2013 IEEE International Conference on Smart Grid Communications

(SmartGridComm 2013)

Vancouver, British Columbia, Canada
21-24 October 2013
**Tutorial 1: IEC 61850-Principles, Applications and Benefits**

The tutorial will cover briefly the history and fundamental principles of IEC 61850, its applications and benefits. The concepts of abstract models and services and their mapping to specific protocols will be presented. The principles of GOOSE and sampled values, their communication mechanisms, applications and benefits, including their use for synchrophasor communications, will be described. The IEC 61850 configuration language ideas, different files and their application in the engineering of protection and control systems will be discussed. Requirements, methods and tools for the testing of IEC 61850 based systems will be covered at the end.

**Workshop 1: Closed-Loop Wide Area Applications, Communications, and Security**

Electric power grids worldwide are getting increasingly stressed each year for a number of factors, including renewable integration and inadequate growth in transmission capacity. Further, the lack of adequate visibility has been a major contributing factor in all recent major blackouts. These factors can partially be mitigated by closed-loop applications, including distributed control and system integrity protection schemes (SIPS). These applications by nature have extreme communications requirements -- latency of 1-2 power cycles, extremely high availability, and sometimes a rate of hundreds of Hz -- across hundreds of miles or more.

This industry-focused workshop will help attendees better understand this brave new world that requires different thinking, protocols, etc. The first session will be a panel session on these kinds of applications. The second session will provide an overview of communications issues needed to support this, including an overview of the emerging (but not fully implemented) NASPInet concept as well as a case study with GridStat. The final session will be on the security issues and mechanisms that are required -- naive (but common) applications of existing security mechanisms such as RSA effectively rule out low enough delivery latencies. As a whole, the attendees will get a concrete glimpse into how and why business as usual will not apply to these new and necessary applications.

08:30 - 09:20
Dr. Greg Zweigle, Principal Research Engineer, Schweitzer Engineering Labs Inc.
Applications of Closed-Loop Wide Area Protection and Control

09:20 - 10:00
David Bakken, Professor, Washington State University
Communications for Closed-Loop Cyber Physical WAMPAC

10:10 - 10:30
COFFEE BREAK

10:30 - 11:00
Thoshitha Gamage, Research Assistant Professor, Washington State University
Security Issues and Tradeoffs for Closed-Loop WAN Applications

11:00 - 11:40
The Security Fabric for Critical Infrastructures

11:40 - 12:00
Panel, Q&A

**Workshop 2: Smart Grid at Scale - The UBC Living Lab**

At UBC we view our entire campus as a living laboratory, a “city scale” sand box in which to explore, creatively and collaboratively, solutions to today’s challenges and market opportunities. The session will describe the UBC Living Lab initiative and provide details on specific projects supporting the development of integrated smart-grid technology on the campus.

08:30 - 09:00
Iain Evans, Associate Director, Strategic Partnerships UBC
UBC’s Living Lab Initiative - Driving Innovation

09:00 - 09:30
Cliff Mui, Director, Product Development, Nexterra Systems Corporation
Carbon-Neutral Community Scale Co-Generation

09:30 - 10:00
Geoff Davenport, President, International Business, Corvus Energy
The role of Energy Storage in the Energy Grid
Workshop 3: Joint WWRF/SmartGridComm workshop on Wireless Communications and the Smart Grid

This workshop will discuss both the roles that wireless communications can play in the smart grid of the future, and the use of the smart grid to power future wireless systems including cellular systems and machine-to-machine communications. Speakers will be drawn from both industry and academia, and come from Europe, North America and Asia. Topics covered include the optimal management of energy in a system of cellular base stations, networking issues arising from using wireless sensors and meters in a smart grid, R&D activities within major industry players in this domain, standardization, and more

13.30-14.00 - Fiona Williams, Ericsson: Smart Energy Field Trials: Insights from a Private Public Partnership and the FINESCE project.
14.00-14.30 - Chuck Adams, Distinguished Standards Strategist, Futurewei Technologies: IEEE Strategic Smart Grid Standards Infrastructure Development - Integrating Power, Communications, IT, and Applications Requirements
14.30-15.00 - Xavier Costa Perez, Chief Researcher, NEC Europe: Getting fit for the Smart Grid: Wireless Standardization Efforts
15.00-15.30 - Coffee Break
15.30-16.00 - Martha Russell, Executive Director, mediaX at Stanford University: Sensors, Signals and Sense-Making in Human-Energy Relationships
16.00-16.30 - Teng Joon Lim, National University of Singapore: Energy Management at Cellular Base Stations in a Smart Grid
16.30-17.00 - Mischa Dohler, King’s College London: Shift of Smart Grid Industries

Workshop 4: Smart Grid Cyber Security

Although power utilities across North America operate within their own jurisdictional frameworks, their networks are moving toward a higher level of interconnection as a consequence of the roll out of Smart Grid technologies. As such, attacks on their critical infrastructure may not be contained within jurisdictional borders. Security and resiliency of electrical power infrastructure needs to be ensured through a federally supported coordination, collaboration and standardization program. Issues that need to be thoroughly examined are:

What communication security threats are most critical for electrical utilities?
How vulnerable are existing communication standards and protocols?
Are vendor implementations of these standards truly interoperable?
How willing are vendors to embrace standards and move away from proprietary solutions?
What security best practices exist to help utilities today?
What security technologies are needed in the future?
What role can policy makers play?

Our workshop will discuss these, and other related issues with smart grid cyber security, and provide plenty of time for Q&A.

1:30 - 1:40 - Dr. Hassan Farhangi, Director, BCIT Group for Advanced Information Technology: Welcome and Opening Remarks
1:40 - 2:00 - Bob Lockhart, Research Director, Navigant Research: Smart Grid Communications Security - What Utilities Are Actually Doing
2:00 - 2:20 - Nell Ranup, Enterprise Security Architect, BC Hydro: Cybersecurity Technology Strategy Development for Utilities
2:20 - 2:40 - Patrick C Miller, Managing Partner, The Anfield Group: Securing the Grid - A Discussion on Dependence
Keynote 1: Networks and Markets for Scheduling Energy Consumption

DEM1: Demand Response and Transportation Electrification

-Congestion Management for Urban EV Charging Systems-
Emmanouil S. Rigas (Aristotle University of Thessaloniki, Greece); Sarvapali Ramchurn (University of Southampton, United Kingdom); Nick Bassiliades (Aristotle University of Thessaloniki, Greece); George Koutitas (International Hellenic University, Greece)
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-Design of a V2G Aggregator to Optimize PHEV Charging and Frequency Regulation Control-
Ran Wang (Nanyang Technological University, Singapore); Yifan Li (Nanyang Technological University, Singapore); Ping Wang (Nanyang Technological University, Singapore); Dusit Niyato (Nanyang Technological University, Singapore)
pp. 127-132

-Electric Power Resource Provisioning for Large Scale Public EV Charging Facilities-
I. Safak Bayram (North Carolina State University, USA); George Michailidis (University of Michigan, USA); Michael Devetsikiotis (North Carolina State University, USA)
pp. 133-138

-Randomized Response Electric Vehicles for Distributed Frequency Control in Smart Grid-
Mohammad Reza Vedady Moghadam Nanehkaran (National University of Singapore, Singapore); Rui Zhang (National University of Singapore, Singapore); Richard T. B. Ma (National University of Singapore, USA)
pp. 139-144

-Analysis of the Behavior of Electric Vehicle Charging Stations with Renewable Generations-
Woongsup Lee (Friedrich Alexander University Erlangen Nurnberg, Germany); Lin Xiang (University Erlangen-Nuremberg, Germany); Robert Schober (University of British Columbia, Canada); Vincent W.S. Wong (University of British Columbia, Canada)
pp. 145-150

NET1: Access Network Performance

-Novel Coexistence Scheme between Wireless Sensor Network and Wireless LAN for HEMS-
Fumihiro Inoue (Kyoto University, Japan); Masahiro Morikura (Kyoto University, Japan); Takayuki Nishio (Kyoto University, Japan); Koji Yamamoto (Kyoto University, Japan); Fusao Nuno (NTT, Japan); Takatoshi Sugiyama (NTT, Japan)
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-Dynamic Selection of Wireless/Powerline Links using Markov Decision Processes-
Dacfey Dzung (ABB Switzerland Ltd. & Corporate Research, Switzerland); Yvonne-Anne Pignolet (ABB Corporate Research, Dättwil, Switzerland)
pp. 277-282

-Pilot Based Channel Estimation and Transform Domain Analysis in Broadband PLC for Smart Grid-
Muharrem A Tunç (University of Kansas, USA); Erik S. Perrins (University of Kansas, USA)
pp. 283-288
Feedback Control Scheme with Prediction for Power Line Communication Channels
Cesar Carrizo (Nagoya University, Japan); Kentaro Kobayashi (Nagoya University, Japan); Hiraku Okada (Nagoya University, Japan); Masaaki Katayama (Nagoya University, Japan)
pp. 289-293

Performance Evaluation of PRIME in Smart Grid
Mehdi Korki (Swinburne university of Technology, Australia); Cishen Zhang (Swinburne University of Technology, Australia); Hai L. Vu (Swinburne University of Technology, Australia)
pp. 294-299

STO1: Support for Storage, Renewable Resources and Micro-grids I

Optimal Energy Storage Management in DC Power Networks
Akira Ito (DENSO, Japan); Toru Shiraki (Denso CO., LTD, Japan)
pp. 630-635

Low-Rank Solution of Convex Relaxation for Optimal Power Flow Problem
Somayeh Sojoudi (California Institute of Technology, USA); Ramtin Madani (Columbia University, USA); Javad Lavaei (Columbia University, USA)
pp. 636-641

Convex Relaxation and Decomposition in Large Resistive Power Networks with Energy Storage
Xin Lou (City University of Hong Kong, Hong Kong); Chee Wei Tan (City University of Hong Kong, Hong Kong)
pp. 642-647

Optimal Storage-Aided Wind Generation Integration Considering Ramping Requirements
Lin Xiang (University Erlangen-Nuremberg, Germany); Derrick Wing Kwan Ng (University Erlangen-Nürnberg, Germany); Woongsup Lee (Friedrich Alexander University Erlangen Nurnberg, Germany); Robert Schober (University of British Columbia, Canada)
pp. 648-653

Robust Optimal Power Flow with Wind Integration Using Conditional Value-at-Risk
Yu Zhang (University of Minnesota, USA); Georgios B. Giannakis (University of Minnesota, USA)
pp. 654-659

DEM2: Pricing for Demand Response

Convex Hull Pricing for Demand Response in Electricity Markets
Naoki Ito (Keio University, Japan); Akiko Takeda (The University of Tokyo, Japan); Toru Namerikawa (Keio University, Japan)
pp. 151-156

Optimal Battery Configuration in a Residential Home with Time-of-Use Pricing
Baris Aksanli (UCSD, USA); Tajana Simunic Rosing (UCSD, USA)
pp. 157-162

Dynamic Price Optimization Models for Managing Time-of-Day Electricity Usage
Shivaram Subramanian (IBM Research, USA); Soumyadip Ghosh (IBM T.J. Watson Research Center, USA); Jonathan Hosking (IBM Research, USA); Ramesh Natarajan (IBM TJ Watson, USA); Xiaoxuan Zhang (IBM Research, USA)
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Low-Frequency Power-Grid Ancillary Services From Commercial Building HVAC Systems
Yashen Lin (University of Florida, USA); Prabir Barooah (Univ of Florida, USA); Sean Meyn (University of Florida, USA)
pp. 169-174

Online Speeding Optimal Charging Algorithm for Electric Vehicles without Future Information
Wanrong Tang (The Chinese University of Hong Kong, Hong Kong); Suzhi Bi (The Chinese University of Hong Kong, Hong Kong); Ying Jun (Angela) Zhang (The Chinese University of Hong Kong, Hong Kong)
pp. 175-180
SEC1: Data Integrity

Detection and Localization of Targeted Attacks on Fully Distributed Power System State Estimation
Ognjen Vuković (KTH, Royal Institute of Technology, Sweden); György Dán (KTH, Royal Institute of Technology, Sweden)
pp. 390-395

On Phasor Measurement Unit Placement against State and Topology Attacks
Jinsub Kim (Cornell University, USA); Lang Tong (Cornell University, USA)
pp. 396-401

Malicious Data Detection in State Estimation Leveraging System Losses & Estimation of Perturbed Parameters
William Niemira (University of Illinois Urbana-Champaign, USA); Rakesh B. Bobba (University of Illinois at Urbana-Champaign, USA); Peter Sauer (University of Illinois at Urbana-Champaign, USA); Bill Sanders (University of Illinois at Urbana-Champaign, USA)
pp. 402-407

Detecting False Data Injection in Smart Grid In-Network Aggregation
Lei Yang (The University of Kansas, USA); Fengjun Li (University of Kansas, USA)
pp. 408-413

A Formal Model for Verifying Stealthy Attacks on State Estimation in Power Grids
Mohammad Ashiqur Rahman (University of North Carolina at Charlotte, USA); Ehab Al-Shaer (University of North Carolina Charlotte, USA); Md Rahman (Virginia Polytechnique Institute and State University, USA)
pp. 414-419

STO2: Support for Storage, Renewable Resources and Micro-grids II

Dynamic Contract to Regulate Energy Management in Microgrids
Lingjie Duan (Singapore University of Technology and Design (SUTD), Singapore); Rui Zhang (National University of Singapore, Singapore)
pp. 660-665

ECO-DAC Energy Control Over Divide and Control
Alper Sinan Akyurek (University of California - San Diego, USA); Bill Torre (University of California - San Diego, USA); Tajana Simunic Rosing (UCSD, USA)
pp. 666-671

Stability, Power Sharing, & Distributed Secondary Control in Droop-Controlled Microgrids
John Simpson-Porco (University of California, Santa Barbara, USA); Florian Dörfler (University of California Santa Barbara & Center for Control, Dynamical Systems and Computation, USA); Qobad Shafiee (Aalborg University, Denmark); Josep M. Guerrero (Aalborg University, Denmark); Francesco Bullo (UCSB, USA)
pp. 672-677

Optimal Energy Management for Cooperative Microgrids With Renewable Energy Resources
Duong Nguyen (INRS, University of Quebec, Canada); Long Bao Le (INRS, University of Quebec, Canada)
pp. 678-683

Scalable Model Predictive Control of Demand For Ancillary Services
Mahnoosh Alizadeh (University of California, Davis, USA); Anna Scaglione (University of California, Davis, USA); George Kesidis (Pennsylvania State University, USA)
pp. 684-689
ARCH1: Architectures and Models for the Smart Grid I

Management of a Smart Grid with Controlled-Delivery of Discrete Power Levels
Roberto Rojas-Cessa (New Jersey Institute of Technology, USA); Yifei Xu (New Jersey Institute of Technology, USA); Haim Grebel (New Jersey Institute of Technology, USA)
pp. 1-6

Voltage-based clustering to identify connectivity relationships in distribution networks
Vijay Arya (IBM Research - India, India); Rajendu Mitra (IBM Research - India, India)
pp. 7-12

Distributed Regulation Allocation with Aggregator Coordinated Electric Vehicles
Sun Sun (University of Toronto, Canada); Min Dong (University of Ontario Institute of Technology, Canada); Ben Liang (University of Toronto, Canada)
pp. 13-18

Distributed Mode Scheduling for Coordinated Power Balancing
Hiroaki Kawashima (Kyoto University, Japan); Takekazu Kato (Kyoto University, Japan); Takashi Matsuyama (Kyoto University, Japan)
pp. 19-24

Double-Layered Control Methodology Combining Price Objective and Grid Constraints
Sandro Iacovella (KU Leuven, Belgium); Frederik Geth (KULeuven ESAT-ELECTA, Belgium); Frederik Ruelens (KU Leuven, Belgium); Niels Leemput (KULeuven ESAT-ELECTA, Belgium); Pieter Vingerhoets (KU Leuven, Belgium); Bert Claessens (VITO, Belgium); Geert Deconinck (KU Leuven, Belgium)
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NET2: Smart Grid Data Management

Coral: Reliable and Low-latency P2P Convergecast for Critical Sensor Data Collection
Daniel Germanus (Technical University of Darmstadt, Germany); Abdelmajid Khelil (Huawei European Research Center, Germany); Johannes Schwandke (TU Darmstadt, Germany); Neeraj Suri (Technical University of Darmstadt, Germany)
pp. 300-305

Analyzing Storage Requirements of the Resilient Information-Centric SeDAX Architecture
Michael J Hoefling (University of Tuebingen, Germany); Cynthia Mills (University of Tuebingen, Germany); Michael Menth (University of Tuebingen, Germany)
pp. 306-311

Utilizing a Flexibility Interface for Distributed Energy Resources Through a Cloud-Based Service
Lasse Orda (Technical University of Denmark, Denmark); Jesper Bach (Technical University of Denmark, Denmark); Anders Bro Pedersen (Technical University of Denmark, Denmark); Bjarne Poulsen (, Denmark); Lars Hansen (DONG Energy, Denmark)
pp. 312-317

On the Scalable Collection of Metering Data in Smart Grids through Message Concatenation
Babak Karimi (Wichita State University, USA); Vinod Namboodiri (Wichita State University, USA); Murtuza Jadliwala (Wichita State University, USA)
pp. 318-323

Characteristics of AMI using DLMS/COSEM and IEEE 802.15.4g Multi-hop Wireless Communication
Tetsuo Otani (Central Research Institute of Electric Power Industry, Japan); Michifumi Miyashita (Central Research Institute of Electric Power Industry, Japan)
pp. 324-329
STAN1: Simulation and Co-simulation

MAC-Sim: A Multi-Agent and Communication Network Simulation Platform for Smart Grid Applications Based on Established Technologies
Fidelis Perkonigg (Imperial College London, United Kingdom); Djordje Brujic (Imperial College London, United Kingdom); Mike Ristic (Imperial College London, United Kingdom)
pp. 570-575

INSPIRE: Integrated Co-Simulation of Power and ICT Systems for Real-Time Evaluation
Hanno Georg (TU Dortmund University, Germany); Sven Christian Müller (TU Dortmund, Germany); Nils Dorsch (TU Dortmund University, Germany); Christian Rehtanz (University of Dortmund, Germany); Christian Wietfeld (TU Dortmund University & Communication Networks Institute, Germany)
pp. 576-581

A Tool for Assessing Interdependency of Mobile Communication And Electricity Distribution Networks
Seppo Horsmanheimo (VTT Technical Research Centre of Finland, Finland); Niwas Maskey (Aalto University, Finland); Heli Kokkonieni-Tarkkanen (VTT Technical Research Centre of Finland, European Union); Pekka Savolainen (VTT Technical Research Centre of Finland, Finland); Lotta Tuominimäki (VTT Technical Research Centre of Finland, Finland)
pp. 582-587

A Control Loop Approach for Integrating The Future Decentralized Power Markets and Grids
Yong Ding (Karlsruhe Institute of Technology, Germany); Per Goncalves da Silva (SAP, Germany); Martin A. Neumann (Karlsruhe Institut of Technology (KIT), Germany); Lin Zhang (Tsinghua University, P.R. China); Michael Beigl (KIT & TecO, Germany); Matthias Budde (Karlsruhe Institute of Technology, Germany)
pp. 588-593

The Development of a Smart Grid Co-Simulation Platform and Case Study on Vehicle-To-Grid Voltage Support Application
Chong Shum (City University of Hong Kong, Hong Kong); Wing-Hong Lau (City University of Hong Kong, Hong Kong); Ka Lun Lam (City University of Hong Kong, Hong Kong); Yuxuan He (City University of Hong Kong, Hong Kong); Shu-hung Chung (City University of Hong Kong, Hong Kong); Norman Tse (City University of Hong Kong, Hong Kong); Kim Fung Tsang (City University of Hong Kong, Hong Kong); Loi Lei Lai (City University. London, United Kingdom)
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Keynote 2: Transforming Our Business with Technology

ARCH2: Architectures and Models for the Smart Grid II

Impact Study of Collaborative Implementation Models on Total Cost of Ownership of Integrated Fiber-Wireless Smart Grid Communications Infrastructures
Ramzi Charni (INRS-EMT, Canada); Martin Maier (Institut National de la Recherche Scientifique (INRS), Canada)
pp. 31-36

Fair Power Allocation in Multi-User Systems with Controllable Loads
Maja Etinski (NEC Laboratories Europe, Germany); Anett Schülke (NEC Laboratories Europe, Germany)
pp. 37-42

Online Scheduling for Vehicle-to-Grid Regulation Service
Junhao Lin (The University of Hong Kong, Hong Kong); Ka-Cheong Leung (The University of Hong Kong, Hong Kong); Victor O. K. Li (University of Hong Kong, P.R. China)
pp. 43-48

A Comparative Study of High Renewables Penetration Electricity Grids
Jay Taneja (University of California at Berkeley, USA); Virginia Smith (University of California, Berkeley, USA); David Culler (University of California at Berkeley, USA); Catherine Rosenberg (University of Waterloo, Canada)
Impact Analysis of Locational Marginal Price Subject to Power System Topology Errors
Dae-Hyun Choi (Texas A&M University, USA); Le Xie (Texas A&M University, USA)
pp. 55-60

NET3: Grid Detection and Estimation

Wireless Communication Aided Differential Relay Protection in Smart Grids: A Concerted Blitzkrieg
Zhenghao Zhang (The University of Tennessee & University of Tennessee, USA); Husheng Li (University of Tennessee, USA); Ju Bin Song (Kyung Hee University, Korea); Zhu Han (University of Houston, USA); Gaoqiong Luo (Guangzhou University, P.R. China); Wenjing Hu (Shandong University, USA)
pp. 330-335

Power Grid Topology Inference Using Power Line Communications
Lutz Lampe (University of British Columbia, Canada); Mohamed Osama Ahmed (University of British Columbia, Canada)
pp. 336-341

PMU Placement for Optimal Three-Phase State Estimation Performance
Yue Yang (University of Washington, USA); Sumit Roy (University of Washington, USA)
pp. 342-347

Fuzzy C-Means Algorithm for Parameter Estimation of Partitioned Markov Chain Impulsive Noise Model
Fabien Sacuto (McGill University, Canada); Fabrice Labeau (McGill University, Canada); Basile Landaable Agba (Institut de Recherche d'Hydro-Québec & École de technologie superieure, Canada)
pp. 348-353

A Maximum-Entropy Based Fast Estimation of Power Quality for Smart Microgrid
Sardar Ali (University of Victoria, Canada); Kui Wu (University of Victoria, Canada); Dimitri Marinakis (University of Victoria, Canada)
pp. 354-359

STAN2: Testbeds and Field Trials

Unify AMI Information Models to Support Diversified Smart Grid Systems and Applications
Zhao Li (ABB US Corporate Research Center, USA); Jiang Zheng (ABB US Corporate Research Center, USA)
pp. 600-605

An On-line PLC Frequency Impedance Analyzer
Cornelis J. Kikkert (James Cook University, Australia)
pp. 606-611

Domino of the Smart Grid: An Empirical Study of System Behaviors in the Interdependent Network Architecture
Xiang Lu (Institute of Information Engineering, CAS, P.R. China); Wenye Wang (NC State University, USA); Jianfeng Ma (Xidian University, P.R. China); Limin Sun (Institute of Information Engineering, China Academy of Science, Beijing, P.R. China)
pp. 612-617

Randomizing AMI Configuration for Proactive Defense in Smart Grid
Muhammad Qasim Ali (University of North Carolina Charlotte, USA); Ehab Al-Shaer (University of North Carolina Charlotte, USA); Qi Duan (UNCC, USA)
pp. 618-623

Realistic Model for Narrowband PLC for Advanced Metering Infrastructure
Tanguy Ropitault (Telecom Bretagne, France); Alejandro Lampropulos (Institut TELECOM / TELECOM Bretagne, France); Alexander Pelov (Institut Mines-Telecom / Telecom Bretagne, France)
Utilities worldwide are looking to implement smartgrid technologies to help meet business objectives due to drivers such as aging infrastructures, workforce and capital resource constraints, rate pressures, elevated customer expectations, policy requirements, and the need to manage disruptive technologies. Although smartgrid technologies promise a host of benefits, including improvements in efficiency, reliability, and safety, they are often transformational and represent significant challenges to the traditional utilities. This panel will discuss, from BC Hydro's perspective, real-life experiences and challenges associated with planning, implementing, and operating systems that incorporate these new technologies.

BC Hydro is a Crown Corporation providing electricity to 95% of British Columbia residents. BC Hydro is committed to energy conservation, reduction of greenhouse gases, and modernization of the electrical grid while keeping the lights on and the rates low for customers.

Participants:
Sol Lancashire, Chief Telecom Architect, Chair
Al Mithani, Project Manager Distribution Management System
Vern Kwiatkowski, IT Manager Smart Metering Infrastructure
Adam French, Manager Telecommunications

DEM3: Demand Response Communications and Networking

**Enabling Demand Response in a Computer Cluster**
Chen Wang (CSIRO ICT Centre, Australia); Martin de Groot (CSIRO ICT Center, Australia)
pp. 181-186

**LTE and Hybrid Sensor-LTE Network performances in Smart Grid Demand Response Scenarios**
Juho Markkula (Centre for Wireless Communications, University of Oulu, Finland); Jussi P Haapola (Centre for Wireless Communications, University of Oulu, Finland)
pp. 187-192

**Ambient Sensing-based Incentives for Behavior Modification in Demand Response**
Chen-Khong Tham (National University of Singapore, Singapore); Chongyu Zhou (National University of Singapore, Singapore)
pp. 193-198

**Online Energy Management Strategies for Base Stations Powered by the Smart Grid**
Johann Leithon (National University of Singapore, Singapore); Teng Joon Lim (National University of Singapore, Singapore); Sumei Sun (Institute for Infocomm Research, Singapore)
pp. 199-204

**An Adaptive Scheduling of PHEV Charging: Analysis under Imperfect Data Communication**
Qiumin Dong (Nanyang Technological University, Singapore); Dusit Niyato (Nanyang Technological University, Singapore); Ping Wang (Nanyang Technological University, Singapore); Zhu Han (University of Houston, USA)
pp. 205-210

SEC2: Privacy, Confidentiality and Authentication

**Privacy-Friendly Appliance Load Scheduling in Smart Grids**
Cristina E.M. Rottondi (Politecnico di Milano, Italy); Giacomo Verticale (Politecnico di Milano, Italy)
pp. 420-425

**Smart Meter Speed Dating, short-term relationships for improved privacy in Smart Metering**
Sören Finster (Karlsruhe Institute of Technology (KIT), Germany)
pp. 426-431
Confidentiality-preserving Obfuscation for Cloud-based Power System Contingency Analysis
Ognjen Vuković (KTH, Royal Institute of Technology, Sweden); György Dán (KTH, Royal Institute of Technology, Sweden); Rakesh B. Bobba (University of Illinois at Urbana-Champaign, USA)
pp. 432-437

Spoofing Prevention Using Received Signal Strength for ZigBee-Based Home Area Networks
Paria Jokar (University of British Columbia, Canada); Nasim Arianpoo (University of British Columbia, Canada); Victor CM Leung (The University of British Columbia, Canada)
pp. 438-443

TSAF: Tamper-resistant and Scalable Mutual Authentication Framework for Plug-in EV Charging
Young Jin Kim (Bell Labs, Alcatel-Lucent, USA); Vladimir Kolesnikov (Bell Labs, USA); Marina Thottan (Bell Labs, USA)
pp. 444-449

STO3: Testbeds II & Support for Storage, Renewable Resources and Microgrids

A High Performance Line Filter for Narrowband Power Line Communication Testbed Applications
Steffen Mueller (University of Erlangen-Nuremberg, Germany); Robert Weigel (University of Erlangen-Nuremberg, Germany); Fabian Lurz (University of Erlangen-Nuremberg, Germany); Alexander Koelpin (University of Erlangen-Nuremberg & Institute f. Electronics Engineering, Germany)
pp. 690-695

Cloud Motion Estimation for Short Term Solar Irradiation Prediction
Hao Huang (Stony Brook University & Brookhaven National Lab, USA); Jin Xu (Stony Brook University, USA); Zhenzhou Peng (Stony Brook University, USA); Shinjae Yoo (Brookhaven National Lab, USA); Dantong Yu (BNL, Upton, USA); Dong Huang (Brookhaven National Lab, USA); Hong Qin (Stony Brook University, USA)
pp. 696-701

Modeling the Effect of Geographically Diverse PV Generation on California’s Distribution System
Michael Cohen (University of California, Berkeley, USA); Duncan Callaway (UC Berkeley, USA)
pp. 702-707

Solar Irradiance Forecast System Based on Geostationary Satellite
Zhenzhou Peng (Stony Brook University, USA); Shinjae Yoo (Brookhaven National Lab, USA); Dantong Yu (BNL, Upton, USA); Dong Huang (Brookhaven National Lab, USA)
pp. 708-713

Value of Aggregation in a Smart Grids
Raffi Sevlian (Stanford University, USA); Ram Rajagopal (University of California, Berkeley, USA)
pp. 714-719

CYB1: Cyber-Physical Wide-Area Monitoring, Protection & Control - I

SeCPSim: A Training Simulator for Cyber-Power Infrastructure Security
Ceeman Vellaithurai (Washington State University, USA); Anurag Srivastava (Washington State University, USA); Saman Zonouz (University of Miami, USA)
pp. 61-66

Structural Dependability Analysis in Smart Grid under Simultaneous Failures
Jonas Wäfle (Norwegian University of Science and Technology, Norway); Poul E. Heegaard (Norwegian University of Science and Technology & NTNU, Norway)
pp. 67-72
Detection, Recognition, and Localization of Multiple Attacks through Event Unmixing
Wei Wang (University of Tennessee, USA); Li He (University of Tennessee, Knoxville, USA); Penn Markham (University of Tennessee, USA); Hairong Qi (the University of Tennessee, USA); Yilu Liu (University of Tennessee, USA)
p. 73-78

On Measurement Unit Placement for Smart Electrical Grid Fault Localization
Md Mashud Hyder (The University of Newcastle, Australia); Kaushik Mahata (University of Newcastle, Australia)
p. 79-84

Dynamic Modeling and Resilience for Power Distribution
Yun Wei (Georgia Institute of Technology, USA); Chuanyi Ji (Georgia Institute of Technology, USA); Floyd Galvan (Entergy Services, Inc., USA); Stephen Couvillon (Entergy Services, Inc., USA); George Orellana (Entergy Services, Inc., USA)
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SERV1: Smart Grid Network Management and Services

Electric Vehicle Charging Station Placement
Albert Y.S. Lam (Hong Kong Baptist University, Hong Kong); Yiu-Wing Leung (Hong Kong Baptist University, Hong Kong); Xiaowen Chu (Hong Kong Baptist University, Hong Kong)
p. 510-515

Distributed Real-Time Power Flow Control with Renewable Integration
Kiyoshi Nakayama (University of California, Irvine & Donald Bren School of Information and Computer Sciences, USA); Changhong Zhao (California Institute of Technology, USA); Lubomir Bic (University of California, Irvine, USA); Michael B Dillencourt (University of California, Irvine, USA); Jack Brouwer (University of California, Irvine, USA)
p. 516-521

Modeling economic interactions between microgrids and electric utilities: a regulator’s perspective
Chiara Lo Prete (Harvard University, USA); Benjamin Hobbs (Johns Hopkins University, USA)
p. 522-527

Tackling the Photovoltaic Integration Challenge in the Distribution Network with Deferrable Load
Enxin Yao (University of British Columbia, Canada); Pedram Samadi (University of British Columbia, Canada); Vincent W.S. Wong (University of British Columbia, Canada); Robert Schober (University of British Columbia, Canada)
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