



IEEE 7<sup>th</sup> Global Power, Energy and Communication Conference

Bochum/GERMANY

June 11-13, 2025

## Special Session on

# Power Electronics and Control Strategies for Energy Conversion and Power-to-X Systems in Future Power System

The next generation of energy systems is marked by the growing adoption of renewable energy sources such as wind farms and solar power plants. Managing the variability and intermittency of these resources depends on advanced energy storage solutions, including power-to-X technologies, battery energy storage systems, and compressed air reservoirs. Among these, power-to-X systems play a particularly important role due to their long-term and large-capacity storage capabilities. These systems are essential for balancing supply and demand, improving grid stability and enabling a sustainable and reliable energy future. The integration of storage systems, especially power-to-X solutions like power-to-hydrogen, ammonia and methanol, requires sophisticated power electronic technologies and innovative control strategies to achieve efficient energy conversion, seamless operation and reliable interaction with renewable energy sources. This Special Session seeks to provide a forum for researchers, engineers and industry professionals to present recent advancements, address key challenges and explore emerging trends in power electronics and control for energy conversion and storage systems.

### Topics of interest include, but are not limited to:

- Power-to-X technologies and applications in grid decarbonization
- Novel power electronic topologies for Power-to-X systems, fuel cells, battery energy storage systems, and compressed air reservoirs.
- AI and machine learning innovations for the control and optimization of Power-to-X systems.
- Advanced control strategies for grid-connected AC/DC, DC/AC, and DC/DC power converters in different Power-to-X systems including power to Hydrogen, Ammonia, Jet fuel, etc.
- Decentralized and autonomous control frameworks for hybrid energy systems with advanced storage technologies
- Enhancing grid stability and reliability under high integration of storage, Power-to-X, and/or fuel cell technologies
- Advanced fault detection, diagnostics, and mitigation techniques for energy conversion and storage systems
- Cybersecurity and resilience in intelligent power electronics and power-to-X integration
- Industrial applications of power-to-X, energy storage and conversion systems in renewable energy systems

### Organizer(s):

**Dr. Arman Fathollahi**

Department of Electrical and Computer Engineering,  
Aarhus University, 8200 Aarhus, Denmark

E-mail: [arman.f@ece.au.dk](mailto:arman.f@ece.au.dk)

### Organizer(s):

**Prof. Björn Andresen**

Department of Electrical and Computer Engineering,  
Aarhus University, 8200 Aarhus, Denmark

E-mail: [bjra@ece.au.dk](mailto:bjra@ece.au.dk)

### Deadlines of the special session:

Full paper submission (maximum 6 pages):	<b>March 30, 2025</b>
Notification of acceptance:	<b>April 27, 2025</b>
Final submissions due:	<b>May 11, 2025</b>



**Arman Fathollahi** received his Ph.D. in Power Electrical Engineering from the Department of Electrical Engineering at Shahrood University, IR, in collaboration with Utah Valley University, USA, and Aarhus University, Denmark, in 2022. From November 2016 to 2018, he was a Research Assistant at the Smart Microgrid Research Center in Isfahan, Iran. From August 2021 to 2022, he served as a Research Assistant in the Department of Electrical and Computer Engineering at Aarhus University, Denmark, where he is currently a Postdoctoral Associate. His research interests include power system stability, power-to-X systems, power electronic control, power system analysis, renewable and sustainable energy, and electric vehicles.



**Björn Andresen** is currently the section Head of the Electrical Energy Technology Area, Aarhus University, Aarhus, Denmark. He is furthermore internationally active in the standardization of Systems aspects for electrical energy supply, dealing with standards and the grid connection rules of generation and consumer systems to the grid. Furthermore, he has more than 20 years working expertise in relation to power converter design and operation and participated in several national and international research projects. His research interests include electrical energy transition, renewable power generation, grid integration, power systems, and power quality. He was the recipient of the

International IEC 1906 Award for his expert role in relation to power quality.

All the instructions for paper submission are included at the conference website.

<https://gpecom.org/2025/guidelines/>