



GHR3EC  
RENEWABLE ENERGIES

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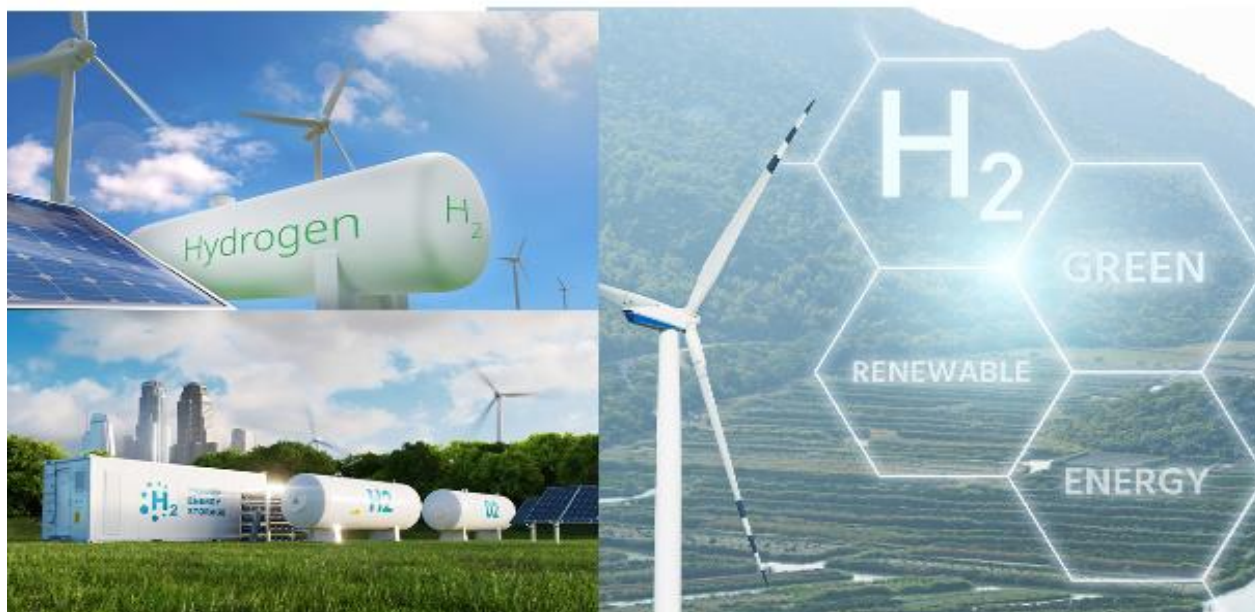
# First Edition of the Green Hydrogen and Renewable Energies Conferences

13<sup>th</sup> November 2024

**GREEN HYDROGEN AND RENEWABLE ENERGIES :  
Engineering and Economic Challenges  
GHR3EC-2024**



**Mohammadia School of Engineers**



## WELCOME MESSAGE FROM THE CONFERENCE CHAIRS

Welcome to the conference on Green Hydrogen and Renewable Energies: Engineering and Economic Challenges (GHR3EC2024), which is held at EMI, Moahmmadia School of Engineers, Morocco on 13-11-2024. The conference is organized by EMISys and University Center for Entrepreneurship at UM5. GHR3EC2024 is a forum for depicting excellent results and new challenges on the energy and its theoretical and applicative aspects.

This conference will provide an exceptional opportunity for scientists, researchers and professionals working in renewable energy and green hydrogen field to present and discuss their recent research results and approaches.

Thus, we would like to thank all the participants and authors for their interest to this conference, the scientific committee members, who carried out the most difficult work by carefully evaluating the submitted papers. Thanks to Publicity, Organizing and all Committees members for their assistance in making this conference a success. Our special thanks to our distinguished Keynote Speakers who have agreed to address the conference attendees.

### CONFERENCE CHAIR

- **HAMID MOUNIR, EMI, RABAT**

### CONFERENCE CO-CHAIR

- **KARIMA GHAZOUANI, UM5, RABAT**

### ORGANIZATION COMMITTEE

#### Professors

| Full Name          | Graduate | Affiliated Institution                        |
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| HAMID MOUNIR       | PES      | EMI, UM5, RABAT, MOROCCO                      |
| GHAZOUANI KARIMA   | PES      | UM5, RABAT, MOROCCO                           |
| THILO ZIMMERMANN   | DR       | COLOGNE UNIVERSITY, COLOGNE, ALLEMAGNE        |
| EL MOSTAPHA BOUDI  | PES      | EMI, UM5, RABAT, MOROCCO                      |
| ADIL ATIFI         | PH       | ENSAM-R, UM5, RABAT, MOROCCO                  |
| Lahcen BALLI       | PH       | ABDELMALEK ESSAÂDI UNIVERSITY, ENSAH, MOROCCO |
| RANIA MINIESY      | PES      | BRITISH UNIVERSITY BUE, EGYPT                 |
| M. KARIM ETTOUHAMI | PH       | ENSAM-R, UM5, RABAT, MOROCCO                  |

#### Post-Doc and PhD Students

| Full Name          | Graduate      | Affiliated Institution   |
|--------------------|---------------|--------------------------|
| FATIMA EL BAKKARI  | Ph. D Student | EMI, UM5, RABAT, Morocco |
| ANASS KHIER        | Ph. D Student | EMI, UM5, RABAT, Morocco |
| AMADANE YASSINE    | Doctor        | EMI, UM5, RABAT, Morocco |
| OMAR EL FAKKAK     | Ph. D Student | EMI, UM5, RABAT, Morocco |
| SAFAE REHHALI      | Ph. D Student | EMI, UM5, RABAT, Morocco |
| ABDESSAMADE FALAHI | Ph. D Student | EMI, UM5, RABAT, Morocco |
| IDIAHYA YOUSSEF    | Ph. D Student | EMI, UM5, RABAT, Morocco |
| ABDELAZIZ SAMRIS   | Ph. D Student | EMI, UM5, RABAT, Morocco |

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| AHMED AZIM            | PES      | BRITISH UNIVERSITY BUE, EGYPT       |
| ABDELLATIF EL MARJANI | PES      | EMI, UM5, RABAT, MOROCCO            |
| RACHID BENCHRIFA      | PES      | FS, U RABAT, MOROCCO                |
| YASSER ELSHAYEB       | PH       | AMERICAN UNIVERSITY IN CAIRO, AUC   |
| MOHAMED BELAICHE      | PES      | ENS, UM5, RABAT, MOROCCO            |
| KHALID NOUNEH         | PES      | FS, UIT, KENITRA, MOROCCO           |
| HAMID MOUNIR          | PES      | EMI, UM5, RABAT, MOROCCO            |
| RANIA MINIESY         | PES      | BRITISH UNIVERSITY BUE, EGYPT       |
| MOUSTAFA ORABY        | PH       | AMERICAN UNIVERSITY IN CAIRO, EGYPT |
| ADIL ATIFI            | PH       | ENSAM-R, UM5, RABAT, MOROCCO        |
| MOHAMED MAAROUFI      | PES      | EMI, UM5, RABAT, MOROCCO            |
| EL MOSTAPHA BOUDI     | PES      | EMI, UM5, RABAT, MOROCCO            |
| M. KARIM ETTOUHAMI    | PH       | ENSAM-R, UM5, RABAT, MOROCCO        |
| LASRI LARBI           | PES      | ENSAM, MEKNES, MOROCCO              |
| MOUBACHIR YOUNES      | PH       | EMI, UM5, RABAT, MOROCCO            |
| KALID ELATIFE         | PA       | EMI, UM5, RABAT, MOROCCO            |
| LAFDAILI ZAKARIA      | PSA      | EMI, UM5, RABAT, MOROCCO            |
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| LAAZIZI ABDELLAH      | PES      | ENSAM-MEKNES, MOROCCO               |
| ABDELLAH EL GHARAD    | PES      | ENSAM-R, UM5, MOROCCO               |
| LAGRAT ISMAIL         | PES      | ENSA-KÉNITRA, MOROCCO               |
| RAJAD OMAR            | PA       | USMS-BÉNI MELLAL, MOROCCO           |
| RAJAA NECHAD          | PES      | EMI, UM5, RABAT, MOROCCO            |
| BALLI LAHCEN          | PH       | ENSA AL-HOCEIMA, MOROCCO            |
| YOUNES ELFELLAH       | PH       | IAV, RABAT, MOROCCO                 |
| HAUSA BOUHRIM         | PA       | ENSMR, UM5, RABAT, MOROCCO          |
| ZAKARIA BELFKIRA      | Dr       | UM6P, MOROCCO                       |
| IMANE AMARIR          | Dr       | AIAC, CASA, MOROCCO                 |
| IMARIOUANE MOHAMED    | PA       | EMI, UM5, RABAT, MOROCCO            |

## SPEAKERS AT THE PLENARY SESSION



**Mohammed Belaïche**, a professor at École Normale Supérieure in Rabat, is a specialist in magnetic materials and founder of the Laboratory of Magnetism and Ceramics. Known for his work on structure-property relationships in materials, he has contributed to advancements in molecular electronics and magnetic storage. Dr. Belaïche has led significant projects, published extensively, and organized international conferences in materials science.



**Reinhard Joas**, a chemical engineer and economist, has over 30 years of experience advising industry and governments on environmental and health issues, supporting innovative technologies and business models. He serves as an advisor to the European Commission, the UN, and sits on several industry boards. He founded BiPRO GmbH, now part of an international consulting group, and continues to contribute to strategic initiatives in sustainability and public health.



**Youssef Naimi**, born on March 19, 1966, in Casablanca, holds a PhD from Pierre and Marie Curie University and a Doctorat d'État from Ben M'sik Faculty of Sciences. Since 1996, he has been a Full Professor at Hassan II University, specializing in renewable energy and environmental sciences. Dr. Naimi is Vice-President of SMADER and coordinates the "Environmental Chemistry" program, also leading the Specialized Masters in Renewable Energy and Materials.



**Khalid Nouneh**, Professor of Physics at Ibn Tofail University, specializes in nanomaterials and materials physics, focusing on CZTS and perovskite materials for solar cells. He holds a PhD from Montpellier II University and a JSPS Fellowship from Kyoto University. With over 102 publications, he has led global research projects and contributes to photovoltaics, nanotechnology, and energy materials.



**AHMED ABDEL-AZIM AHMED**, Professor of Energy in the Mechanical Engineering department, BUE for almost 15 years with 32 years of experience in the field of Energy Engineering in both streams of renewable and non-renewable sources. A certified expert/consultant in the field of industrial energy systems optimization and energy efficiency from UNIDO.



**David Wohlleben** is a Research Associate at EWI since 2023 and a doctoral student at the University of Cologne. His research focuses on the hydrogen economy. Before joining EWI, David Wohlleben studied industrial engineering with a specialization in mechanical engineering at RWTH Aachen University and the Hong Kong University of Science and Technology.

## LIST OF TOPICS

### The GHR3EC2024 Conference Seeks Original Papers

#### TOPIC 1: Hydrogen Production Technologies

- Electrolysis technology and production methods.
- Advances in hydrogen production efficiency.
- Hydrogen storage technologies

#### TOPIC 2: Energy Storage, Management and Economic viability

- Advanced Battery Technologies
- Grid-Scale Energy Storage
- Energy Management Systems (EMS)
- Decentralized Energy Storage

#### TOPIC 3: Fuel Cells and Electrochemical Systems

- Proton Exchange Membrane Fuel Cells (PEMFCs)
- Electrochemical Hydrogen Production
- Hybrid Systems and Energy Integration

#### TOPIC 4: Solar Energy Applications

- Photovoltaic (PV) Technologies
- Solar Thermal Systems
- Building-Integrated Solar Energy
- Solar Energy for Off-Grid Solutions

#### TOPIC 5: Innovating Material for energy

- Advanced Energy Storage Materials
- Nanomaterials for Energy Efficiency
- Materials for Renewable Energy
- Smart Materials for Energy Applications

#### TOPIC 6: Intelligent Energy Systems and Energy Management

- Smart Grids and Smart Metering
- AI and Machine Learning in Energy Management
- Demand Response and Energy Efficiency
- Decentralized Energy Systems.



# TECHNICAL PROGRAM

November 13<sup>th</sup> 2024

## Green Hydrogen and Renewable Energies: Engineering and Economic Challenges GHR3EC-EMI-2024

### PROGRAMME

**08h30min - 09h** Registration

**09h – 9h 45min** Opening Ceremony

- Mots 1 Monsieur le Ministre de l'enseignement supérieur de la recherche scientifique et de l'innovation,
- Mots 2 Madame la Ministre de la transition énergétique et du développement durable,
- Mots 3 Monsieur le Ministre de l'industrie et du commerce,
- Mots 4 Monsieur le président de l'université Mohammed V,
- Mots 5 Monsieur le Directeur de l'Ecole Mohammadia d'Ingénieurs,
- Mots 6 Monsieur le président de la conférence,

**9h45min -10h 45min** Plenary session

- **BELAICHE MOHAMED** (Professeur et membre de l'Académie Hassan II des Sciences et Techniques, **Morocco**)
- **REINHARD JOA** (Professor Doctor, Managing Director at CS3 GmbH, **Germany**)
- **NAIMI YOUSSEF** (Full Professor, Université Hassan II de Casablanca- **Morocco**)
- **KHALID NOUNEH** (Full Professor, Materials Physics Professor, Université Ibn Tofail **Morocco**)
- **AHMED ABDEL-AZIM AHMED** (Professor of Energy in the Mechanical Engineering department, British university in **Egypt**)
- **DAVID WOHLLEBEN** (Senior researcher at EWI, **Germany**)

**10h45min -11h 15min** coffee break and poster session

Welcome Coffee: 10h45min – 11h15min

| Session1: Hydrogen Production Technologies (Salle poly-Valente)<br>(11h15 to 12h05)<br>Session Chairs : Pr BOUDI EL MOSTAPHA/ Pr. RANIA MENISY |  |   |      | Session2: Energy Storage and Management (G. Amphi):<br>(11h15 to 12h05)<br>Session Chairs: Pr NAIMI YOUSSEF /Pr MOUSTAFA OURABY |  |
|--|--|---|------|---|--|
| 11h15mn<br><br>ID31  | MAHMOUD<br>ALGHRIEB, FATIMA<br>EL BAKKARI,<br>SAFAE REHHALI,<br>AHMED M.<br>AMER, DAVID<br>WOHLLEBEN, MARK<br>OS FARAG | <i>Economic and Technical<br/>Evaluation of Different<br/>Hydrogen Export Options:<br/>The Case Study of Morocco</i>  | ID39 | BOUDRAHAM<br>SALIMA, MABROUKI<br>JAMAL, AIT<br>OUJALLAL ILHAM,<br>ABROUKI YOUNES  | <i>Hydrogen Energy Storage:<br/>Technologies, Challenges, and<br/>Opportunities</i>                                      |
| 11h25mn<br><br>ID26  | SMAHANE<br>OUNNABI,<br>HAMID<br>MOUNIR, REDA<br>RABEH  | <i>Trends and Future<br/>Perspectives in Hydrogen<br/>Production: Green<br/>Hydrogen and Electrolyzer<br/>Technologies for<br/>Sustainable Energy and<br/>Decarbonization</i> | ID21 | MOHAMED<br>IDBENALI   | <i>Molten Salts Are Potential<br/>Candidates as Energy Storage<br/>Materials</i>   |
| 11h35mn<br><br>ID27  | ETTOUHAMI<br>TAHA, SOLH<br>ANOUAR RIAD,  | <i>Green Hydrogen in Africa:<br/>Opportunities and<br/>Limitation</i>   | ID25 | ACHRAF EL ALLAOUI,<br>LOUBNA EL ANSARI,<br>ATAE SEMMAR, WAFAA<br>DACHRY, HASSAN<br>GZIRI, HICHAM EL<br>EDROMI                   | <i>Modeling and simulation of the<br/>impact of nanoparticles and<br/>ionic liquids on reverse osmosis<br/>membranes</i> |
| 11h45mn<br><br>ID57  | FARAH LAKRAA,<br>MOUNIR HAMID,<br>KENZA<br>BOUCHAALA,<br>KHALID ELATIFE  | <i>Hydrogen as a Clean Energy<br/>Carrier:<br/><br/>A Comprehensive Overview</i>  | ID30 | MOUHSSINE<br>BOUTALEB,<br>KAMAL TABIT,<br>MOHAMMED<br>MANSORI,<br>LATIFA SAADI,<br>MOHAMED WAQIF                                | <i>Low-Cost Refractory Cordierite<br/>for Solar Thermal Storage</i>  |
| 11h55mn  | HAMZA<br>KHALDI, MOUNIR<br>HAMID   | <i>Green Hydrogen and Water<br/>Management: A New</i>   | ID32 | EL FAKKAK<br>OMAR, MOUNIR<br>HAMID  | <i>Battery Optimization for Solar<br/>Electric Vehicles: A Comparative<br/>Study</i>                                     |

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| ID23   |  | <i>Dynamic for Morocco's Energy and Water Security</i>  |      |  |  |
| <b>Session3: Fuel Cells and Electrochemical Systems (Grand Amphi)</b><br>12h05 to 13h15<br>Session Chairs: Pr. ADIL ATIFI / AHMED ABDEL-AZIM     |  |   |      | <b>Session4 : Solar Energy Applications (Salle poly-Valente)</b><br>12h05 to 13h15<br>Session Chairs: Pr. LAHCEN BALLI /Pr. MOHAMMED OUASSAID                    |  |
| 12h05mn<br>ID28  | MOHAMMED HICHAM NEJMA, HAMID MOUNIR  | <i>Design Optimization of PEM Water Electrolyzers: Material and Pressure Considerations for Cost-Effective Research and Manufacturing</i>                                       | ID24 | FATIMA ZMIM, ELKHATIR RAHMOUNI, NADIA DIHMANI, SAMIR AMRAQUI   | <i>Study of Optical Performance of Solar Concentration for a Box-Type Cooker and a Parabolic Cooker</i>                                      |
| 12h15mn<br>ID43  | YASSINE AMADANE, HAMID MOUNIR, OMAR RAJAD, IMANE AMARIR, HAFSA BOUHRIM, KAOUTAR DAOUDI | <i>The Heat Management as a Fundamental Response for Improving the Performance of a Proton Electrolyte Fuel Cell by Using a Statistical Approach</i>                            | ID56 | ZIYAD BOUSSIF, LAHCEN BALLI, MOHAMED HLIMI, ADIL ATIFI   | <i>The green hydrogen revolution for an eco-friendly energy future</i>   |
| 12h25mn<br>ID40  | ABDELAZIZ SAMRIS, HAMID MOUNIR   | <i>Analysis of Temperature and Pressure Distribution at the Interface of GDL/CL and CL/PEM and the Impact of Output Voltage on PEM Fuel Cell Performance Using CFD Modeling</i> | ID45 | OUSSAMA DRISSI MALIANI, KHALID GUISSI, YOUNES EL FELLAH  | <i>Comparative study of solar still designs: enhancing efficiency in water desalination</i>  |
| 12h35mn<br>ID62  | IMANE ANNITOU, LAHCEN BALLI, ADIL ATIFI  | <i>Study of the Influence of Gas Crossover Across the Membrane on the Performance of a PEMFC Fuel Cell</i>  | ID80 | BENNANI KAWTAR, FATIMA ZMIM, LAHCEN BALLI, MOUNIR HAMID  | <i>Optical Study of a Pseudo-Parabolic Solar Concentration System</i>  |
| 12h45mn<br>ID22  | KABOUCHI KAOUTAR, ETTOUHAMI MED KARIM  | <i>CFD Analysis of PEM Fuel Cell Stack Performance under Different Operating Voltage Conditions</i>   | ID55 | F.Z. IHFA, DONIA EL FADLAOUI, MOHAMED NFAOUI, L. NOURI, Y. AIT OUBELLA, M. BENNAI  | <i>Numerical Simulation of InGaP/GaAs/Si Triple Junction Solar Cells</i>   |
| 12h55mn<br>ID73  | SAFAE REHHALI, HAMID MOUNIR  | <i>Comparative Analysis and Optimization Methods for Proton Exchange Membrane Fuel Cells Parameters</i>   | ID69 | SOUMHI MERYAME, ZALIM YASSINE, ZAKIA EL AHMADI, ZOUHAIR ABDELLAH, ALAOUI SAAD  | <i>Design Optimization of a 150 MW Simple Supercritical Brayton Cycle for a CSP Application</i>  |
| 13h05mn<br>ID78  | GHITA BENINDALSI, LAHCEN BALLI, MOHAMED HLIMI, DIL ATIFI                               | <i>Comparative Study and Analysis of Saltwater desalination technics: Energy and Environmental Optimization</i>   | ID63 | A. FENDAOU, F. YATIM, Z. NGADI, F. M'HAMDI ALAOUI  | <i>Modeling the Effect of Hydrogen Content on Biomass Heating higher value</i>   |
| <b>Lunch 13h15min – 14h30min</b>   |  |   |      |  |  |
| <b>Session 5: Innovating Material for energy (Salle poly-Valente)</b><br>14h30 to 15h20<br>Session Chairs: Pr. LAAZIZI ABDELILAH/ Pr. OMAR RAJAD |  |   |      | <b>Session 6: Intelligent Energy Systems and Energy Management (Grand Amphi):</b><br>14h30 to 15h20<br>Session Chairs: Pr. YOUNESS EL FALLAH/ Pr. ISMAIL LAKRAIT |  |
| 14h30mn<br>ID70  | C. HERMAMA, A. ELMALIKI, S. LAHBABI  | <i>The Role of Polyurethane Foams in Building Efficiency: A Thermal Study of Property-Structure Relationships</i>   | ID36 | NOUR ABOU SEADA, EL FAKKAK OMAR, ABRAHAM OLUWAPELUMI ADENIRAN, HODA FADDA, MOHAMED ELOKL, BASMA KHALED   | <i>Integrated Economic and Engineering Strategies for Scaling Green Hydrogen into Different Energy Sectors: A Multidisciplinary Approach</i> |
| 14h40mn<br>ID61  | YOUNES OULAHOU, YOUSSEF ELGUENNOUNI, MOHAMED HSSIKOU, JAMAL BALITI, MOHAMMED ALAOUI    | <i>Numerical Analysis of Heat Transfer for Nanofluids Using SRT-LBM</i>   | ID65 | BOUHRIM HAFSA, ABDELLATIF EL MARJANI   | <i>On the Use of Artificial Intelligence in the Field of Wave Energy</i>   |

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| 14h50mn<br>ID48  | KAMAL ABOUELMAJD, ALI ENNORI, ISMAIL LAGRAT, HAMID MOUNIR                             | <i>Numerical CFD Analysis of Internal Cooling Strategies in Aeronautical Gas Turbines</i>  | ID29 | ZYAD BELAHSEN, AHMED ABOU   | <i>Contribution to the Modeling, Management, and Integration of the Energy Storage System in a Microgrid Using Linear Controllers</i>   |
| 15h00mn<br>ID44  | MOHAMED BERAA, ADIL ATIFI, MOHA CHERKAoui, ABDNNABI EL HASSNAoui                      | <i>Selective Study of Candidate Materials and Alloys for PEMFC Bipolar Plate</i>   | ID51 | AKRAM AGOUMADA, MOUNIR HAMID, LAFDILI ZAKARIA   | <i>Navigating Challenges in the Implementation of Intelligent Hybrid Solar Systems</i>  |
| 15h10mn<br>ID41  | KHANFRI CHAIMAE, MOUHAT OUADIA, ELRHAFFARI YOUNES, EL MENNAOUY FATIMA, ROUGUI MOHAMED | <i>Comparative Study of the Response of Masonry Wall Using the Drucker-Prager Model and the Concrete Damage Plasticity Model</i> | ID72 | HANINE HAJAR, LAHCEN BALLI, MOHAMED HLIMI, DRISS LEMBARKI   | <i>Building Study and Simulation: Integrating AI for Optimized Energy Management</i>  |
| <b>Coffee break 15 :20 à 15 :40h</b>   |   |  |      |   |   |
| <b>Session Poster: 15 :40h à 16 :00</b>  |   |  |      |   |   |
| <b>Complement of Session1 : Hydrogen Production Technologies (Salle poly-Valente)</b><br>(16h00 to 17h10)<br>Pr. MAAROUFI MOHAMED/Pr. M. KARIM ETTOUHAMI |   |  |      | <b>Complement of Session 5: Innovating Material for energy (Grand amphi)</b><br>(16h00 to 17h00)<br>Session Chairs: Pr. ZAGHAR HAMID /Pr. LAFDILI ZAKARIA |   |
| 16h00mn<br>ID52  | MALLOUKI RIHAB, MOUNIR HAMID, EL ATIFE KHALID   | <i>Optimization of the levelized cost of green hydrogen using electrolysis for sustainable production</i>                        | ID67 | M. IMARIOUANE, M. SAADAoui, J. CHEVALIER, H. REVERON  | <i>Mechanical Behavior of a New Zirconia-Based Material</i>   |
| 16h10mn<br>ID38  | YASSINE KAMEL, NECHAD RAJAA, ABDELATIF MARJANI  | <i>A Review on Recent Advancement of Green Hydrogen Production through Thermochemical Water Splitting Using Solar Energy</i>     | ID71 | DRISS LEMBARKI, LAHCEN BALLI, MOHAMED HLIMI, ELHASSANE BARHDADI, HAJAR HANIN  | <i>Stady and Numerical Simulation of 2D Heat Transfer in a Prototype Pottery Furnace</i>  |
| 16h20mn<br>ID34  | ANASS KHEIR, FATIMA EL BAKKARI, , MOUNIR HAMID  | <i>Hydrogen Production, Storage and Distribution: Morocco's Opportunities and Challenges</i>                                     | ID68 | OUNSS SOUKAINA, MOUNIR HAMID, ETTOUHAMI M. KARIM  | <i>Investigation of the Failure Behavior of a Sandwich Composite Bolted Assembly Used for Sustainable Aeronautical Systems</i>  |
| 16h30mn<br>ID37  | ABDESSAMADE FALAHI, HAMID MOUNIR  | <i>Hydrogen Drones: Towards an Energy Revolution in Unmanned Aerial Aviation</i>   | ID42 | IDIHYA YOUSSEF, HAMID MOUNIR, OMAR RAJAD  | <i>Critical Review on the Fiber Orientation Effect on the Behavior of the Composite Materials of the Horizontal Axis Wind Turbine Blade (HAWTB) Based on the Previous Study</i> |
| 16h40mn<br>ID35  | LEHBIB CHEIKHANE, BOUDI EL MOUSTAPHA, MOUNIR HAMID                                    | <i>Green Hydrogen Production Technologies: A Comprehensive Analysis</i>  | ID64 | LAHCEN OUHMAD, ABDESSAMAD MALAOUI   | <i>Performance Optimization of 3D Thermoelectric Generators: Advanced Multiphysics Analysis Using COMSOL Multiphysics</i>   |
| 16h50mn<br>ID33  | FATIMA EL BAKKARI, ANASS KHEIR, MOUNIR HAMID, ETTOUHAMI MOHAMED KARIM                 | <i>Renewable Energies and Green Hydrogen: Levers for Sustainable Development in Morocco</i>                                      | ID83 | H. BOUAYAD, J. SABOR  | <i>Assessment of Environmental and Socio-Economic Impacts of a Green Hydrogen Transport Pipeline: Comparing Construction Materials for Noor 1 and Ouarzazate</i>                |
| 17h00mn<br>ID50  | EL YAZIDI FATIMA ZAHRA, MOUNIR HAMID  | <i>Cutting-Edge Technologies in Intelligent Hybrid Solar Energy Systems</i>  |      |   |   |



**Session Poster: 15 :40h à 16 :00**

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|------|---|--|------|--|--|
| ID46 | SIHAM ELMAZOUZI, HASSAN MABRAK, ILHAM ZERDANI, YOUSSEF NAIMI, | <i>Development and Characterization of Microbial Fuel Cells for Wastewater Treatment and Sustainable Electricity Production</i>                | ID60 | BENAATTOUCH YAHYA, BENSOUZA ZHOR, BADRI MOHAMED                            | <i>Study and Modeling of a Vertical Axis Wind Turbine</i>  |
| ID47 | Z. EL HAFIDI, N. OUTALEB, Y. NAIMI                            | <i>Electrochemical Deposition of Zinc Oxide Thin Films at Low Temperature: Optimization and Characterization for Photovoltaic Applications</i> | ID66 | ABAHNINI IKRAM, AKHRIF BADR, BERNOUSSI ADAM                                | <i>Proposal and development of an energy recovery system in electric cars</i>  |
| ID49 | MERYEM EL AMRANI, MOUNIR HAMID                                | <i>Advanced Catalysts for Green Hydrogen Production from Renewable Energy Sources: A Review</i>  | ID74 | ADID LAHOUCINE, BALLI LAHCEN, BARHDADI EL HASSANE, KHALED AISSAM           | <i>Sizing, Simulation, and Design of a Prototype Hydrogen Production Site Powered by a Hybrid Renewable Energy System in the Southern Regions of Morocco</i>     |
| ID53 | OTHMANE BIKRI, OMAR MOUNKACHI                                 | <i>Production of green ammonia by green hydrogen</i>   | ID75 | BEN RAOUANE MINA, BALLI LAHCEN, DRIOUCH ISAMEL                             | <i>Design and Development of an Intelligent Hybrid Energy Management System: Integration of Artificial Intelligence for Optimizing Electric Vehicle Charging</i> |
| ID54 | WISSAL MAKBOUL OMAR MOUNKACHI                                 | <i>Green Hydrogen Production via Solar Energy: Photocatalysis Approach and Material Selection Criteria</i>                                     | ID76 | WIAM ROUYANI, MOUNIR HAMID, LAHCEN BALLI                                   | <i>Kinetic-oscillating energy harvesting: a light overview</i>   |
| ID58 | BOUCHRA OUSSMOU   | <i>Optimization of Alkaline Electrolyzers for Green Hydrogen Production: A Review of Strategies and Challenges</i>                             | ID77 | MERYEM EL YOUBI, LAHCEN BALLI, ADIL ATIFI, MOHAMED HLIMI, AISSAM KHALED    | <i>Comparative Study and Analysis of Green Hydrogen Production Technologies: Energy and Environmental Optimization</i>   |
| ID59 | ILHAM SEBBANI, M. KARIM ETTOUHAMI, HAMID MOUNIR               | <i>Study of mechanical effects in a PEM fuel cell</i>  | ID79 | JHIATE ANASSE, HAMID MOUNIR, MOHAMED KARIM ETTOUHAMI                       | <i>Review of integrated solar hydrogen energy storage systems for water desalination</i>   |
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# Together to Build a Sustainable Future

## International Conferences

### Green Hydrogen and Renewable Energies: Engineering and economic Challengers

13<sup>th</sup> November 2024

Mohammadia School of Engineers

