Types of Sewage Treatment Plants

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Abstract: Small scale hydropower is among the most attractive and cost-effective sustainable energy technologies available, by harnessing electricity through moving water. Naturally, moving water can be found in rivers and also man-man conduits where there is a continuous water flow. The sewage treatment facility has continuous water flow at the effluent pipe that can a generate electricity by means of small-hydropower system. However, there are no sewage treatment plant (STP) in Malaysia that reclaim the energy through the usage of water turbines. This study is conducted to evaluate the feasibility of a micro-hydropower (MHP) system at the continuous flow of effluent discharge point of domestic STP that comprises of a low head with high flow fluctuations. This work comprises of evaluation of the potential power output of MHP generator which attached to different type of STP. The work starts with selection of a five STP which have maximum current population equivalent (PE) over design PE loading ratio. Next, the effluent discharge flow rate & outfall head were collected and recorded. Finally the potential output power for all selected STPs were calculated. The highest continuous effluent discharge flow rate contributing in high potential power and will be identified as the feasible STP for the MHP system installation.

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Evaluation Residual Stress Relaxation Induced by Shot Peening Parameters and Its Effect on Fatigue of 2024-T351 Aluminum Alloy

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Abstract: Compressive residual stresses are often induced by mechanical surface treatment such as shot peening for the purpose of improving fatigue life of components. The simulation and experimental work have been carried out under variable amplitude tests to three different shot peening treatments of 2024-T351 aluminium alloy. Experiments were conducted on subjected to three different shot peening intensities which on 4-6A, 6-8A and 8-10A and tested under cyclic loading. The cyclic test for tow applied stress amount, 170MPa and 280MPa, was performed for the 1, 2, 10, 1000, 10000 cycles. The maximum relaxation for the load of 170MPa is 45% of the initial residual stress at 10000 cycles for intensities (4-6A, 6-8A) while the maximum relaxation for load 0f 280MPa is 53% at 10,000 cycles for the intensity of 4-6A.This result showing that the relaxation of residual stress depended on the amplitude of applied load and shot peened material. A computer simulation was carried out using the finite element method (FEM) by ANSYS software to investigate the residual stresses behavior of 2024T351 aluminium alloy. The simulation results showed a good agreement with the experimental results.

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Electricity supply industry reform in Malaysia: Current state and way forward

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Abstract: The Malaysia electricity supply industry (MESI) has gone through a series of transformation and restructuring since it first started at the beginning of the last century. The latest reform, also known as MESI 1.0 took place from 2010 to 2020 is about to end. In a recent development, an announcement was made on the start of the next series of MESI reform, MESI 2.0. The objectives of the reform are to increase the industry efficiency, to future proof the industry, structure, regulations and key processes, and to empower the consumers. MESI 2.0 is the continuation of MESI 1.0, which objectives are to achieve secure and reliable supply of energy, to have economically competitive tariffs, to be environmentally sustainable and to improve customer satisfaction/choice. Thus, prior to the start of MESI 2.0, it is important to know the achievement of MESI 1.0 in such a way that enables informed decisions to be made when designing MESI 2.0. Considering MESI 1.0 that is coming to its end, it is time for such a review to be made. This paper, therefore, presents a review on MESI 1.0, focusing on the initiatives undertaken and evaluating the extent to which the objectives of MESI 1.0 have been addressed by the initiatives. Analysis performed on the review results shows that the second objective of having competitive tariffs is mostly addressed by the initiatives whereas more work needs to be done to address the other objectives. Findings from this study can serve as the reference point in identifying the current state of MESI reform and in determining the way forward for subsequent MESI reforms.

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Early Fault Detection in Bearing with Fault Seeded on Outer Raceway at Three Different Positions: Orthogonal, Centered and Opposite

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Abstract: Rotating machine such as a small low voltage motor or a power plant generator is an essential asset to the industrial applications. The execution and efficiency of these rotating machines are being reduced due to faulty rotating machinery parts. The faulty parts also generate various forces, thus increases the amplitude of vibration as well as energy consumption. Early fault detection and diagnosis have been widely used with various methods as they were able to reduce accidents and machine breakdowns along with economic losses. Among the methods, vibration signal data is one of the champions. In this study, using the time domain technique, early fault detection were focused on the bearing and the data were analyzed. Particularly, the fault was introduced on the outer raceway at three different positions; orthogonal (3 o'clock), centred (6 o'clock) and opposite (12 o'clock). The fault was seeded in the bearings ranges from 0.007 inches to 0.021 inches in diameter. The MATLAB software was used to determine the time domain parameters, comprising of the standard deviation, Root Mean Square (RMS), skewness and shape factor as the representation of the best reflection of the failure. The time domain parameters for healthy and faulty bearing were plotted and compared in graphical presentation.

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Design of Three Levels Electric Vehicle Charger Integrated PV System

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Abstract: Electric vehicles (EVs) are considered a solution for the rapid increase of the environment pollutions. EVs are energized by battery storage systems which are environment friendly and with more technological advancements; their price will be affordable by the consumers. However, as EVs become significant loads on the utility distribution system, maintaining the power quality becomes a challenge. This is due to the harmonics distortions that are produced when many loads connected to the grid. Moreover, for various reasons - including environmental concerns and energy costs - it is preferable to use Renewable Energy Sources (RES) to charge EVs Therefore, in order to mitigate these issues, the battery charger of the EV needs to have a sufficient performance with minimized total harmonic distortion (THD). Moreover, for various reasons including environmental concerns and energy cost, it is preferable to use Renewable Energy (RE) sources to charge EVs. Thus, the electrical power of the proposed EV charger is provided by a photovoltaic (PV) system which converts solar irradiance into DC current. The proposed charger consists of two converters: (1) a three-phase sinusoidal pulse-width- modulation (SPWM) (2) a converter for the three-phase bridge rectifier. The charger provides a three-stranded level of EV charging (Levels 1, 2 and Level 3). Simulation work of the universal EV charger was conducted and assessed in MATLAB-Simulink. Moreover, a laboratory prototype was constructed with a TMS320F28335 digital signal processor (DSP) programmed as the controller, to validate its operation and performance. From the findings, the proposed charger is able to provide level 1, 2 and 3 battery charging with low THD.

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Design and Development of Toilet Cistern with Tipping Mechanism for Quick Replacement

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Abstract: Toilet is a sanitation fixture used primarily for the disposal of human waste. However, the fixture which includes a cistern tank and a bowl is highly prone to experience damage due to frequent mechanical movement in the cistern tank. Therefore, a quick replacement is needed to continually ensure that the toilet can function as it is supposed to. In this paper, we present a new design of cistern. The cistern is able to accommodate for quick replacement in any case of mechanical malfunction. The new design of the cistern in terms of the tipping mechanism and configuration with the cistern tank is presented. The detailed analysis via simulation with respect to mechanical strength and motion analysis is executed to make sure that the proposed design is able to replace the faulty cistern quickly with ease. Testing has shown the potential of the new cistern to be used as a quick replacement for faulty cistern.

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A Review on Various Concentration Testing of an Essential Oil (Eucalyptus) to Knock Down Mosquitoes

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Abstract: This paper discusses about the effectiveness of essential oil in controlling dengue vectors. Dengue has been a huge challenge to curb since a very long time especially in Asia, as 70% of the type of mosquito (Ae. Aegypty) that is able to spread the viral infection are found here. However, many methods have been developed in order to control the spread of these viral infection including pesticides, aerosol sprays and many more which are currently being researched and developed. A breakthrough invention like the mosquito buster is discussed further in this paper. The mosquito buster is a vaporizer which has a high effectiveness in repelling mosquitoes. This paper focuses on the effectiveness of essential oil used in the vaporizer in repelling mosquitoes. Mosquitos were captured using the ovitrap for experimental purposes. An experimental setup rig was developed in order to study the knockdown rate of each concentration of essential oil. The concentration of essential oil varies from 1.25% to 10%. Based on the results obtained, it is known that at the maximum time the experiment was ceased which is at the 80th minute, a complete success rate is obtained at an essential oil concentration of 10%.

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PROTOTYPE DEVELOPMENT OF TRAFFIC CALMING SOLUTION: REPLACING SPEED HUMP TO ROLLER ELECTRICITY GENERATOR ROAD

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Abstract: The consumption of natural resources and power has increased tremendously. Malaysia is still considered as a developing country. Therefore energy and resources are very essential for the country's development. This study is aimed to determine the performance of electrical generating speed breaker by using a roller mechanism which is called as roller electricity generator road. By changing the conventional speed breakers with the roller mechanism, electricity can be generated. As a vehicle passes over the speed breakers on the road track, the rollers, which are connected to a generator, will spin, and hence generate electricity. The selected method is one of the most effective ways to produce electricity as the number of vehicles that will pass over the speed breakers are ever increasing. This study showed that the dynamics of the fabricated prototype was studied from a few aspects, such as the effect of vehicle speed and vehicle weight on the electricity generation. The vehicle speed and weight will affect the amount of electricity generated. Result revealed that the prototype could generate up to 7 W of peak power. However, the amount of power generated also depended on the rating of the DC generator used and the speed breaker design.

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Energy Saving Potential Using Elite Jatropha curcas Hybrid for Biodiesel Production in Malaysia

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Abstract: The world continues to search for renewable energy resources, due to the devastating effect of global warming and the dwindling resources of fossil fuels. Without needing much modifications to the existing diesel engines, biodiesel is regarded as one of the most promising ways to treat these two issues simultaneously. However, the production of biodiesel is always associated with a higher cost compared to its counterpart; the petroleum-derived diesel. In addition, the type of feedstock used in the production of biodiesel also has also become a big concern due to the never-ending fuel vs food debate. Jatropha curcas is a second generation feedstock which can be specifically grown to avoid the usage of edible oils as feedstock to produce fuel. In this paper, the energy saving potential of using elite Jatropha curcas hybrid for biodiesel production in Malaysia are evaluated by conducting a full chain energy analysis. It was found that the new hybrid consumed 25.32 MJ of energy in order to produce 1kg of biodiesel. The net energy balance (NEB) and net energy ratio (NER) when by-products are not utilized are found to be 15.89 MJ/kg and 1.63, respectively. However, the NEB and NER increase to 26.72 MJ/kg and 2.84 when the by-products are used in the biodiesel conversion process. Hence, this new hybrid of Jatropha curcas has a huge potential to be used for the production of biodiesel.

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Optimization of Biodiesel Production from Mixed Ceiba Pentandra and Rice Bran Oil Assisted by Ultrasound

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Abstract: The present study is to investigate the feasibility of mixed non-edible oils, Ceiba pentandra (CPO) and rice bran oil (RBO) for biodiesel production. Several blends of CPO and RBO, ranging from 10:90 to 50:50% w/w were put under evaluation. The transesterification process variables of CP50RB50 as the suitable blend were optimized using response surface methodology (RSM). Three process parameters investigated were the ratio of methanol to oil, reaction time and the concentration of catalyst. The optimum conditions of the transesterification process based on RSM such as KOH catalyst concentration: 0.83% wt, ratio of methanol to oil: 55.36%, and reaction time: 18.58 min, with methyl ester yield of 98.7 %. The result shows that the CP50RB50 methyl ester properties satisfy the biodiesel requirements laid in ASTM D6751 and EN 14214 standards.

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Numerical Simulation of Charge Accumulation and Transport within Cross-Linked Polyethylene (XLPE) subjected to High Electrical Stresses

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Abstract: Accumulation of space charge has been identified to be an important factor affecting the electrical performance of the cable insulation. Space charge dynamics within polymeric insulations under various electric stresses have been widely investigated. The aim of this paper is to investigate the charge accumulation and bipolar charge transport within cross-linked polyethylene (XLPE) material through numerical simulation. The model developed is a simple model established from previous work proposed by J M Alison and R M Hill. The model features the injection, transport, trapping and recombination of electrical charges. The numerical model is governed by three basic equations that described the behaviors of space charge as a function of time and spatial position. These are Poisson's, Transport and Continuity equations. The XLPE sample used for the simulation is divided into equal elements of width along the direction of its thickness. Direct discretization of Poisson's equation is used to calculate the electric field at each division. In the simulation, mobile electrons/holes and trapped electrons/holes are considered, and the charge generation is provided by Schottky injection with electrons at the cathode and holes at the anode. Then different values of applied voltage are considered and preliminary results have shown that the variation of electric field would influence the accumulation and dynamics of space charge within the material.

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Design and Monitoring of A Solar Charge Controller for Stand-alone Photovoltaic Systems

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Abstract: Solar charge controllers are devices that handle battery charging from solar cells and also control the flow current to batteries and loads. The technology to implement such controllers mostly involves microcontrollers. However, the design of integrated advanced monitoring and control mechanisms is required so that users can enhance the energy consumption performance. This work aims to develop a standalone solar charge controller that allows real-time monitoring of the battery status and is included with an automatic circuit breaker for increasing the battery lifetime. The implementation is completed in four phases which involves the design and development of the hardware, software as well as prototype for testing. The results have shown that a solar charge controller with real-time online monitoring of the battery status can be implemented successfully through the use of ThingsNet platform.

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Decoupled Control of Three Phase Grid Connected Solar PV System

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Abstract: A reliable grid connected Photovoltaic (PV) system require effective control schemes for efficient use of solar energy. This paper presents a three-phase grid connected PV system with decoupled real and reactive power control to achieve desired power factor with Maximum Power Point Tracking (MPPT) controller to extract maximum solar energy. The synchronous reference frame (dq) control along with decoupling concept is used to control the DC-AC inverter output, while the Phase Locked Loop (PLL) synchronization technique is used to monitor and synchronize the voltage and current at the grid side. The DC-DC Boost converter with Incremental Conductance (InC) based MPPT algorithm is also designed in this paper due to better accuracy compared to Perturb & Observe (P&O) algorithm. The simulation is performed in MATLAB/SIMULINK and a 31.5 kW PV system is modelled to get 30kW power with the help of MPPT at Standard Test Conditions (STC). Any power factor value between 0.85 lagging to 0.9 leading can be obtained by the presented inverter control strategy.

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Optimal Placement and Sizing of Multiple DG in Microgrid Systems: A review

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Abstract: Microgrid (MG) has become popular due to its ability to disconnect from utility grid during disturbance and operate autonomously. MG typically consists of three main parts, which are Distributed Energy Resource (DER), Energy Storage System (ESS) and load. MG has several benefits and one of them is to enhance the power system reliability and flexibility by balancing the supply and demand. The scarcity of fossil fuel and environmental concern have contributed to the growth of Renewable Energy Source (RES), which is one of the main element in MG. However, the RES integration into MG has led to multiple uncertainties due to their inherent intermittency. Therefore, optimal strategies are essential to be employed in MG to manage and control the dynamic uncertainty introduced by the renewable-based DER and variable loads. In this paper, a comprehensive review is presented on the optimal allocation of the multiple DER in MG. Various optimization methods are also investigated to solve the problems in MG. Furthermore, advantages and drawbacks of each optimization method are also reported.

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Performance Analysis of Gallium Arsenide (GaAs) Based Solar Cells from Numerical Simulation

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Abstract: This study analyses the single, dual and triple junction Gallium Arsenide (GaAs) based solar cell structures using Analysis of Microelectronic and Photonic Structures (AMPS-1D) simulator. The effect of layer thickness on the performance of GaAs solar cells has been investigated elaborately. As the layer thickness of the top GaInP in both double and triple junction solar cells decreases, the efficiency rises. Meanwhile, increasing the n doped GaAs layer thickness slightly enhances the efficiency. The thickness range from 500 nm to 3500 nm gives a variation in efficiency of about 1%. In double and triple junction cells, the thickness variation of p-GaInP and n-GaInP significantly change the efficiency of the solar cell. The optimization achieved here indicates some model structures for practical usage to achieve high efficiency GaAs based solar cells.

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The Effect of FDI on Renewable Energy Consumption in Malaysia

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Abstract: Foreign Direct Investment (FDI) is a flow traditionally associated with transfer of knowledge, technology, and management practices, and systems from the home countries of multinational enterprises to their host countries. FDI can improve local environmental performance and raise local environmental standards through the transfer of cleaner technology and better management practices, which in turn leads to a decline in the usage of non-renewable energy. A lot of developing countries (including Malaysia) are seeking to attract more FDI in renewable energy. This paper investigate the relationship between macroeconomic factors (including FDI), CO2, energy intensity and renewable energy in Malaysia covering the period of 1999-2016. The PLS analysis results show that there is a negative relationship between the macroeconomic factors and renewable energy consumption, this could be related to the cost of renewable energy, which is high and requires a huge capital investment.

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A Multi Platform for Utility using OpenFMBTM Reference Architecture: Challenges and Lessons Learned

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Abstract: The exponential growth of smart micro grids is making centralized control unmanageable. Data generated by grid-edge devices are also inaccessible due to the installation of private micro grids with proprietary communication protocols. The OpenFMBTM reference architecture solves this interoperability issue and eases the manageability of huge data by creating a virtual node that would allow exchange information between field devices with the use of publish/subscribe paradigm. However, the OpenFMBTM framework is yet to be adopted by industries but researches related to the implementation of this framework is being conducted with the aim to find out the cost and reliability on performance issues such as accuracy, scalability and security. Smart Grid Interoperability Panel (SGIP) provided a live demonstration of OpenFMBTM framework at DistribuTECH conference. DistribuTECH demo provides a guideline to setup simulators deployed in a single Linux machine. This paper discusses about the simulation demo and lessons learned to further developing the project. The implemented demo focuses on the use of MQTT communication protocol for transport layer data transfer. The experiment uses the guidelines of the DistribuTECH demo and addresses the challenge of deploying the framework in real devices at industry level.

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Minimize Effluents of Aeration Process in Wastewater Treatment Plant

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Abstract: Conventional artificial intelligent (AI) algorithm has it inherent limitations and causes not to achieve optimal solution in certain circumstance. The combination of different AI algorithm is needed to overcome those limitations in order to improve the efficiency. This paper proposes Transform of Artificial Immune System (TRANSAIS) and Cross Three Parents of Artificial Immune System (X3PAIS) algorithm in solving the optimization problem. The proposed algorithm will improved the efficiency of standard AIS algorithm in optimization problems. The proposed algorithm applied into two model of aeration process in practical wastewater treatment process plant (WWTP). The aim of the optimize problem is to minimize the dissolved oxygen (DO) and other effluents such as biochemical oxygen demand (CBOD), concentration of suspended solids (TSS), dissolved phosphorous (TDP), suspended phosphorous (TSP) produced during the process. The two models are tested under the similar condition such as generation number, size of population, rate of cloning process, rate of mutation process, crossover rate and stopping condition.

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Water absorption properties of kenaf/glass reinforced unsaturated polyester composites used in insulator rods

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Abstract: Water absorption test was carried out on kenaf/glass fibers reinforced unsaturated polyester composite materials used in high voltage polymeric insulator rods. The kenaf/glass hybrid composites were based on 20%, 30% and 40% of kenaf fibers replacement glass fibers with modified 60% unsaturated polyester resins. The composites were immersed the water at room temperature, and composites resistance to water absorption in terms of the rate of water absorption was determined. Considerable difference in the properties of water absorption of the hybrid composite was found demonstrating that the water absorption effect on characteristics of insulator rods it will depend on the arrangement and volume fraction of kenaf fiber of composite used. Based on results, a slight effect of water absorption on pure glass fiber composite (control) was observed. Addition of kenaf fiber on glass fiber composite rod increased the water absorption of the composite. It was shown that glass fibers surrounded kenaf fiber was reduced water absorption. Despite the 40% of kenaf fiber composite had the highest natural fiber content but it was the lowest water absorption because of its arrangement on all composite diameter and surrounded by glass fibers. All of the materials reached equilibrium and ceased to absorb water after 300 hours.

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Estimating Arsenic Concentration In Compost Production Using Ann Model

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Abstract: This study has been developed to predict arsenic concentration in compost, based on input materials and outside temperature, using an Artificial Neural Network model (ANN) in Christchurch, New Zealand. The final ANN model developed was based on monthly input of kerbsides, food wastes, river wastes and average air temperature for the last eight years. Comparing actual and predicted energy usage showed that the model could be fitted to arsenic concentration and accounted for around 94% and 97% of the variance for training and validation data, respectively.