

Program

Foreword

It is our real pleasure to welcome you to the 9th edition of the International Conference on Renewable and Sustainable Energy (IRSEC'21), organized as an online event owing to the current Covid-19 pandemic and live streamed from Morocco on November 24 – 27, 2021.

Placed under the auspices of the Moroccan Ministry of Energy Transition and Sustainable Development, IRSEC'21 is co-organized by the Mediterranean Space of Technology and Innovation (MSTI) in partnership with the Moroccan Agency for Sustainable Energy (MASEN-Strategic Partner), Mohammed V University in Rabat, Abdelmalek Essaadi University, and several other National and International organizations (<http://www.med-space.org/irsec21>).

IRSEC'21 succeeded to attract an outstanding number of participants from academia, industry and government representing about forty nationalities who are taking part in this event. A very rich and attractive scientific program is provided by IRSEC'21 highlighting recent advances in renewable energies and sustainable development. Several workshops and tutorials led by world-renowned experts are scheduled in the very rich and diversified technical program. In addition, a virtual exhibition is organized to accommodate national and international industries, companies and startups providing all kind of technologies, applications and services related with renewable energies and sustainable development. The fact that confirms once again this international conference as an essential international forum for exchange, networking and know-how and technology transfer among participants from academia, industry and government in matters related to renewable energies and sustainable development.

We would like to express our heartiest thanks and gratitude to all the keynotes and tutorials and invited speakers, workshop and special sessions chairs and organizers and to all the organizing committee members for the amazing job that contributed to the overwhelming success of this very special edition of IRSEC'21.



Prof. Mohamed Essaaidi
ENSIAS
Rabat, Morocco



Prof. Youssef Zaz
Faculty Science
Tetouan, Morocco

IRSEC'21 General Chairs

Workshops

W1	Workshop 1	Lithium Battery Science and Technology
W2	Workshop 2	Emerging semiconductors for photovoltaics
W3	Workshop 3	The Advances in Renewable Resources Forecasting and their Economic Prospects
W4	Workshop 4	Sustainable Energy for Building and Urban Environment
W5	Workshop 5	Digital Technologies in Solar Energy
W6	Workshop 6	Perspectives of Green Hydrogen Development

Special Sessions

SS1	Special Session 1	Smart Grid Technologies and Applications
SS2	Special Session 2	Magnetic Materials and Devices for Energy
SS3	Special Session 3	Biomass and Biogas Energy
SS4	Special Session 4	Wind Energy

Tutorials

T1	Tutorial 1	An Example of Real Smart Grid: use of Dynamic Line Ratings to Connect more Renewables
T 2	Tutorial 2	The role of AI in PV systems design and control with hardware implementations
T3	Tutorial 3	Energy storage tutorial: Introduction to Electrochemical Energy Storage Technologies
T4	Tutorial 4	Density-Functional Theory toward Predicting Properties and Design of Materials
T5	Tutorial 5	Green Hydrogen production

Keynote speakers and panelists should be ready 15 minutes before the beginning of the session in order to perform the necessary sound, video, and screen sharing tests.

The used platform: Zoom Webinar.

	Nov. 19	Nov. 20	Nov. 22	Nov. 23	Nov. 24	Nov. 25	Nov. 26	Nov. 27	
9:00	Friday	Sat.	Mon.	Tuesday	Wednesday	Thursday	Friday	Saturday	
9:10				Opening Ceremony	KN-31	KN-61	KN-51	IS-35	9:00
9:20								5min Pres.	9:10
9:30								Discussion	9:20
9:40				KN-21	KN-32	KN-62	KN-52	Discussion	9:30
9:50								Break	9:40
10:00	Tuto 4	Tuto 2	Tuto 1	KN-22	IS-33	IS-63	KN-53	IS	9:50
10:10				KN-23	KN-34	Discussion	Discussion	(A) 5mn Pres.	10:00
10:20				Discussion	Discussion	5mn Pres.	5min Pres.	(A) Discussion	10:10
10:30	Break	Break	Break	Discussion	5min Pres.	Discussion	Discussion	(B) 5mn Pres.	10:20
10:40				5mn Pres.	Discussion	Break	Break	(B) Discussion	10:30
10:50				Discussion	Discussion			(C) 5mn Pres.	10:40
11:00				Break	Break	KN-43	KN-64	(C) Discussion	10:50
11:10				KN-24	KN-27	KN-44	IS-65	Break	11:00
11:20				KN-25	KN-28	Discussion	IS-66	(A) - 5min Pres.	11:10
11:30				IS-26	IS-29	(A) 5mn Pres.	Discussion	(A) Discussion	11:20
11:40				Discussion	Discussion	(A) Discussion	5 min presentations	(B) - 5min Pres.	11:30
11:50				5min Pres.	5min Pres.	(B) 5mn Pres.	Discussion	(B) Discussion	11:40
12:00				Discussion	Discussion	(B) Discussion	Break	Break	11:50
12:10				Break	Break	Break	Break	Break	12:00
12:20				KN-71	KN-41	KN-11	KN-14	KN-81	12:10
12:30				KN-72	KN-42	KN-12	KN-15	KN-82	12:20
12:40				KN-73	Discussion	KN-13	Discussion	KN-83	12:30
12:50				Discussion	5min Pres.	Discussion	5 min Pres.	Discussion	12:40
13:00				(A) 5mn pres.	5min Pres.	5 min Pres.	Discussion	Discussion	12:50
13:10				(A) Discussion	Discussion	Discussion	Closing ceremony		13:00
13:20				(B) 5mn pres.					13:10
13:30				(B) Discussion					13:20
13:40				(C) 5min Pres.					13:30
13:50				(C) Discussion					13:40
14:00				(D) 5min Pres.					13:50
14:10				(D) Discussion					14:00
14:20				Break					14:10
14:30				(A) 5min Pres.					14:20
14:40				(A) Discussion					14:30
14:50				(B) 5min Pres.					14:40
15:00				(B) Discussion					14:50
15:10				(C) 5min Pres.					15:00
15:20				(C) Discussion					15:10
15:30				(D) 5min Pres.					15:20
15:40				(D) Discussion					15:30
15:50				Break					15:40
16:00				KN-71	KN-41	KN-11	KN-14	KN-81	15:50
16:10				KN-72	KN-42	KN-12	KN-15	KN-82	16:00
16:20				KN-73	Discussion	KN-13	Discussion	KN-83	16:10
16:30				Discussion	5min Pres.	Discussion	5 min Pres.	Discussion	16:20
16:40				(A) 5mn pres.	5min Pres.	5 min Pres.	Discussion	Discussion	16:30
16:50				(A) Discussion	Discussion	Discussion	Discussion	Discussion	16:40
17:00				(B) 5mn pres.					16:50
17:10				(B) Discussion					17:00
17:20				(C) 5min Pres.					17:10
17:30				(C) Discussion					17:20
17:40				(D) 5min Pres.					17:30
17:50				(D) Discussion					17:40
18:00				Break					17:50
18:10				KN-71	KN-41	KN-11	KN-14	KN-81	18:00
18:20				KN-72	KN-42	KN-12	KN-15	KN-82	18:10
18:30				KN-73	Discussion	KN-13	Discussion	KN-83	18:20
18:40				Discussion	5min Pres.	Discussion	5 min Pres.	Discussion	18:30
18:50				(A) 5mn pres.	5min Pres.	5 min Pres.	Discussion	Discussion	18:40
19:00				(A) Discussion	Discussion	Discussion	Discussion	Discussion	18:50
				(B) 5mn pres.					19:00
				(B) Discussion					

W1	Li-Ion Batteries
W2	Semiconductors for PV
W3	RE Resources Forecasting
W4	Energy Efficiency
W5	Digital Techno in SE
W6	Green Hydrogen
SS1	Smart grid
SS2	Magnetocal.c refrigeration
SS3	Biomass & Biogas Energy
SS4	Wind Energy
T1	Smart Grid
T2	role of AI in PV
T3	Energy Storage
T4	Density-Functional
T5	Green Hydrogen production

Webinars:

[IRSEC'21, from 23 to 27 November](#)

(Unique address, including the opening session)

[Monday 22 November \(Workshop 4 \(III\) & Workshop 5 \(II\)\)](#)

[Tutorial 1 - An Example of Real Smart Grid: use of Dynamic Line Ratings to Connect more Renewables](#)

[Tutorial 2 - The role of AI in PV systems design and control with hardware implementations](#)

[Tutorial 3 - Energy storage tutorial: Introduction to Electrochemical Energy Storage Technologies](#)








[Tutorial 4 - Density-Functional Theory toward Predicting Properties and Design of Materials](#)

[Tutorial 5 - Green Hydrogen production](#)

Webinar Link: https://us02web.zoom.us/webinar/register/WN_-kl0dBnTTXCzII1U90DqCQ
(The same URL from 23 to 27 Nov.)

Opening Ceremony

Tuesday 23 November 2021

08:45 - 09:30		Dr. Leila Benali Minister of Energy Transition and Sustainable Development, Morocco.
		Prof. Saifur Rahman IEEE President-elect 2022 Director, Virginia Tech Advanced Research Institute, USA
		Dr. Hicham Bouzekri <i>R&D Director of Masen (Moroccan Agency for Sustainable Energy), Morocco.</i>
		Prof. Abdellatif Moukrim Dean of Faculty of Science, Tetouan, Morocco.
		Prof. Shahzada Ahmad (TPC Chair) <i>BCMaterials-Basque center for materials, applications & nanostructures, Leioa, Spain.</i>
		Prof. Mohamed Essaaidi (General Chair) National Higher School of IT (ENSIAS), Rabat, Morocco.
		Prof. Youssef Zaz (General Chair) MSTI & Faculty of Science, Abdelmalek Essaadi University, Tetouan.

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(The same URL from 23 to 27 Nov.)

Workshop 1 (1)		<u>Advances in Lithium-ion Battery and Beyond</u>	
Thursday 25 November 2021 15:15-18:30 (GMT +1)			
Moderator		Dr. Khalil Amine <i>distinguished Fellow and manager of the Advanced Lithium Battery Technology program at Argonne National Laboratory, IL, USA</i>	
Panelists	Prof. Stefano Passerini , Helmholtz Institute Ulm, Ulm, Germany Dr. Mohamed Chakir , Junior Expert, Solid state Batteries in Renault, France. Dr. Mouad Dahbi , Med VI Polytechnic University, Benguerir, Morocco.		
KN11 15:30-16:00		Offering High Safety High Energy LIBs for EV Application through Novel Material Design Dr. Wenjuan Liu Mattis Chief Technology Officer of Microvast, Orlando, USA	
KN12 16:00-16:30		Advancing Na-ion batteries: the critical role of electrode selection Prof. Teófilo Rojo Faculty of Science and Technology, University of the Basque Country, Bilbao, Spain	
KN13 16:30-17:00		The Application of Conductive Polymers in Lithium Rechargeable Batteries Dr. Gao Liu Lawrence Berkeley National Laboratory, USA	
17:00-17:30	Discussion		
17:30-18:00	5 min Presentations	High Rate Na₃NiZr(PO₄)₃ Electrode Material for Sodium-ion Batteries (ID - 202) <i>Marwa Tayoury, Abdelwahed Chari, Mohammed Aqil, Youssef Tamraoui, Jones Alami, Mouad Dahbi</i> Sol-Gel Synthesis of Li₃VO₄ as High-Capacity and High-Capability Anode for Lithium-Ion Batteries (ID - 214) <i>Elmaataouy Elhoucine, Chari Abdelwahed, Tayoury Marwa, Alami Jones and Dahbi Mouad</i> Charging Interface based on an LDO Regulator for a Li-ion Battery in 180nm CMOS Technology (ID - 42) <i>Abdelhafid El Attafi, Mounir Ouremchi, Karim El Khadiri, Hassan Qjidaa</i> DFT Calculations on Mn-doped and Pristine Na₂FePO₄F for Sodium-ion Batteries Applications (ID - 134) (local) <i>Zineb El Kacemi, Zouhir Mansouri, Abdelilah Benyoussef, Abdallah El Kenz, Mohamed Balli, Omar Mounkachi</i>	
18:00-18:30	Discussion		





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Workshop 1 (2)		<u>Advances in Lithium-ion Battery and Beyond</u>	
		Friday 26 November 2021 15:15-18:30 (GMT +1)	
Moderator		Dr. Khalil Amine <i>distinguished Fellow and manager of the Advanced Lithium Battery Technology program at Argonne National Laboratory, IL, USA</i>	
Panelists		Prof. Teófilo Rojo , Faculty of Science and Technology, University of the Basque Country, Bilbao, Spain. Dr. Gao Liu , Lawrence Berkeley National Laboratory, USA. Dr. Mouad Dahbi , Med VI Polytechnic University, Benguerir, Morocco.	
KN14 15:30-16:00		Ionic liquids for long-term cycling of high-performance lithium metal batteries Prof. Stefano Passerini Helmholtz Institute Ulm, Ulm, Germany	
KN15 16:00-16:30		Slurry coating Process: Effect of Argyrodite solid electrolyte purity on the fabrication of ASSB Dr. Mohamed Chakir Junior Expert, Solid state Batteries in Renault, France	
16:30-17:00		Discussion	
17:00-17:30	5 min Presentations	Sol gel synthesis of Nanoparticles $\text{Ni}_{0.5}\text{Mg}_{0.5}\text{Fe}_{1.7}\text{Mn}_{0.3}\text{O}_4$ as Anode Material for Lithium-Ion Batteries (ID - 213) <i>Kouchi Khadija, Abdelwahed Chari, Marwa Tayoury, Chchiyai Zakaria, Hdidou Loubna, Youssef Tamraoui, Jones Alami, Manoun Bouchaib and Dahbi Mouad</i> Performance of Na/Na₃V₂(PO₄)₃@C half-Cell in Ionic Liquid-based Yybrid Electrolyte (ID - 215) <i>Hasna Wakrim, Abdelwahed Chari, Sanae Majid, Aicha Boukhriss, Jones Alami, Said Gmouh, Mouad Dahbi</i> A New Electrodeposited Sodium Vanadyl Phosphate Material as a Cathode for High-Voltage Na-ion Batteries (ID - 212) <i>Asma Kafih, Abdelwahed Chari, Jones Alami, Mouad Dahbi, Aicha Guessous</i> omparative Study on the effects of Different Coating of Cathode Materials for Sodium-Ion Batteries (ID - 203) <i>Abdelwahed Chari, El Houcine Elmaataouy, Marwa Tayoury, Jones Alami, Mouad Dahbi</i> A Titanium Oxy-phosphate Na₄TiO(PO₄)₂ as High Performance Electrode Material for Sodium-ion Batteries (207) <i>Chaimae Hamdouchi, Abdelwahed Chari, Marwa Tayoury, Jones Alami, Abdeslam El Bouari, Mouad Dahbi</i>	
17:30-18:00		Discussion	

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Workshop 2 (I)		<u>Emerging semiconductors for photovoltaics application</u>	
Tuesday 23 November 2021 08:45 – 12:10 (GMT +1)			
Moderator		Prof. Shahzada Ahmad (TPC & Workshop Chair) BCMaterials-Basque center for materials, applications & nanostructures, Leioa, Spain.	
Panelists	Dr. Peng Huang , BCMaterials, Spain Dr. Samrana Kazim , BCMaterials-Basque center for materials, applications & nanostructures, Leioa, Spain		
KN21 09:30-10:00		Tuning 3D/2D Interface by Various Cations to Afford Efficient and Stable Perovskite Solar Cells and Modules Prof. Mohammad Khaja Nazeeruddin Ecole Polytechnique Federale de Lausanne, Switzerland	
KN22 10:00-10:30		Efficient Photon-harvesting Technologies for Energy Applications Prof. Sanjay Mathur Director of the Institute of Inorganic Chemistry at University of Cologne, Germany	
KN23 10:30-11:00		Elucidating Hydrogen Migration in Hybrid Organic Inorganic Perovskite Materials and how it can Help Improve Device Performance Prof. Dario Bassani University of Bordeaux, France	
11:00-11:30	Discussion		
11:30-11:50	5 min Presentations	Experimental Investigation on the Influence of the Diameter on Thermosyphons for Application in a Hybrid Photovoltaic/Thermal System (ID - 175) <i>Pedro Leineker Ochoski Machado, Romeu Miqueias Szmoski, Victor Vaurek Dimbarre, Thiago Antonini Alves</i>	
11:50-12:10		Investigation of the Structural Properties of SnO₂ Co-doped by (K, Dy) and (K, Sm) Synthesized by the Co-precipitation Method for Photon Conversion (ID - 48) <i>Najoua Eraza, Mohamed Youssef Messous, Mohamed Naji, Mounia Tahri</i> Energetic and Economic Evaluation of Mono and Poly c-Si Grid-connected PV Systems: In Ouarzazate, Morocco (ID - 100) <i>Manar Jabbour, Mohamed Akhsassi, Yassine Darmane, Abdelhadi Baala, Hasnae El Mouden, Fatima Chaoui, Mustapha Raoufi, Abdelkader Outzourhit, Amine Bennouna</i>	

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(The same URL from 23 to 27 Nov.)

Workshop 2 (II)		<u>Emerging semiconductors for photovoltaics application</u>	
Tuesday 23 November 2021 (GMT +1)			
Moderator		Prof. Mohammad Khaja Nazeeruddin <i>Ecole Polytechnique Federale de Lausanne, Switzerland.</i>	
Panelists	Prof. Mingkui Wang , Huazhong University of Science and Technology, China Prof. Yingping Zou , Central South University, China Dr. Vida Engmann , South Denmark University, Denmark Abdelkader Aissat , University of Blida, Algeria		
KN24 12:40-13:10		Designing of Molecular Semiconductors for Efficient Perovskite Solar Cells Dr. Samrana Kazim BCMaterials-Basque center for materials, applications & nanostructures, Leioa, Spain	
KN25 13:10-13:40		Engineering the Perovskites for Efficient Solar to Electricity Harvesting Prof. Shahzada Ahmad BCMaterials-Basque center for materials, applications & nanostructures, Leioa, Spain	
IS26 13:40-14:00		Transition metal dichalcogenides as interfacial materials for highly efficient and stable perovskite solar cells Dr. Peng Huang BCMaterials, Spain	
14:00-14:30	Discussion		
14:30 – 14:50	5 min Presentations	Structural and Optical Properties of TiO₂(Ce,Nd) Nanopowders Prepared by Coprecipitation (ID - 49) <i>Mohamed Youssef Messous, Touria Badaoui, Ahmed Liba, Mounia Tahri</i> Cu₂FeSnS₄ Thin Film Solar Cells (ID - 141) <i>Abdelkader El Kissani, Dris Ait El Haj, Abbelaziz Abali, Safia Drissi, Kassem El Assali, Hassan Chaib, Abdelkader Outzourhit</i> First-principles DFT Investigation of the Photo-catalytic Capability of Cl Doped rutile TiO₂ as a Self-cleaning Coating for Photovoltaic Panels (ID - 56) <i>Badr Akharkhach, Abdelfettah Barhdadi</i> Comparative Study Between a Single Junction and One Intermediate Band Solar Cells (ID - 6) <i>Nacer Said, Abdelkader Aissat</i>	
15:50-15:10		Discussion	

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Workshop 2 (3)		<u>Emerging semiconductors for photovoltaics application</u>	
Wednesday 24 November 2021 12:25-15:10 (GMT +1)			
Moderator			Dr. Samrana Kazim BCMaterials-Basque center for materials, applications & nanostructures, Leioa, Spain
Panelists		Prof. Shahzada Ahmad , BCMaterials-Basque center for materials, applications & nanostructures, Leioa, Spain Dr. Peng Huang , BCMaterials, Spain Djamila Rekioua , University of Bejaia, Algeria	
KN27 12:40-13:10			Lead-less perovskite solar cells Prof. Mingkui Wang Huazhong University of Science and Technology, China
KN28 13:10-13:40			A-DA'D-A type acceptor based organic solar cells Prof. Yingping Zou Central South University, China
IS29 13:40-14:00			Additive-assisted Stabilization of Organic Solar Cells Dr. Vida Engmann South Denmark University, Denmark
14:00-14:30		Discussion	
14:30-14:50		5 min Presentations	Synthesis and Characterization of $\text{Cu}_2\text{Fe}_{1-x}\text{Co}_x\text{SnS}_4$ Thin Films Prepared by the Simple (ID - 176) (local) <i>Safia Drissi, Abdelkader El Kissani, Driss Ait El Haj, Abdelaziz Abali, Kassem El Assali, Abdelkader Outzourhit</i> Efficiency Prediction of Cu-chalcopyrite based Solar Cells: a First-principles Study (ID - 98) (local) <i>Bikerouin Mouad, Balli Mohamed</i> Properties Evaluation of $\text{Fe}_{95-x}\text{Si}_5\text{Ni}_x$ under the Earth's Inner-Core Conditions: Insight from the Ab-Initio Investigation (ID - 124) <i>El Mehdi Salmani, Mustapha Zidane, Hamid Ez-Zahraouy, Abdelilah Benyoussef</i> Impact of Conducting Polymer Interlayer and Iodine Doping on the Electronic Properties of Hybrid Solar Cells based on Alkylated Sexithiophene and Nanostructured Zinc Oxide (ID – 44) <i>Houda Jebari, Abdelmajid El Mansouri, Nabil Hadik, Najim Tahiri, Omar El Bounagui, Abdelkader El kissani, Hamid Ez-Zahraouy, Abdelkader Outzourhit</i>
14:50-15:10		Discussion	

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Workshop 3 (I)	<u>The Advances in Renewable Resources Forecasting and their Economic Prospects</u>	
Wednesday 24 November 2021 08:45-12:10 (GMT +1)		
Moderator		Best Practices for Accurate Renewable Energy Forecasting Mr. Gorkem Teneler Senior Consultant, Enercast, Germany
Panelists	Dr. Stefan Wilbert , Team Leader Energy Meteorology, DLR (German Aerospace Center), Germany Mr. Gorkem Teneler , Senior Consultant, Enercast, Germany Dr. Hicham Bouzekri , R&D Director of Masen (Moroccan Agency for Sustainable Energy), Morocco. Mr. Ismail Belhaj , R&D and Industrial Integration Analyst, MASEN, Morocco. Mr. Abderezzak Himdi , MASEN	
KN31 09:00-09:30		Forecasting of solar irradiance and ramp events with all-sky imagers Prof. Andreas Kazantzidis Head of the Laboratory of Atmospheric Physics, University of Patras, Greece
KN32 09:30-10:00		Prediction of solar radiation and photovoltaic production Mr. Jan Remund Head of Solar Energy & Climatology Unit, Meteotest, Switzerland
IS33 10:00-10:20		Sky cameras for intra-hour forecasting – A few use cases Mr. Nicolas Schmutz Founder and CEO, Reuniwatt, France
KN34 10:20-10:40		All Sky imager-based radiation forecasts for solar energy systems and electrical grids Dr. Stefan Wilbert Team Leader Energy Meteorology, DLR (German Aerospace Center), Germany
10:40-11:10	Discussion	

11:10-11:40	5 min Presentations	<p>Recent Development of Hybrid Renewable Energy Systems (ID - 3) <i>Smahane Ounnabi, Hamid Mounir</i></p> <p>Performance Comparison of Support Vector Regression, Random Forest and Multiple Linear Regression to Forecast the Power of Photovoltaic Panels (ID - 52) <i>Souhaila Chahboun, Mohamed Maaroufi</i></p> <p>Solar Photovoltaic Forecasting of Power Output using Artificial Neural Network (ID - 61) <i>Abdelkader El Kounni, Hassan Radoine, Hicham Mastouri, Hicham Bahi, Abdelkader Outzourhit</i></p> <p>PV Power Prediction based on Artificial Neural Network Optimized by Genetic Algorithm (ID - 78) <i>Khadija Lmesri, Samira Chabaa, Mohammed Ali Jallal, Nasima El Assri, Sihame Nachat and Abdelouhab Zeroual</i></p>
11:40-12:10	Discussion	

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Workshop 3 (II)	<u>The Advances in Renewable Resources Forecasting and their Economic Prospects</u>	
Saturday 27 November 2021 08:45-10:10 (GMT +1)		
Moderator		M. Abderrahim Jamrani Technical Director of Masen (Moroccan Agency for Sustainable Energy), Morocco.
Panelists	Mr. Jan Remund , Head of Solar Energy & Climatology Unit, Meteotest, Switzerland Mr. Ismail Belhaj , R&D and Industrial Integration Analyst, MASEN, Morocco. M. Abderrahim Jamrani , Technical Director of Masen (Moroccan Agency for Sustainable Energy), Morocco.	
IS35 09:00-09:20		Best Practices for Accurate Renewable Energy Forecasting Mr. Gorkem Teneler Senior Consultant, Enercast, Germany
09:20-09:40	5 min Presentations	Analyzing Land Use Change and Climate Data to Forecast Energy Demand for a Smart Environment (ID - 27) <i>Archana Prasad, Aparna S. Varde, Raga Gottimukkala, Clement Alo, Pankaj Lal</i> Effect of Convection on Latent Heat Storage in a Tube and Shell Exchanger (ID - 183) <i>Oussama El Mhamdi, Elalami Semma</i> Towards the Utilization of Concentrating Solar Power as a Source of Heat for Hydrothermal Carbonization Process (ID - 157) <i>Hamza Chater, Mohamed Asbik, Ilias Bakhattar, Khadija El Alami, Ammar Mouaky, Abdelghani Koukouch</i> Wind Power Forecasting using Machine Learning Algorithms (ID - 17) <i>Sambalaye Diop, Papa Silly Traore and Mamadou Lamine Ndiaye</i> Techno-Economic Investigation of Novel Hybrid CSP-PV Plant Configuration (ID - 81) <i>Hicham El Madioune, Yousra Filali Baba, Hanane Ait Ousaleh, Abdechafiq Elharrak, Fayrouz Elhamdani, Hicham Bouzekri, Abdessamad Faik</i>
09:40-10:10	Discussion	

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Workshop 4 (I)

Energy Efficiency in the Buildings and construction sector

Building energy challenges and urban sustainability emergency

Wednesday 24 November 2021

15:35-18:30 (GMT +1)

Moderator		Prof. Helcio R. B. Orlande (Workshop Chair) Escola Politécnica, Federal University of Rio de Janeiro, Brazil
Panelists	Dr. Parham Mirzaei Ahranjani , Faculty of Engineering, University of Nottingham, UK Prof. Mohammed Garoum (Local Chair) , University Mohammed V in Rabat, EST Salé, Morocco Prof. Najma Laaroussi , University Mohammed V in Rabat, EST Salé, Morocco Dr. Zaid Romani , National School of Architecture, Tetouan, Morocco.	
KN41 15:50-16:20		Overview of Smart and Grid-Interactive Efficient Buildings Prof. Moncef Krarti Coordinator of Building Systems Program, University of Colorado, USA
KN42 16:20-16:50		The Future of the Built Environment in Face of Climate Changes and Global Challenges Prof. Umberto Berardi Canada Research Chair in Building Science, Ryerson University, Canada
16:50-17:10	Discussion	
(A) 17:10-17:30	5 min Presentations	A sustainable Heating Solution for Multifamily Residential Buildings in Cold Climates (ID - 122) <i>Sajjan Pokhrel, Seyed Ali Ghoreishi-Madiseh, Leyla Amiri, Sébastien Poncet, Agus P. Sasmito</i> Thermal Behaviour Evaluation of a Traditional Earthen Building under the Climatic Conditions of the Benguerir City (ID - 93) <i>Tarik Lemrani, Mohamed Ouakrouh, Hassan Radoine, Najma Laaroussi, Hicham Mastouri</i> Upgrading Rural Living: Agri-Green House Concept for Agriculturists (ID - 163) <i>Hassan Radoine, Hicham Mastouri, Philippe Drobinski, Jordi Badosa</i>
17:30-17:50	Discussion (A)	
(B) 17:50-18:10	5 min Presentations	Designing Low-cost Insulating Panels to Enhance Buildings' Thermal Performance (ID - 145) <i>Hicham Mastouri, Hassan Radoine, Isaac Galobardes, Mouad Dahbi, Youssef Tamraoui, Hassan Chehouani, Brahim Benhamou, Abdelkader Outzourhit, Gaetano Squadrito, Agatino Nicita, Manuel Carlos Gameiro Da Silva</i> Evaluation of Global Energy Performance of Complex Walls Integrating Phase Change Materials (PCM): Case study of semi-arid Climate of Benguerir city (ID - 194) <i>Mustapha Salihi, Maryam El Fiti, Yasser Harmen, Younes Chhiti, Ahmed Chebak, Fatima Ezzahrae M'Hamdi Alaoui, Mounia Achak, Shrir Bousalham, Charafeddine Jama</i> Study of some Passive Solutions Integrated to a Residential Building using Multi-objective Optimization (ID - 209) <i>Fatima Najoui, Noussaiba Rharbi, Safae Oulmouden, Abdelkader Outzourhit, Hassan Radoine, Hicham Mastouri, Hicham Bahi</i>
18:30-18:30	Discussion (B)	

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(The same URL from 23 to 27 Nov.)

Workshop 4 (II)

Energy Efficiency in the Buildings and construction sector

Building energy simulation, optimization and measurement

Thursday 25 November 2021

12:15-15:00 (GMT +1)

Moderator		Prof. Moncef Krarti Coordinator of Building Systems Program, University of Colorado, USA
Panelists	Prof. Mohammed Garoum , University Mohammed V in Rabat, EST Salé, Morocco. Prof. Najma Laaroussi , University Mohammed V in Rabat, EST Salé, Morocco. Dr. Zaid Romani , National School of Architecture, Tetouan, Morocco. Prof. Brahim Benhamou , Cadi Ayyad University Marrakech, Morocco.	
KN43 12:30-13:00		Multi-scale Approach CFD Modeling of Airborne Pathogen Droplets of COVID-19 Dr. Parham Mirzaei Ahranjani Faculty of Engineering, University of Nottingham, UK
KN44 13:00-13:30		Inverse Problem Solutions for the Thermal Characterization of Materials at High Temperatures Prof. Helcio R. B. Orlande Escola Politécnica, Federal University of Rio de Janeiro, Brazil
13:30-14:00	Discussion	
(A) 14:00-14:15	5 min Presentations	PV Sizing of a Grid Connected Solar Carport System Linked to Charging Stations and its Economic Analysis (A Case Study) (ID - 187) <i>Fatima-Ezzahra Riakhi, Asmae Khaldoun</i> Characterization of UHI and Outdoor Thermal Comfort Mapping: a case of Rabat (ID - 169) <i>Kaoutar Ouali, Moulay larbi Abidi, Khalid El Harrouni</i> Impact of Canyon and Courtyard Microclimate Interactions on Building Energy Performance (ID - 167) <i>Adnane M'saouri El Bat, Zaid Romani, Abdeslam Draoui</i>
14:15-14:30	Discussion (A)	
(B) 14:30-14:45	5 min Presentations	Development of an Energy Sustainability Index of Mobility for Tunisian Cities (ID - 165) <i>Emna Khamassi, Ferid Rehim, Adel Kalboussi</i> PV Sizing of a Stand-Alone Solar Carport System Linked to Charging Stations and its Economic Analysis (A Case Study) (ID - 186) <i>Fatima Ezzahra Riakhi, Asmae Khaldoun</i> Experimental Investigation on the Ground Temperature Profile for Shallow Geothermal Energy Applications in A Hot and Dry Climate (ID - 153) <i>Mahmoud Bady, Mohamed Ouzzane, Mohamed Shahin</i>
14:45-15:00	Discussion (B)	

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(for 22 Nov.)

Workshop 4 (3)

Energy Efficiency in the Buildings and construction sector

Monday 22 November 2021





11:15-14:50 (GMT +1)

Moderator	 <p>Prof. Brahim Benhamou Cadi Ayyad University Marrakech, Morocco</p>
Panelists	<p>Prof. Mohammed Garoum, University Mohammed V in Rabat, EST Salé, Morocco. Prof. Najma Laaroussi, University Mohammed V in Rabat, EST Salé, Morocco. Dr. Zaid Romani, National School of Architecture, Tetouan, Morocco.</p>
<p>(A) 11:30-11:55</p>	<p>5 min Presentations</p> <p>Building Design Optimization to Enhance Thermal Comfort Performance: A case Study in Marrakech Region (ID - 16) <i>Fatima Zahra Benaddi, Abdelaziz Belfqih, Jamal Boukherouaa, Anass Lekbich, Faissal El Mariami</i></p> <p>Exploring BIM and Energy Analysis Potential of Binayate Software Tools for Energy Retrofit Purpose (ID - 19) <i>Rim Afa, Abderrahim Brakez, Issam Sobhy, Mohcine Draou</i></p> <p>Design of a Low Energy System for Air Cooling of a Residential Building in Benguerir, Morocco (ID - 97) <i>Oumaima Diani, Hassan Radoine, Hassan Mahach, Hicham Mastouri, Brahim Benhamou</i></p> <p>Study of Economic and Environmental Impact of Photovoltaic Installation Located in Sale, Morocco (ID - 24) <i>Amale Laaroussi, Abdelrhani Bouayad</i></p> <p>Comfort and Energy Management System: Operational Project for Intelligent Efficiency Optimization (ID - 114) <i>Cheikh Hady Diasse, Khaoula Hanin, Abdelhaq Karimi, Hassan Radoine, Hicham Mastouri, Hicham Bahi</i></p>
11:55-10:20	<p>Discussion (A)</p>
<p>(B) 12:20-12:45</p>	<p>5 min Presentations</p> <p>Integration of Passive Cooling System in a Building Information Model: Indoor Vegetated Envelope Model (ID - 149) <i>Hind Khana, Rafika Hajji, Moha Cherkaoui</i></p> <p>Numerical Study of PCM Melting Process Inside Concentric Cylinder (ID - 159) <i>Hajar Zennouhi, Abedlmajid El Ouali, Tarik Elrhafiki, Kousksou Tarik</i></p> <p>The assessment of the durability and the performance of an existing building according to LEED v4 and, WELL v2 environmental tools: School building at AL Akhawayn University in Ifrane, Morocco (ID - 172) <i>Hanaa Nacer, Nabil Koubaa, Hassan Radoine, Hicham Mastouri, Abdelghani El Asli</i></p> <p>Forecast of Greenhouse Gas Emissions in the Transport Sector in Morocco (ID - 189) (local) <i>Hasnaa Oubnaki, Charifa Haouraji, Badia Mounir, Ilham Mounir, Abdelmajid Farchi</i></p> <p>Multi-objective Optimization of Thermal Insulation Thickness of a House in Benguerir, Morocco (ID - 205) <i>Mhajjiba Belhous, Hicham Mastouri, Hassan Radoine, Brahim Benhamou</i></p>
12:45-13:10	<p>Discussion (B)</p>

<div>(C)</div> <div>13:10-13:35</div>	<div>5 min Presentations</div>	<div>Multi-Objective Optimization of a Shading System to Reduce Heating and Cooling Energy Needs in Benguerir, Morocco (ID - 208)</div> <div>Houda Er-retby, Bouthayna Idrissi Gartoumi, Abdelkader outzourhit, Hicham Mastouri, Hassan Radoine, Hicham Bahi</div>
		<div>The Impact of Integrated-rooftop Greenhouses on Buildings Efficiency "The Case of the Administrative Building of UM6P" (ID - 210)</div> <div>Ibtissam El Aouni, Hicham Mastouri, Hassan Radoine, Abdelghani El Asli, Nabil Koubaa</div>
		<div>The Thermal Performance of an Earth to Air Heat Exchanger Connected to a Single-family House for Air Heating and Cooling under European Climates (ID - 105)</div> <div>Hassan Mahach, Brahim Benhamou, Christoph Schmidt, Bodo Gross, Horst Altgeld</div>
		<div>Optimal Building Envelope Design and Renewable Energy Systems Size for Net-zero Energy Building in Tetouan (Morocco) (ID - 14)</div> <div>Nawal Abdou, Youness El Mghouchi, Said Hamdaoui, Mhamed Mouqallid</div>
		<div>Concentration Polarization Phenomena in forward Osmosis Process: An Experimental Study (ID - 112)</div> <div>Imane Chaoui, Issa Ndiaye, Souad Abderafi, Sebastien Vaudreuil, Tijani Bounahmidi</div>
<div>13:35-14:00</div>	<div>Discussion (C)</div>	
<div>(D)</div> <div>14:00-14:25</div>	<div>5 min Presentations</div>	<div>Numerical Simulation of Hydrogen Combustion in the Event of a Severe Accident in a Nuclear Power Plant (ID - 55) (local)</div> <div>Abdallah Elorf, Youssra Tijani, Alan Jean-Marie</div>
		<div>Modeling of Atmospheric Dispersion of Pollutants Through the Building using a Lagrangian Stochastic Model (ID - 182)</div> <div>Hakim Sara, Najma Laaroussi, Amir Ali Feiz, Boulos Alam, Mohammed Garoum</div>
		<div>Estimation of Thermal Diffusivity from a Long-term Measurement of Sub-soil Temperature in Marrakech (ID - 126)</div> <div>Hassan Mahach, Brahim Benhamou, Amin Bennouna</div>
		<div>Thermal Performance Enhancement of a Longitudinal Finned Latent Thermal Energy Storage Unit (ID - 193)</div> <div>Maryam El Fiti, Mustapha Salihi, Yasser Harmen, Youness Chhiti, Ahmed Chebak, Fatima Ezzahrae M'Hamdi Alaoui, Mounia Achak, Srhir Bousalham, Charafeddine Jama</div>
		<div>Impact of Aspect Ratio and Green Surfaces on the outdoor Thermal Comfort of the Street Canyon under Mediterranean Climate (ID - 206)</div> <div>Omar Charif, Adnane M'saouri El Bat, Zaid Romani, Abdeslam Draoui</div>
<div>14:25-14:50</div>	<div>Discussion (D)</div>	

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(The same URL from 23 to 27 Nov.)

Workshop 5		<u>Digital Technologies in Solar Energy</u>	
Friday 26 November 2021 08:45-12:00 (GMT +1)			
Moderator		Prof. Josep M. Guerrero (Under confirmation) IEEE Fellow, Center for Research on Microgrids, Aalborg University, Denmark.	
Panelists	<ul style="list-style-type: none">- Dr. Saad Motahhir, ENSA Fez, Morocco.- Prof. Saad Mekhilef, University of Malaya, Kuala Lumpur, Malaysia.- Prof. Said Ahzi, Strasbourg University, France.- Prof. Abdelfettah Barhdadi, ENS, Med V University in Rabat, Morocco.		
KN51 09:00-09:30		Transformer-less Online Uninterruptible power supply (UPS) system Prof. Saad Mekhilef University of Malaya, Kuala Lumpur, Malaysia	
KN52 09:30-10:00		Theoretical and computational analysis for the design of PV panels Prof. Said Ahzi Strasbourg University, France	
KN53 10:00-10:30		A Novel Musical Chairs Algorithm Applied for MPPT of PV Systems Prof. Ali Eltamaly King Saud University, Riyadh, Saudi Arabia & Mansoura University, Mansoura, Egypt	
10:30-11:00	Discussion		
11:00-11:30	5 min Presentations	Theoretical and Numerical Analysis of a Passive Cooling System for a Commercial Photovoltaic Module (ID - 129) <i>Vinicius Marson, Domisley Dutra Silva, João Batista Campos Silva, Elaine Maria Cardoso</i> Comparative Analysis of Conventional and Modified Perturb and Observe MPPT Controllers under Partial Shading Conditions (ID - 135) <i>Sajib Ahmed, Immad Shams, Saad Mekhilef, Tey Kok Soon, Marizan Binti Mubin</i> Performance of DFIG-Wind Turbine Generator System for LVRT Enhancement using Proportion-Resonant Controller (ID - 184) <i>Ravikiran Hiremath, Tukaram Moger</i> Comparative Analysis of Different Controllers for Enhancing the LVRT of DFIG System (ID - 185) <i>Ravikiran Hiremath, Tukaram Moger</i> MPPT Techniques Investigation in Photovoltaic System (ID - 166) <i>Hicham Oufettoul, Ghassane Aniba, Saad Motahhir</i> Modeling and Simulation of Photovoltaic Pumping System used for Irrigation (ID - 76) <i>Duy An Pham</i> Bicycle Generation Station for Portable DC Charging – Experimental Project (ID - 68) <i>Adel El-Shahat, Nicholas Carlson, Aubrey Lee</i>	
11:30-12:00	Discussion		


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(for 22 Nov.)


Workshop 5 (II)

Digital Technologies in Renewable Energy

Monday 22 November 2021

15:05-18:30 (GMT +1)

Moderator	 Prof. Abdelfettah Barhdadi ENS, Med V University in Rabat, Morocco.
Panelists	Prof. Mohamed Ouassaid , EMI, Med V University in Rabat (Morocco) Dr. Saad Motahhir , ENSA Fez, (Morocco) Prof. Abdelaziz El Ghizal , EST, SMBA university, Fez, Morocco
(A) 15:20-15:45	<div>5 min Presentations</div> Micro-Scale Desalination System Utilizing Distributed Generation Alternative Sources (ID - 70) <i>Adel El-Shahat, Babajide Adepitan, Walter Brannen, Samuel Trent</i> Autonomous Solar Rotary Composter Equipped with a Remote Management System (ID - 39) <i>Fatima Zahra Siti, Yassine Baskoun, Fatima Zahra Beraich, Mustafa Elalami, Moha Arouch, Mohamed Taouzari and Salah Dine Qanadli</i> Modern Control of a Standalone Solar Pumping System Based on Asynchronous Motor (ID - 46) <i>Zakaria Massaqa, Abdelouahed Abounada, Oumaima Benkirane, Mohamed Ramzi</i> Numerical Study of the Turbulent Air Flow through the Turbocharger Compressor using Different Rotor Shapes (ID - 80) <i>Abdelmadjid Chehhat, Mouna Maache, Mohamed Si Ameur</i> Comparative Study of Different MPPT Algorithms for Photovoltaic Systems under Partial Shading Conditions (ID - 102) <i>Khadija Sabri, Ouadia El Maguiri, Abdelmajid Farchi</i>
15:45-16:10	Discussion (A)
(B) 16:10-16:35	<div>5 min Presentations</div> Caracterization of Light Dependent Resistors Sensors for Optical Sun Tracking Application (ID - 108) <i>Youssef Boukdir, Hamid El Omari</i> Optimization of Circumferential Temperature Uniformity of a PTC Absorber with U-pipe Exchanger (ID - 117) <i>Mohammed Halimi, Oumachtaq Ayoub, Aumeur El Amrani, Choukri Messaoudi</i> Comparative Study of Production of Three Grid-Connected PV Systems in two Cities of Morocco (ID - 119) <i>Nablous El Hajjam, Bouchaib Hartiti, Abdelfettah Barhdadi, Abderrazak Elamim, Ali Faddouli, Abderrahim Habchi, Salah Fadili</i> Fuzzy Logic Controller Controls a Smart Lighting System for Energy Savings (ID - 128) <i>Jabeur Reda, Abderazzak Lakrim, Najat Ouahline</i> Numerical Study of a Hybrid Photovoltaic Solar Thermal System in a Transient Condition (ID - 133) <i>Mohamed Bouzelmad, Youssef Belkassmi, Abdelhadi Kotri, Lahoucine Elmaimouni, Mohammed Gounzari, Abdelaziz Benahmida</i>
16:35-17:00	Discussion (B)

Moderator		Prof. Abdelaziz El Ghzizal EST, SMBA university, Fez, Morocco
(C) 17:00-17:25	5 min Presentations	Development of a Hybrid Energy Solution for a Smart Agricultural System (ID - 142) <i>(local)</i> <i>Omrane Derhy, Mourad Zegrari, Oussama Bayssi, Ayoub Hirt, Samir Rachidi</i> Design and Implementation of a Robust MPPT Controller based on BSMC (ID - 195) <i>(local)</i> <i>Khalid Chennoufi, Mohammed Ferfra, Mohcine Mokhlisse</i> Electric Vehicle Progress and Challenges on the Road to Sustainable Transportation (ID - 10) <i>Fatima El Bakkari, Hamid Mounir, Abdellatif El Marjani</i> Photovoltaic and Battery Systems Control and Monitoring for Energy Management using IoT (ID - 13) <i>Chaimae Zedak, Abdelaziz Belfqih, Jamal Boukherouaa, Anass Lekbich, Faissal El Mariami</i> Optimal Location and Scale of DG Units by using the Chaotic Acceleration Arctangent to Improve the PSO Algorithm (ID - 74) <i>M'dioud Meriem, Rachid Bannari, Ismail Elkafazi</i>
17:25-17:50	Discussion (C)	
(D) 17:50- 18:25	5 min Presentations	Speed Control of a Brushless DC Motor Powered by a PEM Fuel Cell (ID - 79) <i>Abdessamad Intidam, Hassan El Fadil, Zakariae El Idrissi, Abdellah Lassioui, Aziz Rachid, Abdeslam Jabal Laafou</i> Modeling and Simulation of the Electrical behaviors of a Functional and Faulty PV Array (ID - 109) <i>Samira Chabaa, Sihame Nachat, Atmane Baddou, Khadija Lmesri</i> Sites Benchmark using AHP Method for Implementing Solar Powered Thermal Desalination Plants in Morocco (ID - 110) <i>Jaouad Eddouibi, Sébastien Vaudreuil, Souad Abderafi, Tijani Bounahmidi</i> Wettability Effect on Homogenous Cavitation Induced by Lid-driven Flow (ID - 18) <i>Ayoub Afass, Soufiane Derfoufi, Mohammed Ahachad, Fatima Bahraoui, Mustapha Mahdaoui</i> Comparative Study of the Electrical Performance of Photovoltaic Systems for Two Different Cities (ID - 53) <i>Halim Eddahbi, Mohamed Khafallah, Aziz Elafia, Loubna Benaouinate</i> On The Harvesting and Numerical Modelling of the Ocean Wave Energy Resource: A Review (ID - 204) <i>Maha Rioui, Abdellatif El Marjani, Hafsa Bouhrim, Rajae Nechad, Hamid Mounir</i> Monthly Solar Radiation Maps for Morocco based on The Visualization of Clustering (ID - 12) <i>Anas Hajou, Youness El Mghouchi, Mohamed Chaoui</i>
18:25-19:00	Discussion (D)	

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Workshop 6 (I)	Perspectives of Green Hydrogen Development	
Thursday 25 November 2021 08:45-11:50 (GMT +1)		
Moderator		Dr. Sonya Calnan Research Group Leader, PVcomB, Helmholtz Zentrum Berlin, Germany
Panelists	Mr. Oghosa Erhahon , Lawyer and Energy Analyst, Nigeria Mr. Yassine Ennassiri , R&D and Industrial Integration Analyst, Moroccan Agency for Sustainable Energy (MASEN), Morocco. Dr. Younes Faydi , Research specialist, hydrogen production via electrolysis, Moroccan Agency of Sustainable Energy (MASEN), Morocco. Mr. Abdelali Djdiaa , Project Management Officer, MASEN, Morocco. M. Mohamed Bernanou , Energy Expert and NERA board member, Morocco. Prof. Djamila Rekioua , University of Bejaia, Algeria.	
KN61 09:00-09:30		Is Large-Scale Green Hydrogen / Ammonia Production Sustainable for Morocco? Prof. Jamal Chaouki Polytechnique Montreal, Canada
KN62 09:30-10:00		Low Cost Catalyst for Hydrogen production through Dry Autothermal Reforming of methane Prof. Tarik Chafik Faculty of Sciences and Techniques of Tangier, Morocco
IS63 10:00-10:20		Hydrogen-rich feedstocks and fuels: Africa's strengths Mr. Cédric Philibert Energy and climate analyst, France
10:20-10:50	Discussion	
10:50-11:20	Monograin Membranes for Biomimetic Solar Water Splitting Stepwise Opening of Ionically Conductive Channels (ID - 151) <i>Dieter Meissner, Ali Samieipour, Elham Kouhiisfahani, Souhaib Oueslati, Tobias Morawietz, Michael Handl, Matthias Simolka, Renate Hiesgen</i> Technical-economic Evaluation of the Potential of Municipal Leachate for Bio-hydrogen Production in Morocco: Fez Area Case Study (ID - 138) (local) <i>Aicha Oujidi, Abdellah Arrahli, Anass Bakouri, Oussama Bayssi, Ayoub Hirt, Samir Rachidi</i> Fuzzy Logic based Energy Management Strategy for Fuel Cell Supercapacitor Hybrid Vehicles (ID - 139) <i>Nada Rifai, Sabor Jalal, Chakib Alaoui, Hamid Gualous</i>	
11:20-11:50	Discussion	

Webinar Link: https://us02web.zoom.us/webinar/register/WN_-kI0dBnTTXCzII1U90DqCQ
(The same URL from 23 to 27 Nov.)

Workshop 6 (II)	Perspectives of Green Hydrogen Development	
Friday 26 November 2021 12:15-15:00 (GMT +1)		
Moderator		Prof. Jamal Chaouki Polytechnique Montreal, Canada
Panelists	Mr. Cédric Philibert , Energy and climate analyst, France Prof. Tarik Chafik , FST, Abdelmalek Essaadi University, Tangier, Morocco. Prof. Djamila Rekioua , University of Bejaia, Algeria. Mr. Yassine Ennassiri , R&D and Industrial Integration Analyst, Moroccan Agency for Sustainable Energy (MASEN), Morocco. Dr. Younes Faydi , Research specialist, hydrogen production via electrolysis, Moroccan Agency of Sustainable Energy (MASEN), Morocco. M. Abderrahim Jamrani , Technical Director of Masen (Moroccan Agency for Sustainable Energy), Morocco. M. Mohamed Bernanou , Energy Expert and NERA board member, Morocco.	
KN64 12:30-13:00		Scientific and technological progress in green hydrogen based on solar powered water electrolysis Dr. Sonya Calnan Research Group Leader, PVcomB, Helmholtz Zentrum Berlin, Germany
IS65 13:00-13:20		The role of Green Hydrogen in energy transition for Africa Mr. Oghosa Erhahon Lawyer and Energy Analyst, Nigeria
IS66 13:20-13:40		Innovation and R&D, a Key to a competitive Green Hydrogen Economy Dr. Samir Rachidi , Director of Thermal Systems & "Power-To-X", IRESEN, Morocco.
13:40-14:10	Discussion	
14:10-14:35	Screening of the most Favorable Metal Oxides Systems for H2 Production via Solar Thermochemical Water Splitting (ID - 84) <i>Yassine Nassereddine, Hanane Ait Ousaleh, Yousra Filali Baba, Abdechafik El Harrak, Samir Rachidi, Abdessamad Faik</i> Modeling and Simulation of a PEMFC Fuel Cell using Three-dimensional Multi-phase Computational Fluid Dynamics Model (ID - 72) <i>Mohamed-Amine Babay, Mustapha Adar, Mustapha Mabrouki</i> New optimized Sizing based Techno-economic analysis of PV system with hybrid storage H2-Battery (ID - 11) <i>Hakim Azoug, Hocine Belmili, Bouazza Fekkak, Samia Harrouni</i>	
14:35-15:00	Discussion	

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(The same URL from 23 to 27 Nov.)

Special Session 1

Smart Grid Technologies and Applications

Tuesday 23 November 2021

15:35-19:00 (GMT +1)

Moderator		Prof. Josep M. Guerrero (Under confirmation) IEEE Fellow, Center for Research on Microgrids, Aalborg University, Denmark.
Panelists	Prof. Mohamed Essaïdi, ENSIAS, Rabat, Morocco. Dr. Mohamed Barara (Organizing Chair), ESME SUDRIA, Paris, France.	
KN71 15:50-16:20		Role of the Smart Grid in Facilitating the Integration of Renewables Prof. Saifur Rahman IEEE President-elect 2022 Director, Virginia Tech Advanced Research Institute, USA
KN72 16:20-16:50		Grid Modernization: Technological Advancements Beyond Smart Grid Mr. John D. McDonald (IEEE Life Fellow), Smart Grid Business Development Leader, GE Renewable Energy, Atlanta, USA
KN73 16:50-17:20		Virtual Dynamics Shaping in Renewable Integrated Power Grids Prof. Hassan Bevrani Smart/Micro Grids Research Center, University of Kurdistan, Iran
17:20-17:50	Discussion	
(A) 17:50-18:10	5 min Presentations	Robust Optimal Damping Control Design for Grid-Forming Converters (ID - 150) <i>Hassan Bevrani, Jia Liu, Toshiji Kato</i> Blockchain based Solar Energy Trading (ID - 23) <i>Ajinkya Brahmankar, Sanket Patil, Prathmesh Kulkarni, Vaibhav Pallod, Hrushikesh Joshi</i> Technical Considerations for Legacy SCADA System (RTU) Replacement with an Advance Gateway (ID - 160) <i>Ammar Aleithan, Muhammad Z. Mir, Abdullah U. Sheikh, Louai S. Qudaihi</i> Optimized Energy Management Strategy for Off-grid Energy System (ID - 174) <i>Mohamed Barara, Tareq Alnejaili, Sami Labdai, Mohammed Ouriagli, Larbi Chrifi-Alaoui</i>
18:10-18:25	Discussion (A)	
(B) 18:25-18:45	5 min Presentations	Smart Grid Cost Optimization: Comparing Bellman and Genetic Algorithms (ID - 144) <i>Fatimazahra Zahraoui, Houssam Eddine Chakir, Mehdi Et-Taoussi, Hamid Ouadi</i> Magnetic Induction Wireless Power Transfer in Solar Roads for Electric Vehicles (Experimental Case Project) (ID - 67) <i>Adel El-Shahat, Steven Thomas, Austin Lawson, Mason Moore</i> Hybrid Wind-PV DC Microgrid – Experimental Project (ID - 69) <i>Adel El-Shahat, Samuel Fakorede, Debora Cipleu, Antoine Kabre</i> Applying Deep Learning Model to Predict Smart Grid Stability (ID - 218) <i>Abdulwahed Salam, Abdelaaziz El Hibaoui</i> Global Fuzzy Supervisor Control For a Dual Input-Single Output Boost Converter (ID - 47) <i>Sameh Mahjoub, Larbi Chrifi-Alaoui, Laurent Delahoché, Bruno Marhic, Nabil Derbel</i>
18:45-19:00	Discussion (B)	

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(The same URL from 23 to 27 Nov.)

Special Session 2

Magnetic Materials and Devices for Energy

Saturday 27 November 2021
15:15-18:00 (GMT +1)

Moderator		Prof. Mohamed Balli International University of Rabat, Morocco.
Panelists	Prof. Daniel Fruchart , Institut Néel, CNRS, Grenoble, France. Prof. Mohamed Balli , International University of Rabat, Morocco.	
KN81 15:30-15:50		Magnetic and Magnetocaloric Properties of $R(\text{Fe}_{0.25}\text{Co}_{0.75})_2\text{H}_x$ Compounds (R=Ho, Er) Prof. Daniel Fruchart Institut Néel, CNRS, Grenoble, France
KN82 15:50-16:10		The Green Rare Earth Magnet Dr. Sophie Rivoirard Product & Technology Director of MagREEsources, France
KN83 16:10-16:30		Nanoscience Approach for Creating Unusual Magnetic and Magnetocaloric Features Prof. Mohamed Balli International University of Rabat, Morocco
16:30-17:00	Discussion	
17:00-17:30	5 min Presentations	Topological Optimization of Piezoelectric Structures for Low-frequency Energy Harvesting Applications (ID - 32) Madiha Yessari, Mohamed Rguiti, Abdelwahed Hajjaji, Najoua Fangachi, Abdezzahid Arbaoui On the Electronic and Magnetic Properties of HoVO_3 (ID -103) (local) Sohail Ait Jmal, Mohamed Balli Influence of CuO-secondary phase on $\text{Pr}_{1-x}\text{Sr}_x\text{MnO}_3$ magnetocaloric features (ID - 104) (local) Oumayma Chdil, Mohamed Balli, Patricia De Rango, Naima Brahiti, Patrick Fournier, Rachid Essehli, Khadija El Maalam, Omar Mounkachi Experimental Characterization EAF Slag under Thermal Cycling as Sensible Thermal Energy Storage Material (ID - 82) Hmida Slimani, Yousra Filali Baba, Hanane Ait Ousaleh, Abdechafiq Elharrak, Fayrouz Elhamdani, Hicham Bouzekri, Abdessamad Faik Valorization of "Porcellanite" as Mining Industry by-product for Medium Temperature Packed-bed Thermal Energy Storage System (ID - 83) Fadila El Kouihen, Yousra Filali Baba, Hanane Ait Ousaleh, Abdechafiq Elharrak, Khadija Elalami, El Ghali Bennouna, Abdessamad Faik
17:30-18:00	Discussion	

Webinar Link: https://us02web.zoom.us/webinar/register/WN_-kI0dBnTTXCzII1U90DqCQ

(The same URL from 23 to 27 Nov.)

Special Session 3

Biomass and Biogas Energy

Saturday 27 November 2021

10:25-13:10 (GMT +1)

Moderator	Prof. Edison Muzenda (Under approval) University of Johannesburg, South Africa	
Panelists	M. Charlotte Morton , World Biogas Association, UK	
IS91 10:40-11:00		Biomass to Bioenergy in Sustainable Development Context Prof. Hassan El Bari Faculty of Science, Ibn Tofail University, Morocco. President of Moroccan Association of Solid Waste.
(A) 11:00-11:25	5 min Presentations	Contribution of Biomass Valorization for Renewable Energy Generation in Low Emission Development Pathways: A Policy Review (ID - 30) <i>Trust Nhubu, Edison Muzenda, Mohamed Belaid</i> Experimental Study of Wood Pellets Combustion in a Counter-Current Fixed-Bed (ID - 155) <i>Mohammed Allae Bennini, Ilias Bakhattar, Hamza Chater, Mohamed Asbik, Ammar Mouaky, Abdelghani Koukouch, Abdellah Elorf, Brahim Sarh, Toufik Boushaki</i> The Design and Development of an Innovative and Environment-friendly Pilot Unit for the Transformation of Used Cooking Oils into Biodiesel in the City of Ifrane, Morocco (ID - 161) <i>Ismail El Hamzaoui, Abdelghani El Asli, Ezzaki Mitouilli, Mohammed El Kihal, Maryam Adwan, Ismail Achgani, Mohamed Jadid</i> Municipal Solid Waste (MSW) Generation from Morocco and Tunisia, and their Possible Energetic Valorization (ID - 22) <i>Souad Aboudaoud, Sara El Kourdi, Souad Abderafi, Mohammad Ammar Abbassi</i> Life Cycle Assessment of Anaerobic Digestion: A Review of Findings and Opportunities for Anaerobic Digestion Development in Sub-Saharan Africa (ID - 36) <i>Trust Nhubu, Edison Muzenda, Mohamed Belaid</i>
11:25-11:45		Discussion (A)
(B) 11:45-12:10	5 min Presentations	Energy Recovery of Palm Leaflet Waste by Anaerobic Digestion and Thermochemical Conversion (ID - 54) <i>Omar Kerrou, Nabila Lahboubi, Mohammed Bakraoui, Hassan El Bari</i> Evaluation of the Thermal Decomposition Behaviour of Algal Biomass in a Rotary Kiln Pyrolyser (ID - 45) <i>Bothwell Nyoni, Shanganyane Hlangothi</i> Physicochemical and Thermal Characterization of Olive Pomace (ID - 106) <i>Ilias Bakhattar, Imane Aadnan, Omar Zegaoui, Mohamed Asbik, Hamza Chater, Khadija El Alami, Ammar Mouaky, Abdelghani Koukouch, Abdellah Benzaouak</i> The Effect of Light on Anaerobic Digestion Process of Household and Similar Waste under Mesophilic Regime (ID - 181) <i>Amine Hajji, Najma Laaroussi, Mohammed Rhachi</i> Potential Impact of the Covid-19 Pandemic on Plastic Medical Waste Management in South Africa - A Narrative Review (ID - 188) <i>Zvanaka Senzeni Mazhandu, Edison Muzenda, Mohamed Belaid, Trust Nhubu</i>
12:10-12:30		Discussion (B)

<p>(C) 12:30-12:55</p>	<p>5 min Presentations</p>	<p>Pyrolysis of Edible and Cosmetic Oil Production Waste (ID - 101) <i>Bonnie Nage, Placxedes Sigauke, Edison Muzenda, Tirivaviri Mamvura</i></p> <p>A Review of Various Feedstocks Utilized in Thermochemical Processes (ID - 190) <i>Edison Muzenda, Trust Nhubu, Mohamed Belaid</i></p> <p>Improving of the Rheological Properties of Bensmim Clay for its Use in Clay Brick Prodcution (ID – 192) (local) <i>Ghita El Boukili, Fatima Zahra El Ouardi, Mahdi Lechheb, Fatima Kifani-Sahban, Asmae Khaldoun</i></p> <p>Application of Life Cycle Assessments in Waste Management: A Mini Review (ID - 41) <i>Zvanaka S. Mazhandu, Edison Muzenda, Mohamed Belaid, Trust Nhubu</i></p>
<p>12:55-13:10</p>	<p>Discussion (C)</p>	

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(The same URL from 23 to 27 Nov.)

Special Session 4

Wind Energy

Saturday 27 November 2021

13:15-14:50 (GMT +1)

Moderator	 <p>Prof. Ahmad Zahedi (under approval) James Cook University, Queensland, Australia</p>
Panelists	<ul style="list-style-type: none"> - Prof. Ahmad Zahedi, James Cook University, Queensland, Australia. - Prof. Cristianis Nichita, University of Le Havre Normandy, France. - Dr. Chakib Alaoui, INSA, EuroMed, Morocco. - Dr. Youssef Errami, Faculty of Science, Eljadida, Morocco.
(A) 13:30-13:50	<p>5 min Presentations</p> <p>Wavelet Multi-scale Analysis of Wind Turbines Smoothing Effect and Power Fluctuations (ID - 91) <i>Antun Meglic</i></p> <p>Synchronization of an Isolated Sensorless Doubly-fed Induction Generator based Wind Energy Conversion System (ID - 173) <i>Sami Labdai, Larbi Chriji-Alaoui, Lazhari Nezli, Boualem Hemici, Mohamed Hamzaoui</i></p> <p>Cascade H-Bridge Multilevel Inverter for a Wind Energy Conversion System Applications (ID - 33) <i>Maha Annoukoubi, Ahmed Essadki, Tamou Nasser</i></p> <p>Hybrid Interior Point Method and Genetic Algorithm for Parameter Estimation of Three-Phase Induction Motor (ID - 50) <i>Sami Labdai, Larbi Chriji-Alaoui, Laurent Delahoche, Bruno Marhic, Pascal Bussy</i></p>
13:50-14:10	Discussion (A)
(B) 14:10-14 :30	<p>5 min Presentations</p> <p>A review on the HAWCT Technology, Performance Enhancement Methods, Numerical Models and AI Concept used for the Blade Composite Structure Assessment: Context of New Industry 5.0 (ID - 65) <i>Omar Rajad, Hamid Mounir</i></p> <p>Determining Optimal Wind Energy Farms Locations based on MCDM and GIS: A Case Study from Morocco (ID - 90) <i>Asmae Azzioui, Rafika Hajji, Ettarid Mohammed, Moulay Hafid Bouhamidi, Mouadine Mustapha, Ihssane Ouacha</i></p> <p>Comparative Study of DFIG Power Control using the Vector Control and Fuzzy Logic (ID - 95) <i>Ikram Aissaoui, Ahmed Essadki, Nouredine Elmouhi</i></p> <p>Participation in Microgrids Frequency Regulation of Variable Speed Wind Generator based on DFIG using ADRC Control Method (ID - 118) <i>Mohssine Chakib, Tamou Nasser, Ahmed Essadki</i></p>
14:30-14:50	Discussion (B)

T2	Tutorial 2 – The role of AI in PV systems design and control with hardware implementations		
Saturday 20 November 2021			
Saturday 09:00-11:00 (GMT +1)		Dr Ayman Mahgoub Youssef Limerick University, Limerick.	
Webinar: https://us02web.zoom.us/webinar/register/WN_dTxDPikOQ9iMcXNrVoDmRg			
T3	Tutorial 3 - Energy storage tutorial: Introduction to Electrochemical Energy Storage Technologies		
Friday 19 November 2021			
Friday 09-10 :30 & 14:30-16:00 (GMT+1)		Dr. Mouad Dahbi Materials Science, Energy, and Nanoengineering, Med VI Polytechnic University, Benguerir, Morocco.	
Webinar: https://us02web.zoom.us/webinar/register/WN_rfm7KhhPQxi1RugyNzm81w			
T4	Tutorial 4 – Predicting materials and device structure by Materials Theory tools, Computation, & Design		
Friday 19 November 2021			
Monday 09:00 – 11:00 (GMT +1)		Density-Functional Theory toward Predicting Proprieties and Design of Materials Prof. EL Mehdi Salmani Faculty of Science, Mohammed V University, Rabat, Morocco.	
Webinar: https://us02web.zoom.us/webinar/register/WN_wLQhS8M2SJujlyUDxsCirQ			
T5	Tutorial 5 - A General Introduction to 'Power-To-X		
Saturday 20 November 2021			
Saturday 11-30 13:00 & 14:30-16:00 (GMT+1)		Dr. Samir Rachidi, Director of Thermal Systems & "Power-To-X", IRESEN, Morocco.	
Webinar: https://us02web.zoom.us/webinar/register/WN_YPH_XXbYQBymVagyu0YxOg			