

**International Conference on
Sustainable Energy Technologies and Computational Intelligence
(SETCOM 2025)
Department of Electrical Engineering, SoET
Pandit Deendayal Energy University (PDEU), Gandhinagar, Gujarat, India |
February 21 – 23, 2025**



**SETCOM 2025 Special Sessions on
“Green Hydrogen: Driving the Future of Sustainable Energy Systems”**

Aims & Scope of the Session (100-200 words):

Aim:

The special session titled "Green Hydrogen: Driving the Future of Sustainable Energy Systems and Circular Economy" seeks to gather innovative research and real-world case studies on the transformative role of green hydrogen in advancing global sustainability. The session aims to create a collaborative platform for researchers, industry professionals, and policymakers to discuss the latest advancements in green hydrogen production, storage, and utilization. With a focus on leveraging hydrogen as a key driver for renewable energy systems, the session aspires to highlight how green hydrogen can decarbonize industries, enhance energy efficiency, and foster a circular economy. Papers focusing on cutting-edge technologies, challenges, and opportunities in scaling green hydrogen solutions will be at the forefront of the session.

Scope:

This session invites conference papers that explore a wide range of topics related to green hydrogen, including renewable energy-based hydrogen production (e.g., solar, wind, and biomass), advancements in fuel cell technologies, and innovations in hydrogen storage and distribution. The scope extends to applications in transportation, power generation, and industrial sectors. In addition, contributions addressing the integration of green hydrogen within circular economy frameworks, emphasizing resource efficiency, lifecycle analysis, waste reduction, and recycling strategies, are welcomed. The session will also cover policy, regulatory, and economic considerations necessary to scale hydrogen technologies globally, encouraging a multidisciplinary approach that includes both technical and non-technical aspects.

Topics of interest include, but are not limited to:

1. Green Hydrogen Production Technologies
 - Renewable energy-driven electrolysis (solar, wind, hydro)
 - Hydrogen production from biomass, waste, and bioenergy processes
2. Advanced Electrolyzer Technologies
 - Efficiency improvements in water-splitting technologies
 - Development of cost-effective and durable electrolyzers
3. Fuel Cell Innovations
 - Development of high-performance fuel cells for various applications
 - Durability, efficiency, and scalability of fuel cell technologies
4. Hydrogen Storage Solutions
 - Solid, liquid, and gas-phase hydrogen storage technologies
 - Safe, efficient, and low-cost storage materials and methods
5. Hydrogen Distribution and Transportation
 - Infrastructure for hydrogen pipelines and networks
 - Innovations in hydrogen compression, liquefaction, and transport
6. Hydrogen-Powered Transportation
 - Applications in road transport, aviation, maritime, and rail systems
 - Development of hydrogen fueling stations and refueling infrastructure
7. Grid Integration of Hydrogen
 - Hydrogen as a medium for energy storage and balancing renewable energy grids
 - Hydrogen's role in hybrid renewable energy systems
8. Industrial Decarbonization
 - Use of green hydrogen in hard-to-abate industries like steel, cement, and chemicals
 - Replacement of fossil fuels in industrial processes with hydrogen
9. Hydrogen in Energy Storage Systems
 - Power-to-hydrogen-to-power solutions for long-duration energy storage
 - Hydrogen as a seasonal and large-scale storage medium
10. Circular Economy and Hydrogen
 - Hydrogen's role in reducing waste and promoting resource recovery
 - Lifecycle analysis and circular economy principles in hydrogen production and use
11. Techno-Economic and Lifecycle Assessments
 - Economic feasibility, lifecycle cost analysis, and sustainability assessments
 - Quantitative analysis of environmental benefits and financial viability
12. Hydrogen Policy and Regulatory Frameworks
 - Government policies, market incentives, and regulatory challenges
 - International standards and protocols for hydrogen deployment
13. Hydrogen Market Development and Financing
 - Global hydrogen markets, supply chain development, and trade opportunities
 - Investment models, financing mechanisms, and private-public partnerships
14. Environmental and Socioeconomic Impacts
 - Analysis of hydrogen's contribution to reducing greenhouse gas emissions

– Social, economic, and environmental implications of large-scale hydrogen adoption

15. Safety, Standards, and Public Acceptance

- Safety protocols for hydrogen production, storage, and transportation
- Public perception, awareness, and acceptance of hydrogen technologies

Special Session Organizers (names and contact emails):


1. Dr. Kartik S. Pandya, (SM-IEEE),


Associate Professor, Dept. of Electrical Engineering,
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2. Dr. Nilesh Chothani

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Special Session Organizers (short bios with photo):

	<p>Dr. Kartik S. Pandya (Senior Member IEEE) is working as an Associate Professor in the dept. of Electrical Engg. At Parul Institute of Engineering and Technology (PIET), Parul University, Vadodara, INDIA. His research area includes computational intelligence methods, Green hydrogen Technologies, Power system optimization, Smart Grid, and Renewable integrations. His team had successfully executed unique consultancy project of ABB entitled “Prototype Development of Switch-sync Simulator Demo Kit”. His team’s Proposed optimization algorithms entitled “Levy Differential Evolutionary Particle Swarm Optimization (Levy DEEPSO)”, “CHAOS Differential Evolutionary Particle Swarm Optimization”, “Entropy Enhanced Covariance Matrix Adaptation Evolution Strategy (EECMAES)” had secured 3rd, 4th and 2nd ranks respectively in IEEE Power and Energy Society (PES) worldwide competitions on Operational planning of sustainable power systems in the years 2017 and 2018 at Chicago and Portland, USA. Also, his team’s proposed algorithms entitled “Enhanced Velocity Differential Evolutionary Particle Swarm Optimization (EVDEPSO)” and “Improved Chaotic Differential Evolutionary Particle Swarm Optimization (IC_DEEPSO)” had secured 2nd rank and 4th rank respectively in IEEE international competition namely World Congress on Computational Intelligence (WCCI) 2018 at Brazil. His proposed meta-heuristic algorithms entitled “Hybrid Levy Particle Swarm Variable Neighborhood Search Optimization (HL_PS_VNSO)” and “Gauss Mapped Variable Neighborhood Particle Swarm Optimization (GM_VNPSO)” secured 2nd and 3rd ranks</p>
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	<p>in international competitions at The Genetic and Evolutionary Computation Conference (GECCO) 2019 and 2019 IEEE Congress On Evolutionary Computation (CEC) at Czech Republic and New-Zealand respectively in year 2019. He has published 75+ research papers in reputed international journals and conferences. He has been awarded with “Outstanding Contribution in Reviewing” in International Journal of Electrical Power and Energy Systems journal published by Elsevier in July 2018. He is a team member of RAE sponsored project entitled, “Advancing Green Hydrogen Production through Electrolysis: Optimization and Renewable Energy Integration”.</p>
	<p>NILESH CHOTHANI (Member, IEEE) received a Ph.D. degree in Electrical Engineering from Sardar Patel University, Gujarat in 2013. He is currently an Assistant Professor with the Department of Electrical Engineering, SoET, Pandit Deendayal Energy University (PDEU), Gandhinagar, India. He has more than 19 years of academic Experience. He has published 32 peer-reviewed international journal papers, 7 national journal papers, and 28 international conference papers. He has also published 5 technical books in the field of power system protection and switchgear. He has successfully guided 3 PhD candidates and currently guiding 3 PhD research scholars. Three of his IEEE and one of his Springer international conference papers have been selected as best papers and awarded with work of excellence. He is a reviewer of various international journals too. He has delivered several expert lectures at various engineering colleges on recent innovation and technological trends in Electrical Engineering. He received the "TECH GURU" award from Gujarat Technological University (GTU) in the year 2021 for outstanding contributions in the Engineering Field. He has completed a research grant funded by the Science and Engineering Research Board (SERB-DST), New Delhi, India. He is a life member of ISTE and IE(India).</p>