



PRINCE MOHAMMAD BIN FAHD
UNIVERSITY

UAEU

The 7th International Conference on RENEWABLE
ENERGY GENERATION AND APPLICATION

ICREGA 2024

April 21 - 24, 2024

Department of Electrical Engineering
College of Engineering
Prince Mohammad Bin Fahd University
Al-Khobar, Saudi Arabia



Conference Program

Program-at-a-Glance

- All times are Saudi Arabia time zone (GMT +3)

Sunday, April 21st 2024

Pre-conference Workshop	13:00 – 16:00	G-014 Robotics Lab
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The Potential of Adopting 3D Printing in the Energy Sector: Applications and Challenges

Dr. Waleed Ahmed, Mechanical Engineering Department, United Arab Emirates University, Al Ain, UAE

Prof. Mousa Hussein, Electrical Engineering Department, United Arab Emirates University, Al Ain, UAE

Program-at-a-Glance

- All times are in Saudi Arabia local time (GMT +3)

Monday, April 22nd 2024

Registration	8:00 – 16:00	Atrium Admin Building
Opening	9:00 – 9:30	Auditorium Admin Building
Welcome Speech Dr. Faisal Al Anezi <i>General Chair</i> <i>Prince Mohammad Bin Fahd University</i> <i>Khobar, Saudi Arabia</i>	9:30 – 9:45	Auditorium Admin Building
Break	9:45 – 10:00	Atrium Admin Building
Keynote Lecture 1 Role of the Smart Grid in Facilitating the Integration of Renewables into the Power Grid Prof. Saifur Rahman <i>Director, Virginia Tech Advanced Research Institute, USA</i> <i>President, IEEE Power & Energy Society, 2018 and 2019</i> <i>2023 IEEE President & CEO</i>	10:00 – 10:45	Auditorium Admin Building
Coffee Break	10:45 – 11:00	Atrium Admin Building
Technical Sessions	11:00 – 13:00	G-031, G-033 COBA Building
Lunch	13:00 – 14:00	Atrium Admin Building
Technical Sessions	14:00 – 16:00	G-031, G-033 COBA Building
Industry Sessions	14:00 – 16:00	Lecture Hall COBA Building
Gala Dinner	16:00 – 20:00	Heritage Village

Program-at-a-Glance

- All times are in Saudi Arabia local time (GMT +3)

Tuesday, April 23rd 2024

Registration	8:00 – 16:00	Atrium Admin Building
Keynote Lecture 2 Recent Advances in Inverter and Battery Integration in PV Systems Prof. Issa Batarseh <i>Director, Florida Power Electronics Center</i> <i>Professor, University of Central Florida, USA</i>	10:00 – 10:45	Auditorium Admin Building
Coffee Break	10:45 – 11:00	Atrium Admin Building
Technical Sessions	11:00 – 13:00	G-031, G-033 COBA Building
Lunch	13:00 – 14:00	Atrium Admin Building
Technical Sessions	14:00 – 16:00	G-031, G-033 COBA Building
Industry Sessions	14:00 – 16:00	Lecture Hall COBA Building
Social Event	16:00 – 20:00	Ithraa

Program-at-a-Glance

- All times are in Saudi Arabia local time (GMT +3)

Wednesday, April 24th 2024

Registration	8:00 – 15:00	Atrium Admin Building
Panel Discussion Grid Integration of Renewable Energy Sources: Challenges and Solutions Prof. Saifur Rahman <i>Director, Virginia Tech Advanced Research Institute, USA</i> <i>President, IEEE Power & Energy Society, 2018 and 2019</i> <i>2023 IEEE President & CEO</i> Prof. Issa Batarseh <i>Director, Florida Power Electronics Center</i> <i>Professor, University of Central Florida, USA</i>	10:00 – 10:45	Auditorium Admin Building
Coffee Break	10:45 – 11:00	Atrium Admin Building
Technical Sessions	11:00 – 13:00	G-031 COBA Building
Lunch	13:00 – 14:00	Atrium Admin Building
Technical Sessions	14:00 – 16:00	G-031 COBA Building
Industry Sessions	14:00 – 16:00	Lecture Hall COBA Building
Coffee Break	16:00 – 16:30	Atrium Admin Building
Conference Closing	16:30 – 17:00	Auditorium Admin Building

Technical Sessions

Session 1A: Renewable Energy Systems, Technologies, Applications & Materials

Monday, April 22 | 11:00 – 13:00 | Room G-031 COBA Building

Session Chair: Dr. Ala Al-Haj Hussein

Paper ID: 6 | Time: 11:00 – 11:20

Analysis of Thermal Efficiency of Solar Flat Plate Collector Working with Hybrid Nano fluids: An Experimental Study

*Lingala Syam Sundar, Solomon Mesfin and Veeredhi Vasudeva Rao
Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia*

Paper ID: 17 | Time: 11:20 – 11:40

Potential Uses of Renewable Energy in Construction: Advantages and Challenges

*Essam Zaneldin, Waleed Ahmed, Betiel Paulos, Feruz Gabir, Makda Araya, El Bethel Muluye and Deborah Debele
United Arab Emirates University, Al Ain, United Arab Emirates*

Paper ID: 21 | Time: 11:40 – 12:00

A Novel Approach to Address Reliability Concerns of Wind Turbines

*Sorena Artin
Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia*

Paper ID: 33 | Time: 12:00 – 12:20

Power Systems Stability of High Penetration of Renewable Energy Generation

*Ahmad Harb and Hamza Alnawafleh
German Jordan University, Madaba, Jordan*

Paper ID: 37 | Time: 12:20 – 12:40

Exploring Sustainable Micro Milling: Investigating Size Effects on Surface Roughness for Renewable Energy Potential

*Ahmet Hascelik, Kubilay Aslantas and Waleed Ahmed
United Arab Emirates University, Al Ain, United Arab Emirates*

Paper ID: 43 | Time: 12:40 – 13:00

Vibration Analysis of 3D Printed PLA Beam with Honeycomb Cell Structure for Renewable Energy Applications and Sustainable Solutions

*Kubilay Aslantas, Ekrem Özkaya and Waleed Ahmed
United Arab Emirates University, Al Ain, United Arab Emirates*

Technical Sessions

Session 2A: Sustainability and Green Economy

Monday, April 22 | 11:00 – 13:00 | Room G-033 COBA Building

Session Chair: Dr. Samir El Nakla

Paper ID: 4 | Time: 11:00 – 11:20

Batch reactor production of Biogas from Industrial Wastewater of chalawa, kano, as an Alternative Energy for Sustainable Development in Nigeria

Garba Uba and Abdulhadi Yakubu

Jigawa State polytechnic Dutse, Jigawa, Nigeria

Paper ID: 8 | Time: 11:20 – 11:40

Green and Environmental-Friendly Material for Sustainable Buildings

Noura Al-Mazrouei, Amged Elhassan, Waleed Ahmed, Ali H. Al-Marzouqi and Essam Zanldin

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 10 | Time: 11:40 – 12:00

Techno-Economic Comparison between PV and Wind to Produce Green Hydrogen in Jordan

Zaid Hatamleh and Ahmad Al Miaari

King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

Paper ID: 14 | Time: 12:00 – 12:20

Sustainability Policies and Regulation Challenges in Recycling EV Batteries

Afnan Khalil, Mousa Hussein, Essam Zaneldin and Waleed Ahmed

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 35 | Time: 12:20 – 12:40

Assessment of utilizing solar energy to enhance the performance of vertical aeroponic farm

Esam Jassim, Bashar Jasem and Faramarz Djavanroodi

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 40 | Time: 12:40 – 13:00

From Smart Soles to Green Goals, Interlacing Sustainable Innovations in the Age of Smart Health: An Exploratory Search

Fahd Koraiche, Amine Dehbi and Rachid Dehbi

Université Hassan II, Faculté des Sciences Ben M'Sik, Casablanca, Morocco

Technical Sessions

Session 1B: Renewable Energy Systems, Technologies, Applications & Materials

Monday, April 22 | 14:00 – 16:00 | Room G-031 COBA Building

Session Chair: Dr. Jawad Al Asad

Paper ID: 66 | Time: 14:00 – 14:20

On the Performance Assessment of King Faisal University Grid-Connected Solar PV Facility

Mounir Bouzguenda

King Faisal University, Hofuf, Saudi Arabia

Paper ID: 71 | Time: 14:20 – 14:40

An Automated and Cost-efficient Method for Photovoltaic Dust Cleaning based on Biaxially Oriented Polyamide Coating Material

Said Halwani, Mena Maurice Farag, Abdul Kadir Hamid and Mousa Hussein

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 73 | Time: 14:40 – 15:00

Vibration harvesting techniques for electrical power generation – review

Omar D Mohammed, Isha Bubshait, Reyounf Alqahtani, Kawther Almenayan, Semat Alzaher and Reem Alhussain

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 80 | Time: 15:00 – 15:20

A Developed System Design for Blue Energy Generation

Omar D Mohammed, Saud Alharbi, Shoja Alharbi, Waleed Aldhuwaihi and Nasser Bini Hameem

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 81 | Time: 15:20 – 15:40

A Review of the Renewable Energy Technologies and Innovations in Geotechnical Engineering

Eman J. Bani Ismaeel, Samer Rababah, Mohammad Ali Khasawneh, Nayeemuddin Mohammed and Danish Ahmed

Jordan University of Science & Technology, Irbid, Jordan

Paper ID: 83 | Time: 15:40 – 16:00

Renewable Energy in Pavement Engineering and its Integration with Sustainable Materials: A Review Paper

Mohammad Ali Khasawneh, Danish Ahmed, Fawzyah Alkhammas, Zainab Almshar, Maryam Hussain, Dalya Alshali, Maryam Alkhuraim, Rana Aldawood, Hidaia Alzayer and Nayeemuddin Mohammed

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Technical Sessions

Session 2B: Sustainability and Green Economy

Monday, April 22 | 14:00 – 16:00 | Room G-033 COBA Building

Session Chair: Dr. Sadiq Alhuwaidi

Paper ID: 13 | Time: 14:00 – 14:20

Exploiting Cow Dung Biopellets as a Renewable Solid Biofuel for Advancing Sustainable Development

Salisu Ahmed, Musa Abdullahi and Abubakar Ahmad

Jigawa State Polytechnic, Dutse, Jigawa State, Nigeria

Paper ID: 16 | Time: 14:20 – 14:40

Renewable Energy Sources, Sustainability Aspects and Climate Alteration- A Comprehensive Review

M. Amin Mir, M. Waqar Ashraf and Kim Andrews

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 46 | Time: 14:40 – 15:00

Potential Use of Reject Brine Waste as a Sustainable Construction Material

Seemab Tayyab, Essam Zaneldin, Waleed Ahmed and Ali Al Marzouqi

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 70 | Time: 15:00 – 15:20

Role of Renewable Energy in Decarbonisation process: Case Study in KSA

Samar Dernayka, Saidur R. Chowdhury and Mohammad Khasawneh

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 78 | Time: 15:20 – 15:40

Electricity Sector Reforms In Saudi Arabia and their Impact on Demand Growth and Development of Renewable Energy

Samir El-Nakla, Chedly Belhadj Yahya, Jamal Nayfeh

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 79 | Time: 15:40 – 16:00

Optimising Solar: A Techno-Economic Assessment and Government Facility Compensation Framework Power Generation

Navaid Ali, Dr. Faheem Ullah Shaikh and Dr. Laveer Kumar

Mehran University of Engineering and Technology, Jamshoro, Sindh, Pakistan

Technical Sessions

Session 3A: Emerging Technologies and Applications

Tuesday, April 23 | 11:00 – 13:00 | Room G-031 COBA Building

Session Chair: Dr. Jamil Bakhshwain

Paper ID: 5 | Time: 11:00 – 11:20

Electroluminescence Images Based Defective Photovoltaic (Solar) Cell Detection Using Modified Deep Convolution Neural Network

Hiren Mewada, L. Syam Sundar, Hiren Kumar Thakkar and Miral Desai

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 22 | Time: 11:20 – 11:40

Solar Radiation Forecasting using Attention-based Temporal Convolutional Network

Damilola Olawoyin-Yussuf, Mohamad Mohandes, Bo Liu and Shafiqur Rehman

King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

Paper ID: 23 | Time: 11:40 – 12:00

Application of Artificial Intelligence (AI) in Wind Energy System with a Case Study

Fay Alzahrani, Feroz Shaik, Nayeemuddin Mohammed and Nasser Al-Na'Abi

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 32 | Time: 12:00 – 12:20

Prediction of Distillate Output in Photocatalytic Solar Still Using Artificial Intelligence (AI)

Reyouf Alqahtani, Feroz Shaik, Nayeemuddin Mohammed, Mohammad Ali Khasawneh and Tasneem Sultana

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 41 | Time: 12:20 – 12:40

Water and Electricity Consumption Management Architectures Using IoT and AI: A Review Study

Oumaima Rhallab, Amine Dehbi and Rachid Dehbi

Université Hassan II, Faculté des Sciences Ain chok, Casablanca, Morocco

Paper ID: 50 | Time: 12:40 – 13:00

Date Fruit Type Classification using Convolutional Neural Networks

Abdullah Alavi, Md Faysal Ahamed, Ali Albeladi and Mohamed Mohandes

King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

Technical Sessions

Session 4A: Modeling, Control and Simulation

Tuesday, April 23 | 11:00 – 13:00 | Room G-033 COBA Building

Session Chair: Dr. Hiren Mewada

Paper ID: 19 | Time: 11:00 – 11:20

Design of a Stable and Robust H^∞ Loop-Shaping Controller for LCL Filter Based Grid-Tied Inverter

Mahdi Debouza and Rachid Errouissi

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 20 | Time: 11:20 – 11:40

Adaptive cooling framework for Photovoltaic systems: A seasonal investigation under the terrestrial conditions of Sharjah, UAE

Mena Maurice Farag, Abdul Kadir Hamid and Mousa Hussein

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 42 | Time: 11:40 – 12:00

A Comprehensive Review on Computing methods for the prediction of energy cost in Kingdom of Saudi Arabia

Nayeemuddin Mohammed, Andi Asiz, Mohammad Ali Khasawneh, Feroz Shaik, Hiren Kumar Kantilal Mewada and Tasneem Sultana

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 44 | Time: 12:00 – 12:20

Effect of Loading Modes for Different Dimensions of a Reduced Tee Internal Pressure

Sofiane Maachou, Mohamed Mokhtari and Abdeldjalil Benbakhti

University Centre of Maghnia, Maghnia, Algeria

Paper ID: 48 | Time: 12:20 – 12:40

Adaptive Neuro-Fuzzy Inference System for DC Power Forecasting for Grid-Connected PV System in Sharjah

Tareq Salameh, Mena Maurice Farag, Abdul Kadir Hamid and Mousa Hussein

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 60 | Time: 12:40 – 13:00

Sliding Mode Control for Grid Integration of Point Absorber type Wave Energy Converter

Abdin Elamin and Addy Wahyudie

United Arab Emirates University, Al Ain, United Arab Emirates

Technical Sessions

Session 3B: Emerging Technologies and Applications

Tuesday, April 23 | 14:00 – 16:00 | Room G-031 COBA Building

Session Chair: Dr. Christakis Papageorgiou

Paper ID: 53 | Time: 14:00 – 14:20

AI-Based PV Panels Inspection using an Advanced YOLO Algorithm

*Agus Haeruman, Sami Ul Haq, Mohamed Mohandes, Shafiqur Rehman and Sheikh Sharif Iqbal
King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*

Paper ID: 55 | Time: 14:20 – 14:40

Impact of Artificial Intelligence (AI) in Martian Architecture (exterior and interior)

*Lindita Bande, Jose Berengueres, Aysha Alsheraifi, Anwar Ahmad, Saud Alhammadi, Almaha Alneyadi, Amna Alkaabi, Maitha Altamimi and Yosan Asmelash
United Arab Emirates University, Al Ain, United Arab Emirates*

Paper ID: 62 | Time: 14:40 – 15:00

The Utilization of IoT-Based Humidity Monitoring Method and Convolutional Neural Networks for Orchid Seed Germination

*Muhammad Ridhan Firdaus, Hilal H. Nuha, Mohamed Mohandes and Agus Haeruman
Telkom University, Bandung, Indonesia*

Paper ID: 63 | Time: 15:00 – 15:20

Ameliorated Crowd Management through AI

*Ali Khan and Mohamed Mohandes
King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*

Paper ID: 64 | Time: 15:20 – 15:40

Intelligent Solutions for Modern Agriculture: Leveraging Artificial Intelligence in Smart Farming Practices

*Fatima Zahrae Berrahal and Amine Berqia
Mohammed V University, Rabat, Morocco*

Paper ID: 67 | Time: 15:40 – 16:00

Solar Energy Powered Smart Water Heating System

*Ahmed Alturki, Yahya Almahzari, Majid Alblooshi, Faris Alghamdi, Ahmed A. Hussain, Ala A. Hussein and Jamal Nayfeh
Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia*

Technical Sessions

Session 4B: Modeling, Control and Simulation

Tuesday, April 23 | 14:00 – 16:00 | Room G-033 COBA Building

Session Chair: Mr. Ahmad Abul Hussain

Paper ID: 7 | Time: 14:00 – 14:20

Real-Time Hardware Implementation of Novel Automate Water Recycling Mechanism for Cleaning of Solar PV Modules

Mohammad Rizwan and Abdul Azeem

Delhi Technological University, Delhi, India

Paper ID: 11 | Time: 14:20 – 14:40

Analytical and numerical evaluation for wind turbine aerodynamic characteristics

Ashraf Abdelkhalig, Mahmoud Elgendi, Mohamed Y.E. Selim, Maryam Almallahi and Sara Maen Asaad

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 28 | Time: 14:40 – 15:00

Improvement of management algorithm of a transformable photovoltaic-wind system

Yahya Lahlou

Ibn Tofail University, Kenitra, Morocco

Paper ID: 47 | Time: 15:00 – 15:20

Bidding Optimization for a Reverse Osmosis Desalination Plant with Renewable Energy In a Day Ahead Market Setting

Ebaa Al Nainoon and Ali Al Awami

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 61 | Time: 15:20 – 15:40

Design and Fabrication of Low Temperature Flat Plate Collector for Domestic Water Heating

Abdulkrim Almutairi, Abdulrahman Almarul, Riyadh Alnafessah, Abbas Hassan Abbas Atya, Sheroz Khan and Noor Maricar

Onizah Colleges, Onizah, Saudi Arabia

Paper ID: 82 | Time: 15:40 – 16:00

Theoretical Modeling to Analyze the Thermal Energy Efficiency and Exergy Efficiency of Double Air-Pass Solar Tunnel Drying with Recycled Organic Waste Material

Dagim Kebede Gari, A Venkata Ramayya and Lingala Syam Sundar

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Technical Sessions

Session 5A: Modeling, Control and Simulation

Wednesday, April 24 | 11:00 – 13:00 | Room G-031 COBA Building

Session Chair: Dr. Adil Khan

Paper ID: 3 | Time: 11:00 – 11:20

Cyclic Voltammetry and Characterization Studies of Electrodeposited Copper-Indium for Thin-Film Solar Cell Application

Leher Farooq

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 36 | Time: 11:20 – 11:40

Energy Efficiency and Sustainability Enhancement of Electric Discharge Machines by Incorporating Nano-Graphite

Asaad Ali Abbas, Raed.R Shwaish, Shukry.H. Aghdeab and Waleed Ahmed

United Arab Emirates University, Al Ain, United Arab Emirates

Paper ID: 52 | Time: 11:40 – 12:00

Li-ion Batteries Life Cycle from Electric Vehicles to Energy Storage

Muhammad Rashid, Muhammad Sheikh and Sheikh Rehman

University of Warwick, Coventry, United Kingdom

Paper ID: 58 | Time: 12:00 – 12:20

Smart Cities and Intelligent Transportation Systems: Integration of Autonomous Vehicles and Their Impact on Congestion and Safety

Eman Algherbal and Nedal Al-Ratrout

King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

Paper ID: 69 | Time: 12:20 – 12:40

Solar PV based Charging Station for Electric Vehicles

Raghad Alghamdi, Batool Alsunbul, Raghad Almutairi, Rania Alnassar, Maha Alhajri, Saifullah Shafiq, Samir El-nakla, Ahmed Abul Hussain, Jamal Nayfeh

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 77 | Time: 12:40 – 13:00

Multiport Universal Solar Power Bank

Abdullah Altelmessani, Abdulqader Aljaber, Turki Altuwairqi, Ala Hussein and Jamal Nayfeh

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Technical Sessions

Session 5B: Modeling, Control and Simulation

Wednesday, April 24 | 14:00 – 15:00 | Room G-031 COBA Building

Session Chair: Mr. Wael Suliman

Paper ID: 49 | Time: 14:00 – 14:20

Robust testing requirements for Li-ion battery performance analysis

Muhammad Sheikh, Muhammad Rashid and Sheikh Rehman

University of Warwick, Coventry, United Kingdom

Paper ID: 51 | Time: 14:20 – 14:40

Bidding Optimization for Hydrogen Production from an Electrolyzer

Nouf Almutairy and Ali Alawami

Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia

Paper ID: 68 | Time: 14:40 – 15:00

Experimental investigation on the thermal and exergy efficiency for a 2.88 kW Grid connected photovoltaic/thermal system

Mena Maurice Farag, Tareq Salameh, Abdul Kadir Hamid and Mousa Hussein

United Arab Emirates University, Al Ain, United Arab Emirates