

# **2016 Australasian Universities Power Engineering Conference (AUPEC 2016)**

**Brisbane, Australia  
25-28 September 2016**



**IEEE Catalog Number: CFP1666D-POD  
ISBN: 978-1-5090-1406-4**

**Copyright © 2016 by the Institute of Electrical and Electronics Engineers, Inc  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\*This publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1666D-POD
ISBN (Print-On-Demand):	978-1-5090-1406-4
ISBN (Online):	978-1-5090-1405-7

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE CONTENTS

**Monday, 26<sup>th</sup> September**

## Session 1: Power system operation and planning 1

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-24	<b>Impact of Concentrated Solar Power with Thermal Energy Storage on Australian Electricity Network</b> , Afsaneh Narimani, QUEENSLAND UNIVERSITY OF TECHNOLOGY.	Australia	1
AUPEC-2016-32	<b>Impacts of voltage transition from 240V to 230V voltage standard</b> , Alex Guinane, Ergon Energy; Donald McPhail, Ergon Energy; Michael Gorman, Ergon Energy.	Australia	6
AUPEC-2016-41	<b>Robust Pade Approximations for the Holomorphic Embedding Load Flow</b> , Alberto Sarnari, The University of Adelaide; Rastko Zivanovic, The University of Adelaide.	Australia	10
AUPEC-2016-80	<b>Delay Compensation in the Wide Area Control of SVCs for First Swing Stabilisation and Damping</b> , Edward Palmer, Central Queensland University.	Australia	16

## Session 2: Power system economics and management 1 Room: 50-N202

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-38	<b>Optimal Incremental Pricing Methodology for Valuing Demand Management Incentives</b> , Andrew Thomas, Ergon Energy.	Australia	21
AUPEC-2016-39	<b>Demand Side Management with Stepped Model Predictive Control</b> , Lei Liu, Queensland University of Technology; Gerard Ledwich, QUEENSLAND UNIVERSITY OF TECHNOLOGY; Wendy Miller, QUEENSLAND UNIVERSITY OF TECHNOLOGY.	Australia	27
AUPEC-2016-63	<b>Investigating the Effects of Conservation Voltage Reduction on UK-Type Residential Networks</b> , Donald Azuatalam, University of Sydney, Australia.	Australia	33
AUPEC-2016-71	<b>Comparative Assessment of the Productive Performance of Three Solar PV Technologies at Gatton</b> , Phillip Wild, UQ Solar.	Australia	39
AUPEC-2016-130	<b>Transmission Pricing in National Electricity Market</b> , Hanxiao Zhang, The University of Queensland.	Australia	45

## Session 3: Asset management and condition monitoring 1

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-8	<b>Improving the Determination of Water Content of Power Transformer Insulation Paper near the End of Its Functional Life</b> , Daniel Martin, The University of Queensland; Tapan Saha, The University of Queensland; Olav Krause, The University of Queensland; Gary Buckley, Energex; Srinivasan Chinnarajan, Energex; Richard Dee, Energex; Gary Russell, Powerlink.	Australia	50
AUPEC-2016-22	<b>Possibilities for Minimising Sulphur Hexafluoride Use for HV Switchgear Asset Renewal</b> , Andreas Helwig, University of Southern Queensland; Michael Marland, Sydney Trains.	Australia	56

AUPEC-2016-40	<b>Influences of Oil Flow Speed and Temperature on Partial Discharge Properties in Transformer Oil</b> , Shuaibing Li, Southwest Jiaotong University; Guangning Wu, Southwest Jiaotong University; Bo Gao, Southwest Jiaotong University.	China	61
AUPEC-2016-49	<b>Integrated Asset Management Framework for Australian Wind Farms</b> , Muhammad Shahid, University of Southern Queensland; Nateque Mahmood, University of Southern Queensland; Narottam Das, University of Southern Queensland.	Australia	65
AUPEC-2016-53	<b>An Analysis of Australian Power Transformer Failure Modes, and Comparison with International Surveys</b> , Judith Marks, Daniel Martin, Tapan Saha & Olav Krause, The University of Queensland; Amra Alibegovic-Memisevic , & Gary Russell, Powerlink; Gary Buckley, & Srinivasan Chinnarajan, Energex; Matthew Gibson, Ausgrid.	Australia	70

#### Session 4: Power system operation and planning 2

AUPEC Code	Title, Authors, Affiliations	Country of Origin	Page #
AUPEC-2016-45	<b>Robust State Estimation in Distribution Networks</b> , Bernd Brinkmann, University of Tasmania; Michael Negnevitsky, University of Tasmania.	Australia	76
AUPEC-2016-46	<b>A Travelling Wave Detector Based Fault Location Device and Data Recorder for Medium Voltage Distribution Systems</b> , Peter Wolfs, Central Queensland University Australia; Ali Tashakkori jahromi, Curtin University; Syed Islam, Curtin University.	Australia	81
AUPEC-2016-66	<b>Optimum Placement in Distribution System Including Renewable Energy Resources</b> , Afsaneh Narimani, Queensland University of Technology.	Australia	86
AUPEC-2016-81	<b>Increasing the Capacity of Transmission Lines via Current Uprating: An Updated Review of Benefits, Considerations and Developments</b> , Mavula Ntuli, Eskom; Jan-Harm Pretorius, University of Johannesburg.; Nhlanhla Mbuli, University of Johannesburg.	South Africa	91
AUPEC-2016-102	<b>Reliability Evaluation of Power Network: A Case Study of Fiji Islands</b> , Kabir Mamun, The University of the South Pacific; F. R. Islam, The University of the South Pacific.	Fiji	97

#### Session 5: Power system economics and management 2

AUPEC Code	Title, Authors, Affiliations	Country of Origin	Page #
AUPEC-2016-54	<b>Energy Management and Automated Analytics for Reduction of Energy Consumption</b> , Matthew Santarossa, University of Southern Queensland; Narottam Das, University of Southern Queensland; Andreas Helwig, University of Southern Queensland; Tony Ahfock, University of Southern Queensland.	Australia	103
AUPEC-2016-85	<b>Impact of Module Soiling on the Productive Performance of Three Solar PV Technologies at Gatton</b> , Phillip Wild, UQ Solar.	Australia	108
AUPEC-2016-92	<b>Competition Driven Bi-Level Supply Offer Strategies in Day Ahead Electricity Market</b> , Nur Mohammad, Queensland University of Technology; Yateendra Mishra, Queensland University of Technology.	Australia	114

AUPEC-2016-129	<b>Evaluation of Savings from an Underground Fan Replacement Project</b> , Daniel de Canha, University of Johannesburg; Jan-Harm Pretorius, University of Johannesburg; Rudolph Laubscher, University of Johannesburg; Pierre van Rhyn, University of Johannesburg.	South Africa	120
AUPEC-2016-000	<b>Modelling of integrated multi-energy systems: drivers, requirements, and opportunities</b> , P. Mancarella, G. Andersson, J.A. Peças-Lopes and K.R.W. Bell, The University of Melbourne.	Australia	N/A

## Session 6: Asset management and condition monitoring 2

AUPEC Code	Title, Authors, Affiliations	Country of Origin	Page #
AUPEC-2016-52	<b>Gaining Experience in SFRA of Transformer Reliability Engineering for Undergraduates</b> , Andreas Helwig, University of Southern Queensland; Amrit Pal Kaur, University of Southern Queensland; Narottam Das, University of Southern Queensland.	Australia	125
AUPEC-2016-56	<b>Analysis of the Field Ageing of Natural Ester Transformer Dielectrics: Ten Years of Data</b> , Daniel Martin, The University of Queensland; Olav Krause, The University of Queensland; Lindsay McPherson, Essential Energy.	Australia	130
AUPEC-2016-87	<b>Finite Element Modelling of a Transformer Winding for Vibration Analysis</b> , Lakshitha Naranpanawe, The University of Queensland; Chandima Ekanayake, Griffith university.	Australia	135
AUPEC-2016-90	<b>The Application of Sweep Frequency Response Analysis for the Online Monitoring of Power Transformers</b> , Hossein Rahimpour, The University of Newcastle; Steve Mitchell, The University of Newcastle; Joe Tusek, Aurecon Australasia Pty Ltd.	Australia	141
AUPEC-2016-107	<b>Determination of stressed system loadability based on current and voltage characteristics</b> , Yang Liu, University of Auckland; Nirmal Nair, University of Auckland.	New Zealand	147

## Session 7: Power electronics

AUPEC Code	Title, Authors, Affiliations	Country of Origin	Page #
AUPEC-2016-30	<b>An Improved Four Step Commutation Process for Silicon Carbide Based Matrix Converters</b> , Md. Sawkat Ali , Central Queensland University Australia; Peter Wolfs, Central Queensland University Australia.	Australia	152
AUPEC-2016-75	<b>Design of a 100W Bi-directional LCC Series-Parallel Resonant DC-DC Converter</b> , Mohamed Khalil-Abaker, Victoria University; Juan Shi, Victoria University; Akhtar Kalam, Victoria University.	Australia	157
AUPEC-2016-89	<b>Design Concepts and Preliminary Implementations of Dual Output Supercapacitor-Assisted Low-Dropout Regulators (DO-SCALDO)</b> , Kasun Subasinghage, AUT University; Kosala Gunawardane, AUT University; Tek Lie, AUT University; Nihal Kularatna, University of Waikato.	New Zealand	162
AUPEC-2016-91	<b>Multifunctional control of single-phase transformerless PV inverter connected to a distribution network</b> , Md Monirul Islam, The University of Queensland; Mithulananthan Nadarajah, The University of Queensland; Jahangir Hossain, Griffith University.	Australia	168

AUPEC-2016-119	<b>Harmonic Balance Method Used for Harmonics Calculation and Prediction in Power Systems</b> , Seyedfoad Taghizadeh, Griffith University; Junwei Lu, Griffith University; Jahangir Hossain, Griffith University.	Australia	174
----------------	---	-----------	-----

#### Session 8: Power system operation and planning 3

AUPEC Code	Title, Authors, Affiliations	Country of Origin	Page #
AUPEC-2016-57	<b>Evaluation of Temperature Rise in Continuously Loaded Distribution Earthing Electrodes</b> , Nusra Noorudheen, Central Queensland University; Peter Wolfs, Central Queensland University Australia; Sanath Alahakoon, Central Queensland University Australia.	Australia	180
AUPEC-2016-108	<b>Low Frequency Oscillation Mitigation by Power System Stabilizer and TCSC-POD designed using SOS</b> , Juhi Datta, National Institute of Technology Agartala; Aniruddha Bhattacharya, NIT Agartala.	India	N/A
AUPEC-2016-120	<b>Practical Impact of VSPP in Distribution Networks - Intentional Islanding Operation</b> , Noppatee Sabpayakom, KMUTNB; Somporn Sirisumrannukul, KMUTNB.	Thailand	186
AUPEC-2016-124	<b>A Linearization Technique to Estimate Operational Constraints States by Pseudo Inverse Matrix</b> , Sohel Uddin, The University of Queensland; Olav Krause, The University of Queensland; Daniel Martin, The University of Queensland.	Australia	192
AUPEC-2016-135	<b>A post-contingent load management scheme utilising peer-to-peer SCADA communications</b> , Darren Spoor, TransGrid; Jahan Peiris, TransGrid; Phillip Nichols, University of Newcastle; John Roberts, TransGri	Australia	198

#### Session 9: Power system protection

AUPEC Code	Title, Authors, Affiliations	Country of Origin	Page #
AUPEC-2016-15	<b>Two-Part Synthetic Test Procedures for the Testing of Medium Voltage Load Break Switches</b> , Asif Islam, The University of Queensland.	Australia	N/A
AUPEC-2016-64	<b>Software Implementation of two Seamless Redundant Topologies in a Digital Protection System based on IEC 62439-3</b> , Shantanu Kumar, Curtin University; Narottam Das, University of Southern Queensland; Syed Islam, Curtin University.	Australia	203
AUPEC-2016-84	<b>Detection and Identification of High Impedance Faults in Single Wire Earth Return Distribution Networks</b> , Moses Kavi, Queensland University of Technology; Yateendra Mishra, Queensland University of Technology; Mahinda Vilathgamuwa, Queensland University of Technology.	Australia	208
AUPEC-2016-118	<b>Analysis of Lightning Induced Effects on Buried Pipeline due to Direct Strike on Ground</b> , Mahbub Rabbani, Deakin University; Aman Than Oo, Deakin University; Raju Ahmed, DUET; Joglul Kabir, Deakin University.	Australia	214
AUPEC-2016-125	<b>Overhead Shielding Wire and Induced Potential on Pipeline Located Close to High Voltage Transmission</b> , Ahmed Alshahri, Auckland University.	New Zealand	219

**Tuesday, 27<sup>th</sup> September**

**CIGRE-GHD Innovation Poster Competition**

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-18	<b>Position estimation for sensorless FOC of Five-phase PMSM in Electric Vehicles</b> , Dmitry Semenov, Harbin Institute of Technology; Bing Tian, Harbin Institute of Technology.	China	223
AUPEC-2016-20	<b>Discharging scheme for distributed battery storage devices in Smart Grid</b> , Dmitry Semenov, Harbin Institute of Technology.	China	228
AUPEC-2016-23	<b>Realizing the Potential of CSP's Parabolic Trough Technology While Considering Government Incentives in Longreach, Queensland, Australia</b> , Awak Mathok, Queensland University of Technology.	Australia	233
AUPEC-2016-35	<b>Development of smoothing control strategy for reducing wind and photovoltaic power fluctuations based on Kalman filter</b> , Dipesh Lamsal, University of Western Australia; Victor Sreeram, University of Western Australia; Yateendra Mishra, Queensland University of Technology.	Australia	239
AUPEC-2016-37	<b>Evolutionary Bayesian Fusion for Transformers Fault Detection</b> , Yi Cui, University of Queensland; Lakshitha Naranpanawe, University of Queensland; Junhyuck Seo, University of Queensland.	Australia	244
AUPEC-2016-43	<b>Implementation of 3D Lookup Tables in PLECS for Modeling Photovoltaic Modules</b> , Leonardo Callegaro, University of New South Wales; Mihai Ciobotaru, University of New South Wales; Vassilios Agelidis, University of New South Wales.	Australia	250
AUPEC-2016-48	<b>Application of Online Impulse Technique to Diagnose Inter-turn Short Circuit in Transformer Windings</b> , Bahar Mohseni, Curtin University; Syed Islam, Curtin University; Naser Hashemnia, Curtin University; Zhongyong Zhao, Chongqing University.	Australia	256
AUPEC-2016-50	<b>Strategic Asset Management Framework for the Improvement of Large Scale PV Power Plants in Australia</b> , Syed Shah, University of Southern Queensland; Nateque Mahmood, University of Southern Queensland; Narottam Das, University of Southern Queensland.	Australia	260
AUPEC-2016-58	<b>Impacts of EV Charging on Business Premises: A Case Study of The University of Queensland</b> , Md Shariful Islam, The University of Queensland; Mithulananthan Nadarajah, The University of Queensland.	Australia	265
AUPEC-2016-68	<b>Optimal Placement and Sizing of Multiple StatCom in Distribution System to Improve Voltage Profile</b> , Moayed Moghbel, Curtin University; Mohammad Ali Masoum, Curtin University; Sara Deilami, Curtin University.	Australia	271
AUPEC-2016-69	<b>D-STATCOM Based on Hysteresis Current Control to Improve Voltage Profile of Distribution Systems with PV Solar Power</b> , Moayed Moghbel, Curtin University; Mohammad Ali Masoum, Curtin University; Alireza Fereidouni, Curtin University.	Australia	276
AUPEC-2016-74	<b>Comparison of the Electricity Tariffs and Bills across the Zones of Australian Power Distribution Companies</b> , Muhammad Hayat, Murdoch University; Farhad Shahnian, Murdoch University; Ali Arefi, Murdoch University.	Australia	281



AUPEC-2016-79	<b>The Use of Siemens PTI PSS/E in Undergraduate Teaching at Central Queensland University</b> , Edward Palmer, Central Queensland University.	Australia	287
AUPEC-2016-88	<b>A Comprehensive CES Planning Strategy based on a Cost-Benefit Analysis</b> , Junainah Sardi, UQ.	Australia	291
AUPEC-2016-93	<b>Arc Flash Hazard Analysis of Coal-Fired Power Station</b> , Jacob Gould, CQ University; Peter Wolfs, Central Queensland University Australia.	Australia	297
AUPEC-2016-99	<b>Performance Monitoring of a PMU in a Microgrid Environment based on IEC 61850-90-5</b> , SHANTANU KUMAR, Curtin University; Narottam Das, University of Southern Queensland; Syed Islam, Curtin University.	Australia	303
AUPEC-2016-104	<b>Sag Calculation Difference Caused by Temperature Difference between the Steel Core and Surface of Overhead Transmission Lines</b> , Yang Li, South China University of Technology; Jinyu Yu, South China University of Technology; Yiming Cai, South China University of Technology.	China	308
AUPEC-2016-106	<b>Incremental Placement of PMUs for Enhancing State Estimation Accuracy</b> , Hatim Abood, the university of western Australia; Victor Sreeram, University of Western Australia; Yateendra Mishra, Queensland University of Technology.	Australia	313
AUPEC-2016-111	<b>UV Radiation Effect on Anti-reflection Coating Module Degradation in Australia</b> , Amit Dhole, The University of Queensland; Adrian Mengede, The University of Queensland.	Australia	319
AUPEC-2016-112	<b>Maximum Instantaneous Renewable Energy Integration of Power Grids</b> , Huajie Gu, University of Queensland.	Australia	324
AUPEC-2016-122	<b>Innovation to Brisbane City Council Street Lighting System with Solar Powered LED: A Techno-economic feasibility study</b> , Xinren Jiang, The University of Queensland.	Australia	329
AUPEC-2016-123	<b>Comparison of Different Correlational Techniques in Estimating the Total Generated Power of Neighboring Photovoltaic Systems</b> , Hasanain Al-Hilfi, Curtin University; Farhad Shahnia, Murdoch University; A. Abu-Siada, Curtin University.	Australia	335
AUPEC-2016-126	<b>Impact of PEV Behavior on Peak Demand Reduction in a Commercial Microgrid</b> , Mojtaba Moghimi, Griffith University; Domagoj Leskarac, Griffith University; Nazanin Nadian, Griffith University; Sascha Stegen, Griffith University; Junwei Lu, Griffith University.	Australia	341
AUPEC-2016-127	<b>DG Integration Issues in Unbalanced Multi-Phase Distribution Networks</b> , Naruttam Kumar Roy, Khulna University of Engineering and Technology (KUET); Hemangshu Pota, University of New South Wales; Apel Mahmud, Deakin University.	Bangladesh	346
AUPEC-2016-134	<b>Incipient Fault Diagnosis in Power Transformers by Clustering and Adapted KNN</b> , Md Mominul Islam, Murdoch University; Gareth Lee, Murdoch University; Sujeewa Hettiwatte, National School of Business Management.	Australia	351
AUPEC-2016-116	<b>Modelling demand response aggregator behavior in wind power offering strategies</b> , Nadali Mahmoudi, The University of Queensland.	Australia	N/A
AUPEC-2016-82	<b>Power Quality Impacts during CFL to LED Transition</b> , Piyush Verma, University of Auckland; Nitish Patel, University of Auckland; Nirmal Nair, University of Auckland.	New Zealand	356



### Session 10: Battery storage and electric vehicles 1

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-17	<b>Utilizing an Aggregated Network of Electric Vehicle Supply Equipment to Provide Demand Response to the Electricity Grid</b> , Donald McPhail, Ergon Energy; Jeffrey Wishart, Intertek CECET.	Australia	362
AUPEC-2016-19	<b>Automatic Charging Scheme for Electric Vehicle to Grid Using Vehicle Built-in Monitoring Device</b> , Timo Lehtola, James Cook University; Ahmad Zahedi, James Cook University.	Australia	368
AUPEC-2016-72	<b>Wheel Slip Control based on Traction Force Estimation of Electric Locomotives</b> , Tajrin Ishrat, Queensland University of Technology; Gerard Ledwich, Queensland University of Technology; Mahinda Vilathgamuwa, Queensland University of Technology; Pietro Borghesani, Queensland University of Technology.	Australia	372
AUPEC-2016-100	<b>Novel nonlinear speed control of a five-phase PMSM for Electric Vehicle applications</b> , Dmitry Semenov, Harbin Institute of Technology; Qun-Tao An, Harbin Institute of Technology; Li Sun, Harbin Institute of Technology; Galina Mirzaeva, The University of Newcastle.	Australia	378
AUPEC-2016-115	<b>A Review of how Emerging Customer Technologies are Likely to Affect the Queensland Transmission System</b> , Ben Jarrett, University of Queensland.	Australia	383

### Session 11: Smart grid

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-47	<b>Dynamic voltage regulation of grid-tied renewable energy system with ANFIS</b> , Nasif Mahmud, James Cook University.	Australia	389
AUPEC-2016-83	<b>Using IEC61499 to Achieve Smart Grid Automation through Interconnected pole Top Reclosers</b> , Martin van der Linde, NOJA Power Switchgear.	Australia	395
AUPEC-2016-96	<b>Validation and calibration of the Blackwall SVC AVR and POD models</b> , Rizah Memisevic, Powerlink; Aljosa Kamberovic, Powerlink; Anthony Kenwick, Powerlink.	Australia	401
AUPEC-2016-97	<b>Power Oscillation Damper design - Blackwall SVC</b> , Rizah Memisevic, Powerlink; Aljosa Kamberovic, Powerlink; Jagath FONSEKA, Powerlink; Sarah Gilmour, Powerlink; Anthony Kenwick, Powerlink.	Australia	407
AUPEC-2016-103	<b>Real-time Solar Radiation Intensity Modeling for Dynamic Rating of Overhead Transmission Lines</b> , Yang Li, South China University of Technology.	China	413

### Session 12: Microgrid control 1

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-55	<b>Controller Interaction in Parallel Connected High Frequency Grid Converters</b> , Blessy John, Curtin University; Arindam Ghosh, Curtin University.	Australia	419
AUPEC-2016-60	<b>Performance Investigation of Hybrid AC/DC Microgrids during Mode Transitions</b> , Jiannan Liu, Griffith University; M.	Australia	425

	J. Hossain, Macquarie University; Md Shamiur Rahman, Griffith University; Junwei Lu, Griffith University.		
AUPEC-2016-62,	<b>Investigating the Technical Impacts of Microgeneration on UK-Type LV Distribution Networks</b> , Donald Azuatalam, University of Sydney, Australia.	Australia	431
AUPEC-2016-70	<b>Real Time Resonant Frequency Estimation and Excitation Frequency Adjustment for Piezoelectric Ultrasonic Transducers</b> , Negareh Ghasemi, Queensland University of Technology.	Australia	436
AUPEC-2016-101	<b>Overview of Optimal Energy Management for Nanogrids (End-Users with Renewables and Storage)</b> , Benjamin Young, University of Adelaide; Nesimi Ertugrul, University of Adelaide; Hong Gunn Chew, University of Adelaide.	Australia	441

## Wednesday, 28<sup>th</sup> September

### Session 13: Battery storage and electric vehicles 2

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-95	<b>A Battery Management Approach to Improve Steady State Voltage Performance of an LV Distribution Feeder</b> , Shohana Rahman Deeba, The University of Queensland.	Australia	447
AUPEC-2016-42	<b>Opportunities for Battery Storage and Australian Energy Storage Knowledge Bank Test System for Microgrid Applications</b> , Nesimi Ertugrul, University of Adelaide.	Australia	453
AUPEC-2016-65	<b>Current Economic Viability of Combined PV and Battery Energy Storage Systems for Australian Households</b> , Georgios Konstantinou, UNSW Australia; Allen Wang, MG & Apsaras Pty Ltd; Yishan Zhan, UNSW Australia.	Australia	459
AUPEC-2016-67	<b>Customer and grid impacts of solar, storage and cost reflective tariffs</b> , Dean Condon, Ergon Energy; Donald McPhail, Ergon Energy; David Ingram, Ergon Energy.	Australia	465
AUPEC-2016-117	<b>Investigating the Possibility of a Solar PV and Battery Storage Based DC Power System at a Brisbane Airport Corporation Facility</b> , Rollsy Ponmattam Madassery, The University of Queensland; M Jan Alam, The University of Quee; Wayne Olsen, Brisbane Airport Corporation.	Australia	471

### Session 14: Distributed energy resources 2

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-12	<b>Solar PV for Australian Tropical Region; The most affordable and an appropriate power supply option</b> , Ahmad Zahedi, James Cook University	Australia	477
AUPEC-2016-51	<b>Fault Ride Through improvement of Fixed Speed Wind Turbine Using CR-FCL with its Modified Control Strategy</b> , Seyed Behzad	Australia	481

	Naderi, University of Tasmania; Michael Negnevitsky, University of Tasmania; Amin Jalilian, University of Tabriz; Mehrdad Tarafdar Hagh, University of Tabriz.		
AUPEC-2016-73	<b>Application of low voltage Statcom to correct voltage issues caused by Inverter Energy Systems</b> , Dean Condon, Ergon Energy; Donald McPhail, Ergon Energy; David Ingram, Ergon Energy.	Australia	487
AUPEC-2016-76	<b>Low Inertia Power Systems: Frequency Response Challenges and a Possible Solution</b> , Nahid Al Masood, The University of Queensland; Nilesh Modi, The University of Queensland; Ruifeng Yan, UQ.	Australia	493
AUPEC-2016-98	<b>A Fully Decentralized Approach for Mitigating Destructive Disturbances in Isolating Process of Remote Coupled Microgrids</b> , Ehsan Pashajavid, Curtin University; Arindam Ghosh, Curtin University.	Australia	499

#### 15: Microgrid control 2

AUPEC Code	Title, Authors, Affiliations	Country of Origin	Page #
AUPEC-2016-94	<b>EV Charging in a Commercial Hybrid AC/DC Microgrid: Configuration, Control and Impact Analysis</b> , Md Shamiur Rahman, Griffith University; Jahangir Hossain, Griffith University; F. H. M. Rafi, Griffith University; Junwei Lu, Griffith University.	Australia	505
AUPEC-2016-109	<b>IEC 61850 Control of Wide-Area Solar-Energy Storage Schemes by Wireless Communication Network</b> , Marcus Steel, Regional Electricity Micro-Grids Pty Ltd.	Australia	511
AUPEC-2016-110	<b>Fuzzy Gain Scheduled Load Frequency Controller in Presence of Frequency Grid Code Responsive Wind Power Penetration</b> , Asma Aziz, Deakin University.	Australia	516
AUPEC-2016-133	<b>Control strategies for combined Photovoltaic – Energy Storage Systems connected to the grid</b> , Sarah Lyden, UTAS.	Australia	522
AUPEC-2016-132	<b>Investigation of Post-Fault Voltage Recovery Performance with Battery-Based Energy Storage System in a Microgrid</b> , Tareq Aziz, Ahsanullah University of Science & Technology; Shohana Rahman Deeba, The University of Queensland; Nahid Al Masood, The University of Queensland.	Bangladesh	528

#### Session 16: Renewable integration

AUPEC Code	Title, Authors, Affiliations	Country of Origin	Page #
AUPEC-2016-26	<b>Enhancing grid compliance of DFIG wind turbine generators to voltage sags and swells</b> , Tapash Das, Swinburne University of Technology.	Australia	534

AUPEC-2016-34	<b>An Improved Neural Ensemble Forecast Framework for Accurate PV Output Power Forecast</b> , Muhammad Qamar Raza, The University of Queensland ; Mithulananthan Nadarajah, The University of Queensland; Chandima Ekanayake, The University of Queensland.	Australia	540
AUPEC-2016-86	<b>Cost-Benefit Analysis for Proactive Consumers in a Microgrid for Transactive Energy Management Systems</b> , Uzma Amin, Griffith University; Jahangir Hossain, Griffith University; Junwei Lu, Griffith University; Apel Mahmud, Deakin University.	Australia	546
AUPEC-2016-105	<b>Opportunities and Challenges of Implementing Renewable Energy in Fiji Islands</b> , F. R. Islam, The University of the South Pacific; Kabir Mamun, The University of the South Pacific.	Fiji	552

#### Session 17: Distributed energy resources 1

AUPEC Code	Title, Authors, Affiliations	Country of Origin	Page #
AUPEC-2016-16	<b>A Study of Solar PV Saturation Limits for Representative Low Voltage Networks</b> , Donald McPhail, Queensland University of Technology, Ergon Energy; Benjamin Croker, Ergon Energy; Blake Harvey, Ergon Energy.	Australia	558
AUPEC-2016-36	<b>Consensus Control Algorithm for Voltage Control of Distribution Feeders</b> , Amin mohammad Saberian, Queensland University of Technology; Hossein Sagha, Queensland University of Technology; Gerard Ledwich, Queensland University of Technology; Geoffrey Walker, Queensland University of Technology.	Australia	564
AUPEC-2016-113	<b>A Hybrid Real-Time Simulation Method for Distribution Grid Control</b> , Jaroslaw Krata, Queensland University of Technology, The University of Queensland.		570
AUPEC-2016-121	<b>Implementation of Independent Improved Neutral Current Controller Using Four-Leg PV-VSI</b> , F. H. M. Rafi, Queensland University of Technology, Griffith University; Jahangir Hossain, Griffith University; Md Shamiur Rahman, Griffith University; Junwei Lu, Griffith University.	Australia	576
AUPEC-2016-128	<b>A Stochastic Approach of Climate Scenario Tracking for Photovoltaic Generators</b> , Munira Batool, Queensland University of Technology, Curtin University; Syed Islam, Curtin University; Farhad Shahnian, Murdoch University.	Australia	582

**Session 18: Power quality**

<b>AUPEC Code</b>	<b>Title, Authors, Affiliations</b>	<b>Country of Origin</b>	<b>Page #</b>
AUPEC-2016-11	<b>Comparative Study of the Response of Wind Turbine Generators to Voltage Sags and Swells</b> , Tapash Das, Swinburne University of Technology; Jingxin Zhang, Swinburne University of Technology; Hemangshu Pota, University of New South Wales.	Australia	587
AUPEC-2016-14	<b>Harmonics Analysis of Industrial and Commercial Distribution Networks with High Penetration of Power Electronics Converters</b> , Firuz Zare, Danfoss Drives A/S; Dinesh Kumar, Danfoss Drives A/S.	Denmark	593
AUPEC-2016-21	<b>The Impact of X/R Ratio on Voltage Stability in a Distribution Network Penetrated by Wind Farms</b> , Morteza Alizadeh, Victoria University; Cagil Ozansoy, Victoria University; Tansu Alpcan, University of Melbourne.	Australia	599