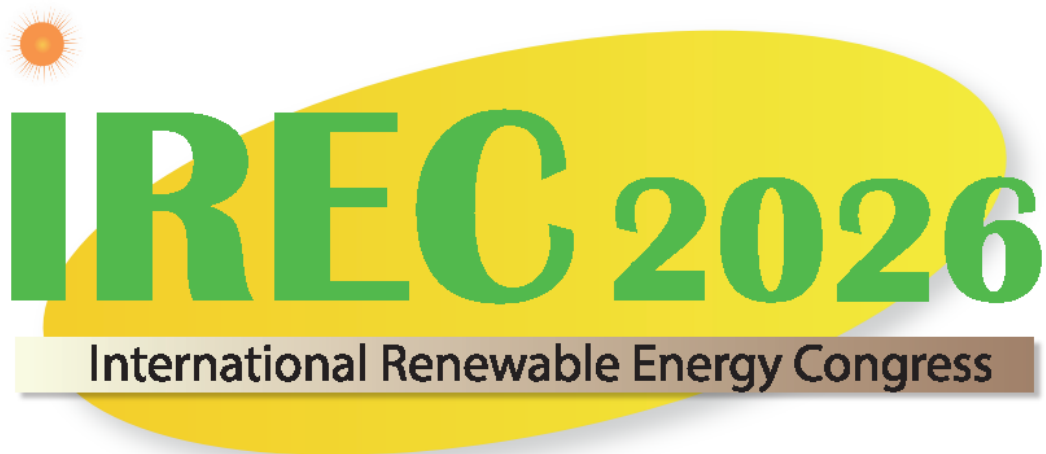


The 16th International Renewable Energy Congress

October 24 - 26, 2026 – Sousse, Tunisia



Website : www.irec-conference.com

 **info@irec-conference.com**

The proceedings will be published on IEEE Xplore

Part Number: CFP26REC-ART

ISBN: 979-8-3195-3593-1

Online ISSN: 2378-3451

The International Renewable Energy Congress (IREC) provides a forum for researchers, academicians, scientists, and industrial professionals around the world on recent developments in the fields of renewable energy. The congress consists of keynotes, oral sessions, and poster presentations. Considered as a catalyst for research works, the IREC publishes the best presented papers in partner journals.

The proceedings include works of authors from academia as well as industry working within the scope of the congress subjects. The submissions as full papers have been peer reviewed by the IPC. Acceptance have been based on quality, originality and relevance. Contributions were checked to be original and neither published elsewhere nor submitted for publication during the review period.

COMMITTEES

GENERAL CHAIRMAN: Pr. Maher Chaabene, Tunisia

CO- CHAIRMAN: Pr. Fernando Tadeo, Spain

Associated Editors Committee

- Pr. Abdeslam-Hassen Meniai, Algeria
- Pr. Mohamed Faisal, Libya
- Pr. Ahmad Harb, Jordan
- Pr. Mohamed Kesraoui, Algeria
- Pr. Mejdi Jeguirim, France
- Pr. Mohammed Haj-Ahmed, Jordan

Advisory Committee

- Pr. Issa Batarseh, USA
- Pr. My Ali El Khakani, Canada
- Pr. Julio Elias Normey-Rico, Brasil
- Pr. Sümer Şahin, Turkey
- Pr. Giuseppe Marco Tina, Italy
- Dr. Antonis Zorpas, Cyprus
- Dr. Antonio Gagliano, Italy
- Dr. Georg Frey, Germany
- Dr. Ahmad Atieh, Canada

Organizing Committee

- Kamel Mkaouar, Tunisia
- Fathi Ben Abdallah, Tunisia
- Amer Ghorbel, Tunisia
- Wassim Khanfir, Tunisia
- Mourad Chaabouni, Tunisia

PARTNERS



هيئة أبحاث العلوم الطبيعية و التكنولوجيا
Authority of Natural Science Research
and Technology



IEEE Xplore publication

The Advisory Committee will select the ELIGIBLE papers for IEEE Xplore Digital Platform from those presented at the conference: scientific content will be screened, and the similarity index (SI), provided by IEEE CrossCheck (Plagiarism tool), must fulfil any of these two conditions:

1. The Similarity Index (SI) is less than 40 %,
2. The SI is between 40% and 70%, but on both conditions:
 - a) a Self-Citation (SC) less than 30%: which is the similarity with any source by one of the authors
 - b) a Cross Citation (CS) less than 20%: which is the similarity with any other source.



Publications in partner journals

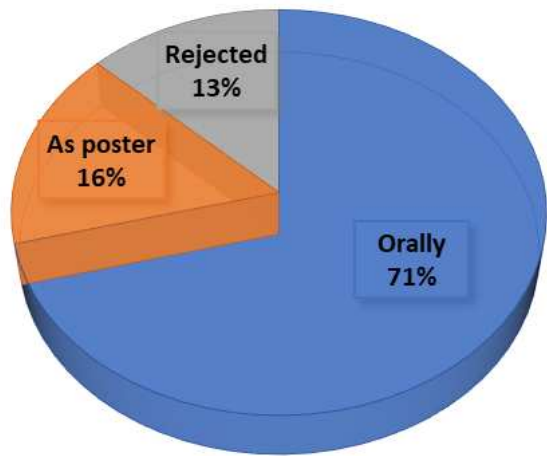
Suitable papers will be selected by the Associated Editors based on their fitting to each journal topics.

Authors of the selected papers will be invited just after the conference to revise extensively the manuscripts according to the following:

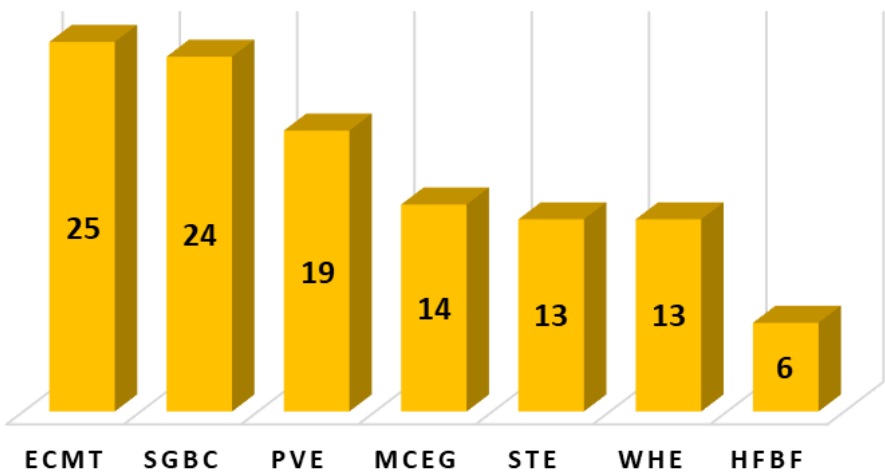
1. At least 50% should be added in fundamentals, material, validation, etc.
2. The title, the abstract and the conclusion should be changed.
3. The references should be updated (to add at least 30% to introduction).
4. The discussion of results should be updated.
5. The manuscript should be formatted according to the journal guidelines.
6. The revised paper should be submitted at the journal link before the deadline in the invitation email.

The revised paper will then go through a full review process according to the journal review process.

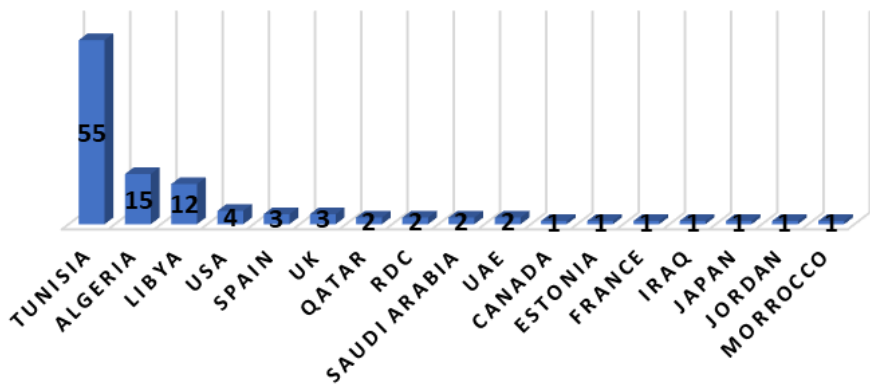
STATUS OF SUBMISSIONS (131)



ACCEPTED PAPERS BY TOPIC



107 PARTICIPANTS FROM 17 COUNTRIES



KEYNOTE 1

Saturday October 24, 2026

(09:00 - 10:00) / Room 1

Smart Microgrid and Digital Twin

(Stability and Sustainability with High RES Penetration)

Prof. Ahmad Harb

German Jordanian University, Jordan
North Carolina A&T State University (NCAT), USA (Unpaid leave)

Chairman: Pr. Mohammed Haj-Ahmed (Jordan)

Abstract

Smart Microgrid: Renewable Energy Sources (RES) such as solar energy (PV) and Wind energy are been widely used in most of power systems all over the world. No doubt that connecting such renewable energy sources to power grid is something good in many aspects, but in other hand, RES might harm the power systems stability. So, in this presentation, the impacts of RES on the power system stability will be discussed and give some solutions to avoid any kind of stability problems. As solutions, we studied the impacts of Energy Storage Systems (ESS), either static or dynamic. Static ESS (Battery Storage System, BSS), and dynamic (Hydro-Pump Storage Systems, HPSS). To have sustainable power grid, one can use microgrid with RES and use the AI and Machine learning to have a smart microgrid and eventually to have a Digital Twin (DT) virtual microgrid. What is DT? **Digital Twins:** Before talking about Digital Twins (DT), one should understand what a smart power system means? Smart power system consists of three major layers. First layer is the fundamental power system, that includes: Generations (conventional or renewable energy sources), Transformers, Transmission Lines, Distribution Lines, and Loads, in addition to that, accessories devices for protection and monitoring the systems, such as: Protection relays, meters for voltage, current, power, and frequency. Second layer is the Information Communication Technology (ICT) layer, that includes: Smart metering, Real time monitoring, Grid balancing, and Demand Management. The third layer is the Market layer, that includes: Tariff and pricing, Retail, Bidding, and Wholesale.

Biography



Ahmad M. Harb receive his Ph.D. degree from Virginia Tech., Virginia, USA, in 1996. Curently, he is a Professor at German Jordanian University (GJU). Dr. Harb is IEEE senior member and PE. Dr. Harb was the dean of Natural Resources Engineering at German Jordanian University (2011-2013). Dr. Harb is the founder and Editor-in-Chief for the International Journal of Modern Nonlinear Theory and Application, IJMNTA. Dr. Harb has published more than 115 journal articles and conference proceedings. Currently, Dr. Harb spent his sabbatical leave at University of California at Los Angeles (UCLA) at Smart Grid Center (SMERC), and unpaid leave as Program Manager (PM) of the Artificial Intelligence (AI) and Clean Energy at North Carolina A&T State University (NCAT). His research interests include power system stability, renewable energy, energy storage, smart power grid, artificial intelligence (A.I.), machine learning, power electronics, modern nonlinear theory (Bifurcation and Chaos Theory).

KEYNOTE 2

Saturday October 24, 2026

(15:00 - 16:00) / Room 1

The Flexible Heat Pump Technology: A Quasi–Two-Stage Cycle for Enhanced Efficiency and Broad Applications

Pr. Zhibin Yu

University of Liverpool, UK
Royal Society Industrial Fellowship

Chairman: Pr. Fernando Tadeo (Spain)

Abstract

Heat pumps are widely recognised as a key technology for decarbonising heat. However, their adoption has been slower than anticipated. Most commercial heat pumps are single-stage systems based on the conventional Evans–Perkins vapour compression cycle, originally developed for refrigeration nearly 200 years ago. As the temperature lift between the heat source and sink increases, their coefficient of performance declines significantly due to throttling losses. In this talk, Professor Yu will provide an up-to-date overview of recent research advances in heat pump technology and introduce his work on the invention and development of the Flexible Heat Pump Cycle, which integrates thermal energy storage into the conventional Evans–Perkins cycle. This innovation enables the recovery, storage, and reuse of otherwise wasted thermal energy from the warm liquid refrigerant leaving the condenser. The new cycle design resembles a two-stage (two-compressor) vapour compression system with subcooling and flash gas removal, offering an innovative solution to the persistent challenge of throttling losses in high-temperature heat pumps. Thermodynamically, the Flexible Heat Pump Cycle effectively creates a quasi–two-stage system that delivers performance comparable to conventional two-stage designs while using only a single compressor. The in-cycle heat recovery and storage not only enhance efficiency but also unlock a range of new application opportunities, delivering significant energy savings and improved operational flexibility.

Biography



Professor Zhibin Yu currently holds the Chair of Energy Engineering in the School of Engineering at the University of Liverpool. He is the Head of the Clean Energy and Power Research Cluster within the School and holds a Royal Society Industrial Fellowship (2023–2027). Prior to this, he was Professor of Thermal Energy at the James Watt School of Engineering, University of Glasgow. His research focuses on thermal energy technologies, with particular interest in developing innovative solutions for sustainable heating, cooling, and power generation. His expertise spans heat pumps, refrigeration, energy storage, organic Rankine cycle, thermoacoustics, etc. He has published over 200 research papers and developed the Flexible Heat Pump Cycle (PCT: WO2022069581A1). He currently serves as Associate Editor for Applied Energy (Elsevier) and Thermal Science and Engineering (Springer Nature), Subject Editor for Applied Thermal Engineering (Elsevier), and Section Editor-in-Chief for Frontiers in Thermal Engineering. He also sits on the editorial boards of Energy Reports (Elsevier) and the International Journal of Green Energy (Taylor & Francis).

KEYNOTE 3

Sunday, October 25, 2026

(09:00 - 10:00) / Room 1

Intelligent and Sustainable Energy Systems

Zhe CHEN

Aalborg University, Denmark

Chairman: Pr. Mohamed Kesraoui (Algeria)

Abstract

Our energy system is undergoing a profound transition toward a clean, sustainable system based on new energy technologies. Electrification is to play a pivotal role in future energy systems, while hydrogen is emerging as a significant energy carrier. Traditional fossil-fuel-based technologies are being replaced by new energy technologies, including wind turbines, photovoltaic (PV) panels, battery energy storage, power-to-hydrogen systems, carbon capture technologies, and EV and Fuel Cell vehicles etc. Power electronic technologies are becoming very important in modern power systems. These advancements of technologies are reshaping the structure and characteristics of modern energy systems, while optimal and secure usage of those energy technologies is also very important for developing a reliable, economic and sustainable energy system. This speech will provide a brief overview of the new energy technologies and discuss the challenges and optimal integration of the new energy technologies and AI's applications.

Biography



Dr Chen is a Professor and the leader of Research Group Power Grids for the Green Transition with the Department of Energy Technology, Aalborg University, Denmark. Professor Chen's main current research interests are wind energy, power electronics, power system and modern energy systems and AI applications in energy systems. In these areas, he has led many international and national research projects and has supervised many PhD, Postdoctoral researchers and visiting PhDs/scholars, he has more than 1000 technical publications.

Dr Chen is a member of editorial boards for many international journals. He is a Fellow of IET, a Chartered Engineer in the U.K., a Life Fellow of IEEE, a member of the Danish Academy of Technical Sciences and a member of European Academy of Sciences and Arts.

IREC 2026 SCHEDULE

	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00
Friday October 23rd , 2026								Registration				
Saturday October 24th, 2026	Welcome and Opening Room 1	Keynote 1 Room 1	Coffee break	Slot 1 4 rooms		Lunch		Keynote 2 Room 1	Slot 2 4 rooms			
Sunday October 25th , 2026		Keynote 3 Room 1	Slot 3 4 rooms			Lunch		Excursion to the walled medina of Kairouan				
Monday October 26th , 2026		Slot 4 4 rooms			Awards & Closing	Lunch		WISH YOU ALL SAFE AND NICE TRIP BACK HOME				

SESSIONS

- **ECMT** : Energy Conversion, Management and Transmission
- **BHBF**: Biohydrogen and Biofuel
- **MCEG**: Materials For Clean Energy Generation
- **SGBC**: Smart-Grids, Zero Energy Buildings and Sustainable Cities
- **PVE** : Photovoltaic Energy
- **STE** : Solar Thermal Energy
- **WHE**: Wind and Hybrid Energies

Social Program: Excursion to Kairouan city; Tunisia's Islamic heritage (20€)

Kairouan is referred to as the Islamic Cultural Capital. The city was founded by the Arabs around 670. In the period of Caliph Mu'awiya, it became an important centre for Islamic and Quranic learning, and thus attracting a large number of Muslims from all over of the world, next only to Mecca and Medina. The holy Mosque of Uqba is situated in the city. It is considered as Islam's fourth holiest city.



DISPATCHING OF PRESENTATIONS

ID	Room 1					Room 2					Room 3							
Slot 1	Oral : ECMT					Oral : PVE					Orally : SGBC							
	13	93	69	132	85	128	15	25	54	55	49	75	88	98	105	148	133	
	153	34	51			114												
Slot 2	Oral : MCEG BHBF					Oral : STE					As poster : ECMT SGBC WHE							
	91	67	82	43	89	17	29	47	86	120	52	50	71	92	104	119	130	137
	117	154	95			131	142				138	68	20	74	96	97	80	44
											56	61	118	143	159			
Slot 3	Oral : SGBC					Oral : WHE					Orally : ECMT							
	32	23	26	28	36	27	31	38	134	144	66	65	149	77	83	70	64	135
	45	60	145			147	160											
Slot 4	Oral : SGBC					Oral : PVE					As poster : BHBF MCEG STE PVE							
	48	103	107	116	81	150	87	21	40	78	72	73	99	58	122	140	151	162
	139	161				84	121	152			19	24	59	110	113	136	100	101
											115							

ECMT : Energy Conversion, Management and Transmission

Slot 1 : October 24th , 10:30 AM - 12:30 PM

Room 1

Chairs:

Nabiha Brahmi , Tunisia

Order	ID	Paper
1	13	Optimal Design Method for Isolated Dual Half Bridge Converters Afef Ben Mansour, Mohamed Abbas
2	93	Performance Evaluation and Thermal Analysis of Two-Level and Four-Level Flying-Capacitor Inverters for PMSM-Driven Electric Vehicles under the UDDS Cycle Salma Harrath, Meriem Ghodbane-Cherif, Afef Ben Abdelghani Bennani
3	69	Field-Oriented Control of a PMSM Traction Drive for Electric Vehicles: Comparative Analysis of PI and Sliding Mode Speed Controls Meriem GHODBANE ep CHERIF, Firas Mahjoub, Salma Harrath, Afef Ben Abdelghani Bennani
4	132	Condition-Aware Gaussian Process Regression for Health Assessment of Lithium Iron Phosphate Battery Cells Raja Yahmadi, Kais Brik
5	85	Effect of Pressure-Dependent Water Properties on Transpiration Cooling with Phase Change in Porous Media Aroua Ghedira, Zied Lataoui, Abdelmajid Jemni
6	153	Injection-Ratio Scaling of Phase-Change Transpiration Cooling in Porous Media: A Volume-of-Fluid Study with OpenFOAM Aroua Ghedira, Zied Lataoui, Abdelmajid Jemni
7	34	Virtual Current-Based PLL-Less Pre-Synchronization for Andronov-Hopf Oscillator Grid-Forming Inverters Yanwei Cai, Salaheddine Ethni, Mohammed Elgendy, Mohamed Dahidah, Volker Pickert, Faisal Mohamed
8	51	Super-Twisting Sliding-Mode Control with Dual Extended Disturbance Observers and Optimised Frequency-Splitting EMS for Fuel Cell/Battery/Supercapacitor Hybrid Vehicles Marwen BJAOUI, Mohamed KOUKI

Slot 2 : October 24th , 04:00 PM - 06:30 PM

Room 3

Chairs:

Ahmad Harb , USA
 Mohamed KESRAOUI , Algeria
 Rafael Carnicero Gómez , Spain

Order	ID	Paper
	52	Numerical optimization methodology of Phase Change Material equipped Photovoltaic system under Tunisian operating conditions Meriem Noura, Mohamed Bechir Ben Hamida
	50	Intelligent Transportation Systems for Sustainable Energy Transition: A Review of Energy Conservation and Carbon Emission Reduction Sonia Mrad, Rafaa Mraihi
	71	Modeling and Feasibility Assessment of Tunisia's Energy Transition Scenario by 2030 Using OpenTEPES Framework Meriem Noura, Maher Ben Chiekh
	92	A Hierarchical Fuzzy Control Strategy for Enhanced Performance of a Photovoltaic/Thermal Desalination Plant Mahmoud AMMOUS, Nabiha Brahmi, Maher CHAABENE
	104	PV/T-Driven Reverse Osmosis with Parallel Permeate and Brine Heat Recovery: Performance Evaluation and Economic Optimization Mahmoud AMMOUS, Nabiha Brahmi, Maher Chaabene
	119	Life Cycle Assessment of One Tonne of Steam Generated by a Natural Gas-Fired Boiler Azza Masmoudi, Haythem Haddad
	130	Reinforcement Learning-Based Maximum Power Point Tracking for Wind Energy Conversion Systems Using TD3 Agent Maryem Moussaoui, Nabiha BRAHMI, Maher CHAABENE
	137	Experimental Solid-Liquid Equilibrium Data for Citric Acid-Water and UNIFAC Predictions for Salicylic Acid in Acetone and Ethyl Acetate KARIMA BITCHIKH, ABDESSALEM HASSEN MENIAI, NABIL SMAKGHI
	138	Preliminary Qualitative Assessment of Dermal Chemical Risk in Pharmaceutical Operations KARIMA BITCHIKH, ABDESSALEM HASSEN MENIAI, HIND NOUARA, HIBA MERIEM, NABIL SMAKGHI

Slot 3 : October 25th , 10:00 AM - 12:30 PM

Room 3

Chairs:

Manef Bourogaoui , Tunisia

Order	ID	Paper
1	66	GRU-Based Online SoC Estimation for Li-ion Batteries: A Temporal Window Analysis Marwa Gaich, Sabeur Jemmali, Bilal Manai
2	65	Lithium-Ion Battery Diagnosis Based on SoH, SoP, and RUL Estimation for Electric Vehicle Applications Houda sta, Sabeur jemmali, Bilal Manai
3	149	Performance Assessment of a 5-kW Photovoltaic Energy Conversion Chain using a Two-Diode PV Simulator Intissar Moussa, Adel Khedher
4	77	Optimal Integrated Sizing and Two-Stage System Operation of Microgrids with Hydrogen and Battery Energy Storage CHIRAZ KRIFA, Toma Kubotani, Yutaka Sasaki, Ahmed Bedawy, Yoshifumi Zoka, Shinya Sekizaki
5	83	Artificial Intelligence and Machine Learning Across the Lifecycle of Hybrid Renewable Energy Systems Nabiha BRAHMI, Mahmoud AMMOUS, Maher CHAABENE
6	70	Reliability Modelling and Comparative Assessment of Multilevel Inverter Topologies Hajer Kouki, Khaled Ben Smida
7	64	Constant Power versus Multi-Step Constant Current Charging of Lithium-Ion Battery Packs for Electric Vehicle Applications: An Electro-Thermal-Aging Simulation Study with Kalman State Estimation Bilel Abbassi, Sabeur Jemmali, Bilal Manai
8	135	Optimization of a solar assisted ground source heat pump system using TRNSYS simulation tool Nabiha Naili, Omeima Nouicer, Sami Kooli

BHBF : BioHydrogen and BioFuel

Slot 2 : October 24th , 04:00 PM - 06:30 PM

Room 1

Chairs:

mariem zaghdoudi , Tunisia

Abdeslam-Hassen MENAI , Algeria

Order	ID	Paper
2	67	Innovative design of hydrogen furnace for aluminum recycling Saida Chatti, Hazem Touati, Abdelmajid Jemni
3	82	Investigation of SMR during regular and irregular cylindrical packing: A CFD test Hajer TROUDI, Moncef GHISS, Zoubeir TOURKI

Slot 4 : October 26th , 09:00 AM - 11:30 AM

Room 3

Chairs:

Nihel Ben Slimane , Tunisia

Faisal Mohamed , Libya

Order	ID	Paper
	72	Scenario Analysis and Feasibility Assessment of Green Hydrogen Production in Tunisia Towards 2040 Meriem Noura, Mohamed Bechir Ben Hamida
	73	Scenario Analysis and Feasibility Assessment of Green Hydrogen Production in Tunisia Towards 2030 Meriem Noura, Mohamed Bechir Ben Hamida
	99	Integrated Experimental and Environmental Assessment of Biomass Co-Pyrolysis for Hydrogen-Rich Gas Production and Biochar Valorization KORDOGHLI SANA

MCEG : Materials For Clean Energy Generation

Slot 2 : October 24th , 04:00 PM - 06:30 PM

Room 1

Chairs:

mariem zaghdoudi , Tunisia
Abdeslam-Hassen MENIAI , Algeria

Order	ID	Paper
1	91	Efficient Moisture Diffusivity and Activation Energy for Pomegranate Peel Convective Drying Nihel Ben Slimane
4	43	Structural, Electronic, and Electrochemical Properties of CoFe_2O_4 , MgFe_2O_4 , and CuFe_2O_4 Spinel Ferrites for Hydrogen Storage Chaima Sakouhi, Youssef Dabaki, Chokri Khaldi, Mohammed Kassem
5	89	Immersive VR Simulation: Modeling Solar Panel Performance and Energy Flow in Unity Using Real-World Energy and Weather Data Abhinav Pendem, Jessica Noutchet, Issa W. AlHmoud, Balakrishna Gokaraju, Chyi Lyi Liang
6	117	Atmospheric-Pressure Plasma Processing of Hybrid Nanomaterials for Enhanced Renewable Energy Storage and Grid Integration Faysil Alfaydh zreeq, Abu Bakr Ali Duqaimish, Al-Shaybani Al-Zarruq Al-Murab
7	154	DEVELOPMENT AND CHARACTERIZATION OF STARCH/XANTHAN GUM BIODEGRADABLE FILMS ibtissem HOUCINAT, Hibet errahmane ARFI, Rania FILALI, Dorsane FELLAH, Nawel OUTILI, Abdeslam Hassen MENIAI
8	95	Limits of Ideal Osmotic Flux Models in Forward Osmosis: A Parameter-Resolved Validation Against Pilot-Scale Data Nihel Ben Slimane

Slot 4 : October 26th , 09:00 AM - 11:30 AM

Room 3

Chairs:

Nihel Ben Slimane , Tunisia
Faisal Mohamed , Libya

Order	ID	Paper
-------	----	-------

	58	Castor Seed Oil Extraction: Experimental Insights and Kinetic Modeling Mehdi LOUAER, Narimane LAMMARI, Abdeslam Hassan Meniai
	122	Ag/BiOI/TiO ₂ Nanocomposites for Enhanced Visible-Light Photocatalysis mariem zaghdoudi, wissem Dimassi
	140	Valorization of Algerian pumpkin seeds as a source of natural tyrosine inhibitors using ultrasound technology Rania BOUKHALFA, Ouassila LARKECHE, Ahmed ZERMANE, Nabil GRIMI, Rayane-Cherifa AMIRECHE
	151	Modeling of hydrogen furnace for aluminum scrap melting saida chatti, Hazem Touati, Abdelmajid Jemni
	162	Experimental Design and Preliminary Optimization of Hydrothermal Carbonization Process Parameters Using Response Surface Methodology Minyar Baccouche, Ajmia Chouchène, Besma Khiari, Mejdi Jeguirim

SGBC : Smart-Grids, Zero Energy Buildings and Sustainable Cities

Slot 1 : October 24th , 10:30 AM - 12:30 PM

Room 3

Chairs:

Noman Shabbir , Estonia

Order	ID	Paper
1	49	A Hybrid AI Framework for PV Forecasting and Demand Side Management in Arid Climates Ameni Boumaiza, Furkan Ahmad, Fareeduddin Mohammed, Muneera Al-Qahtani
2	75	Uncertainty-Aware Solar Forecasting for Optimal Sizing of PV-Battery Microgrids with Limited Grid Backup Anamika Das, Vijay Kosaraju, Koundinya Challa, Robert Eshun, Raymond Tesiero, Issa AlHmoud, Balakrishna Gokaraju
3	88	High-Fidelity Single-Diode PV Digital Twin for Residual Anomaly Monitoring in Renewable Microgrids Skander SMAOUI, Raouia AOUNI, Khadija BEN KILANI, Tedjani MESBAHI
4	98	Comparative characterization of Posidonia oceanica waste as a sustainable thermal insulation material Dalel Hamdi, Rachid Méchi, Habib farhat
5	105	An IoT Energy Acquisition System and Embedded CNN Based Nonintrusive Load Monitoring on an STM32 Platform Meriam Bani, Fathi Chelly, Lotfi Charaabi, Sejir Khojet El Khil
6	148	Performance investigation of tri-generation system concept for an industrial dairy unit sioud doniazed, Bellagi Ahmed, Ben ezzine Nizar
7	133	Enhanced Cascaded Control of Three-Phase Grid Forming Inverters Based on Improved Super-Twisting Sliding Mode Control Mouna Nasri, Youssef Kraiem, Saber Krim, Mohamed Faouzi Mimouni

Slot 2 : October 24th , 04:00 PM - 06:30 PM

Room 3

Chairs:

Ahmad Harb , USA
Mohamed KESRAOUI , Algeria
Rafael Carnicero Gómez , Spain

Order	ID	Paper
	68	Design and Implementation of an IoT-Enabled Dual Axis Solar Tracker with Bifacial Photovoltaics Hadiyya Jibril, Salma Al Arefi
	20	Sewage Sludge Valorization for Environmental Sustainability: A Bibliometric Analysis DAOUD EL-ALOUANY, Berroug Fatiha, Boukhattem Lahcen
	74	Comparative Evaluation of Droop, VSG, and CGVSG Controls Under Varying Grid Strength, Power Disturbances, and Grid-Connected and Islanded Operation Zakariya Rajab, Seham Lathram, Hebat Allah Alsadiq, Aya Gouda, Ashraf khalil, Faisal Mohamed, Nikolaos Koltsaklis
	96	Comprehensive Grid Impact, Hosting Capacity, and Inverter Control (GFL/GFM) Assessment of Solar PV Integration: Kufra Power Grid Case Study Zakariya Rajab, Emhammed Ahmed, Emhammed Awad, Ashraf Khalil, Nikolaos Koltsaklis, Gamal hashem, Faisal Mohamed
	97	Analysis of Photovoltaic Hosting Capacity and Grid-Forming Inverter Control for Islanding Support in Low-Voltage Distribution Networks Zakariya Rajab, Emran Abdulsalam, Khalid Bushaalah, Ashraf Khalil, Ahmed Taher, Faisal Mohamed
	80	Comparative analysis of droop and virtual synchronous generator control for grid forming pv inverter Zakariya Rajab, Asmaa Emran, Yomna Elbejou, Shatha Hosni, Ahmed Taher, Ashraf Khalil, Faisal Mohamed

Slot 3 : October 25th , 10:00 AM - 12:30 PM

Room 1

Chairs:

Abdellaziz Inés , Tunisia

Order	ID	Paper
1	32	Realistic Partial-Shading Profile Synthesis and Machine-Learning Classification for Parallel-DPP Photovoltaic Array Monitoring Mohamed Etarhouni, Salima Abeid, Naser Elnaily
2	23	Node-Level Overvoltage Exposure in PV-Rich LV Feeders: Comparing Community BESS Placement against Distributed Individual Storage Noman Shabbir, Kristjan Peterson, Victor Astapov, Rana Muhammad Arslan Qadar, Kamran Daniel, Lauri Kutt, Argo Rosin

Order	ID	Paper
3	26	The Impacts of Dynamic Storage System (Hydro-Pump) on the Stability of Jordanian Power System Hamza Nawafah, Banah Harb, Ahmad Harb, Balakrishna Gokaraju
4	28	A Distributed Agent-Based Control Framework for Community-Scale DSM in Cooling-Dominated Distribution Networks Ameni Boumaiza, Furkan Ahmad, Muneera Al-Qahtani
5	36	The Metering Boundary Determines the Apparent Peak Value of Photovoltaic Generation on a District-Cooled Campus Fareeduddin Mohammed, Ameni Boumaiza
6	45	Cavity-Filled Glazing for Energy-Efficient Building: Bibliometric Mapping and Comparative Simulation of Inert Gases and Silica Aerogel Asad Ullah, Mohammed Alhaji Mohammed
7	60	Experimental Assessment of Flicker Phenomena for a Hospital Facility with PV Microgrid Integration IGNACIO MARTIN-DIAZ
8	145	Neuro-Sliding Mode Control MPPT Firmware on a Digital Buck-Boost Platform: Experimental Comparison with PO and Hybrid Trackers Mohamed Sharif, Mustafa Mohamed, Salma Al Arefi

Slot 4 : October 26th , 09:00 AM - 11:30 AM

Room 1

Chairs:

Mohammed Haj-ahmed , Jordan

Ahmed Kateb Jumaah Al-Nussairi , Iraq

Order	ID	Paper
1	48	ML-Based Non-Intrusive Occupancy Prediction for Energy Optimization Inés Abdellaziz
2	103	Control of Master-Slave DC Microgrid with flex Grid DWDM Asma Alfergani, Farhat Shaltami, Khalid Alfator, Ashraf Khalil, Faisal Mohamed
3	107	Techno-Economic Analysis of a Building-Connected PV–Wind Microgrid with Hybrid Battery–Supercapacitor Energy Storage Fehri krout, Lotfi khemissi, Hatem oueslati

Order	ID	Paper
4	116	Adaptive Tuning of Voltage Controller Parameters for DC-DC Buck Converter Under Variable Load Conditions Using Artificial Neural Networks Asma Alfergani, Fatima Atwer, Fatima Hussein, Heba Alshakmak, Ashraf Khalil, Faisal Mohamed
5	81	A Digital Transformation Framework for Logistics Flow Optimization in Emerging Ports: Evidence from the Port of Sfax, Tunisia Najoua MEZGHANI, Tarak BARHOUMI
6	139	Adaptive Negative-Sequence Directional Overcurrent Protection with Voltage-Unbalance Supervision for Microgrids in Grid-Connected and Islanded Modes Mohammed Alarafi, Abdelsalam Elhaffar, Ali Alasheibi, LLAHM BEN DALLA
7	161	Improve the Performance Localization (RSSI) of Wireless Sensor Networks with the Fitness A Hybrid (POS) Solution Ahmed Kateb Jumaah Al-Nussairi, Shirin S. AlOdwan

PVE : Photovoltaic Energy

Slot 1 : October 24th , 10:30 AM - 12:30 PM

Room 2

Chairs:

Raja Yahmadi , Tunisia
Sana Kordoghli , Tunisia

Order	ID	Paper
1	128	From Oil Dependence to Economic Diversification: The Role of Renewable Energy Policies in UAE TAHIRA YASMIN, Ghaleb Elrefae
2	15	Techno-Economic evaluation of a solar photovoltaic Power Plant to Supply 11 well Pumps at Sarir Wellfield of Man-Made River Project: A Case Study ABDELNASER ELBREKI, Fatma Obaidi, Abdullah El Twaty, Faisal Mohamed
3	25	Protection of Electrical Installation Under Extended Grid Voltage Sags Sahar Ouertatani, Mohamed Abbas
5	54	LSTM-Based Real Power and Voltage Profile Prediction in PV-Integrated Distribution Networks Using Optuna Optimization Mariem Kammoun, Manef Bourogaoui, Zina Boussaada
6	55	Impact of Forecasting Accuracy on PV-Battery Systems Using Dynamic Programming Mariem Kammoun, Hamid Ben Ahmed, Manef Bourogaoui
7	114	Real-Time Power Management of a PV–Battery–Supercapacitor System Using a dSPACE DS1104 Controller Lotfi KHEMISSI, Imen CHALLOUF, Anis SALLEMI, Fayçal BEN HMIDA, Mongi BOUAICHA

Slot 4 : October 26th , 09:00 AM - 11:30 AM

Room 2

Chairs:

Intissar Moussa , Tunisia
Salma Al Arefi , UK

Order	ID	Paper
-------	----	-------

1	150	Interface-Engineered NiCuOx/TiO2 nanotube photocatalysts for broadband degradation of Bisphenol A: Experimental Evaluation and DFT Insights S. Syrine, Wajd Bennani, A. Hajjaji, B.M. Soucase
2	87	SolidWorks Modeling and simulation of ZnO Nanowires for Energy Harvesting and Piezophototronic Solar Cells. sahar ammar, rabeb belghouthi, nejiba aoun, mounir Ben El Hadj Rhouma4
3	21	Dual-Strategy Solar Harvesting: Synergizing Jute-Based Passive Cooling with Enhanced PSO for Optimal Photovoltaic Performance in Arid Climates Mahmoud Chaabani, Sami Zdiri, Slah Sbika, Moez Soltani, Abderrahmane Zaafouri
4	40	Security-Constrained Dynamic Economic Dispatch (SCDED) with Distributed PV Integration and Deep Learning salma Belal Ali, Hend M. Farkash, Faisal Mohamed, A.M Elbreki
5	78	Event-Driven TD3 MPPT with Causal Best-Duty Retention for a Multi-String PV System under Partial Shading Hanen Berriri, Marwa Banawaz, Majdi Mansouri, Mohamed Faouzi Mimouni
6	84	PIS-MPPT: A Physics-Informed Supervisory Reinforcement Learning Architecture for Safe Photovoltaic MPPT marwa banawaz, hanen berriri, mohamed faouzi mimouni
7	121	Systematic Architecture Optimization of Artificial Neural Networks for Daily Global Horizontal Solar Radiation Estimation Alhassan Teyabeen, Basim Belgasim, Jamal Bugrien, Faisal Mohamed, Abdulmaged Algareu
8	152	Performance Enhancement of In _{0.62} Ga _{0.38} N p-i-n Solar Cells via Intrinsic Layering and InN Back-Surface Field Modeling amine hadjouni, Arslane Hatem kacha, boudali akkal, zineb benamara, mekki abdelkader benamara

Slot 4 : October 26th , 09:00 AM - 11:30 AM

Room 3

Chairs:

Nihel Ben Slimane , Tunisia
Faisal Mohamed , Libya

Order	ID	Paper
-------	----	-------

	100	Comparative Material Trade-offs for High-Efficiency Power Conversion Aziz RHOUMA, Rabeb Belghouthi, Mounir BEN EL HADJ RHOUMA
	101	Comparative Material Trade-offs for High-Efficiency Power Conversion Aziz RHOUMA, Rabeb Belghouthi, Mounir BEN EL HADJ RHOUMA
	115	InGaN-Based Nanowires for Efficient Energy Harvesting Rabeb Belghouthi, Sahar Ammar, Nejiba Aoun, Mounir Ben El Hadj Rhouma

STE : Solar Thermal Energy

Slot 2 : October 24th , 04:00 PM - 06:30 PM

Room 2

Chairs:

MOHAMED SALEM S ETARHOUNI , UK
Aroua Ghedira , Tunisia

Order	ID	Paper
1	17	Experimental energy exergy environ-economic and sustainability investigations of an enhanced pyramidal solar distiller with energy storage Saber Chemkhi, Souhir Mankai, Fatma Ouled Saad, Jamel Madiouli
2	29	Multi-Objective Thermo-Economic Optimization of a PV/T-Driven Solar Absorption Cooling System with Phase-Change Thermal Storage for University Buildings in a Hot-Arid Climate Mustafa M. Bhukhari
3	47	Solar-assisted ground source heat pump system with a vertical double-U ground heat exchanger operated in heating mode: an experimental case study in Tunisia omeima nouicer, nabiha naili, sami kooli
4	86	A Comprehensive Thermo-Optical Assessment of Solar Dish–Stirling–PEM Hydrogen Production Safa SKOURI, Moncef BALGHOUTH
5	120	Techno-Economic Comparison of PV, CSP, and Hybrid Systems with Thermal Storage Across North Africa Omar Behar, Basim Belgasim, Faisal Mohamed
6	131	Passively PV Module Performance Enhancement and Water Evaporation Reducing Using Evaporation Cooling: Experimental Investigation Ahmed Alhederi, Anas Elhederi, A.M. Elbreki, Faisal Mohamed
7	142	Multi-Objective Design Optimization of a Solar-Assisted Liquid Sensible Thermal Energy Storage System Using Non-Edible Sunflower Oil Abdenour BOURABA, Amel Boulemtafes-Boukadoum

Slot 4 : October 26th , 09:00 AM - 11:30 AM

Room 3

Chairs:

Nihel Ben Slimane , Tunisia
Faisal Mohamed , Libya

Order	ID	Paper
	19	A 3D Numerical Study of Heat Transfer in a Mortar Wall Incorporating Spherical Macro-Capsules Nizar Loussif
	24	Mathematical Modeling of Heat and Mass Transfer in Packed-Bed Drying of Shrinking Particles Kraiem Amal, Sghaier Jalila
	59	Thermal Performance Assessment of Beeswax and EPS in Double-Wall Insulation Systems: An Experimental Study Sana Dardouri, Bendida Medjahed, Chahrazed Arabi, Amina Benabdallah
	110	Numerical Investigation of an Innovative Solar Air Collector Using a Pyramid-Shaped Transparent Insulation Material Cover marwa ammar, nahed soussi, ameni mokni, hatem mhiri, philipe bournot
	113	Enhancing Solar Still Productivity Using a Vertical Absorber with Wick Material: A Summer Comparative Study of Sensible (Gravel) and Latent (Soya Wax) Thermal Storage Souhir Mankai, Jamel Madiouli, Saber Chemkhi, Fatma Ouled Saad, Salila Sghaier
	136	AI-Enhanced Solar Aquaponics for Climate-Resilient Food Production in Semi-Arid Regions: Thermal Modeling and Experimental Validation salmen chehaibi, rabeb ayed, safa skouri, salwa bouadila

WHE : Wind and Hybrid Energies

Slot 2 : October 24th , 04:00 PM - 06:30 PM

Room 3

Chairs:

Ahmad Harb , USA
Mohamed KESRAOUI , Algeria
Rafael Carnicero Gómez , Spain

Order	ID	Paper
	44	Comparative Aerodynamic Analysis of Standalone Darrieus, Savonius, and Hybrid Vertical Axis Wind Turbines Rihab Haffar, Mohamed Mehdi Oueslati, Anouar Wajdi Dahmouni, Daoued Mihoubi
	56	Techno-Economic and Environmental Assessment of Green Hydrogen and Ammonia Production from Onshore and Offshore Wind Energy in the Southwestern Mediterranean Region Fares Meziane, Sidi Mohammed Boudia, Mohammed Debbache
	61	Deep-Learning-Accelerated CFD Design Framework for Low-Power Darrieus Vertical-Axis Wind Turbines in Urban Environments Mohammed Debbache, Fares Meziane, Madjid Tata, Ahmed Bekhti, Dawoud Hamane
	118	Wind resource assessment using ERA5 data with an overlapping approach Sabiha kheder, Hafida Daaou, Samira Louassa
	143	A Deep-Learning-Accelerated Aerodynamic Design Framework for Low-Power Darrieus Vertical-Axis Wind Turbines in Urban Wind Environments Mohammed Debbache, Fares Meziane, Madjid Tata, Ahmed Bekhti, Dawoud Hamane
	159	Hierarchical Control of an MMC-HVDC Link for Grid Integration of a Hybrid DFIG/PMSG Offshore Wind Farm Zareb Mohammed Amin, Djehaf Mohammed Abdeldjalil, Khatir Mohamed

Slot 3 : October 25th , 10:00 AM - 12:30 PM

Room 2

Chairs:

Mohammed Haj-ahmed , Jordan

Order	ID	Paper
1	27	Design and simulation of small vertical axis wind turbine using QBlade and estimation of blade testing Rafael Carnicero
2	31	A Hybrid Wind–Hydrogen–Grid Energy System with Machine Learning–Based Hydrogen Production Forecasting for Intelligent Energy Management Abdallah Darwish, Hiba Darwish, Farah Darwish, Haneen Darwish, Maha Zaquot, Ahmad J. Alzubaidi, Osamah Al-shraideh, Mohammad Issa Alawneh, Mohamed Boghdady
3	38	Inverse design of a small horizontal axis wind turbine Mohamed Mehdi Oueslati, Anouar Wajdi Dahmouni, Narjes Dimassi
4	134	Renewable-Based Hybrid Energy-System Planning for Tunisia Through 2040: A Feasibility Assessment for Enhancing Energy Security and Reducing External Dependence Mounir Bouzguenda, Mohamed Amine Ksiksi
5	144	Modeling, Control, and Performance Assessment of Wind Energy Conversion System: From Wind Emulation to Electrical Generation Intissar Moussa, Adel Khedher
6	147	Modal Analysis of the Control of a DFIG for Wind Energy in Network Context Mouna Bejaoui, Bogdan Marinescu, Ilhem Slama Belkhodja, Eric Monmasson, Mohamed Faouzi Mimouni
7	160	Artificial intelligent based Identification of a wind turbine Pitch angle Sensor Achour Djalloul, abdelkader Elmeddah, Mohamed Kesraoui, Fatima Boudali