An International Association for Green Energy (IAGE) Magazine October 2023

Green Energy Today

Third Issue 2023

IAGE
INTERNATIONAL ASSOCIATION FOR GREEN ENERGY

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October 2023

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EDITOR'S LETTER

HONGXIA LI, PhD

Editor-in-chief
Green Energy Today
November 2023

Senior Researcher,
Renewable and Sustainable Energy Research Center,
Technology Innovation Institute

Hongxia.Li@tii.ae

Dear readers,

After a long wait, I am thrilled to present to you the new issue of the ***Green Energy Today***, also the third issue of 2023. This month, the United Nations Climate Change Conference (COP28) is ongoing now in Dubai, UAE. The two-week COP28 events bring the world together to fast track the energy transition, focus on nature, lives and livelihoods, and foster a more inclusive process at the Middle East and globally.

As an echo to COP28 from Green Energy community, this issue eyes the Gulf countries' efforts in accelerating energy transition for net-zero target. With great pleasure, I have invited two renowned scholars from this region, Professors Samuel Mao and Phil Hart, to share their opinions and perspectives on these topics as our feature articles. Dr. Samuel Mao, whom I benefit a lot from his unrestrained and insightful conversations, shares the technological status and remaining challenges on renewable power generation. Dr. Phil Hart, the Chief Researcher of the Renewable and Sustainable Energy Research Center at the Technology Innovation Institute, provides his thoughts on the energy transition and hydrogen economics. Please enjoy his sharp and inspiring opinions on the 'colourful' hydrogen!

I am also delighted to share some interesting facts, reports, and news that I have read recently on topics other than hydrogen economy, such as power generation and sustainability. I hope you find inspiration and knowledge within these items, and you are encouraged to engage in the future publication.

In this issue, a report on the Q2 performance of our journal the International Journal of Green Energy is also shared with you all. It is also my great pleasure to share the lists of award winners of the IGEC2023 and the receipts of 2023 IAGE awards! Who will be the next winner? You nominate!

Lastly, I would like to highlight the announcement from IAGE Conference Committee (CC), calling for bids to host the 18th IGEC in 2026! Submit your bid by March 31, 2024!

With the contentious support from the International Association for Green Energy, ***Green Energy Today*** aims to keep you informed, inspired, and equipped to be part of the change. Together, we look forward to embarking on new energy adventures together in the coming year!

Sincerely,

Hongxia Li

Welcome to the 3rd Issue of IAGE Newsletter, *Green Energy Today*.

Dear IAGE members,

I am delighted to write this message warmly welcoming IAGE members and the general communities to the 3rd issue of 2023 IAGE newsletter, ***Green Energy Today***. This issue was planned to be published earlier, but delayed until now to coincide the 28th Conference of the Parties to the UN Framework Convection on Climate Changes (COP 28 in short) that is taking place in Dubai, United Arab Emirates, from 30 November to 12 December 2023.

XIANGUO LI, PH.D., P.ENG., FCAE, FEIC, FCSME
President, International Association for Green Energy (IAGE)

Professor, Mechanical and Mechatronics Engineering
Director, Laboratory for Fuel Cell and Green Energy, University of Waterloo, Waterloo, Ontario N2L 3G1 Canada

xianguo.li@uwaterloo.ca

Energy has become the fundamental ingredient in human civilization. Accompanied with the increase in global population and improvement of living standards, comes the increase in the total global energy consumption and in the emissions of the harmful chemical and global warming pollutants that degrade the local and global environment, threatening the very existence of the humankind and all living species on Earth. Making commitments is easy and cheap, concrete and fast actions are required for a slow down and reversal of the global climate change!

More important is that all processes of energy conversion and utilization are less than 100% efficient, dictated by the second law of thermodynamics. The missing energy, often referred to as the waste energy, is lost, or dumped into our environment. If the dumping is more than the resilience, or the tolerance limit of the environment, permanent damage to the environment occurs. Therefore, fast-tracking the energy transition is one thing, improving our environment's resilience is another; and **energy transition is more than just decarbonization!** We must recognize the capacity and limitation of our environment, that must be respected to avoid catastrophes. Respect and then be respected! Human and environment alike!

We sincerely wish COP 28 will succeed as desired, planned and hoped for.

Sincerely,

Xianguo Li

The 16th International Green Energy Conference (IGEC2024)

June 30 - July 4, 2024
Ningbo International Conference Center (NBICC)
Ningbo, Zhejiang, China

As multi-disciplinary international conferences, the 16th International Green Energy Conference (IGEC-XVI), the 5th International Conference on Energy and AI (ICEAI-V), and the Symposium on Chemical Engineering and AI join forces together to promote pioneering research and innovation in the fields of energy, environment and AI (artificial intelligence) as well as their mutual impact and interaction. The conference aims to provide a forum for the exchange and sharing of latest technical information, dissemination of high-quality research results and new developments in the relevant fields. The conference will also provide ample opportunities for the debate and shaping of future directions and priorities in energy sustainability and security, and for the promotion of the R&D and application of AI technologies for advancing green energy, access to affordable and cheap clean energy, decarbonization and net-zero emission.

The conference will be of particular value and interest to researchers, scientists, engineers and practitioners working in the relevant fields of energy, environment and AI, from policy making, technical development to management and marketing.

CONFERENCE VENUE (ON-SITE)

The 16th International Green Energy Conference and the 5th International Conference on Energy and AI will be jointly held on-site at Ningbo International Conference Center (NBICC) in Ningbo, China on June 30 - July 4, 2024. Ningbo is the southern economic center of the Yangtze Delta megalopolis and is also the core city and center of the Ningbo Metropolitan Area. To the north, Hangzhou Bay separates Ningbo from Shanghai; to the east lies Zhoushan in the East China Sea. (Source: https://en.wikipedia.org/wiki/Ningbo)

CONFERENCE FORMAT

The conference will be composed of the following events and activities:

- General contributed abstracts/papers that will be presented orally in technical sessions.
- Keynote lectures by invited speakers.
- Panel sessions on special topics of particular interest.
- General contributed poster presentations.
- Book/Journal/Industry exhibitions.
- Social events for the conference delegates.

CONFERENCE PROCEEDINGS

All papers will be reviewed by the conference Technical Committee under the direction of the International Advisory Committee. Eligible papers will be published in the Conference Proceedings, which will be available to the conference registrants.

JOURNAL PUBLICATION

High-quality original papers of archival value will be considered for publication in Special Issues of prestigious international journals, including

- **International Journal of Green Energy** (Taylor & Francis)
- **Frontiers in Thermal Engineering** (Frontiers)
- **Energy and AI** (Elsevier)
- **Energy Storage and Saving** (Elsevier)

IMPORTANT DATES (BEIJING TIME)

Feb. 28, 2024: Abstract/Paper submission due
April 30, 2024: Revised abstract/paper due
April 30, 2024: Early bird registration due

Contact

Website: https://www.iage-net.org/igec2024
Conference Secretary: Drs. Bowen Wang or Jian Zhao
Email: igec_iceai@outlook.com

Call for nominations

IAGE association awards

More information on Page 17 in this issue of Green Energy Today

Renewable Power Generation: Current Status and Perspectives

Samuel S. Mao, Khalifa University

Dr. Samuel S. Mao
Professor of Practice, Mechanical Engineering & Senior Director of Masdar Institute
Director of Clean Energy Engineering Laboratory and an adjunct professor of the University of California at Berkeley
Email: samuel.mao@ku.ac.ae

With a Ph.D. degree from the University of California at Berkeley, Professor Samuel Mao started his career as a staff scientist of Lawrence Berkeley National Laboratory, and later an adjunct professor and director of clean energy engineering laboratory of the University of California at Berkeley. His research is centered on sustainable energy technologies and advanced functional materials; for example, he devised the concept of disorder-engineering, based which developed high-efficiency nanocrystal photocatalysts (published in Science). He has delivered more than 100 invited lectures at international conferences and leading universities around the world and served as a technical committee member, program review panelist, research grant reviewer, and national laboratory observer for the U.S. Department of Energy. He co-chaired the Materials Research Society annual meeting in the spring of 2011, and the International Conference on Clean Energy in 2012 and 2017. He is a recipient of the prestigious “R&D 100” Award for his innovation in clean technology.

Current Status of Renewable Power Generation

In the early stages, the development of renewable power generation technology was driven by government subsidies. However, in recent years, due to rising fossil fuel prices and international energy security concerns, countries worldwide have been increasing their investments in renewable energy technologies. Renewable energy, primarily dominated by solar and wind power, has rapidly expanded on a global scale, including the oil-producing countries in the Middle East. For instance, the United Arab Emirates began financing clean energy projects more than 16 years ago, and has invested over US$ 40 billion by 2021. Globally, renewable energy generation represents around 30% of the total electricity generation, and it is projected that by 2022, renewable energy capacity will account for over 80% of all new power installations.

The sharp decline in the cost of solar and wind power generation has also driven the rapid growth of renewable energy. For example, thanks largely to the mature manufacturing industry in China, the cost of solar photovoltaic cells has decreased by 90% in the past decade. Renewable energy, represented by solar and wind power, has shown a trend of rapid performance improvement, sustained economic viability, and accelerated expansion in application scale. According to data from the International Energy Agency in June 2023, it is estimated that global renewable energy installed capacity will grow by one-third in 2023, and the total installed capacity of global renewable energy will reach 4.5 billion kilowatts in 2024, equivalent to the total electricity generation of China and the United States combined.

The Middle East, despite being a major producer and exporter of fossil fuels, has shown a growing interest in renewable energy in recent years. Several countries in the region have developed renewable energy policies and initiatives to diversify their energy sources and reduce dependence on fossil fuels. Many Middle Eastern countries have set renewable energy targets to be achieved within a specific timeframe. For example, Saudi Arabia has ambitious plans to diversify its energy mix and increase renewable energy capacity, targeting to reach 60 GW of renewable energy capacity by 2030 with a focus on solar and wind energy; The United Arab Emirates (UAE) has set a target to have 44% of its energy mix come from renewable sources by 2050.

Prospects of Renewable Power Generation Technologies

However, renewable energy still has a long way to go to replace fossil fuels. Renewable energy sources such as solar and wind power have significant characteristics such as volatility and intermittency, and how to achieve large-scale development and efficient utilization of renewable energy is a challenge. In the next decade, while renewable energy generation continues to grow

rapidly, technologies such as electrification of equipment, energy storage systems, renewable hydrogen production, and digital smart grids are expected to undergo breakthrough development to address the key challenges faced by high-proportion renewable energy systems.

- *Equipment Electrification*

Clean electricity based on renewable energy can meet almost all application needs. As fossil fuel power generation is gradually replaced by renewable energy generation, equipment that uses fossil fuels, such as industrial machinery and transportation, will be gradually replaced by equipment that uses clean electricity. Recently, we have demonstrated the first advanced lithium-ion battery-based hybrid-electric heavy-duty vehicle, a hybrid-electric mining truck with vehicle mass 34 ton and maximum load 60 ton.

- *Renewable Hydrogen Production*

Hydrogen, as a multi-purpose energy carrier, has great potential to accelerate renewable energy integration and deployment, paving the way for the transition to a sustainable and green economy. In particular, green hydrogen is produced using renewable energy (electrolysis of water), and the hydrogen production process has zero carbon emissions. In UAE, the Green Hydrogen project, implemented in collaboration between DEWA, Expo 2020 Dubai, and Siemens Energy, is the first of its kind in the Middle East and North Africa to use solar power to produce hydrogen. The pilot project and its legacy will accelerate the transition to a green economy in the region, as well as the adoption of renewable energy across the world.

- *Energy Storage Systems*

Renewable energy generation is constrained by factors such as weather, resulting in intermittency and fluctuation issues, which can impact the security and stability of the grid. As the proportion of renewable energy generation increases, the flexibility of the power system becomes crucial for integrating renewable energy into the grid. Energy storage is an important means to enhance the adaptability of the power system to high-proportion renewable energy, address the intermittency and fluctuation issues of solar and wind power. Green hydrogen, as one possible solution, also facilitates the large-scale integration of renewable energy, enabling grid-scale peak shaving and cross-seasonal/cross-regional energy storage.

- *Digital Smart Grids*

With the emergence of numerous distributed microgrids based on renewable energy on the user side, the flow of electricity is transitioning from a unidirectional flow from production to consumption to a bidirectional flow. The grid is transforming from a vertically integrated centralized grid to a distributed, flat grid. This transformation requires a digital and intelligent distribution grid that can adapt to large-scale integration of distributed renewable energy and diverse load demands.

As various technological challenges are being overcome, renewable energy will eventually transition from a substitute role to a leading role in the energy system. In this transition, the Middle East will continue to promote the large-scale, high-proportion, and high-quality development of renewable energy, consolidating its position as a key player in the development and utilization of renewable energy.

The End

The Green Hydrogen Project Located at the United Arab Emirates

Photo by DEWA

Who Cares about Colours? Musings on the Hydrogen Economy…

Phil Hart, Technology Innovation Institute

The energy density and convenience of chemical fuels, historically fossil based, has arguably been the key enabler of the modern global economy. ***Indeed, it is very difficult to see how we could have established the great gains in economic growth and standards of living without exploiting coal, oil and gas as energy sources.*** It is important to recognize the dramatic progress that has been enabled by these resources, even as we start to rethink their applicability in the future.

As reported by a plethora of highly qualified scientific groups (such as the IPCC), these gains have now been shown unequivocally to come with significant cost to the environment. We are at a stage where it is somewhat foolish to try to argue against anthropogenic climate change. We are able to attribute the sources of these effects quite definitively, accurately and inconveniently to the use of fossil resources.

We thrive on the convenience of burning a chemical substance to create heat, using them to drive our engines and provide base chemicals; all that and more within a substance that is eminently portable and storable. We have a globally important system to extract and distribute these materials that in itself represents a significant proportion of the world economic activity, with a market size of $6.3T in 2021 which is still growing at ~5% CAGR. Thus, we have the dilemma where a (the?) key enabler for our society is also the major contributor to our potential downfall.

Ultimately, we need a direct alternative to fossil fuels that provides the convenience and capability we are used to, does not excessively damage the global economic system, and removes the damaging effects of their use… and finding that is one of the driving ambitions for chemical energy researchers.

There are a few alternatives being investigated, such as ammonia, methanol and hydrogen. Arguably, hydrogen represents the ambrosia of chemical fuels as, if used correctly, it suffers no emissions at point of use. This zero-impact property is extremely important as it implies that if it is produced cleanly then the fuel can be used in any volume, for any application, with no detrimental emissions. We in effect centralise the emissions problem to lower numbers of nodes of production of the fuel, removing the much more difficult distributed pollution problem.

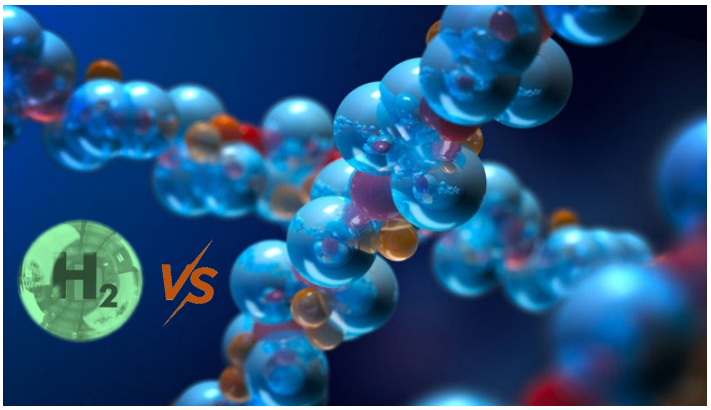
How do the various methods of HYDROGEN production stack up?

The research community has got itself slightly tied up in knots by characterising the production of hydrogen based on a colour system. We have a full rainbow of available wavelengths to choose from and full use has been made of that, most of which is frankly a little unhelpful. Let's take as an example the case of green hydrogen. This technique represents the perfect outcome, where green electrons are used to split purified water into its constituent parts. The issues in my opinion come down to the 'perfection' sought by this process. "Green" appeals to the politician and idealist by virtue of its fully renewable and sustainable characteristics. Green renewable electrons, acting on pure water, what could be more representative of where we need to be? But let's take that apart a little.

Prof. Phil Hart
Chief Researcher
Renewable and Sustainable Energy Research Center, TII, UAE
https://www.tii.ae/team/prof-phil-hart

Prof. Phil Hart is Chief Researcher at the Renewable and Sustainable Energy Research Center at the Technology Innovation Institute (TII), a cutting-edge UAE-based scientific research center. He is responsible for the research and development of the next generation of energy systems and solutions - from fuel cells and batteries to alternative fuels, bioenergy and renewable energy production, and carbon capture and reduction technologies, as well as energy system design and modelling. Prof. Hart brings to his role more than 35 years of experience in the field of energy and power technologies. He specializes in sustainable net zero energy infrastructure and technologies, next generation energy systems, wind and marine energy systems, and the role/impact of business and society within the energy transition.
Prior to joining TII, he led engineering and science teams in R&D within academia and industry, in an international career spanning Asia, Europe and the Americas. He has also held senior management, Board level, and executive leadership roles in multi-national companies, large and small SMEs and startups, as well as charities, and academic institutions.

As a thought experiment let's say our traditional grid delivers 100 MW of power, and we replace 20 MW with renewables. What could we do with those 20 MW of green electrons with technology available today? We could electrify steel making or other industry, or personal transport, or industrial and domestic heating and cooling, or cooking, the list goes on… essentially, we could use the renewable power directly for electrical applications with high efficiency and with significant emissions reductions cw. sticking with fossil fuels. Alternatively, we could provide this 20 MW to an electrolyser to split water molecules at say 60% efficiency, then use them to compress the produced hydrogen at say 75-85% efficiency, then use distribution systems with associated losses to get the hydrogen to the point of use, and then turn it back into power with a fuel cell at say 60% efficiency.



Which is the right COLOUR?

Well, that depends on the target we're aiming for. If our sole aim is to revolutionise the energy system to be zero carbon immediately, GREEN hydrogen is the way to go. If we aiming to reduce emissions and transition the energy system over a practical time horizon, and we have alternative production technology options, then the alternative uses for our renewable energy are probably the more efficient and appropriate way to achieve our ultimate net zero goal?

Enter other colours of hydrogen. BLUE methods crack methane and capture the CO_2 that is produced as a by-product. There will be fugitive emissions and production emissions from the original extraction processes, and the CCS is not 100% effective so we'll not capture it all. Of course, we now must deal with the produced CO_2, but to hit net-zero we'll need that supply chain to be put in place anyway, so perhaps this approach is a solution driver for that problem also? To its benefit Blue H_2 doesn't need green electrons and it is a high-volume production process that is well proven (without the CCS part = GREY hydrogen). PINK hydrogen uses nuclear power to run electrolysers and is thus very low emissions and arguably as green as green. Other options exist such as turquoise (pyrolyzed fossil fuel) that produces carbon as a solid byproduct, with very low CO_2 emissions. The question becomes are ***any of these good enough to offset the perfection offered by Green H_2 methods?***

To test that, let us consider a straw-man pathway to the ultimate clean fuel. Let's first establish our reasonable objectives as:

1. *Reduce and eliminate GHG emissions.*
2. *Limit global economic impact of a transition from fossil fuels.*
3. *Establish a hydrogen economy as quickly as possible.*

If those hold true, a pathway starting from Blue H_2 gives us a volume production base of pretty-clean H_2 quickly and allows us to use our renewable electrons for other more pressing and impactful applications. Backing this up by as much Pink H_2 as possible, and perhaps turquoise if developed successfully at scale, seems a valid strategy. This approach allows us to quickly establish H_2 supply chains and operational methods based on highly scalable existing technology, making it more likely that H_2 will become widely available with the right economics. Though this is somewhat imperfect H_2, it will be 'good enough', giving us breathing space whilst we aggressively build out our renewable portfolio. Once we have excess renewables by virtue of having decarbonized all of the directly electrifiable applications, we can shift surplus green electrons onto electrolysers to produce carbon free hydrogen, and as that becomes the norm we can phase out fossil based H_2 production.

Fundamentally, ***a laser like focus on Green H_2 as the only solution makes no sense in this strategy***, so where is the flaw? It is not perfect, but it is practical and sensible and has all the right impacts to enable a rapid transition to low and then zero carbon H_2. In that argument, it seems we should focus on 'clean' H_2, or even more practically 'as clean as possible H_2' and retire the whole unhelpful colour game – it's past its useful shelf life.

If our target is to hit 2050, a focus on the perfect is likely to slow down and potentially disrupt the transition to a low and zero carbon energy system and to a functional hydrogen economy. A pragmatic, stepwise approach may overall be a more practical and faster approach, with much reduced shocks across the global economy…

THE BLUE TOUCH PAPER IS LIT, DISCUSS…

The End

Every newsletter, the Editor will curate the news that they have read on the latest development in green energy. Other than the energy transition and hydrogen technology, this third issue of 2023 also lists some news power generation and sustainability.

Power generation

- In 2023, the world will add more than 107 GW of renewable power capacity, led by the growth of solar PV installations for both utility-scale and distributed systems. China is leading the global renewable installation. More information can be found in the report from the International Energy Agency (IEA)
- In Canada's North, a large solar PV power plant with approximately 4,200 MWh output will be built in the Diavik Diamond Mine. There will be over 6,600 bi-facial solar panels, which can generate electricity from both direct sunlight and the light reflected by the snow.
- Ørsted will cease the development of two offshore wind projects in the US, due to factors such as supply chains and increased interests rates.
- NuScale's plan to build the first-of-a-kind small modular reactor (SMR) nuclear plant was canceled. The cost of the plan was projected to increase to $9.3 billion which is more than double of its original estimate in 2014. The potential customers of the nuclear electricity from this plant also backed out.

Sustainable communities

- The production of construction materials, ranging from concrete and steel to paint, contributes around 11% of global carbon emissions. An upcoming report will highlight the life-cycle carbon and environmental footprints of different construction materials. This will provide insight to increase social and environmental benefits while maximizing financial returns.
- Climate crisis and sustainable development goals action need to go together, suggested in a new report by the United Nations. Both challenges and opportunities of global communities are addressed to enhance the synergy between these two prominent problems.
- To expand the adoption of battery electric vehicles (EV), more than 900,000 public charging stations were installed world-wide in 2022, adding the total to 2.7 million. Among the new addition, about 1/3 were fast chargers, with the most installation (90%) in China. More information can be found on the report.
- The U.S. Department of Transportation published a toolkit for municipalities to plan for electric mobility infrastructure in cities. A full range of fleet in an urban environment, from electric bikes and scooters to heavy-duty vehicles, are included.

International Journal of Green Energy: performance in quarter 2 of 2023

***International Journal of Green Energy* has achieved 62838 article downloads so far in 2023.**

The below figure shows how many times articles published in *International Journal of Green Energy* have been downloaded in **April, May, and June of 2023**.

2023

***International Journal of Green Energy* achieved 31888 downloads in quarter 2 of 2023.**

Benchmarking quarter 2 downloads

We have provided data back to 2020 to give more insight to the comparative performance of the journal.

2020

13310

2021

21399

2022

32658

Journal website: https://www.tandfonline.com/journals/ljge20

IAGE AWARDS

2023 Recipients

IAGE Lifetime Achievement Award

Dr. Jerry Jinyue Yan, Professor, Hong Kong Polytechnic University

Citation: For outstanding leadership, research achievements, and advancement of knowledge and technology in energy systems; renewable energy; climate change mitigation; and related environment and energy policies.

IAGE Outstanding Researcher Award

Dr. Ibrahim Dincer, Professor, Ontario Tech University

Citation: For exceptional contributions made to the state of the art of sustainable energy technologies focused on sustainable communities and cities, district energy systems, green buildings, and innovative technologies related to renewable energy, energy storage, hydrogen and ammonia energy, and waste to energy.

IAGE Young Researcher Award

Dr. Huizhi Wang, Senior Lecturer, Imperial College London

Citation: For outstanding research and advancement of knowledge in electrochemical devices for energy applications.

INTERNATIONAL ASSOCIATION FOR GREEN ENERGY IAGE

CALL FOR nominations

IAGE GREEN ENERGY AWARDS'24

AWARDS 2024

IMPORTANT DATES

March 31, 2024 - Deadline of Application

July 4, 2024 - Announcement of Award Winners

IAGE GREEN ENERGY AWARDS'24

AWARDS will be presented at
International Green Energy Conference (IGEC-XVI) 2024
June 30 - July 4 2024

INTERNATIONAL ASSOCIATION FOR GREEN ENERGY

jing.shi@uc.edu

IGEC2023 AWARDS

IGEC 2023 Best Paper Award

Winner

Paper title: Stability Analysis of Thermoacoustic Engine with Unconventional Stacks
Authors: Elio Di Giulio (University of Naples Federico II); Armando Di Meglio (University of Naples "Parthenope"); Rosario Aniello Romano (University of Naples Federico II); Raffaele Dragonetti (Università di Napoli Federico II); Nicola Massarotti (University of Naples Parthenope)

Honourable mention

Paper title: Prediction of Temperature Field In a T-junction Based on Deep Learning
Authors: Yuang Jiang (School of Energy and Power Engineering, Xi'an Jiaotong University); Ziliang Zhu (School of Energy and Power Engineering, Xi'an Jiaotong University); Mei Lin (School of Energy and Power Engineering, Xi'an Jiaotong University); Qiuwang Wang (School of Energy and Power Engineering, Xi'an Jiaotong University)

IGEC 2023 Best Student Paper Awards

Winners

Paper title: Research on Solar-assisted Ejector-enhanced Air Source Heat Pump Cycle with Dual-pressure Condensation
Authors: Yan Zhu (South China University of Technology); Youcai liang (South China University of Technology); Kai Ye (South China University of Technology)

Paper title: Dynamic Analysis of Hybrid Electric Vehicle Coupled with Waste Heat Recovery System Under Different Road Conditions
Authors: Xuanang Zhang (Tianjin University); Hua Tian (Tianjin University); Xuan Wang (Tianjin University)

Paper title: Size Effect of Catalyst particles on Co-N-C Cathode Catalyst Layer for PEMFC
Authors: Shilin Ling (Tianjin University); Weikang Zhu (Tianjin University); Yabiao Pei (Tianjin University); Lianqin Wang (Tianjin University); Xin Liu (Tianjin University); Junfeng Zhang (Tianjin University); Yan Yin (Tianjin University)

Honourable mentions

Paper title: Perovskite Solar Cells with Tunable Bandgaps for Beam-splitting Photovoltaic-thermal System
Authors: Yu Gao (Tsinghua University); Hui Zhou (Tsinghua University); Lei Tang (Tsinghua University); Yanguo Zhang (Tsinghua University); Zhongchao Tan (University of Waterloo); Qinghai Li (Tsinghua University)

Paper title: Pore-scale Simulation of Turbulent Convective Heat Transfer in Metal Foam
Authors: Waleed Sarhan Alruwaili (University of Manchester); Mohammad Jadidi (University of Manchester); Amir Keshmiri (University of Manchester); Yasser Mahmoudi Larimi (The University of Manchester)

Paper title: Dynamic Response Characteristics of S-CO_2 Brayton Cycles for Energy Conversion of Generation IV Nuclear Reactors
Authors: Xin Wen (Sun Yat-sen University); Guopeng Yu (Sun Yat-Sen University); Xuan Wang (Tianjin University)

IGEC 2023 Best Student Presentation Awards

Winners

Paper title: Comparison Analysis of Cooling Systems (Ehp & Fabric Duct) Based on Thermal Comfort & CO_2 Concentration for Stair-type Lecture Room Using CFD Analysis
Presenter: Se Eun Choi (Seoul National University of Science and Technology)
Co-authors: Hyoun Seung Jang, Ji Min Kim, Han Don Kim, Soun Jo, Gahyeon Kim

Paper title: Theoretical Study on The Performance of a Standing-wave Thermoacoustic Refrigerator Under Various Boundary Conditions
Presenter: Wenpeng Sun (The University of Auckland)
Co-authors: Geng Chen, Lihua Tang, Kean C. Aw

Paper title: Research on Solar-assisted Ejector-enhanced Air Source Heat Pump Cycle with Dual-pressure Condensation
Presenter: Yan Zhu (South China University of Technology)
Co-authors: Youcai Liang, Kai Ye

Paper title: Levelized Cost of Carbon Abatement (LCCA) Study on Low Carbon Versus Conventional Ammonia Production for Use As Fertilizer and Hydrogen Carrier
Presenter: Soukaina Skribbe (University of Waterloo)
Co-authors: Shrey Patel, Mufeng Liu, Michael Rix, Farid Bensebaa, Lawrence Mak, Xiao-Yu Wu

Honourable mentions

Paper title: $FeCo_2Se_4$ Counter Electrode for Application In DSSC: Synthesis, Structural, Electrochemical and Efficiency Studies
Presenter: M.Z. Najihah (Universiti Teknologi MARA)
Co-authors: Farish Irfal Saaid, IM Noor, H J Woo, and Tan Winie

Paper title: Hydrogen Production from Fossil Fuels Integrated with Carbon Capture, Utilization, and Storage (CCUS)
Presenter: Shams Anwar (University of Waterloo)
Co-authors: Xianguo Li, and Yahui Zhang

Paper title: Defective $ZnIn_2S_4$/NiO Z-scheme Heterostructure for High-performance Photocatalytic Water Splitting
Presenter: Keda Chen (City University of Hong Kong)
Co-author: Michael K. H. Leung

CALL FOR candidates

IGEC CONFERENCE AWARDS'24

AWARDS 2024

Submit your paper and presentation at the IGEC website.

For more information:

iage-net.org

IGEC CONFERENCE AWARDS'24

AWARDS will be presented at
International Green Energy Conference(IGEC-XVI) 2024
June 30 - July 4 2024

INTERNATIONAL ASSOCIATION FOR GREEN ENERGY

jing.shi@uc.edu

Call for Nominations – 2024 IAGE Awards

The International Association for Green Energy (IAGE) is pleased to announce the Call for Nominations for 2024 IAGE society level awards. For full consideration, nominations must be received by **March 31, 2024**. Award winners will be announced at the 16th International Green Energy Conference venue and will be listed after the conference on the IAGE website.

Nominations should be emailed to the Honours and Awards Committee Chair, Dr. Jing Shi at jing.shi@uc.edu. The entire nomination package (completed nomination form, and the required documents applicable to the award category) should be submitted in one single email. For more information about the awards, refer to the IAGE website: https://www.iage-net.org/.

The IAGE society level awards include the following categories:

- **Lifetime Achievement Award**

  It recognizes an individual who has made extraordinary contribution to the advancement of green energy over his/her lifetime. The Lifetime Achievement Award is the highest honor bestowed upon an individual by IAGE.

- **Distinguished Service Award**

  It is an honor bestowed to an individual who has provided exemplary service to the Association. It recognizes the individual's outstanding contribution to the IAGE, IGEC, IJGE, and the professional communities at large.

- **Outstanding Researcher Award**

  It recognizes outstanding scientific work in green energy research by a world-leading scientist or engineer. The award recipient must have demonstrated exceptional contribution to the green energy research community.

- **Technology Innovation Award**

  It recognizes and celebrates the researchers and/or inventors from the industry, academia, or individuals regarding their innovative ideas, products, or concepts. The Award is intended to encourage individuals or parties to think about "Technology Innovation" benefits.

- **Young Researcher Award**

  It recognizes outstanding scientific work in green energy research by a young scientist or engineer. The award recipient must show exceptional promise as a developing leader and make outstanding and continuing contribution to green energy research.

Call for Bids

Call for bids to host the 18th International Green Energy Conference in 2026

The International Green Energy Conference (IGEC) is a multi–disciplinary conference on energy systems and technologies with no/reduced environmental, economic and social impact, and provides a forum for the exchange of technical information, for the dissemination of high-quality research results, and for the debate and shaping of future directions and priorities in energy sustainability and security. IGEC is held annually typically in July and is organized by International Association for Green Energy (IAGE).

IAGE Conference Committee (CC) is calling for bids to host the **18th IGEC in 2026**. For full consideration, bids should be submitted by email with subject line "Bid to host the 18th IGEC" to the CC chair SeongDae Kim (seongdae-kim@utc.edu) by **March 31, 2024**.

To be eligible to host the 18th IGEC,

- The proposed conference city should not have hosted the IGEC within the past 5 years.
- The organizer should have experience in conference organizing.
- The proposed conference city should be able to attract new participants and have good accessibility.

Bids should be brief and include the following information:

1. **Organizers**. List the following organizer(s) with contact info and affiliation:
    a. Organizing committee chair(s)
    b. Organizing committee members
    c. Hosting institution
2. **Institutional support and commitments**.
    a. Relevance of the organization to green energy
    b. Letter(s) of support from upper administration with detailed commitments, such as release time, secretarial support, and financial commitment
    c. Professional conference services that will be available and considered to execute the conference – general description of what is available and whether or not they have been contacted prior to submitting proposal.
3. **Conference site**. Provide the following:
    a. Brief description of the conference city
    b. Brief description of possible conference venues
    c. Site access and travel options: air travel and/or ground transportations with associated cost estimates
    d. Conference facilities
    e. Weather/climate
    f. Local attractions
    g. Accommodation: lodging options and cost estimates
    h. Tentative conference schedule
    i. Technical tours
    j. Conference finance: estimated revenue and expenses, plan for securing sponsorships
    k. Plan for conference promotion

The winning bid is expected to be announced by **May 31, 2024**.

Bidders may contact any IAGE CC members before submitting the bid to discuss any aspect of the bid.

IAGE Conference Committee
Seong Dae Kim, Ph.D. (seongdae-kim@utc.edu)
Zhibin Yu, Ph.D. (Zhibin.Yu@glasgow.ac.uk)
Chong Wen Tong, Ph.D. (chong_wentong@um.edu.my)
Zhongchao Tan, Ph.D. (zhongchaotan@eias.ac.cn)
Rúnar Unnþórsson, Ph.D. (runson@hi.is)

Feature: Professor position at the University of Glasgow

An exciting position for Professor in Materials for Green Energy Technologies. The James Watt School of Engineering of the University of Glasgow is hiring!!!

We are seeking to fill a professorial position for an ambitious academic to join the Materials and Manufacturing Research Group based in the Division of Systems, Power and Energy. Specifically, applications in the broad area of Materials for Green Energy Technologies. Early application is encouraged, and our interview panel will convene at regular intervals to assess potential applicants.

More details can be found via: https://www.gla.ac.uk/explore/jobs/appointments/116632/

Feature: Lead Researcher/Senior Researcher/Researcher positions at the RSERC of Technology Innovation Institute

The Renewable and Sustainable Energy Research Center (RSERC) pushes the frontiers of technological research in energy storage, analysis, and solutions. RSERC is part of the Technology Innovation Institute (TII), a global scientific research center attracting the world's foremost scientists and researchers. We offer unique, resource-rich opportunities at our world-class laboratories to create and innovate without boundaries, collaborating across disciplines to generate real-world impact through both theoretical development and practical systems designed for tomorrow.
Bolstered by a well-resourced team of scientists and researchers, our core focus domains include bioenergy and fuel cells, energy storage, energy analysis and optimized systems design and modelling, and modernized energy solutions. Positions are opening now!

More details can be found via: https://www.tii.ae/careers

Feature:

There is also a list of openings in industry and academia on the IAGE website: https://www.iage-net.org/careers-and-job-postings

Have openings related to green energy?
You can post them here for free!

Please contact Dr. XiaoYu Wu (xiaoyu.wu@uwaterloo.ca)

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Fuel cell and Electrolyzer	Samaneh Shahgaldi	samaneh.shahgaldi@uqtr.ca

Website: https://www.iage-net.org/
Twitter: @the_IAGE
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