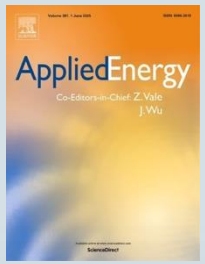
The APEN-Disco HSI Workshop is jointly led by



HI-ACT
Hydrogen Integration for Accelerated Energy Transitions

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

UK-HyRES
UK Hub for Research Challenges in Hydrogen and Alternative Liquid Fuels

1-3 September, 5 The Parade, Newport Road, Cardiff, CF24 3AA, UK

Programme

The First Applied Energy Discovery Workshop on System Integration of Hydrogen

APEN-Disco

HSI 2025

Venues& Travel Guides

The venue for APEN-Disco HSI 2025 is located at

C/2.04 Queen's Building, Cardiff, CF24 3AA

The Queen's Building is one of the key buildings of Cardiff University, located on the Cathays Park campus (the main campus). It is primarily used for teaching and research in disciplines such as engineering, physics, and computer science, and houses classrooms, laboratories, and office spaces.

Registration will open 8:00 - 12:00 in Room C/2.07 on Day 1, Queen's Building, Cardiff, CF24 3AA.

Reception:
Cardiff Castle
The Banqueting Hall

Our Reception will be held at Cardiff Castle's magnificent Banqueting Hall.

Cardiff Castle

At the heart of the capital city of Wales, Cardiff Castle is the ultimate in prestigious venues. As one of the UK's most important historic houses, set within magnificent grounds, Cardiff Castle's enchanting fairytale towers conceal elaborate and splendid interiors of unique architecture, magnificent décor and breath-taking elegance.

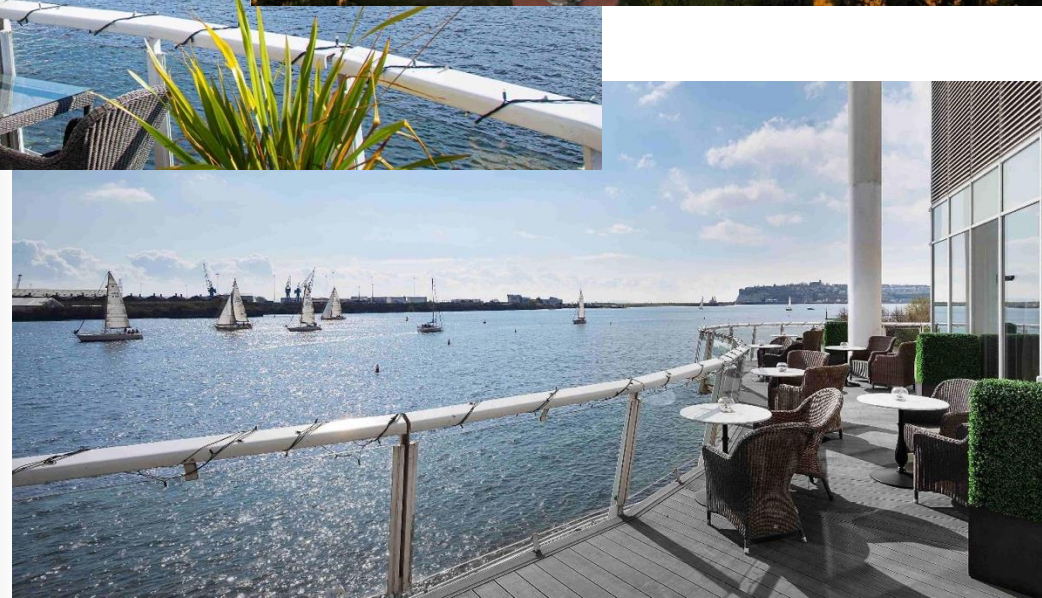
The Banqueting Hall

This magnificent hall was used by the Bute family when in residence for grand entertaining. With high ceilings and atmospheric lighting, this room is unrivalled and provides a spectacular setting for this occasion.

It is the largest room in the Castle and the decoration is typical of the genius art-architect William Burges' flamboyant style. A drinks reception will be served in the Library and Drawing Room and all attendees can then take the spectacular Octagon Staircase to the Banqueting Hall.

Dinner:
The St David's Hotel Cardiff

Our Day 2 Dinner will take place at the luxurious St David's Hotel Cardiff , set on the edge of the sparkling Cardiff Bay.



The St David's Hotel Cardiff

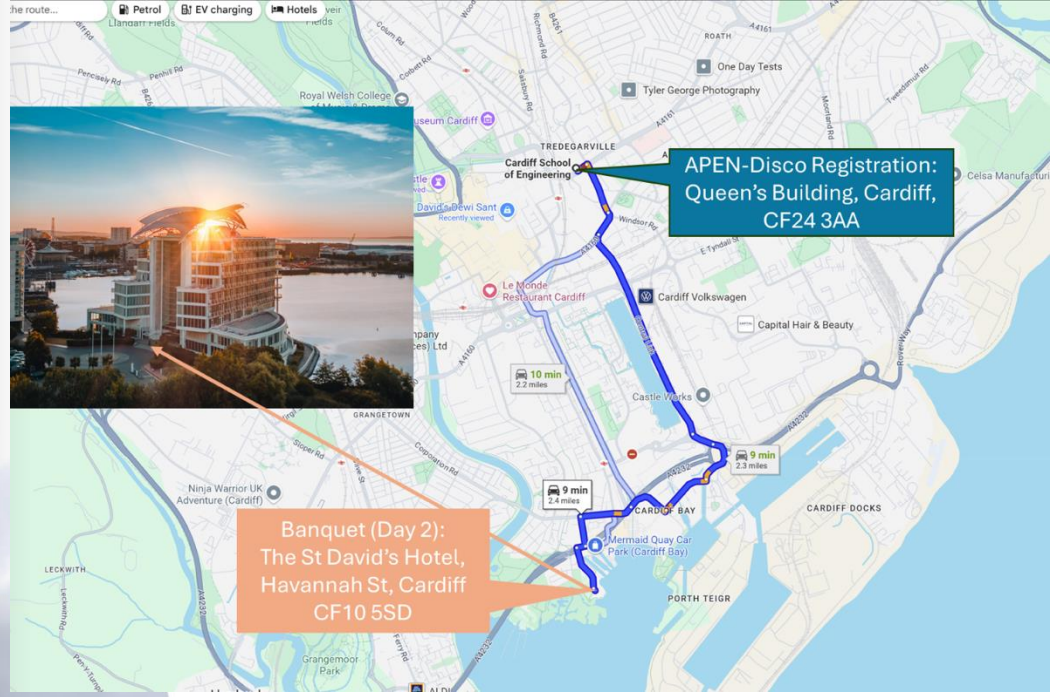
The St David's Hotel Cardiff is a five-star waterfront landmark and one of Wales' most recognisable buildings. Its striking sail-shaped glass façade and soaring atrium open to sweeping views over Cardiff Bay. Combining contemporary luxury with a tranquil seaside atmosphere, the hotel offers an elegant retreat just minutes from the vibrant city centre.

Travel Guide:

Queen's Building → Cardiff Castle

Address of Cardiff Castle:

Castle Street, Cardiff CF10 3RB
On foot (~15 minutes)
By taxi (~5 minutes)



Address of the St David's Hotel Cardiff:

Havannah Street, Cardiff CF10 5SD
By taxi (~10 minutes)
By public transport (~25 minutes): Walk from Queen's building to Cardiff Queen Street Station (~7 minutes). Take the train to Cardiff Bay Station (~5 minutes). From there, walk (~13 minutes) to the hotel.

Queen's Building → The St David's Hotel Cardiff

The First Applied Energy Discovery Workshop on System Integration of Hydrogen

APEN-Disco

HSI 2025

CONTENTS

1-3 September, 5 The Parade, Newport Road, Cardiff, CF24 3AA, UK

About APEN-Disco

The internationally-renowned journal *Applied Energy* is launching a new initiative – *Applied Energy Discovery Workshops (APEN-Disco)*, which will bring researchers together regularly to discuss, collaborate and publish on selected high-impact, cutting-edge research topics in the applied energy field.

As the world strives to meet the shared Net Zero targets, while providing sustainable, reliable and affordable energy access for all, there is a critical need for timely and collaborative research and publication of new energy solutions. *APEN-Disco* is a new platform to serve the APEN research community, leading the research advancement in applied energy, and facilitating high-impact publications on Applied Energy.

How is APEN-Disco organized?

- In collaboration with the research community, the Editorial team of APEN will keep identifying high-impact, cutting-edge research topics for APEN-Disco workshops.
- Each APEN-Disco workshop will focus on one selected topic.
- Call for participation of a workshop will be announced with detailed time and venue information.
- Potential participants will submit one-page summary of their research to the workshop before the deadline.
- A Scientific Committee will evaluate the novelty, importance and application potential of each submission, and make a accept/reject decision. The full event schedule will then be announced.
- Each workshop is an in-person-only event and will be a mix of keynote presentations, panel sessions, oral presentations, discussions, and posters. We need you and your research to make it a success so make sure you get involved and make the most of this unique opportunity to meet other researchers focused on the selected crucial topics.
- Close-to-publication research ideas and outcomes will be discussed, and new research collaborations will be fostered.
- All accepted summaries, and other identified high-quality research outcomes during the workshop, will be recommended to submit to dedicated or related Special Issues of APEN.

Workshop Chairs

•Prof. Sara Walker
•University of Birmingham, UK

Sara Walker is Professor of Energy and Co-Director of the Birmingham Energy Institute.
Her work has a focus on energy transitions, and whole energy systems, with an interest in building energy performance and hydrogen integration into energy systems.
She is Director of the UKRI Hub on Hydrogen Integration for Accelerated Energy Transitions (HI-ACT) and Co-Director of the UKRI Energy Demand Research Centre (EDRC).
Sara also contributes to the wider energy community through roles on the UKRI Strategic Advisory Committee on Energy and Decarbonisation, the UK Energy Research Centre (UKERC) Advisory Board, and the UK Carbon Capture and Storage Research Centre (UKCCSRC) Advisory Board.

•Prof. Jianzhong Wu
•Cardiff University, UK

BSc (Hons), MSc, PhD , FIEEE, FEI, FLSW

Jianzhong Wu holds the position of Professor of Multi-Vector Energy Systems and is Head of School of Engineering at Cardiff University. Additionally, he serves as a co-Editor-in-Chief of Applied Energy, a prestigious journal with an Impact Factor of 11 and a CiteScore of 21.2.
He is:
•Co-Director of the UK Energy Research Centre;
•Co-Director of the EPSRC Supergen Energy Networks Impact Hub;
•WP1 Lead of the Hydrogen Integration for Accelerated Energy Transition (HI-ACT) Hub;
•Member of the UK Government Taxonomy Energy Working Group;
•Member of the Scottish Power Energy Networks Independent Net Zero Advisory Council;
•Member of the Welsh Government Independent Advisory Group on Future Electricity Grid for Wales; and
•Member of the Royal Society Working Group on Thermal Energy Efficiency in Industry.
He is the Mary Shepard B. Upson Visiting Professor in Engineering at Cornell University.

Committees

Scientific Committee:

Chair:
•Prof. Lourdes Vega, Khalifa University, UAE

Co-Chairs:
•Prof. David Flynn, University of Glasgow, UK
•Prof. Zita Vale, Polytechnic Institute of Porto, Portugal
•Prof. Tim Mays, University of Bath, UK

Members:
•Prof. Adam Hawkes, Imperial College London, UK
•Prof. Fengqi You, Cornell University, US
•Prof. Meysam Qadrdan, Cardiff University, UK
•Dr. Xiaonan Wang, Tsinghua University, China
•Dr. Dawei Wu, Durham University , UK
•Dr. Zhien Zhang, University of Cincinnati, US
•Dr. Zhouyang Ren, Chongqing University, China

International Advisory Committee:
•Daniel Schwappach, Siemens Energy, UAE
•Prof. Takao Kashiwagi, Tokyo Institute of Technology, Japan
•Prof. Sally Brooker, University of Otago, New Zealand
•Prof. Henrietta Langmi, University of Pretoria, South Africa
•Dr. Roger Dargaville, Monash University, Australia
•Dr. Padraig Lyons, International Energy Research Centre, Ireland
•Prof. Meilin Liu, Georgia Institute of Technology, USA
•Prof. Vigna Ramachandaramurthy, Universiti Tenaga Nasional (UNITEN), Malaysia
•Prof. Yan Xu, Nanyang Technological University, Singapore
•Dr. Hanna Breunig, Lawrence Berkeley National Lab, USA
•Prof. Enzo Sauma, Pontificia Universidad Católica de Chile, Chile
•Martin van Agteren, Gasunie, Netherlands
•Frank Geuzebroek, Shell, Netherlands
•Prof. Yingru Zhao, Xiamen University, China

Local Organizing Committee:

Chair:
•Dr. Wenlong Ming, Cardiff University, UK

Members:
•Sian Allister, Casey Bodel, Yue Zhou, Tong Zhang, Shuai Yao
•Wei Gan, Ruiyang He, Xun Jiang, Modassar Chaudry

Keynote Speakers

Keynote 1

10:00 Monday 1st September 2025

"Hydrogen – another false dawn?"

Prof. John Loughhead
CB, OBE, FREng, FTSE, FIMechE, FIET, is Chair of the Mission Innovation Steering Committee.

Abstract: Hydrogen has long been claimed to be the next generation energy vector, and seen waves of enthusiasm and financial support over 20 years. So far new applications have proved challenging to realise, but even now large-scale public financial support is devoted to R&D and industrial demonstrations. Are we approaching a tipping point or just in another cycle of effort?

Biography: Prof. John Loughhead was Chief Scientific Adviser at the Department for Business, Energy and Industrial Strategy (BEIS) from 2016 to 2020. Before that he was Chief Scientific Adviser at the Department of Energy and Climate Change (DECC).

Before joining DECC, John was Executive Director at the UK Energy Research Centre (UKERC). Prior to that, he was Corporate Vice-President of Technology and Intellectual Property at Alstom's head office in Paris.

John's professional career has been predominantly in industrial research and development for the electronics and electrical power industries, including advanced, high power industrial gas turbines, new energy conversion systems, spacecraft thermal management, electrical and materials development for electricity generation and transmission equipment, and electronic control systems. He has extensive international experience in both industry and academia.

John is a Chartered Engineer, graduating in Mechanical Engineering from Imperial College, London, where he also spent 5 years in computational fluid dynamics research. He is Past-President of the UK's Institution of Engineering and Technology, Fellow of both the UK and Australian national Academies of Engineering, Professor of Engineering at Cardiff University and Fellow of Queen Mary University of London.

Keynote Speakers

Keynote 2

10:30 Monday 1st September 2025

"Design, integration and optimization of hydrogen fuel cell-based power and propulsion systems "

Prof. Xianguo Li

Abstract: Hydrogen fuel cell is essential for achieving net zero emission and global climate change mitigation, especially for commercial adoption in the transport sector. However, ground vehicle, water-surface ship and aviation applications have substantially different requirements for their power and propulsion systems, from the performance, lifetime and costs for the initial equipment (capital) and M&O (maintenance and operations); as a result, one design of the power/propulsion systems cannot serve all. In this talk, general methodologies will be described for the design, integration and optimization of hydrogen fuel cell-based power and propulsion systems, and then examples will be provided to meet the needs of the specific applications from the power/propulsion systems, even though individual fuel cell materials/components/stacks cannot meet the requirements for performance, durability and cost. Examples of the specific applications include ground vehicles and zero-emission aircrafts (ground transportation and aviation).

Biography: Prof. Xianguo Li is a Professor of Mechanical and Mechatronics Engineering at the University of Waterloo. His research interests include hydrogen energy, including hydrogen production by water electrolysis and hydrogen utilization with fuel cells, liquid fuel atomization and sprays, and green energy systems, as well as the thermal management of power batteries for electric vehicles. Dr. Li has published extensively, including the book "Principles of Fuel Cells" (single-authored), "Fuel Cells for Transportation: Fundamental Principles and Applications" (co-edited), and "Progress in Green Energy" (edited). He serves as the editor in chief for the International Journal of Green Energy, Field Chief Editor for Frontiers in Thermal Engineering; Senior Vice President, Canadian Society for Mechanical Engineering (CSME), and President, International Association for Green Energy (IAGE). He is a fellow of Canadian Academy of Engineering, Engineering Institute of Canada and CSME.

Keynote Speakers

Keynote 3

11:30 Monday 1st September 2025

"Hydrogen network developments in the Netherlands "

Mr. Martin van Agteren

Abstract: Grid repurposing from natural gas to hydrogen is technically feasible. Studies and practical demonstrations show the capacity of natural gas network to be used to transport hydrogen safely and reliably. According to the HyWay 27 study, most of the studies available in the literature show that the design factors used for high-pressure natural gas pipelines in the Netherlands and Europe are in line with the design factors used for new hydrogen pipelines. Standards, such as the NEN 3650 series, are based on the fulfillment of safety criteria among others as pre-requisite. Due to some differences in the physical properties of hydrogen compared to natural gas, some had to be solved before repurposing natural gas grid to hydrogen. The Dutch TSO Gasunie has already a running hydrogen pipeline in the Netherlands and currently develops a nation-wide hydrogen network to be fully operated between 2030-2035. Additionally, Gasunie has plans to built caverns, terminals and an offshore hydrogen network in the North Sea. This presentation will give an overview regarding these developments including the technical challenges that were faced.

Biography: Martin van Agteren is a Principal Advisor at the NV Nederlandse Gasunie. Within the department of Asset Management, he is responsible for the technical performance of various projects including more recently the development of the hydrogen network in the Netherlands. In this challenging programme the Dutch natural gas network will be gradually be converted into a hydrogen network. He is also managing the grid connection team of Gasunie in which the focus is on natural gas but also facing the challenges of the energy transition. He is master of science in Chemistry and graduated at the University of Groningen, where he specialized in energy and environmental studies and biotechnology.

Keynote Speakers

Keynote 4

12:00 Monday 1st September 2025

"Socio-techno-economic integration of green hydrogen into the ecosystem between the Middle East and North Africa (MENA) and Europe "

Mr. Daniel Schwappach

Abstract: The Middle East and North Africa (MENA) region can supply green hydrogen, in global demand, at a very attractive price level due to its outstanding renewables abundances and existing feedstock infrastructure. Current projects in the MENA region are mainly focused on the use of ammonia as a carrier. This is a challenge for offtake due to the price advantage of fossil alternatives, the limited number of end use cases and the low economic attractiveness of ammonia cracking. Derivatives such as methanol and sustainable aviation fuels represent an alternative but have limited technical and economic feasibility due to current regulations, such as the carbon border adjustment mechanism in Europe. With limited government funding programs available in the MENA region, the green hydrogen ecosystem relies mainly on self-sustainable business models for its projects in the region.
To accelerate the implementation of green hydrogen projects in the MENA region, governments and authorities need to take the leadership between the production and offtake markets by opening the window of opportunity to create win-win scenarios through harmonized approaches financing, regulations and definitions.

Biography: Daniel Schwappach is the Head of Sustainable Energy Systems for Middle East and Africa at Siemens Energy, based in Abu Dhabi since October 2022. In his previous role, he led consulting solutions for energy system design and digital applications related to hydrogen and PtX business at Siemens Energy.
With over 15 years of experience in the power generation and hydrogen industry, he has held various national and international positions in project management, sales, business development, strategy and product/solutions development.
Daniel Schwappach holds a diploma degree in mechanical engineering of the TH Nuernberg and a Master of Business Administration from Steinbeis University Berlin. He is a PhD candidate at the University of Bamberg with a research focus in business psychology on leadership in innovation and business ecosystems using the example of hydrogen.

Keynote Speakers

Keynote 5

9:00 Tuesday 2nd September 2025

"German-New Zealand Green Hydrogen Centre / He Honoka Hauwai "

Prof. Sally Brooker
MNZM, FRSNZ, FRSC, FNZIC

Abstract: The increasingly severe impacts of climate change demand us to: (a) reduce energy use (b) decarbonise existing high emissions industrial processes and (c) rapidly replace of our present range of carbon-emitting fossil fuels (coal, oil, natural gas) by a suite of carbon-zero and carbon-neutral fuels. The best carbon-zero fuel is direct electrification (from renewable generation), followed by batteries and green hydrogen, both of which are also carbon-zero fuels. Green hydrogen is also a key base chemical for manufacturing greener industrial chemicals. New Zealand is very well placed to take up this amazing economic opportunity, with an already very renewable electricity grid and the potential to dramatically increase renewable generation, so positioning us to become an exporter of green, energy-intense, high value products.
After setting the scene, I will introduce He Honoka Hauwai / German-New Zealand Green Hydrogen Centre for research, networking and outreach, and present our wide range of activities, including a range of NZ industry green hydrogen initiatives and achievements.

Biography: Distinguished Professor Sally Brooker (MNZM, FRSNZ, FRSC) studied at the University of Canterbury, New Zealand [BSc(Hons) first class; PhD with Professor Vickie McKee]. After postdoctoral research at Georg-August-Universität Göttingen, Germany, with Professor George M. Sheldrick, she took up a Lectureship at the University of Otago, where she is now a Distinguished Professor, a principal investigator with the MacDiarmid Institute, and co-leader of the German New Zealand Green Hydrogen alliance / He Honoka Hauwai (*https://blogs.otago.ac.nz/honoka-hauwai/*). She has published over 230 papers, and been the recipient of numerous awards, including a Queens Birthday Honour for services to science (MNZM), the Hector Medal (RSNZ) and the Burrows Award (RACI). Her research interests concern designer complexes of transition metal and lanthanide ions for applications in switching, sensing, and the catalytic production of green hydrogen from water and the selective reduction of carbon dioxide into commodity chemicals (*otago.ac.nz/brooker*).

Keynote Speakers

Keynote 6

9:30 Tuesday 2nd September 2025

"Hydrogen, and its future role in the UK energy system "

Prof. Sara Walker

Abstract: The long-term mission of the Hub on Hydrogen Integration for Accelerated Energy Transitions (HI-ACT) is to conduct multidisciplinary, qualitative, and quantitative research that will identify and map the complex relationships, interdependencies, risks, expectations and needs of energy citizens and stakeholders, to provide open and informed scrutiny of hydrogen integration, to unlock new insights to hydrogen pathways, and to protect national energy resilience. A Whole Systems and Systems Integration approach is needed in order to better understand the interconnected and interdependent nature of complex energy systems, including hydrogen and alternative liquid Fuels (HALF), from a technical, social, environmental and economic perspective. Professor Walker will present an overview of HI-ACT, and progress to date on key research topics such as supply chain analysis, hydrogen blending into the UK natural gas network, and the potential for hydrogen to alleviate electricity network congestion.

Biography: Professor Sara Walker is Director of Birmingham Energy Institute. She has been working in the energy sector since 1996, with a career spanning industry and academia. Her research focus is on renewable energy and energy efficiency in buildings, energy policy, energy resilience, and more recently she has focused on whole energy systems. She is Director of the EPSRC Hub on Hydrogen Integration for Accelerated Energy Transitions (HI-ACT), and Co-Director of the EPSRC Energy Demand Research Centre. She is an Advisory Committee Member for the UK Energy Research Centre and the UK CCS Research Centre, and also contributes to the EPSRC Scientific Advisory Committee for Energy and Decarbonisation.

HSI 2025 Highlights

Six Paper Sessions

Hydrogen Use Cases
Hydrogen for Different Sectors
Hydrogen Infrastructure
Hydrogen Technologies Session
Hydrogen Production Session
Multi-Energy System Integration

Six Keynotes

Internationally renowned experts will deliver keynote speeches and participate in panel discussions, guiding attendees to focus on the latest developments and challenges in Hydrogen System Integration (HSI) research.

Four Panel Sessions

The workshop will feature four panel sessions, including a special "Meet the Editors" session dedicated to discussing the writing and publication of high-quality research papers.

Reception & Workshop Dinner

A welcome reception will be held on the evening of the first day, followed by a workshop banquet on the evening of the second day.

Programme Overview

	Session Groups	Time	Day
1	Multi-Energy System Integration	60 mins	Day 1 15:00-16:00
2	Hydrogen Use Cases	90 mins	Day 2 10:30-12:00
3	Hydrogen Infrastructure	90 mins	Day 2 14:00-15:30
4	Hydrogen for Different Sectors	90 mins	Day 2 16:00-17:30
5	Hydrogen Technologies Session	90 mins	Day 3 10:30-12:00
6	Hydrogen Production	90 mins	Day 3 13:00-14:30

	Panels	Time	Day
1	HI-ACT: Hydrogen Integration for Accelerated Energy Transitions	60 mins	Day 1 13:30-14:30
2	Multi-Energy Analysis and Operation	60 mins	Day 1 16:00-17:00
3	Meet the Editors: Secrets to Publishing High-Impact Research	60 mins	Day 2 12:00-13:00
4	Hydrogen Facilitated Zero-carbon Energy System	60 mins	Day 3 09:00-10:00

	Day 0	Day 1	Day 2	Day 3
9:00-10:00		Opening	Keynote	Panel 4
10:00-11:00		Keynote	Coffee/Tea	Coffee/Tea
11:00-12:00		Coffee/Tea	Session 2	Session 5
12:00-13:00		Keynote	Panel 3	Lunch
13:00-14:00		Lunch	Lunch	Session 6
14:00-15:00		Panel 1	Session 3	Coffee/Tea
15:00-16:00		Coffee/Tea	Coffee/Tea	HI-ACT International Board Meeting (HI-ACT people only)
16:00-17:00	APEN Editors Meeting	Session 1	Session 4	
17:00-18:00	Castle Tour	Panel 2		
18:00-19:00			Banquet	
19:00-20:00	APEN Editors Dinner	Reception		
20:00-21:00				

Registration will open 8:00 - 12:00 in Room C/2.07 on Day 1, Queen's Building, Cardiff, CF24 3AA.

Programme Breakdown

Day 0: 31st August 2025

Invitation Only

Venue: Guest Tower Suite, Cardiff Castle, Cardiff Castle · Wales' Capital Castle

15:30-16:00	**Guests Arriving (Oak Room)**
16:00-17:30	**APEN Editors Meeting (Walnut room)** Lead: Dr. Jing Zhang Elsevier
17:30-18:30	**Castle Tour**
18:00-20:00	**APEN Editors Dinner (Walnut room)** Lead: Dr. Jing Zhang Elsevier

Day 1: 1st September 2025

9:30-10:00 **Opening & Welcome** Prof. Jianzhong Wu, Cardiff Uni
Prof. Sara Walker, Uni of Birmingham

10:00-11:00 **Keynote**

Chair: Prof. Sara Walker, University of Birmingham

10:00-10:30 **Hydrogen – another false dawn?**
Prof. John Loughhead
CB, OBE, FREng, FTSE, FIMechE, FIET, Chair of the Mission Innovation Steering Committee, UK

10:30-11:00 **Design, Integration and Optimization of Hydrogen Fuel Cell-based Power and Propulsion Systems**
Prof. Xianguo Li
University of Waterloo, Canada

11:00-11:30 **Coffee/Tea Break/Discussion**

11:30-12:30 **Keynote** Chair: Prof. Hongjie Jia, Tianjin University

11:30-12:00 **Hydrogen network developments in the Netherlands**
Mr. Martin van Agteren
NV Nederlandse Gasunie, the Netherlands

12:00-12:30 **Socio-techno-economic integration of green hydrogen into the ecosystem between the Middle East and North Africa (MENA) and Europe**
Mr. Daniel Schwappach
Energy Systems for Middle East and Africa at Siemens Energy, Germany

12:30-13:30 **Lunch Break/Discussion**

13:30-14:30 **Panel 1: HI-ACT: Hydrogen Integration for Accelerated Energy Transitions**

Panel Details	Name	Affiliation
Panel Chair	Prof. Tapas Mallick	University of Exeter
Panel Members	Prof. Sara Walker	University of Birmingham
	Prof. Jianzhong Wu	Cardiff University
	Prof. Dawei Wu	Durham University
	Prof. Meysam Qadrdan	Cardiff University
	Dr. Adib Allahham	Northumbria University
	Dr. Danny Pudjianto	Imperial College London

14:30-15:00 **Coffee/Tea Break/Discussion**

15:00-16:00 Session 1: Multi-Energy System Integration

Chair: Prof. Xin Zhang, The University of Sheffield
Co-Chair: Prof. Xiandong Xu, Tianjin University

15:00-15:10 Paper No. 43:

Time-resolution Electrochemical Impedance Spectroscopy Analysis of PEMWE based on Wavelet Transform

Xin Wang[1], Zhixue Zheng[1], Zhongliang Li[1], Daniel Hissel[1,2]
1. Université Marie et Louis Pasteur, UTBM, Institute FEMTO-ST, FCLAB, CNRS, France.
2. Institut Universitaire de France (IUF)

15:10-15:20 Paper No. 45:

System Benefits and Costs of Hydrogen Integration to Electricity System

Danny Pudjianto, Hossein Ameli, Goran Strbac
Imperial College London, United Kingdom

15:20-15:30 Paper No. 47:

Exploiting Building Integrated Photovoltaic to Produce H_2 for FCEVs

Yusuf N. Chanchangi[1], Tapas K. Mallick[1], Jianzhong Wu[2], Sara Walker[3]
1. University of Exeter, Cornwall Campus, United Kingdom,
2. Cardiff University, Cardiff, Wales.
3. University of Birmingham, Birmingham, United kingdom.

15:30-15:40 Paper No. 54:

Exploring Flexibility of Hydrogen Energy Storage in Power System via Multi-Time-Resolution Uncertainty

Zan Ni1, Xin Huang[1], Chengcheng Shao[1], Tao Qian[2], Xiuli Wang[1], Xifan Wang[1]
1. Xi'an Jiaotong University, Xi'an, China
2. Southeast University, Nanjing, China

15:40-16:00 Session 1 Discussion

16:00-17:00 Panel 2: Multi-Energy Analysis and Operation

Chair: Prof. Su Guo, Hohai University
Co-Chair: Dr. Bai Zhang, China university of petroleum

Paper No. 25:

Capacity Optimization of Off-grid Green Ammonia Production Systems Considering Dynamic Characteristics

Su Guo, Zhenkun Qin, Zherui Ma, Chen Wang
Hohai Uni, China

Paper No. 34:

Process Intensification of Mass Transfer and Reaction in Methanol Steam Reforming (MSR) Microreactors through Fractal Pore Distribution

Zhang Bai, Lianlian Xu, Huan Chen, Shuoshuo Wang

College of New Energy, China University of Petroleum (East China), Qingdao 266580, China

Modeling to support degradation mitigation control development for fuel cells

Zhongliang Li
FEMTO-ST research institute, Université Marie et Louis Pasteur, France

Panel Discussion

19:00-21:00 Reception

Day 2: 2nd September 2025

9:00-10:00 **Keynote**

Chair: Prof. Zita Vale, Department of Electrical Engineering, the Polytechnic Institute of Porto, Portugal

9:00-9:30 **German-New Zealand Green Hydrogen Centre / He Honoka Hauwai**

Prof. Sally Brooker
University of Otago, New Zealand

9:30-10:00 **Hydrogen, and its future role in the UK energy system**

Prof. Sara Walker
University of Birmingham

10:00-10:30 **Coffee/Tea Break/Discussion**

10:30-12:00 **Session 2: Hydrogen Use Cases**

Chair: Mr Daniel Schwappach, Siemens Energy
Co-Chair: Prof. Yue Zhou, Tianjin University

10:30-10:40 **Paper No. 02:**

Decarbonising Home Heating with Hydrogen: A Regional Case Study of the North of Tyne

Nabila Ahmed Rufa'I[1], Adib Allahham[2], Mohamed Abuella[1], Sara Louise Walker[1]
1, University of Birmingham, Birmingham, United Kingdom
2. Northumbria University, Newcastle

10:40-10:50 **Paper No. 05:**

Navigating the Future: Integration of Alternative Fuels in Deep-Sea Shipping – A Comparative Analysis

Yan Zhang[1], Dawei Wu[1,2], Ebrahim Nadimi[1,2], Athanasios Tsolakis[1],
1. Department of Mechanical Engineering, University of Birmingham, Birmingham B15 2TT, United Kingdom
2. Department of Engineering, Durham University, Durham DH1 3LE, United Kingdom

10:50-11:00 **Paper No. 07:**

Hydrogen-Driven Industrial Circular Economy in Integrated Steel, Cement, and Chemical Production

Jiatai Wang, Jhuma Sadhukhan, Lirong Liu,
University of Surrey

11:00-11:10 **Paper No. 26:**

The Grid Implications of Electrification and Hydrogen Integration: Evidence from South Wales

Shuai Yao[1], Jianzhong Wu[1], Modassar Chundry[1], Ruiyang He[1], Sara Walker[2]
1. School of Engineering, Cardiff University, UK, CF24 3AA
2. School of Chemical Engineering, University of Birmingham, UK, B15 2TT

11:10-11:20 **Paper No. 29:**

H_2 Integration Assessment for Integrated Carbon Capture and Utilisation in EAF of Steel Industry under Techno-economic Analysis

Yuanting Qiao[1], Zi Huang[2]
1. Swansea University
2. Oxford Uni

11:20-12:00 **Session 2 Discussion**

12:00-13:00 Panel 3: Meet the Editors: Secrets to Publishing High-Impact Research

Panel Details	Name	Affiliation
Panel Chair	Prof Jianzhong Wu	School of Engineering, Cardiff University, UK
Panel Members	Prof. Jinyue Yan	Department of Building Environment and Energy Engineering, the Hong Kong Polytechnic University, China
	Prof. Xianguo Li	Department of Mechanical and Mechatronics Engineering, the University of Waterloo, Canada
	Prof. Zita Vale	Department of Electrical Engineering, the Polytechnic Institute of Porto, Portugal
	Dr. Jing Zhang	Elsevier

13:00-14:00 Lunch Break/Discussion

14:00-15:30 Session 3: Hydrogen Infrastructure

Chair: Mr. Martin van Agteren, the NV Nederlandse Gasunie

Co-Chair: Prof. Meysam Qadrdan, Cardiff University

14:00-14:10 Paper No. 09:

Perspective Article on Socio-technical-economic Innovation Leadership in Scaling Green Hydrogen between the MENA region and Europe. Call to Action for Governments and Authorities

Daniel Schwappach[1], Wener G. Faix[2], Jens Mergenthaler[2], Claus-Christian Carbon[1]

1. Department of General Psychology and Methodology, University of Bamberg, Markusplatz 3, 96047 Bamberg, Bavaria, Germany
2. School of International Business and Entrepreneurship, Steinbeis University, Kalkofenstr. 53, 71083 Herrenberg, Baden-Wuerttemberg, Germany

14:10-14:20 Paper No. 19:

Data-Driven Optimisation of Hydrogen Export Infrastructure via MPC and Stochastic Bayesian Optimisation

Cameron Aldren[1,2], Nilay Shah[1,2], Adam Hawkes[2]

1. Sargent Centre for Process Systems Engineering, Imperial College London, SW7 2AZ
2. Department of Chemical Engineering, Imperial College London, SW7 2AZ

14:20-14:30 Paper No. 30:

A dynamic approach for assessing the resilience of hydrogen-blended gas transmission networks

Amirreza Azimipoor, Zahra Kheirkhah Ravandi and Meysam Qadrdan

Cardiff Uni

14:30-14:40 Paper No. 44:

System implications of offshore electrolysers on the electricity and hydrogen transport infrastructure

Hossein Ameli, Danny Pudjianto, Goran Strbac

Imperial College London, London, UK

14:40-14:50 **Paper No. 49:**
UK Hydrogen Technology Roadmap: Academic and Industrial Capability Mapping for Holistic System Integration
Salman Farrukh[1], Dawei Wu[1], Rebecca Adavani[2], Julia Brady[2]
1. Department of Engineering, Durham University, Stockton Road, Durham, DH1 3LE, UK
2. Connected Places Catapult, London, United Kingdom

14:50-15:30 **Session 3 Discussion**

15:30-16:00 **Coffee/Tea Break/Discussion**

16:00-17:30 **Session 4: Hydrogen for Different Sectors**

Chair: Dr. Danny Pudjianto, Imperial College
Co-Chair: Prof. Lirong Liu, University of Surrey

16:00-16:10 **Paper No. 03:**
Modelling Hydrogen Integration for Airport Decarbonisation: A Case Study of Birmingham International Airport
Zekun Guo[1,2], Hadi Heidary[2], Tongtong Zhang[2], Sara Walker[2]
1. Data Science, Artificial Intelligence and Modelling Centre, University of Hull, Hull, HU6 7RX, UK,
2. The College of Engineering and Physical Sciences, University of Birmingham, Birmingham, B15 2TT, UK

16:10-16:20 **Paper No. 23:**
Hydrogen Integration in Aviation Propulsion: Enhancing Recirculation Efficiency in PEMFC Systems
Hongbing Ding[1], Panpan Zhang[1], Yuanyuan Dong[1], Chuang Wen[2,3]

1. School of Electrical and Information Engineering, Tianjin University, Tianjin, 300072, China
2. School of the Built Environment, University of Reading, Reading, RG6 6AH, UK
3. School of Architecture, Technology and Engineering, University of Brighton, BN2 4GJ, UK

16:20-16:30 **Paper No. 33:**
EH2Air: Electricity and Hydrogen towards Green Air Transport
Jinning Zhang[1], Yajing Xiao[1], Bozheng Li[2], Xin Zhang[2], Ruifan Liu[3]
1. School of Engineering, University of Leicester, UK,
2. School of Electrical and Electronic Engineering, University of Sheffield, UK
3. EasyJet, UK

16:30-16:40 **Paper No. 46:**
Digital Advanced Manufacturing Facilitates Fuel Cell Integration for Aerospace Secor
Hadi Heidary, Sara Walker, Sophie Cox, Moataz Attallah, Robert Steinberger-Wilckens
The College of Engineering and Physical Sciences, University of Birmingham, Birmingham, B15 2TT, UK

16:40-16:50 **Paper No. 52:**
Decarbonising Agritech Operations with HALFs
Yusf chanchangi[1], Tapas K. Mallick[1], Jianzhong Wu[2], Sara Walker[3]
1. Unversity of Exereter, Cornwall Campus, United Kingdom
2. Cardiff University, Cardiff, Wales.
3. University of Birmingham, Birmingham, United kingdom

16:50-17:30 **Session 3 Discussion**

18:30-20:30 **Banquet**

Day 3: 3rd September 2025

09: 00-10: 00 **Panel 4: Hydrogen facilitated zero-carbon energy system**

Chair: Prof. Zhouyang Ren, Chongqing University

Paper No. 14:
Coordinated Operation of a Multi-Energy Microgrid Considering Power-to-Ammonia via Distributional Reinforcement Learning
Yifan Chen, Rangit Ray, Eerik Söderström, Jiawu Liu, Xueyong Jia, Zhengmao Li, Aalto Univrsity, Espoo 02150, Finland

Paper No. 40:
Hydrogen-electricity integrated microgrid solution for zero-carbon airport operations
Bozheng Li, Rong Zeng, Xin Zhang
School of Electrical and Electronic Engineering, University of Sheffield, Sheffield, United Kingdom

Paper No. 42:
Technological pathways for Hydrogen Integration in iron and steel industry
Shuhan Liu[1], Wenqiang Sun[1], Xiaoyuan Xu[2], Yue Chen[3],
1. Northeastern University, Shenyang, China
2. Shanghai Jiao Tong University, Shanghai, China,
3. The Chinese University of Hong Kong, Hong Kong, China

Paper No. 53:
Boundary variable transfer model for coupling multi-system analysis
Yanli Liu, Xuerui Meng, Haonan Feng
Key Laboratory of Smart Grid of Ministry of Education, Tianjin University, Tianjin 300072, China

10: 00-10: 30 **Coffee/Tea Break/Discussion**

10: 30-12: 00 **Session 5: Hydrogen Technologies Session**

Chair: Prof. Dawei Wu, Durham University
Co-Chair: Prof. Xiaolong Jin, Tianjin University

10:30-10:40 **Paper No. 04:**
Experimental Evaluation of Humidified Hydrogen in a Solid Oxide Fuel Cell
Mercy N.A.A Budu, Keena Trowell, McMaster University, 1280 Main St W, Hamilton, Ontario, Canada

10:40-10:50 **Paper No. 08:**
Centrifugal Hydrogen compression: a key to sustainable energy infrastructure.
Andrei Aleksandrov, Ahti Jaatinen-Värri, Teemu Turunen-Saarest, LUT University, Lappeenranta, Finland

10:50-11:00 **Paper No. 18:**
Metal hydrides for thermally-efficient hydrogen storage: from materials to systems
Alexander R P Harrison, Haoliang Hong, Binjian Nie
Uni of Oxford

11:00-11:10 **Paper No. 55:**
Optimized Fuel Cell System with Scheduled Hydrogen Refills for Off-Grid Telecommunication Sites
Emanuele De Vito[1], Paolo Aliberti[1], Luca Capozucca[2], Gianpiero Lops[2], Marco Sorrentino[1]
1. Department of Industrial Engineering, University of Salerno, Via Giovanni Paolo II 132,84084 Fisciano, SA, Italy
2. Infrastrutture Wireless Italiane Spa, Piazza Trento, 10 - 00198 Roma

11:10-11:20 **Paper No. 56:**
Comparative Study of Single and Dual DC/DC Converters for Distributed Standalone Photovoltaic-Electrolyser Systems
Pingyang Sun[1], Chunjun Huang[2], Hanwen Zhang[3], Kaiwen Sun[1], Xiaojing Hao[1]
1. School of Photovoltaic and Renewable Energy Engineering, Sydney, Australia,
2. Electrical Sustainable Energy Department, Delft University of Technology, Delft, Netherlands,
3. Department of Electronics and Electrical Engineering, University of Bath, Bath, UK

11:20-12:00 **Session 5 Discussion**

12: 00-13: 00 **Lunch Break/Discussion**

13: 00-14: 30 **Session 6: Hydrogen Production**
Chair: Prof. Sally Brooker, University of Birmingham
Co-Chair: Prof. Tao Xu, Tianjin University

13:00-13:10 **Paper No. 06:**
Integrated offshore hydrogen production with hybrid wave-tidal energy harvesting and subsea underground storage
Peihao Chen[1], Saeed Harati[2], Dawei Wu[1,3], Sara Walker[2]
1. Department of Mechanical Engineering, University of Birmingham, Birmingham B15 2TT, United Kingdom.
2. School of Chemical Engineering, University of Birmingham, Birmingham B15 2TT, United Kingdom.
3. Department of Engineering, Durham University, Durham DH1 3LE. Uni of Durham

13:10-13:20 **Paper No. 10:**
Chemical looping reforming: An emerging player in the hydrogen economy

Isabel Pazmiño-Mayorga[1], Andrew D. Wright[1], Deirdre Diamond[2], Luigi Crolla[2], Vincent Gouraud[3], Vincenzo Spallina[1]
1. University of Manchester, Manchester, United Kingdom,
2. Kent Energies, Woking, United Kingdom,
3. TotalEnergies, Courbevoie, France

13;20-13:30 **Paper No. 11:**
Repurposing Retired Gas Power Stations for Modular Nuclear and Hydrogen Systems: A Techno-Economic Assessment
Ruiyang He, Jianzhong Wu, Shuai Yao, Cardiff Uni

13:30-13:40 **Paper No. 27:**
Synergistic Integration of Curtailed Offshore Wind Energy and Depleted Gas Fields for Green Hydrogen Production and Long-Duration Storage
Saeed Harati[1], Sara Louise Walker[1], Jamie Blanche[2], David Flynn[2],
1. School of Chemical Engineering, University of Birmingham, Birmingham, B15 2TT, United Kingdom
2. James Watt School of Engineering, University of Glasgow, Glasgow G12 8QQ, United Kingdom

13:40-13:50 **Paper No. 51:**
Molten Carbonate Electrolysis: A Flexible Pathway to Sustainable eFuels and CO_2 Circularity
Jaroslaw Milewski
Warsaw University of Technology, Poland

13:50-14:30 **Session 6 Discussion**

14: 30-15: 30 **Close/Coffee/Tea Break/Discussion**

15: 30-17: 30 **HI-ACT International Board Meeting (HI-ACT people only)**

Panel 1

"HI-ACT: Hydrogen Integration for Accelerated Energy Transitions"

13:30-14:30 1st September 2025

Abstract: This panel will introduce and explore the work of HI-ACT (Hydrogen Integration for Accelerated Energy Transitions), a UKRI-funded research programme aimed at accelerating the integration of hydrogen and alternative liquid fuels (HALF) into local and national energy systems. HI-ACT adopts a whole-systems, interdisciplinary approach to evaluate the roles, risks, and opportunities of hydrogen in achieving net zero. The programme combines technical, environmental, economic, and societal perspectives across four interconnected work packages: roadmap and techno-economic pathways, integrated energy systems modelling, digital-physical platforms, and socio-political analysis. With over £10 million in EPSRC investment and led by leading UK universities, HI-ACT brings together experts in engineering, modelling, policy, and stakeholder engagement to co-design pathways for a hydrogen-inclusive energy future. Panel members will share progress, tools, and policy-relevant insights to support a just and effective energy transition.

Panel Details	Name	Affiliation
Panel Chair	Prof. Tapas Mallick	University of Exeter
Panel Members	Prof Sara Walker	University of Birmingham
	Prof Jianzhong Wu	Cardiff University
	Prof. Dawei Wu	Durham University
	Prof. Meysam Qadrdan	Cardiff University
	Dr. Adib Allahham	Northumbria University
	Dr. Danny Pudjianto	Imperial College London

Panel 1

Panel chair
Prof. Tapas Mallick
University of Exeter

Biography: Professor Tapas Mallick is a Professor and Chair of Clean Technologies, Renewable Energy and the lead of the Solar Energy Research Group within the Environment & Sustainability Institute. He is a Distinguished Adjunct Professor at the Department of Mechanical and Energy Engineering, College of Engineering, Imam Abdulrahman Bin Faisal University, Saudi Arabia. He is a Fellow of the Royal Society of Chemistry and a Fellow of the World Society of Sustainable Energy Technologies. He is also the Director and Scientific Advisor of BuildSolar Limited. His research focus is applied solar energy and, with his research team, he looks at bridging the urban and rural energy divide through solar energy implementation. He is actively involved various RCUK, European and Industrial funded research projects in the area of Solar Energy. He is part of SUPERGEN solar consortium, EUED centre - key research consortium in the UK. He is a Co-I and use case leader of the HI-ACT Hub.

Panel 1

Panel member 1
Prof. Sara Walker
School of Chemical Engineering, University of Birmingham

Biography: Sara Walker is Professor of Energy and Co-Director of the Birmingham Energy Institute. Her work has a focus on energy transitions, and whole energy systems, with an interest in building energy performance and hydrogen integration into energy systems. She is Director of the UKRI Hub on Hydrogen Integration for Accelerated Energy Transitions (HI-ACT) and Co-Director of the UKRI Energy Demand Research Centre (EDRC). Sara also contributes to the wider energy community through roles on the UKRI Strategic Advisory Committee on Energy and Decarbonisation, the UK Energy Research Centre (UKERC) Advisory Board, and the UK Carbon Capture and Storage Research Centre (UKCCSRC) Advisory Board.

Panel 1

Panel member 2
Prof. Jianzhong Wu
School of Engineering, Cardiff University

Biography: Prof Jianzhong Wu is Head of the School of Engineering at Cardiff University, UK, specializing in Smart Grid and Multi-Vector Energy Systems. He has led or contributed to over 70 research projects, published 300+ peer-reviewed papers, and authored key books, including "Smart Grid: Technology and Applications" (2012) and "The Future of Gas Networks" (2019). He serves on the UK Government DESNZ Taxonomy Energy Working Group, Wales Smart Energy System Group, and SPEN Independent Net Zero Advisory Council. Prof Wu is Co-Editor-in-Chief of Applied Energy, a Fellow of IEEE, Energy Institute, and the Learned Society of Wales. He leads HI-ACT Work Package 1 (The Way Forward), which develops techno-economic roadmaps for integrating hydrogen and alternative liquid fuels into UK energy systems.

Panel 1

Panel member 3
Prof. Dawei Wu
Department of Engineering, Durham University

Biography: Prof. Dawei Wu is Professor, an EPSRC Industry Innovation Fellow in Department of Engineering. He is a member of the CEE (Clean Energy Engineering) research group and is associated with the CASE (Connectivity, Autonomy, Sharing, and Electrification) Automotive Research and Education Centre. Dr Wu's research strength lies in zero-carbon fuels (such as hydrogen, ammonia, and e-fuels) and zero-emitting propulsion technologies for transport.

Panel 1

Panel member 4
Prof. Meysam Qadrda
School of Engineering, Cardiff University

Biography: Prof. Meysam Qadrdan is Professor of Energy Networks and Systems at Cardiff University. He is an Industrial Fellow of the Royal Academy of Engineering. He was an EPSRC-UKRI Innovation Fellow from 2018 to 2022. His research covers the expansion and operational planning of interdependent energy networks at different scales from community to national level. Meysam Qadrdan develops optimisation and simulation modelling tools to investigate: cross-sectoral flexibility to support the operation of low carbon power systems; interactions between gas, electricity and heat supply systems; expansion planning of energy infrastructure under uncertainty; and whole-system impacts of heat decarbonisation pathways.

Panel 1

Panel member 5
Dr. Adib Allahham
Department of Mathematics, Physics and Electrical Engineering, Northumbria University

Biography: Dr. Adib Allahham's expertise lies in smart grids, electricity distribution, the power sector, and multi-vector energy systems. His work focuses on addressing the urgent need to cost-effectively decarbonise the energy sector over the next 30 years by enabling innovative network integration of new energy generation and incorporating diverse energy vectors, including hydrogen. Through a combination of computer simulations, laboratory investigations, and demonstration projects, Dr. Allahham contributes to generating new knowledge that supports this critical transition.

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Panel 1

Panel member 6
Dr. Danny Pudjianto
Department of Electrical and Electronic Engineering,
Imperial College London

Biography: Dr. Danny Pudjianto is an Advanced Research Fellow at Imperial College London. He holds bachelor's degrees in Economics from Open University, Indonesia, and Electronics from the Institute of Technology Sepuluh Nopember Surabaya, and M.Sc. and Ph.D. degrees in Power System Engineering in 1999 and 2003 from the University of Manchester Institute of Science and Technology. His research work is in the area of power system modelling and optimisation, power system economics, regulation, strategic planning and system operation, system security, renewable integration, integrated multi-energy systems, and smart technology evaluations. He has over 20 years of experience in the field. He is involved in Work Package 1 (WP1) and Work Package 2 (WP2) of the HI-ACT project.

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Panel 2

"Multi-Energy Analysis and Operation"

16:30-17:30 Monday 1st September 2025

Abstract: This panel explores cutting-edge advancements in multi-energy system analysis and operation, focusing on integrated renewable energy solutions to sustainable energy supply system. Although new energy technologies, especially the hydrogen-based solutions exhibit excellent low-carbon emission characteristics, it is still challenging to establish an extensible and flexible system under the considerations on durability, complexity and economic. The panel collect the updated ideas and research results, including off-grid wind-solar-hydrogen-ammonia framework, portable, micro-reforming methanol reactors modification, various assessment studies including design, production, and transport for fuel cell. The importance of uncovering and applying the dynamics of the multi energy is highlighted by these presentations. Attendees interested in multi-scale modeling, real-time optimization, and integrated design-operation methodologies driving resilient multi-energy networks are welcomed to attend the sharing and discussion.

Panel Details	Name	Affiliation
Panel Chair 1	Su Guo	School of Renewable Energy, Hohai University, China
Panel Chair 2	Zhang Bai	China university of petroleum (East China), China
Panel Member	Zhongliang Li	Université Marie et Louis Pasteur / FEMTO-ST institute

Panel 2

Panel chair 1

"Capacity Optimization of Off-grid Green Ammonia Production Systems Considering Dynamic Characteristics"

Prof. Guo Su

Abstract: Capacity optimization of off-grid wind-solar-hydrogen-ammonia systems represents a critical issue in the development of integrated multi-energy systems. Existing studies often rely on steady-state models, which fail to capture the real operational behavior of key components under dynamic conditions. To address this gap, this paper proposes a tri-layer coordinated optimization framework for configuration-scheduling-control, which incorporates dynamic characteristics to enhance the system's lifecycle economic efficiency and dynamic responsiveness. The proposed method includes three layers: (1) the upper layer performs multi-objective capacity sizing using NSGA-II, aiming to minimize investment cost, operational cost, and dynamic deviation; (2) the middle layer adopts a rolling optimization strategy, updating hourly scheduling trajectories based on the feedback state information from the lower layer; and (3) the lower layer implements a model predictive control (MPC) scheme with autoregressive exogenous (ARX)-based dynamic models of electrolyzers and ammonia synthesis units, minimizing control errors at a 15-minute resolution and feeding real-time states back to the upper layers. This tri-layer structure forms a closed-loop coupling mechanism through "configuration-dynamic simulation-rolling correction," ensuring that the capacity optimization is both economically viable and dynamically implementable. Simulation results show that, compared with conventional steady-state approaches, the proposed dynamic optimization method achieves better cost-effectiveness and dispatch feasibility, demonstrating superior system adaptability and economic performance.

Biography: Su Guo is a professor and Associate Dean of the School of Renewable Energy at Hohai University. Her research interests focus on the application of optimization theory and advanced control theory in solar power generation, hydropower, and integrated multi-energy complementary systems, including cutting-edge research on wind-solar-hydrogen-ammonia-methanol energy systems. She has undertaken numerous major research projects supported by the Global Environment Facility (GEF) of the United Nations, the National Key R&D Program of China, sub-projects of the National 863 Program, and the National Natural Science Foundation of China. She has published over 100 academic papers, including about 24 SCI Q1 journal articles as the first or corresponding author, with one recognized as an ESI Highly Cited Paper. She holds more than 20 authorized invention patents. She serves as an expert member of the Multi-Energy Complementary Committee of the International Small Hydropower Association, a director of the Engineering Thermophysics Committee of the Chinese Association of Higher Education, and members of the Solar Thermal Committee and Integrated System Committee of the Chinese Renewable Energy Society.

Panel 2

Panel chair 2

"Process Intensification of Mass Transfer and Reaction in Methanol Steam Reforming (MSR) Microreactors through Fractal Pore Distribution"

Dr. Zhang Bai

Abstract: Methanol, with its convenient liquid storage and transportation, abundant feedstock accessibility, and mild reforming reaction conditions, demonstrates significant potential across the hydrogen energy value chain. Reforming methanol to achieve on-site hydrogen production can promote the large-scale safe application of hydrogen, meet the demand for immediate energy supply across diverse sectors, and ultimately improve the utilization efficiency of hydrogen energy. Hydrogen production by **methanol steam reforming** has attracted much attention due to its notable advantages, including low reaction temperature, high hydrogen yield, and low CO content. However, in methanol steam reforming, as a strongly heat-absorbing reaction, the continuous heat input coupled with the complex multiphase transport during the reaction process makes its reaction kinetics and thermodynamic properties extremely sensitive to the heat and mass transport process. Furthermore, considering requirements for portability and integrated applications, miniaturizing the reaction system to achieve efficient and continuous hydrogen production presents a significant challenge. In this context, this presentation focuses on providing optimization strategies for enhancing the hydrogen production performance of methanol steam reforming and the structural design of micro-reforming reactors.

Biography: Dr. Zhang Bai is the Associate Professor in China University of Petroleum (East China), his research focuses on solar thermochemistry and multi-energy complementary systems. He has approved the Young Elite Scientists Sponsorship Program of China Association for Science and Technology, the Younth Taishan Scholars of Shandong Province. He is involved in research projects funded by NSFC, Sinopec and China Postdoctoral Science Foundation. So far, he has published over 50 peer-reviewed papers in international journals and proceedings and serves as a Young Editorial Board Member in the journal of *Carbon Neutrality*, *Advances in New and Renewable Energy*, the journal of *Electric Power* (in Chinese).

Panel 2

Panel member 1

"Modeling to support degradation mitigation control development for fuel cells"

Prof. Zhongliang Li

Abstract: The talk is focused on the performance and durability improvement of long-temperature fuel cells and electrolyzers.

- Development and application of in-situ in-operando characterization tools;
- Multiphysics multiscale modelling;
- Health indicator extraction and prediction models;
- Health-aware and degradation mitigation control designs;
- Comparison between the researches of fuel cells and electrolyzers.

Biography: Zhongliang Li received his Bachelor's and Master's degrees in Electrical Engineering from Tsinghua University, Beijing, China, in 2009 and 2011, respectively. He obtained his Ph.D. degree in Automation from the University of Aix-Marseille, Marseille, France, in September 2014. From 2014 to 2016, he worked as a Postdoctoral Research Associate with Labs FEMTO-ST (UMR CNRS 6174) and FCLAB (CNRS 3539), Belfort, France. From 2016 to 2022, he was an Associate Professor with Lab LIS (UMR CNRS 7020), Aix-Marseille University. Since 2022, he has been a professor chair at the University of Franche-Comté. His research interests include modeling, control, diagnosis, and prognosis with applications to fuel cell and electrolyser systems, electric vehicles, and other energy systems.

Panel 3

"Meet the Editors: Secrets to Publishing High-Impact Research"

12:00-13:00 2nd September 2025

Abstract: What does it take to publish high-impact research in today's competitive academic landscape? Join us for an exclusive panel featuring Editors-in-Chief from Applied Energy, Advances in Applied Energy, Nexus, Journal of Green Energy, and Frontiers in Thermal Engineering, as well as the Executive Publisher from Elsevier overseeing Energy, Applied Energy and some STM journals. This unique session brings together leading voices from across the research publishing ecosystem: editors, publishers, authors, and readers, for a candid conversation on how to navigate the peer-review process, choose the right journal, communicate your science effectively, and make your research stand out.

Whether you're an early-career researcher or a seasoned academic, this panel offers insider perspectives, practical tips, and live Q&A to help you improve your publication success rate and enhance the impact of your work. The panel provides a great opportunity to interact directly with the gatekeepers of top-tier journals in the energy fields.

Panel Details	Name	Affiliation
Panel Chair	Prof Jianzhong Wu	School of Engineering, Cardiff University, UK
Panel Members	Prof. Jinyue Yan	Department of Building Environment and Energy Engineering, the Hong Kong Polytechnic University, China
	Prof. Xianguo Li	Department of Mechanical and Mechatronics Engineering, the University of Waterloo, Canada
	Prof. Zita Vale	Department of Electrical Engineering, the Polytechnic Institute of Porto, Portugal
	Dr. Jing Zhang	Elsevier

Panel 3

Panel chair
Prof. Jianzhong Wu

School of Engineering, Cardiff University, UK
BSc (Hons), MSc, PhD , FIEEE,
FEI, FLSW

Biography: Prof Jianzhong Wu is Head of the School of Engineering at Cardiff University, UK, specializing in Smart Grid and Multi-Vector Energy Systems. He has led or contributed to over 70 research projects, published 300+ peer-reviewed papers, and authored key books, including "Smart Grid: Technology and Applications" (2012) and "The Future of Gas Networks" (2019). He serves on the UK Government DESNZ Taxonomy Energy Working Group, Wales Smart Energy System Group, and SPEN Independent Net Zero Advisory Council. Prof Wu is Co-Editor-in-Chief of Applied Energy, a Fellow of IEEE, Energy Institute, and the Learned Society of Wales. He is Mary Shepard B. Upson Visiting Professor in Engineering and AI4S Visiting Professor at Cornell University.

Panel 3

Panel member 1
Prof. Jinyue Jerry Yan
Department of Building Environment and Energy Engineering, the Hong Kong Polytechnic University, China

Biography: Professor Jinyue Jerry Yan is a Chair Professor of The Hong Kong Polytechnic University. He is an active member of the European Academy of Sciences and Arts. Professor Yan's research interests include energy systems, renewable energy, and climate change mitigation. He has published over 400 papers in scholarly journals including Science, Nature Energy, and Nature Climate Change and is a highly cited researcher, with over 10 patents. He has received several awards including the Global Human Settlements Award, the EU Energy Islands' Award, and Top100 Research2Business (Royal Swedish Academy of Engineering Sciences). In addition to his role as founding editor-in-chief of Nexus, he is the advisory editor-in-chief of Applied Energy, the founding editor of Advances in Applied Energy, and the founder of several international and inter-disciplinary research and development platforms and events.

Panel 3

Panel member 2

Prof. Xianguo Li

Department of Mechanical and Mechatronics Engineering, the University of Waterloo, Canada

Biography: Prof. Xianguo Li is a Mechanical and Mechatronics Engineering Professor at the University of Waterloo. His main research interests and activities are in the area of thermal fluid/science, including energy systems and energy storage, various energy conversion devices, propulsion and power generation systems, aerosol generation and applications, and transportation fuel cell and battery systems. He is the Founding Editor-in-Chief of the International Journal of Green Energy, which established the International Green Energy Conference series and launched the annual review series Progress in Green Energy. He is also the Field Chief Editor, Frontiers in Thermal Engineering. Professor Li is a fellow of Canadian Academy of Engineering (FCAE), a fellow of the Engineering Institute of Canada (FEIC) and a fellow of the Canadian Society for Mechanical Engineering (CSME), and serves as VP Technical Program for CSME. Previously he served as the CSME Division Chair for the Advanced Energy Systems technical division. He also currently serves as the President of the International Association for Green Energy and President of the Fuel Cell Division, International Association for Hydrogen Energy and established the World Fuel Cell Conference series.

Panel 3

Panel member 3

Prof. Zita Vale

Department of Electrical Engineering, the Polytechnic Institute of Porto, Portugal

Biography: Prof. Zita Vale, IEEE Senior Member, is Full Professor in the School of Engineering, Polytechnic of Porto. She is a member of the Coordination Board of LASI – The Associated Lab on Intelligent System and leads the research activities on Intelligent Power and Energy Systems at GECAD – Research Group on Intelligent Engineering and Computing for Advanced Innovation and Development. She has been involved in more than 60 R&D projects and published more than 200 papers in international scientific journals. Her scientific research activities mainly focus on Power and Energy Systems Operation, Electricity Markets, Demand Response, Renewables, Electric Vehicles, and Distributed Generation and Storage. Prof. Zita Vale actively participates in several technical working groups and committees. She is the IEEE PES (Power and Energy Society) Technical Committee Program Chair (TCPC) for Analytic Methods for Power Systems (AMPS) Committee, Chair of the IEEE PES Intelligent Data Analysis and Mining (IDMA) Working Group and of the Open Data Sets (ODS) Task Force. She is the Chair of the Board of Directors of ISAP – Intelligent Systems Application to Power Systems. She is a co-Editor-in-Chief of Applied Energy.

Panel 3

Panel member 4

Dr. Jing Zhang

Elsevier

Biography: Dr. Jing Zhang is an accomplished Executive Publisher at Elsevier, overseeing the Energy and Applied Energy journal portfolios. She brings extensive experience in academic publishing, including journal management and development, society collaboration, open-access strategy, content acquisition, and launching new titles. Dr. Zhang has a proven track record of enabling partnerships between Elsevier and key Chinese scholarly societies and journals, enriching global reach and impact across academic communities. She is recognized for her expertise in organizing academic conferences and effectively building content pipelines from initial proposal through to successful publication. With deep insight into the publishing ecosystem, from editors and publishers to authors and readers. Dr. Zhang champions high-quality research dissemination. She is dedicated to enhancing journal visibility, bolstering scientific integrity, and ensuring impactful outcomes across the energy research community.

Panel 4

"Hydrogen facilitated zero-carbon energy system"

9:00-10:00 3rd September 2025

Abstract: The zero-carbon energy systems are of vital importance to the sustainable development of human society. Hydrogen energy boasts advantages such as flexibility, zero carbon emissions, high calorific value, and ease of conversion with other energy forms. These characteristics make it conducive to achieving deep decarbonization of the energy systems. Hydrogen energy is regarded as the most promising secondary energy source. However, the zero-carbon energy system driven by hydrogen energy is faced with various key challenges, including real-time balance of multiple types of energy, safe and reliable operation, and economic planning and construction. This panel invites the experts and scholars to discuss the above-mentioned challenges. All attendees are welcome to join this panel.

Panel Details	Name	Affiliation
Panel Chair	Prof. Zhouyang Ren	School of Electrical Engineering, Chongqing University, China
Panel Members	Prof. Wenqiang Sun	Northeastern University
	Prof. Xin Zhang	The University of Sheffield
	Dr. Zhengmao Li	School of Electrical Engineering, Aalto University, Finland
	Prof. Yanli Liu	School of Future Technology, School of Electrical and Information Engineering Tianjin University, China

Panel 4

Panel chair

"Committed Carbon Emission Operation Region of Integrated Electricity-Hydrogen Energy Systems"

Prof. Zhouyang Ren

Biography: Prof. Zhouyang Ren is currently a full professor with Chongqing University, his research interests include probabilistic safety assessment and decision-making for renewable energy integrated power systems, integrated electricity-hydrogen energy systems, artificial intelligence. His research achievements have been successfully applied to multiple regional power grids and new energy stations. He has conducted 32 scientific and technological projects. He was awarded the honor of IEEE Transactions on Sustainable Energy Outstanding Associate Editor of 2022. He has published 96 papers, among which 4 papers were selected as ESI highly cited papers (top 1%) and ESI hot papers (top 0.1%). He has authorized 22 national invention patents and obtained 6 software copyrights. He serves as a member of the editorial board of international flagship journals such as IEEE Trans. on Smart Grid, IEEE Trans. on Sustainable Energy, and Applied Energy.

Panel 4

Panel member 1

"Technological Pathways for Hydrogen Integration in Iron and Steel Industry"

Prof. Wenqiang Sun

Abstract: Amid growing challenges related to fossil energy scarcity and environmental sustainability, the iron and steel industry urgently requires development and implementation of advanced green and low-carbon technologies. Hydrogen, valued for its high efficiency and environmental benefits, is poised to play a pivotal role in reshaping the sector's energy landscape. This work comprehensively discusses the applications of hydrogen, as fuel or reducing agent, in iron and steel production, focusing on four key technologies: hydrogen production from renewable power and coke oven gas (COG), hydrogen-based iron ore reduction, hydrogen-rich oxyfuel combustion, and smart management and control of hydrogen-involved integrated energy system (H-IES), collectively advancing the transition toward low-carbon operations.

Biography: Dr. Wenqiang Sun is Professor and Director of Department of Energy, Northeastern University, China. He serves as an Associate Editor for Applied Energy from 2022 to 2024 and he is now a Senior Editor. He also serves as a subject editor of High Temperature Materials and Processes and an editorial member of Energy for Metallurgy. His research interests cover systematic energy conservation; efficient energy utilizaiton; low-carbon and zero-carbon industrial energy system; integrated industrial energy system; smart energy management in process industries; demand flexibility; thermodynamic cycle; and energy efficiency improvement. He is Vice Secretary General of Institute of Energy and Thermal Engineeirng of the Chinese Society for Metals; Expert Member of Low Carbon Work Promotion Committee of China Iron & Steel Association (CISA); Member of the LCA Workgroup of CISA; and Member of New Energy and Energy Storage Branch of China Education Association of Machinery Industry (CEAMI).

Panel 4

Panel member 2

"Hydrogen-electricity integrated microgrid solution for zero-carbon airport operations"

Prof. Xin Zhang

Abstract: Hydrogen power systems provide energy solutions for both aviation and power systems, while hydrogen and electric aircraft require charging infrastructure, and power grid operation requires flexibility from electrified aviation. This presentation explores a new area of Aviation-to-Grid, where hydrogen is used to supply electricity demand for both aviation and power systems, while increasing the energy coupling links between both energy systems. Airports act as energy hubs to develop hydrogen–electricity integrated multi-energy microgrids, as well as hybrid charging infrastructure for hydrogen and electric aircraft. The energy dispatch strategy for both airport energy operation and aviation flight schedules is considered to provide energy security and flexibility for both Aviation-to-Grid industries. Various hydrogen power system solutions are explored, including hydrogen–solar–storage integrated airport energy system design, direct and battery-swap airport charging systems for electric aircraft, and hydrogen–electricity integrated airport coordination with electric aircraft and vehicle charging. Particularly, wider Aviation-to-Grid system integration with multiple airports and power grid operation is explored, with a novel framework of Aviation-to-Grid flexibility to provide frequency response services from aviation to power systems, enabled by hydrogen-integrated multi-energy solutions. This research work is funded by the EPSRC New Investigator Award and two Department for Transport TRIG projects, where Prof. Xin Zhang is the project PI.

Biography: Prof. Xin Zhang is a Professor of Control and Power Systems at the University of Sheffield, U.K. His research interests include power system control and operation, cyber-physical power system modelling and digital simulation, and grid-integrated transport electrification. He was previously a Senior Lecturer at Cranfield University and an Associate Professor at Brunel University London, U.K. Prior to his academic roles, he worked at National Grid Electricity System Operator, Wokingham, U.K.

He is the recipient of the UK Research and Innovation Future Leaders Fellowship and the EPSRC New Investigator Award. He serves as an Associate Editor for IEEE Transactions on Smart Grid, IEEE Power Engineering Letters, Protection and Control of Modern Power Systems, Energy Conversion and Economics, and Cyber-Physical Energy Systems.

Panel 4

Panel member 3

"Coordinated Operation of a Multi-Energy Microgrid Considering Power-to-Ammonia via Distributional Reinforcement Learning"

Dr. Zhengmao Li

Abstract: The integration of power-to-ammonia (P2A) technologies into multi-energy microgrids (MEMGs) facilitates sector coupling and enhances the utilization of renewable energy sources. However, the inherent uncertainties arising from renewable generation and diverse energy demands pose significant challenges to traditional model-based methods. To address this issue, this paper proposes a novel data-driven framework for the coordinated operation of MEMGs with P2A integration. First, a comprehensive P2A system model consisting of an electrolyzer, hydrogen storage tank, nitrogen generator, and ammonia synthesis units is presented to derive practical and efficient operation. Then, a distributional reinforcement learning (DRL) method is applied to solve the coordination problem. Unlike conventional RL methods that estimate only the expected return, DRL learns a distribution function of state-action returns, enabling robust decision-making under uncertainty. Numerical case studies demonstrate the effectiveness of the proposed method in managing complex MEMG operations under uncertain environments.

Biography: Dr. Li Zhengmao received a Ph.D. degree from the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, in 2020. From April. 2023, Dr. Li joined Aalto University as an Assistant Professor. Till Now, he has published 42 journal papers, 12 conference papers, 2 books, and 2 patents. Among them, there are 13 first-authored journal papers of which 10 are top-tier journals, and 6 first authored conference papers. He got Google Scholar citations 2441 times (h index 23, i10 index: 36) and in total 8 highly cited research papers (5 of which are first-authored journal papers, TOP 1%) and one hot paper (TOP 0.1%). One paper is regarded as pioneering research on the IEEE Innovation Spotlight website. In 2023, he was selected into the World's Top 2% of Scientists in the subfield of "Energy". In 2024, he won the best reviewer of the journals IEEE Transactions on Power Systems, IEEE Transactions on Sustainable Energy, CSEE JPES, and IET Economic Conversion Management. Dr. Li serves as an associate editor and guest editor of IEEE Transactions on Industry Application, IEEE Access, Journal of Energy Storage, IET Renewable Power Generation, Heliyon (SCI Journal under cell), Protection and Control of Modern Power Systems, Frontiers in Energy Research, and IET Economic Conversion Management journals. He has successfully applied for more than 10 special issues and conference topics.

Panel 4

Panel member 4

"Boundary variable transfer model for coupling multi-system analysis"

Prof. Yanli Liu

Abstract: With the response to climate change and the structural transformation of energy, the planning, analysis, operation and control of energy systems considering hydrogen energy integration all need to be carried out from the perspective of coupled systems. This report introduces a boundary variable transfer model that can be used when analyzing coupled multiple systems (more of an academic research approach), which can integrate the classic models of independent systems through simple modeling.

Biography: Prof. Yanli Liu is a ternure professor at School of Electrical and Information Engineering, vice dean of School of Future Technology of Tianjin University, executive deputy director of the National International Base for Integrated Energy Power System, vice chair of IEEE PES Working Group on Application of Big Data Analytics on Transmission System Dynamic Security Assessment, and director of UNiLAB (International joint lab) on Big Data Analytics and AI for Smart Energy Systems. She has made breakthroughs in key technologies in the interdisciplinary field of "AI+ Smart Grid" and cyber physical system, and she has presided over more than 20 projects including NFSC. She has published more than 50 papers, including the cover paper of the top journal Engineering, and has been selected for National Talent, and has been awarded the IEEE PES China Outstanding Women Engineer Award, IEEE PES China Distinguished Educator Award.

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