



CEPSI

SINGAPORE 2025

Empowering the Energy Transition



Call for Papers Manual

Submit your abstract at <https://cmt3.research.microsoft.com/CEPSI2025/> by **14 February 2025**.

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Introduction

Marking a quarter of the way into the century, 2025 stands at the crossroads as the world confronts the reality of peak emissions and evaluates its progress towards global energy and sustainability targets.

Electricity remains the backbone of sustainable development and economic growth, fuelled by the rapid adoption of renewable energy, cutting-edge technologies, and strengthened regional collaboration. The region must navigate the complexities of integrating renewable energy, modernising infrastructure, and fostering regional energy collaboration, while ensuring equitable access and addressing climate demands. These demands create pathways to reshape energy systems, encourage innovation, and build stronger partnerships for a sustainable future.

Successful authors will present their full papers at the Technical Sessions of CEPSI 2025. These sessions, supported by the IEEE PES Singapore Chapter, provide a valuable platform for presenting original research, sharing practical experiences, and discussing strategies to tackle key issues in the energy sector.

CEPSI 2025 Technical Tracks:

- Track A: Transmission and Distribution Networks Technologies and Strategies
- Track B: Green Energy Technologies
- Track C: Smart Grid, Microgrid & Distributed Energy Technologies
- Track D: Electricity Sales & Customer Experience
- Track E: ICT & Innovation in the Power Sector
- Track F: Developments in Sustainable Power

Important Dates to Observe:

Call for Abstracts:	Opens 15 January 2025
Abstract Submission Deadline:	14 February 2025
Abstract Acceptance Notification:	17 March 2025
Full Paper Submission Deadline:	15 April 2025
Final Paper Submission Deadline:	31 July 2025

Conference Paper Technical Committee:

- Er Kane Neo, SP PowerGrid
- Dr Er Lai Kai Xian, SP PowerGrid
- Wiwin Renandya, SP PowerGrid
- Dr Anurag Sharma, Newcastle University (Singapore Campus)
- Dr Dhivya Sampath Kumar, Singapore Institute of Technology
- Dr Sivaneasan Bala Krishnan, Singapore Institute of Technology

Technical Track Categories

Track A: Transmission & Distribution Networks Technologies and Strategies		Track B: Green Energy Technologies	
A.1	Advanced Monitoring and Maintenance for Power Equipment	B.1	Low-Carbon Energy Production and Carbon Capture
A.2	Digital Solutions for Diagnostics and Maintenance	B.2	Emerging Energy Generation Technologies
A.3	High Voltage Direct Current (HVDC) Systems	B.3	Energy Efficiency and Conservation Technologies
A.4	Flexible AC/DC Transmission Systems (FACTS and FDCTS)	B.4	Electrification and Electricity Replacement Solutions
A.5	Underground Transmission and Distribution Networks and Substations	B.5	Advanced Energy Storage Solutions
A.6	Managing Ageing Infrastructure	B.6	Decarbonisation Technologies for Power Grids
A.7	Power Flow Control and Dynamic Equipment Ratings	B.7	Circular Economy and Sustainable Material Use
A.8	Addressing Network Congestion	B.8	Green Hydrogen, Fuel Cells, and Distributed Energy Resources (DER)
A.9	Workforce and Knowledge Management in Energy Sector		

Track C: Smart Grid, Microgrid & Distributed Energy Technologies		Track D: Electricity Sales & Customer Experience	
C.1	Energy and Distribution Management Systems (EMS, DMS, SCADA) and Data Analytics	D.1	Customer-Side Energy Efficiency Management
C.2	Smart Grid and Microgrid Applications and Technologies	D.2	Demand Response and Customer Interaction
C.3	Power Plant Digitalisation, Automation, and Cybersecurity	D.3	Innovation in Retail Electricity and Customer Services
C.4	Integrated, Self-Healing Systems	D.4	Integrated Customer Energy Management Solutions
C.5	Smart Buildings and Low-Carbon Infrastructure	D.5	Decentralised and Peer-to-Peer (P2P) Energy Trading
C.6	Smart Metering and Advanced Metering Infrastructure (AMI)		
C.7	Electric Vehicles (EVs), Charging Infrastructure, and Vehicle-to-Grid (V2G) Technologies		
C.8	Microgrid Design, Operation, and Control		
C.9	Demand Response (Demand Side Management) and Flexible Load Management		
C.10	Renewable Integration and Grid Compatibility		



Track E: ICT & Innovation in the Power Sector		Track F: Developments in Sustainable Power	
E.1	Emerging Technologies and Industry 4.0 in the Power Sector	F.1	Cross-Border Power Interconnection and Power Trading
E.2	ICT Innovations in Corporate Management	F.2	Power Generation Planning and Energy Transition Goals
E.3	Telecommunications and Cybersecurity for Critical Infrastructure	F.3	Integration of High Shares of Variable Renewable Energy (VRE)
E.4	Digital Utilities and the Internet of Things (IoT)	F.4	Flexibility Requirements and Solutions for Enhanced Grid Flexibility
E.5	Artificial Intelligence (AI) and Large Language Models (LLMs)	F.5	Decentralised and Distributed Energy Systems (VPP)
E.6	Digital Twins for Energy Systems	F.6	Sustainable Power Financing and Policy
E.7	Virtual Reality (VR) and Augmented Reality (AR)	F.7	Environmental and Social Impacts of Renewable Power Development
E.8	Blockchain and Decentralised Data Management		

Abstract Submission Guidelines

**Submissions that do not meet the format requirements will be rejected.*

Title	Must be concise and reflect the abstract's content.
	The first letter should be capitalised.
	Maximum length: 30 words.
Authors	Provide full names, including surnames, for all authors.
	Do not include academic degrees or titles.
Affiliations	Include only the institution's name.
	Do not list departments or street addresses.
	Each author can list up to two affiliations.
Contents	Word limit: The abstract body must not exceed 500 words .
	Abstracts must be written in English
References	Limit references to a maximum of five.
	References are included in the 500-word limit.

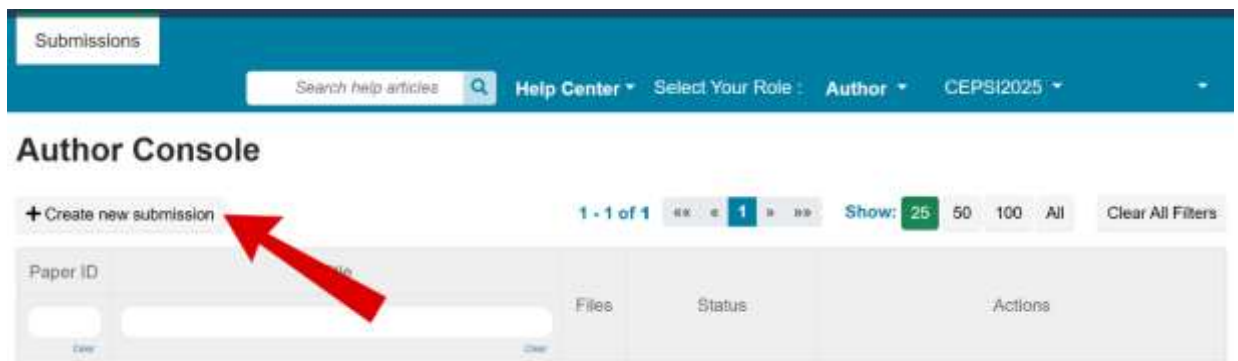
How to Submit

1 Submission Portal

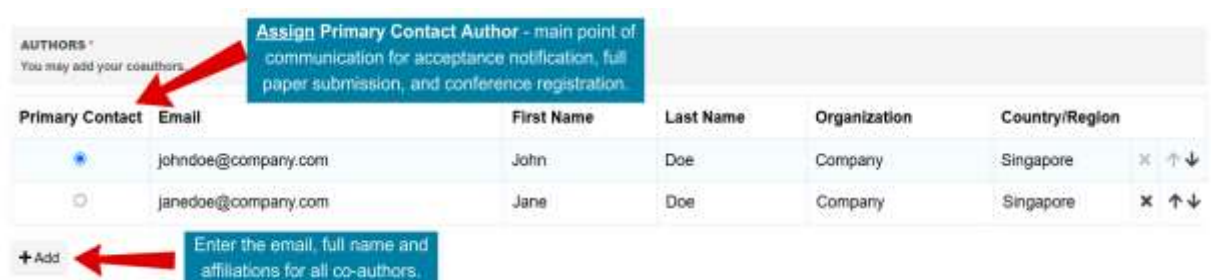
- a. Only electronic submissions by the author through the CMT3 Portal will be accepted.
- b. To register or log in to your account, please visit:
<https://cmt3.research.microsoft.com/CEPSI2025/>
 - i. Your CMT3 account must be created using your affiliation email address (e.g., institutional or company email).
 - ii. Submissions with incorrect email formats will be rejected immediately.
- c. All abstracts must be submitted by **14 February 2025, 23:59 (GMT+8, Singapore Time)**.

2 Submitting your Abstract

- a. After logging in, click on “Create new submission” at the top left of your author console.



- b. Provide the Title, Abstract, Author(s), Keywords, and all other fields marked with an asterisk [*].
- c. Enter the names, emails, and affiliations for all co-authors.
- d. Choose which author will be the main point of contact. This person will receive important emails, including acceptance notices and reminders to register for the conference.
 - i) If the second author will register for the conference, set the second author as the primary contact.
 - ii) You can change the primary contact during the registration period if necessary.





- e. Select the track that aligns most closely with the subject matter of your abstract. For a detailed overview of the CEPSI 2025 technical track categories, please refer to [Page 5](#).

SUBJECT AREAS*

<p>Track A: Transmission and Distribution Networks Technologies and Strategies</p> <ul style="list-style-type: none"><input type="checkbox"/> A.1 Advanced Monitoring and Maintenance for Power Equipment<input type="checkbox"/> A.2 Digital Solutions for Diagnostics and Maintenance<input type="checkbox"/> A.3 High Voltage Direct Current (HVDC) Systems<input type="checkbox"/> A.4 Flexible AC/DC Transmission Systems (FACTS and FDCTS)<input type="checkbox"/> A.5 Underground Transmission and Distribution Networks and Substations<input type="checkbox"/> A.6 Strategies Managing Ageing Infrastructure<input type="checkbox"/> A.7 Power Flow Control and Dynamic Equipment Ratings<input type="checkbox"/> A.8 Addressing Network Congestion<input type="checkbox"/> A.9 Workforce and Knowledge Management in Energy Sector <p>Track B: Green Energy Technologies</p> <ul style="list-style-type: none"><input type="checkbox"/> B.1 Low-Carbon Energy Production and Carbon Capture<input type="checkbox"/> B.2 Emerging Energy Generation Technologies	<p>Select ONE only.</p>	<p>Track D: Electricity Sales & Customer Experience</p> <ul style="list-style-type: none"><input type="checkbox"/> D.1 Customer-Side Energy Efficiency Management<input type="checkbox"/> D.2 Demand Response and Customer Interaction<input type="checkbox"/> D.3 Innovation in Retail Electricity and Customer Services<input type="checkbox"/> D.4 Integrated Customer Energy Management Solutions<input type="checkbox"/> D.5 Decentralised and Peer-to-Peer (P2P) Energy Trading <p>Track E: ICT's Innovation in the Power Sector</p> <ul style="list-style-type: none"><input type="checkbox"/> E.1 Emerging Technologies and Industry 4.0 in the Power Sector<input type="checkbox"/> E.2 ICT Innovations in Corporate Management<input type="checkbox"/> E.3 Telecommunications and Cybersecurity for Critical Infrastructure<input type="checkbox"/> E.4 Digital Utilities and the Internet of Things (IoT)<input type="checkbox"/> E.5 Artificial Intelligence (AI) and Large Language Models (LLMs)<input type="checkbox"/> E.6 Digital Twins for Energy Systems
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- f. Successful authors will be invited to submit a full paper by 17 March 2025, 23:59 (GMT+8, Singapore Time).

3 About the CMT Portal

- a. The [Microsoft CMT service](#) was used for managing the peer-reviewing process for this conference. This service was provided for free by Microsoft and they bore all expenses, including costs for Azure cloud services as well as for software development and support.
- i) For more details on requesting or managing a conference, see [HOW-TO: Request a Conference](#)
 - ii) For more guidance on the submission process, please refer to the official CMT documentation: [HOW-TO: Author Submission](#)

Contact and Support

For inquiries regarding the abstract submission process, please contact:
submissionsupport@aesieap.com



Track Categories

Track A: Transmission and Distribution Networks Technologies and Strategies

1. **Advanced Monitoring and Maintenance for Power Equipment**

Focus on innovative strategies and technologies for monitoring and maintaining power equipment, including remote monitoring and diagnostics of renewables and other critical assets. Topics may cover both preventive and predictive maintenance.

2. **Digital Solutions for Diagnostics and Maintenance**

Explore the use of cutting-edge digital tools, such as big data analytics, machine learning, and drones, for efficient diagnostics, monitoring, and maintenance in transmission and distribution networks.

3. **High Voltage Direct Current (HVDC) Systems**

Topics on HVDC engineering, operations, planning, implementation, and advancements in submarine cable technology, highlighting their role in efficient long-distance power transmission.

4. **Flexible AC/DC Transmission Systems (FACTS and FDCTS)**

Discuss the design, implementation, and benefits of FACTS and FDCTS for improving grid stability, efficiency, and flexibility in response to varying loads and power flows.

5. **Underground Transmission and Distribution Networks and Substations**

Insights into the development, operation, and maintenance of underground TCD networks and substations.

6. **Managing Ageing Infrastructure**

Strategies for modernising or upgrading ageing transmission and distribution infrastructure, with a focus on extending asset life, enhancing reliability, and cost-effectiveness.

7. **Power Flow Control and Dynamic Equipment Ratings**

Topics on power flow control technologies and dynamic ratings, emphasising their role in optimising the performance and capacity of transmission and distribution equipment.

8. **Addressing Network Congestion**

Approaches to mitigate physical and systemic network congestion, including solutions for efficient power routing, grid reinforcement, and capacity planning.

9. **Workforce and Knowledge Management in Energy Sector**

Innovative approaches to attract and retain top talent, focusing on strategies to boost employee engagement, minimise turnover, and address workforce challenges in the evolving energy industry. Structured programs for enhancing technical skills through training, mentorship, and continuous learning initiatives to keep the workforce aligned with advancements in energy technologies.



Track B: Green Energy Technologies

1. Low-Carbon Energy Production and Carbon Capture

Explore advancements in low-carbon energy generation and carbon capture technologies aimed at reducing pollution and carbon emissions. Topics may include innovative methods for carbon capture, utilisation, and storage (CCUS) and breakthroughs in low-carbon power generation.

2. Emerging Energy Generation Technologies

Focus on next-generation energy sources, including hydrogen, modular nuclear reactors, bioenergy, and other low-emission solutions. Submissions could examine the potential, challenges, and practical applications of these technologies in the global energy mix.

3. Energy Efficiency and Conservation Technologies

Innovations in energy-saving technology designed to reduce energy consumption across sectors, such as industrial, commercial, and residential. Topics may cover smart devices, energy management systems, and advancements in efficiency standards.

4. Electrification and Electricity Replacement Solutions

Research and technologies that support electrification of traditionally fossil-fuel-dependent sectors (e.g., transportation and heating) or develop alternatives that replace or reduce direct electricity use in high-demand applications.

5. Advanced Energy Storage Solutions

Developments in energy storage technology, including nuclear batteries, grid-scale batteries, and innovative storage media, focusing on storage efficiency, safety, and integration into existing infrastructure.

6. Decarbonisation Technologies for Power Grids

Explore innovative strategies to decarbonise power grid operations, focusing on integrating renewable energy sources, deploying energy storage solutions for grid stability, and implementing advanced grid management systems to minimise emissions. This also highlights grid-scale carbon capture for transitional fossil-based facilities and the electrification of grid-support processes to further reduce carbon footprints.

7. Circular Economy and Sustainable Material Use

Advances in sustainable material production, recycling, and resource recovery within energy technologies. Topics could explore the circular economy in renewable energy systems, focusing on waste reduction, material efficiency, and end-of-life strategies for energy infrastructure.

8. Green Hydrogen, Fuel Cells, and Distributed Energy Resources (DER)

Explore the production, storage, and application of green hydrogen and fuel cell technologies as sustainable energy solutions. Topics will include the integration of distributed energy resources (DERs), such as rooftop solar, community wind, and battery storage, and how these technologies, including hydrogen and fuel cells, contribute to the energy transition and enhance local energy resilience, particularly in microgrids.



Track C: Smart Grid, Microgrid and Distributed Energy Technologies

- 1. Energy and Distribution Management Systems (EMS, DMS, SCADA) and Data Analytics**
Explore advances in energy and distribution management systems, including SCADA, and the role of data collection, real-time analytics, and data-driven decision-making in enhancing grid reliability and efficiency.
- 2. Smart Grid and Microgrid Applications and Technologies**
Explore technologies in smart grids and microgrids that enhance energy efficiency and grid reliability. Topics will focus on grid automation, energy management systems and integrating distributed energy resources to support renewable adoption.
- 3. Power Plant Digitalisation, Automation, and Cybersecurity**
Discuss the digital transformation of power plants through automation and IoT, emphasising cybersecurity measures necessary to protect critical infrastructure from emerging digital threats.
- 4. Integrated, Self-Healing Systems**
Focus on self-healing grids and integrated energy systems that combine power, heat, water, and transport networks. Topics may include fault detection, system resiliency, and multi-utility integration.
- 5. Smart Buildings and Low-Carbon Infrastructure**
Advances in smart, low-carbon building technologies that support energy efficiency and emissions reduction. Topics may cover energy management for buildings, green building design, and smart building integration with distributed energy resources.
- 6. Smart Metering and Advanced Metering Infrastructure (AMI)**
Research on smart meters and AMI, including applications for grid optimisation, demand response, and enhancing customer engagement through real-time usage data and billing.
- 7. Electric Vehicles (EVs), Charging Infrastructure, and Vehicle-to-Grid (V2G) Technologies**
Focus on the integration of EVs with the grid, including charging infrastructure development, V2G technology, and the role of EVs in supporting grid stability and energy storage.
- 8. Microgrid Design, Operation, and Control**
Focus on the design, operation, and resilience of microgrids, particularly in isolated or remote areas. Topics will include both grid-connected and standalone microgrid systems, along with strategies for improving operational control.
- 9. Demand Response (Demand Side Management) and Flexible Load Management**
Strategies for managing and leveraging demand response and flexible loads in smart grids, including residential, commercial, and industrial applications to enhance grid stability and sustainability.
- 10. Renewable Integration and Grid Compatibility**
Strategies and technologies for integrating renewable energy sources into the grid, addressing challenges like intermittency, balancing, and grid flexibility. Topics could include hybrid systems, virtual power plants, and renewable energy forecasting.



Track D: Electricity Sales & Customer Experience

1. Customer-Side Energy Efficiency Management

Approaches to empower customers in managing their energy consumption efficiently. Topics could include energy-saving programs, smart home devices, and technologies that help reduce energy use and costs on the customer side.

2. Demand Response and Customer Interaction

Explore strategies for enhancing customer engagement in demand response programs, including customer incentives, real-time feedback systems, and interactive platforms that enable customers to actively participate in grid management.

3. Innovation in Retail Electricity and Customer Services

Insights into innovations in retail electricity services, such as personalised energy plans, customer-centric billing solutions, loyalty programs, and new customer service models that enhance customer satisfaction and retention.

4. Integrated Customer Energy Management Solutions

Advances in integrated energy management systems that offer customers a unified approach to managing their energy usage, storage, and generation. Topics may cover home energy management systems (HEMS), integrated solar and storage solutions, and digital tools that streamline customer energy interactions.

5. Decentralised and Peer-to-Peer (P2P) Energy Trading

Emerging models for decentralised energy trading, such as peer-to-peer (P2P) energy marketplaces, where customers can buy and sell energy locally, increasing customer choice and engagement.



Track E: ICT & Innovation in the Power Sector

1. Emerging Technologies and Industry 4.0 in the Power Sector

Explore the impact of Industry 4.0 technologies on the power sector, including automation, robotics, and advanced manufacturing. Topics will cover digitalisation's role in enhancing efficiency, productivity, and adaptability in power generation and distribution.

2. ICT Innovations in Corporate Management

Advancements in ICT that streamline corporate management in the energy sector. Topics could include cloud-based management systems, digital collaboration tools, and data-driven decision-making that enhance operational efficiency and support agile business practices.

3. Telecommunications and Cybersecurity for Critical Infrastructure

Focus on the role of telecommunications in grid operations and the cybersecurity measures required to protect critical infrastructure. Topics may include secure communications, cyber resilience strategies, and cybersecurity best practices to guard against threats.

4. Digital Utilities and the Internet of Things (IoT)

Innovations in digital utilities and IoT applications for energy management, including smart grids, sensor networks, and IoT-driven enhancements in service reliability, efficiency, and customer engagement. This section covers technologies that drive the integration of grid-edge digital solutions and enable real-time data exchange.

5. Artificial Intelligence (AI) and Large Language Models (LLMs)

Applications of AI and LLMs in the energy sector, including predictive maintenance, customer service automation, data analysis, and knowledge management. Explore how these technologies can streamline operations and transform customer interactions.

6. Digital Twins for Energy Systems

The use of digital twin technology for real-time monitoring, simulation, and optimisation of energy assets and infrastructure. Topics may cover applications in predictive maintenance, asset management, and system planning.

7. Virtual Reality (VR) and Augmented Reality (AR)

Explore how VR and AR are being applied in training, maintenance, and remote support within the energy sector. Topics may include immersive training environments, augmented field support for technicians, and virtual facility tours.

8. Blockchain and Decentralised Data Management

The role of blockchain and decentralised technologies in energy transactions, asset tracking, and data management. Topics could cover applications in peer- to-peer energy trading, secure data sharing, and transparent tracking of renewable energy credits.



Track F: Developments in Sustainable Power

1. Cross-Border Power Interconnection and Power Trading

Discuss advancements in cross-border power interconnections, regional power markets, and trading mechanisms that enhance energy security and foster renewable energy integration. Topics could cover technical, regulatory, and economic aspects of building and maintaining interconnected power systems.

2. Power Generation Planning and Energy Transition Goals

Strategies and frameworks for planning sustainable power generation to meet energy transition targets. Topics may include pathways to decarbonisation, aligning with international climate goals, and balancing generation portfolios with a focus on renewable integration and phasing out fossil fuels.

3. Integration of High Shares of Variable Renewable Energy (VRE)

Focus on challenges and solutions for incorporating high levels of solar and wind energy into power grids. Topics will cover grid stability, energy storage, and forecasting technologies that support reliable VRE integration.

4. Flexibility Requirements and Solutions for Enhanced Grid Flexibility

Explore the flexibility needed to support grids with high VRE penetration. Discussions will include demand response, energy storage, flexible generation, and grid modernisation to enhance adaptability and resilience.

5. Decentralised and Distributed Energy Systems (VPP)

Examine the role of decentralised generation systems, such as virtual power plants (VPPs), in supporting renewable energy adoption. This sub-track will cover community energy projects and integration of distributed energy resources (DERs) into traditional power systems.

6. Sustainable Power Financing and Policy

Insights into financial models and policy frameworks that support the development of sustainable power. Topics could cover renewable energy incentives, carbon pricing, public-private partnerships, and investment trends in green energy infrastructure.

7. Environmental and Social Impacts of Renewable Power Development

Address the environmental and social considerations of large-scale renewable power deployment. Topics might include land use impacts, biodiversity, community engagement, and ensuring equitable access to sustainable energy resources.