EFCH2 2026

# European Fuel Cells and Hydrogen

**PIERO LUNGHI** CONFERENCE

# FINAL PROGRAM


**ORGANIZED BY**

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Tuesday 15th September, 2026

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| 09:00 | 09:10 | **Welcome**<br>Viviana Cigolotti, Jack Brouwer, *Chairs of EFCH2 2026* |
| 09:10 | 09:20 | **Opening Ceremony - The Italian Energy Framework and the role of Hydrogen**<br>Giulia Monteleone \| *Department of Energy Technologies and Renewable Energy Sources, ENEA* |
| | | **SESSION I - HYDROGEN STRATEGIES AND RESEARCH PRIORITIES: EUROPEAN AND PERSPECTIVES** |
| 09:20 | 09:40 | **National hydrogen programs and incentives International**<br>Stefania Crotta \| *General Director, Financial Programs and Incentives, Ministry of the Environment and Energy Security* |
| 09:40 | 10:00 | **Driving Innovation in the EU Hydrogen Ecosystem: Priorities, Projects, and Pathways**<br>Mirela Atanaisu \| *Head of Unit Operations and Communications, Clean Hydrogen Partnership* |
| 10:00 | 10:20 | **Strategic Research Priorities for Hydrogen in Europe**<br>Luigi Crema, *President of Hydrogen Europe Research* |
| 10:20 | 10:40 | **Accelerating Clean Hydrogen Innovation through Mission Innovation: Global Strategies, Cooperation and Deployment Pathways**<br>Piero Venturi \| *Director of Clean Hydrogen Mission, Mission Innovation* |
| 10:40 | 11:00 | **Japan's Strategy for Hydrogen and Its Derivatives: Policy Leadership and International Cooperation in Building Robust Supply Chains**<br>Daishu Hara \| *Director, Hydrogen and Ammonia Department, NEDO* |
| 11:00 | 11:30 | **COFFEE BREAK** |
| | | **SESSION II - INNOVATION PATHWAYS: FROM RESEARCH EXCELLENCE TO INDUSTRIAL IMPACT** |
| 11:30 | 11:50 | **Critical Challenges and Opportunities in Building a Viable Hydrogen Market**<br>Jack Brouwer \| *Director, Clean Energy Institute, University of California Irvine* |
| 11:50 | 12:10 | **Scaling PEM Electrolysis from Materials Innovation to Industrial Manufacturing**<br>Kathy Ayers \| *SVP Research & Development, Nel Hydrogen* |
| 12:10 | 12:30 | **From Innovation to Market: Enabling the Hydrogen Economy Through Infrastructure Development**<br>Pere Margalef \| *Director of Snam Research and Technology Center, SNAM* |
| 12:30 | 12:50 | **Research and Innovation Across the Hydrogen Value Chain: current status, main challenges and Future Perspectives**<br>Julie Mougin \| *Deputy Director for Hydrogen Technologies, CEA Liten* |
| 12:50 | 13:30 | **Roundtable Q&A and Closing remarks "Key Messages and Way Forward"** |
| 13:30 | 14:30 | **LUNCH** |

# Tuesday 15th September, 2026

| START STOP | Session 1a: ROOM TEATRO<br>Fuel Cell and Hydrogen for Heavy Duty Transport<br>Session Chair | Session 1b: ROOM CAPRI<br>High-Temperature Fuel Cells<br>Session Chair | Session 1c: ROOM DONNA LUCIA<br>PEM Electrolysis: Experimental Activities<br>Session Chair | Session 1d: ROOM ROTONDA<br>Hydrogen Skills for Europe Building Competences, Industrial Capacity and a Coordinated Ecosystem for the Energy Transition<br>Session Chair | Session 1e: ROOM ROTONDA A<br>Innovative Materials for Hydrogen Production<br>Session Chair |
|---|---|---|---|---|---|
| 14:30 14:50 | 153 **Degradation modelling of a PEMFC system for heavy-duty long-haul applications using semi-empirical approach**<br>Utkarsh Sodagar — *Daimler Truck AG* | 125 **Advanced Electrochemical Characterization Methods of Solid Oxide Fuel Cells**<br>Florian Brunet-Coy — *CNRS - ICMCB* | 19 **Low equivalent weight Aquivion® ionomers behaviour in enhanced proton exchange membrane water electrolysis**<br>Antonino Salvatore Aricò — *CNR-ITAE* | 14:30 - 14:35 **Opening Remarks**<br>**Viviana Cigolotti** *ENEA*<br>14:35 - 14:50 **Why hydrogen skills matter for Europe: The Urgent Need for a Coordinated Approach**<br>**Mirela Attanasiu** *Clean Hydrogen Partnership* | 130 **From Photovoltaics to Integrated PEC Systems: Hybrid Perovskite Photoanodes with Operando $H_2$ Analysis**<br>Vera La Ferrara — *ENEA* |
| 14:50 15:10 | 179 **Efficient pseudo 2D PEM fuel cell model for integration in multi-stack system**<br>Noé Labeyrie — *Nantes University* | 198 **Fuel-Flexible SOFC-CHP for a Just Hydrogen Transition**<br>Remo Santagata — *ENEA* | 102 **Feasibility Assessment of Long Short-Term Memory Neural Networks for Electrolyzer Operation Prediction under Start-Stop Conditions**<br>Federico Hattab — *RSE* | 14:50 - 15:00 **European Policy Perspective on Hydrogen Skills and Workforce Development**<br>**Andrei Bunis** *Policy Officer Skills for Competitiveness, European Commission – Directorate-General for Employment, Social affairs and Inclusion*<br>15:00 - 15:10 **Towards a European Hydrogen Skills Ecosystem: The Role of the Hydrogen Skills Alliance and GreenSkills4Hydrogen**<br>**Dominik Richter** *Hydrogen Europe Research* | 100 **Physical Vapor Deposition of thin layers for proton-conducting solid oxide electrolysis cells**<br>Emanuele De Bona — *Fondazione Bruno Kessler* |
| 15:10 15:30 | 114 **Linking Hydrogen Demand For Freight Transport And Power System Decarbonization Through Spatially Resolved Energy System Modelling**<br>Andrea Lanzini — *Politecnico di Torino* | 161 **Dimethyl sulphide as a biogas contaminant in SOFCs: experimental characterisation and degradation modelling**<br>Lucia Pera — *Politecnico di Torino* | 213 **From converter measurements to internal degradation: a converter-oriented method for assessing PEM electrolysis cell health**<br>Claudia Carrasco — *University of Concepción* | 15:10 - 15:20 **Industrial Needs and Skills Gaps Emerging from the IPCEI Hydrogen Project Wave2theFuture**<br>**Paolo Guglia** *Fincantieri*<br>15:20 - 15:30 **Higher Education for Hydrogen: Developing Advanced Skills and Competences**<br>**Massimo Santarelli** *Politecnico of Torino, HySET, HyAcademy, GreenSkills4H2* | 43 **Microstructure–Property Relationships in Digitally Deposited and In-Line Compacted NiO–3YSZ Anode Supports for Solid Oxide Cells**<br>Dino Boccaccini — *University of Modena and Reggio Emilia* |
| 15:30 15:50 | 57 **Integrated On-Board Hydrogen Production and Fuel Cell Systems for Railway Applications: Design and Risk Assessment**<br>Maria Portarapillo — *University of Naples Federico II* | 112 **Application of MCFC technology for the decarbonization of Italian district heating networks: a case study**<br>Gioele Di Marcoberardino — *University of Brescia* | 110 **Transient Rise of Polarisation-like Resistance During Activation of PEM Water Electrolyser**<br>Andrej Zvonimir Tomić — *University of Split* | 15:30 - 15:40 **Towards a European Hydrogen Skills Ecosystem**<br>**Birgit Thoben** *Future Solution, European Hydrogen Academy, Green SKHy, PermittHy*<br>15:40 - 16:00 **Conclusion** | 18 **Fe-phthalocyanine-derived Fe-N-C electrocatalysts for the Nitrate Reduction Reaction (NO3RR)**<br>Simone Lombardi — *University of Milano-Bicocca* |
| 15:50 16:10 | 59 **A Fault Injection Framework for Hydrogen Fuel Cell-Battery Hybrid Trains to Enable Condition-Based Maintenance.**<br>Lavinia Gaeta — *Politecnico di Torino* | 85 **Effect of Ambient Humidity on Ba-Containing Cobaltite Electrodes for Protonic Ceramic Fuel Cells**<br>Iman Ghasemi — *Adelaide University* | 189 **Optimizing Contact Pressure in PEM Water Electrolyzers for the highest durability: Linking Impedance analysis and DRT to Performance**<br>Mohsen Mansourkiaei — *Politecnico di Torino* | 16:00 - 16:30 ***Best Paper Award of the European Fuel Cells and Hydrogen Piero Lunghi Conference 2026***<br>*Second Edition of the Best Thesis Awards (MSc & PhD), funded by H2IT and supported by the H2Excellence EU Project.* | 91 **CRM content in PEM water electrolysers: a review of catalyst loading, material intensity and temporal trends**<br>Smritirekha Talukdar — *Area Science Park* |
| 16:10 16:30 | 82 **Predictive Energy Management for Hydrogen Fuel Cell Hybrid Trains**<br>Yosef Berhan Jember — *Politecnico di Torino* | | 38 **Water Pathways and Impurity Diagnostics in PEM Water Electrolysis**<br>Ruba Al Shabibi — *University of Aberdeen* | | |

# Tuesday 15th September, 2026

| START STOP | Session 2a: ROOM TEATRO<br>Fuel Cell and Hydrogen for Maritime<br>Session Chair | Session 2b: ROOM CAPRI<br>PEM Fuel Cells: Experimental Activities<br>Session Chair | Session 2c: ROOM DONNA LUCIA<br>Hydrogen Refueling Stations<br>Session Chair | Session 2d: ROOM ROTONDA<br>Hydrogen Economy: Regional and National Perspectives<br>Session Chair | Session 2e: ROOM ROTONDA A<br>Alternative Pathways for Hydrogen Production<br>Session Chair |
|---|---|---|---|---|---|
| 17:00 17:20 | 78<br>**Dynamic Simulation and Optimization of a PEMFC-Battery Fast Ferry on a Real Italian Route**<br>Giuliano Agati — *University of Rome Sapienza* | 163<br>**Advanced In-situ Oxygen Transport Diagnostics for Large Format PEM Fuel Cells**<br>Oliver Curnick — *Coventry University* | 116<br>**Safe, Fast and Efficient Hydrogen Refuelling for Heavy-Duty Vehicles via a Multiphysics and Data-Driven Approach**<br>Matteo Genovese — *University of Calabria* | 219<br>**The French National Research Program on Low Carbon Hydrogen: Projects and Achievements**<br>Abdelilah Slaoui — *CNRS* | 22<br>**Hydrogen production from recycled aluminum foils and waste: Reactivity and kinetic analysis in acid or alkaline solution**<br>Marcello Romagnoli — *University of Modena and Reggio Emilia* |
| 17:20 17:40 | 141<br>**Ejector Scaling for Marine PEMFC: CFD Modelling and Semi-Empirical Bias Correction from 5 to 200 kW**<br>Christian Antetomaso — *CNR-STEMS* | 55<br>**Iron-Induced Degradation and Cation Migration in PFSA Membranes: Spatially Resolved Insights from Segmented Cell Analysis**<br>Assma El Kaddouri — *University of Lorraine* | 29<br>**Hydrogen Compressor Modeling Using Physics-Informed Surrogates**<br>Niklas Nickig — *The Hydrogen and Fuel Cell Center ZBT* | 227<br>**Hydrogen in pathways towards a climate-neutral, circular and competitive European process industry: the AMIGDALA scenario framework**<br>Vittoria Battaglia — *ENEA* | 90<br>**Thermo-Assisted Non-Thermal Plasma Methane Cracking: Prototype Development and First Experimental Insights for $CO_2$-Free Hydrogen Production**<br>Orlando Corigliano — *ENEA* |
| 17:40 18:00 | 214<br>**Analysis of the pressure time profile in a liquid hydrogen tank used for ship propulsion**<br>Rodolfo Taccani — *University of Trieste* | 47<br>**Influence of Methanol Reformer Aging on HT-PEMFC Performance under Dynamic Conditions**<br>Emilija Todorovski — *University of Ljubljana* | 173<br>**Techno-economic assessment of on-site hydrogen refueling stations based on renewable electricity, biogas, and ammonia pathways**<br>Davide Lanni — *University of Cassino*<br>*European University of Technology EUt+* | 178<br>**Importing Decarbonisation: The Geopolitics of Italy's Hydrogen Hub Strategy in the Mediterranean**<br>Giuseppe Pellegrini Masini — *ENEA* | 231<br>**Low-Temperature $H_2$ Release from Ammonia: Bridging the Ni–Ru Gap in an Electrified Structured Membrane Reactor**<br>Vincenzo Palma — *Università di Salerno* |
| 18:00 18:20 | 205<br>**Estimating Hydrogen, Methanol, and Ammonia Demand for the Deployment of Green Corridors in the Maritime Sector.**<br>Aniello Cappiello — *University of Naples Parthenope* | 53<br>**Influence of nominal contact pressure on activation behavior and spatial current redistribution in a pre-doped HT-PEMFC**<br>Filip Todorovski — *University of Ljubljana* | 186<br>**MetroHyVe3: Traceable Metrology for Reliable, Safe and Scalable Hydrogen Refuelling Infrastructure**<br>Vito Fernicola — *Istituto Nazionale di Ricerca Metrologica* | 207<br>**Biogas-Fueled Renewable Peak Power and Renewable Hydrogen and Fuel Generation Using Reversible Solid Oxide Electrolysis Cells – potentials on local and national level in Finland**<br>Robert Weiss — *VTT Technical Research Centre of Finland Ltd* | 27<br>**Seawater electrolysis with integrated brine valorisation: a contribution to the water-energy nexus**<br>Raphaël Defroyennes — *UC Louvain* |
| 18:20 18:40 | 117<br>**H-PORT: An Integrated Simulation, Safety and Techno-Economic Framework for Hydrogen-Powered Smart Ports**<br>Francesco Piraino — *University of Calabria* | 56<br>**An investigation on the performance of pretreated sPEEK based CCB and CCM MEA for PEMFC operation**<br>Guillaume Etienne — *University of Lorraine* | 217<br>**Techno-economic optimization of an on-site solar-powered hydrogen refueling station**<br>Giovanni Di Ilio — *University of Naples Parthenope* | 121<br>**Energy System Modelling for Hydrogen Integration in the Italian Power Grid: Benchmarking and 2050 Scenario Analysis**<br>Andrea Lanzini — *Politecnico di Torino* | 128<br>**Integrated Thermochemical Cycles for Carbon-Negative Hydrogen Production**<br>Salvatore Francesco Cannone — *University of Turin* |
| 18:40 19:00 | | 30<br>**Operando x-ray-based analyses for PEM fuel cells and water electrolyzers: time-resolved insights about catalyst degradation at a single cell level**<br>Marco Bogar — *University of Trieste* | 215<br>**Predictive operation of a hydrogen refuelling station with scheduled clients**<br>Pol Cardona Rubio — *Institut de Robòtica i Informàtica Industrial CSIC-UPC* | | 168<br>**Electrochemical Hydrogen Production from Cassava/Tapioca Residues: A Proof-of-Concept for the Energy Valorization of Starchy Wastes in African Contexts**<br>Sipho Ndlovu — *University of Pretoria - EBIT* |

Wednesday 16th September, 2026

| START | STOP | Session 3a: ROOM TEATRO<br>Fuel Cell and Hydrogen for Aviation<br>Session Chair | Session 3b: ROOM CAPRI<br>Intelligent Diagnostics for Hydrogen Systems<br>Session Chair | Session 3c: ROOM DONNA LUCIA<br>GERG Metrology and Hydrogen Emissions<br>Session Chair |
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| 9:00 | 9:20 | 32<br>**Test campaign for the proof of funtionality of a PEM fuel cell system for regional aircraft applications**<br>Cornelie Bänsch — *German Aerospace Center* | 144<br>**Physics-Based One-Dimensional Modelling of a PEM Water Electrolyzer to Quantify Performance Trade-offs of PFAS-Free Membranes**<br>Thomas Dankers — *TNO* | **Keynote Speech - GERG Presentation**<br>Robert Judd — *GERG* |
| 9:20 | 9:40 | 60<br>**Digital Twin-Oriented Modeling and Validation of a Fuel Cell Hybrid Electric Propulsion System for Hydrogen-Based Aviation**<br>Christian Simone — *University of Salerno* | 61<br>**Real-Time Electrolysis Stack Temperature Prediction Using Neural Networks and OpenModelica**<br>Mohsen Gharib — *Fraunhofer IKTS* | **GERG Strategy towards H2**<br>Matteo Robino — *SNAM* |
| 9:40 | 10:00 | 93<br>**Development and testing of a lightweight two-phase pumped cooling system for aviation fuel cells**<br>Henk Jan van Gerner — *NLR-Royal Netherlands Aerospace Centre* | 103<br>**Data-Driven Degradation Forecasting for AEM Water Electrolysis**<br>Marco Veneriano — *University of Genova* | 188<br>**Metrology for Hydrogen and Hydrogen–Natural Gas Mixtures in Gas Networks: Validated Testing Methodologies from the THOTH2 Project**<br>Pawel Kulaga — *INIG* |
| 10:00 | 10:20 | 139<br>**Impact of High-Energy Neutron Radiation on PEM Fuel Cells in Aviation**<br>Nadine Mohamed — *TU Braunschweig* | 191<br>**Development of a Flexible Test Bench for Advanced Characterization and Diagnostics of PEM and AEM Electrolyser Stacks**<br>Simone Anelli — *BluEnergy Revolution* | 143<br>**Flow measurement traceability for hydrogen in gas networks: an insight into H2FlowTrace project**<br>Alessandro Guzzini — *UNIBO* |
| 10:20 | 10:40 | 36<br>**Accelerating Solid Oxide Fuel Cell – Gas Turbine Simulations: A Surrogate Modeling Approach**<br>Pascal Köhler — *Leibniz University Hannover* | 39<br>**In-situ contact pressure monitoring of PEMFC stack: A new approach**<br>Vasanth Parthasarathy — *Hanze University* | 220<br>**Metrology to Support Ammonia Use in Emerging Energy Applications (MetNH3Energy): Validation of the Ammonia Calibration Method**<br>Miguel Ballesteros — *GERG* |
| 10:40 | 11:00 | 145<br>**Direct synthesis of Sustainable Aviation Fuels from captured CO2 and green H2 via one-pot CO2-Fischer-Tropsch Synthesis: vision or viable pathway?**<br>Mattia Piacentini — *Politecnico di Milano* | 129<br>**Conditional Physics-Informed Neural Network Modelling of PEM Electrolyzer Voltage Dynamics**<br>Nouhaïla Elkasmi — *Institut de Robòtica i Informàtica Industrial CSIC-UPC* | 87<br>**Closing the Hydrogen Emissions Knowledge Gap: the NHyRA Approach**<br>Vittoria Troisi — *SNAM* |
| 11:00 | 11:30 | **Coffee Break with Poster Session** | | |

Wednesday 16th September, 2026

| START | STOP | Session 4a: ROOM TEATRO | | Session 4b: ROOM CAPRI | | Session 4c: ROOM DONNA LUCIA | |
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| | | Hydrogen for Energy Transition: Integrated Assessment | | Advanced Pathways for Renewable Fuels Production | | GERG Hydrogen Emissions and Safety | |
| | | Session Chair | | Session Chair | | Session Chair | |
| 11:30 | 11:50 | 107 | The role of hydrogen in the energy transition: effects of carbon budget and of the introduction of nuclear power plants<br>Paolo Colbertaldo — *Politecnico di Milano* | 181 | Advanced biorefinery platform for renewable H2-based fuels production<br>Emilio Nieto — *Centro Nacional del Hidrógeno* | 209 | Advancing the assessment of climate and environmental impacts of a future Hydrogen Economy with the HYDRA project<br>Rossella Urgnani — *TINEXTA INNOVATION HUB* |
| 11:50 | 12:10 | 17 | Price-driven optimal grid-connected hydrogen production<br>Robert Dickinson — *Adelaide University* | 149 | Analysis of SOEC-based systems for the production and import of e-NG<br>Stefano Campanari — *Politecnico di Milano* | 195 | Impacts of the Hydrogen Economy on Global Hydrogen and Air Pollutant Emissions: A Scenario Analysis Using the GAINS Model<br>Peter Rafaj — *IIASA* |
| 12:10 | 12:30 | 148 | Integration of green hydrogen production for transport decarbonization into the italian electricity grid: a numerical analysis<br>Fulvio Paolo Buzzi — *University of Tuscia* | 106 | Fuel properties and composition of green diesel produced via catalytic deoxygenation of rapeseed oil<br>Sonia Dell'Aversano — *University of L'Aquila* | 111 | Applying Hydrogen Safety Lessons to the 2026 Colton Accident<br>David Blekhman — *California State University* |
| 12:30 | 12:50 | 75 | Techno-Environmental Assessment of Industrial-Scale AEM Electrolysis: The Ansaldo Green Tech case<br>Vera D'Oriano — *Ansaldo Green Tech* | 65 | Enhancing e-Biomethanol Synthesis from Biomass-Derived Syngas via a LTA-Zeolite Catalytic Membrane System<br>Nadia Cerone — *ENEA* | 224 | Advance $H_2$ Safety: Material Integrity to Network Resilience drawing on EU Projects: CANDHy, PilgrHYm and SHIMMER<br>Ludovico Mazzocco — *GERG* |
| 12:50 | 13:10 | 92 | Performance evaluation of a hybrid energy system of biomass based on solid oxide fuel cell<br>Angeliki Brouzgou — *University of Thessaly* | 197 | Green Methanol Production via SOEC Co-Electrolysis Coupled with Solar Energy: Process Design and Analysis<br>Gianpaolo D'Andrea — *University of Naples Parthenope* | 224 | Advance $H_2$ Safety: Material Integrity to Network Resilience drawing on EU Projects: CANDHy, PilgrHYm and SHIMMER<br>Miguel Ballesteros — *GERG* |
| 13:10 | 14:10 | Lunch | | | | | |

Wednesday 16th September, 2026

| START | STOP | Session 5a: ROOM TEATRO — PEM Fuel Cells: Modelling Activities — Session Chair | | Session 5b: ROOM CAPRI — Alkaline Electrolysis: Experimental Activities — Session Chair | | Session 5c: ROOM DONNA LUCIA — Hydrogen Systems: Economics and Integration — Session Chair | |
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| 14:10 | 14:30 | 119 | **Deep learning model of PEMFC stack degradation under CO contamination**<br>Luca Pratticò — *Fondazione Bruno Kessler* | 33 | **Characterisation of electrode bubble coverage by electrochemical impedance spectroscopy in an alkaline water electrolysis flow-cell**<br>Xavier Pinon — *UC Louvain* | 206 | **Preliminary Assessment of a Hydrogen-Powered Pushback Tractor for Ground Handling Decarbonization at Milan Malpensa Airport**<br>Simona Di Micco — *University of Naples Parthenope* |
| 14:30 | 14:50 | 23 | **Pinhole growth in PFSA and hydrocarbon membranes under relative humidity cycling**<br>Mina Bahraminasab — *Chalmers University* | 109 | **Efficient urea-assisted water electrolysis at 1.5 A/cm2 for 1100 hours over in-situ produced NiOOH species**<br>Angeliki Brouzgou — *University of Thessaly* | 21 | **Electrolyzer Model Detail in Energy System Optimization: Implications for Dispatch and Waste Heat Availability**<br>Simon Dübell — *Reiner Lemoine Kolleg* |
| 14:50 | 15:10 | 142 | **Europy: a modular PEMFC multiphysics framework in Python/JAX/PETSc**<br>Gilmar Nogueira Junior — *CEA - LITEN* | 146 | **Pressurized alkaline electrolyser: technical challenges towards a high-pressure design**<br>Alessandro Guzzini — *University of Bologna* | 83 | **Integrated Autonomous Hydrogen Energy Systems for Resilience and Humanitarian Crisis Response: A Techno-Economic Assessment**<br>Emmanuel Stamatakis — *National Center for Scientific research DEMOKRITOS* |
| 15:10 | 15:30 | 154 | **Computational Model-based Performance Assessment of PFAS-Free Membrane-Electrode Assemblies in PEM Fuel Cells**<br>Andreas Podias — *TNO* | 127 | **Enhancing alkaline water electrolysis with Co-Mo layered double hydroxides**<br>Nerea López García — *Centro Nacional del Hidrógeno* | 155 | **Hydrogen Energy Storage for Long-Duration Energy Shifting in a Remote Off-Grid Microgrid**<br>Robert Flores — *UC Irvine* |
| 15:30 | 15:50 | 41 | **CFD-Based Parametric Optimization of Sinusoidal Flow Fields for High-Temperature PEM Fuel Cells**<br>Emanuele D'Alessio — *University of Rome Sapienza* | 193 | **Moving Beyond the Limitations of Conventional Alkaline Water Electrolysers for Efficient and Flexible Hydrogen Production**<br>Fatemeh Razmjooei — *German Aerospace Center* | 190 | **Mapping Hydrogen Supply Opportunities for Aluminium Decarbonization: Development of a GIS-Based Decision Support Tool**<br>Simone Anelli — *BluEnergy Revolution* |
| 15:50 | 16:10 | 81 | **Modelling of Multi-Step Platinum Oxidation and Dissolution Under Cyclic Potential Operation In PEMFC Cathodes**<br>Awa SAKHO — *CEA - LITEN* | 211 | **Membrane-less Supercritical Water Electrolysis for High-Pressure Hydrogen Production: First Technical Results from the X-SEED Project**<br>Giovanna Massobrio — *Snam* | | |
| 16:10 | 16:40 | Coffee Break with Poster Session | | | | | |

## Wednesday 16th September, 2026

| START | STOP | Session 6a: ROOM TEATRO<br>High-Temperature Electrolysis I<br>Session Chair | Session 6b: ROOM CAPRI<br>PEM Fuel Cells: Materials to System Modelling<br>Session Chair | Session 6c: ROOM DONNA LUCIA<br>Hydrogen Valleys and Integrated Systems<br>Session Chair |
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| 16:40 | 17:00 | 96 **A Multi-rSOC System for Flexible Energy Management in Data Center Applications: Modeling and Configuration Analysis**<br>Luigi Margutti — *University of Perugia* | 182 **Large-scale 3D HTPEM stack simulations: single-cell thermal extrapolation vs. full electrochemistry modelling**<br>Vincenzo Mulone — *University of Rome Tor Vergata* | 24 **HyMantovalley – A Case Study from Italy**<br>Marcello Romagnoli — *University of Modena and Reggio Emilia* |
| 17:00 | 17:20 | 76 **Effect of Air Contact Layer Thickness on Oxygen Transport and Current Density Distribution in Solid Oxide Cells**<br>Imdad Uddin Chowdhury — *FZJ* | 40 **Performance and mass transfer evaluation of a single HT-PEM fuel cell with straight and wavy serpentine flow channels using CFD simulation**<br>Mahmoud M. Abdelkader — *University of Rome Sapienza* | 45 **Dynamic modelling and performance mapping of an integrated hydrogen valley ecosystem: the HySPARK case**<br>Jaroslaw Milewski — *Warsaw University of Technology* |
| 17:20 | 17:40 | 202 **Integration of Proton Conducting Ceramic Electrolysis for hydrogen production in targeted industrial applications**<br>Fabiana Romano — *University of Salerno* | 169 **1D - 3D heat transfer model for air cooling of hydrogen proton exchange membrane fuel cell**<br>Pierpaolo Martini — *University of Modena and Reggio Emilia* | 105 **A methodological framework for mapping hydrogen value chains: the case of Friuli Venezia Giulia and the North Adriatic Hydrogen Valley**<br>Marinella Favot — *Area Science Park* |
| 17:40 | 18:00 | 184 **Role of reverse Water-Gas Shift Reaction for $CO_2$ Utilization in Molten Carbonate Electrolysis Cells**<br>Simone Mataloni — *University of Rome Sapienza* | **Electrospun PBI Membranes for HT-PEM Fuel Cells: Phosphoric Acid Uptake, Interaction Mechanisms and Preliminary Single-Cell Assessment**<br>Emmanuel De Gregorio — *University of Naples Parthenope* | 183 **Qualitative Risk Assessment of Hydrogen Transport and Hydrogen-Fuelled Mobility in Road Tunnel**<br>Emanuela Bruno — *Politecnico di Torino* |
| 18:20 | 20:00 | FREE TIME | | |
| 20:00 | 23:00 | SOCIAL DINNER @ DA PAOLINO | | |

Thursady 17th September, 2026

| START | STOP | Session 7a: ROOM TEATRO<br>High-Temperature Electrolysis II<br>Session Chair | Session 7b: ROOM CAPRI<br>Low-Temperature Electrolyser and Fuel Cell Manufacturing<br>Session Chair | Session 7c: ROOM DONNA LUCIA<br>Hydrogen Storage: Materials, Modelling and System Integration<br>Session Chair | Session 7d: ROOM ROTONDA<br>Sustainability and Life Cycle Assesment in the Hydrogen Economy<br>Session Chair |
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| 9:00 | 9:20 | 72 **Design and Validation of Machine Learning-based Prognostic Algorithm for SOEC durability prediction**<br>Pierpaolo Polverino — *University of Salerno* | 98 **Impact of Roll-to-Roll Production Technologies on the Cost of PEM Fuel Cell Membrane Electrode Assemblies**<br>Ulf Groos — *Fraunhofer ISE* | 157 **Kinetic-based and FVM numerical tools for the simulation of Metal Hydride storage tanks coupled with Phase Change Materials**<br>Vesselin Krassimirov Krastev — *University of Rome Tor Vergata* | 203 **Advancing Social Life Cycle Assessment for Hydrogen Energy Pathways in Italy's 2050 Transit**<br>Alessandro Agostini — *ENEA* |
| 9:20 | 9:40 | 70 **EIS-Based Diagnostic Algorithm for State-of-Health Assessment and Degradation Monitoring of SOEC systems**<br>Valentino Frasci — *University of Salerno* | 126 **Enhancing the Mechanical Durability of Anion Exchange Membranes via Electrospun PVDF Fibers Reinforcement for Water Electrolysis**<br>Davide Damiani — *University of Bologna* | 104 **Experimental Investigation of a Lab-Scale Metal Hydride – Phase Change Material Hydrogen Storage System**<br>Marco Maggini — *University of Tuscia* | 180 **Lessons learned from the PEFCR development process: the case of the Fuel Cells and Hydrogen PEFCR for hydrogen storage devices**<br>Claudio Carbone — *ENEA* |
| 9:40 | 10:00 | 34 **Concept of a solid oxide electrolysis-molten carbonate fuel cell hybrid system to support a power-to-gas installation**<br>Jaroslaw Milewski — *Warsaw University of Technology* | 71 **Galvanic Pulse-Plating of iridium-ruthenium-alloys as catalyst for PEM water electrolysis**<br>Johannes Näther — *Mittweida University of Applied Sciences* | 97 **CFD Assessment of Absorption-Rate-Based Charging Interruption for Thermal Protection and Recovery of an AB2 Metal Hydride Tank**<br>Massimiliano Renzi — *University of Bozen-Bolzano* | 150 **Social Life Cycle Assessment of green hydrogen technologies: a systematic review and commentary from a social science perspective**<br>Giuseppe Pellegrini Masini — *ENEA* |
| 10:00 | 10:20 | 201 **Thermally Integrated Hydrogen and Electricity Co-generation in a Direct Ammonia-Fueled Solid Oxide Fuel Cell System**<br>Hyuntae Sohn — *Korea Advanced Institute of Science and Technology* | 136 **Toward Sustainable Bio-Inspired Anisotropic Ion Exchange Membranes by Self-Assembly of Bio-Based Solid Polymer Electrolytes**<br>Laurent Billon — *IPREM* | 204 **Evaluation of internal bed temperature in a metal hydride cartridge during hydrogen charging using an experimentally based lumped-parameter model**<br>Scipione d'Avino — *University of Naples Parthenope* | 79 **The Best Uses of Green Electrolytic Hydrogen**<br>Robert Flores — *UC Irvine* |
| 10:20 | 10:40 | 62 **Multi-Mode Electrochemical Transient Characterisation of SOC Short Stacks under Fuel-Flexible/Biogas Operating Conditions**<br>Sadhana Golani — *FZJ* | 151 **Surface treatment of stainless steel porous transport layer for oxygen evolution reaction enhancement in an anion exchange membrane electrolyser**<br>Rachmat Adhi Wibowo — *AIT Austrian Institute of Technology* | 177 **C-based materials for solid state hydrogen storage: a new perspective**<br>Chiara Milanese — *Pavia University & CSGI* | 160 **From Scrap to Storage: Life Cycle and Circularity Assessment ofTiFe0.80X0.20 Alloys for Hydrogen Storage**<br>Francesca Garelli — *University of Turin* |
| 10:40 | 11:00 | 228 **Innovative Manufacturing Processes for Low-Cost, High-Performance SOCs: From Laboratory Results to Industrial Deployment**<br>Fabrizio Gualandris — *Hydrospark Srl* | 133 **Mechanical Recovery of Platinum-Based Cathode Catalysts: A Circular Economy Approach for Sustainable and Cost-Effective PEM Technologies**<br>Nerea López García — *Centro Nacional del Hidrógeno* | 156 **Geopolymers modification and its hybrid materials for hydrogen storage**<br>Md Akram Hossain — *University of Oulu* | |
| 11:00 | 11:30 | Coffee Break with Poster Session | | | |

Thursady 17th September, 2026

| START | STOP | Session 8a: ROOM TEATRO<br>Low-Temperature Electrolysis: Modelling Activities<br>Session Chair | Session 8b: ROOM CAPRI<br>Hydrogen Integration in Multi-Energy Systems<br>Session Chair | Session 8c: ROOM DONNA LUCIA<br>Hydrogen for Industrial Processes<br>Session Chair | Session 8d: ROOM ROTONDA<br>Bio-Based Hydrogen Production and Waste Valorization<br>Session Chair |
|---|---|---|---|---|---|
| 11:30 | 11:50 | 194 **A Practical PI Controller Design Approach for DC-DC Power Electronic Converters for Electrolyzer Applications**<br>Silvia Di Girolamo — *CNR* | 216 **H2SCORE: An Integrated Hydrogen-Based Architecture for Complex Local Multi-Energy Microgrids**<br>Marta Gandiglio — *Politecnico di Torino* | 131 **Novel hydrogen-based technologies for green iron and steel making**<br>Alfonso Chinnici — *Adelaide University* | 164 **Design and Validation of a Modular Microbial Fuel Cell Stack for Urine Valorization and Energy Harvesting**<br>Domenico Borello — *University of Rome Sapienza* |
| 11:50 | 12:10 | 196 **Fault-Tolerant Operation of a Stacked Interleaved DC-DC Buck Converter for PEM Electrolyzers**<br>Giuseppe La Tona — *CNR* | 199 **Hydrogen as a Cross-Sector Vector in Advanced Multi-Energy Networks: Use-Case Framework and NZMES Results for Tertiary Buildings**<br>Francesco Lorusso — *Politecnico di Bari* | 200 **Hydrogen Demand Projections and Renewable Power System Sizing for Hard-to-Abate Sectors in the Italian Energy Transition**<br>Simona Di Micco — *University of Naples Parthenope* | 166 **Green hydrogen-driven in-situ biomethanation for methane-enriched biogas production in hybrid PtG configurations**<br>Giuseppe Lembo — *ENEA* |
| 12:10 | 12:30 | 158 **Towards high-pressure AEM single-cell design through coupled electro–thermo–mechanical modelling**<br>Martina Prastaro — *Politecnico di Torino* | 46 **Hierarchical Predictive Control for Coordinated Operation of Smart Prosumers in an Energy Community**<br>Alessandro Polimeni — *University of Rome Tor Vergata* | 122 **Optimal green hydrogen generation design for the decarbonization of the steel industry: an Italian case study**<br>Emanuela Marzi — *ENEA* | 132 **From biowaste to renewable hydrogen: pilot-plant validation and scale-up challenges**<br>Eudald Tuxans — *Sorigué* |
| 12:30 | 12:50 | 208 **Multiphysics Modeling and Optimization of a Membrane-less Supercritical Alkaline Electrolyzer**<br>Arash Nemati — *Technical University of Denmark* | 162 **H2BIDEA: Experimental and Numerical Evaluation of Structural Integrity and Material Compatibility for 100% Hydrogen Distribution Networks**<br>Unai De Francisco Vargas — *Fundación Tecnalia R&I* | 120 **Decarbonization of a hard-to-abate process in steel making: effects of measured hydrogen plant performances on the techno-economic feasibility study**<br>Beatrice Bulzacca — *University of Bologna* | 210 **A Scale-Up Platform for Renewable Hydrogen Production Technologies Based on Waste-Derived Biogas and Biomethane**<br>Daniele Micale — *Snam* |
| 12:50 | 13:10 | 25 **Electrochemists going with the flow: CFD-guided optimization of flow-engineered 3D electrodes and cells for alkaline water electrolysis**<br>Kevin Van Droogenbroek — *UC Louvain* | 20 **Numerical Insights into Transient Hydrogen Tracking in Gas Distribution Networks**<br>Michele Francesconi — *University of Florence* | 222 **Multi-criteria assessment of green hydrogen value chains for Europe's sustainable transition**<br>Marianna Kama — *UPC* | 84 **Development of an intensified gasification process for H2-rich syngas production**<br>Donatella Barisano — *ENEA* |
| 13:10 | 13:30 | 101 **Performance-degradation oriented multiphysics 0D/3D numerical framework for PEMWE's digital twin applications**<br>Raffaele Iossa — *RSE* | 185 **Traceable Humidity Measurements Supporting Hydrogen Quality Assurance and Safety Across the Hydrogen Supply Chain**<br>Rezvaneh Nobakht — *Istituto Nazionale di Ricerca Metrologica* | | 167 **Development of a Bio$H_2$-Biorefinery Through the Integration of Dark Fermentation and Microbial Electrolysis Cells**<br>Antonella Marone — *ENEA* |

# POSTER SESSION

POSTER SESSION

# TOPIC 1 — HYDROGEN PRODUCTION

| ID | Title | Presenter | Affiliation |
|---|---|---|---|
| **42** | Electrochemical characterization of Molten Carbonate Electrolysis Cells: a focus on fuel electrode kinetics and degradation | Silvia Lo Conte | University of Naples Parthenope |
| **63** | Biomass-assisted electrolysis using lignocellulosic feedstock to produce hydrogen | Francesco Zimbardi | ENEA |
| **73** | Development of Performance Factor Analysis Method for Steam Electrolysis by SOEC | Takumi Imabayashi | Central Research Institute of Electric Power Industry |
| **113** | Towards a Standardized Testing Framework for AEM Water Electrolyzers | Giulia Campolucci | University Campus Bio-Medico of Rome |
| **124** | Investigation of the Challenges in Dynamic Operation of Pressurized Alkaline Water Electrolysers | Kamal Ghotia | German Aerospace Center |
| **147** | InnAEM: Innovative Materials for Anion Exchange Membrane Water Electrolysis | Miryam Gulino | University of Rome Sapienza |
| **170** | Electrochemical analysis of long-term performance of Molten Carbonate Electrolysis Cells under simulated seawater feed | Silvia Lo Conte | University of Naples Parthenope |
| **BTA** | Frequency Stability of Power-to-X and X-to-Power Technologies: Lab-Scale Microgrid Experimental Assessment | Lorenzo Fucacci | University of Bologna |
| **BTA** | Optimization Of Anode Catalyst Ink For Proton Exchange Membrane Water Electrolysis (PEMWE) In Terms Of Stability And Performance | Tushal Bhanubhai Hirpara | Zentrum für Sonnenenergie und Wasserstoff Forschung |

POSTER SESSION

# TOPIC 2 — HYDROGEN STORAGE AND DISTRIBUTION

| ID | Title | Presenter | Affiliation |
|---|---|---|---|
| **138** | Experimental System for Hydrogen Permeability Testing at High-Pressure | Andrea Dei Sommi | University of Salento |
| **176** | Development of Pt-based bimetallic catalyst promoted with Fe, Mn and Co for hydrogen storage and release in LOHC systems | Emilio Nieto | Centro Nacional del Hidrógeno |
| **192** | Effect of Thermally Grown Steel Oxides on Hydrogen Permeation | Brigida Alfano | ENEA |

POSTER SESSION

# TOPIC 3 — FUEL CELLS TECHNOLOGIES

| ID | Title | Presenter | Affiliation |
|---|---|---|---|
| **31** | Polydopamine-assisted functionalisation of bacterial cellulose with lignosulfonate as a bio-based ion exchange membrane in fuel cells | Sara Zdovc | University of Maribor |
| **37** | Combined thermal management and heat recovery for PEMFC-battery hybrid propulsion systems | Carla Menale | ENEA |
| **48** | Direct Biomass Fuel Cells for Small-Scale Biomass Utilization | Makoto Kawase | Central Research Institute of Electric Power Industry |
| **50** | Mechanical Testing Investigation of Aqueous Capillary r-GO based Inks for 3D-Printed Electrodes | Angeliki Brouzgou | University of Thessaly |
| **80** | Comparing the efficiency of a hybrid ICE vehicle fuelled with hydrogen with a fuel cell vehicle, based on a simulation model | Fernando Ortenzi | ENEA |
| **95** | Semicrystalline Syndiotactic Polystyrene Membranes for Electrochemical Applications | Alessandra Laperuta | University of Naples Parthenope |
| **99** | Electrochemical and morphological analysis of Pt catalyst degradation under maritime-inspired AST for PEMFCs | Sara Tamburello | Delft University of Technology |
| **115** | Interface Engineering in sPPO-Based Hydrocarbon Catalyst-Coated Membranes for PEM Fuel Cells | Carlo De Luca | University of Naples Federico II |
| **118** | Nanostructured Pt Catalyst Layers for Low-Loading PEMFCs by Pulsed Laser Deposition and Inverse MAPLE | Emmanuel De Gregorio | University of Naples Parthenope |
| **212** | From natural gas to hydrogen: experimental performance characterization of a solid oxide fuel cell system installed in an airport environment | Marta Gandiglio | Politecnico di Torino |
| **230** | SPOTT: Controlled Validation of Semi-Autonomous Driving Assistance on a Hydrogen-Battery Terminal Tractor | Andrea Altomonte | University of Naples Parthenope |
| **BTA** | Optimization of Water Management in PEM Fuel Cells: Experimental HFR Analysis under Variable Humidity Conditions | Anna Vondram | TU Braunschweig; German Aerospace Center DLR |
| **BTA** | Engineering Advanced FeNC Catalysts for PEM Fuel Cells: From Pore Design to Device Performance | Giulia Gianola | Istituto Italiano di Tecnologia CSFT, Polito |
| **233** | Hot Gas Conditioning and SOFC systems coupled to steam/oxygen fluidized bed gasifier plant | Enrico Bocci | Marconi University |

POSTER SESSION

## TOPIC 4 — HYDROGEN END-USE APPLICATIONS

| ID | Title | Presenter | Affiliation |
|---|---|---|---|
| **86** | Nutrient management in biological methanation reactors: experimental optimization of nutrient formulations and CSTR-TBR comparison | Gabriele Soggia | RSE |
| **225** | Real-Time Optimization of a Hydrogen Based Multi Energy System Using Machine Learning | Fatemeh Sadeghi | University of Tuscia |

## TOPIC 5 — HYDROGEN ECONOMY AND SUSTAINABILITY

| ID | Titolo | Presentatore | Affiliazione |
|---|---|---|---|
| **52** | Environmental performance assessment of catalysts for water electrolysis in the context of the X-SEED project | Martí Aliaguilla | Leitat Technological Center |
| **134** | Techno-economic modelling of a hydrogen valley in Italy: a multi-scenario analysis of the Levelised Cost of Hydrogen | Andrés Yáñez | CIRCE Technology Centre |
| **232** | HySPARK: A Cross-Regional Hydrogen Valley for Airport and Urban Mobility Decarbonization | Alessia Piccolo | University of Naples Parthenope |
| **BTA** | Advanced Methods for the Quantitative Assessment of the Safety of Decarbonization Technologies | Federica Tamburini | ETH Zurich, RRE Lab; University of Bologna, LISES |

## TOPIC 6 — HYDROGEN POLICY, MARKET, AND BUSINESS MODELS

| ID | Title | Presenter | Affiliation |
|---|---|---|---|
| **64** | Standardization Safety and Analytical Protocols for Biomass Hydrogen: the project START-H2 | Nadia Cerone | ENEA |

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# TOPIC 7 — HYDROGEN INNOVATION AND FUTURE TRENDS

| ID | Title | Presenter | Affiliation |
|---|---|---|---|
| **74** | Redox properties of Azo Dyes determined via quantum chemical methods | Eleonora Hubenova | IEES BAS - Plovdiv University |
| **77** | Anodic biofilm formation under short-circuited conditions of SMFC | Yolina Hubenova | IEES BAS - Plovdiv University |
| **152** | H2-SimNet: A Simulation-Based Framework for Data-Driven Monitoring of Hydrogen Networks | Saverio De Vito<br>Elena Esposito | ENEA |
| **159** | Electrochemical characterisation of Electrospun Nitrogen-Doped PVDF Hybrid Nanofibers for Bifunctional Metal-Free Electrocatalysts | Claudio Mele | University of Salento |
| **171** | Hydrogen-related pathways in NEST++: reversible conversion, biomass-to-syngas routes, storage monitoring and intelligent control | Francesca Santoni | ENEA |
| **172** | Characterization and Calibration Protocols for Gas Sensors in Hydrogen Systems: Towards Integrated Environmental Monitoring | Ettore Massera | ENEA |
| **229** | AI-PORT: An Edge-to-Cloud Computer-Vision Platform for Port-Asset Identification and Tracking | Andrea Altomonte | University of Naples Parthenope |

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By connecting expertise across the sector, we help identify common challenges, develop innovative solutions and advance technologies that can contribute to a sustainable, low-carbon, competitive and secure energy future.

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PEH serves customers worldwide across a broad range of industries, including renewable energy, sustainable mobility, metallurgy, glass manufacturing, heavy industry, food processing, and the oil & gas sector. By combining advanced engineering with customized system integration, we help our clients accelerate the transition toward a low-carbon hydrogen economy.
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