

THE 22ND ANNUAL POWER SYMPOSIUM 2024

Power System Operations in the Era of Power Electronics and Grid Edge Technologies

13th September 2024

Cordis Hotel, Hong Kong

Organised by Power and Energy Section, The Institution of Engineering and Technology Hong Kong



PAST SYMPOSIUMS

No	Year	Symposium Theme	Chairman	Area
1 st	2001	Traction Development in Hong Kong	David TW CHAN	N/A
2 nd	2002	Modern Building Electrical Systems Status Quo & Issues	Thomas KC CHAN	Building
<i><u>2003 Symposium cancelled due to the outbreak of SARS</u></i>				
3 rd	2004	Power Supply Network in the Digital Era	TK CHIANG	Power
4 th	2005	Green Energy & Utilisation – Reality or Idealism	KK LI	Energy
5 th	2006	Conquering the Height – Challenge to Electrical Technology in Skyscrapers	Albert TO	Building
6 th	2007	The Ever-Changing Electricity Market – Challenges from Generation through Delivery to Utilisation	SK HO	Power
7 th	2008	Engineering A World Class City – The Role of Leading Edge Technology	Norman TSE	Power
8 th	2009	Hong Kong in the next Decade Infrastructure and Technological Development	WS TAM	Building
9 th	2010	Energy Generation, Utilisation and Recovery – Confronting the Challenge on Climate Change	MS KWAN	Energy
10 th	2011	How Smart is Smart Grid? – Challenges and Opportunities	CN LEUNG	Power
11 th	2012	Road to Zero Carbon Building – How applicable in Hong Kong?	CY CHUNG	Building
12 th	2013	Engineering for Cable-Neutral World? – Built Environment Technology for Cosmopolitan Hong Kong	Roy MUI	Energy
13 th	2014	Dynamic & Flexible Response of Today's Power Network Operation to the Changing Environment	Keith CHAN	Power
14 th	2015	A Global Pursuit for Zero Carbon Building: Challenges and Solutions – The Hong Kong Story	Peter LEUNG	Building
15 th	2016	Energy Saving – A Challenge? – Opportunities and Technologies	Cathen HO	Energy
16 th	2017	What it takes to Digitize the Operations of a Power System?	Jacky HUNG	Power
17 th	2018	Zero Carbon Building within a Smart Cosmopolitan City in Greater Bay Area – The Hong Kong Approach on Global Platform	Enzo WONG	Building
18 th	2019	Energy Refined in The Era of The Internet and The Renewables	Alex CHAN	Energy
<i><u>2020 Symposium cancelled due to the outbreak of COVID-19</u></i>				
19 th	2021	Challenges for Future-Proof Power Systems in the Digital Era – Planning, Operation and Maintenance	Edmond LEUNG	Power
20 th	2022	Building the Carbon Neutral Future – Challenges and Opportunities	Alfred LEE	Building
21 st	2023	Sustainable Energy and Technology Development for Smart Liveable City	Kan IP	Energy

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***Message from Chairman of Power and Energy Section
The Institution of Engineering and Technology Hong Kong***

Welcome all fellow members, engineers, scholars and distinguished guests to the 22nd Power Symposium, our annual flagship event organized by the Power and Energy Section (PES) of the Institution of Engineering and Technology (IET) Hong Kong.

The theme of the year is “Power System Operations in the Era of Power Electronics and Grid Edge Technologies”. With the global trend of energy industry to fight against climate change and aiming for net zero carbon, technologies related to grid-connected renewable energy and distributed energy resource continue to see breakthrough and enhancement, with more cost-effective and reliable solutions being developed. The symposium aims to bring together the experts in these areas for exploring the latest technology development, sharing innovative research findings, and exchanging valuable experiences from real case applications in the power system operation.

Likewise with the past successful symposiums held, we aim to offer a professional and sustainable platform to foster quality and insightful discussion amongst the power and energy industry stakeholders on the key and contemporary topics happening in the industry.

This year we are honor to have Mr Paul Tomlinson, Chief Operations & Transformation Officer of CLP Power, to deliver the opening remarks, and Prof Vladimir Terzija, Professor of Energy Systems & Networks, Newcastle University (UK), and Prof Haoran Zhao, National Distinguished Professor, Shandong University (PRC) to deliver the keynote speeches.

The full day symposium will be filled and flourished by a diversity of technical paper presentations from experts, scholars and engineers from the government, power utilities, industry sectors as well as local and overseas academia, with topics covering Smart Grid, Distributed Energy Resources Management, Smart Meter Technology, IoT Applications in Asset Maintenance and more. We encourage your active participation and interaction with the speakers as well as the rest of participants to exchange your views and insights on these topics.

Taking this opportunity, I would like to express my sincere gratitude to all our distinguished guests, generous sponsors, paper authors and speakers, as well as all the symposium participants. Your unfailing support and participation make this event truly remarkable. Last but not least, my heartfelt congratulation to the Organizing Committee of the 22nd Annual Power Symposium, led by Professor Steve Bu as the OC Chairman, for organizing this successful and meaningful event. Wishing you all a fruitful and rewarding day in the symposium!

Kan IP

Chairman, Power & Energy Section

The Institution of Engineering and Technology Hong Kong

***Message from Chairman of Organising Committee,
The 22nd Annual Power Symposium***

On behalf of the Organising Committee, I am very delighted to welcome all the distinguished guests, speakers and participants to the 22nd Annual Power Symposium 2024.

As cities worldwide strive to reduce carbon emissions and become more ambitious in the integration of renewable energy and distributed energy resources (DERs), the role of power electronics and grid edge technologies (e.g., behind-the-metre (BTM) resources, Internet of Things (IoT)) becomes increasingly vital in power system operations. Power electronics and grid edge technologies encompass a range of innovative solutions, which can facilitate secure and cost-effective renewable energy integration, and enable smart and efficient power distribution at the edge of power grid. Therefore, the theme of the symposium this year has been set as "Power System Operations in the Era of Power Electronics and Grid Edge Technologies".

We have invited two keynote and eight paper presentations from Government, Academia, Power Utilities and Industry sectors, covering noticeable transformation and various advanced techniques in multiple aspects of power system operations including monitoring, maintenance, regulation, economics and load forecasting. We hope this symposium will bring a plurality of interests and perspectives within power industry, and provide a platform for participants to share their ideas and experiences, and discuss cutting-edge research and practical solutions for modern urban power systems to achieve carbon neutrality target.

We would like to express our deep gratitude to Mr Paul Tomlinson for the Opening Remarks, Prof Vladimir Terzija and Prof Haoran Zhao for the morning and afternoon Keynote Speech, and technical paper authors and speakers for the contribution of high-quality work. We would also like to express our heartfelt thanks to the event sponsors and supporting organisations to make the event successful. Moreover, my special thanks go to all the Organising Committee members, helpers and advisors of this event for your professional dedication. Without your unwavering support, this symposium can never be so successful.

Lastly, many thanks for your enthusiastic participation and presence. We hope all of you will find this symposium stimulating, fulfilling and enjoyable. Let us join hands and make collective efforts to build a more sustainable, reliable, and affordable power system for Hong Kong and the world!

Steve BU

*Chairman, on behalf of the Organising Committee
The 22nd Annual Power Symposium*

Acknowledgements

Special Acknowledgements

The Power and Energy Section of the IET Hong Kong would like to extend its sincere gratitude to

Construction Industry Council

for their support to the 22nd Annual Power Symposium

Acknowledgements

The organising committee would also like to express appreciations to the following organisations and companies for sponsoring the 22nd Annual Power Symposium

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Programme

08:45 – 09:05	Registration
09:05 – 09:10	Welcome Address <i>Mr Kan IP – Chairman of Power & Energy Section, IET Hong Kong</i>
09:10 – 09:20	Opening Remarks <i>Mr Paul Tomlinson – Chief Operations & Transformation Officer of CLP Power Hong Kong Limited</i>
09:20 – 09:30	Group Photography
09:30 – 09:40	Souvenir Presentation to Sponsors and Supporting Organisation
09:40 – 10:05	Keynote Presentation - 1 <i>Prof Vladimir Terzija – Professor of Newcastle University, United Kingdom</i>
10:05 – 10:35	Coffee break
10:35 – 11:00	Paper 1: Advancing Predictive Maintenance: A Health Diagnosis System for Electrical Supply System in Government Building <i>Ms Vanessa YAU & Mr Loki LI</i> <i>Electrical & Mechanical Services Department, HKSAR Government</i>
11:00 – 11:25	Paper 2: Quality Assurance and Performance Monitoring of Smart Meter Assets <i>Mr Aaron TSE</i> <i>The Hongkong Electric Company, Limited</i>
11:25 – 11:50	Paper 3: A New Method for Calculating Temperature-Controlled Load Electricity Consumption Based on Sensitive Temperature Detection <i>Ir Yuhang FAN</i> <i>Energy Development Research Institute, China Southern Grid</i>
11:50 – 12:05	Q&A for Morning Session
12:05 – 13:40	Lunch Break
13:40 – 14:05	Keynote Presentation - 2 <i>Prof Haoran ZHAO – Deputy Dean of the School of Electrical Engineering of Shandong University</i>
14:05 – 14:30	Paper 4: Optimal Reactive Power Support from Uninterruptable Power Supplies for Voltage Regulation in Distribution Systems with Renewable Energy Sources <i>Dr Sam LAM</i> <i>The University of Hong Kong</i>
14:30 – 14:55	Paper 5: A Review on the Grid Integration and Market Participation Models of Energy Storage Resources <i>Dr Qin WANG</i> <i>The Hong Kong Polytechnic University</i>
14:55 – 15:20	Paper 6: Development of Hong Kong's Virtual Power Plant for Cost-efficient Power Network Flexibility Optimisation <i>Dr Tianxiang JIANG</i> <i>CLP Power Hong Kong Limited</i>
15:20 – 15:50	Coffee break
15:50 – 16:15	Paper 7: Application of Digital Twin Technology in the Full Life Cycle of Substations <i>Mr Jianyu HE</i> <i>Energy Development Research Institute, China Southern Grid</i>
16:15 – 16:40	Paper 8: Innovative LDO Design for Enhanced Transient Response in RISC-V and Analog-AI Computing Systems in Electric Vehicles <i>Mr Mak Yi LAM</i> <i>High Tech Technology Limited</i>
16:40 – 16:55	Q&A for Afternoon Session
16:55 – 17:00	Closing Address <i>Dr Steve BU – Chairman of Power Symposium 2024 Organising Committee</i>