12th IEEE PES Innovative Smart Grid Technologies Conference

Nov 21-24

ISGT ASIA 2023

Auckland, New Zealand

IEEE PES Power & Energy Society®
New Zealand North Chapter

IEEE
New Zealand North Section

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Table of Contents

ISGT 2023 General Chair Welcome Speech

Assoc. Prof Nirmal Nair
Chair IEEE ISGT 2023
University of Auckland

Kia ora All:

On behalf of the IEEE Power and Energy Society (PES) **12th International Conference on Innovative Smart Grid Technologies- ISGT Asia 2023** Organizing Committee, it is our privilege and great pleasure to extend a warm Kiwi welcome to all delegates, invited keynotes/guests, sponsors and exhibitors. Attendees from 19 countries around the globe hail from different life-long learning stages like Student, Young Professional, Women in Engineering, Researchers, Professors, Innovators and Professionals. A special welcome to all the invited panel speakers who are power engineering thought leaders, experts, executives and professionals.

It has been slightly less than 12 months since this journey began with the invitation by IEEE Power and Energy for IEEE PES New Zealand North Section to host ISGT Asia 2023. We had just completed hosting the 7th IEEE Workshop on the Electronic Grid (eGRID 2022) end of the 2022, as the world was just opening up since the closing down due to pandemic. In December 2022, the originally scheduled venue in Asia for ISGT Asia 2023 was still uncertain to host the conference and IEEE PES was looking for an alternate host within Asia-Pacific. We had previously successfully hosted ISGT Asia 2017 with a lead-time of almost 2 years then. However, our EGRID 2022 Organizing volunteers were ready to host ISGT 2023, even though we had less than a year to pull this off. Some of our volunteer leaders had also attended the 11th ISGT Asia 2022 conference in Singapore and hence decided to proceed further with preparations, call for paper and focussing more on value to local industry here in NZ. Though we did not have to go through the bidding process, we would like to take this opportunity to express our sincerest gratitude to the Auckland Convention Bureau, who helped prepare marketing documents professionally which we strongly believe played a key part for getting more local industry participation despite several of the conferences happening during this time of the year as the world have started reopening back for conferences. The electricity industry's IEEE PES members from across New Zealand and the 4 NZ tertiary institutions where Power Engineering teaching and research is active i.e. University of Canterbury, Victoria University of Wellington, Auckland University of Technology and University of Auckland have also been very supportive of these efforts and are delighted for the opportunity to engage strongly with this IEEE PES brand of

conferencing for this global membership driven power engineering fraternity together here 'down-under'.

As part of the hosting process, we would particularly like to take this opportunity to express our sincerest gratitude to the Department of Electrical, Computer and Software Engineering at University of Auckland, who agreed to be the main host. The electricity industry's from across New Zealand and IEEE members from Electricity Utilities across NZ have been very supportive of these efforts and are delighted for the opportunity to host collectively, this **PES NZ** facilitated flagship Asia-Pacific event, in Auckland for the second time..

For a global industry event of this kind, we have embedded co-located workshops and panels sponsored by NZ Power & Energy Collaboratory (NZPEC) and QuakeCore (Seismic Centre of Research Excellence) to blend and engage alongside the main industry led three full day intense panels delivered by professional stakeholders and other future low-carbon energy partners like solar developers, transport, councils, innovators and policy makers.

Technical presentations and poster sessions typical of ISGT are scheduled to go along with Executive Round Table panel sessions on all the 3 days by national and international thought leaders and executives. This naturally meant that the traditional culture and practices of the ISGT paper conference attendees need to be met along with a blended program that appears seamless and representative to the attendees who might be representing countries, institutions/ companies and as individuals. At the outset, we would like to acknowledge the patience and accommodation that each one of you extended before arriving here, as the organizing committee worked through the details and help establish a cohesive and integrated program that hopefully satisfies each one of your expectations and positive experiences during this conference.

At the time of sending this handbook to the e-printer we have about 205+ attendees from 19 countries that are participating across various events during this conference. The pre-conference NZPEC event on Monday has an additional 20+ attendees. During the actual conference, we expect some more local participants to engage.

In particular, we would like to thank **IEEE PES Conference & Meeting Committee** reposing their faith to host ISGT Asia 2023 in Auckland and for their support and advice during the program preparation and sharing expectation of the industry-academia-research balance expected of this international smart grid conference brand.

At this stage, we would also like to say a big **'Nga mihi' (Thanks)** to our supporters, members and volunteers of all categories – Industry Professionals, Electricity Utilities, Power industry organisations and Student Members for being part of the local program that will capture and

showcase the electrical power systems challenges, opportunities, experiences and engagements from across Aotearoa, New Zealand. There is active participation across the various events from Kiwi engineers, leadership, researchers, affinity groups- 'Students, Women, Young professionals' electricity stakeholders across the board and engineering societies which represents the breadth of New Zealand power systems, whose history is about 135+ years.

The tag line for this ISGT 2023 (Auckland) is "**Grid Edge Technologies towards Resilient and Sustainable Energy Systems**" and during the four days of the programming will have industry relevant Tutorial alongside a site-visit, an Opening Plenary: ***Global Executive Perspectives on Utility of the future***, followed by poster session and trade exhibit opening on Wednesday along with another industry sponsored panel on Renewable Energy Integration and control. CEO breakfast,3 additional Executive Industry Panels and Fire-chat sessions like "*Electricity Markets, Regulations and Standards*", "*Future workforce for success - Industry development'*" , "*ISGT Asia Industry Executive Fireside chat - "Achieving Net Zero'"* embedded with 11 Technical Sessions, a Poster session on Wednesday, 2 days of workshops from NZPEC and QuakeCORE groups, 2 social networking functions, 1 Dinner Banquet and several opportunities to professionally interact with global innovators, experts, technical professionals, researchers gaining opportunities for recognition and peer-esteem. Details of the above are provided by our Industry and Technical Chairs later in this handbook.

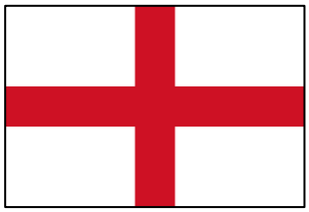
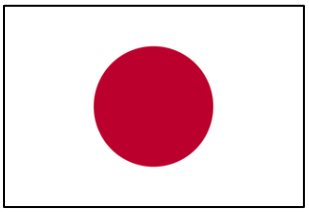
We hope that the **4-day formal program of events** including an **integrated half-day NZPEC research workshop** and various social networking activities will provide a roadmap for all attendees, to inspire new ideas for a collaborative leadership of sustainable energy issues for low-carbon transitions globally in coming decades. A special thanks to all the volunteers, sponsors and exhibitors for the preparation and help towards actual conduct of this event.

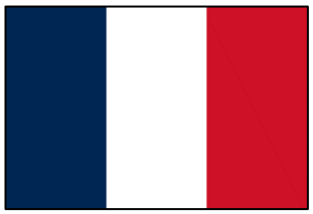
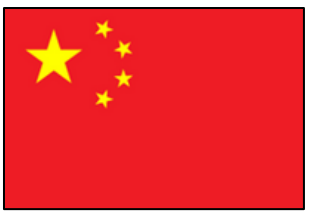
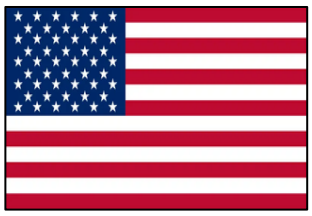
On behalf of the organizing committee, we thank you for your participation and supporting ISGT Asia 2023. We wish you all a great event full of new ideas, networking opportunities and showcasing the new technologies and strategies that will shape our sector in coming decades. For those of you who are here for the very first time, please take time to explore locally and nearby across our beautiful landscape and experience the friendly hospitality.

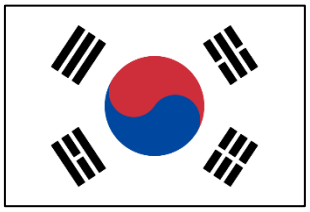
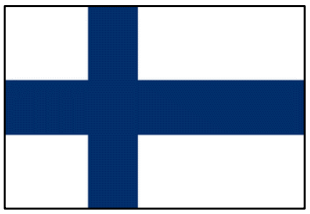
Nga Mihi,

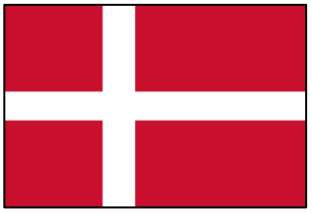
Nirmal Nair General ChairISGT ASIA 2023

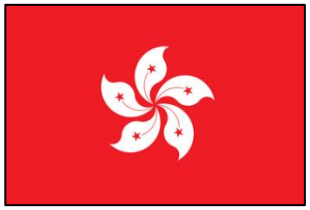
Countries Represented




Institutions Represented

Japan
1. Meiji University 2. Hitachi Ltd 3. Waseda University 4. Tohoku Electric Power Network Co., Inc. 5. Tokyo University of Science 6. Mitsubishi Electric Corporation 7. Mitsubishi Electric Software Corporation 8. Hokkaido University 9. The University of Electro-Communications 10. Hitachi, Ltd. Research and Development Group 11. National Institute of Advanced Industrial and Science Technology 12. Okayama University 13. University of Fukui 14. Tohoku University 15. J-Power Transmission Network Co., Ltd 16. Kyushu University 17. Hiroshima Institute of Technology 18. TEPCO Power Grid, Inc.

China
19. Northeast Electric Power University 20. Tsinghua University 21. Harbin Institute of Technology Shenzhen 22. State Grid Economic and Technological Research Institute Co., LTD 23. State Grid Beijing Electric Power Co., Ltd. 24. Shijingshan Power Supply Company 25. North China Electric Power University 26. Grid Hebei Electric Power Co., Ltd 27. Tsinghua University 28. Shandong Power Exchange Center 29. Zhejiang University 30. State Grid Jilin Electrical Power Company Limited 31. Henan University

India
1. Jawaharlal Nehru Technological University Anantapuramu 2. Grid Controller of India Limited (Grid-India) 3. Indian Institute of Technology Bombay 4. Indian Institute of Technology Gandhinagar 5. Indian institute of Technology Hyderabad 6. Indian Institute of Science 7. IIT Kanpur, Energy System Innovation Center

Korea
1. Korea Institute of Energy Research 2. KONGJU National University 3. Pusan National University 4. Korea Southern Power Company (KOSPO) 5. Dong-Nam Grand ICT Research and Development Center 6. Korea Institute of Energy Technology (KENTECH) 7. INJE University

England
1. University of Oxford 2. Durham University 3. Northumbria University Newcastle upon Tyne ○

Germany
1. RWTH Aachen University 2. Leibniz University Hannover 3. Electric Power Engineering Centre 4. Institute of Electric Power Systems 5. Technical University of Munich

France
○ Grenoble Ecole de Management
Australia
1. The University of Melbourne 2. FTI Consulting 3. CSIRO 4. CSIRO_Data61 5. GridQube 6. Australian National University 7. Queensland University of Technology 8. Monash University
United States of America
○ University of California ○ Washington State University
Pakistan
○ NED University of Engineering & Technology Karachi ○ Lahore University of Management Sciences (LUMS)
Hong Kong
○ Hong Kong Baptist University
Switzerland
○ ETH Zurich
Israel
○ Technion - Israel Institute of Technology

Netherlands
○ Erasmus University
New Zealand
1. University of Canterbury 2. Transpower NZ Ltd 3. University of Auckland 4. Victoria University of Wellington 5. Auckland University of Technology 6. Transnet 7. Omexom 8. EEA 9. Ventia 10. Vector 11. Quakecore
Denmark
○ Denmark Technical University ○ Green Power Denmark
Singapore
○ Singapore University of Technology and Design ○ Seatrium Ltd ○ TUMCREATE Ltd
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○ Tampere University
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○ University of Glasgow
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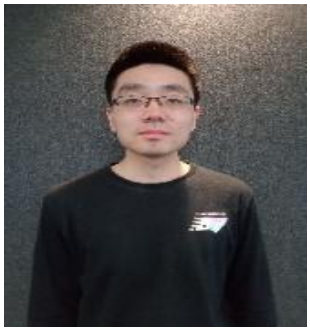

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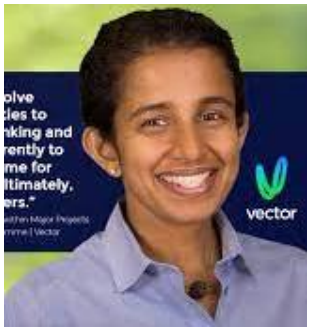

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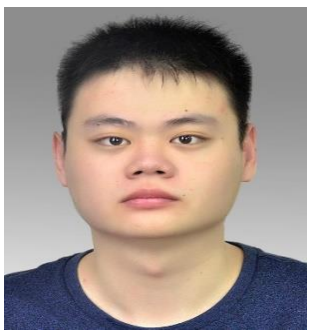

Linge
Volunteer

Zhenyang
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ISGT Asia 2023 Technical Paper Reviewer List

Name	Country
Tobias Massier	Singapore
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Daniel Burmester	New Zealand
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Mazher Huddin	UK
Olivier Chris	France
Hevez Martin	France

ISGT 2023 General Information

The following information is provided as a guide the Conference.

If you have any queries, please visit the registration desk.

Registration desk

For any questions, please visit the registration desk during the conference.

Registration desk is located on Science Building foyer.

Available from Tuesday, 21 November 2023 From 8:00 am onward

Conference catering

Lunches morning and afternoon tea will be served in the ground level Foyer of the Science Building, University of Auckland.

Dietary requirement

Vegetarian options are provided with each meal break. Care has been taken to ensure all of advised dietary requirements are catered to.

If you specified your dietary requirements when registering, please make yourself known to the catering staff.

Presenting authors

Presentation slots are 15 minutes long, with 3 minutes scheduled for questions. Each session chair will be keeping strictly to time.

Please ensure your PowerPoint is uploaded before your session starting.

Mobile phones

During all presentation please turn your mobile phones to silent.

Presentation

As a courtesy to our presenters, please ensure you arrive at each session venue prior the start of presentation.

Wi-Fi Access

Select the wireless network : UoA-Guest-WiFi

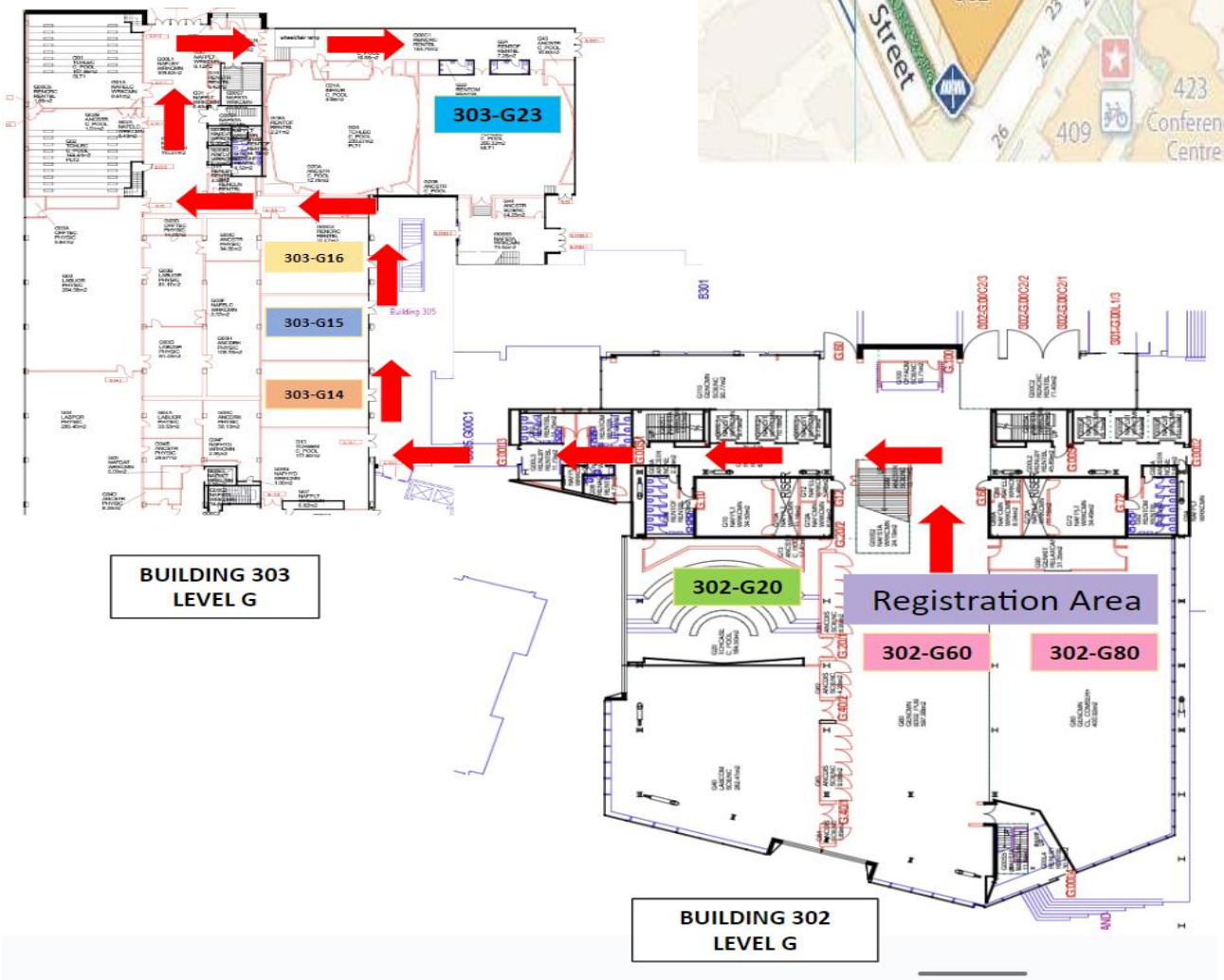
Enter the username : isgtasia@uoawifi.com

Enter the password : 3X20YyMM

ISGT 2023 Conference Venue

Science Building, University of Auckland.

23 Symonds Street, Auckland CBD, Auckland 1010



ISGT Asia 2023 Programme

Day 1 Tuesday 21st November		
Time	Conference Opening Stream	Tutorial Stream *only for Tutorial Registered Attendees
08:00 - 08:30		Tutorial Registration
08:30 - 10:00		Tutorial Super Session Grid Forming Inverters : Theory and Applications in Power System (Room 302-G20)
10:00 - 10:30		Tea & Coffee
10:30 - 12:30		Tutorial Super Session Grid Forming Inverters : Theory and Applications in Power System (Room 302-G20)
12:30 - 13:30		Lunch
13:30 - 15:00		Substation Visit
16:15 - 17:30	Mihi Whakatau - Conference Welcome Evening. Featuring guest speaker (Room 302-G20)	
17:30 - 19:00	Pre-Conference Registration Wonder Project New Zealand Welcome Drinks & Networking	

Day 2 Wednesday 22nd November			
Time	Industry Stream	Technical Stream	
08:00 - 09:00	Conference Registration		
09:00 - 10:00	Conference Welcome & Opening Keynote (Room 303-G23)		
10:00 - 10:30	Tea & Coffee Break		
10:30 - 12:30	Plenary: Global Executive Perspectives on Utility of the Future (Room 303-G23)		
12:30 - 13:30	Lunch		
13:30 - 15:30	Panel: Renewable Energy Integration & Control (Room 303-G23)	TS1: Smart Grid Planning, Operation & Analysis (Room 303-G14)	TS2: Protection, Control & Automation of Modern Power Systems (Room 303-G15)
15:30 - 15:45	Tea & Coffee Break		
15:45 - 17:45		TS3: Smart Grid Planning, Operation & Analysis (Room 303-G14)	TS4: Protection, Control & Automation of Modern Power Systems (Room 303-G15)
17:45 - 18:45	Industry Poster session Trade Exhibit Opening		
18:45 - 19:45	Networking & Refreshments		

Day 3 Thursday 23rd November				
Time	Industry Stream	Technical Stream		
07:00 - 09:00	CEO and Executive standing breakfast, with invited Young Professionals and Women in Energy & Engineering (Sponsored by Omexom) (Room 302-G20)			
08:00 – 09:00	Conference Registration			
09:00 – 10:00	Plenary Speaker (Room 303-G23)			
10:00 – 10:30	Tea & Coffee Break			
10:30 – 12:30	IP1: Industry Presentations (Room 303-G23)	TS5: Advanced Technologies/Tools for Smart Grid Applications and Validations (Room 303-G14)	TS6: Renewable Energy Integration and Control (Room 303-G15)	TS7: Electricity Market, Regulations & Standards (Room 303-G16)
12:30 – 13:30	Lunch			
13:30 – 15:30	Panel : Electricity Markets, Regulations and Standards (Sponsored by Vector) (Room 303-G23)	TS8: Advanced Technologies/Tools for Smart Grid Applications and Validations (Room 303-G14)	TS9: Advanced Technologies/Tools for Smart Grid Applications and Validations (Room 303-G15)	
15:30 – 16:00	Buses to Conference Banquet Venue			
16:00 – 22:00	Conference Banquet and Awards (Registered dinner ticket holders only) at Soljans Estate			

Day 4 Friday 24th November		
Time	Technical Stream	
08:00 - 09:00	Conference Registration	
09:00 - 10:00	Plenary speaker (Room 303-G23)	
10:00 - 10:30	Tea & Coffee Break	
10:30 - 12:30	Future Workforce for Success - Industry Development Workshop (Room 303-G23)	
12:30 - 13:30	Lunch	
13:30 - 15:30	TS10: Protection, Control & Automation of Modern Power Systems (Room 303-G14)	TS11: Advanced Technologies/Tools for Smart Grid Applications and Validations (Room 303-G15)
15:30 - 15:45	Ice Cream Break	
15:45 - 16:30	Best Paper Awards & Conference Close	

ISGT Asia 2023 Technical Session Programme

Technical Session 1 (TS-01) Smart Grid Planning, Operation & Analysis Chair: Abhisek Ukil Wednesday, 22nd November 2023 Time: 13:30 - 15:30 NZST Room: 303-G14	
13:30 - 13:45	Paper ID 10
	Thermally limiting grid assets for temporary admissible transmission loading (TATL) in curative congestion management *Jonas Mehlem, Muriel Krüger and Albert Moser*
13:45 - 14:00	Paper ID 15
	Preliminary Study of Temporal Variables Reduction to Reduce Computational Time of V2G Scheduling in Stochastic Programming Approach *Shigeru Tamura and Hiroto Kimura A*
14:00 - 14:15	Paper ID 16
	Planning for Inertia and Resource Adequacy in a Renewable-rich Power System *Amir Fayaz Heidari, Amin Masoumzadeh, Maria Vrakopoulou and Tansu Alpcan*
14:15 - 14:30	Paper ID 22
	An Open Optimal Power Flow Model for the Australian National Electricity Market *Rahmat Heidari, Matthew Amos and Frederik Geth*
14:30 - 14:45	Paper ID 28
	Grid Congestion Management using Grouping of Renewable Energies based on Sensitivity Analysis and Grid Congestion Amount of Transmission Lines. *Yujiro Tanno, Akihisa Kaneko, Yasuhiro Hayashi, Yuki Itoda, Wataru Wayama and Choei Takahashi*
14:45 - 15:00	Paper ID 36
	Building Energy Management Considering Nonlinearity of Electric Equipment with PV-Battery Systems during Power Outage *Yuta Kimura, Nobuyuki Yamaguchi, Fuyuki Sato, Takuma Mineyuki and Hiroki Kawano*

15:00 - 15:15	Paper ID 39
	Time-Series Clustering Of UK Non-domestic Consumers for Demand Response Aggregators *Maitha Al Shimmari, Jan-Peter Calliess and David Wallom*
15:15 - 15:30	Paper ID 50
	Robust Operating Envelopes with Phase Unbalance Constraints in Unbalanced Three-Phase Networks *James Russell, Paul Scott and José Iria*

Technical Session 2 (TS-02) Protection, Control & Automation of Modern Power Systems Chair: Tran T. Hoang Wednesday, 22nd November 2023 Time: 13:30 - 15:30 NZST Room: 303-G15	
13:30 - 13:45	Paper ID 8
	Precise Protection of Wind Farm Collector Line *Yufei Han, Shenxing Shi and Enshu Jin*
13:45 - 14:00	Paper ID 21
	Current Harmonic Reduction Based on Fractional Order Filter for a Grid-Connected PV System *Musadg Zakaria Abdalrahim Abdalfadeel, Venkata Usha Wookuttu, Tharun Kumar Sadu and Sri Priyanka Garikapati*
14:15 - 14:30	Paper ID 25
	A Novel Virtual Impedance Method for Interfacing Renewable to Grid with High Impedance *Phuoc Sang Nguyen, Ghavameddin Nourbakhsh and Gerard Ledwich*
14:30 - 14:45	Paper ID 27
	An Improved Control Method for Type-IV Wind Turbine Connected to Weak Grid Systems *Hailong Wang, Jeremy Watson and Neville Watson*
14:45 - 15:00	Paper ID 31
	Dual Optimal Strategy with Receding Horizon Control of Wind Farm to Provide the Fast Frequency Response *Dae-Jin Kim, KyungSang Ryu, Yanghyeon Nam, Chansu Kim, Seung-Jin Yoon and Byungki Kim*
15:00 - 15:15	Paper ID 107
	Preparing for an Increase in Inverter-based Resources in New Zealand *Nuwan Herath, Nyuk-Min Vong and Matthew Copland*
15:15 - 15:30	Paper ID 63
	Innovating the way out of the energy crisis: Commercialization pathways of home energy management user-innovations *Tuukka Huosianmaa, Jussi Valtaand, Ulla Saari*
15:30 - 15:45	Paper ID 64
	Municipalities' ecosystem roles in different energy communities *Jussi Valta, Anne-Lorène Vernay, Tuomas Vanhanen, Raúl Castaño-Rosa, and Ulla Saari*

Technical Session 3 (TS-03) Smart Grid Planning, Operation & Analysis Chair: Andre Cuppen Wednesday, 22nd November 2023 Time: 15:45 - 17:45 NZST Room: 303-G14	
15:45 - 16:00	Paper ID 58
	Comparison of Adapted PSO Methods Regarding the Determination of Grid Operation Constraints in the Vertical Active and Reactive Power Area *Manuel Wingenfelder and Lutz Hofmann*
16:00 - 16:15	Paper ID 68
	Application of a Multi-Horizon Multi-Energy Optimization Model for a European Case Study *Julian Walter, Sebastian Goertz, William Inghelram and A. Moser*
16:15 - 16:30	Paper ID 79
	Study on the Optimal Capacity Planning Method of Converter Stations for Sending-end Multiterminal HVDC Transmission Grid *Hao Lin, Liang Liang and Haiqiong Yi*
16:30 - 16:45	Paper ID 80
	Demand Response Analytical Framework for Assessing Programme Applicability across Countries *Katya Soegiharto and David Wallom*
16:45 - 17:00	Paper ID 84
	Experiments with Linearisations of the Optimal Power Flow Problem for Radial Networks *Alireza Barzegar, Rahmat Heidari and Frederik Geth*
17:00 - 17:15	Paper ID 88
	Network-Agnostic Voltage-to-Power Sensitivities of a Real-Time Reduced Active Distribution Network *Manorath Prasad, Zakir Hussain Rather, Reza Razzaghi and Suryanarayana Doolla*
17:15 - 17:30	Paper ID 91
	Method of Baseline Load Estimation Result Based on the Identification and Evaluation of the Rebound Effect *Lishan Ma, Chao Sun, Shengqiang Gao, Yuanxiao Ma, Xinxin Ge and Fei Wang*
17:30 - 17:45	Paper ID 92
	An Overview of Optimization Techniques for Operation and Planning of Energy Hub Under Uncertainty *Divya Sharma and Naran Pindoriya*

Technical Session 4 (TS-04) Protection, Control & Automation of Modern Power Systems Chair: Abhisek Ukil Wednesday, 22nd November 2023 Time: 15:45 - 17:45 NZST Room: 303-G15	
15:45 - 16:00	Paper ID 46
	Optimizing Stability and Uncertainty Control in Power Plant Reactors *Mohsin Qureshi*
16:00 - 16:15	Paper ID 49
	Modeling of A Grid-Following Inverter Considering the relationship between PCC and POC Voltages *Nobauki Kawashima, Ryoichi Hara, Hiroyuki Kita and Hideo Ishii*
16:15 - 16:30	Paper ID 57
	Chaotic behavior of arc extinction distance for capacitive load in LVDC systems *Hyosung Kim*
16:30 - 16:45	Paper ID 71
	Performance Evaluation of Northern Regional Transmission System of India: Critical Analysis for Grid Resilience *Prashant Garg, Priyanshi Aggarwal, Sheikh Shadruddin, Somara Lakra and Rajiv Kumar Porwal*
16:45 - 17:00	Paper ID 97
	Power System Transient Stability Assessment Using Convolution Neural Network and Saliency Map *Heungseok Lee, Jongju Kim and June Ho Park*
17:00 - 17:15	Paper ID 99
	Impacts of the Reactive Power Control on the Small-signal Stability of Grid Forming Inverters *Nabil Mohammed, Weihua Zhou and Behrooz Bahrani*
17:15 - 17:30	Paper ID 100
	Voltage and Current Dynamics-Canceled Virtual Synchronous Generators for Stability Guarantee *Weihua Zhou, Nabil Mohammed and Behrooz Bahrani*

Technical Session 5 (TS-05) Advanced Technologies/Tools for Smart Grid Applications and Validations Chair: Andre Cuppen Thursday, 23rd November 2023 Time: 10:30 - 12:30 NZST Room: 303-G14	
10:30 - 10:45	Paper ID 35
	Enhancing Power Converter Reliability in Photovoltaic Systems: A Novel Active Thermal Controlled Algorithm *Shahbazi Mahmoud, Niall Andrew Smith, Marzband Mousa and Habib Ur Rahman Habib*
10:45 - 11:00	Paper ID 40
	Resonant Frequency Analysis of Dual Inverter-based Resources with LCL Filters in Offshore Wind Farm *Ji-Min Lee and Gyu-Sub Lee*
11:00 - 11:15	Paper ID 42
	Experience of Reactive Capability Assessment of RE plant in Western Region of India *Vishal Puppala, Pushpa Seshadri, Manoj Thakur, Srinivas Chitturi, Pradeep Sanodiya*
11:15 - 11:30	Paper ID 44
	A Comparison Study on the Performance of Different MPPT Control Strategies in DC Microgrids with Photovoltaic Systems *Dongze Li and Qian Hu*
11:30 - 11:45	Paper ID 48
	A Linear Model for Estimating Power Generation on City Facade using a City 3D model and Solar Power Generation Simulation *Guanglei Li and Shinji Yokogawa*
11:45 - 12:00	Paper ID 67
	Modeling and Control of Dual Active Bridge DC-DC Converters in DC Grids *Choidorj Adiyabazar, Josh Schipper, Jeremy Watson and Alan Wood*
12:00 - 12:15	Paper ID 70
	Planning and Management of Distributed Energy Resources for Achieving the Target Renewable Energy Rate in Distribution Systems *Sota Miyazaki, Akihisa Kaneko, Yasuhiro Hayashi, Shunsuke Kawano, Masayuki Kagita, Keishi Matsuda and Nobuhiko Itaya*

12:15 - 12:30	Paper ID 72
	Internal System Losses of Renewable Energy Sources and their Influence on the Economic Efficiency of the Provision of Reactive Power *Christian Ziesemann, Robert Schmidt, and Albert Moser*

Technical Session 6 (TS-06) Renewable Energy Integration and Control Chair: Neville Watson Thursday, 23rd November 2023 Time: 10:30 - 12:30 NZST Room: 303-G15	
10:30 - 10:45	Paper ID 1
	An Investigative Study for the Commercialization of Anion Exchange Membrane-based Unitized Regenerative Fuel Cell *Eun-chong Lee, Byung-Wook Lee and Hyung-Man Kim*
10:45 - 11:00	Paper ID 32
	Sharing Battery Energy Storage System to Promote RE100 *Soichiro Hashiba, Hiroki Satoh and Yu Ikemoto*
11:00 - 11:15	Paper ID 41
	Effects of Capacity Factor on Sizing of Energy Storage Systems for Electric Vehicle Charging Plazas *Kari Lappalainen and Jan Kleissl*
11:15 - 11:30	Paper ID 56
	Framing Barriers for Distribution Grid Digitalisation: A conceptual framework for policy recommendation *Roberto Monaco, Claire Bergaentzlé, Per Sieverts Nielsen and Konrad Sundsgaard*
11:30 - 11:45	Paper ID 59
	Generation of Realistic Smartmeter Data *Ali Othman, Neville Watson, Andrew Lapthorn and R. Mukhedkar*
11:45 - 12:00	Paper ID 62
	Introducing Digitalisation to Component Risk Models: Enhancing Regulatory Effectiveness *Konrad Sundsgaard, Roberto Monaco, Jose Angel Leiva Vilaplana, Claire Bergaentzlé, Jens Zoëga Hansen and Guangya Yang*
12:00 - 12:15	Paper ID 65
	A New Forecasting Method for Wind Power Generation Output with Wavelet ELM-Type Radial Basis Function Network *Hiroyuki Mori and Kohtaro Watanabe*
12:15 - 12:30	Paper ID 76
	A Framework for Generating Attack Samples in Power Energy Systems using VAEs *Tran Le, David Yau and Justin Albrethsen*

Technical Session 7 (TS-07) Electricity Market, Regulations & Standards Chair: Jeremy Watson Thursday, 23rd November 2023 Time: 10:30 - 12:30 NZST Room: 303-G16	
10:30 - 10:45	Paper ID 77
	Evaluation of PV Output Prediction Errors Due to Snow Coverage on Unit Commitment Using a Time-Varying Mean Reversion Model *Takuto Komuro, Nobuyuki Yamaguchi, Yusuke Manabe and Hideaki Ohtake*
10:45 - 11:00	Paper ID 81
	Determination of Fluctuated Threshold of Input Data in CNN-based Solar Irradiance Prediction Method using Sky Image *Minori Kanenobu, Akiko Takahashi and Masakazu Ito*
11:00 - 11:15	Paper ID 83
	Assessing Probabilistic Load Forecasting Accuracy Against Customer Privacy Constraints At a Low Aggregate Level *Ehsan Razavi, David Smith, Manickam Minakshi and Martina Calais*
11:15 - 11:30	Paper ID 86
	Enhancing Irradiance Prediction Using Short-Term Data: A Machine Learning Approach to Resilient Energy Management *Pratishtha Pandey*
11:30 - 11:45	Paper ID 90
	Day-ahead Demand Response Potential Forecasting Model Based on BILSTM for Load Aggregators *Yuntong Lv, Di Yang, Zhitao Wang, Bingfang Xu, Meiyi Li, Xinxin Ge and Fei Wang*
11:45 - 12:00	Paper ID 108
	Using Ground Source Heat Pump to Provide Heating in Rural Areas in New Zealand *Pengcheng Hu, Abhisek Ukil and Nirmal Nair*
12:00 - 12:15	Paper ID 110
	Sliding Mode Observer based FCS-MPC Control of Voltage Source Inverter *Pengxiang Jing, Xibeng Zhang, Abhisek Ukil and Akshya Swain*

Technical Session 8 (TS-08) Advanced Technologies/Tools for Smart Grid Applications and Validations Chair: Neville Watson Thursday, 23rd November 2023 Time: 13:30 - 15:30 NZST Room: 303-G14	
13:30 - 13:45	Paper ID 9
	A Conceptual Insight Into Achieving Interoperability Between Heterogeneous Blockchain Enabled Interconnected Smart Microgrids *Disha Dinesha Lagadamane and Balachandra Patil*
13:45 - 14:00	Paper ID 23
	Evaluating the Financial Viability of Vehicle-to-Grid for Autonomous Electric Ride-Hailing Fleets *Linda Punt*
14:00 - 14:15	Paper ID 34
	Effect of Linked Block Orders on Day-Ahead Energy Market Using Multi-Agent Simulation *Chakihara Kohei and Yamaguchi Nobuyuki*
14:15 - 14:30	Paper ID 45
	A Marginal Power Generation Cost Estimation Method Based on Probability Interval Accumulation Considering Bounded Rationality *Qinghu Tang, Hongye Guo, Feng Li, Zichao Sun and Qixin Chen*
14:30 - 14:45	Paper ID 54
	The Impact of Energy Communities on Electricity Distribution Business – Aspects on Seasonal Turnover Risks for the Distribution System Operator *Kimmo Lummi, Juha Koskela and Pertti Järventausta*
14:45 - 15:00	Paper ID 82
	A Network-Aware Peer-to-Peer Energy Trading Framework with Dynamic Pricing Mechanism *Sachinkumar Suthar and Naran Pindoriya*
15:00 - 15:15	Paper ID 87
	Effect of Considering Network Constraints in Energy or Reserve Market on Procurement Cost of Market Players *Keita Kato and Hiroumi Saitoh*
15:15 - 15:30	Paper ID 96
	An Incentive-Based Demand Response Scheme for Unbalanced Distribution System *Abhishek Tiwari, Bablesh K Jha and Naran M Pindoriya*

Technical Session 9 (TS-09) Advanced Technologies/Tools for Smart Grid Applications and Validations Chair: Jeremy Watson Thursday, 23rd November 2023 Time: 13:30 - 15:30 NZST Room: 303-G15	
13:30 - 13:45	Paper ID 78
	Attack Detection for Distributed Photovoltaic Generation Systems Leveraging Cyber and Power Side Channel Data *Huaiyu Liu, Yuze Fu, Kaikai Pan, Wenyuan Xu, Chenggang Li and Chen Liu*
13:45 - 14:00	Paper ID 89
	GRU based EV Charging Algorithm for Vehicle-to-Home Applications *Pratosh Patankar, Zakir Hussain Rather, Ariel Liebman and Suryanarayana Doolla*
14:00 - 14:15	Paper ID 94
	Optimized Scheduling of Ensemble Home Energy Resources for Effective Utilization Under Demand Response Program *Abhishek Tiwari, Souvik Bera and Naran M Pindoriya*
14:15 - 14:30	Paper ID 95
	SoC Balancing Mechanism to Improve Active Power Sharing among multiple ESSs in Low-Inertia Power Systems *Nikita Buchinskiy and Hiroumi Saitoh*
14:30 - 14:45	Paper ID 98
	Bad-Data-Resilient Dynamic State Estimation for Power Systems with Partially Known Models *Milos Katanic, John Lygeros and Gabriela Hug*
14:40 - 15:00	Paper ID 101
	Optimal Allocation of D-STATCOM Devices with Improved Quantum Brain Storm Optimization in Hybrid Code *Hiroyuki Mori, Yusuke Kawauchi and Naohisa Someya*

Technical Session 10 (TS-10) Protection, Control & Automation of Modern Power Systems Chair: Tek Tjing Lie Friday, 24th November 2023 Time: 13:30 - 15:30 NZST Room: 303-G14	
13:30 - 13:45	Paper ID 26
	Evaluating Demand Response Potential of Air Conditioners in Residential Sector: A Data-Driven Approach Estimating Room Temperature *Tetsushi Ono, Aya Hagishima and Jun Tanimoto*
13:45 - 14:00	Paper ID 29
	Electricity Exchange between Control Areas Due to Tie Line Expansion and Demand Shifting Using Unit Commitment in Japan *Shoki Okawara, Yusuke Manabe and Nobuyuki Yamaguchi*
14:00 - 14:15	Paper ID 33
	Neural Network Based Fault Location in Power Distribution System *Viresh Patel, Soumyajit Ghosh, Saikat Chakrabarti, Ankush Sharma and Sanjeev Pannala*
14:15 - 14:30	Paper ID 55
	A study on the installed capacity of energy supply system in a household *Ken Yamamoto and Koji Kawahawara*
14:30 - 14:45	Paper ID 43
	Prioritization of Distribution Networks with Distributed Energy Resources for Efficient Deployment of Loss Minimum Reconfiguration Technology *Kei Hagiwara, Yu Fujimoto, Yasuhiro Kodama, Yasuhiro Hayashi, Ryo Maeda, Kohei Oishi and Kenjiro Mori*
14:45 - 15:00	Paper ID 20
	Bi-Level Optimal Energy Management in Distribution Networks with Partial Penetration of Smart Home Energy Management Systems *Kuthsav Thattai , Shuheng Chen, Boyu Liu and Jayashri Ravishankar*
15:00 - 15:15	Paper ID 30
	Communication-free control concept for operating a low voltage island grid *Iwo Bekker and Lutz Hofmann*
15:15 - 15:30	Paper ID 47
	Optimisation of Transient Stability for Integration of Offshore Oil Rigs with Offshore Wind *Jing Zhong Tee, Meng Tang Lai and Idris Li Hong Lim*

Technical Session 11 (TS-11) Advanced Technologies/Tools for Smart Grid Applications and Validations Chair: Tobias Massier Friday, 24th November 2023 Time: 13:30 - 15:30 NZST Room: 303-G15	
13:30 - 13:45	Paper ID 53
	Electrolyzer cost projections compared to actual market costs: A Critical Analysis *Hadi Vatankhah Ghadim, Rafaella Canessa, Jannik Haas and Rebecca Peer*
13:45 - 14:00	Paper ID 66
	Application of Quantum Brain Storm Optimization to Robust State Estimation in Distribution Systems *Hiroyuki Mori and Akio Ito*
14:00 - 14:15	Paper ID 60
	Leveraging Digital Twins and Demand Side Recommender Chatbot for Optimizing Smart Grid Energy Efficiency *Abiodun Onile, Juri Belikov, Eduard Petlenkov and Yoash Levron*
14:15 - 14:30	Paper ID 105
	Life cycle assessment of green hydrogen production via geothermal energy-driven electrolysis *Anurag Chidire, Christopher Schifflechner and Tobias Massier*
14:30 - 14:45	Paper ID 75
	Women in Engineering – Role of Women in Renewable Energy *Anisha Chopra, Priyanshi Aggarwal, Alok Kumar, Somara Lakra, Rajiv Porwal and S.R. Narasimhan*
14:45 - 15:00	Paper ID 102
	An Evolutionary Computation Method for Selecting Pilot Buses with Clustering-based Robust Optimization *Hiroyuki Mori and Rikuto Miwa*

Technical Session 12 (TS-11) Advanced Technologies/Tools for Smart Grid Applications and Validations Chair: Abhinav Rakesh Chopra Friday, 24th November 2023 Time: 13:30 - 15:30 NZST Room: Online	
13:30 - 13:45	Paper ID 93
	Sizing of Battery Energy Storage System for Peak Reduction of Commercial Users using Historical Data *Abhishek Joshi, Vikram Cherala and Pradeep Yemula Kumar*
13:45 - 14:00	Paper ID 103
	Revolutionizing EV Adoption: Enhancing User Participation through SOC Strategies Incorporating Degradation-Dependent Economic Model for Battery Swapping Stations *Muhammad Osama Tarar, Ayesha Khan, Naveed Ul Hassan and Ijaz Haider Naqvi*
14:00 - 14:15	Paper ID 104
	Exploring Battery Degradation and Range Variability in Electric Vehicles Across Global Drive Patterns and Charging Levels *Ayesha Khan, Ijaz Naqvi and Naveed Ul Hassan*

ISGT ASIA 2023 Day 1 Detail

Tutorial Session - Grid forming inverters (Tuesday 08:30-10:00)

Dr Ben Kroposki

Dr. Ben Kroposki is the Director of the Power Systems Engineering Center at the National Renewable Energy Laboratory (NREL) where he leads NREL's strategic research in the design, planning and operations of electrical power systems. He has over 30 years of experience in the design, testing, and integration of renewable and distributed power systems. Dr. Kroposki received his BSEE and MSEE from Virginia Tech and Ph.D. from the Colorado School of Mines. Dr. Kroposki is the recipient of the *IEEE Power & Energy Society (PES) Ramakumar Family Renewable Energy Excellence Award*. Dr. Kroposki serves as the organizational director for the Universal interoperability for Grid-forming Inverters (UNIFI) consortium tackling the challenges with seamless integration of inverter-based resources and synchronous machines in all power systems.

Dr Behrooz Bahrani

Behrooz is associate professor from Electrical and Computer Systems Engineering, Monash University.

Behrooz Bahrani received the B.Sc. degree from Sharif University of Technology, Tehran, Iran, the M.Sc. degree from the University of Toronto, Toronto, ON, Canada, and the Ph.D. degree from the Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland, all in electrical engineering, in 2006, 2008, and 2012, respectively.

From September 2012 to September 2015, he was a Postdoctoral Fellow at several institutions including EPFL, Purdue University, West Lafayette, IN, USA, Georgia Institute of Technology, Atlanta, GA, USA, and Technical University of Munich, Munich, Germany. His research interests include control of power electronics systems, applications of power electronics in power and traction systems, and grid integration of renewable energy resources.

Behrooz Bahrani received the Swiss National Science Foundation Early Postdoc.Mobility Fellowship in 2013, and the Swiss National Science Foundation Advanced Postdoc.Mobility Fellowship in 2014.

Substation Visits (Tuesday 16:00-17:30)

Location: Jellicoe Street Car Park (37-55 Madden Street, Auckland CBD, Auckland). Battery Energy Storage System – Vector Lights

Requirements: Full PPE, Vector WTC 2 holder

Vector personnel: Aparna Arunthavasothy

Mihi Whakatau and Conference Welcome (Tuesday 16:00-16:30)

Professor Gerard Rowe

Gerard is Dean of Engineering at University of Auckland. He completed a BE, ME and PhD at the University of Auckland in 1978, 1980 and 1984 respectively, where he is currently Dean of the Faculty of Engineering and a Professor (in the Department of Electrical, Computer, and Software Engineering). He is a member of the Department's Radio Systems Group and his (disciplinary) research interests lie in the areas of radio systems, electromagnetics and bioelectromagnetics. Over the last 37 years he has taught at all levels and has developed a particular interest in identifying and correcting student conceptual misunderstandings and in curriculum and course design. He has received numerous teaching awards from his institution. In 2004 he was awarded a (National) Tertiary Teaching Excellence Award in the Sustained Excellence in Teaching category and in 2005 he received the Australasian Association for Engineering Education award for excellence in Engineering Education in the Teaching and Learning category.

Dr. Nirmal Nair

General Chair of IEEE ISGT Asia 2023

Kate Murphy

Chair of IEEE PES North Chapter

Panel Session - Resilient and Sustainable Energy System: IEEE Perspective and New Zealand Perspective (Tuesday 16:30 – 17:30)

Wayne Bishop

Wayne Bishop Jr. is Vice President of Industry Outreach and Strategy at Quanta Technology, a subsidiary of Quanta Services, and Fortune 500 company. He has worked in the electric power industry for over 30 years.

Wayne is also IEEE PES Vice President of Meetings and Conferences, a member of the IEEE Power and Energy Society Governing Board and a member of the IEEE PES Executive Committee. He helped write and implement the Long-Range Strategic Plan for IEEE PES and is a Senior Member of IEEE. In addition, Wayne currently serves as a Senior Advisor to LUMA Energy, the electric utility in Puerto Rico.

Previously, Wayne worked at OMICRON electronics for 13 years where he was the Head of Marketing for North America. Prior to that, Wayne was employed at Doble Engineering Company for nearly 20 years in several senior management positions. In 2007, he was appointed by Doble's Board of Directors to serve on the Executive Committee to broker the sale of Doble Engineering to ESCO Technologies.

Wayne is a graduate of Merrimack College, Harvard University, and the Executive MBA Program at Suffolk University in Boston, graduating with honors. He speaks regularly at industry conferences and has published several articles and papers in industry publications including IEEE Power and Energy Magazine and T&D World Magazine. Wayne is also a member of the Board of Advisors for the College of Science and Engineering at Merrimack College in North Andover, Massachusetts. Wayne and his family live in the suburbs of Boston, Massachusetts.

David Seymour

David grew up in Whangarei with two younger brothers, where his parents were a pharmacist and a draughtsman. As a teenager, he moved to Auckland for high school before graduating from the University of Auckland in electrical engineering and philosophy.

Before politics, David worked as an electrical engineer in New Zealand and for private sector think tanks in Canada. He has served as ACT Leader and MP for Epsom since 2014.

In Government, he was responsible for Regulatory Reform and charter schools. From opposition, he passed the End-of-Life Choice Act. Fearless and principled, he is known for standing up for his constituents and, if necessary, to every other party. He has been named MP of the year twice, and 'the only one talking sense' too many times to count.

David knocked on 13,000 doors in the Epsom electorate suburbs of Epsom, Mt Eden, Parnell, and Remuera before being elected in 2014, and he hasn't stopped since. He regards being elected to Parliament by his neighbours as an enormous honour and privilege. Since then, his electorate office has assisted over 2,000 constituents on issues from ACC claims to hazardous trees on their properties. In cases such as that of Ana-Carolina Bircham, he has gone in to bat for as long as it takes, sometimes years. He has stood up for constituents on electorate-wide issues including proposed cycleways in Parnell, attacks on school children in Greenlane, and threats to Epsom's school zones.

Wonder Project New Zealand (Tuesday 17:30-19:30)

Charge up a brighter future for the electricity industry by signing up as a volunteer Ambassador for the Wonder Project Power Challenge in 2023

This free schools programme aims to inspire young Kiwis to consider a career in STEM, as they design and build their very own wind turbine to light up a mini town.

Wonder Project Ambassadors are role models for our future electricity industry workforce, uplifting students' aspirations and confidence as they learn how teamwork can keep the lights on, the schools open, and the hospitals running.

Facilitators:

- Alison Lawrie (Wonder Project Team Lead)
- Gay Watson
- Renee King

ISGT ASIA 2023 Day 2 Detail

Conference Welcome (Wednesday 09:00 to 09:10)

Dr. Nirmal Nair

General Chair of IEEE ISGT Asia 2023

Opening Keynote (Wednesday 09:10 to 09:10)

Eric Pyle

Director, Public Affairs and Policy at solarZero New Zealand

Plenary Session - Global Executive Perspectives on the Utilities of Future (Wednesday 10:30 to 12:30)

Wayne Bishop (Chair)

Wayne Bishop Jr. is Vice President of Industry Outreach and Strategy at Quanta Technology, a subsidiary of Quanta Services, and Fortune 500 company. He has worked in the electric power industry for over 30 years.

Wayne is also IEEE PES Vice President of Meetings and Conferences, a member of the IEEE Power and Energy Society Governing Board and a member of the IEEE PES Executive Committee. He helped write and implement the Long-Range Strategic Plan for IEEE PES and is a Senior Member of IEEE. In addition, Wayne currently serves as a Senior Advisor to LUMA Energy, the electric utility in Puerto Rico.

Previously, Wayne worked at OMICRON electronics for 13 years where he was the Head of Marketing for North America. Prior to that, Wayne was employed at Doble Engineering Company for nearly 20 years in several senior management positions. In 2007, he was appointed by Doble's Board of Directors to serve on the Executive Committee to broker the sale of Doble Engineering to ESCO Technologies.

Wayne is a graduate of Merrimack College, Harvard University, and the Executive MBA Program at Suffolk University in Boston, graduating with honors. He speaks regularly at industry conferences and has published several articles and papers in industry publications including IEEE Power and Energy Magazine and T&D World Magazine. Wayne is also a member of the Board of Advisors for the College of Science and Engineering at Merrimack College in North Andover, Massachusetts. Wayne and his family live in the suburbs of Boston, Massachusetts.

Eric Pyle

Director, Public Affairs and Policy at solarZero New Zealand

Steve Edwell

In August 2021 the Government of Western Australia appointed Steve as the State's economic regulator - Chair of the Governing Body of the Economic Regulation Authority, for a 5 year term.

The Northern Territory Government (April 2023) has appointed Steve as Independent Member of the NT Electricity Market Reform Taskforce.

Steve Edwell is an economist specialising in the energy sector. Most of Steve's work has been on behalf of Federal and State Governments across Australia, where he has both consulted and held various Government statutory appointments.

Steve has a deep understanding of energy markets, with over 25 years high level policy, regulatory and management involvement in both the Eastern State National Electricity Market and the Wholesale Electricity Market in Western Australia. He has advised on and implemented energy market reforms across Australia and has been a senior member of energy regulatory boards in Australia since 2005. He was inaugural full-time Chair of the Australian Energy Regulator, an Associate Member of the Australian Competition and Consumer Commission and for eleven years was a member of the Governing Body of the Economic Regulation Authority of Western Australia, and in August 2021 was appointed as Chair.

A feature of Steve's career is his successful experience in leading the implementation of large-scale market reforms on behalf of Government, primarily in the energy sector. On behalf of the Queensland Government Steve was a "foundation official" for the establishment of the National Electricity Market (NEM). He subsequently led the design and establishment of the Wholesale Electricity Market in Western Australia.

More recently Steve has been Board Chair of Horizon Power and in May 2021 completed a two - year commission as Full Time Chair of the Western Australian Government's Energy Transformation Strategy for the State's energy sector. The Transformation Strategy implemented sweeping changes to the design, regulation and operation of the South West Interconnected System, in order to maximise renewable generation by 2030.

Thomas Patrick

Thomas works as a Project Manager for Transpower, delivering a variety of electrical distribution infrastructure projects. From cables, substations, and power lines, to new technology battery energy systems, LiDAR surveys and data processing, and smart infrastructure. Thomas has a Bachelor of Engineering with Honours in Electrical and Electronic engineering from the University of Canterbury, is a member of Engineering New Zealand, Project Management Institute, and proudly, IEEE for the last 10 years

Plenary Session - Renewable Energy Integration and Control (Wednesday 13:30 to 15:30)

Kate Murphy (Chair)

Following two of her passions, problem-solving and sustainability, Kate studied Energy Engineering at University College Cork and obtained a Master's in Energy with Auckland University's Power Systems Group.
She has worked with Marine & Renewable Energy Ireland (MaREI) and most recently at Vector, New Zealand's largest electricity distribution network owner, in a range of engineering and leadership roles.
Kate is now embedded in Helios Energy's engineering, technical, and commercial analysis activities throughout the portfolio of utility-scale solar and battery energy storage system (BESS) projects. Her experience ranges from customer facing grid-scale Solar PV & Battery, network trials of Smart Fault Indicators, Distribution Transformer Monitoring and Smart Meter Data applications. Kate is also an active member of IEEE Power and Energy Society, having chaired the New Zealand North Chapter for several years. She is also currently Chapter Chair of IEEE PES New Zealand North.

Dr Nilesh Modi

Dr Nilesh Modi is Manager of Operational Analysis & Engineering team at AEMO. He has been working with AEMO since 2012. Nilesh has been involved in various key projects/documents published by AEMO, namely the review of the South Australian (SA) system black event, system strength assessments for South Australia, the review of under-frequency load shedding design for SA, the system integrity protection scheme for SA, system strength requirements, inertia requirement methodology and large scale EMT modelling of the grid. Currently his key focus area is power system operation with high penetration of inverter-based resources and grid-forming inverters.

Dr Christopher Franks

Chris is a data and digital expert with more than 20 years of industry experience.

Starting as Vector's Business Intelligence Specialist in 2014, Chris has spent nearly a decade working with or in most departments at Vector gaining a deep understanding of the industry and of Vector's business processes, information systems, data, and staff.

Since 2020, Chris has been in the role of General Manager for Operational Information and Insights leading enterprise content management (ECM), information management, data governance, asset information life-cycle management and records management.

Chris's industry expertise and versatility are second-to-none, with a profound awareness of industry regulatory requirements and a vision for strategic opportunities embedded within Vector's Symphony strategy.

Dr Graeme Ancell

Graeme Ancell received a BE(Hons) in electrical engineering and a PhD from the University of Auckland. Graeme has over 30 years' experience within the power industry in New Zealand. He has worked in asset management, transmission system planning, system operations, transmission pricing, protection, distribution planning and connection of distributed energy resources. His interests include power system performance at the network and asset levels, system operations, electricity market and the commercial and regulatory issues facing transmission and distribution companies and distributed energy developers.

He is a Chartered Professional Engineer in New Zealand and an International Professional Engineer. He has been the convenor of CIGRE Australian Panel APC1 and the convenor of CIGRE Working Groups C1.32 and C1.38, was a contributor to the CIGRE Green Book "Power System Assets", was a member of CIGRE International C1 Study Panel (System Development and Economics) and currently is a member of CIGRE Australia Panel APC6 (Active Distribution Systems and Distributed Energy Resources).

He is currently working on the development of utility scale DER which includes the connection of a 35 MWh BESS onto WEL Networks' sub transmission network.

ISGT ASIA 2023 Day 3 Detail

CEO and Executive standing breakfast, with invited Young Professionals and Women in Energy & Engineering (Thursday 07:00 to 09:00)

Plenary - ISGT Asia Industry Executive Fireside chat - "Achieving Net Zero" *(Thursday 09:00 to 10:00)*

Thomas Patrick (Chair)

Thomas works as a Project Manager for Transpower, delivering a variety of electrical distribution infrastructure projects. From cables, substations, and power lines, to new technology battery energy systems, LiDAR surveys and data processing, and smart infrastructure. Thomas has a Bachelor of Engineering with Honours in Electrical and Electronic engineering from the University of Canterbury, is a member of Engineering New Zealand, Project Management Institute, and proudly, IEEE for the last 10 years

Angela Ogier

Angela is EY Oceania's Hydrogen and Energy Transition Director, and a prominent figure in New Zealand's energy sector. Angela has expertise in areas such as energy transition, renewable energy, hydrogen, biofuels, and regulated infrastructure. Her career, which spans the UK, France, Nigeria, Australia, and New Zealand, has equipped her with a comprehensive understanding of international energy market dynamics and techno-economic factors.

Mark Ryall

Mark is the GM of grid delivery at Transpower, New Zealand's Transmission Grid Owner. Mark leads large multi-disciplinary teams responsible for project delivery and operations in the transmission utility sector.

Jeff Schlichting

Jeff, also an Edmund Hillary Fellow, is the Managing Director and co-founder of Helios Energy, a New Zealand company that is developing utility-scale Solar and Battery storage in Aotearoa. During his career, Jeff has led the successful development of multiple renewable energy projects and has advised on the sale and purchase of numerous others.

Plenary Session - Electricity Markets, Regulations and Standards (Thursday 13:30 to 15:30)

Dr. Ramu Naidoo (Chair)

Ramu is currently a Principal Market Advisor in the Operations division of Transpower. Ramu's interests are in power system operation, planning, economics and modelling. In his current role he is involved in the development, application and analysis of electricity markets and electricity security of supply.

Ramu has been in the electricity industry for two decades working in consulting, regulation and operations. He is active in CIGRE (International Council on Large Electric Systems) and has participated and presented at both local and international conferences.

Ramu received his Ph.D. in industrial engineering and master's degree in electrical engineering from Purdue University, USA and did his undergraduate degree in electrical engineering at the University of KwaZulu-Natal in South Africa.

Robyn Holdaway

With nearly a decade of experience across the public and private sectors, Robyn's background places her expertise at the intersection of policy, business, and political engagement. Her focus is on solving complex problems that have impact by strengthening the connection between Government and industry, and, by supporting the translation of high level policy objectives through to outcomes.

With five years of experience in the energy sector, leading the public policy engagement of New Zealand's largest electricity network business, Robyn has a deep understanding of challenges and opportunities surrounding an affordable and secure energy transition that is designed for consumers. This includes achieving the right settings for the accelerated integration of technologies, a sustainable and competitive electricity market, and a whole-systems approach to policy decision making.

Robyn has experience leading the development and implementation of public policy strategies and stakeholder engagement plans; co-developing policy and regulatory solutions with diverse stakeholders between and across sectors; and, implementing these solutions across policy, regulatory and political processes. Having worked in as a public policy advisor in innovation policy at the Ministry of Business Innovation and Employment, a consultant for government clients, and an advisor on public service-delivery strategy at the Ministry of Social Development, Robyn has experience advising Cabinet Ministers and executive leaders across the policy cycle.

Robyn graduated with Hons (1st) in International Relations with a focus on strategic studies. Her undergraduate degree had majors in International Relations, Political Science, and Philosophy. During her time at university, she interned in New Zealand Parliament.

Sean McCready

Sean is currently a Principal Advisor (Engineer) in the Infrastructure Regulation Branch at the Commerce Commission. He has been at the Commission for 15 months. Sean has been involved in the electricity sector most of his career, including: power generation, the transmission and distribution sectors, managing engineering and commercial teams, maintenance, project management and as an industry technical guide.

In Sean's current role he provides engineering advice on policy development, reviewing the asset performance of regulated suppliers and working with industry to understand their challenges.

Alan Eyes

Alan is Energy Manager at NZ Steel, a position he has held for the last 12 years. He holds post graduate qualification in commerce and management. Prior to joining NZ Steel in a senior finance role, he worked in the meat and dairy industries, and initially in the electricity distribution sector.

His role at NZ Steel sees him as part of the executive committees of the major electricity and major gas user groups. He was a member of the EA wholesale advisory group for 5 years.

Outside his day job, Alan is an elected Trustee of Counties Energy Trust which holds the shares in Counties Energy Limited. He continues an active involvement in community organisations and he and his wife enjoy overseas travel.

Andrew Toop

Andrew Toop is General Manager Commercial at Counties Energy, which is an electricity distribution business supplying 48,000 customers in the south rural Auckland and northern Waikato regions. He started work in the electricity industry over 30 years ago as a Research Analyst for the Electricity Industry Association of New Zealand when the industry was dominated by ECNZ and there were over 60 power companies.

Andrew's role at Counties Energy covers legal and regulations as well as managing the company's metering business. He previously worked at Telecom New Zealand in fixed line and mobile commercial roles. His other roles have included a Policy Advisor for the Ministry of Transport and a Monitoring Analyst at EECA. Andrew has a Master of Commerce in Management Science from Canterbury University as well as a Bachelor of Science and Diploma of Science.

Technical Presentation Session

TS01: Smart Grid Planning, Operation & Analysis
(Wednesday 13:30-15:30)

Assoc Prof. Abhisek Ukil (Chair)

University of Auckland

TS02: Protection, Control & Automation of Modern Power Systems
(Wednesday 13:30-15:30)

Dr. Tran The Hoang (Chair)

University of Auckland

TS03: Smart Grid Planning, Operation & Analysis
(Wednesday 15:45-17:45)

Andre Cuppen (Chair)

Powerco., New Zealand

TS04: Protection, Control & Automation of Modern Power Systems Analysis (Wednesday 15:45-17:45)

Assoc Prof. Abhisek Ukil (Chair)

University of Auckland

TS05: Advanced Technologies/Tools for Smart Grid Applications and Validations (Thursday 10:30-12:30)

Andre Cuppen (Chair)

Powerco., New Zealand

TS06: Renewable Energy Integration and Control (Thursday 10:30-12:30)

Prof. Neville Watson (Chair)

University of Canterbury

TS7: Electricity Market, Regulations & Standards Control (Thursday 10:30-12:30)

Dr. Jeremy Watson (Chair)

University of Canterbury

TS08: Advanced Technologies/Tools for Smart Grid Applications and Validations (Thursday 13:30-15:30)

Prof. Neville Watson (Chair)

University of Canterbury

TS09: Advanced Technologies/Tools for Smart Grid Applications and Validations (Thursday 13:30-15:30)

Dr. Jeremy Watson (Chair)

University of Canterbury

ISGT ASIA 2023 Day 4 Detail

Plenary Session (Friday 09:00 to 09:30)

Kate Sutton

Future of Auckland Lead, Deloitte

Kate Sutton works for Deloitte one of New Zealand's largest and most respected professional services firms. She is an innovation, cities, and impact specialist with the remit for leading Deloitte New Zealand's work on Auckland and cities. Prior to working for Deloitte she was at the UN Development Programme based in Bangkok and before that working for the UKs Innovation agency Nesta backing impact start ups for social and environmental impact

IEEE PES LRP (Friday 09:30 to 10.00)

Dr. Nirmal Nair

Nirmal received his BE in Electrical Engineering from Maharaja Sayajirao University (M.S.U), Baroda, India. He completed his ME in Electrical Engineering with specialization in High Voltage Engineering from Indian Institute of Science (IISc), Bangalore, India. After a decade of professional engineering and lecturing in India he moved to the United States where he completed his PhD in Electrical Engineering at Texas A&M University. Since 2004 he has been based in New Zealand.

He has held several professional, teaching and research positions in India, USA and in New Zealand. Presently, he is a tenured Associate Professor at Department of Electrical & Computer Engineering of University of Auckland. His expertise involves smart grids, power system analysis, protective relaying & optimisation in the context of electricity markets and integration of DG/renewable sources into electricity networks.

He serves in various capacities for IEEE New Zealand North Section, IEEE Power and Energy Society and is Secretary for CIGRE New Zealand National Committee. He is actively engaged towards University of Auckland's outreach with power system stakeholders, internationally and in New Zealand across all sectors (generators, distributors, retailers, metering, transmission system operator, regulatory bodies, consultancies, vendors, Electricity Engineering Association etc)

Future Workforce for Success Session (Friday 10:30-12:00)

Abhinav Chopra (Chair)

Abhinav heads the Future and Advanced Technology Security and Architecture portfolio working with Space Power Systems, Communication Systems, OT and ICS Systems, Smart Grid Architecture, Substation Automation Architecture, DERMS, ADMS, GIS, Asset Management, Big Data, Blockchain, Distributed Systems, Cloud, Cyber Security, ISA99, IEC62443, IIoT, IoT, IED.

He has helped set standards (ISO/IEC/IEEE) and provides consulting services to critical infrastructure sectors – ports, telecommunication, transport, energy, water, health. He has worked for council, insurance, healthcare, life sciences, critical infra, public policy, CERTNZ, NCSC and the higher education domain within Europe, the United States, Australia, and New Zealand to uplift their security Posture. Abhinav is CISSP, TOGAF, Prince 2, ITIL, Six Sigma certified. He holds advanced degree qualifications in Software, Power Systems, Electronics and Telecommunications Engineering and Business Management

Peter Berry

Executive Director Electricity Engineers' Association of NZ

Paul Spoonley

Research Director for the College of Humanities and Social Sciences

at Massey University

Damian Pedreschi

Executive General Manager, New Zealand

at Ventia

Technical Session (13:30-15:30)

TS10: Protection, Control & Automation of Modern Power Systems (Friday 13:30-15:30)

Prof. Tek Tjing Lie (Chair)

Auckland University of Technology

TS11: Advanced Technologies/Tools for Smart Grid Applications and Validations (Friday 13:30-15:30)

Dr. Ing. Tobias Massier (Chair)

TUMCREATE Ltd., Singapore

TS12: Advanced Technologies/Tools for Smart Grid Applications and Validations (Friday 13:30-15:30)

Abhinav Chopra, M.Eng. CSBM (Chair)

University of Auckland

Pre-Conference Day - 2023 NZPEC

NZ Power and Energy Collaboratory Research Workshop at 2023 ISGT Asia

The 2023 ISGT Asia hosted the Power and Energy Collaboratory Research Workshop on Monday, November 20, at The University of Auckland. The Annual Meeting for NZPEC included 5-minute elevator pitch sessions by NZ Power System Researchers from The University of Auckland (UOA), Victoria University of Wellington (VUW) & Auckland University of Technology (AUT).

Affiliation	Presenters	Title of Research
VUW	*Nabil Adam*	Use of Grid Forming Inverters to Support Stability
UOA	*Angaline Krishna*	TBC
VUW	*Haesum Ali*	Energy Management in Local Energy Markets for Improving DERs Hosting Capacity in Distribution Networks
UOA	*Michael Gibson*	TBC
AUT	*Aphrodis Nduwamungu*	TBC
UOA	*Xin Liu*	TBC
AUT	*Hussam Almukhtar*	The Impact of Dust on PV Temperature
UOA	*Andre Cuppen*	TBC
AUT	*Zaid Al-Tameemi*	Adaptive event triggered consensus protocol of DC microgrids cluster
UOA	*Shaila Arif*	Enhancement of grid resilience with grid-forming converter interfaced solar PV
AUT	*Rasool Peykarporsan*	Model Order Reduction for Control and Stability Analysis of Complex Dynamical Systems in a DC Microgrid
UOA	*Abhinav Chopra*	TBC
AUT	*Barkha Parkash*	An intelligent forecasting method for hierarchical load structure in a residential market
AUT	*Uvini Perera*	Oscillatory stability monitoring and analysis of the power grid with high penetration of renewables
AUT	*Avy Sheina*	An Adaptive Approach for DC Microgrid Protection System with Optimization and Hardware-in-the-loop Implementation in Offshore Application
AUT	*Hayder Al-Sarraf*	TBC
AUT	*Uchenna Emmanuel Edeh*	TBC

Pre-Conference Day- 2023 QuakeCoRE Event

The first day of IEEE ISGT ASIA 2023 also features a sponsored workshop on Seismic Resilience.

Schedule:

Time	Mode	Title
10:00 -10:30	*In person*	Overview and updates of IP4
		Overview of IP4 -Dr Garry McDonald and Assoc. Prof. Nirmal Nair
		Quick Fire introductions for attendees (Name, organization and interest areas.)
		Update of IP4's Yearly activities, progress and updates
10:30 - 12:00	*In person*	Panel session: Renewable Distributed Energies and Electric Autonomous Transportation to seismic resilience
		Renewable distributed energies
		Electric autonomous transportation
12:00 - 13:30	*In person*	Lunch and Lab tour
13:30 - 15:00	*In person*	Panel session: Technologies of Smart Cities and Real-Time Sensing to seismic resilience
		Smart cities and real-time sensing (Robotics & AR/VR)
		Megatrend technology workshop group meeting leading by Prof Kevin on Machine Learning /AI
15:00 - 15:15	*In person*	Afternoon tea
15:15 - 15:45	*In person*	General discussion and close of this workshop
		Plans for the year 2024.
		Strategy for attracting applications for 2024 IP4 masters and PhD applicants.
		Industry engagement for IP4 projects (2024-25)
		Inviting new researchers to IP4 from and upgrading to AI

Overview and updates of IP4

Dr Garry McDonald
QuakeCoRE IP4 Director

Dr Nirmal Nair
QuakeCoRE IP4 Co-Director

Renewable Distributed Energies and Electric Autonomous Transportation to Seismic Resilience

Xin Liu

Postgraduate Student
University of Auckland

Eric Sauvage

Postgraduate Student
University of Auckland

Yuan Liu

Research Fellow
University of Auckland

Technologies of Smart Cities and Real-Time Sensing to Seismic Resilience

Dr Kevin Wang

Associate Professor
University of Auckland

Dr Ho Seok Ahn

Senior Research Fellow
University of Auckland

Dr Yang Zou

Senior Lecturer
University of Auckland

Auckland Information

The following information is provided as a guide to Auckland. If you have any queries, please visit the registration desk.

Emergencies, Medical Needs and Illnesses

If you have an emergency you can contact the police, paramedics and fire department by calling 111 from any landline or mobile phone.

The Venue for the event is:

Faculty of Science,

23 Symonds Street,

Waipapa Taumata Rau

University of Auckland,

Auckland

If you require non-emergency medical attention during the workshop, please inform the registration desk.

Getting Around

Taxis and Airport Shuttles

There are many taxi companies to choose from in Auckland. We suggest:

Auckland Co-op Taxis 00 300 3000
www.cooptaxi.co.nz

Blue Bubble Taxis 0800 228 296
www.bluebubbletaxi.co.nz

Super Shuttle 0800 748 885 shared airport transfers direct to/ from your accommodation
www.supershuttle.co.nz

SkyDrive 0800 759 374 direct express service between the terminals of Auckland Airport & Central Auckland City

www.skydrive.co.nz




Piha Beach (top left), Wynard Quarter (bottom left), Waiheke Island (top right), Cornwall Park (bottom right)

Nearby Services

Pharmacy and Post Shop

Level 1 Kate Edgar Information Commons Corner & Symonds Street

Eat & Drink in Auckland

Where to start? Auckland has more great places to eat and drink than we could hope to recommend. For Current reviews visit:

Metro Eats Auckland
www.metroeat.co.nz

Check the Top 50 Restaurants 2023, Cheap Eats and Best Bar lists.

The Urban List
www.theurbanlist.com/auckland

Places to Visit

Visit Waiheke Island for some of the best vineyards in New Zealand, including the University's own award-winning Goldie vineyard.

Take a walk on one of Auckland's 50 volcanoes. For a quick trip, visit Mt Eden or One Tree Hill or for a day trip take the ferry out to Rangitoto Island.

View www.aucklandnz.com for more ideas.

Thank You | Ngā Mihi Maioha!

Thank you for being a part of the ISGT Asia 2023 Conference!

As we conclude this enriching event, we extend our heartfelt appreciation to all participants, speakers, sponsors, and organisers. Your contributions have made this conference a resounding success, fostering collaboration and innovation in the field of Smart Grid Technologies.

Key Highlights | Hirahira:

- Engaging Sessions: The conference featured insightful presentations and discussions, providing a platform for the exchange of cutting-edge research and ideas.
- Diverse Perspectives: Scholars, researchers, industry experts, and policymakers brought diverse perspectives, contributing to a holistic understanding of the challenges and opportunities in the realm of smart grid technologies.
- Networking: The networking sessions facilitated valuable connections, fostering partnerships that will drive future advancements in sustainable energy solutions.

Gratitude | Whakawhetai:

We express our deepest gratitude to our esteemed speakers and presenters who shared their expertise, our sponsors whose support made this event possible, and our organising committee for their dedication and hard work.

Stay Connected | Whakawhanaungatanga:

Keep the conversation going! Connect with fellow participants through our official social media channels and continue the dialogue on the future of smart grid technologies.

We look forward to welcoming you again at the next ISGT Asia conference. Stay tuned for updates on the location, dates, and exciting themes for our upcoming events.

Safe travels, and until we meet again! | Mā te wā!

The University of Auckland Organising Committee