

## Program (at a glance)

	8am	Morning	12pm	2pm	Afternoon	6pm	Evening & night
<a href="#">Sunday 22 Oct</a>		Tutorials		lunch	Tutorials	>Welcome reception	
<a href="#">Monday 23 Oct</a>	Opening & Keynotes		Technical Plenary	Exhibition Opening & lunch	Parallel technical sessions	Exhibitors Reception	
				Exhibition			
<a href="#">Tuesday 24 Oct</a>	Industry Keynote	Parallel sessions	Posters	Lunch & Half-day tours			
		Exhibition					
<a href="#">Wednesday 25 Oct</a>	Parallel sessions		Posters	Lunch	Parallel technical sessions	Conference dinner & awards	
	Exhibition						
<a href="#">Thursday 26 Oct</a>	Parallel technical sessions		Lunch	Technical sessions	Closing		
	Exhibition						

*This is final for Session Structure (there may be some minor changes in actual presentation times). See announcements and notices at Conference*

**Sunday 23 October**

9.15-10:45	<a href="#">Tutorial I</a> Part A	<a href="#">Tutorial II</a> Part A
10:45-11:00	Break	
11:00-12:30	<a href="#">Tutorial I</a> Part B	<a href="#">Tutorial II</a> Part B
12:30-13:30	Lunch	
13:45-15:15	<a href="#">Tutorial III</a> Part A	<a href="#">Tutorial IV</a> Part A
15:15-15:30	Break	
15:30-17:00	<a href="#">Tutorial III</a> Part B	<a href="#">Tutorial IV</a> Part B
18:00-20:00	<b>Welcome Reception</b>	

*Session*

<b>T1</b>	<b>Tutorial I</b> <b>5G Opens the Door for Energy Harvesting (EH) in Telco Applications</b> <i>Brian Zahnstecher, PowerRox, USA</i>
<b>T2</b>	<b>Tutorial II</b> <b>Power Converters for Energy Storage Applications:</b> <i>Analysis and Design From Theory to Practice</i> <i>Dr Petar J. Grbović, Roma TRE University, Italy</i>
<b>T2</b>	<b>Tutorial III</b> <b>Base transceiver cooling and thermal energy storage for energy management</b> <i>Dr Ehsan Haghghi, Northvolt AB, Sweden</i>
<b>T4</b>	<b>Tutorial IV</b> <b>Solar &amp; hybrid design for Communications Energy Systems (on - &amp; off-grid)</b> <i>Cal Lahteenmaa, Carlos Ordonez, David Wilson, Vertiv Co.</i>

**Monday 23 October**

8.00-10:00	<a href="#">Session 1</a> Opening Session			
10:00-10:30	<b>Break</b>			
10:30-11:35	<a href="#">Session 2</a> <b>ES 1</b> Energy Storage 1 Plenary-Forum 1			
11:40-12:00	<b>Exhibition opening</b>			
12:00-1:30	<b>Lunch</b>			
1:30-3:15	<a href="#">Session 3</a> <b>ES 2</b> Energy Storage 2 Battery Technology I	<a href="#">Session 4</a> <b>PE 1</b> Power Electronics 1 Protection for 380V Systems	<a href="#">Session 5</a> <b>PS 1</b> Power Systems 1 Using PV systems	
3:15-3:45	<b>Break</b>			
3:45-5:15	<a href="#">Session 6</a> <b>ES 3</b> Energy Storage 3 Forum I	<a href="#">Session 7</a> <b>CV 1</b> Converters 1 AC-DC Converters	<a href="#">Session 8</a> <b>PS 2</b> Power Systems 2 Data-centre Powering	<a href="#">Session 9</a> <b>CPE 1</b> Commercial Product Exposure 1
6:00	<b>Exhibitors Reception</b>			

[Back](#)

**1 Opening ceremony**

1.1 Welcome to Country

1.2 Official Opening

1.3 **Keynote 1**

**Telcos, energy and the fabric of space-time**

*Ben Burge, Executive Director – Telstra Energy*

1.4 **Keynote 2**

**Data Centres in the future**

*Peter Greaves, Global Electrical Leader, Aurecon.*

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**2 ES 1 Energy Storage 1: Plenary 1**

2.1 **Advanced batteries – Are they ready to replace the standard VRLA in high reliability ICT Energy Systems?**

*View A: The Lithium Ion battery option*

*View B: The Advanced Lead-acid option*

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**3 ES 2 Energy Storage 2: Battery technology I**

3.1 Special Interest Seminar I

**A Review of the Suitability of Lithium Battery Technology in ICT Energy Infrastructure**

*Ole Vigerstol, Consultant*

3.2 **Demonstration Project of Power System Stabilization with the Hybrid Battery Energy Storage System**

*Sano Shinichi & Ichiro Shimoura, Hitachi Chemical Co., Japan*

3.3 **Pure Lead Carbon Technology Development**

*Shawn M. Peng, Leoch Battery Corp. USA, and Fang Yuan, Leoch International Technology, China.*

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**4 PE 1 Power Electronics 1: Protection for 380V Systems**

4.1 **DC Power Distribution Systems and 400 V DC Applications**

*Richard Mehl, E-T-A GmbH, Germany*

4.2 **Safety Considerations for the Operation of Bipolar DC-Grids**

*Julian Kaiser, Kilian Gosses, Leopold Ott, Yunchao Han, Bernd Wunder & Martin März, Fraunhofer IISB, Germany, and Franz Schork, Klaus Bühler & Thomas Böhm, DEHN + SÖHNE GmbH + Co, Germany.*

4.3 **Droop Controlled Cognitive Power Electronics for DC Microgrids**

*Bernd Wunder, Leopold Ott, Julian Kaiser, Kilian Gosses, Matthias Schulz & Fabian Fersterra, Fraunhofer IISB, Germany, and Martin März, Melanie Lavery & Yunchao Han, Friedrich-Alexander University Erlangen-Nürnberg, Germany*

4.4 **Development of Appliance coupler of LVDC for information communication technology (ICT) equipment with protection of both inrush current and arc discharge.**

*Koichi Klryu, Tetsugaku Tanaka & Koki Sato, FUJITSU COMPONENT, and Keiichi Hirose, Tetsusi Tsumura & Naoki Hanaoka, NTT-FACILITIES, Japan*

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**5 PS 1 Power Systems 1: Use of PV systems**

5.1 **How have we progressed in our photovoltaic power technologies for telecommunications energy into today's mega-solar deployment?**

*Yousuke Nozaki, Keiichiro Hakuta, Oda Kazuhiko, Kensuke Murai and Yuji Kawagoe, NTT FACILITIES, Japan.*

5.2		<b>When can we afford to deploy Solar for On-Grid Solutions in Telecom?</b> <i>David Wilson, Vertiv, Sweden</i>
5.3		<b>Demonstration of a highly land-area-efficient solar array structure</b> <i>Keiichiro Hakuta, Kensuke Murai, Shunsuke Ihara &amp; Yosuke Nozaki, NTT FACILITIES, Japan</i>
5.4		<b>Photovoltaic solar systems for smart bus shelters in the urban environment of Turin (Italy)</b> <i>G. Mutani, A. Vodano, M. Pastorelli, Politecnico di Torino, Italy</i>
<b>6</b>	<b>ES 3</b>	<b>Energy Storage 1: Forum I</b> <b>Are Li-ion batteries or advanced lead-acid batteries ready to replace the standard VRLA in high reliability ICT Energy Systems?</b>
<b>7</b>	<b>CV 1</b>	<b>Converters 1: AC-DC Converters</b>
7.1		<b>State of the Art Low Power AC-DC Single-Stage Converters</b> <i>Yuntong Li &amp; Gerry Moschopoulos, Western University, Canada42</i>
7.2		<b>Coupled Inductor Based Single-Phase Bridgeless PFC Boost Rectifier with Auxiliary Circuit Assisted ZVS</b> <i>Debjani Chakraborty &amp; Dipti Srinivasan, National University of Singapore, and Pritam Das, Binghamton University, USA</i>
7.3		<b>Analysis and Design of AC-DC Resonant Single-Stage Converter with Reduced DC Bus Voltage Variation</b> <i>Javad Khodabakhsh, Prashanth Prabhu, &amp; Gerry Moschopoulos, Western University, Canada</i>
<b>8</b>	<b>PS 2</b>	<b>Power Systems 2: Power Systems for Data Centres</b>
8.1		<b>Comparative analysis on different architectures of power supply system for Data center and telecom center</b> <i>Shuguang Qi, &amp; Yapan Wu, China Academy of Information and Communication Technology, China, and Wenbo Sun China Telecom, China.</i>
8.2		<b>Application of Eco Mode UPS in Data Center</b> <i>Xiyu Liu, Da Teng, Diankui Wang, Qingfeng Zhu, Zhenghai Liu, China Information Technology Designing &amp; Consulting Institute Co., China</i>
8.3		<b>Customer's 110kV Power Substations in the Large Data Centers</b> <i>Yingjie Yang &amp; Da Teng, China Information Technology Designing &amp; Consulting Institute Co. China, and Chang Cheng, State Grid Henan Electric Power Company, China</i>
<b>9</b>	<b>CPE 1</b>	<b>Commercial Product Exposure 1</b>
9.1		<b>Can we propose a 3N electrical infrastructure at a lower cost than Tier 4? - Introducing Power Fusion, a revolution in powering data centres</b> <i>Wald Kerschot, CE+T Power, Malaysia</i>
9.2		<b>Air Conditioner and Fan Hybrid Control for Outdoor Integrated Power Supply System</b> <i>Huang Yuanhua, ZTE, China</i>

**Tuesday 24 October**

8:00-8:30	<a href="#">Session 10</a> Keynote Address 3			
8:30-10:00	<a href="#">Session 11</a> <b>ES 4</b> <b>Energy Storage 4</b> Battery Technology II	<a href="#">Session 12</a> <b>CV 2</b> <b>Converters 2</b> DC-DC Converter I	<a href="#">Session 13</a> <b>PS 3</b> <b>Power Systems 3</b> Power Back-up	<a href="#">Session 14</a> <b>CPE 2</b> <b>Commercial</b> <b>Product Exposure 2</b>
10:00-10:30	<b>Break</b>			
10:30-12:00	<a href="#">Session 15</a> <b>PE 2</b> <b>Power Electronics 2</b> Special Interest Seminar	<a href="#">Session 16</a> <b>PR-1</b> <a href="#">Posters 1</a>		
12:00-6:00	<b>Lunch &amp; Conference tours</b>			

[Back](#)

<b>10</b>		<b>Keynote 3</b> <b>Developments and Impacts in the ICT infrastructure space</b> <i>David Moffatt, Executive Chairman, Ventia</i>
<b>11</b>	<b>ES 4</b>	<b>Energy Storage 4: Battery Technology II</b>
	11.1	<b>Estimation of the Dynamic Leakage Current of a Supercapacitor in Energy Harvesting Powered Autonomous Wireless Sensor Nodes</b> <i>Xicai Yue, Janice Kiely &amp; Abdul Farooq, University of the West of England, UK, and Alan Champneys, University of Bristol, UK.</i>
	11.2	<b>A Study on Limitation in Transient Behaviour of Redox Flow Battery in Phase Space</b> <i>Toko Mannari &amp; Takashi Hikiyara, Kyoto University, Japan</i>
	11.3	<b>Adaptive Battery Steering and Management System for the Optimized Operation of Stationary Battery Energy Storage Systems in Multi-Use Applications</b> <i>Julia Badeda, Dominik Schulte &amp; Timo R�uwald, BatterieIngenieure GmbH, Germany, and Monika Kwiecien &amp; Dirk Uwe Sauer, RWTH Aachen University, Germany</i>
<b>12</b>	<b>CV 2</b>	<b>Converters 2: DC-DC Converters I</b>
	12.1	<b>A Comparative Study of DC-DC Flyback Converters for Telecom Applications</b> <i>Adel Alganidi, Adel Abosnina, &amp; Gerry Moschopoulos, University of Western Ontario, Canada</i>
	12.2	<b>Design Optimization of a High Step-Up DC-DC Converter for Photovoltaic Microinverters</b> <i>Lenon Schmitz, Gustavo C. Knabben, Denizar C. Martins &amp; Roberto F. Coelho, Federal University of Santa Catarina, Brazil, and Odair J. Custodio, Inergiae Conversores Est�ticos, Brazil, and Renato Z. de Medeiros &amp; Alexandre L. Ferreira, Empresa de Luz e For�a Santa Maria, Brazil</i>
	12.3	<b>Three Level NPC Dual Active Bridge Capacitor Voltage Balancing Switching Modulation</b> <i>Jun-young Lee, Hyun-jun Choi &amp; Jee-hoon Jung, Ulsan National Institute of Science and Technology, Republic of Korea.</i>
<b>13</b>	<b>PS 3</b>	<b>Power Systems 3: Power Back-up</b>
	13.1	<b>ELECTRICAL BACKUP REQUIREMENT FOR CRITICAL TELECOMMUNICATION SYSTEMS –TELEKOM MALAYSIA APPROACH</b> <i>Fakhrulrazi bin Mahtar, Telekom Malaysia Berhad, Malaysia</i>
	13.2	<b>Loading Rate Optimization of Hybrid Power Supply System in Self-Adaptive Dual Generator Parallel Operation</b> <i>Wang Yun &amp; Feng Fujian, ZTE Corporation, China</i>
	13.3	<b>Innovative Fuel Cell Deployment in Telstra’s Network and Key Learnings from the Field</b> <i>Louise Stroyov, Sophiya Patel, and Rafiq Ali, Telstra Corporation, Australia</i>

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<b>14</b>	<b>CPE 2</b>	<b>Commercial Product Exposure 2</b>
14.1		<b>An Innovative Mixed-use Technology of Battery</b> <i>Weibo Li, Xianhong Hu, Mingming Liu, Qian Zhang, Yong Xiong &amp; Junning Fan, ZTE, China</i>
14.2		<b>Applying the Internet of Things (IoT) to the Telecom Power Ecosystem</b> <i>Victor Goncalves, Bill Killion, Rahul Baliga, Frank VanHooft, Brent McDonald, Alpha Technologies, Canada</i>
14.3		<b>The Modernization of the Traditional Site – Make it Site Smart: The VHA Case.</b> <i>Bob Davis, Vodafone, Australia</i>
<b>15</b>	<b>PE 2</b>	<b>Power Electronics 2</b>
14.1		Special Interest Seminar II <b><i>Model-based development technology of ICT power supply and future application for intelligent energy management with IoT</i></b> <i>Yu Yonezawa, Hiroshi Nakaom, Fujitsu Laboratories, Japan</i>
<b>16</b>	<b>PR 1</b>	<a href="#"><u>Posters 1</u></a>

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[Back](#)



## Wednesday 25 October

8.00 8:45	<a href="#">Session 17</a> <b>PS 4</b> <b>Power System 4</b> Plenary-2			
8.45- 10:00	<a href="#">Session 18</a> <b>PS 5</b> <b>Power Systems 4</b> Equipment Cooling I	<a href="#">Session 19</a> <b>ES 5</b> <b>Energy Storage 5</b> Management & Adaptability	<a href="#">Session 20</a> <b>PE 3</b> <b>Power Electronics 3</b> Components & Control	<a href="#">Session 21</a> <b>CV 3</b> <b>Converters 3</b> Inverters
10:00- 10:30	<b>Break</b>			
10:30- 12:00	<a href="#">Session 22</a> <b>PS 5</b> <b>Power Systems 5</b> Special Interest Seminar	<a href="#">Session 23</a> <b>PR-2</b> <b>Posters 2</b>		
12:00- 1:30	<b>Lunch</b>			
1:30- 3:15	<a href="#">Session 24</a> <b>PS 6</b> <b>Powers Systems 6</b> Equipment Cooling II	<a href="#">Session 25</a> <b>PS 8</b> <b>Power Systems 7</b> System Reliability & Resilience I	<a href="#">Session 26</a> <b>PE 4</b> <b>Power Electronics 4</b> Wireless Transfer & Battery Systems	<a href="#">Session 27</a> <b>CPE 3</b> <b>Commercial Product Exposure 3</b>
3:15- 3:45	<b>Break</b>			
3:45- 5:15	<a href="#">Session 28</a> <b>PS 9</b> <b>Power Systems 9</b> Forum 2	<a href="#">Session 29</a> <b>PS 10</b> <b>Power Systems 10</b> Evaluation & Defects	<a href="#">Session 30</a> <b>PS 11</b> <b>Power Systems 11</b> Grounding Design & Protection	<a href="#">Session 31</a> <b>CV 4</b> <b>Converters 4</b> DC-DC Converters II
6:00- 11:00	<b>Conference Dinner</b>			

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17	PS 4	<b>Power Systems 4: Plenary-2 How to cool your ICT infrastructure</b>
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18	PS 5	<b>Power Systems 5: Equipment Cooling I</b>
18.1		<b>Displacement Free Cooling for Telecommunication Base Stations</b> <i>Ehsan Bitaraf Haghighi, Northvolt AB, Sweden</i>
18.2		<b>Comparison of ICT equipment air-intake temperatures between cold aisle containment and hot aisle containment in datacenters</b> <i>Akihiro TSUDA, Yosuke MINO, Shun NISHIMURA, NTT-FACILITIES, Japan</i>
18.3		<b>Trial and Application of Direct Evaporative Cooling at Telstra's Information and Communication Technology Centres</b> <i>Ben de Jonge, Telstra Corporation, Australia</i>

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19	ES 5	<b>Energy Storage 5: Management &amp; Adaptability</b>
19.1		<b>Improving energy self-consumption rate by using weather forecasts in renewable energy system for back-up power supply.</b> <i>Miki UESHIMA, Kazufumi YUASA &amp; Tadatoshi BABASAKI, NTT-FACILITIES, Japan</i>
19.2		<b>An Innovative Hybrid Battery Management System for Telecom</b> <i>Huang Yuanhua, ZTE Corporation, China</i>
19.3		<b>Flow battery versatility: adapting the battery to the specific application</b> <i>Mike Giulianini &amp; Mio Dart, Redflow, Australia</i>

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20	PE 3	<b>Power Electronics 3: Components &amp; Control</b>
20.1		<b>An Analysis of False Turn-On Phenomenon of GaN HEMT with Parasitic Components</b> <i>Toshihiro Iwaki &amp; Seiya Ishiwaki, Shimane University, Japan, and Takashi Sawada &amp; Masayoshi Yamamoto, Nagoya University, Japan.</i>
20.2		<b>Model-based Development of High-current-density Point-of-load Converter of High Performance FPGA for Telecommunication Application</b> <i>Yu Yonezawa, Hiroshi Nakao &amp; Yoshiyasu Nakashima, Fujitsu Laboratories, and Ananda Vithanage, Tomohiro Kanehira &amp; Yasunori Ueno, FDK Corporation, Japan</i>
20.3		<b>A Comparative Study of Two Current-Control Techniques Applied to a Three-Phase Three-Level Active Power Filter</b> <i>Muhammad Kashif, M. J. Hossain, Yuba Raj Kafle &amp; Md Shamiur Rahman, Macquarie University, Australia</i>

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21	CV 3	<b>Converters 3: Inverters</b>
21.1		<b>Reducing Losses in the Shoot-Through State of a Single-Phase Quasi-Z-Source Inverter</b> <i>Carlos R. Baier, Claudio Flores &amp; Manuel A. Diaz, Universidad de Talca, Curicó, Chile, and Miguel A. Torres, Universidad de O'Higgins, Chile, and Josep Pou, Nanyang Technological University, Singapore, and Pedro Melín, Universidad del Bio-Bio, Concepción, Chile, and Eduardo Espinosa, Universidad Católica de la Santísima Concepción, Chile.</i>
21.2		<b>An Improved Model Predictive controller for Highly Reliable Grid connected Photovoltaic Multilevel Inverters</b> <i>Mokhtar Aly &amp; Masahito Shoyama, Kyushu University, Japan, Emad M. Ahmed, Aswan University, Egypt</i>

21.3		<b>Multi-Level Topology Evaluation for Ultra-Efficient Three-Phase Inverters</b> <i>J. Azurza Anderson, L. Schrittwieser, M. Leibl, &amp; J. W. Kolar, ETH Zurich, Switzerland.</i>
<b>22</b>	<b>PS 6</b>	<b>Power Systems 6</b>
	22.1	Special Interest Seminar III <b>Telecom Fuel Cell Power in Multi-year Off Grid application</b> <i>Harol Koyama, H2 PowerTech LLC</i>
<b>23</b>	<b>PR 2</b>	<a href="#">Posters 2</a>
<b>24</b>	<b>PS 7</b>	<b>Powers Systems 7: Equipment Cooling II</b>
	24.1	<b>The Development Trend of Power System for ICT Equipment</b> <i>Mingming Liu &amp; Xianhong Hu, ZTE Corporation, China</i>
	24.2	<b>Research of Power Supply and Cooling Mode for Node Room under 5G Network Architecture</b> <i>Zhen Wang &amp; Jianfeng Huang, China Mobile, China</i>
	24.3	<b>Free Cooling and Indoor Humidity Level in Telecommunication Base Stations</b> <i>Ehsan Bitaraf Haghighi, Northvolt AB, Sweden</i>
	24.4	<b>Passive cooling and thermal management in data centers</b> <i>Chayan NADJAH &amp; Hasna LOUAHLIA, University of Caen, France, and Alberto CONTE, Alcatel-Lucent Bell labs, France, and Stéphane LE MASSON, Orange Labs, France</i>
<b>25</b>	<b>PS 8</b>	<b>Power Systems 8: System Reliability &amp; Resilience I</b>
	25.1	<b>Reliability Analysis and Calculation for the Most Common Modular UPS System Architectures</b> <i>Leo Saro, Clemente Zanettin, Vinko Božič, Socomec, Italy</i>
	25.2	<b>Generalized Integrated Framework for Modelling Communications and Electric Power Infrastructure Resilience</b> <i>Alexis Kwasinski &amp; Vaidyanathan Krishnamurthy, University of Pittsburgh, USA.</i>
	24.3	<b>Robust PV System against Disasters for Green Base Station</b> <i>M. Nakamura<sup>1</sup>, K. Kimura<sup>1</sup> &amp; K. Takeno, NTT DOCOMO, Japan.</i>
<b>26</b>	<b>PE 4</b>	<b>Power Electronics 4: Wireless Transfer &amp; Battery Systems</b>
	26.1	<b>Simple Self-Driven Synchronous Rectifier for Resonant Inductive Coupling Wireless Power Transfer</b> <i>Takahiro Koyama, Toru Honjo, Masataka Ishihara, Kazuhiro Umetani &amp; Eiji Hiraki, Okayama University, Japan</i>
	26.2	<b>Implementation and Evaluation of Pre- and Post-Regulation Control with Class-E2 Wireless Power Transfer System</b> <i>Yuta Ozawa &amp; Hiroo Sekiya, Chiba University, Japan</i>
	26.3	<b>Reduction in the Number of Gate Drive Power Converters for a Cell Voltage Equalizer Using an LC Series Circuit</b> <i>Daiki SATOU, Nobukazu HOSHI, Kosuke UCHIDA &amp; Ryosuke OTA, Tokyo University of Science, Japan</i>
	26.4	<b>A Flyback Converter Based Partial Power Processing Structure for BESS with Voltage/Current Regulation and Battery Balancing Functionalities</b> <i>Jian Qi, The University of Sydney, Australia, and Dylan Dah-Chuan Lu, University of Technology Sydney, Australia</i>
<b>27</b>	<b>CPE 3</b>	<b>Commercial Product Exposure 3</b>
	27.1	<b>Addressing Persistent Pain Points of Hybrid Deployments</b> <i>Murray Wyma, Enatel Energy, New Zealand</i>

		<b>27.2 DC Energy Metering for Managing Telecommunications Network Power Usage</b> <i>Darren Salter, Eaton Industries, Australia</i>
		<b>27.3 A Big Data Management Diagnosis System of Batteries Based on Cloud Platform</b> <i>Huang Shihui &amp; Wang Rugang, Shenzhen Pluke Intelligent Test Equipment Co., China and Yang Zhongliang, Shenzhen Power Supply Co., China</i>
<b>28</b>	<b>PS 9</b>	<b>Power Systems 9: Forum 2</b> <b>How to cool your ICT infrastructure</b>
<b>29</b>	<b>PS 10</b>	<b>Power Systems 10: Evaluation &amp; Defects</b>
	29.1	<b>Basic Evaluation for the DC Circuit Breaker Using Power Semiconductor with Fault Current Limiting Feature</b> <i>Masaaki Komatsu, National Institute of Technology, Kushiro College, Japan</i>
	29.2	<b>Method for detection of lot defects for maintenance of ICT power supplies and air conditioning equipment and verification results</b> <i>Hiroki HAYASAKA, Kaisei KANETANI, Sohei NAKASHIMA, Masahiro YAMAZAKI &amp; Tadatoshi BABASAKI, NTT-FACILITIES, INC, Japan, and Risshi KONDO &amp; Masami AMANO, NTT DATA Corporation, Japan</i>
	29.3	<b>Classification of causes of broken solar panels in solar power plant</b> <i>Yuji HIGUCHI &amp; Tadatoshi BABASAKI, NTT Facilities, Japan</i>
<b>30</b>	<b>PS 11</b>	<b>Power Systems 11: Grounding Design &amp; Protection</b>
	30.1	<b>Mesh Bonded vs Isolated Bonded Earthing Network for Indoor Grounding</b> <i>Rohit Narayan, ERICO PENTAIR, Australia</i>
	30.2	<b>A study on measurement method for transient current from lighting equipment with considering the dependence on test sites</b> <i>Naomichi Nakamura, Farhan Mahmood, Ken Okamoto, Yuichiro Okugawa &amp; Yoshiharu Akiyama, NTT Network Technology Laboratories, Japan</i>
	30.3	<b>Key Technology Research on 5G Mobile communications Power system</b> <i>Pengchao Wang, Mingming Liu, Zhirong Cheng, Yundong Yang &amp; Shaomin Zhang, ZTE Corporation, China</i>
<b>31</b>	<b>CV4</b>	<b>Converters 4 : DC-DC Converters II</b>
	31.1	<b>A Novel Three-Phase DC-DC PWM Isolated Boost Converter</b> <i>Adel Ali Abosnina &amp; Gerry Moschopoulos, University of Western Ontario, Canada</i>
	31.2	<b>A Two-Loop PI Control of DC-DC Boost Converter with Intelligent State Observer</b> <i>Zekiye Erdem &amp; Mohamed Youssef, University of Ontario Institute of Technology, Canada</i>
	31.3	<b>A Bidirectional Flyback Converter with Cross-Coupled Non-Dissipative Snubber Circuits</b> <i>Nurhakimah M. Mukhtar, University of Sydney, Australia, and Dylan Dah-Chuan Lu, University of Technology Sydney, Australia</i>

**Thursday 26 October**

8:45-10:00	<a href="#">Session 32</a> <b>PS 12</b> <b>Power Systems 12</b> Remote-line Powering I	<a href="#">Session 33</a> <b>ES 4</b> <b>Energy Storage 4</b> Battery Systems	<a href="#">Session 34</a> <b>PE 5</b> <b>Power Electronics 5</b> Noise & disturbance	<a href="#">Session 35</a> <b>PS 13</b> <b>Power Systems 13</b> System Reliability & Resilience II
10:00-10:30	<b>Break</b>			
10:30-12:00	<a href="#">Session 36</a> <b>PS 14</b> <b>Power Systems 10</b> Remote Line powering II	<a href="#">Session 37</a> <b>PS 15</b> <b>Power Systems 11</b> 380V Deployments	<a href="#">Session 38</a> <b>CV 5</b> <b>Converters 5</b> DC-DC Converters III	<a href="#">Session 39</a> <b>CPE 4</b> <b>Commercial Product Exposure 4</b>
12:00-1:30	<b>Lunch</b>			
1:30-3:15	<a href="#">Session 40</a> <b>PS 16</b> <b>Power Systems 16</b> Forum 3	<a href="#">Session 41</a> <b>PS 17</b> <b>Power Systems 12</b> Innovative Ideas	<a href="#">Session 42</a> <b>PS 18</b> <b>Power Systems 13</b> Smart Buildings	
3:15-3:30	<b>Break</b>			
3:30-4:30	<a href="#">Closing Session</a>			

[Back](#)

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<b>32</b>	<b>PS 12</b>	<b>Power Systems 12</b>
	32.1	<b>Plenary 3</b> <b>Remote Line Power: Is it ready for routine deployment?</b>
	32.2	Special Interest Seminar IV <b>A Comparison of Remote Line Power and Local Power</b> <i>Satheesh Hariharan, Alpha Technologies</i>
<b>33</b>	<b>ES 6</b>	<b>Energy Storage 6: Battery Systems</b>
	33.1	<b>Cutting Edge Central Office Energy Storage Solutions</b> <i>Jay Frankhouser, Enersys, USA</i>
	33.2	<b>An Innovative Lithium-ion Battery and Lead-acid Battery Hybrid Solution for Telecom in Frequent Grid off Region</b> <i>Huang Yuanhua, ZTE Corporation, China</i>
	33.3	<b>Planning, building, efficiency measurement and determination of forecast data of a grid-scale hybrid 5 MW / 5 MWh battery storage system</b> <i>Jeanette Muenderlein, Marc Steinhoff, Hendrik Axelsen &amp; Dirk Uwe Sauer, RWTH Aachen University, Germany</i>
<b>34</b>	<b>PE 5</b>	<b>Power Electronics 5: Noise &amp; Disturbance</b>
	34.1	<b>Research on Input Conducted Emission for Rectifier with High Efficiency and High Power Density</b> <i>Zhirong Cheng, Mingming Liu, Penchao Wang, Shaomin Zhang &amp; Yundong Yang, ZTE Corporation, China</i>
	34.2	<b>Features extraction of conducted disturbance below 150 kHz from rectifier for ICT equipment</b> <i>Farhan Mahmood, Ken Okamoto, Yuichiro Okugawa, &amp; Yoshiharu Akiyama, NTT Network Technology Laboratories, Japan.</i>
	34.3	<b>Conducted Noise Prediction for Zero-crossing Issue in Totem-pole Bridgeless PFC Converter</b> <i>Baihua Zhang, Qiang Lin, Jun Imaoka, &amp; Masahito Shoyama, Kyushu University, Japan, and Satoshi Tomioka &amp; Eiji Takegami, TDK-Lambda Corporation, Japan</i>
<b>35</b> <b>38</b>	<b>PS13</b>	<b>Power Systems 13: System Reliability &amp; Resilience II</b>
	35.1	<b>Estimating Reliability of a Telecommunications Energy Network</b> <i>Frank Bodi, Visionstream, Australia</i>
<b>185</b>	35.2	<b>Solar Tracker Effectiveness: It's All About Availability</b> <i>Jon G. Elerath, Consultant, USA</i>
<b>133</b>	35.3	<b>Multi-node Power Supply Resiliency of Communication Networks During Extreme Events</b> <i>Vaidyanathan Krishnamurthy and Alexis Kwasinski, University of Pittsburgh, USA</i>
<b>36</b>	<b>PS 14</b>	<b>Power Systems 14: Remote line powering I</b>
	36.1	<b>Remote Powering the Cellular Infrastructure at the RIO 2016 Olympic Games</b> <i>Satheesh Hariharan, José Carlos Santana, Glenn Lumanog and Iain Selkirk, Alpha Technologies, Canada</i>
	36.2	<b>Best Practices Guide for Remote Line Power</b> <i>Kevin Borders, Grant Clark, Satheesh Hariharan, and Tony Wilson, Alpha Technologies, Canada.</i>
	36.3	<b>Remote Line Powering Networks – Emerging Applications and Standards for RFT-V</b> <i>Andrew J. Dickson, Victor Goncalves, Piet de Beer, Alpha Technologies, Canada</i>

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<b>37</b>	<b>PS 15</b>	<b>Power Systems 15: 380V deployments</b>
37.1		<b>Energy-saving effects by using 380VDC power supply system interconnected with a solar power generation system in Texas</b> <i>Yoshiteru Yoshida, Toshihiro Hayashi, Hirotaka Kusabe, Toshiyuki Kyunai, Kenichi Usui, Hiroya Yajima &amp; Keiichi Hirose, NTT FACILTIES, Japan, Tadahito Aoki, NTT FACILITIES ENGINEERING, Japan, and Dan Stanzione, The University of Texas at Austin, USA.</i>
37.2		<b>Telecom Operator's to accelerate the migration towards 400 Volt Direct Current Efficient powering for telecom/ICT equipment and coupling sites to smart energy microgrids</b> <i>Didier Marquet, Olivier Foucaul &amp; Jean-Marc Pichon, Orange Labs, and Keiichi Hirose, NTT-FACILITIES, Japan, and Claudio Bianco, Telecom Italia, Italy, and Richard Hockley, British Telecom, Great Britain</i>
37.3		<b>Deploying 'HVDC' in existing network exchanges - Practical and Financial Benefits for Telecommunications Carriers</b> <i>Marcus Yong &amp; David Bettle, Telstra Corporation, Australia</i>
<b>38</b>	<b>CV 5</b>	<b>Converters 5: DC-DC Converters III</b>
38.1		<b>Winding Concepts for High Frequency Inductors with Reduced DC Resistance</b> <i>Sven Bolte, Jehan Khan Afridi &amp; Joachim Böcker, Paderborn University, Germany</i>
38.2		<b>A High Gain DC-DC Full-Bridge Converter with Integrated Passive Snubber Network</b> <i>Prashanth Prabhu, Javad Khodabakhsh, Mona Abo El Dahb, &amp; Gerry Moschopoulos, University of Western Ontario, Canada</i>
38.3		<b>A New PWM Shoot-through Control For Voltage-Fed Quasi-Z-Source DC/DC Converters</b> <i>Yuba Raj Kafle, Saad Ul Hasan, Muhammad Kashif, Jahangir Hossain &amp; Graham E. Town, Macquarie University, Australia</i>
<b>39</b>	<b>CPE 4</b>	<b>Commercial Product Exposure 4</b>
39.1		<b>NEW Type of Surge Reduction Filters for Remote Cabinets and Enclosures</b> <i>Rohit Narayan, Pentair ERICO, Australia</i>
39.2		<b>Electronic Distributions in Small Telecom DC Systems to Simplify Deployment and Reduce TCO</b> <i>Richard Moore, Eaton, UK</i>
39.3		<b>Multipurpose energy storage installations for dual UPS and variability management tasks</b> <i>John Wood, Ecout, Australia</i>
<b>40</b>	<b>PS 16</b>	<b>Power Systems 16: Forum 3</b>
<b>41</b>	<b>PS 17</b>	<b>Power Systems 17: Innovative Ideas</b>
41.1		<b>Feasibility Study on using Pipe Type Cables and Co-Axial Cables for HFAC Power Distribution in Data Centre Applications</b> <i>W. Anand Fernando, University of Sydney, Australia, and &amp; Dylan Dah-Chuan Lu, University of Technology, Australia</i>
41.2		<b>Control methods for power storage devices in distributed power system</b> <i>Daiki Owaki, Kazuto Yukita, Toshiro Mastumura, Yasuyuki Goto, Aichi Institute of Technology, Japan, and Kazuhiko Taniguchi &amp; Hiroshi Morita, Kinden Corporation, Japan, and Masatoshi Noritake &amp; Keiichi Hirose, NTT FACILITIES, Japan, and Hiroaki Miyoshi, SANYO DENKI Co., Japan.</i>

41.3	<b>Optimization-Algorithm Addressing Voltage and Power Quality in Distributed Grid Control Systems</b>	<i>Norbert Grass &amp; Anja Woelfel, Technische Hochschule Nuernberg, Germany</i>
41.4	<b>Usage of telecommunication base station batteries in demand response for frequency containment disturbance reserve: Motivation, background and pilot results</b>	<i>Ilari Alaperä, Pekka Manner, Johan Salmelin &amp; Heli Antila, Fortum Power and Heat Oy, Finland</i>
<b>42</b>	<b>PS 18 Power Systems 18: Smart Buildings</b>	
42.1	<b>Air Conditioning Equipment Using DC Power Supply System</b>	<i>Kazuto Yukita, Tadashi Hosoe Shunsuke Horie, Toshiro Matsumura &amp; Masayoshi Hamanaka, Aichi Institute of Technology, and Keichi Hirose &amp; Masatoshi Noritake, NTT Facilities, Japan</i>
42.2	<b>Nearly Zero Energy Buildings: analysis on monitoring energy consumptions for residential buildings in Piedmont Region (IT)</b>	<i>G. Mutani, F. Pascali, &amp; M. Martino (M), Politecnico di Torino, Italy, and G. Nuvoli, Regione Piemonte Torino, Italy</i>
42.3	<b>Modeling hourly profile of space heating energy consumption for residential buildings</b>	<i>G. Mutani, F. Giaccardi, M. Martino (M) &amp; M. Pastorelli (M), Politecnico di Torino, Italy.</i>
42.4	<b>Demand Response Using Air Conditioner</b>	<i>Masayoshi Hamanaka, Kenshu Nimi, Shunsuke Horie, Kazuto Yukita, Daiki Owaki, Toshiro Matsumura &amp; Yasuyuki Goto, Aichi Institute of Technology, Japan, and Keichi Hirose, NTT FACILITIES, Japan.</i>
<b>43</b>	<b>CLS Closing Session</b>	
43.1	<b>Wrap-up Forum</b>	<i>What do you think about ICT energy and the future?</i>
43.2	<b>Paper &amp; Poster Awards</b>	
43.3	<b>Good bye INTELEC 2017 &amp; Hello INTELEC 2018</b>	
	<b>Close of Conference</b>	



## Posters 1 & 2 (all posters are in both sessions)

- P 1 Analysis and Implementation of an Advanced EPP-MPPT Control Technique in Solar-based Water Pump Applications**  
*Ahmed S. Abdelrahman, Mahmoud Eid, Ying Wang, & Mohamed Z. Youssef, University of Ontario Institute of Technology, Canada*
- P2 A Novel LLC Resonant DC-DC Converter with Integrated Transformer**  
*Shota Kimura, Kimihiro Nanamori & Mostafa, Shimane University, Japan, and Masayoshi Yamamoto, Nagoya University, Japan*
- P3 A Penny Saved is a Penny Earned - Methods of Energy Transformation to Reduce OPEX for Remote Area**  
*Weibo Li, Junning Fan, Yong Xiong, Qian Zhang, Mingming Liu & Xianhong Hu, ZTE Corporation, China*
- P4 Research on the operating mode of the Power supply for a Telecom Base Station Based on the Peak & Valley Model of the Power Grid**  
*Zhang Shaomin, Wang Pengchao, Liu Mingming & Chen zhirong, ZTE Corporation, China*
- P5 A study on close-loop control of manipulator by power packet density modulation**  
*Shiu Mochiyama & Takashi Hikiyama, Kyoto University, Japan*
- P6 Analytical Investigation of Interleaved DC-DC Converter using Closed-Coupled Inductor with Phase Drive Control**  
*Daigoro Ebisumoto, Shota Kimura, Kimihiro Nanamori & Mostafa Noah, Shimane University, Japan, and Jun Imaoka, Kyushu University, Japan, and Masataka Ishihara, Okayama University, Japan, and Masayoshi Yamamoto, Nagoya University, Japan*
- P7 Boost Full Bridge DC-DC Converter Ensuring Safe Installation of PV Energy in Data Center Power Management Systems**  
*Satoshi Ikeda, Panasonic Co., Japan & Fujio Kurokawa, Nagasaki Institute of Applied Science, Japan*
- P8 DC-DC Converter Based on Voltage Dividing Class E Amplifier**  
*Katsutoshi Hirayama, Nagasaki University, Japan, and Tadashi Suetsugu, Fukuoka University, Japan, and Fujio Kurokawa, Nagasaki Institute of Applied Science, Nagasaki, Japan*
- P9 A Compact & Cost Effective Solar Harvesting Modular Wireless Sensor Node with Innovative Energy Management: System: Design & Implementation**  
*Mohamed Z. Youssef, University of Ontario Institute of Technology, Canada*
- P10 Design Consideration of Efficiency Improvement in Three phase Dual Active Bridge Converter for LVDC Application**  
*Hyunjun Choi, Junyoung Lee & Jee-hoon Jung, Ulsan National Institute of Science and Technology, Republic of Korea, and Young-pyo Cho, KEPCO Research Institute, Republic of Korea.*
- P11 Distributed Control Scheme for a 5-Level Modular Multilevel STATCOM**  
*Stephan C. Adams, Mark A. H. Broadmeadow, Geoffrey R. Walker & Gerard F. Ledwich, Queensland University of Technology, Australia*
- P12 Experimental Verification of Suppressing Power Fluctuation in Photovoltaic Generation System Using Water Electrolyzer**  
*Akiko Takahashi, Jun Imai & Shigeyuki Funabiki, Okayama University, Japan*
- P13 High-Efficiency Voltage Sag Protector with Low Ground Leakage Current**  
*Min-Kwon Yang & Woo-Young Choi, Chonbuk National University, South Korea*

- P14 Innovative Energy Management to utilize energy efficient solutions in the ICT infrastructure**  
*Robert Wikström, VERTIV, Sweden*
- P15 Lifetime Prognostics of Hybrid Backup Power System: State-of-the-Art**  
*Simon Dyhr Sønderskov, Maciej Jozef Swierczynski, & Stig Munk-Nielsen, Aalborg University, Denmark*
- P16 Optimal Placement of VIT Automation Switches Considering Distribution Generation (DG)**  
*Hamid Sharifian, Javad Mahmoodi & Alireza Saboori Keyvanlo, North Khorasan Electric Distribution Company, Iran*
- P17 Oscillation Condition Analysis of a VHF Self-Oscillating Gate Driver Based on a  $\Phi 2$  Resonant Inverter**  
*Takuya Mizushima, Naoyuki Ishibashi, Kento Goto & Akihiko Katsuki, Nagasaki University, Japan, and Masahiko Hirokawa, TDK Corporation, Japan*
- P18 Proportional and Integral Gain Changeable Control DC-DC Converter for Improvement of Dynamic Performance**  
*Kazuhiro Kajiwara, Nobumasa Matsui & Fujio Kurokawa, Nagasaki Institute of Applied Science, Japan, and Yudai Furukawa, Nagasaki University, Japan.*
- P19 A Consideration on Current Noise Measurement in Distributed Power Supply Introduction System**  
*Shunsuke Horie, Kazuto Yukita, Toshiro Matsumura & Yasuyuki Goto, Aichi Institute of Technology, Japan, and Keichi Hirose, NTT Facilities, Japan, and Hiroaki Miyoshi, Sanyo Denki, Japan*
- P20 Study on Data Center Optimal Management by utilizing Data Center Infrastructure Management**  
*Kosuke SASAKURA, Takeshi AOKI & Takeshi WATANABE, NTT-FACILITIES, Japan*
- P21 Transient Response Improvement of Digitally Controlled DC-DC Converter with Feedforward Compensation**  
*Kosuke Sato, Nagano Prefecture General Industrial Technology Center, Japan, and Toshiro Sato & Makoto Sonehara, Shinshu University, Japan*
- P22 Photovoltaic Facade: Comparison of Actual Technologies**  
*M. Caruso, R. Miceli, P. Livreri, F.M. Raimondi, P. Romano & F. Viola, University of Palermo, Italy, and M. Martino, & M. Pastorelli, Politecnico di Torino, Italy*
- P23 EV Charging Station at University Campus**  
*M. Caruso, P. Livreri, R. Miceli & F. Viola, University of Palermo, Palermo, Italy, and M. Martino, Politecnico di Torino, Italy*