



EDINBURGH
SCOTLAND



International Conference
on Hydrogen Safety

ORGANISED BY



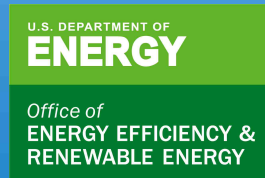
The Scottish Government and IA HySafe invite you to the unique

INTERNATIONAL CONFERENCE ON HYDROGEN SAFETY ICHS2021

"Safe Hydrogen for Net Zero"

Edinburgh on 21-23 September 2021

WITH THE
ENDORSEMENT OF



SPONSOR



PLATINUM SPONSOR



SILVER SPONSOR

COVID 19
IMPLICATIONS

Despite the uncertainties that COVID19 pandemic imposes, ICHS2021 will be taking place in Edinburgh on 21 – 23 September 2021.

If the difficulties with travel and holding large events persist, the ICHS2021 conference will also be held in Virtual mode. The Organising Committee hope to make a decision in February 2021 and communicate the exact form in which the Conference will be held.

The continuity of ICHS biennial conferences and their scientific content will be guaranteed with the publication of the ICHS2021 Proceedings, which will join the more than 1000 articles that are part of the memory of ICHS series.



CONFERENCE SCOPE

The Scottish Government and IA HySafe invite you to take part in ICHS2021 which will be about "Safe Hydrogen for Net Zero". This ninth International Conference on Hydrogen Safety (ICHS 2021) will be held in Edinburgh, Scotland on 21-23 September 2021 under the auspices of the International Association for Hydrogen Safety (IA HySafe). The first eight ICHS biennial conferences from 2005 to 2019 attracted experts from all over the world, and provided an open platform for the presentation and discussion of new findings, information and data on hydrogen safety - from basic research to applied development and from good practice to standardisation and regulatory issues.

Hydrogen is now beginning to play a greater role in the transition to clean, safe and sustainable energy systems. As part of "Net Zero Applications" hydrogen solution will address industrial heat and feedstocks, commercial and domestic heat, energy storage & energy transportation, and decarbonised clean transport throughout regions and across continents.

In May 2019 the Scottish Government announced the ambition to become Net Zero by 2045. In Feb 2020 the Scottish Government commissioned a wide-ranging assessment to appraise the potential of hydrogen to be deployed within the Scottish energy system, to help achieve those challenging decarbonisation targets. The findings of the hydrogen assessment work and other studies will identify Scotland's strengths in a hydrogen economy and help inform the development and delivery of a Scottish Government Action Plan for Hydrogen and a Hydrogen Policy Statement.



This further reinforces Scotland as one of the leading locations for deployment of hydrogen and fuel cell solutions into developing low carbon energy systems. Highlights include the expanding hydrogen bus fleet in Aberdeen and along with many other innovative projects in locations such as Fife, the Western Isles, and the Orkney Islands. These projects are leading the way with a 'learning by doing' approach, and are willing to share best practice and experience.

The overarching theme for ICHS2021 is therefore "Safe Hydrogen for Net Zero" and will address a wide range of hydrogen safety topics including: safety of large production and supply chain infrastructure, hydrogen and hydrogen carrier behaviours, physical effects, consequence and risk analysis, incidents, accidents and near misses, hydrogen effects on materials and components, safety of energy storage, power to gas/gas to power related safety issues, safety solutions for the implementation of hydrogen technologies, risk management, best practices, regulations, codes and standards, as well as communication strategies for wider public awareness and acceptance of hydrogen.

A more detailed list of ICHS2021 Themes and Topics will be find at:

<https://hysafe.info/ichs2021/themes-and-topics/>

All contributions to ICHS2021 will be evaluated for their scientific content and relevance to the wider uptake and deployment of safe hydrogen as part of the transition to a low carbon energy system.



CONFERENCE STRUCTURE

ICHS 2021 will include thematic plenary sessions, topical lectures, and parallel oral and poster sessions. The conference seeks to facilitate (enable/strengthen) the near-term introduction and global trade of hydrogen and its technologies in the market place.

ORGANISER COMMITTEE

Marco Carcassi, Stuart Hawksworth, Stuart McKay, Colin M. Thomson, Nigel Holmes, Iñaki Azkarate, David Holman, Thomas Jordan, Jay Keller, Frank Markert, Pietro Moretto, Annmarie Purmer and Nick Smith.

SCIENTIFIC COMMITTEE

Daniel Allason, Enis Askar, Iñaki Azkarate, Nick Barilo, C. Herve Barthelemy, Luc Bauwens, Regis Bauwens, Pierre Benard, Gilles Bernard-Michel, Dag Bjerketvedt, Marco Carcassi, Marco Cavriani, Paul Michael Cronin, Francesco Dolci, Sergey Dorofeev, Fabian Frank, Andre V. Gaathaug, Stella Giannissi, Luisa Giuliani, Carlyn C.Greenhalgh, Stuart Hawksworth, Kal Holtappels, LV Hong, Michael Johnson, Thomas Jordan, Shoji Kamiya, Jay Keller, Stephan Kelm, Armin Keßler, John Khalil, Wookyung Kim, Alexei Kotchourko, Daniel Krosch, Mike Kuznetsov, Zhe Liang, Dmitriy Makarov, Frank Markert, Akiteru Maruta, Akiko Matsuo, Michele Mazzaro, Josue Melguizo-Gavilanes, Daniele Melideo, Vladimir Molkov, Pietro Moretto, Beatriz Nieto, Quentin Nouvelot, Briony O'Shea, Melodia Lucas Perez, Sebastien Quesnel, Ernst-Arndt Reinecke, Paola Russo, Pratap Sathiah, Lucas Schindhelm, Xiaobo Sheng, Trygve Skjold, Nick Smith, Andrei Tchouvelev, Andrzej Teodoreczyk, Piet Timmers, Ilias Toliás, Alexandros Venetsanos, Changjian Wang, Benno Weinberger, Jennifer Wen, Huahua Xiao, Mingzhe Xue, Jinyang Zheng.

THEMES AND TOPICS

Themes and Topics for ICHS2021 Safe Hydrogen for Net Zero

As the leading conference on hydrogen safety, ICHS2021 looks to cover all topics relating to hydrogen and safety, and are interested to receive papers regarding experimental studies, theoretical mathematical modelling, safety management, incidents, accidents and near misses. Below is a focused list of themes and topics to act as a guide. If you wish to submit an abstract on a topic not listed please do and we will give it our full consideration as below is not an exhaustive list. Alternatively, if you would prefer please contact us before the abstract deadline to discuss.



ENERGY & INFRASTRUCTURE

Safety in Hydrogen Infrastructure

Production at large scale including Steam Methane Reforming (SMR) and Auto Thermal Reforming (ATR); Safety of purification processes; Storage, distribution and transport (hydrogen pipelines, gaseous, liquid, other chemical carriers); Handling and use; Global transport: road, rail, marine and aviation; Repurposing existing infrastructure for H₂; Future infrastructure projections and safety implications / consequences.

Power to Hydrogen and Hydrogen to Power Related Safety Issues

Electrolyser Safety; Purification and Intermediate Storage; Fuel Cell and Gas Turbine Safety Operating, at all levels including full operations, demonstration projects, experimental studies, theoretical modelling, incidents, accidents and near misses: Risk Assessment for Those Applications; Safety of materials; Normative or pre-normative research; Root Cause Assessments including Membrane Failures and cross-over in membrane-free electrolysers; Safety of H₂/O₂ mixtures plant

Energy Storage Systems

Pressurised Storage; liquid Hydrogen Storage; Materials-based Storage; Subsurface Porous Media and Salt Cavern Storage; Gas Grid Scale storage; Liquid Organic Hydrogen Carriers (LOHCs), Ammonia and Cracked Ammonia; Innovative Storage Concepts.

Hydrogen for Heat

Under this theme we are looking for papers covering the whole life cycle of Hydrogen for Heat applications covering 100% Hydrogen and Hydrogen blends with NG, and including Explosions in Weak (Domestic) Structures; Accumulation and Ventilation of Buildings; Ignition Potential; Mitigation; Distribution Network Safety; Appliance Development (burners, cookers, boilers, fires) and Hydrogen Detection in Domestic Setting.

Hydrogen Safety Aspects in Other Applications / Industries / Technologies

Chemical and Steel Plants; Oil Refinery; Nuclear; Defence Applications; Mining Industry (refuelling stations, interface and mining vehicles); Semiconductor/Electronic Industries, Electrical Generators, Neutron Beams and other Fundamental Experiments.



MOBILITY AND TRANSPORT SAFETY

Hydrogen Vehicles (Material Handling, Cars and Buses) and Related Fuelling Infrastructure

Hydrogen Refuelling Stations including: Safe Design; Indoor/Outdoor Fuelling; Permitting; Mitigation; Fuelling Protocols: On-Board Storage upset Conditions: Co-Location with Other Fuels; Mixed/Blended Fuels of Natural Gas and Hydrogen; Material Handling and Operations in Warehouses; Vehicle Operation in Tunnels and Garages; Vehicle Maintenance and Repair Facilities; Related Regulation Codes and Standards; Risk Assessment and Operational Experience in Particular of Fleets.

Safety in Emerging Mobility Markets – Infrastructure, Refuelling and Operation

Fleets; Heavy-Duty Road Vehicles (buses and trucks); Rail; Aviation (drones and planes); Spacecrafts-Unmanned Aerial Vehicles; Mobile Refuelling for Drone & Flight Applications; Maritime (port side, container ships, cruise lines, ferries); Related RCS and Risk Assessment.

Safety Issues of Hydrogen Batch Transport & Distribution

Safety of Liquid Hydrogen (LH₂) and Compressed Gaseous Hydrogen (CGH₂) Road and Rail Trailers; Innovative Designs; Safe Transfer Protocols, Purging etc; Safety of Ship Transport of Hydrogen, in particular LH₂ and related transfer; Associated Regulation Codes and Standards and Risk Assessment



CROSS CUTTING TOPICS

Behaviour of Gaseous and Liquid Hydrogen (LH2).

Release and Mixing; Jet Release with Phase Change; Wall Attached Jets and Impinging Jets; Ignition and Auto-Ignition; Combustion in any Relevant Mixture and Thermodynamic Conditions; Fire; Flash Fire; Deflagration; Detonation; Deflagration to Detonation Transition; Transitional effects and Instabilities; Rapid Phase Transitions (RPTs) and BLEVE; Blast Waves; H₂/CH₄ Blending and Possible PSA Impact of De-Blending.

Physical Effects, Consequence Analysis

Thermal Effects; Overpressure Effects; Structural Response; Missile Effects; Effects on Humans and Environments; Storage; Distribution and Transport Hazards; Effect of ventilation and water sprays on mixing and combustion; Effect of suppressants on ignition, fire and transient combustion; Spatial congestion and confinement effects on deflagration–detonation transitions; Methodology for including physical effects into Risk Assessment.

Hydrogen Effects on Materials and Components

Metallic and non-Metallic Material Safety; Embrittlement; Permeation/blistering; Liquid Hydrogen Storage; Distribution Transport and Compatibility; Knowledge Transfer from Experience in Other Sectors Such as Oil & Gas; Materials Selection for Specific Environments (e.g. high salinity, desert, cryogenic etc.).

Risk / Safety Management

Hazards and Vulnerabilities Identification and Analysis; Development and Use of Specific Accident Databases; Risk Assessment (cost-benefit analysis, safety perception, acceptance and harm criteria, uncertainties, decision making, risk awareness, risk perception, human factor); Risk Management and Safety Culture (including project safety plans for publicly funded R&D and demonstrations); Comparative Risk (i.e. hydrogen vs. conventional fuels); Inherent Safety (substitution, moderation and simplification); Whole System Safety Approach and Risk-Informed Safety Engineering; Accounting for Prevention and Mitigation (active, passive, sensors, safety distances); Safety Solutions and Implementation to Hydrogen Technologies; Mitigation Technology and Safety Equipment; Insurance.



Regulations, Codes and Standards (RCS)

Aspects of International, National, Regional and Organisation based RCS; Pre-Normative Research (PNR) (needs, priorities, approaches, incorporation of QRA); Experience / Lessons Learned from Bringing PNR Results into Standard Technical Committees; Post-Normative Experience (case studies); Comparison/Compatibility with Other Fuels; Safety Regulations for Hydrogen Carriers in Regional/International Trade (e.g. maritime, rail, pipelines); Permitting of Large Scale Applications; Safety Regulation and International Summary of Injection to Grid / Pipeline / Hydrogen Specifications; RCS Gaps; Internationalisation and Standardisation (Intercountry Trade / Continental Shipments / Pipes); Implications from Mixtures with Bio-Methane, (Blue/Green Hydrogen in Gas Transmission & Distribution Networks).

Education and Training

First and Second Responders Training; Technician Training; Train the Trainers; Academic Education; Vocational training; Accreditation of Public Accessible Education Resources; Role of Open Learning and Science, Technology, Engineering and Mathematics (STEM) Ambassadors ; Best Practice for Application Specific Training (including technician training for gas appliance, for stationary facilities and garages maintaining H2 vehicles).

Communicating Safety

Stakeholder Communication (policy, financial authorities and communities); Public Perception and Acceptance; Risk Perception and Awareness and Trust; Safety Databases and Lessons - Learned; Lessons from Communications about Past and Recent Incidents, Accidents and Near Misses; Social Media—Winning Hearts & Minds; Accreditation of Communications; Informing Key Stakeholders how can Safety Help to Shape Policy; Embedding Safety to Win Social Acceptance Gas Safety at the Domestic / Industrial / Transport End User (the necessary changes to the end user appliances).

OTHER

Case Studies; Safety & Terminology; Showcase of Useful Technologies; Stakeholder Management



EDINBURGH
SCOTLAND



CONTRIBUTED PAPERS

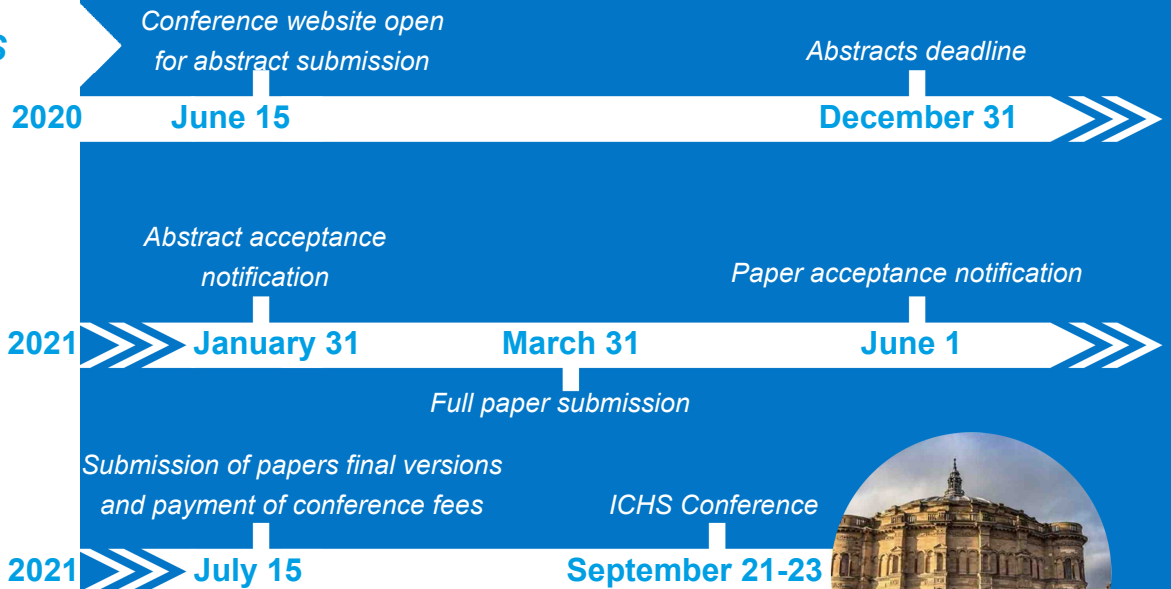
Conference attendees who wish to present a paper are required to submit a short abstract (up to 250 words). When submitting the abstract/paper, authors can express a preference for the presenting their work in an oral session or in the poster session or no preference. Authors whose abstract has been accepted will be asked to submit a full paper which will be peer-reviewed. The evaluation will be forwarded to the Authors by e-mail. All accepted papers (oral and poster) will be published with the same format in the proceedings of the conference.

Abstract submission instructions will be available on the Conference website from June 15, 2020: www.ichs2021.com

Registration will be accepted only in electronic form on the conference website: www.ichs2021.com

For more information, contact: email: ichs@hysafe.org Conference Website: www.ichs2021.com

KEY DEADLINES



CONFERENCE LANGUAGE

English

CONFERENCE WEBSITE

www.ichs2021.com

CONFERENCE CONTACT

ichs@hysafe.org