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

"Role of Cybersecurity in Sustainable Energy Infrastructure"

Aims & Scope of the Session:

Aim:
Cybersecurity in sustainable energy aims to protect energy infrastructure from digital threats, ensuring the reliable, safe, and uninterrupted generation and distribution of renewable energy. As the world transitions to more sustainable energy sources like wind, solar, and hydropower, energy systems are increasingly digitized and interconnected. This connectivity introduces vulnerabilities to cyberattacks, which could disrupt energy production, grid stability, and storage systems. Cybersecurity in this sector seeks to safeguard data integrity, prevent unauthorized access, and secure communication networks, enhancing resilience against threats such as hacking, ransomware, and data breaches.

Scope:
The scope of cybersecurity in sustainable energy encompasses the protection of various components of the energy ecosystem, including smart grids, energy storage systems, IoT-enabled devices, and renewable energy plants. It covers threat detection, risk assessment, data encryption, secure communication protocols, and the development of resilient, fail-safe systems. Furthermore, cybersecurity initiatives in sustainable energy address regulatory compliance, incident response strategies, and the integration of artificial intelligence for predictive threat mitigation. As the energy sector embraces more digital tools for efficiency, cybersecurity is crucial to ensuring that the growth of sustainable energy is both secure and sustainable.

Topics of interest include, but are not limited to:

1. **Cybersecurity in Smart Grids**: Investigating vulnerabilities and developing secure communication protocols for distributed, renewable-based smart grids.

2. **Cyber Threat Detection in Renewable Energy Systems**: Utilizing AI and machine learning to detect and mitigate cyber threats in solar, wind, and other renewable energy installations.

3. **Blockchain for Securing Energy Transactions**: Exploring how blockchain technology can provide secure, transparent, and decentralized transactions in peer-to-peer energy trading networks.

4. **Cybersecurity for Energy Storage Systems**: Protecting large-scale battery storage solutions, such as lithium-ion and grid-connected systems, from cyberattacks and ensuring operational integrity.

5. **Cyber-Resilience of IoT in Renewable Energy**: Examining the security challenges of IoT devices in renewable energy systems and proposing robust cybersecurity frameworks.

6. **Secure Communication Protocols for Distributed Energy Resources (DER)**: Developing secure communication architectures for DER, including wind farms, solar panels, and other microgrids.

7. **Quantum Cryptography in Sustainable Energy Systems**: Assessing the potential of quantum cryptography to provide future-proof security in energy infrastructure.

8. **Risk Assessment and Management in Renewable Energy Cybersecurity**: Frameworks for identifying, evaluating, and mitigating cyber risks specific to the renewable energy sector.

9. **Impact of Cyberattacks on Grid Stability**: Studying how cyber incidents affect grid stability, particularly in systems reliant on intermittent renewable energy sources.

10. **Regulatory Compliance and Policy for Cybersecurity in Sustainable Energy**: Analyzing existing regulations and proposing enhanced policies to enforce cybersecurity in the renewable energy sector.

Special Session Organizers (names and contact emails):
(Maximum two members)

1. **Dr. Ujjaval Patel**,

   Assistant Professor,

   Department of Cyber Security & Digital Forensics

   National Forensic Sciences University (NFSU),

    Police Bhavan Rd, Sector 9, Gandhinagar, Gujarat 382007

   Email: ujjaval58@rediffmail.com

2. **Dr. Nilesh Chothani**

   Assistant Professor, Department of EE,

   School of Energy Technology,

   Pandit Deendayal Energy University (PDEU),

   Raisan, PDPU Rd, Gandhinagar, Gujarat, India-382007

   Email: nilesh.chothani@sot.pdpu.ac.in

<u>Special Session Organizers (short bios with photo):</u>

Ujjaval Patel is working as Assistant Professor (IOT/SCADA) in the School of Cyber Security & Digital Forensic at National Forensic Sciences University, Gandhinagar which is an institution of national eminence under Ministry of Home Affairs in India. He has completed his Bachelors in Electrical Engineering from L.D. College of Engineering in 2001, Masters in "Microprocessor Systems & Applications" from Faculty of Technology, M.S. University in 2008 and Ph.D. from CHARUSAT University in 2019. He has 17 years' experience in academia and 3 years' experience in industry. He has published a book with Springer, Singapore on "Futuristic Trends in Numerical Relaying Schemes for Transmission Line Protections" in 2021. He is also working as reviewer of several peer reviewed national and international journals. He has published several research papers in peer reviewed international journals and also presented several research papers in IEEE sponsored international conferences and also written several book chapters with Springer publications. He is Life member of Indian Society of Technical Education (ISTE) & Member of Institution of Engineers (India). He has also completed several online courses on NPTEL on "Internet of Things" & he has also completed Specialization in IoT from University of California, Irvin, USA. His research area includes IoT Security & Forensics in Smart Grid Protections & Industrial Automations.

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).