Meeting Contributors
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# IEEE POWER & ENERGY SOCIETY
## 2013 GENERAL MEETING
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WELCOME
The IEEE Power & Energy Society (PES) is proud to be holding its 2013 General Meeting in Vancouver, British Columbia, Canada. The technical program theme of “Shaping the Future Energy Industry” will provide a platform to offer new insights, innovative ideas and answers to some of the most intriguing and important questions facing the power industry today.

The Local Organizing Committee and PES Technical Committees welcome colleagues and friends from all facets of the industry and corners of the world to a valuable technical program, productive committee meetings and exciting networking opportunities.

OUR THANKS
PES gratefully acknowledges the support of the 2013 General Meeting’s host utilities, BC Hydro and Fortis BC, and of all our other generous meeting contributors.

CONFERENCE OVERVIEW
Below is a brief overview of the conference and meeting schedule and a description of each element of the meeting. The descriptions are in approximately the same order as they occur during the meeting.

Note: Attire for the conference is business casual. No denim jeans or shorts in the technical sessions or committee meetings, please.

CONFERENCE LOCATION
The 2013 General Meeting will be held at the Vancouver Convention Centre East and West, the Vancouver Marriott Pinnacle Downtown Hotel and the Renaissance Vancouver Harbourside Hotel located in Vancouver, British Columbia, Canada. With its scenic views, mild climate, and friendly people, Vancouver is known around the world as one of the best places to live and is certainly a beautiful destination to visit.

Please note the Local Organizing Committee has established a Facebook page and Twitter feed to provide up to the minute news and announcements.

Facebook: facebook.com/IEEEPesGM2013
Twitter: @IEEE_PES_GM2013

The PES asks that you tweet about the PES General Meeting and tag it #IEEEPESGM

CONFERENCE SCHEDULE AT A GLANCE
A quick overview of the meeting in chronological order. Detailed description of the events listed can be found elsewhere in the program.

Note: A limited number of sessions and events (in particular, some committee meeting) may fall outside this schedule. The PES Scholarship Plus Golf Outing will be held at Furry Creek Golf Course on Sunday, 21 July http://www.pes-gm.org/2013/index.php/golf-outing-left

*Tutorials, Technical and Leisure/Companion Tours and Evening Events, SIF Luncheon, and Awards Dinner are optional activities with limited capacities; they require an additional fee and tickets for admittance. Plain Talk courses are co-located with the General Meeting, and require a separate registration rather than General Meeting registration. See the General Meeting Registration page for more information about the Golf Outing and Plain Talk courses http://pes-gm.org/2013/

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| AM and PM | Committee Meetings | Companion Tours*
|      |          | Tutorials*                                             |
| PM   | New Attendees Orientation (2 sessions – 3:00 and 4:00 PM) |
| PM   | Companion Lounge open for registered companions and registered children |
| 4:00 PM | IEEE PES Scholarship Plus Reception |
REGISTRATION AND INFORMATION

Convention Center East – East Convention Level Lobby

Sunday 21 July
7:30 AM – 7:00 PM

Monday 22 July–Tuesday 23 July
6:30 AM – 7:00 PM

Wednesday 24 July
6:30 AM – 4:00 PM

Thursday 25 July
6:30 AM – 12:00 PM

All attendees are required to register for the 2013 General Meeting and pay the appropriate fee in order to participate in any aspect of the meeting.
At the registration counters, you may pick up your advance registration packets, register on-site, purchase tickets for luncheons or companion and evening events (depending on availability), ask questions at both the registration and information counters.

**Conference Proceedings:** All registrants for the technical program are entitled to one copy of the conference proceedings on a USB flash drive which you will receive with your registration packet.

**INCLUDED WITH REGISTRATION**

**Attendee registration fees include:** Continental breakfasts Monday–Thursday, Welcome Reception Sunday evening, full technical session and committee meeting program (including the Poster Session and Reception on Monday evening, and Student Poster Contest on Tuesday morning), a copy of the meeting’s proceedings on a USB flash drive, the opportunity to participate in any of the available optional events open exclusively to registrants at the prevailing registrant rate.

**Companion and Children registration fees include:** Continental breakfasts Monday–Thursday in the Companion Lounge, welcome reception on Sunday evening, Poster Session and Reception/Fellows Reception on Monday evening, companion lounge Sunday–Thursday, the opportunity to participate in companion tours and any of the other available optional events open to registered companions at the prevailing registered companion rate. Companions are not admitted to technical session nor do they receive a copy of the proceedings. **Note:** Registered children must be accompanied by a registered companion when in the companion lounge or participating in any conference activities, including tours.

**Student registration fees include:** Continental breakfasts Monday–Thursday, welcome reception on Sunday evening, full technical session and committee meeting program (including the poster session and co-located receptions on Monday evening and the Student Poster Contest on Tuesday morning), a copy of the meeting’s proceedings on a USB flash drive, the opportunity to participate in any program elements designed exclusively for students. If you wish to attend the Student/Industry/Faculty Luncheon on Wednesday, you must purchase a ticket for the luncheon. Plus optional events open to registrants at the prevailing registrant rate.

**IN AND AROUND THE REGISTRATION AREA**

**PES-Related Displays:** Tables with literature and with materials about PES and IEEE membership, programs, publications and future meetings.

**Information Booth:** Staffed by local volunteers, you can obtain information about the meeting, the venue and the Vancouver area from knowledgeable people.

**Message Center:** A bulletin board where you can find last-minute changes to the meeting program or room assignments, and leave written messages for other attendees.

**NEW ATTENDEES ORIENTATION SESSION**

**Sunday 21 July 3:00 PM and 4:00 PM Renaissance Ballroom I**

A short orientation session will familiarize first-time attendees with PES and the PES General Meeting. The session will be offered twice. Each session will provide an understanding of the various types of technical sessions, committee meetings, tutorials, technical tours, and social events. At the end of the session, the newcomer should be able to navigate confidently through the General Meeting and obtain maximum value from the experience. Each session will include a question and answer period.

**WELCOME RECEPTION**

**Sunday 21 July 5:00 PM – 8:30 PM Vancouver Convention Centre, West Ballroom CD**

Take this opportunity to renew old acquaintances and meet more members of the power and energy community. You are invited to enjoy a complimentary hors d’oeuvre buffet and a cash bar. Photo ID will be required to purchase alcoholic beverages. A live performance from Canada’s #1 event band, the Ten Souljiers, will be enjoyed by all.

**A few things to keep in mind:**

— Remember your GM badge. You will not be allowed to the Welcome Reception without it. Registration will be open until 7:00 PM. (Location: VCC East – East Convention Level Lobby)

— As is true of all elements of the General Meeting, smoking is not permitted at this event.
ATTENDEE BREAKFASTS

Monday 22 July 6:30 – 7:45 AM VCC East – Ballroom AB
Tuesday 23 July 7:00 – 9:30 AM VCC East – Exhibit Hall C
(with Student Poster Contest)
Wednesday 24 July 6:30 – 8:30 AM VCC East – Ballroom AB
Thursday 25 July 6:30 – 8:30 AM VCC East – Ballroom AB

Complimentary continental breakfasts for all conference registrants will be available Monday through Thursday. Note that a general breakfast is not offered on days other than these.

PRESENTERS BREAKFASTS

Monday 22 July 6:30 – 7:45 AM VCC East – East Meeting Room 8 & 15
Tuesday 23 July 6:30 – 8:30 AM VCC East – East Ballroom C
Wednesday 24 July 6:30 – 8:30 AM VCC East – East Ballroom C
Thursday 25 July 6:30 – 8:30 AM VCC East – East Ballroom C

Presenters must attend a special breakfast on the day of their sessions where final plans for the session at which they will present will be made. There is a separate Poster Session Presenter Breakfast on Monday morning from 6:30–7:45 AM. See additional information in the “Information for Presenters” section of this program.

PES MEMBERS MEETING

Monday 22 July 8:00 – 9:00 AM VCC East – Exhibit Hall A

PES President Noel N. Schulz will provide an update about PES progress and activities of the past year. The candidates for the offices of PES President-Elect, PES Treasurer & PES Secretary will each make a short presentation of his/her views for the Society and IEEE so you can make an informed decision when you vote during this year’s election. (Meet the candidates face-to-face at a reception that will be co-located with the Monday Night Poster Session Location to be announced, 5:00–7:00 PM, Monday 22 July.)

PLENARY SESSION

Monday 22 July 9:00 – 11:00 AM VCC East – Exhibit Hall A

PES President Noel Schulz will moderate the Plenary Session which begins immediately following the PES Members Meeting. The notable keynote speakers who will address aspects of the conference theme, “Shaping the Future of Energy Industry” are:

Greg Reimer, Executive Vice President Transmission and Distribution, B.C. Hydro, speaking on Shaping BC Hydro's Transmission & Distribution for Today and Tomorrow;
Edmund O. Schweitzer, Founder of Schweitzer Engineering Laboratories, speaking about The Future of Protection and Control in Evolving Energy Industry;
Mark McGranaghan, Vice President of the Power Delivery and Utilization Sector, Electric Power Research Institute, speaking on Grid Resiliency and the Smart Grid.

COMMITTEE MEETINGS

Most administrative and technical committee meetings are scheduled from Monday 11:00 AM (following the Plenary Session) through Thursday afternoon. Some additional committee meetings are scheduled on Sunday 21 July. See the Committee Meeting section of the program for details. Last minute updates to the program will be posted on the message board in the Registration area.

TECHNICAL SESSIONS AND OTHER TECHNICAL EVENTS

See the “Technical Session and Other Events” section of the program for a complete listing and description of all technical sessions. Descriptions include an abstract of each event and papers presented during each session. Last minute updates to this program will be posted in the Registration area. Technical meetings are planned for Monday afternoon and evening and all day Tuesday, Wednesday and Thursday. The following types of sessions are scheduled:

Super Sessions: a series of presentations in composite sessions designed to fully explore topics from different perspectives. Experts from several PES technical committees will address subjects that are of significant interest to the profession:
- **Late Breaking News:** Managing Extreme Events & Developments Affecting Electrical Power Systems
- Impacts of Geomagnetic Disturbance (GMD) Events on Electric Power Systems
- Electricity Supply to Rural and Remote Communities
- Innovation and Advancements in Protection, Automation and Control for Evolving Power Systems
- Transmission System Efficiency and Reliability Improvements
- Generation Mix Strategies: Solving Energy Production Challenges of the 21st Century

**Panel Sessions:** Invited papers on a wide variety of noteworthy subjects.

**Transactions Paper Sessions:** Presentation of high quality IEEE PES Transactions papers on many issues of significance to energy and power professionals.

**Paper Forums:** Multiple authors present brief overviews of their quality papers followed by time for a discussion with the individual author(s) of your choice.

**Poster Session:** A Monday evening special event with hundreds of authors representing all aspects of the industry, each presenting a poster version of his/her paper. Enjoy hot and cold hors d’oeuvres and refreshing beverages as you browse the posters and discuss the papers one-on-one with their authors. VCC East Exhibit Hall BC

**Student Poster Contest:** The Student Poster Contest will be held in conjunction with the Tuesday morning attendee breakfast (on 23 July) in the VCC East Exhibit Hall C

**Tutorials:** Ten tutorials will be presented during the meeting. Classes are taught by eminent professionals in the field. Earn PDHs and CEUs for your attendance (see below for an explanation of PDHs and CEUs). Full or one-day conference registration plus an additional fee is required in order to attend any of these courses. For complete information about the tutorials including pricing, information about the instructors and schedule, see the Tutorial section of the program in the pages that follow. Tickets may be purchased at the Registration desk if seats remain. Topics covered will include various aspects of:
- Smart Grid
- Power Quality
- Standards in Power System Modeling
- Static Var Compensators
- Electricity Markets

**Technical Tours:** Five half-day inspection trips are offered. Registration is permitted through 11 July only. No on-site technical tour registration is available. Valid photo ID must be presented at the beginning of each tour. See the Technical Tour section of the program for descriptions and details of each tour.

**MONDAY NIGHT POSTER SESSION AND RECEPTION**

Monday 22 July  
5:00 – 7:00 PM 
VCC East Exhibit Hall BC
(co-located with the Fellows’ Reception, the Meet the Candidates Reception and an opportunity to meet the donors who have contributed to the PES Scholarship Plus program)

A popular feature of the PES General Meeting technical program is the Poster Session, where papers from each represented committee and all topics will be presented. A complimentary hors d’oeuvre buffet will be served and cash bar will be available. Attendee or Companion badges are required for entrance to the Poster Session. Photo ID will be required to purchase alcoholic beverages at the bar. *(The Student Poster Contest will be held Tuesday morning, 7:00 – 9:30 in the VCC East – Exhibit Hall C, during which an Attendees’ Breakfast will be available.)*

**CANDIDATES MEET & GREET RECEPTION**

Monday 22 July  
5:00 – 7:00 PM 
VCC East Exhibit Hall BC
(co-located with the Poster Session and New Fellows Reception)

The PES candidates for the offices of President-Elect, Treasurer & Secretary will each make a short presentation of his/her views for the Society and IEEE so you can make an informed decision when you vote during this year’s election.

**NEW FELLOWS RECEPTION**

Monday 22 July  
5:00 – 7:00 PM 
VCC East Exhibit Hall BC
(co-located with the Poster Session, Candidates Reception)

As part of PES’s recognition of extraordinary achievements in the technical and professional fields of energy and power, during the reception held in their honor you are cordially invited to stop in and congratulate the IEEE Fellows elected to the class of 2013 who are members of PES.
SCHOLARSHIP PLUS RECEPTION
Monday 22 July 5:00 – 7:00 PM VCC East Exhibit Hall BC
(co-located with the Poster Session, Candidates Reception and New Fellows Reception)
Meet the individuals who will help shape the future of the Power Industry and congratulate them on being selected as IEEE PES Scholars.

STUDENT POSTER CONTEST
Tuesday 23 July 7:00 – 9:30 AM VCC East Exhibit Hall C
(co-located with Attendee Breakfast)
Take this opportunity to see the work done by hundreds of the top students in our field. Plan to spend some time discussing topics of mutual interest with the participants.

AWARDS CEREMONY AND BANQUET
Tuesday 23 July 7:00 – 9:30 PM Renaissance – Ballroom I, II, III
US$75; After 25 June US$90
Join us for a banquet dinner where IEEE and PES award winners are honored for their outstanding achievements. Vegetarian/vegan meals are available upon request. Seating is limited. You may purchase tickets on-site at the Registration Desk if there are seats remaining. A cash bar serving beer and wine will open at 6:30 PM and be available thru dinner. Photo ID will be required to purchase alcoholic beverages.

STUDENT PROGRAM
An exciting student program for IEEE PES Student Members includes a Poster Contest, and the Student/Industry/Faculty luncheon (ticket required) as well as the Student/Industry/Faculty Job Fair. Student members are invited to participate in all other aspects of the General Meeting as well. After registering for the General Meeting, students may visit http://www.pes-gm.org/2013/index.php/student-program for more information about the program. Students must be prepared to verify their status by providing their ID and IEEE Membership number when picking up their registration packets on-site.

STUDENT / INDUSTRY / FACULTY LUNCHEON
Wednesday 24 July 12:00 – 1:30 PM Marriott – Pinnacle Ballroom
US$45; After 25 June US$50
Students US $25; After 25 June US $30
Student/Industry/Faculty Luncheon: Attend a luncheon designed to bring together students, industry representatives and faculty advisors. The recipients of the IEEE PES Student Prize Paper Award in Honor of T. Burke Hayes and the recipients of the Student Poster Contest will be recognized. There will be a keynote speech by Dr. Muhammad Arshad, Division Manager of Generation Engineering at BC Hydro.
All meeting registrants are invited to purchase tickets and join the luncheon as long as there are seats remaining. Seating is limited.

STUDENT / INDUSTRY / FACULTY JOB FAIR
Wednesday 24 July 1:30 – 3:00 PM VCC East – East Ballroom C
International Job Fair for Students: Employers and university graduates and undergraduates can participate in an International Job Fair for Students following the luncheon. This job fair will provide a forum for employers and students who share a common interest in the power and energy industry to meet and discuss career opportunities. It enables one-to-one conversations between company engineers or recruitment professionals and students who will soon be in the job market. Students will sit with a potential employer during lunch. Students may circulate among recruiting tables for further conversations.

NETWORKING RECEPTION – HOSTED BY PES AND IEEE WIP COMMITTEE
Wednesday 24 July 5:00 – 6:30 PM VCC East – East Meeting Room 11
All registered attendees are invited to this complimentary informal reception held to encourage networking between industry, government and university participants. This year, an exciting new format is being introduced. From 5:45 – 6:30 PM, interact with one or more of the woman successful in the power industry who have been invited to share experiences and wisdom with those attending the reception. There will be plenty of opportunity to network with other attendees at the reception as well. Light refreshments will be provided.
GRADUATES OF THE LAST DECADE (GOLD) – SEMINAR AND RECEPTION

Wednesday 24 July 6:00 – 7:30 PM VCC East – East Meeting Room 8 & 15

The Graduates of the Last Decade reception and seminar provides an opportunity for all conference attendees, in particular, current students and engineers that have graduated within the last ten years to network, meet officers of IEEE PES, and to make contacts among their peers in the Power & Energy community. Find out how you can contribute to PES and how it can help you. All registered attendees are invited. Light refreshments will be provided. A 20 minute seminar will begin at 6:45 PM.

COMPANION ACTIVITIES

Access to the activities described below is limited to registered companions and registered children in the company of a registered companion.

Registered companions and children are invited to mingle and relax in the Companion Hospitality Lounge, located in the Tuscany Room of the Renaissance Vancouver Harbourside Hotel. The lounge will be open Sunday Noon through 5:00 PM, Monday through Wednesday 7:00 AM through 5:00 PM, and Thursday 7:00 AM through Noon. Complimentary breakfast will be served Monday through Thursday 7:00 – 9:30 AM.

Many fun activities are being planned for the lounge. Please check on-site in the lounge for more details and activity sign-up.

COMPANION TOURS

A full program of optional tours has been planned for registered companions. Descriptions of the tours follow in chronological order. Registered children are welcome on the tours but must be accompanied by a registered parent. Tickets for each tour are sold at a single rate regardless of the age of the person participating. A companion or child’s badge is required in order to participate. You may purchase ticket onsite if there are seats available. Please visit the registration desk to check availability.

Please arrive at the pick-up point 15 minutes before the scheduled start time of the tour. All tours depart from the Companion Lounge located in the Tuscany Room on the lobby level of the Renaissance Vancouver Harbourside Hotel.

Note: The buses used for the tours have storage for a wheelchair or mobility scooter, but do not have a wheelchair lift. Guests must be able to enter and exit the buses without the aid of a lift.

Whistler Day Trip

Sunday 21 July 8:00 AM – 4:00 PM Pricing: $76

Whistler, one of the rising stars in the league of International Destination Resorts, and one of the proud sites of the 2010 Winter Olympics, is featured in this scenic day tour. Guests will board a motorcoach and head on their way to one of the most scenic rides in the world. The trip from Vancouver to Whistler Mountain is a photographer’s paradise.

Traveling by Lions Bay, Porteau Cove, towering pines and plunging cliffs, boats bobbing in marinas, rich green isles of Howe Sound and the majestic mountain peaks present a panorama of nature’s generosity that the guests will long remember. Passing the mining community of Britannia Beach, and the logging town of Squamish, the tour begins to climb into the Coastal Mountains. With the peaks of the rugged Tantalus Range watching its progress, the motorcoach winds its way through the Cheakamus Canyon, past Daisy Lake and Brandywine Falls to the alpine resort of Whistler.

Here in Whistler, enjoy strolling through the sunny Village where guests may be happy to simply browse through quaint village shops, walk along forest trails, or just relax and enjoy the mountain scenery. Later in the afternoon the guests board a motorcoach for the scenic return trip to Vancouver.

Includes:
• Deluxe motorcoach transportation
• Guide to provide narration throughout
• Free time in Whistler Village
• Activity level: 30% bus, 70% leisurely stroll

http://www.whistler.com

Whistler Day Trip Enhancement (Optional) – Summer Sightseeing Lift Ticket

Pricing: $44

You haven’t been to Whistler until you’ve been to the top of Whistler and Blackcomb Mountains. The view at 6,000 feet is 360 degrees of stunning beauty any way you look at it. An easy gondola or chairlift ride provides spectacular views all the way to the top. The gondola to the top of Whistler Mountain is accessible for everybody. For the more adventurous, venture up Blackcomb Mountain with an open-air chairlift experience.

http://www.whistlerblackcomb.com
Sights and Sounds of Vancouver

Sunday 21 July 1:00 PM – 4:00 PM  
Monday 22 July 9:30 AM – 12:30 PM  

This tour provides the perfect opportunity to explore the diverse sights and sounds of Vancouver with a private guide! The tour commences in world-famous Stanley Park, a 1,000 acre peninsula of rain forest only 5 minute drive from the city centre. Following the winding seawall past picturesque yacht clubs, historic totem poles and the Brockton Point Lighthouse with its view of the pulsating tidal waters of the Inner Harbour, the arch of the Lions Gate Bridge frames the snowcapped Lions Peaks beyond. Continuing, the group enters the freshened Point, exits at the tidal flats of English Bay and arrives at sandy Sunset Beach.

Vancouver’s neighborhoods of Kitsilano and the elite Shaughnessy Heights are explored followed by a stop at Queen Elizabeth Park. Here, guests stop to savor the floral beauty of a former rock quarry magically converted into sunken gardens.

To conclude, the guests motor through the bustling bazaar in the heart of Chinatown and along the brick paved roads of Gastown, the Vancouver of yesteryear, to be dropped back at the hotel to freshen up for their evening ahead.

Includes:
- Deluxe motorcoach transportation throughout
- Narrated sightseeing
- Activity level: 90% Bus, 10% leisurely stroll

Canyons & Mountains

Tuesday 23 July 10:00 AM – 3:00 PM  

This exhilarating tour commences with a brief drive through world famous Stanley Park with the glorious Rose gardens and the seafowl floating on Lost Lagoon. The park is exited via the Lions Gate Bridge arching over the entrance to Vancouver’s Inner Harbour. This picturesque bridge is one of the two connections between the city proper and its neighboring residential / recreational playground of the mountain sloped North Shore.

The tour continues into the Capilano River Canyon where it stops at the Capilano Suspension Bridge. Here, the passengers thrill to walk across the world’s longest suspension footbridge swaying 230 feet above the white water in the gorge below. Once guests have traveled across this suspension bridge they have an opportunity to walk with the birds along a connection of seven smaller suspension bridges linked to the trees. The highest bridge here is 90 feet high and towers over guests below. For those extreme thrill seekers, Capilano’s newest attraction “Cliffwalk” should do the trick. This heart-stopping cliffside journey takes you through rainforest vegetation on a series of unobtrusive cantilevered and suspended walkways jutting out from the granite cliff face above Capilano River to previously unexplored areas of the park.

Arriving at the base of Grouse Mountain, participants board the “Super Skyride.” This aerial tramway will whisk the guests up an unforgettable “five minute mile” close to the 4,000 foot peak of Vancouver’s highest mountain. In winter, a skier’s delight, in summer, wooded trails and lakeside walks provide the visitors with a reunion with nature. Here the guests can absorb the spectacular 360 degree view, take in the unique Theatre in the Sky audio visual show “Born to Fly” or marvel at the display of quaint tree trunk carvings. The Mountain is also home to a wildlife habitat with two very active Grizzly Bears. The guests descend from this mountaintop refuge and retrace their route across the harbour’s entrance to their hotel.

Includes:
- Deluxe motorcoach transportation
- Admission into Capilano Suspension Bridge
- Narrated sightseeing throughout
- Roundtrip Gondola transportation at Grouse Mountain
- Activity level: 20% Bus, 80% leisurely walk

http://www.capbridge.com
http://www.grousemountain.com

First Nations Spirit Tour

Wednesday 24 July 10:00 AM – 2:00 PM  

A brief scenic drive along Spanish Banks takes us from the city centre of Vancouver to the University Endowment Lands and the Museum of Anthropology at the University of British Columbia. World renowned for its collections, research, teaching, public programs, and community connections, the museum is also acclaimed for its spectacular architecture by noteworthy Arthur Erickson and its unique setting on the cliffs of Point Grey.

Inside are magnificent Northwest Coast Indian art and artifacts as well as fascinating collections from other cultures around the world. Permanent exhibitions emphasize the First Nations people of Coastal British Columbia.
After an afternoon immersed in culture, the guests will make their way back to the hotel.

Includes:
• Motorcoach transportation throughout
• Knowledgeable tour guide for narration
• Admission to the Museum of Anthropology
• Guided tour of the museum
• Activity level: 20% Bus, 80% leisurely stroll

http://moa.ubc.ca
http://www.ubc.ca/vancouver/about

Granville Island Tour & Market Tasting
Thursday 25 July 10:00 AM – 2:00 PM Pricing: $89

Aquabus water ferries have become a common mode of transportation for many Vancouverites. Cruising through False Creek, guests will see points like the 2010 Olympic Athletes Village, the newly renovated BC Place Stadium and the rest of downtown from a refreshing vantage point on their way over to Granville Island.

Located on the south side of False Creek under the Granville Street Bridge, Granville Island's Public Market, with its festive atmosphere and street entertainers, offers fresh produce, seafood and meats along with flower shops and an ethnic food fair. Upon arrival, guests will be greeted by local island chefs who will take them on a private journey through the market exploring all the different aspects and cultures that make up this vibrant “place to be”. Guests will have a chance to sample some regional favourites and learn some tips on food selection and preparation. Following the guided tour, guests will have time to browse the shops and stroll through the market at leisure.

Includes:
• Roundtrip motorcoach transfers
• False Creek transfer via private Aquabus
• Private 2 hour market tour with regional food tastings
• Leisure time in the marketplace
• Activity level: 10% Bus, 5% Aqua Ferry, 85% leisurely walk

http://www.granvilleisland.com

PLAIN TALK ABOUT THE ELECTRIC POWER SYSTEM:
THE BASICS SERIES FOR NON-ENGINEERING PROFESSIONALS

IEEE PES PLAIN TALK courses for the power industry professional will help you to understand technical aspects of the electric power industry, even if you do not have an engineering background. You will gain insights into the concerns of engineers, the demands of regulators and consumer groups, and the factors and trends that impact the operation of today’s electric power systems. These courses are also appropriate for new engineers to the industry, or for engineers in other fields who are transitioning to the electric power industry. These courses aim to increase your understanding of the electric power system by providing you with practical knowledge that you can use as you work in or with this important industry.

IEEE PES PLAIN TALK courses are co-located events rather than parts of the General Meeting, and thus, conference registration is not required to attend these courses. The fee to register for the courses on-site is US$2,150 for three courses, US$1,510 for two courses and US$795 for a single course. (If you register on or before 26 June, prices are lower. See the Plain Talk web page noted below for specifics.) The course fee includes continental breakfast, lunch and all course materials. Breakfast and registration: 7:30 – 8:00 AM. Courses start promptly at 8:00 AM. You may register on-site if seats are available.

Power System Basics – Understanding the Electric Utility Operation Inside and Out
Tuesday 23 July 8:00 AM – 5:00 PM Renaissance – Salon F

The focus of this course is to provide a fundamental foundation in electric power systems, from basic formulas to the planning, operations, and equipment involved in generating, transmitting, and distributing electric power. Basic electrical terminology will be explained in simple to understand language with regard to design, construction, operation and maintenance of power plants, substations and transmission and distribution lines. Topics covered in the course include an introduction to the fundamentals and basic formulas of electricity as well as the equipment involved in the electric power system. An overview of generation, substations, transmission, distribution, and utilization is provided. Protection, reliable operation, and safety are among the topics covered.

Instructor: William J. Ackerman
Distribution System – Delivering Power to the Customer

Wednesday 24 July 8:00 AM – 5:00 PM  Renaissance – Salon F

The focus of this course is to provide attendees with an overview of the issues associated with the planning, engineering, design, operation, and automation of electrical distribution systems. Types of distribution systems and network circuits, as well as engineering issues related to distribution systems will be explored. New concepts in the design, challenges, and operation of smart grid will be addressed. This course is intended for those who are not familiar with the delivery of electricity to the end user.

Topics covered in the course include an introduction to the types of distribution systems, issues associated with distribution planning such as outages and reliability, distribution engineering considerations relating to radial and secondary networks, and distribution automation. The course also provides an overview of electrical distribution operations, including the roles of utility personnel, construction and maintenance considerations, and trends in the industry. Smart grid and its impact on the distribution system will be explored.

Instructors: Joseph L. Koepfinger and Maurice Ney

Transitiction System – The Interconnected Bulk Electric System

Thursday 25 July 8:00 AM – 5:00 PM  Renaissance – Salon F

Prerequisite for this course is Power System Basics or a familiarity with basic formulas and power system equipment.

The focus of this course is to provide participants with knowledge of how electric power is transferred from generation sources to distribution systems via the interconnected electric bulk power system known as “the grid.” Basic physical laws governing the grid will be introduced, as well as the regulatory agencies involved in its governance. The great blackouts will be explored. This course is intended to increase participant’s understanding of the electric grid and how it functions in the electric power system.

Topics covered in the course include an introduction to the fundamental concepts of power, energy, and power system stability as they relate to the grid. The grid is explored in terms of its interconnections, power flow, North American interconnections, and governing bodies such as NERC/ERO, ISOs, and RTOs. Reliability standards and contingency analysis are addressed. Issues related to the planning and operation of the grid, such as transmission and economic constraints, determining transmission transfer capability, and dealing with congestion are reviewed. The course also discusses the great blackouts, their root causes, and lessons learned.

Instructor: Robert W. Waldele

TECHNICAL PROGRAM INFORMATION

INFORMATION FOR PRESENTERS

Presenter/Chair Breakfasts

All presenters, panelists and session chairs MUST meet at breakfast the day of their session(s) to discuss session arrangements. Attendance is required. All presenters should have received e-mails providing the dates of their sessions and breakfasts.

Presenter Breakfasts

Monday 22 July 6:30 – 7:45 AM  VCC East – East Meeting Room B & 15
Tuesday 23 July 6:30 – 8:30 AM  VCC East – East Ballroom C
Wednesday 24 July 6:30 – 8:30 AM  VCC East – East Ballroom C
Thursday 25 July 6:30 – 8:30 AM  VCC East – East Ballroom C

Poster Session Presenter Breakfast

Monday 22 July 6:30 – 7:45 AM  VCC East – East Ballroom C

AUDIO-VISUAL EQUIPMENT AND PRESENTERS PREPARATION ROOM

Technical Session rooms will be equipped with an LCD projector and screen, power and extension cords, podium, microphone if appropriate, and a wireless mouse. Speakers who wish to use a computer during their presentations are required to provide their own laptop computers and are responsible for ensuring compatibility with on-site equipment.
Committee meeting rooms will be equipped with a cart (for any electronic equipment you may provide on your own), screen, and power and extension cords. No projector or computer will be provided. Arrangements, including payment via credit card, for any additional audio-visual equipment you wish to rent from the meeting’s AV provider must be made in advance.

The Presenters Prep Room, located in the VCC East – Meeting Room 5 will be equipped with an LCD projector with the same specifications and compatibility as those in the Technical Session rooms. The equipment is provided to allow presenters to become familiar with, and to ensure that, their laptop computers are compatible with on-site equipment provided. Please check at the Information Booth or Paper Sales area for exact location, hours and access.

PDHs AND CEUs FOR ATTENDEES

Continuing Education Units (CEUs) offered by IEEE

A Continuing Education Unit (CEU) is ten contact hours of participation in an organized continuing education experience under responsible, qualified direction and instruction. A unit generally consists of courses of study that refresh, update and enhance knowledge, skills and experience of professional personnel.

Providers of CEUs must be approved by an accrediting body within a jurisdiction such as state/province or country. IEEE is an Authorized Provider of CEUs through The International Association of Continuing Education and Training (IACET), and has adopted IACET guidelines and criteria for all its continuing professional development programs. Authorized Providers of the IACET must reapply every five years and undergo a rigorous assessment to maintain their status.

IACET-approved CEUs are accepted by accrediting bodies in every state within the US and by most other countries; therefore, certification of IEEE CEUs by individual states and countries is not required. If IEEE is not included on a state’s list of approved CEU providers, it is because the listing is of CEUs providers specifically certified by the state and does not include the names of the more global IACET CEU providers.

Any course that offers CEUs which is presented by an IEEE entity has been reviewed and approved according to standards set by IACET. All registered students who complete an IEEE course offering CEUs will receive a certificate from the IEEE attesting to the CEUs earned by the attendee.

It is up to each student to determine if a specific course or program fills the needs of the discipline or certifying body for which the CEUs are intended.

Professional Development Hours (PDHs)

Continuing professional education for licensed engineers is measured in Professional Development Hours (PDH). A PDH is one contact hour of instruction or presentation. Currently, approximately thirty states mandate Professional Development Hours to maintain P.E. licensure, each with varying requirements.

CEUs readily translate into PDHs (1CEU=10 PDHs), though PDHs do not convert automatically to CEUs.

The licensee is responsible for maintaining records to be used to support PDH credits claimed. PES does not track this information, and no certificates are provided. Unlike the procedure for CEUs, courses are not pre-approved by the IEEE for PDHs.

At many PES meetings, forms are readily available that can be completed by attendees of any session and signed by the session chair to verify attendance. The completed forms are held by each attendee. They are not submitted to IEEE. It is up to each licensee to provide the forms to the certifying body or employer, and to determine if a specific course or program fills the needs of the discipline or certifying body for which the PDHs are intended.

TECHNICAL TOURS

Technical tours are a unique element of the PES General Meeting technical program. This year, the following tours are being offered to registered attendees of the General Meeting. The departure location for tours is to be announced. Please arrive 15 minutes earlier than the posted departure time. Advance registration for all technical tours is required. There is no on-site registration for technical tours. Tour conditions require that attendees wear clothing with long sleeves/long pants.

Powerex Corp. – Energy Trade Floor Tour

Date: Monday 22 July
Departure Time: 1:30 PM
Return Time: 4:00 PM
Transportation: ~10 minute walk from the General Meeting
Vancouver Convention Centre, East Building, Lobby Doors
Pre-registration: Required (30 people max.)
Tour Description:
Following a short presentation on wholesale energy markets and the business of Powerex, participants will be taken on a tour of Powerex trade floor.

About Powerex:
Powerex was established in 1988 as the wholly-owned electricity marketing subsidiary of BC Hydro – Canada’s third largest electric utility – responsible for marketing BC Hydro’s surplus electricity in the west. Today, it is a key participant in energy markets across North America, buying and supplying physical wholesale power, natural gas, ancillary services, and more recently, environmental products with an ever-expanding list of trade partners.

Powerex’s portfolio of energy resources includes purchases of power and natural gas from a wide variety of energy suppliers across North America, as well as the highly reliable Canadian Entitlement energy derived from the Canada/US Columbia River Treaty.

The knowledge, expertise and creativity of its staff allow it to meet the changing demands of the markets and needs of its customers. Powerex’s employees closely follow the markets, enabling it to quickly respond to market changes. And Powerex’s in-depth knowledge of the various markets, transmission and gas transportation systems helps it find creative solutions for securing and moving energy to support our trade agreements.

In a changing market, Powerex has outlasted many of its competitors and evolved from an electricity marketing company to an energy trading and marketing company, offering a variety of products and services in traditional energy and emerging markets.

Powerex’s chief competitive advantages have been the quality of its service, the integrity and creativity of its people, and its ability to reliably deliver energy products and services.

Trade Floor:
From its trade floor in downtown Vancouver, Powerex trades energy for terms ranging from hours to days, weeks, months and longer. Powerex works with its customers to create customized energy solutions to meet their specific daily and seasonal energy needs. And to ensure it can always meet its customers’ requirements, Powerex operates one of the largest real-time trading desks in the west, open 24/7, 365 days a year.

Centre of Energy Education and Research (CEER) in BCIT
Date: Monday 22 July
Departure Time: 12:30 PM  Return Time: 4:00 PM
Transportation: Shuttle Transportation will be provided from the General Meeting
Vancouver Convention Centre, East Building, Lobby Doors
Pre-registration: Required (25 people max.)
Tour Description:
The School of Energy’s boiler, co-generation and industrial instrumentation facility is a significant part of infrastructure construction happening at British Columbia Institute of Technology (BCIT). The facility forms the basis of the Centre for Energy Education and Research (CEER). Highlights of the new multi-million dollar energy studies centre include:

• The cleanest operating boiler in Western Canada, with controls to minimize emissions and maximize energy efficiency aligning us with the BC Government’s clean energy mandate.
• A 300 kW electrical generator to harness the output from the boiler as part of BCIT’s “intelligent microgrid”.
• The multi-fuel boiler produces enough steam to supply multiple remote labs around campus, including the unit operations lab, the turbine co-generation lab, the pulp and paper lab, and the industrial instrumentation lab.

UBC’s Energy Sustainability Tour
Date: Tuesday 23 July
Departure Time: 12:30 PM  Return Time: 4:00 PM
Transportation: Shuttle Transportation will be provided from the General Meeting
Vancouver Convention Centre, East Building, Lobby Doors
Pre-registration: Required (45 people max.)
Tour Description:
The Bioenergy Research & Demonstration Facility is the first demonstration of its kind in the world of a community-scale heat and power system fuelled by biomass. The system, fueled by biomass, creates synthe-
sis (syn) gas that is then burned, in raw form, to produce steam or it is conditioned to create ultra clean syn gas that is injected into an internal combustion engine used to generate electricity. The system provides heat and power to The University of British Columbia’s Vancouver campus. It facilitates research to develop feedstock (fuel) and process innovations, set new global standards for performance and emissions and lowers the campus’s greenhouse gas emissions (GHGs) and fossil fuel consumption.

Technical Visit to BC Hydro System Control Centre

Date: Wednesday 24 July
Departure Time: 5:00 PM  Return Time: 8:30 PM
Transportation: Shuttle Transportation will be provided from the General Meeting Vancouver Convention Centre, East Building, Lobby Doors
Pre-registration: Required (30 people max.)

Tour Description:
Fraser Valley Office is BC Hydro main control centre with the main function to exercise control of provincial transmission network, generation and distribution. The centre is housed in a new building constructed in 2007 and is equipped with state of the art equipment and technology for power system control. The visit will cover the tour of the building including the control room and computer rooms. Informative presentations will be given on topics related to BC Hydro Real-time Operations, Energy Management System (EMS) and Distribution Management system (DMS). Live demonstrations of BC Hydro EMS and DMS advanced applications will be performed.

Powertech Labs Inc.

Date: Wednesday 24 July
Departure Time: 2:30 PM  Return Time: 4:00 PM
Transportation: Shuttle Transportation will be provided from the General Meeting Vancouver Convention Centre, East Building, Lobby Doors
Pre-registration: Required (45 people max.)

Tour Description:
Powertech Labs Inc. (Powertech), a BC Hydro subsidiary, specializes in clean energy consulting, independent testing services and power system solutions. Since our inception in 1979, we have served a wide range of utilities companies, oil & gas companies and automotive & electrical equipment manufacturers in order to meet the complex and changing needs of our clients around the world. Operating on a separate, commercial basis for most of our 20-year history, we have been providing energy based consulting and testing services to governments, utilities, Fortune 500 companies and communities since our inception. Powertech serves over 400 clients from across all five continents. Combining our multidisciplinary, expert staff of engineers, scientists and technologists, with our world leading testing facilities gives Powertech a unique perspective to help clients from around the globe assess, test and demonstrate their energy systems and energy-related technologies. We are located on an 11 acre, 21-lab campus in Surrey, British Columbia, Canada.

Facility Tour will include the following presentation and/or demonstrations:

- An Introduction from Powertech's Managing Director, Raymond Lings – Introduction and the History of Powertech and Its People, Relationship with BC Hydro – PowerPoint Presentation on Powertech.
- Software Presentation – A presentation on Powertech’s software business and solutions that we are able to provide to our clients.
- DSATools Presentation/Demonstration – Demonstration of the DSATools software including the on-line dynamic security assessment.
- High Voltage Lab Overview/Demonstration – The highlights of our test equipment include 800 kV Resonant test set, 3.2 MV Impulse generator and 1000 kV DC generator. Some of the tests that are performed in the lab include: AC and DC withstand tests, Lightning and Switching Impulse withstand test, Partial Discharge and Corona Tests.
- Scanning Electron Microscope Demonstration – You may witness testing on the state-of-the-art variable pressure scanning electron microscope with an EDS micro-analyzer attachment and a powerful image analysis module.
- Materials Lab Presentation/Demonstration – You may see examples of failure analysis, damaged equipment, and various systems and structure assessments. These may witness vibration testing, cavitation erosion repair and a variety of metallography equipment, hardness testers, impact-testing machines and servo-hydraulic tensile testers.
- Electric Vehicle Charging Station with Vehicle Presentation/Demonstration – You will see examples of Electric Vehicle Infrastructure and a sampling of electric vehicles from the Powertech and BC Hydro fleet.
- Hydrogen Fueling Station with Vehicle Presentation/Demonstration – An overview of how a hydrogen fuel cell vehicle and compressed hydrogen fueling station operate.
- Hydrogen Technology Centre, Cylinder Testing Facility – A general tour is likely to see examples of high-pressure fuel cylinder technologies that are tested at Powertech.

TUTORIALS

Meeting registration plus an additional fee is required to attend any of these courses. Earn CEUs and PDHs for your attendance. You may register on-site if seats and materials are available.

HALF DAY TUTORIALS

DOE's 7 Traits of a Smart Grid

Date: Sunday 21 July 8:00 AM – 12:00 PM
Price: Early Bird $195, Regular $240. Student Early Bird $50, Student Regular $75.
Instructors: Wanda Reder, Jim McClanahan, Ernst Camm, Shay Bahramirad, PhD; S&C Electric Company

This tutorial will provide a fundamental understanding of the DOE’s seven defining traits of a smart grid and the technologies, applications, and market drivers that are making the modernization of today’s electrical system possible. Attendees will also learn about the security, communication and regulatory challenges that are affecting the implementation of the smart grid. This course will cover the following topics:

- Consumer Participation
- Accommodating both Central & Distributed Generation & Storage
- Enabling New Products, Services, and Markets
- Power Quality
- Optimization of Assets
- Anticipating & Responding to System Disturbances
- Operating Resiliency to Attacks & Natural Disasters

Smart Grid Implementations and Lessons Learned

Date: Sunday 21 July 1:00 PM – 5:00 PM
Price: Early Bird $195, Regular $240. Student Early Bird $50, Student Regular $75.
Instructors: Andrew Kunze, PE, Wanda Reder, Ernst Camm, Jim McClanahan; S&C Electric Company

This course examines technologies and application from the perspective of smart grid installation. The course begins with a broad overview of intelligent equipment and services. At the same time, students are introduced to a handful of lessons learned and insight into final application of Smart Grid project implementations.

- Loop systems
- Physical security and level of quality
- Greater number of intelligent devices and services: DG, Storage, Real-time monitoring, AMI, EV, etc.
- Insight into final applications and their level of maturity

Microgrids – Designing Their Role in Smart Grid

Date: Monday 22 July 1:00 PM – 5:00 PM
Price: Early Bird $195, Regular $240. Student Early Bird $50, Student Regular $75.
Instructor: Steve Pullins, Horizon Energy Group

The tutorial introduces the concept and role that Microgrids will play in the evolution of the smart grid. The course material is based on the ongoing implementation of a utility Microgrid and a planned customer-owned Microgrid. Students will be introduced to Microgrid concepts, drivers that influence the Microgrid, as well as the projected market for Microgrids. The course will address Microgrid design aspects, engineering considerations, and architectures based on developed used cases. The attendee will leave with an understanding of the key aspects pertaining to designing and implementing a Microgrid.
Distribution Overcurrent Protection and Coordination

Date: Thursday 25 July 8:00 AM – 12:00 PM
Price: Early Bird $195, Regular $240. Student Early Bird $50, Student Regular $75.
Instructors: Shay Bahramirad, PhD, James Niemira, PE; S&C Electric Company

The tutorial describes the principles of selective coordination, in which removal of faulted equipment and line sections – followed by system restoration – occurs both quickly and reliably. The attendees learn how new technology protective devices can be applied to improve power quality. This half day tutorial instructs attendees on the selection and application of overcurrent protective devices for use in medium-voltage electric power distribution systems. Throughout the course, attendees are given assignments to reinforce the concepts and procedures covered. Also, a comprehensive system protection and coordination example is developed, connecting many of the tutorial topics.

- System parameters
- Symmetrical components
- Protective devices: Circuit breakers and relays, fuses, pulse closers, sectionalizers
- Coordination of overcurrent protective devices

Smart Grid 203: Distribution System

Date: Thursday 25 July 8:00 AM – 12:00 PM
Price: Early Bird $195, Regular $240. Student Early Bird $50, Student Regular $75.
Instructor: Doug Houseman, EnerNex

The distribution impacts of smart grid, including:

- Smart Distribution Systems Fundamentals
- Smart Distribution Systems Applications
- Distribution Automation
- Volt and Var Control
- Distribution System Monitoring (Sensors, fault location, waveshape analysis)
- Distribution Management System
- Distributed Resource Integration
- Telecommunication for Smart Distribution Systems
- Distribution System Applications Integration

Who Should Attend: Smart Distribution System educators, developers, engineers and managers who are considering the deployment of Smart Distribution System technology. The participants will be involved in the complete chain of energy delivery from generation, transmission and distribution to the customers.

Smart Grid 308: Distributed Energy Resources

Date: Thursday 25 July 1:00 PM – 5:00 PM
Price: Early Bird $195, Regular $240. Student Early Bird $50, Student Regular $75.
Instructor: Doug Houseman, EnerNex

This tutorial will cover the following topics:

- Overview of DER and its components
- Understanding variable generation issues
- Limits to DER implementation in a conventional distribution grid
- Interconnect and other standards for DER
- Engineering considerations for DER planning and approval
- Issues in customer owned DER (e.g. maintenance, overrides, etc)

Who Should Attend: Anyone who is interested in Distribution level DER, its impact on the grid and limits in the distribution grid today.
FULL DAY TUTORIALS

Operation of Electricity Markets – Technical and Economic Aspects
Date: Sunday 21 July 8:00 AM – 5:00 PM
Price: Early Bird $295, Regular $395. Student Early Bird $100, Student Regular $150.
Instructor: Kankar Bhattacharya, University of Waterloo

The focus of this course is to provide attendees with an overview of the issues associated with operation of electricity markets from a broad perspective. Market design and structure, price settlement processes, and transmission system issues will be discussed and the fundamental concepts of market auctions will be explored. The course will encompass both the technical and economic aspects of the operation of electricity markets for a multi-disciplinary audience. The topics included are, markets design, types of market auctions and electricity price formation, role of the Independent System Operators in different markets, transmission pricing paradigms, congestion management, firm transmission rights and ancillary services management. Various operational practices adopted by electricity markets in North America are discussed in the context of the above topics.

Power Quality – From Lightning and Harmonics to Variable Energy Resources
Date: Sunday 21 July 8:00 AM – 5:00 PM
Price: Early Bird $295, Regular $395. Student Early Bird $100, Student Regular $150.
Instructors: Surya Santoso, University of Texas at Austin; Roger Dugan; EPRI, Mark McGranahan, EPRI

The aging power grid infrastructure coupled with the elements of nature and increasing penetration of variable energy sources such as wind and solar photovoltaic generation can give rise to poor electric power quality. Incompatibilities between the electrical characteristics of today's power system and the expectations for loads are the root causes of nearly all power quality problems. A decrease in the supply voltage for a fraction of a second can trip a microprocessor-based motor controller offline, disrupting an entire manufacturing process. Another example may involve poor feeder voltage regulation due variable wind or solar power causing short term over- and undervoltages. This course provides a solid foundation in understanding common power quality phenomena, root causes of power quality disturbances, solutions, impacts of variable generation, monitoring, technical standards, and industry trends.

Energy Forecasting in the Smart Grid Era
Date: Sunday 21 July 8:00 AM – 5:00 PM
Price: Early Bird $295, Regular $395. Student Early Bird $100, Student Regular $150.
Instructors: Dr. Tao Hong, SAS Institute; Dr. Shu Fan, Monash University; Dr. Hamidreza (Hamid) Zareipour, University of Calgary; Dr. Pierre Pinson, Technical University of Denmark

Wide range deployment of smart grid technologies enables utilities to monitor the power systems and gather data on a much more granular level than ever before. While the utilities can potentially better understand the customers, design the demand response programs, forecast and control the loads, integrate renewable energy and plan the systems, etc., they are facing analytic issues with making sense and taking advantage of the "big data". This tutorial developed by IEEE Working Group on Energy Forecasting offers a comprehensive overview of energy forecasting to utility forecasters, analysts, planners, operators and their managers. The participants will learn the fundamentals and the state-of-the-art of load, price and wind forecasting through real world examples and case studies.

Synchrophasor Fundamentals and Applications: Leveraging the Investment
Date: Tuesday 23 July 8:00 AM – 5:00 PM
Price: Early Bird $295, Regular $395. Student Early Bird $100, Student Regular $150.
Instructors: Dan Brancaccio, Joe Chow, Fred L. Elmendorf, R. Matthew Gardner, Scott Ghiocel, Kevin Jones, Innocent Karnawa, David M. Lavery, Ken Martin, Mario Paolone, Scott Stapels, James S. Thorp, Kjetil Uhlen, Luigi Vanfretti, Austin D. White

The past five years have seen an immense public and private interest, investment, and cooperation in the synchrophasor technology space. Many electric transmission owners and operators in North America were awarded grants to deploy a great number of PMUs across their respective service areas, along with the related communications and IT infrastructure.

The availability of this new infrastructure can enable the development and implementation of new applications that utilize time-synchronized dynamic measurements. However, unless properly managed, challenges involved in designing, deploying, and operating and, ultimately, extracting value from this new capital- and
data-intensive synchrophasor infrastructure can be daunting. While the research indicates tremendous value in leveraging synchrophasor technology, a divide still exists between the current state of the technology and the possibilities that synchrophasor technology enable.

The purpose of this tutorial is to address the fundamentals of synchrophasor technology and synchrophasor-enabled applications at a practical level. The tutorial will be delivered by hands-on practitioners of the technology along with those in the research community. Covering topics across the spectrum of the technology space, the tutorial opens with a session on synchrophasor computation fundamentals, continues in sessions focusing on PMU installation and testing, designing IT and communications for synchrophasors, deploying synchrophasor applications from the lab to the field, managing the data, state estimation, and culminates in a session on synchrophasor-based widearea control implemented in a utility.

**Application of IEC CIM Standards in Power System Modeling, Smart Grid and Enterprise Integration**

*Date: Tuesday 23 July 8:00 AM – 5:00 PM*

*Price: Early Bird $295, Regular $395. Student Early Bird $100, Student Regular $150.*

*Instructors: Mr. Jay Britton, Dr. Alan McMorran, Margaret Goodrich, Dr. Enamul Haq; CIM Task Force*

This tutorial is organized by the CIM task force on power system information modeling under CAM subcommittee.

The common information model (CIM) is an established IEC standard for modeling power system data and information. Recently the CIM standard has been adopted by many utilities worldwide for exchanging power system network models and enterprise wide integration. It is necessary to educate the power system engineers, data modelers and IT integration personnel on the various aspects of this CIM standard so that more and more utilities worldwide can adopt this standard. This tutorial will provide the basic understanding of power system information modeling using CIM. It will provide in depth knowledge of power system model exchange between utilities and enterprise integration using CIM standard.

The attendees of this tutorial will become familiar with the use of the CIM standard as it relates to the various applications including smart grid. It is expected that the attendees will gain sufficient knowledge about the various aspects of CIM so that they can facilitate the adoption of the CIM standard in their respective enterprise.

**Basic Tutorial on Gas Insulated Lines**

*Date: Wednesday 24 July 8:00 AM – 5:00 PM*

*Price: Early Bird $295, Regular $395. Student Early Bird $100, Student Regular $150.*

*Instructor: Hermann Koch, Siemens*

Gas insulated technology today covers gas insulated substations (GIS) and gas insulated transmission lines (GIL). The GIS technology is now used worldwide for more than 40 years. GIL was mostly used world-wide inside substations or special applications like cavern hydro power plant and finds increasing interest also outside substations as a high power underground transmission technology.

The use of gas-insulated technology in North America is increasing due to the limited space in metropolitan areas, the high power ratings, the opposition coming from the public and the high reliability and availability of gas insulated substations and transmission lines. SF6 is the main insulating gas, which has a high global warming potential and is therefore restricted in use and has to follow precise handling processes. International Standards are defining requirements, testing and commissioning for the products of gas insulated technology.

The full day tutorial is structured in modules, which starts with basic information on the theory of gas-insulated technology. It gives deeper views on special topics related to SF6 GIS and GIL. A wide part of the tutorial is giving examples of typical applications and explains the reasons why GIS or GIL was chosen. The tutorial content has an international outreach and was created by users, manufacturers and consultants from all over the world. The tutorial content is focused on engineers who actually work on high voltage substation projects or who might start soon. The content has a practical orientation and is presented by experts with long time experiences in projects. The goal is to give an overview to the tutorial attendee about the gas insulated technology, how it can be used and what he shall think of when planning and ordering such equipment.
Renewable Energy Plant Design and System Interconnection

Date: Wednesday 24 July 8:00 AM – 5:00 PM
Price: Early Bird $295, Regular $395. Student Early Bird $100, Student Regular $150.
Instructors: Younan Lawando, Paul Pabst, PE, Ernst Camm, Syed S. Ali, PE; S&C Electric Company

This one-day tutorial has been designed to share industrial expertise in designing and integrating large wind and solar power plants with electrical engineers, technicians, developers, and others involved in the design of renewable power plants. The tutorial will include topics such as an introduction to wind turbine generators, photovoltaic, and concentrating solar power technologies, utility interconnection requirements, impacts of wind and solar plants on the utility electrical system, interconnection and collector substation design, collector system design, and reactive power compensation systems.

- Introduction to wind and solar technologies
- Interconnection process
- Impacts of renewable power plants
- Interconnection requirements
- Design of renewable power plants and engineering studies
- Communications and control of wind/solar power plant
- Reactive power compensation and energy storage systems

PHOTOGRAPHY

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| Tuesday 23 July 8:00 AM–12:00 PM VCC East – East Meeting Room 1 and Foyer | **Late Breaking News Super Session:** Managing Extreme Events and Developments Affecting Electrical Power Systems  
Session 1:  
Mike Henderson – Challenges and Solutions for Gas and Electrical Interaction  
Chris Root – Northeast Storm Experience and Improvements  
Tom Gwaltney, FP&L – Storm Hardening and Preparedness  
Gregg Lemler, PG&E – Hardening Grid against Vandalism - Metcalf Substation Event  
Tom Pierpoint, PHI – Technology Innovations to Improve Response to Extreme Events  
Panel Discussion  
Session 2:  
Vic Romero, SDG&E – Using Microgrids for Disaster Recovery  
Juan Castaneda / Bob Yinger, SCE – Modeling and Simulating High Impact System Events  
Cheri Warren, NGrid – Innovation in Customer Communication during Big Events  
S. C. Srivastava, Indian Institute of Technology Kanpur – Lessons Learnt from Indian Blackout and Future Solutions  
Panel Discussion | 100 |
| Tuesday 23 July 1:00 PM–5:00 PM VCC East – East Meeting Room 1 and Foyer | Impacts of Geomagnetic Disturbance (GMD) Events on Electric Power Systems  
Topics that will be discussed in this session include:  
Jeff Dagle – Pacific Northwest Labs – Geomagnetic Storms and Long-Term Impacts on Power Systems – No super session paper, but PNNL has a paper that studied the effects on the WECC system  
Emanuel E. Bernabeu – Dominion Power – He will present his work on understanding the impacts on their equipment  
John Kappenman – Storm Analysis Consultants – He will present his work described in the FERC Meta 322 report on mitigation strategies and updated work he has on mitigation strategies  
Ramsis Girgis – ABB St. Louis – Dr. Girgis - Methodology for Evaluating the Impact of GIC and GIC Capability of Power Transformer Designs | 116 |
| Wednesday 24 July 8:00 AM–12:00 PM VCC East – East Meeting Room 1 and Foyer | Innovation and Advancements in Protection, Automation and Control for Evolving Power Systems  
Presentations  
1. Implementation of an Integrated OMS/DMS at San Diego Gas and Electric, presented by Vic Romero, San Diego Gas and Electric  
4. Synchrophasor Standards and Guides for the Smart Grid, presented by Ken Martin, Electric Power Group  
5. Optimizing Wide Area Measurement System Architectures with Advancements in Phasor Data Concentrators (PDCs), presented by Mital Kanabar, GE Digital Energy  
6. Wide-Area Backup Fault Protection with Synchronphasors, presented by Eric Udren, Quanta Technology  
7. Impact of IEC 61850 on the Interoperability and Reliability of Protection Schemes, presented by Alex Apostolov, Omicron | 133 |

(Continued)
### Wednesday 24 July

**1:00 PM–5:00 PM**

**Electricity Supply to Rural and Remote Communities**

Access to electricity is an essential catalyst for social and economic development. There is global interest to achieve universal access to electricity in 2030, with important technological, social and cost implications. The session aims to give an overall view of the dimensions of sustainable electricity supply to rural and remote communities. In industrialized countries, though demand is still but modestly increasing, the emphasis is on maintaining electricity services and adapting existing rural grids to emerging technologies. Developing countries face a rather large demand growth and their emphasis is on creating an appropriate electric service and rural power system. The presentations will share different global electrification challenges, covering concrete experiences in Canada, Chile, India, US, and Zambia, providing insights into the lessons learned and the critical success factors, such as the institutional conditions and legislation, the business environment, and the political and social conditions. Both grid-based and off-grid solutions will be reviewed.

### Thursday 25 July

**8:00 AM–12:00 PM**

**Transmission System Efficiency and Reliability Improvements**

Reducing the carbon footprint of the electricity business and increasing the role of renewable energy are crucial strategy components for developing a sustainable electric energy supply. Achieving aggressive carbon-reduction goals while ensuring reliability and satisfying demand requires that transmission system owners and operators evaluate their systems for efficiency improvements. Contributions from transmission systems can be achieved through deployment of measures that directly reduce transmission losses, as well as measures that reduce CO2 emissions via increased system utilization, opening access on lines for providers to meet renewable targets and deliver energy from generation sources that are less carbon-intensive, such as wind and solar. Increased utilization of the transmission system and of large amounts of variable generation also introduce potential reliability challenges that must be simultaneously addressed. Presenters in this panel session will address key initiatives that are being considered to improve transmission system efficiency and reliability to achieve sustainability goals.

**Generation Mix Strategies: Solving Energy Production Challenges of the 21st Century**

Topics that will be discussed in this session include:

1. **Evolution of the Future Generation Mix**, Charlie Smith, UVIG, USA
2. **Effects of Natural Gas Pricing in New England**, Michael Henderson, ISO-NE, USA
5. **Do New Generation Mixes Lead to the Need for Probabilistic Planning and Operating Tools?** Mark O’Malley, UCD, Ireland
6. **Emissions Policies and the Impact to Power Generation Investment**: The Case of Alberta, John Esaiw, AESO, Alberta, Canada
### Administrative Committees

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<tr>
<td>Community Solutions Initiative Workshop</td>
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<tr>
<td>Technical Council, Operation &amp; Procedures Committee</td>
<td>Tu</td>
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<tr>
<td>Chapters Leadership Meeting</td>
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<td>MAR – Pinnacle I</td>
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<td>10:00 A - 12:00 P</td>
<td>REN – Port of Hong Kong</td>
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<tr>
<td>Technical Council, Standards Coordination Committee</td>
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<tr>
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<td>12:00 P - 1:00 P</td>
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<tr>
<td>Transactions on Power Systems Editorial Board</td>
<td>Tu</td>
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<td>Technical Council, Technical Sessions Committee</td>
<td>Tu</td>
<td>12:30 P - 2:30 P</td>
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<td>Technical Council Meetings and Marketing</td>
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<td>Electrification Magazine Editorial Board Meeting</td>
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<td>Electrification Magazine Working Meeting</td>
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<td>4:30 P - 5:30 P</td>
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<td>PES Technical Co-Sponsored Meetings Steering Committee</td>
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<td>Power &amp; Energy Magazine Editorial Board</td>
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<td>Web Presence Committee Meeting</td>
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<td>Publications Board Meeting</td>
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<td>Electric Machinery Committee</td>
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<tr>
<td>EMC WG-9 Guide to Testing Permanent Magnet</td>
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<td>EMC Long Range Planning Meeting</td>
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<td>EMC WG-10 Revision of IEEE 112</td>
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<td>EMC WG6 Application of Superconductivity in</td>
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<td>EMC Motor SC WG-11 Condition Monitoring</td>
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<td>EMC Motor Subcommittee (combination, see page 117)</td>
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<td>EMC WG-10 Guideline to On-Line Monitoring of</td>
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<td>IPSC Latin America Infrastructure WG</td>
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<td>EDPG Fellows</td>
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<td>IPSC Asian and Australian Infrastructure WG</td>
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<td>EDPG Award Working Group</td>
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<td>HEPSC – Guide for Control of Hydroelectric Power Plants (P1010)</td>
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<td>HEPSC – Guide for Commissioning of Electrical Systems in Hydroelectric Power Plants (P1248)</td>
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<td>HEPSC – Guide for Computer Based Control for Hydroelectric Power Plant Automation (P1249)</td>
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<td>EDPG Station Design &amp; Control Subcommittee</td>
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<td>W</td>
<td>2:00 P - 4:00 P</td>
<td>VCC East – East Meeting Room 19</td>
</tr>
<tr>
<td>EDPG Committee</td>
<td>Th</td>
<td>8:00 A - 11:00 A</td>
<td>REN – Port of Hong Kong</td>
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</table>

#### Intelligent Grid Coordinating Committee

<table>
<thead>
<tr>
<th>Group</th>
<th>Date</th>
<th>Time</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGCC Meeting</td>
<td>M</td>
<td>1:00 P - 4:00 P</td>
<td>MAR – Ambleside II</td>
</tr>
<tr>
<td>IGCC Smart Grid Implementation (combination, see page 53)</td>
<td>M</td>
<td>1:00 P - 5:00 P</td>
<td>REN – Salon D</td>
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#### Marine Systems Coordinating Committee

<table>
<thead>
<tr>
<th>Group</th>
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<tbody>
<tr>
<td>Marine Systems Coordinating Committee Main Meeting</td>
<td>Th</td>
<td>8:00 A - 11:00 A</td>
<td>VCC East – East Meeting Room 4</td>
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#### Power & Energy Education Committee

<table>
<thead>
<tr>
<th>Group</th>
<th>Date</th>
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<tbody>
<tr>
<td>Outstanding Power Engineering Educator Working Group</td>
<td>Su</td>
<td>1:00 P - 2:00 P</td>
<td>REN – Port of Singapore</td>
</tr>
<tr>
<td>PEEC Research Subcommittee</td>
<td>Su</td>
<td>2:00 P - 4:00 P</td>
<td>REN – Port of San Francisco</td>
</tr>
<tr>
<td>PEEC AdCom</td>
<td>M</td>
<td>11:00 A - 1:00 P</td>
<td>VCC East – East Meeting Room 17</td>
</tr>
<tr>
<td>Career Promotion and Workforce Development Subcommittee</td>
<td>M</td>
<td>1:00 P - 2:00 P</td>
<td>VCC East – East Meeting Room 17</td>
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<tr>
<td>Life Long Learning Subcommittee</td>
<td>M</td>
<td>2:00 P - 4:00 P</td>
<td>VCC East – East Meeting Room 17</td>
</tr>
<tr>
<td>University Education Subcommittee</td>
<td>M</td>
<td>3:30 P - 5:00 P</td>
<td>VCC East – East Meeting Room 9</td>
</tr>
<tr>
<td>Fellows Working Group</td>
<td>M</td>
<td>4:00 P - 5:00 P</td>
<td>VCC East – East Meeting Room 17</td>
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<tr>
<td>PEEC Main</td>
<td>Tu</td>
<td>10:00 A - 12:00 P</td>
<td>VCC East – East Meeting Room 16</td>
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<tr>
<td>Student Meetings Subcommittee</td>
<td>Tu</td>
<td>1:00 P - 3:00 P</td>
<td>VCC East – East Meeting Room 18</td>
</tr>
<tr>
<td>PEEC Awards Subcommittee</td>
<td>Tu</td>
<td>4:00 P - 5:00 P</td>
<td>VCC East – East Meeting Room 9</td>
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#### Power System Analysis, Computing, and Economics Committee

<table>
<thead>
<tr>
<th>Group</th>
<th>Date</th>
<th>Time</th>
<th>Venue</th>
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<tbody>
<tr>
<td>PSACE WG on Test Case Coordination</td>
<td>M</td>
<td>11:00 A - 12:00 P</td>
<td>MAR – Ambleside I</td>
</tr>
<tr>
<td>PSACE Admin Meeting</td>
<td>W</td>
<td>8:00 A - 9:00 A</td>
<td>VCC East – East Meeting Room 14</td>
</tr>
<tr>
<td>PSACE Committee</td>
<td>W</td>
<td>9:00 A - 12:00 P</td>
<td>VCC East – East Meeting Room 14</td>
</tr>
<tr>
<td>PSACE WG on Awards</td>
<td>W</td>
<td>12:00 P - 1:00 P</td>
<td>VCC East – East Meeting Room 11</td>
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</table>
## Computer and Analytical Methods Subcommittee

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Location</th>
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<tbody>
<tr>
<td>CAMS TF on Power System Modeling in CIM</td>
<td>M 11:00 A</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>CAMS TF on Cyber Security in Power Systems</td>
<td>M 12:00 P</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>CAMS WG on Understanding, Prediction, Prevention and Restoration of Cascading Failures</td>
<td>M 1:00 P</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>CAMS WG on Test Systems</td>
<td>M 2:00 P</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>CAMS Sub-Committee Meeting</td>
<td>M 2:00 P</td>
<td>VCC West – West Meeting Room 114</td>
</tr>
<tr>
<td>CAMS TF on Open Source Software</td>
<td>Tu 8:00 A</td>
<td>REN – Port of San Francisco</td>
</tr>
<tr>
<td>CAMS TF on High Performance Computing for Grid Analysis and Operation</td>
<td>Tu 1:00 P</td>
<td>VCC East – East Meeting Room 7</td>
</tr>
<tr>
<td>CAMS TF on Big Data Driven Analytics for Smart Grid Operations</td>
<td>Tu 2:00 P</td>
<td>VCC East – East Meeting Room 19</td>
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## Distribution System Analysis Subcommittee

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
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<tbody>
<tr>
<td>DSA Sub-Committee Meeting</td>
<td>M 1:00 P</td>
<td>MAR – Ambleside I</td>
</tr>
<tr>
<td>DSA WG on Test Feeders</td>
<td>M 2:00 P</td>
<td>MAR – Ambleside I</td>
</tr>
<tr>
<td>DSA TF on Recommended Distribution Practices</td>
<td>M 3:00 P</td>
<td>MAR – Ambleside I</td>
</tr>
<tr>
<td>DSA WG on State Estimation for Distribution Systems</td>
<td>M 4:00 P</td>
<td>MAR – Ambleside I</td>
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</table>

## Intelligent Systems Subcommittee

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Location</th>
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<tbody>
<tr>
<td>ISS WG on Multi-Agent Systems</td>
<td>M 11:00 A</td>
<td>REN – Port of San Francisco</td>
</tr>
<tr>
<td>ISS WG on Intelligent Data Mining and Analysis</td>
<td>M 12:00 P</td>
<td>REN – Port of San Francisco</td>
</tr>
<tr>
<td>ISS TF on ISSS Scope and Application Areas</td>
<td>M 1:00 P</td>
<td>REN – Port of Hong Kong</td>
</tr>
<tr>
<td>ISS TF on Agent-Based Modeling</td>
<td>M 1:00 P</td>
<td>REN – Port of San Francisco</td>
</tr>
<tr>
<td>ISS TF on Micro-Grid Control System</td>
<td>Tu 8:00 A</td>
<td>VCC East – East Meeting Room 4</td>
</tr>
<tr>
<td>ISS WG on Modern Heuristic Optimization</td>
<td>Tu 9:00 A</td>
<td>VCC East – East Meeting Room 19</td>
</tr>
<tr>
<td>ISS WG on Intelligent Control Systems</td>
<td>Tu 10:00 A</td>
<td>VCC East – East Meeting Room 19</td>
</tr>
<tr>
<td>ISS Sub-Committee Meeting</td>
<td>Tu 11:00 A</td>
<td>VCC East – East Meeting Room 4</td>
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</table>

## Risk, Reliability and Probability Applications Subcommittee

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>Reliability Consideration in Emerging Cyber-Physical Electrical Energy Systems Task Force</td>
<td>M 12:00 P</td>
<td>VCC East – East Meeting Room 9</td>
</tr>
<tr>
<td>LOLE Best Practices WG</td>
<td>Tu 8:00 A</td>
<td>VCC East – East Meeting Room 9</td>
</tr>
<tr>
<td>Task Force on Probability Applications for Common Mode</td>
<td>Tu 9:00 A</td>
<td>VCC East – East Meeting Room 9</td>
</tr>
<tr>
<td>Risk, Reliability and Probability Applications Subcommittee (RRPA)</td>
<td>W 1:00 P</td>
<td>VCC West – West Meeting Room 117</td>
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<tr>
<td>RRPA TF on Awards</td>
<td>W 1:00 P</td>
<td>VCC East – East Meeting Room 10</td>
</tr>
<tr>
<td>RRPA TF Reliability Impact of Demand Side Resources</td>
<td>W 3:00 P</td>
<td>VCC East – East Meeting Room 6</td>
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## System Economics Subcommittee

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
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<tbody>
<tr>
<td>SES TF on Sustainable Electricity Systems for Developing Countries</td>
<td>M 11:00 A</td>
<td>VCC West – West Meeting Room 111</td>
</tr>
<tr>
<td>SES WG on Prize Paper Award Nomination</td>
<td>M 11:00 A</td>
<td>VCC West – West Meeting Room 112</td>
</tr>
<tr>
<td>SES WG on Demand Response</td>
<td>M 12:00 P</td>
<td>VCC West – West Meeting Room 111</td>
</tr>
<tr>
<td>SES WG on Distribution Network Charging</td>
<td>M 12:00 P</td>
<td>VCC West – West Meeting Room 112</td>
</tr>
<tr>
<td>SES WG on Test Systems for Economic Analysis</td>
<td>M 5:00 P</td>
<td>VCC West – West Meeting Room 112</td>
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</table>
Committee and Other Entity Meetings, continued

SES WG on the Economics of Energy Storage
Tu 12:00 P 1:00 P VCC East – East Meeting Room 6

SES Sub-Committee Meeting
Tu 2:00 P 4:00 P VCC East – East Meeting Room 6

System Economics Subcommittee
Tu 5:00 P 7:00 P VCC East – East Meeting Room 6

Power System Communications Committee

New Concepts Subcommittee
W 9:00 A 11:00 A REN – Port of Macau

PSC Administrative Committee
W 5:00 P 6:00 P REN – Port of Macau

PSC Main Committee
Th 9:00 A 11:00 A VCC East – East Meeting Room 6

Power System Dynamic Performance Committee

CIGRE Working Group on C4.605 Modeling and Aggregation of Loads in Flexible Power Networks
Su 1:00 P 5:00 P REN – Port of New York

PSDP Task Force on Benchmark Systems for Stability Controls
M 11:00 A 12:00 P VCC East – East Meeting Room 16

PSDP Task Force on Modeling of Large Interconnected Systems for Stability Analysis
M 1:00 P 4:00 P VCC East – East Meeting Room 16

PSDP Task Force on Power System Restoration Dynamics
M 2:00 P 3:00 P VCC East – East Meeting Room 14

PSDP Task Force on MicroGrid Control
M 3:00 P 5:00 P VCC East – East Meeting Room 12

PSDP Working Group on Power System Dynamic Modeling
M 3:00 P 5:00 P VCC East – East Meeting Room 14

PSDP Task Force on Measurements, Monitoring, and Reliability Issues Related to Primary Governor Frequency Response
M 4:00 P 5:00 P VCC East – East Meeting Room 16

Working Group on Dynamic Performance of Wind Power Generation and Panel Session on Modeling and Dynamic Performance of Wind and Solar Generation (combination, see page 103)
Tu 8:00 A 12:00 P VCC West – West Meeting Room 110

PSDP Working Group on Dynamic Security Assessment
Tu 9:00 A 11:00 A VCC East – East Meeting Room 13

Power System Stability SubCommittee Meeting and Panel Session on Identification of Electromechanical Modes in Power Systems (combination, see page 120)
Tu 1:00 P 5:00 P MAR – Pinnacle III

PSDP Task Force on Test Systems for Voltage Stability and Security Assessment
Tu 2:30 P 5:00 P VCC East – East Meeting Room 14

PSDP Power System Stability Controls Subcommittee Meeting and Panel Session on “From Wide-Area Warnings to Discrete Stability Controls” (combination, see page 136)
W 8:00 A 12:00 P VCC West – West Meeting Room 117

W 1:00 P 5:00 P VCC West – West Meeting Room 119

PSDP ADComm
W 5:00 P 7:00 P VCC East – East Meeting Room 18

PSDP Committee
Th 9:00 A 12:00 P VCC East – East Meeting Room 13

PSDP Working Group on Voltage Stability
Th 1:00 P 5:00 P REN – Port of New York

PSDP Task Force on Advanced Pumped Storage Modeling and Panel Session on Advanced Pumped Storage Modeling (combination, see page 176)
Th 1:00 P 5:00 P VCC West – West Meeting Room 120

Power System Instrumentation and Measurements Committee

Smart Sensors WG Meeting (combination, see page 122)
Tu 1:00 P 5:00 P VCC West – West Meeting Room 121

PSIM Main Committee Meeting
W 9:00 A 12:00 P REN – Port of San Francisco
## Committee and Other Entity Meetings, continued

Electricity Metering SubCommittee Meeting  
(combination, see page 151)  
W 1:00 P 5:00 P  VCC West – West Meeting Room 121

### Power System Operations Committee

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Day and Time</th>
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</thead>
<tbody>
<tr>
<td>Power System Operations Committee AdCom</td>
<td>M 12:00 P 1:00 P</td>
<td>REN – Port of Singapore</td>
</tr>
<tr>
<td>Task Force Meeting on Equilibrium of Electricity Market Efficiency and Power System Operation Risk</td>
<td>Tu 8:00 A 9:00 A</td>
<td>VCC East – East Meeting Room 13</td>
</tr>
<tr>
<td>Working Group Meeting on State Estimation Algorithms</td>
<td>Tu 8:00 A 9:00 A</td>
<td>VCC East – East Meeting Room 16</td>
</tr>
<tr>
<td>Control Center Issues (combination, see page 130)</td>
<td>Tu 2:00 P 5:00 P</td>
<td>MAR – Pinnacle I</td>
</tr>
<tr>
<td>Task Force Meeting on State Estimation Concepts and Terminologies</td>
<td>Tu 5:00 P 6:00 P</td>
<td>VCC East – East Meeting Room 13</td>
</tr>
<tr>
<td>Electricity Market Economics Subcommittee Meeting</td>
<td>W 8:00 A 9:00 A</td>
<td>VCC East – East Meeting Room 16</td>
</tr>
<tr>
<td>Power System Operations Main Committee Meeting</td>
<td>W 12:00 P 1:00 P</td>
<td>VCC East – East Meeting Room 16</td>
</tr>
<tr>
<td>Task Force Meeting on Natural Disaster Preparation and Recovery</td>
<td>W 5:00 P 6:00 P</td>
<td>VCC East – East Meeting Room 16</td>
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### Power System Planning and Implementation Committee

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Day and Time</th>
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<tbody>
<tr>
<td>Energy Supply Working Group</td>
<td>M 1:00 P 3:00 P</td>
<td>REN – Port of Singapore</td>
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<tr>
<td>Energy Forecasting Working Group/Energy Forecasting: the State of the Art (combination, see page 54)</td>
<td>M 1:00 P 5:00 P</td>
<td>MAR – Shaughnessy I</td>
</tr>
<tr>
<td>Distribution Planning Working Group</td>
<td>M 3:00 P 5:00 P</td>
<td>REN – Port of Singapore</td>
</tr>
<tr>
<td>Asset Management WG/Asset Management Panel (combination, see page 106)</td>
<td>Tu 8:00 A 12:00 P</td>
<td>REN – Ballroom II</td>
</tr>
<tr>
<td>Transmission Planning Working Group</td>
<td>Tu 9:00 A 12:00 P</td>
<td>REN – Port of San Francisco</td>
</tr>
<tr>
<td>Customer Services Working Group</td>
<td>Tu 3:00 P 5:00 P</td>
<td>VCC East – East Meeting Room 18</td>
</tr>
<tr>
<td>PSPI Main Committee/Power System Planning in the Smart Grid Era (combination, see page 137)</td>
<td>W 8:00 A 12:00 P</td>
<td>MAR – Shaughnessy I</td>
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</table>

### Power System Relaying Committee

<table>
<thead>
<tr>
<th>Event Description</th>
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<tbody>
<tr>
<td>Dynamics Measurements WG of the Power Systems Dynamic Performance Committee (combination, see page 151)</td>
<td>W 1:00 P 5:00 P</td>
<td>VCC West – West Meeting Room 118</td>
</tr>
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</table>

### Substations Committee

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Day and Time</th>
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<tbody>
<tr>
<td>I8 Task Force 1 “P1667 Power Electronics Architecture”</td>
<td>M 1:00 P 5:00 P</td>
<td>VCC East – East Meeting Room 10</td>
</tr>
<tr>
<td>I5 Working Group – Voltage Sourced Converters (VSC)</td>
<td>M 1:00 P 5:00 P</td>
<td>VCC East – East Meeting Room 11</td>
</tr>
<tr>
<td>I8 Task Force 2 “Design Tools for PEBB Based Systems”</td>
<td>Tu 8:00 A 12:00 P</td>
<td>VCC East – East Meeting Room 11</td>
</tr>
<tr>
<td>K5 Working Group – GIL Application Guide</td>
<td>Tu 8:00 A 12:00 P</td>
<td>VCC East – East Meeting Room 18</td>
</tr>
<tr>
<td>I9 Working Group – Guide for Protecting Transmission Static VAR Compensators</td>
<td>Tu 8:00 A 5:00 P</td>
<td>VCC East – East Meeting Room 10</td>
</tr>
<tr>
<td>I8 Working Group – Power Electronic Building Block</td>
<td>Tu 1:00 P 5:00 P</td>
<td>VCC East – East Meeting Room 11</td>
</tr>
<tr>
<td>B0 Meeting</td>
<td>W 8:00 A 12:00 P</td>
<td>VCC East – East Meeting Room 10</td>
</tr>
<tr>
<td>I4 Working Group – Static VAR Compensators</td>
<td>W 8:00 A 12:00 P</td>
<td>VCC East – East Meeting Room 11</td>
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</table>

### Transmission and Distribution Committee

Transmission & Distribution Administrative Committee  
Th 11:00 A 2:00 P  REN – Ballroom II
### Capacitor Subcommittee

- **Capacitor – Shunt Capacitor Technical Report WG**
  - M 2:00 P 4:00 P
  - VCC East – East Meeting Room 18

- **Capacitor – Series Capacitor WG**
  - Tu 8:00 A 12:00 P
  - MAR – Ambleside I

- **Capacitor – Shunt Capacitor App Guide P1036 WG**
  - Tu 1:30 P 5:30 P
  - MAR – Ambleside I

- **Capacitor Switching Application Paper TF**
  - W 8:00 A 10:00 A
  - MAR – Ambleside I

- **Capacitor – GMD Mitigation TF**
  - W 10:00 A 12:00 P
  - MAR – Ambleside I

- **Capacitor Subcommittee Meeting**
  - W 1:30 P 5:30 P
  - MAR – Ambleside I

### Distribution Subcommittee

- **Distribution – Smart Distribution WG**
  - M 1:00 P 3:00 P
  - VCC West – West Meeting Room 115

- **Distribution Stray and Contact Voltage WG**
  - M 2:00 P 5:00 P
  - VCC West – West Meeting Room 116

- **Distribution Management System (DMS) Task Force**
  - M 3:00 P 5:00 P
  - VCC West – West Meeting Room 115

- **Distribution – Distributed Resource Integration WG**
  - Tu 8:00 A 10:00 A
  - VCC West – West Meeting Room 113

- **Distribution Volt/Var Task Force**
  - Tu 8:00 A 10:00 A
  - VCC East – East Meeting Room 14

- **Distribution Switching and Overcurrent WG**
  - Tu 10:00 A 12:00 P
  - VCC East – East Meeting Room 6

- **Distribution Reliability WG Part 1**
  - Tu 1:30 P 4:30 P
  - VCC East – East Meeting Room 13

- **Distribution Reliability WG Part 2**
  - W 8:00 A 12:00 P
  - VCC East – East Meeting Room 13

- **Distribution Subcommittee (combination, see page 159)**
  - W 1:30 P 4:30 P
  - VCC West – West Meeting Room 114

### ESMOL Subcommittee

- **ESMOL – Mechanical Equipment Grounding**
  - M 11:00 A 12:00 P
  - REN – Port of New York

- **ESMOL – P1048 Protective Grounding of Power Lines WG**
  - M 1:00 P 3:00 P
  - REN – Port of New York

- **ESMOL – Manual Proposal**
  - M 3:00 P 4:00 P
  - REN – Port of New York

- **ESMOL – Live Working Friendly Design**
  - M 4:00 P 5:00 P
  - REN – Port of New York

- **ESMO Executive Committee Meeting**
  - Tu 8:00 A 12:00 P
  - REN – Port of New York

- **ESMOL – P516 Live Line**
  - Tu 1:00 P 3:00 P
  - REN – Port of New York

- **ESMOL Subcommittee Meeting**
  - Tu 3:00 P 5:00 P
  - REN – Port of New York

- **ESMOL – P1307 Fall Protection**
  - W 8:00 A 10:00 A
  - REN – Port of New York

- **ESMOL – Application Guide for Engineered Emergency Restoration Structures**
  - W 10:00 A 11:00 A
  - REN – Port of New York

- **ESMOL – Insulator Cleaning**
  - W 11:00 A 12:00 P
  - REN – Port of New York

- **ESMOL Steering Committee Meeting**
  - W 1:00 P 2:30 P
  - REN – Port of New York

### General Systems Subcommittee

- **GS – TF on Frequency Domain Methods for Transient Studies**
  - M 11:00 A 12:00 P
  - VCC East – East Meeting Room 4

- **General Systems – TF on Analysis Tools**
  - M 1:00 P 2:00 P
  - VCC East – East Meeting Room 4

- **General Systems – TF on Modeling and Analysis of Rotating Machine-Based Distributed Resources**
  - M 2:00 P 3:00 P
  - VCC East – East Meeting Room 4

- **General Systems – TF on Modeling and Analysis of Electronically Coupled Distributed Resources**
  - M 3:00 P 4:00 P
  - VCC East – East Meeting Room 4

- **General Systems – TF on Interfacing Techniques for Simulation Tools**
  - M 5:00 P 6:00 P
  - VCC East – East Meeting Room 4

  - Tu 8:00 A 9:00 A
  - VCC West – West Meeting Room 111

- **General Systems – Lightning Performance of Overhead Lines WG (combination, see page 108)**
  - Tu 8:00 A 12:00 P
  - VCC West – West Meeting Room 115
<table>
<thead>
<tr>
<th>General Systems – WG Practical Aspects of Ferroresonance</th>
<th>Tu 9:00 A 10:30 A</th>
<th>VCC West – West Meeting Room 111</th>
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<tbody>
<tr>
<td>General Systems – WG on Field Measured Overvoltages and Their Analysis</td>
<td>Tu 10:30 A 12:00 P</td>
<td>VCC West – West Meeting Room 111</td>
</tr>
<tr>
<td>General Systems – TF on Dynamic Average Modeling Techniques</td>
<td>Tu 1:00 P 2:00 P</td>
<td>VCC West – West Meeting Room 111</td>
</tr>
<tr>
<td>General Systems – TF on Dynamic System Equivalents</td>
<td>Tu 2:00 P 3:00 P</td>
<td>VCC West – West Meeting Room 111</td>
</tr>
<tr>
<td>General Systems – TF on Portable Data &amp; Modeling for Electromagnetic Transient Analysis Programs</td>
<td>Tu 3:00 P 4:00 P</td>
<td>VCC West – West Meeting Room 111</td>
</tr>
<tr>
<td>General Systems – TF on Modeling of Induction Machines</td>
<td>Tu 4:00 P 5:00 P</td>
<td>VCC West – West Meeting Room 111</td>
</tr>
<tr>
<td>General Systems – WG on Superconductivity T&amp;D – Products, Application &amp; Analysis</td>
<td>Tu 4:30 P 5:30 P</td>
<td>VCC West – West Meeting Room 112</td>
</tr>
<tr>
<td>General Systems – WG on Modeling and Analysis of System Transients Using Digital Programs</td>
<td>Tu 5:00 P 6:00 P</td>
<td>VCC West – West Meeting Room 111</td>
</tr>
<tr>
<td>General Systems – Geomagnetic Induced Currents WG</td>
<td>W 8:00 A 10:00 A</td>
<td>VCC East – East Meeting Room 4</td>
</tr>
<tr>
<td>General Systems Subcommittee</td>
<td>W 10:00 A 11:00 A</td>
<td>VCC East – East Meeting Room 4</td>
</tr>
</tbody>
</table>

### HVDC & FACTS Subcommittee

<table>
<thead>
<tr>
<th>HVDC &amp; FACTS Economics and Operating Strategies (WG 15.05.08)</th>
<th>M 11:00 A 1:00 P</th>
<th>REN – Port of Hong Kong</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVDC &amp; FACTS Dynamic Performance and Modeling (WG15.05.02)</td>
<td>M 2:00 P 5:00 P</td>
<td>REN – Port of Hong Kong</td>
</tr>
<tr>
<td>HVDC &amp; FACTS – Use of Power Electronics in Major Grids for Wind Generation Projects</td>
<td>Tu 1:30 P 4:30 P</td>
<td>VCC West – West Meeting Room 112</td>
</tr>
<tr>
<td>HVDC Transmission &amp; FACTS Education &amp; Bibliography WG 15.05.14 &amp; WG 15.05.17 (combination, see page 140)</td>
<td>W 8:00 A 10:00 A</td>
<td>REN – Port of Vancouver</td>
</tr>
<tr>
<td>HVDC &amp; FACTS Subcommittee</td>
<td>W 1:30 P 4:30 P</td>
<td>VCC East – East Meeting Room 13</td>
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</table>

### Integration of Renewable Energy into the Transmission & Distribution Grids Subcommittee

<table>
<thead>
<tr>
<th>Renewables – CIGRE WG C4/C6.29 Power Quality Aspects of Solar PV</th>
<th>Tu 1:00 P 5:00 P</th>
<th>VCC East – East Meeting Room 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewables – Wind and Solar Plant Collector Design Working Group</td>
<td>W 8:00 A 10:00 A</td>
<td>VCC East – East Meeting Room 6</td>
</tr>
<tr>
<td>Renewables – Wind Farm Collector System Grounding for Personal Safety Task Force</td>
<td>W 10:15 A 12:00 P</td>
<td>VCC East – East Meeting Room 6</td>
</tr>
<tr>
<td>Renewables – Wind and Solar Power Plants System Impacts and Interconnection Requirements Working Group</td>
<td>W 1:00 P 3:00 P</td>
<td>VCC East – East Meeting Room 6</td>
</tr>
<tr>
<td>Renewables – C17 – Joint Working Group on Wind Plant Short-Circuit Contributions</td>
<td>Th 8:00 A 10:00 A</td>
<td>REN – Port of New York</td>
</tr>
<tr>
<td>Renewables – Integration of Renewable Energy into the Transmission &amp; Distribution Grids Subcommittee</td>
<td>Th 10:15 A 12:00 P</td>
<td>REN – Port of New York</td>
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### Overhead Lines Subcommittee

<table>
<thead>
<tr>
<th>Overhead Lines – IEEE STD 524 TF</th>
<th>M 1:00 P 3:00 P</th>
<th>VCC West – West Meeting Room 111</th>
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<tbody>
<tr>
<td>Overhead Lines – Smart Grid Monitors TF</td>
<td>M 1:00 P 3:00 P</td>
<td>VCC West – West Meeting Room 112</td>
</tr>
<tr>
<td>Overhead Lines – Fiberglass Components TF</td>
<td>M 3:00 P 5:00 P</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>Overhead Lines – HVDC Line Design Guide TF</td>
<td>M 3:00 P 5:00 P</td>
<td>VCC West – West Meeting Room 111</td>
</tr>
<tr>
<td>Overhead Lines – Practical Vibration TF</td>
<td>M 3:00 P 5:00 P</td>
<td>VCC West – West Meeting Room 112</td>
</tr>
<tr>
<td>Overhead Lines – Special Sessions</td>
<td>Tu 8:00 A 10:00 A</td>
<td>VCC East – East Meeting Room 12</td>
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</table>
## Committee and Other Entity Meetings, continued

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Date</th>
<th>Time</th>
<th>Room/Location</th>
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<tbody>
<tr>
<td>Overhead Lines – W.G. on T&amp;D Overhead Conductors &amp; Accessories</td>
<td>Tu</td>
<td>10:00 A 12:00 P</td>
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<tr>
<td>Overhead Lines – W.G. on T&amp;D Corrosion Management</td>
<td>Tu</td>
<td>1:00 P 3:00 P</td>
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<tr>
<td>Overhead Lines – W.G. on Construction of Overhead Lines</td>
<td>Tu</td>
<td>3:00 P 5:00 P</td>
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</tr>
<tr>
<td>Overhead Lines – Newcomers Meeting</td>
<td>Tu</td>
<td>5:00 P 6:00 P</td>
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<tr>
<td>Overhead Lines – W.G. on TP&amp;C Changes to the NESC</td>
<td>W</td>
<td>8:00 A 10:00 A</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>Overhead Lines – W.G. on T&amp;D Line Design Methods</td>
<td>W</td>
<td>10:00 A 12:00 P</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>Overhead Lines Steering Working Group</td>
<td>W</td>
<td>12:00 P 1:00 P</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>Overhead Lines Subcommittee</td>
<td>W</td>
<td>1:00 P 2:30 P</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>Overhead Lines/ESMOL Joint Meeting</td>
<td>W</td>
<td>2:30 P 5:00 P</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>Overhead Lines – W.G. on Insulator Performance and Applications –</td>
<td>Th</td>
<td>8:00 A 11:00 A</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>Overhead Lines – W.G. on Corona &amp; Field Effects – 15.11.11</td>
<td>Th</td>
<td>11:00 A 12:00 P</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>Overhead Lines – W.G. on Management of Existing O.H. Transmission Lines</td>
<td>Th</td>
<td>1:00 P 2:30 P</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>Overhead Lines – W.G. on T&amp;D Overhead Line Structural Materials &amp; Hardware</td>
<td>Th</td>
<td>2:30 P 4:00 P</td>
<td>VCC East – East Meeting Room 12</td>
</tr>
<tr>
<td>Overhead Lines – W.G. on HVDC Lines</td>
<td>Th</td>
<td>4:00 P 5:00 P</td>
<td>VCC East – East Meeting Room 12</td>
</tr>
<tr>
<td>Overhead Lines – ANSI C29 TF</td>
<td>F</td>
<td>9:00 A 5:00 P</td>
<td>REN – Port of New York</td>
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<tr>
<td><strong>Power Quality Subcommittee</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PQ – Power Quality Interest Group Meeting (combination, see page 115)</td>
<td>Tu</td>
<td>9:00 A 10:30 A</td>
<td>MAR – Dundarave</td>
</tr>
<tr>
<td>PQ – Power Disturbance Analytics WG</td>
<td>Tu</td>
<td>11:00 A 12:00 P</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>PQ – International Conference on Harmonics and Quality of Power (ICHQP) Executive Committee</td>
<td>Tu</td>
<td>12:00 P 1:00 P</td>
<td>VCC West – West Meeting Room 113</td>
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<tr>
<td>PQ – TF on Transfer of Power Quality Data (1159.3)</td>
<td>Tu</td>
<td>1:00 P 2:00 P</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>PQ – TF on Voltage Sag Indices (1564)</td>
<td>Tu</td>
<td>2:00 P 3:00 P</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>PQ – WG on Monitoring Electric Power Quality (1159 &amp; 1159.1)</td>
<td>Tu</td>
<td>3:00 P 4:00 P</td>
<td>VCC West – West Meeting Room 113</td>
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<tr>
<td>PQ – TF on Flicker (1453)</td>
<td>Tu</td>
<td>4:00 P 5:00 P</td>
<td>VCC West – West Meeting Room 113</td>
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<tr>
<td>PQ – Voltage Quality WG (1250)</td>
<td>Tu</td>
<td>5:00 P 6:00 P</td>
<td>VCC West – West Meeting Room 113</td>
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<tr>
<td>PQ – Harmonic WG – P519 TF, 519.1 Application Guide TF, Probabilistic Aspects of Harmonics TF, Harmonics Modeling &amp; Simulation TF</td>
<td>W</td>
<td>8:00 A 10:30 A</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>PQ – PQ Issues with Grid Modernization Technologies</td>
<td>W</td>
<td>10:30 A 12:00 P</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>PQ – Power Quality Subcommittee Meeting</td>
<td>W</td>
<td>1:30 P 3:00 P</td>
<td>VCC West – West Meeting Room 113</td>
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<tr>
<td>PQ – SCC22 Power Quality Standards Coordination Committee</td>
<td>W</td>
<td>3:00 P 4:00 P</td>
<td>VCC West – West Meeting Room 113</td>
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</tbody>
</table>

## Wind and Solar Power Coordinating Committee

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Date</th>
<th>Time</th>
<th>Room/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind &amp; Solar Power Coordinating Committee Meeting</td>
<td>Th</td>
<td>8:30 A 12:00 P</td>
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## Non-Committee

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Date</th>
<th>Time</th>
<th>Room/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIGRE U.S. National Committee Luncheon</td>
<td>M</td>
<td>11:30 A 2:00 P</td>
<td>VCC West – West Meeting Room 109</td>
</tr>
<tr>
<td>CIGRE Executive Committee Meeting</td>
<td>M</td>
<td>2:00 P 5:00 P</td>
<td>VCC West – West Meeting Room 118</td>
</tr>
<tr>
<td>Event</td>
<td>Day</td>
<td>Time</td>
<td>Location</td>
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<tr>
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<tr>
<td>North America Chinese Power Professional Association – Cocktail Party</td>
<td>M</td>
<td>7:00P – 10:00P</td>
<td>VCC East – East Meeting Room 11</td>
</tr>
<tr>
<td>Power Engineering Professors of the Canadian Universities</td>
<td>Tu</td>
<td>5:00P – 7:00P</td>
<td>VCC East – East Meeting Room 19</td>
</tr>
<tr>
<td>North America Chinese Power Professional Association: Student Forum</td>
<td>Tu</td>
<td>5:30P – 7:00P</td>
<td>VCC West – West Meeting Room 121</td>
</tr>
<tr>
<td>North America Chinese Power Professionals Association – Industry Forum</td>
<td>Tu</td>
<td>5:30P – 7:00P</td>
<td>VCC West – West Meeting Room 118</td>
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### TECHNICAL AND OTHER SESSIONS

<table>
<thead>
<tr>
<th>Event Start</th>
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<th>Primary Committee</th>
<th>Title</th>
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<tbody>
<tr>
<td><strong>SATURDAY, JULY 20, 2013</strong></td>
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<tr>
<td>12:00 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>PES</td>
<td>IEEE PES Scholarship Plus Initiative</td>
<td>MAR – Ambleside II</td>
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<tr>
<td><strong>SUNDAY, JULY 21, 2013</strong></td>
<td></td>
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<tr>
<td>8:00 AM</td>
<td>12:00 PM</td>
<td>COM</td>
<td>EMC</td>
<td>EMC WG-9 Guide to Testing Permanent Magnet Machines</td>
<td>REN – Port of Hong Kong</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>12:00 PM</td>
<td>T</td>
<td>PES</td>
<td>DOE’s 7 Traits of a Smart Grid</td>
<td>MAR – Pinnacle I</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>PES</td>
<td>Community Solutions Initiative Workshop</td>
<td>REN – Ballroom II</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>PES</td>
<td>Regions 1-7 Chapter Chairs Meeting</td>
<td>REN – Ballroom III</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>5:00 PM</td>
<td>T</td>
<td>PES</td>
<td>Women in Power Workshop</td>
<td>MAR – Shaughnessy I</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>5:00 PM</td>
<td>T</td>
<td>PES</td>
<td>Operation of Electricity Markets – Technical and Economic Aspects</td>
<td>MAR – Pinnacle II</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>5:00 PM</td>
<td>T</td>
<td>PES</td>
<td>Power Quality – From Lightning and Harmonics to Variable Energy Resources</td>
<td>MAR – Pinnacle III</td>
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<tr>
<td>8:00 AM</td>
<td>5:00 PM</td>
<td>T</td>
<td>PES</td>
<td>Energy Forecasting in the Smart Grid Era</td>
<td>MAR – Ambleside I</td>
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<tr>
<td>8:00 AM</td>
<td>5:30 PM</td>
<td>COM</td>
<td>PES</td>
<td>Conference Training Session</td>
<td>MAR – Shaughnessy II</td>
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<tr>
<td>10:00 AM</td>
<td>12:00 PM</td>
<td>COM</td>
<td>EMC</td>
<td>EMC Long Range Planning Meeting</td>
<td>REN – Port of Singapore</td>
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<td>10:00 AM</td>
<td>4:00 PM</td>
<td>COM</td>
<td>PES</td>
<td>Women in Power Advisory Board Meeting</td>
<td>MAR – Ambleside II</td>
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<td>12:00 PM</td>
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<td>COM</td>
<td>PES</td>
<td>Regions 1-7 Chapter Chairs Meeting (lunch)</td>
<td>REN – Port of Vancouver</td>
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<tr>
<td>1:00 PM</td>
<td>2:00 PM</td>
<td>COM</td>
<td>PEEC</td>
<td>Outstanding Power Engineering Educator Working Group</td>
<td>REN – Port of Singapore</td>
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<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>EMC</td>
<td>EMC WG-10 Revision of IEEE 112</td>
<td>REN – Port of Hong Kong</td>
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<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>T</td>
<td>PES</td>
<td>Smart Grid Implementations and Lessons Learned</td>
<td>MAR – Pinnacle I</td>
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<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>PSDP</td>
<td>CIGRE Working Group on C4.605 Modeling and Aggregation of Loads in Flexible Power Networks</td>
<td>REN – Port of New York</td>
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<tr>
<td>2:00 PM</td>
<td>4:00 PM</td>
<td>COM</td>
<td>PEEC</td>
<td>PEEC Research Subcommittee</td>
<td>REN – Port of San Francisco</td>
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<tr>
<td>3:00 PM</td>
<td>4:00 PM</td>
<td>PL</td>
<td>PES</td>
<td>New Attendees Orientation</td>
<td>REN – Ballroom I</td>
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<td>4:00 PM</td>
<td>5:00 PM</td>
<td>PL</td>
<td>PES</td>
<td>New Attendees Orientation</td>
<td>REN – Ballroom I</td>
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<td>4:00 PM</td>
<td>5:00 PM</td>
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<td></td>
<td>Scholarship Plus Reception</td>
<td>MAR – Point Grey</td>
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<td>5:00 PM</td>
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<td>Welcome Reception</td>
<td>VCC West – West Ballroom CD</td>
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<tr>
<td><strong>MONDAY, JULY 22, 2013</strong></td>
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<tr>
<td>8:00 AM</td>
<td>9:00 AM</td>
<td>PL</td>
<td>PES</td>
<td>PES Members Meeting</td>
<td>VCC East – East Exhibit Hall A &amp; Show Office</td>
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<tr>
<td>9:00 AM</td>
<td>11:00 AM</td>
<td>PL</td>
<td>PES</td>
<td>Plenary Session</td>
<td>VCC East – East Exhibit Hall A &amp; Show Office</td>
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<tr>
<td>11:00 AM</td>
<td>12:00 PM</td>
<td>COM</td>
<td>PSACE CAM</td>
<td>CAMS TF on Power System Modeling in CIM</td>
<td>VCC West – West Meeting Room 113</td>
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<tr>
<td>11:00 AM</td>
<td>12:00 PM</td>
<td>COM</td>
<td>PSACE ES</td>
<td>SES TF on Sustainable Electricity Systems for Developing Countries</td>
<td>VCC West – West Meeting Room 111</td>
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<tr>
<td>11:00 AM</td>
<td>12:00 PM</td>
<td>COM</td>
<td>PSACE ES</td>
<td>SES WG on Prize Paper Award Nomination</td>
<td>VCC West – West Meeting Room 112</td>
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(Continued)
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Room/Location</th>
<th>Days</th>
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<tbody>
<tr>
<td>11:00 AM</td>
<td>COM PSACE IS WG on Multi Agent Systems REN – Port of San Francisco</td>
<td>VCC East – East Meeting Room 19</td>
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<tr>
<td>11:00 AM</td>
<td>COM PES ISGT Steering Committee VCC East – East Meeting Room 11</td>
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<tr>
<td>11:00 AM</td>
<td>COM EMC EMC WG6 Application of Superconductivity in Electrical Machinery</td>
<td>VCC East – East Meeting Room 11</td>
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<tr>
<td>11:00 AM</td>
<td>COM EDPG IPSF Latin America Infrastructure WG VCC West – West Meeting Room 117</td>
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<tr>
<td>11:00 AM</td>
<td>COM PSDP PSDP Task Force on Benchmark Systems for Stability Controls VCC East – East Meeting Room 16</td>
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<tr>
<td>11:00 AM</td>
<td>COM PSACE PSACE WG on Test Case Coordination MAR – Ambleside I</td>
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<tr>
<td>11:00 AM</td>
<td>COM T&amp;D GS – TF on Frequency Domain Methods for Transient Studies VCC East – East Meeting Room 4</td>
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<tr>
<td>11:00 AM</td>
<td>COM EDPG ESMOL – Mechanical Equipment Grounding REN – Port of New York</td>
<td>VCC East – East Meeting Room 17</td>
<td></td>
</tr>
<tr>
<td>11:00 AM</td>
<td>COM EDPG HVDC &amp; FACTS Economics and Operating Strategies (WG 15.05.08)</td>
<td>REN – Port of Hong Kong</td>
<td></td>
</tr>
<tr>
<td>11:00 AM</td>
<td>COM EMC EMC WG12 Revision to IEEE 1415 VCC East – East Meeting Room 6</td>
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<tr>
<td>11:30 AM</td>
<td>Lunch Other CIGRE U.S. National Committee Luncheon VCC West – West Meeting Room 109</td>
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<td>11:30 AM</td>
<td>COM PES Industry Leaders Focus Group REN – Salon C</td>
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<tr>
<td>12:00 PM</td>
<td>COM PSACE CAM TF on Cyber Security in Power Systems VCC West – West Meeting Room 113</td>
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<td>COM PSACE ES SES WG on Demand Response VCC West – West Meeting Room 111</td>
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<tr>
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<td>COM PSACE ES SES WG on Distribution Network Charging VCC West – West Meeting Room 112</td>
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<tr>
<td>12:00 PM</td>
<td>COM PSACE IS ISS WG on Intelligent Data Mining and Analysis REN – Port of San Francisco</td>
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<tr>
<td>12:00 PM</td>
<td>COM PSACE RRA Reliability Consideration in Emerging Cyber-Physical Electrical Energy Systems Task Force</td>
<td>VCC East – East Meeting Room 9</td>
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<td>COM PSACE CAM CAMS WG on Understanding, Prediction, Prevention and Restoration of Cascading Failures VCC West – West Meeting Room 113</td>
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<td>COM PEEC Career Promotion and Workforce Development Subcommittee VCC East – East Meeting Room 17</td>
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<td>COM PL PSACE IS Data Mining for Operational and Economics Decisions REN – Ballroom III</td>
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<td>COM PL EDPG Opportunities and Problems of Smart Grids with Large Penetration of Renewable Energy – Asian and Australian Experience MAR – Shaughnessy II</td>
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<td>COM PSPI Energy Supply Working Group REN – Port of Singapore</td>
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### Meeting at a Glance by Day, continued

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<td>Power Quality Monitoring in Smart Grids</td>
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<td>T&amp;D</td>
<td>Overhead Lines – Smart Grid Monitors TF</td>
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<td>HEPSC – Guide for Electrical &amp; Control Design of Hydroelectric Water Conveyance Facilities (P1827)</td>
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<td>PSDP Task Force on Modeling of Large Interconnected Systems for Stability Analysis</td>
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<td>PL</td>
<td>PSACE IS</td>
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<td>EMC</td>
<td>Advanced Topics in Electric Machines</td>
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<td>IGCC</td>
<td>IGCC Smart Grid Implementation</td>
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<td>REN – Salon D</td>
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<td>PES</td>
<td>Microgrids – Designing Their Role in Smart Grid</td>
<td>REN – Salon B</td>
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<td>PEEC</td>
<td>Research and Education in Cyber Physical Systems for Power and Energy Systems</td>
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<td>PSPI</td>
<td>Energy Forecasting: the State of the Art</td>
<td>MAR – Shaughnessy I</td>
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<td>SWITCH</td>
<td>Switchgear Session on Fault Current Limiters</td>
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<td>PSACE CAM</td>
<td>CAMS WG on Test Systems</td>
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<td>PSACE DSA</td>
<td>DSA WG on Test Feeders</td>
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<td>PSDP Task Force on Power System Restoration Dynamics</td>
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<td>T&amp;D</td>
<td>General Systems – TF on Modeling and Analysis of Rotating Machine-Based Distributed Resources</td>
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<td>PSACE CAM</td>
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<td>T&amp;D</td>
<td>Capacitor – Shunt Capacitor Technical Report WG</td>
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<td>PES Gold Panel Session</td>
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<td>PES</td>
<td>Best Papers on Integrating Wind, Solar, and Energy Storage</td>
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<td>2:00 PM</td>
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<td>PES</td>
<td>Best Papers on System Operations and Market Economics</td>
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### Meeting at a Glance by Day, continued

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<th>Time</th>
<th>Session</th>
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<tr>
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<td>P</td>
<td>Best Papers on Network Analysis and Dynamic Performance</td>
<td>REN – Salon A</td>
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<tr>
<td>2:00 PM</td>
<td>P</td>
<td>Best Papers on Power System Equipment and Load Characteristics</td>
<td>REN – Ballroom II</td>
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<td>COM</td>
<td>T&amp;D Distribution Stray and Contact Voltage WG</td>
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<td>HVDC &amp; FACTS Dynamic Performance and Modeling (WG15.05.02)</td>
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<td>General Systems – TF on Modeling and Analysis of Electronically Coupled Distributed Resources</td>
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<td>3:00 PM</td>
<td>COM</td>
<td>Updates to Stator Current Limiters</td>
<td>VCC East – East Meeting Room 13</td>
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<td>PSDP Task Force on MicroGrid Control</td>
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<td>3:00 PM</td>
<td>COM</td>
<td>Distribution Planning Working Group</td>
<td>REN – Port of Singapore</td>
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<td>3:00 PM</td>
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<td>T&amp;D Power Quality in Your Future</td>
<td>REN – Port of Vancouver</td>
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<td>T&amp;D Overhead Lines – Fiberglass Components TF</td>
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<td>T&amp;D Overhead Lines – Practical Vibration TF</td>
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<td>EDPG International Practices in Developments, Standards and Techniques in Smart Grids</td>
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<td>RTSC – Photovoltaics WG</td>
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<td>PSACE SES SES WG on Test Systems for Economic Analysis</td>
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<td>EMC Electric Machinery Poster Session</td>
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<td>ETC Emerging Technologies Poster Session</td>
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### Meeting at a Glance by Day, continued

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<td>Power System Planning and Implementation Topics</td>
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<td>Surge Protective Devices: Overvoltage Detection and Control</td>
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<td>Switchgear Poster Session</td>
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<td>T&amp;D</td>
<td>Transmission &amp; Distribution Poster Session</td>
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<td>North America Chinese Power Professional Association – Cocktail Party</td>
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### TUESDAY, JULY 23, 2013

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<td>PSACE CAM</td>
<td>CAMS TF on Open Source Software</td>
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<td>8:00 AM</td>
<td>COM</td>
<td>PSACE IS</td>
<td>ISS TF on Micro-Grid Control System</td>
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<td>8:00 AM</td>
<td>COM</td>
<td>PSACE RRA</td>
<td>LOLE Best Practices WG</td>
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<td>EDPG</td>
<td>EDPG Award Working Group</td>
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<td>8:00 AM</td>
<td>COM</td>
<td>EDPG</td>
<td>IPSC Asian and Australian Infrastructure WG</td>
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<td>8:00 AM</td>
<td>COM</td>
<td>PSO</td>
<td>Task Force Meeting on Equilibrium of Electricity Market Efficiency and Power System Operation Risk</td>
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<td>8:00 AM</td>
<td>COM</td>
<td>PSO</td>
<td>Working Group Meeting on State Estimation Algorithms</td>
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<td>8:00 AM</td>
<td>COM</td>
<td>T&amp;D</td>
<td>General Systems – TF on Real-Time Simulation of Power &amp; Energy Systems</td>
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<tr>
<td>8:00 AM</td>
<td>PL</td>
<td>PSACE CAM</td>
<td>Algorithms and Tools for Managing Future Power Grids and Electricity Markets</td>
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<td>8:00 AM</td>
<td>COM</td>
<td>PES</td>
<td>Meetings Department Executive Committee</td>
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<td>Technical Council, Operation &amp; Procedures Committee</td>
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## Meeting at a Glance by Day, continued

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<td>COM EDPG ES&amp;CSC WG: Performance and Modeling</td>
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<td>COM T&amp;D Time-Varying and Probabilistic Methods for Harmonics Aggregation Analysis in a Smart Grid</td>
<td>REN – Port of Vancouver</td>
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<tr>
<td>8:00 AM</td>
<td>COM T&amp;D Distribution – Distributed Resource Integration WG</td>
<td>VCC West – West Meeting Room 113</td>
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<td>8:00 AM</td>
<td>COM T&amp;D Distribution Volt/Var Task Force</td>
<td>VCC East – East Meeting Room 14</td>
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<tr>
<td>8:00 AM</td>
<td>COM T&amp;D Overhead Lines – Special Sessions</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>8:00 AM</td>
<td>PL EDPG Planning and Design of Smart Grids: A Holistic Approach</td>
<td>VCC East – East Meeting Room 7</td>
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<tr>
<td>8:00 AM</td>
<td>COM EDPG EDPG Climate Change Technologies SC, P1595 WG, T&amp;D Energy Efficiency WG</td>
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<td>8:00 AM</td>
<td>PL EDPG The European Offshore Grid – First Steps</td>
<td>MAR – Shaughnessy I</td>
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<tr>
<td>8:00 AM</td>
<td>PL PSACE DSA Topics on Distribution System Analysis</td>
<td>REN – Ballroom I</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>PL PES Advanced Automation Tech Hydro Wind</td>
<td>MAR – Pinnacle III</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>SS – Panel Late Breaking News Super Session: Managing Extreme Events and Developments Affecting Electrical Power Systems</td>
<td>VCC East – East Meeting Room 1 &amp; Foyer S</td>
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<tr>
<td>8:00 AM</td>
<td>PF PES Protection, Control and PMUs</td>
<td>VCC West – West Meeting Room 211</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>PF PES Smart Grid and FACTS</td>
<td>VCC West – West Meeting Room 208-209</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>PL EMC Behavior of Wind Turbines during Unbalance Grid Conditions</td>
<td>REN – Salon C</td>
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<tr>
<td>8:00 AM</td>
<td>Combo ETC ETCC Combo Session</td>
<td>MAR – Shaughnessy II</td>
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<tr>
<td>8:00 AM</td>
<td>COM ETC ETCC Committee Meeting</td>
<td>MAR – Shaughnessy II</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>PL PSDP Modeling and Dynamic Performance of Wind and Solar Generation Combo Session with PSDP Dynamic Performance of Wind Power Generation Working Group</td>
<td>VCC West – West Meeting Room 110</td>
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<tr>
<td>8:00 AM</td>
<td>COM PSDP Working Group on Dynamic Performance of Wind Power Generation and Panel Session on Modeling and Dynamic Performance of Wind and Solar Generation</td>
<td>VCC West – West Meeting Room 110</td>
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<tr>
<td>8:00 AM</td>
<td>TR-P PSDP Power System Dynamic Performance Committee – Transactions Paper Session #1</td>
<td>MAR – Point Grey</td>
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<tr>
<td>8:00 AM</td>
<td>TR-P PSIM PSIM and Transformer Committee – Transaction Papers</td>
<td>VCC West – West Meeting Room 121</td>
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<td>8:00 AM</td>
<td>TR-P PSO Renewable Resource Operations</td>
<td>VCC West – West Meeting Room 112</td>
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<tr>
<td>8:00 AM</td>
<td>PL PSPi Asset Management</td>
<td>REN – Ballroom II</td>
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<tr>
<td>8:00 AM</td>
<td>COM PSPi Asset Management WG/Asset Management Panel</td>
<td>REN – Ballroom II</td>
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<tr>
<td>8:00 AM</td>
<td>COM SUBS Task Force 2 “Design Tools for PEBB Based Systems”</td>
<td>VCC East – East Meeting Room 11</td>
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<tr>
<td>8:00 AM</td>
<td>COM SUBS K5 Working Group – GIL Application Guide</td>
<td>VCC East – East Meeting Room 18</td>
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<tr>
<td>8:00 AM</td>
<td>COM T&amp;D Capacitor – Series Capacitor WG</td>
<td>MAR – Ambleside I</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>COM T&amp;D ESMO Executive Committee Meeting</td>
<td>REN – Port of New York</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Combo T&amp;D General Systems – Lightning Performance of Overhead Lines WG</td>
<td>VCC West – West Meeting Room 115</td>
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<tr>
<td>8:00 AM</td>
<td>COM T&amp;D General Systems – Lightning Performance of Overhead Lines WG</td>
<td>VCC West – West Meeting Room 115</td>
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### Meeting at a Glance by Day, continued

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<tr>
<th>Time</th>
<th>Session</th>
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<th>Topic</th>
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<tr>
<td>8:00 AM – 12:00 PM</td>
<td>PL WPCC</td>
<td>VCC West – West Meeting Room 118</td>
<td>Power System Flexibility in Operations and Planning</td>
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<td>8:00 AM – 5:00 PM</td>
<td>T PES</td>
<td>REN – Salon A</td>
<td>Synchrophasor Fundamentals and Applications: Leveraging the Investment</td>
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<td>T PES</td>
<td>REN – Salon B</td>
<td>Application of IEC CIM Standards in Power System Modeling, Smart Grid and Enterprise Integration</td>
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<td>T PES</td>
<td>REN – Salon F</td>
<td>Power System Basics – Understanding the Electric Utility Operation Inside and Out</td>
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<td>COM SUBS</td>
<td>VCC East – East Meeting Room 10</td>
<td>Working Group – Guide for Protecting Transmission Static VAR Compensators</td>
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<tr>
<td>8:30 AM – 12:00 PM</td>
<td>COM PSACE IS</td>
<td>MAR – Pinnacle I</td>
<td>Chapters Leadership Meeting</td>
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<td>9:00 AM – 10:00 AM</td>
<td>COM PSACE RRA</td>
<td>VCC East – East Meeting Room 9 &amp; 10</td>
<td>Task Force on Probability Applications for Common Mode</td>
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<tr>
<td>9:00 AM – 10:00 AM</td>
<td>COM EDPG</td>
<td>VCC West – West Meeting Room 117</td>
<td>HEPS – Guide for Control of Hydroelectric Power Plants (P1010)</td>
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<td>9:00 AM – 12:00 PM</td>
<td>COM T&amp;D</td>
<td>VCC West – West Meeting Room 111</td>
<td>General Systems – WG Practical Aspects of Ferroresonance</td>
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<td>9:00 AM – 12:00 PM</td>
<td>Combo T&amp;D</td>
<td>MAR – Dundarave</td>
<td>PQ – Power Quality Interest Group Meeting</td>
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<tr>
<td>9:00 AM – 11:00 AM</td>
<td>COM PSDP</td>
<td>VCC East – East Meeting Room 13</td>
<td>PSDP Working Group on Dynamic Security Assessment</td>
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<td>9:00 AM – 12:00 PM</td>
<td>Combo EMC</td>
<td>MAR – Ambleside II</td>
<td>EMC Generation SubCommittee</td>
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<tr>
<td>9:00 AM – 12:00 PM</td>
<td>COM PSPI</td>
<td>VCC East – East Meeting Room 17</td>
<td>Transmission Planning Working Group</td>
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<td>9:00 AM – 12:00 PM</td>
<td>PL PSO</td>
<td>VCC East – East Meeting Room 8 &amp; 15</td>
<td>Managing Uncertainty in Power System and Market Operations I – Robust Optimization for Power System Operations</td>
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<td>9:00 AM – 12:00 PM</td>
<td>COM EMC</td>
<td>REN – Ballroom III</td>
<td>Advances in Power System Operation</td>
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<tr>
<td>9:00 AM – 12:00 PM</td>
<td>COM PES</td>
<td>REN – Port of San Francisco</td>
<td>Technical Council, Standards Coordination Committee</td>
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<tr>
<td>10:00 AM – 11:00 AM</td>
<td>COM PSACE IS</td>
<td>VCC East – East Meeting Room 19</td>
<td>ISS WG on Intelligent Control Systems</td>
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<td>10:00 AM – 11:00 AM</td>
<td>COM EDPG</td>
<td>VCC West – West Meeting Room 117</td>
<td>HEPS – Guide for Commissioning of Electrical Systems in Hydroelectric Power Plants (P1248)</td>
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<td>10:00 AM – 12:00 PM</td>
<td>PL PSACE IS</td>
<td>VCC East – East Meeting Room 8 &amp; 15</td>
<td>Intelligent OPF in an Uncertain and Variable Environment</td>
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<td>10:00 AM – 12:00 PM</td>
<td>COM PES</td>
<td>VCC West – West Meeting Room 109</td>
<td>Technical Council, Standards Coordination Committee</td>
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<tr>
<td>10:00 AM – 12:00 PM</td>
<td>COM EMC</td>
<td>REN – Port of Hong Kong</td>
<td>IEEE PES Leadership in Power Awards Committee</td>
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<td>COM EEC</td>
<td>REN – Port of Singapore</td>
<td>EMC Motor SC WG-11 Condition Monitoring</td>
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<td>COM T&amp;D</td>
<td>REN – Port of Vancouver</td>
<td>Distribution Reliability Analysis Tools and Methods</td>
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<td>10:00 AM – 12:00 PM</td>
<td>COM T&amp;D</td>
<td>VCC East – East Meeting Room 6</td>
<td>Distribution Switching and Overcurrent WG</td>
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<tr>
<td>10:00 AM – 12:00 PM</td>
<td>COM T&amp;D</td>
<td>VCC East – East Meeting Room 12</td>
<td>Overhead Lines – W.G. on T&amp;D Overhead Conductors &amp; Accessories – 15.11.02/06</td>
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<tr>
<td>10:30 AM – 12:00 PM</td>
<td>COM T&amp;D</td>
<td>VCC West – West Meeting Room 111</td>
<td>General Systems – WG on Field Measured Overvoltages and Their Analysis</td>
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<td>10:30 AM – 12:00 PM</td>
<td>COM T&amp;D</td>
<td>VCC West – West Meeting Room 113</td>
<td>PQ – Power Disturbance Analytics WG</td>
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<tr>
<td>11:00 AM – 1:00 PM</td>
<td>COM PSACE IS</td>
<td>VCC East – East Meeting Room 4</td>
<td>ISS Sub-Committee Meeting</td>
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### Meeting at a Glance by Day, continued

<table>
<thead>
<tr>
<th>Time</th>
<th>Time</th>
<th>Type</th>
<th>Event Description</th>
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<tr>
<td>12:00 PM</td>
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<td>COM</td>
<td>PSACE SES WG on the Economics of Energy Storage</td>
<td>VCC East – East Meeting Room 6</td>
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<td>12:00 PM</td>
<td>1:00 PM</td>
<td>COM</td>
<td>PES Chapters Leadership Luncheon and Awards Presentation</td>
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<td>12:00 PM</td>
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<td>COM</td>
<td>T&amp;D PQ – International Conference on Harmonics and Quality of Power (ICHQP) Executive Committee</td>
<td>VCC West – West Meeting Room 113</td>
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<td>12:30 PM</td>
<td>2:30 PM</td>
<td>COM</td>
<td>PES Technical Council, Technical Sessions Committee</td>
<td>VCC West – West Meeting Room 109</td>
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<tr>
<td>12:30 PM</td>
<td>2:30 PM</td>
<td>COM</td>
<td>PES Transactions on Power Systems Editorial Board</td>
<td>VCC East – East Meeting Room 2, 3 &amp; Foyer S</td>
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<tr>
<td>1:00 PM</td>
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<td>COM</td>
<td>PSACE CAM CAMS TF on High Performance Computing for Grid Analysis and Operation</td>
<td>VCC East – East Meeting Room 7</td>
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<td>EDPG HEPSC – Guide for Rehabilitation of Hydroelectric Power Plants (P1147)</td>
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<td>T&amp;D General Systems – TF on Dynamic Average Modeling Techniques</td>
<td>VCC West – West Meeting Room 111</td>
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<td>T&amp;D PQ – TF on Transfer of Power Quality Data (1159.3)</td>
<td>VCC West – West Meeting Room 113</td>
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<tr>
<td>1:00 PM</td>
<td>3:00 PM</td>
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<td>PES Transactions on Power Systems Editorial Board</td>
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<td>COM</td>
<td>EDPG ESCSC Equipment WG</td>
<td>REN – Port of Singapore</td>
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<td>1:00 PM</td>
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<td>COM</td>
<td>PEEC Student Meetings Subcommittee</td>
<td>VCC East – East Meeting Room 109</td>
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<td>1:00 PM</td>
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<td>PL</td>
<td>T&amp;D Change Management for Successful DMS Implementation</td>
<td>REN – Port of Vancouver</td>
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<tr>
<td>1:00 PM</td>
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<td>PL</td>
<td>T&amp;D Bulk System Reliability Impacts of High Levels of Distributed Energy Resources</td>
<td>MAR – Dundarave</td>
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<td>3:00 PM</td>
<td>COM</td>
<td>T&amp;D Overhead Lines – W.G. on T&amp;D Corrosion Management – 15.11.12</td>
<td>VCC East – East Meeting Room 12</td>
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<td>T&amp;D ESMOL – P516 Live Line</td>
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<td>COM</td>
<td>ETC ETCC TAWG Meeting</td>
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<td>EDPG Prevention of Blackouts in Transmission Systems by System Security Improvement – Experiences with Cutting-Edge Solutions</td>
<td>MAR – Shaughnessy II</td>
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<td>PL</td>
<td>PSACE DSA Impact of Plugin Hybrid Electric Vehicles (PHEV) on Distribution Systems</td>
<td>VCC West – West Meeting Room 118</td>
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<td>PL</td>
<td>PSACE SES Coordinated Operation of Retail and Wholesale Power Markets</td>
<td>VCC East – East Ballroom C</td>
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<td>PES Smart Grid Deployment – Challenges and Opportunities</td>
<td>VCC East – East Ballroom AB</td>
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<td>PF</td>
<td>PES Impacts of Renewable Energy Generation and Micro-Grids</td>
<td>VCC West – West Meeting Room 211</td>
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<td>PF</td>
<td>PES Power System Planning, Operation and Dynamic Performance</td>
<td>VCC West – West Meeting Room 208-209</td>
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<td>TR-P</td>
<td>EMC Transaction Presentations on Electric Machines</td>
<td>MAR – Point Grey</td>
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<td>Combo</td>
<td>EMC EMC Motor Subcommittee Combo Session</td>
<td>MAR – Ambleside II</td>
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<td>EMC EMC WG-10 Guideline to On-Line Monitoring of Large Machines</td>
<td>REN – Port of San Francisco</td>
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<td>PL</td>
<td>EMC Advanced Controls for Wind and PV Systems</td>
<td>REN – Salon C</td>
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<td>EMC EMC Motor Subcommittee</td>
<td>MAR – Ambleside II</td>
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<tr>
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<td>EDPG Power System Expansion: New Challenges, Developments and Best Practices in Systems with Strong Growth</td>
<td>MAR – Shaughnessy I</td>
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<td>PES Impacts of Geomagnetic Disturbance (GMD) Events on Electric Power Systems</td>
<td>VCC East – East Meeting Room 1 &amp; Foyer S</td>
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<td>Time</td>
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<td>Topic</td>
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<td>PL PEEC</td>
<td>Hands-On Activities for Pre-Engineering Outreach</td>
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<td>PL PSDP</td>
<td>Identification of Electromechanical Modes in Power Systems – Combo Session with PSDP Power System Stability Subcommittee Meeting</td>
<td>MAR – Pinnacle III</td>
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<tr>
<td>1:00 PM</td>
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<td>COM PSDP</td>
<td>Power System Stability Subcommittee Meeting and Panel Session on Identification of Electromechanical Modes in Power Systems</td>
<td>MAR – Pinnacle III</td>
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<td>Power System Dynamic Performance Committee – Transaction Paper Session # 2</td>
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<td>Qualifying Sensor Systems for the Smart Grid</td>
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<td>Smart Sensors WG Meeting</td>
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<td>System Aspects of High Penetration of Wind Power</td>
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<td>IB Working Group – Power Electronic Building Block</td>
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<td>Renewables – CIGRE WG C4/C6.29 Power Quality Aspects of Solar PV</td>
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<td>Global Energy Forecasting Competition (GEFCom2012) Final Presentations</td>
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<td>Distribution Reliability WG Part 1</td>
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<td>HVDC &amp; FACTS – Use of Power Electronics in Major Grids for Wind Generation Projects</td>
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<td>Capacitor – Shunt Capacitor App Guide P1036 WG</td>
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<td>HEPSC – Draft Guide for Installation of Vertical Generators and Generator/ Motors for Hydroelectric Applications (P1095)</td>
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<td>General Systems – TF on Dynamic System Equivalents</td>
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<td>PQ – TF on Voltage Sag Indices (1564)</td>
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<td>2:00 PM</td>
<td>4:00 PM</td>
<td>COM PSACE CAM</td>
<td>CAMS TF on Big Data Driven Analytics for Smart Grid Operations</td>
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<td>SES Sub-Committee Meeting</td>
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<td>HEPSC – Guide for Computer Based Control for Hydroelectric Power Plant Automation (P1249)</td>
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<td>Potential Impact of High-Performance Computing on the Power Grid</td>
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<td>2:00 PM</td>
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<td>PL PSO</td>
<td>Control Center Issues</td>
<td>MAR – Pinnacle I</td>
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<tr>
<td>2:00 PM</td>
<td>5:00 PM</td>
<td>PL PSO</td>
<td>Managing Uncertainty in Power System and Market Operations II – Comparison between Stochastic and Robust Optimization</td>
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<td>COM PSO</td>
<td>Control Center Issues</td>
<td>MAR – Pinnacle I</td>
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<td>PL PSPI</td>
<td>Managing Advanced Distribution Systems: ICT and Distributed Generation</td>
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<td>Transactions on Sustainable Energy Editorial Board Meeting</td>
<td>VCC East – East Meeting Room 2, 3 &amp; Foyer S</td>
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<td>2:30 PM</td>
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<td>Technical Council Meetings and Marketing</td>
<td>VCC West – West Meeting Room 109</td>
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**WEDNESDAY, JULY 24, 2013**

| Time          | 7:00 AM | 9:00 AM | COM | PES | PES Major Awards Committee and PES Technical Committee Awards Meeting | VCC West – West Meeting Room 109 |
### Meeting at a Glance by Day, continued

<table>
<thead>
<tr>
<th>Time</th>
<th>Time</th>
<th>Organization</th>
<th>Meeting Title</th>
<th>Room</th>
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<tr>
<td>8:00 AM</td>
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<td>COM EDPG</td>
<td>IPSC Africa Electricity Infrastructure WG</td>
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<td>PSACE Admin Meeting</td>
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<td>COM PES</td>
<td>Transactions on Energy Conversion Editorial Board</td>
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<tr>
<td>8:00 AM</td>
<td>10:00 AM</td>
<td>PL EDPG</td>
<td>Energy Efficiency in Smart Cities</td>
<td>MAR – Shaughnessy II</td>
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<tr>
<td>8:00 AM</td>
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<td>COM T&amp;D</td>
<td>General Systems – Geomagnetic Induced Currents WG</td>
<td>VCC East – East Meeting Room 4</td>
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<td>COM T&amp;D</td>
<td>Capacitor Switching Application Paper TF</td>
<td>MAR – Ambleside I</td>
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<td>8:00 AM</td>
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<td>COM T&amp;D</td>
<td>Overhead Lines – W.G. on TP&amp;C Changes to the NESC – 15.11.07</td>
<td>VCC East – East Meeting Room 12</td>
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<tr>
<td>8:00 AM</td>
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<td>Renewables – Wind and Solar Plant Collector Design Working Group</td>
<td>VCC East – East Meeting Room 6</td>
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<td>ESMOL – P1307 Fall Protection</td>
<td>REN – Port of New York</td>
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<td>8:00 AM</td>
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<td>Combo T&amp;D</td>
<td>HVDC Transmission &amp; FACTS Education &amp; Bibliography WG 15.05.14 &amp; WG 15.05.17</td>
<td>REN – Port of Vancouver</td>
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<tr>
<td>8:00 AM</td>
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<td>HVDC Transmission &amp; FACTS Education &amp; Bibliography WG 15.05.14 &amp; WG 15.05.17</td>
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<tr>
<td>8:00 AM</td>
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<td>PQ – Harmonic WG – P519 TF, 519.1 Application Guide TF, Probabilistic Aspects of Harmonics TF, Harmonics Modeling &amp; Simulation TF</td>
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<tr>
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<td>PL EDPG</td>
<td>The New Transmission Level – Smart European Overlay Grid</td>
<td>VCC East – East Meeting Room 7</td>
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<td>8:00 AM</td>
<td>12:00 PM</td>
<td>PL PSACE CAM</td>
<td>Mitigation and Prevention of Cascading Outages: Methodologies and Practical Applications</td>
<td>VCC West – West Meeting Room 115</td>
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<td>PL PSACE ES</td>
<td>FERC Order 1000 – Regional and Interregional Transmission Planning and Cost Allocation</td>
<td>REN – Ballroom I</td>
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<tr>
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<td>PL PES</td>
<td>Future Power System Planning Challenges</td>
<td>VCC West – West Meeting Room 118</td>
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<td>PF PES</td>
<td>DC Applications and Electric Vehicles</td>
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<td>Power System Stability and Security</td>
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<td>SG Initiative Transition</td>
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<td>COM EMC</td>
<td>EMC WG-8 Revision to IEEE C50.13</td>
<td>VCC West – West Meeting Room 111</td>
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<td>PL EMC</td>
<td>Condition Monitoring of Electrical Machines</td>
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<td>SS PES</td>
<td>Innovation and Advancements in Protection, Automation and Control for Evolving Power Systems</td>
<td>VCC East – East Meeting Room 1 &amp; Foyer S</td>
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<td>PL PEEC</td>
<td>Grid Integration of Energy Efficient Buildings</td>
<td>REN – Salon B</td>
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<tr>
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<td>PL PSDP</td>
<td>From Wide-Area Warnings to Discrete Stability Controls – Combo Session with PSDP Power System Stability Controls Subcommittee</td>
<td>VCC West – West Meeting Room 117</td>
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<tr>
<td>Time</td>
<td>Session Type</td>
<td>Committee</td>
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<td>COM</td>
<td>PSDP</td>
<td>PSDP Power System Stability Controls Subcommittee Meeting and Panel Session on “From Wide-Area Warnings to Discrete Stability Controls”</td>
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<td>PSDP</td>
<td>Power System Dynamic Performance Committee – Transactions Paper Session #3</td>
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<td>Power System Planning in the Smart Grid Era</td>
<td>MAR – Shaughnessy I</td>
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<td>PSPI Main Committee/Power System Planning in the Smart Grid Era</td>
<td>MAR – Shaughnessy I</td>
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<td>Power System Analysis, Computing and Economics Committee – Transaction Paper Session #1</td>
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<td>I4 Working Group – Static VAR Compensators</td>
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<td>T&amp;D</td>
<td>Distribution Reliability WG Part 2</td>
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<td>T&amp;D</td>
<td>Transmission and Distribution Paper Session III</td>
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<td>WPCC</td>
<td>Statistical Resource Modelling for Renewables Integration</td>
<td>VCC East – East Meeting Room 2, 3 &amp; Foyer S</td>
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<td>T</td>
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<td>Basic Tutorial on Gas Insulated Lines</td>
<td>REN – Salon C</td>
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<td>8:00 AM</td>
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<td>Distribution System – Delivering Power to the Customer</td>
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<td>8:00 AM</td>
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<td>Renewable Energy Plant Design and System Interconnection</td>
<td>REN – Salon A</td>
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<tr>
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<td>PES Technical Co-Sponsored Meetings Steering Committee</td>
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<td>HEPSC – Governor Task Force</td>
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<td>COM</td>
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<td>Storm Experiences: Toward Smarter and Robust Grid</td>
<td>VCC West – West Meeting Room 119</td>
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<td>EDPG Station Design &amp; Control Subcommittee</td>
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<td>Advancements in Smart Grid Applications</td>
<td>MAR – Dundarave</td>
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<td>EDPG</td>
<td>African Development: Engineering Sustainability &amp; The role of Micro Grids</td>
<td>MAR – Point Grey</td>
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<td>T&amp;D</td>
<td>Case Studies of Experiences with Distributed Resource Interconnections on Distribution Systems</td>
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<td>Risk, Reliability and Probability Applications Subcommittee (RRPA)</td>
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<td>T&amp;D</td>
<td>Overhead Lines – W.G. on T&amp;D Line Design Methods – 15.11.04/05</td>
<td>VCC East – East Meeting Room 12</td>
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<td>T&amp;D</td>
<td>PQ – PQ Issues with Grid Modernization Technologies</td>
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<td>COM</td>
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<td>PES Region 9 Meetings Department Steering Committee</td>
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<td>ESMOL – Insulator Cleaning</td>
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<td>Lunch</td>
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<td>Student Faculty Industry Luncheon</td>
<td>MAR – Pinnacle Ballroom</td>
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<td>Student Faculty Industry Job Fair</td>
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<td>T&amp;D</td>
<td>Overhead Lines Steering Working Group – 15.11.01</td>
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<td>T&amp;D</td>
<td>Distribution Feeder Hosting with High Penetration of Distributed PV</td>
<td>REN – Port of Vancouver</td>
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<td>T&amp;D</td>
<td>Renewables – Wind and Solar Power Plants System Impacts and Interconnection Requirements Working Group</td>
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<td>BigData Analytics for Electric Power Grid Operations</td>
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<td>PSACE</td>
<td>HVDC Grid Reliability</td>
<td>REN – Ballroom III</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>PL</td>
<td>PES</td>
<td>Information Technology and Operation Technology in the Future Grid: Convergence or Collision?</td>
<td>VCC West – West Meeting Room 2, 3 &amp; Foyer S</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>PF</td>
<td>PES</td>
<td>Energy Efficiency and System Reliability</td>
<td>VCC West – West Meeting Room 211</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>PL</td>
<td>EDPG</td>
<td>Planning for Environmental Retirements and Renewable Integration</td>
<td>MAR – Shaughnessy II</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>SS</td>
<td>PES</td>
<td>Electricity Supply to Rural and Remote Communities</td>
<td>VCC East – East Meeting Room 1 &amp; Foyer S</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>PL</td>
<td>PEEC</td>
<td>How DOE-STEPS Program is Enriching Power Engineering Education</td>
<td>REN – Salon B</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>TR-P</td>
<td>PEEC</td>
<td>Transactions Papers T2</td>
<td>MAR – Point Grey</td>
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<tr>
<td>Time</td>
<td>Session</td>
<td>Committee</td>
<td>Title</td>
<td>Location</td>
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<td>1:00 PM</td>
<td>5:00 PM</td>
<td>PL</td>
<td>PSDP Modeling and Assessment of Cyber-Physical Power Systems Combo Session with PSDP Working Group on Dynamic Performance of Cyber-Physical Energy Systems</td>
<td>VCC West – West Meeting Room 119</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>PSDP Power System Dynamic Performance Committee – Transaction Paper Session #4</td>
<td>VCC West – West Meeting Room 119</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>TR-P</td>
<td>PSDP Future Generation of Smart Meters and Their Applications</td>
<td>VCC East – East Meeting Room 14</td>
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<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>PSDIM Electricity Metering Subcommittee Meeting</td>
<td>VCC West – West Meeting Room 121</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>Combo</td>
<td>PSR New Synchronphasor Standards and Guides: Measurements, Data Transfer, Concentration and Implementation Requirements</td>
<td>VCC West – West Meeting Room 118</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>PSR Dynamics Measurements WG of the Power Systems Dynamic Performance Committee</td>
<td>VCC West – West Meeting Room 118</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>PL</td>
<td>SUBS On-Line Condition Monitoring – Value for the Future Grids</td>
<td>VCC East – East Meeting Room 16</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>PL</td>
<td>T&amp;D Modeling and Analysis of Power Systems</td>
<td>MAR – Shaughnessy I</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>TR-P</td>
<td>T&amp;D Transmission and Distribution Paper Session I</td>
<td>MAR – Dundarave</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>5:00 PM</td>
<td>TR-P</td>
<td>T&amp;D Transmission and Distribution Paper Session II</td>
<td>REN – Port of Singapore</td>
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<tr>
<td>1:30 PM</td>
<td>3:00 PM</td>
<td>COM</td>
<td>T&amp;D PQ – Power Quality Subcommittee Meeting</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>3:00 PM</td>
<td>Combo</td>
<td>T&amp;D Distribution Subcommittee</td>
<td>VCC West – West Meeting Room 114</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>3:00 PM</td>
<td>COM</td>
<td>T&amp;D HVDC &amp; FACTS Subcommittee</td>
<td>VCC East – East Meeting Room 13</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>4:30 PM</td>
<td>COM</td>
<td>T&amp;D Distribution Subcommittee</td>
<td>VCC West – West Meeting Room 114</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>T&amp;D Capacitor Subcommittee Meeting</td>
<td>MAR – Ambleside I</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>4:00 PM</td>
<td>COM</td>
<td>EDPG ES&amp;C Subcommittee</td>
<td>VCC East – East Meeting Room 18</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>4:00 PM</td>
<td>COM</td>
<td>EDPG IPSC Subcommittee</td>
<td>VCC East – East Meeting Room 19</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>EMC Electric Machinery Main Committee</td>
<td>VCC West – West Meeting Room 112</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>5:00 PM</td>
<td>PL</td>
<td>PSO Flexible Infrastructure — A Necessary Ingredient for the Renewable Energy Future</td>
<td>VCC West – West Meeting Room 120</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>5:00 PM</td>
<td>PL</td>
<td>PSO Smart Dispatch with Demand Response and Distributed Energy Resources: Business Models, Methodology and Incentives</td>
<td>VCC East – East Meeting Room 9</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>5:00 PM</td>
<td>PL</td>
<td>PSPI Value of Conventional Generation Resources in the ISO/RTO Markets with the Penetration of Intermittent Renewable Resources</td>
<td>VCC East – East Meeting Room 7</td>
</tr>
<tr>
<td>2:30 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>T&amp;D Overhead Lines/ESMOL Joint Meeting</td>
<td>VCC East – East Meeting Room 12</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>4:00 PM</td>
<td>COM</td>
<td>T&amp;D PQ – SCC22 Power Quality Standards Coordination Committee</td>
<td>VCC West – West Meeting Room 113</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>5:00 PM</td>
<td>COM</td>
<td>PSACE RRPA TF Reliability Impact of Demand Side Resources</td>
<td>VCC East – East Meeting Room 6</td>
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</tbody>
</table>

Meeting at a Glance by Day, continued
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>3:00 PM</td>
<td>Publications Board Meeting</td>
<td>REN – Ballroom II</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Web Presence Committee Meeting</td>
<td>MAR – Ambleside II</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Control of Converter Interfaced DER</td>
<td>REN – Port of Vancouver</td>
</tr>
<tr>
<td>5:00 PM</td>
<td>PSC Administrative Committee</td>
<td>REN – Port of Macau</td>
</tr>
<tr>
<td>5:00 PM</td>
<td>Task Force Meeting on Natural Disaster</td>
<td>VCC East – Room 16</td>
</tr>
<tr>
<td>5:00 PM</td>
<td>Networking Reception Hosted by PES and</td>
<td>VCC East – Room 11</td>
</tr>
<tr>
<td>6:00 PM</td>
<td>GOLD Seminar and Networking Reception</td>
<td>VCC East – Room 8 &amp; 15</td>
</tr>
</tbody>
</table>

**THURSDAY, JULY 25, 2013**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 AM</td>
<td>Flexible Ramping Products to Support Renewables Integration</td>
<td>REN – Port of Vancouver</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Development of IEEE Test Systems for Economic Analysis</td>
<td>MAR – Dundarave</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Renewables – C17 – Joint Working Group on Wind Plant</td>
<td>REN – Port of New York</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>EDPG Committee</td>
<td>REN – Hong Kong</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Marine Systems Coordinating Committee Main Meeting</td>
<td>VCC East – Room 4</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Overhead Lines – W.G. on Insulator Performance and</td>
<td>VCC East – Room 12</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Challenges of Widespread Implementation of Distribution</td>
<td>REN – Ballroom III</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Power System Analysis, Computing and Economics Committee</td>
<td>VCC West – Room 211</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Power System Equipment</td>
<td>VCC West – Room 208-209</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Marine and Hydrokinetic (MHK) Generation</td>
<td>MAR – Pinnacle III</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>IGCC Transaction Paper Session</td>
<td>VCC West – Room 113</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Distribution Overcurrent Protection and Coordination</td>
<td>MAR – Pinnacle I</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Smart Grid 203; Distribution System</td>
<td>MAR – Ambleside I</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Transmission System Efficiency and Reliability Improvements</td>
<td>VCC East – Room 1 &amp; 2</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Generation Mix Strategies: Solving Energy Production</td>
<td>VCC East – Room 1 &amp; 2</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Operation, Control and Security</td>
<td>VCC West – Room 112</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Planning and Implementation – Transactions Papers</td>
<td>MAR – Shaughnessy I</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Transactions Papers Presentations</td>
<td>VCC East – Room 9</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Transmission System – The Interconnected Bulk Electric</td>
<td>REN – Salon F</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>Wind &amp; Solar Power Coordinating Committee Meeting</td>
<td>REN – Port of San</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>PSC Main Committee</td>
<td>VCC East – Room 6</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>Energy and Water: Essential, Interdependent Commodities</td>
<td>MAR – Shaughnessy II</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>PSDP Committee</td>
<td>VCC East – Room 13</td>
</tr>
<tr>
<td>Time</td>
<td>Session</td>
<td>Committee</td>
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<td>9:00 AM</td>
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<td>11:00 AM</td>
<td>COM T&amp;D</td>
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<td>11:00 AM</td>
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<td>1:00 PM</td>
<td>TR-P EDPG</td>
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<td>1:00 PM</td>
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<td>COM PES</td>
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Meeting at a Glance by Day, continued

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Topic</th>
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<tbody>
<tr>
<td>2:30 PM</td>
<td>COM T&amp;D</td>
<td>Overhead Lines – W.G. on T&amp;D Overhead Line Structural Materials &amp; Hardware – 15.11.08/10</td>
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<tr>
<td>3:00 PM</td>
<td>PL PSACE CAM</td>
<td>Open Source Tools for Smart Grid Applications</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>PL EDPG</td>
<td>Linkage between Energy and Water</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>PL T&amp;D</td>
<td>Smart Distribution Analytics and Microgrids for Integration of DER – Part 2</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>COM T&amp;D</td>
<td>Overhead Lines – W.G. on HVDC Lines – 15.11.13</td>
</tr>
<tr>
<td>7:00 AM</td>
<td>COM PES</td>
<td>Governing Board Meeting</td>
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<tr>
<td>9:00 AM</td>
<td>COM T&amp;D</td>
<td>Overhead Lines – ANSI C29 TF</td>
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FRIDAY, JULY 26, 2013

<table>
<thead>
<tr>
<th>Time</th>
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<th>Topic</th>
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<tr>
<td>7:00 AM</td>
<td>COM PES</td>
<td>Governing Board Meeting</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>COM T&amp;D</td>
<td>Overhead Lines – ANSI C29 TF</td>
</tr>
</tbody>
</table>

TR-P = Transactions Paper Session; PL = Panel Session; PF = Paper Forum; T = Tutorial; COM = Committee Meeting; COMBO = Combination meeting; PO = Poster Session; SS = Super Session
Sunday Morning

Women in Power Workshop (tutorial)
Sunday, 21 July, 8:00 AM–5:00 PM     MAR – Shaughnessy I
Sponsored by: Power & Energy Society
Chair: S. Bahramirad, S&C Electric

DOE’s 7 Traits of a Smart Grid (tutorial)
Sunday, 21 July, 8:00 AM–12:00 PM     MAR – Pinnacle I
Sponsored by: IEEE Power & Energy Society and Power & Energy Education Committee

INSTRUCTORS:
- W. REDER, S&C Electric Company
- J. MCCLANAHAN, S&C Electric Company
- E. CAMM, S&C Electric Company
- S. BAHRAMIRAD, PhD, S&C Electric Company

This tutorial will provide a fundamental understanding of the DOE’s seven defining traits of a smart grid and the technologies, applications, and market drivers that are making the modernization of today’s electrical system possible. Attendees will also learn about the security, communication and regulatory challenges that are affecting the implementation of the smart grid. This course will cover the following topics:

- Consumer Participation
- Accommodating both Central & Distributed Generation & Storage
- Enabling New Products, Services, and Markets
- Power Quality
- Optimization of Assets
- Anticipating & Responding to System Disturbances
- Operating Resiliency to Attacks & Natural Disasters

Operation of Electricity Markets – Technical and Economic Aspects (tutorial)
Sunday, 21 July, 8:00 AM–5:00 PM     MAR – Pinnacle II
Sponsored by: IEEE Power & Energy Society Committee and Power & Energy Education Committee

INSTRUCTOR:
- K. BHATTACHARYA, University of Waterloo

The focus of this course is to provide attendees with an overview of the issues associated with operation of electricity markets from a broad perspective. Market design and structure, price settlement processes, and transmission system issues will be discussed and the fundamental concepts of market auctions will be explored. The course will encompass both the technical and economic aspects of the operation of electricity markets for a multi-disciplinary audience. The topics included are, markets design, types of market auctions and electricity price formation, role of the Independent System Operators in different markets, transmission pricing paradigms, congestion management, firm transmission rights and ancillary services management. Various operational practices adopted by electricity markets in North America are discussed in the context of the above topics.
Power Quality – From Lightning and Harmonics to Variable Energy Resources
(tutorial)

Sunday, 21 July, 8:00 AM–5:00 PM MAR – Pinnacle III

Sponsored by: IEEE Power & Energy Society Committee and Power & Energy Education Committee

INSTRUCTORS:
S. SANTOSO, University of Texas at Austin
R. DUGAN, EPRI
M. McGranahan, EPRI

The aging power grid infrastructure coupled with the elements of nature and increasing penetration of variable energy sources such as wind and solar photovoltaic generation can give rise to poor electric power quality. Incompatibilities between the electrical characteristics of today's power system and the expectations for loads are the root causes of nearly all power quality problems. A decrease in the supply voltage for a fraction of a second can trip a microprocessor-based motor controller offline, disrupting an entire manufacturing process. Another example may involve poor feeder voltage regulation due to variable wind or solar power causing short term over- and under-voltages. This course provides a solid foundation in understanding common power quality phenomena, root causes of power quality disturbances, solutions, impacts of variable generation, monitoring, technical standards, and industry trends.

Energy Forecasting in the Smart Grid Era (tutorial)

Sunday, 21 July, 8:00 AM–5:00 PM MAR – Ambleside I

Sponsored by: IEEE Power & Energy Society Committee and Power & Energy Education Committee

INSTRUCTORS:
T. HONG, SAS Institute
S. FAN, Monash University
H. ZAREIPOUR, University of Calgary
P. PINSON, Technical University of Denmark

Wide range deployment of smart grid technologies enables utilities to monitor the power systems and gather data on a much more granular level than ever before. While the utilities can potentially better understand the customers, design the demand response programs, forecast and control the loads, integrate renewable energy and plan the systems, etc., they are facing analytic issues with making sense and taking advantage of the “big data”. This tutorial developed by IEEE Working Group on Energy Forecasting offers a comprehensive overview of energy forecasting to utility forecasters, analysts, planners, operators and their managers. The participants will learn the fundamentals and the state-of-the-art of load, price and wind forecasting through real world examples and case studies.

Sunday Afternoon

Smart Grid Implementations and Lessons Learned (tutorial)

Sunday, 21 July, 1:00 PM–5:00 PM MAR – Pinnacle I

Sponsored by: IEEE Power & Energy Society Committee and Power & Energy Education Committee

INSTRUCTORS:
A. KUNZE, PE, S&C Electric Company
W. REDER, S&C Electric Company
E. CAMM, S&C Electric Company
J. McClanahan, S&C Electric Company

This tutorial examines technologies and application from the perspective of smart grid installation. The course begins with a broad overview of intelligent equipment and services. At the same time, students are introduced to a handful of lessons learned and insight into final application of Smart Grid project implementations.

- Loop systems
- Physical security and level of quality
- Greater number of intelligent devices and services: DG, Storage, Real-time monitoring, AMI, EV, etc.
- Insight into final applications and their level of maturity
Sunday Afternoon, continued — Monday Morning

New Attendees Orientation (panel) – Two Sessions
Sunday, 21 July, 3:00 PM–4:00 PM and 4:00 PM – 5:00 PM  
REN – Ballroom I
Sponsored by: IEEE PES
Chair: S. S. Venkata, Alstom Grid
Chair: P. Ryan, IEEE PES

A short orientation session will familiarize first-time attendees with PES and the PES General Meeting. The session will be offered twice. Each session will provide an understanding of the various types of technical sessions, committee meetings, tutorials, technical tours, and social events. At the end of the session, the newcomer should be able to navigate confidently through the General Meeting and obtain maximum value from the experience. Each session will include a question and answer period.

Scholarship Plus Reception
Sunday, 21 July, 4:00 PM–5:00 PM  
MAR – Point Grey

Welcome Reception
Sunday, 21 July, 5:00 PM – 8:30 PM  
VCC West – West Ballroom CD

Monday Morning

Attendee Breakfast
Monday, 22 July, 6:30 AM–7:45 AM  
VCC East – East Ballroom AB

Presenter Breakfast
Monday, 22 July, 6:30 AM–7:45 AM  
VCC East – Ballroom C

Poster Presenter Breakfast
Monday, 22 July, 6:30 AM–7:45 AM  
VCC East – East Ballroom C

PES Members Meeting (panel)
Monday, 22 July, 8:00 AM–9:00 AM  
VCC East – East Exhibit Hall A & Show Office
Chair: N. Schulz, Kansas State

PES President Noel N. Schulz will provide an update about PES progress and activities of the past year. The candidates for the offices of PES President-Elect, PES Treasurer & PES Secretary will each make a short presentation of his/her views for the Society and IEEE so you can make an informed decision when you vote during this year’s election.

Plenary Session (panel)
Monday, 22 July, 9:00 AM–11:00 AM  
VCC East – East Exhibit Hall A & Show Office
Chair: N. Schulz, Kansas State

PES President Noel Schulz will moderate the Plenary Session which begins immediately following the PES Members Meeting. The notable keynote speakers who will address aspects of the conference theme, “Shaping the Future of Energy Industry” are:
- G. REIMER, Executive Vice President Transmission and Distribution, B.C. Hydro, speaking on Shaping BC Hydro’s Transmission & Distribution for Today and Tomorrow;
Monday Morning – continued, Monday Afternoon

- E. O. SCHWEITZER, Founder of Schweitzer Engineering Laboratories, speaking about The Future of Protection and Control in Evolving Energy Industry;
- M. MCGRANAGHAN, Vice President of the Power Delivery and Utilization Sector, Electric Power Research Institute, speaking on Grid Resiliency and the Smart Grid.

Monday Afternoon

Advanced Topics in Electric Machines (panel)

Monday, 22 July, 1:00 PM–5:00 PM VCC East – East Meeting Room 7
Sponsored by: Electric Machinery Committee
Chair: A. Chiba, Tokyo Institute of Tech,

This panel session present the advance topics in electrical machines. The rare-earth problem is apparent in motor industry. After the compact and high efficiency IPMSM, it is very difficult to go back to induction motors. Switched reluctance motors are one of excellent candidates for mass production applications such as automotive industry. Test equipments are also unique for HEV and EV motors. In addition, bearingless motor, which combine magnetic suspension with motor function is one of the advanced topics. High rotational speed motors with high power density is one of the advanced topics in the electrical machines.

PRESENTATIONS AND PANELISTS:

- GM2601, Stabilization of Rotor Levitation in a Time Based Torque and Suspension Force Control Type Bearingless Motors
  M. OOSHIMA, Tokyo University of Science, Suwa
- GM2602, Developments of Rare Earth Free Motors for HEV
  A. CHIBA, Tokyo Institute of Technology
  K KIYOTA, Tokyo Institute of Technology
- GM2603, Advanced Control Techniques for Switched Reluctance Machines for Emerging Applications
  I. HUSAIN, NC State University
- GM2604, High Speed High Power Density Electric Machines for Aerospace Applications
  T. WU, University of Central Florida
- GM2605, Core Loss Reduction in Two-Axis Actively Positioned Bearingless Motor Using Soft Magnetic Composites
  J. ASAMA, Shizuoka University
  D. KANEHARA, Shizuoka University
  T. OIWA, Shizuoka University
  A. CHIBA, Tokyo Institute of Technology
- GM2606, Genetic Algorithm and Finite Element Analysis for Optimum Design of a 1kW AFPM Machine
  A. MAHMOUDI, UMPEDAC
  S. KAHOURZADE, UMPEDAC
  N. RAHIM, UMPEDAC
  H. PING, UMPEDAC
  M. UDDIN, UMPEDAC
- GM2607, Development of a Nonlinear Speed and Efficiency Optimization Control of IPMSM Drive with Flux Estimation
  B. PATEL, Lakehead University
  M. UDDIN, Lakehead University

Opportunities and Problems of Smart Grids with Large Penetration of Renewable Energy – Asian and Australian Experience (panel)

Monday, 22 July, 1:00 PM–3:00 PM MAR – Shaughnessy II
Sponsored by: Energy Development and Power Generation
Chair: S. Mukhopadhyay, GTBIT, GGSIP University

The Smart Grid concept suggest a wide use of renewable energy sources for electricity generation. Operation of renewable sources in electric power systems together with traditional power plants and electric networks not only provides benefits but also creates certain technical, economic, legal and other problems. Electricity industry in the Asian and Australasian countries is developing at a rapid pace and observing a fast growing share of electricity generated from renewable sources. Different countries by
virtue of their geographical locations and economic features have different experiences in using the advantages of renewable sources of electricity generation and in solving the related problems. The major goal of this Panel Session is to analyze the experience gained by the Asian and Australasian countries that suggests discussing various relevant issues including, opportunities and problems arising because of a large share of renewable energy in the energy supply and ways and means of solving them.

PRESENTATIONS & PANELISTS:

• Opportunities and Problems of Smart Grids with Large Penetration of Renewable Energy – Indian Perspective
  S. MUKHOPADHYAY, GTBIT
  S. K. SOONEE, GTBIT
  B. SINGH, GTBIT
  Y. K. SEHGAL, GTBIT

• Northeast Asia Power System Interconnection and Smart Grid Operation Strategies in South Korea
  S.-S. LEE, Seoul National University
  Y. T. YOON, Seoul National University
  S.-I. MOON, Seoul National University
  J.-K. PARK, Seoul National University

• DSM & DR Power System Market Operation Strategies in South Korea
  S.-S. LEE, Seoul National University
  Y. T. YOON, Seoul National University
  S.-I. MOON, Seoul National University
  J.-K. PARK, Seoul National University

• Energy Storage Applications in the System with Large Penetration of Wind Power
  L. LIANG, University of Hong Kong
  J. ZHONG, University of Hong Kong

• Development of an Evaluation Tool for Demand Side Management of Domestic Hot Water Load
  K. WONG
  M. NEGNEVITSKY, University of Tasmania

• Synchronization of a Diesel Generator in Isolated Power Systems with High Wind Penetration and Low Spinning Reserves
  D. NIKOLIC
  R. GARDEN
  M. NEGNEVITSKY, University of Tasmania

• Wind Generation in New Zealand: Benefits and Challenges
  B. CHAKRABARTI, Victoria University of Wellington
  R. GARDEN
  R. RAYUDU

IGCC Smart Grid Implementation Combination Session (combo)
Monday, 22 July, 1:00 PM–5:00 PM REN – Salon D
Sponsored by: Intelligent Grid Coordinating
Chair: E. Gunther, EnerNex Corporation
This session will look at actual implementations of smart grid and the early results that the utilities are getting from those implementations.

Research and Education in Cyber Physical Systems for Power and Energy Systems (panel)
Monday, 22 July, 1:00 PM–5:00 PM MAR – Point Grey
Sponsored by: Power & Energy Education
Chair: A. Pahwa, Kansas State University
Chair: K. Baheti, National Science Foundation
Access to clean and affordable energy as well as their efficient and smart use are critical for sustainable growth of population and global economies. In addition, new systems and control engineering tools are needed for the next generation manufacturing, transportation, and health care systems. The presentation will discuss some of the challenges and opportunities in smart grid, sensor networks, and robotics. The presentations will include sample projects funded by National Science Foundation (NSF) through the Cyber Physical Systems (CPS) program, which will highlight recent activities in the integration of research and education. In addition, funding opportunities for multidisciplinary research in sustainable energy pathways and cyber-physical systems will be discussed.
PRESENTATIONS AND PANELISTS:

• GM0906, NSF Programs in Energy, Power, and Cyber-Physical Systems Cyber Physical Systems (CPS) Program Overview
  K. BAHETI, National Science Foundation

• GM0905, Synchrophasor Data Mining and Spatio-Temporal Wind Power Analysis
  V. VITTAL, Arizona State University

• GM0902, Decentralized Approaches to Control and Coordination of Distributed Energy Resources
  A. DOMINGUEZ-GARCIA, University of Illinois at Urbana-Champaign

• GM0904, Applications of Multi-Agent Systems (MAS) for Energy Management in the Smart Grid: A Cyber-Physical Systems Approach
  S. SURYANARAYANAN, Colorado State University

• GM0907, Boolean Microgrid
  S. MAZUMDER, University of Illinois at Chicago

• GM0903, Holonic Multi-Agent Control of Distribution Systems with High Penetration of Distributed PV Generation
  A. PAHWA, Kansas State University

• GM0908, CPS Education and Research: An Industry Perspective
  S. S. VENKATA, Alstom Grid

Energy Forecasting: The State of the Art (panel)

Monday, 22 July, 1:00 PM–5:00 PM MAR – Shaughnessy I
Sponsored by: Power System Planning and Implementation
Chair: T. Hong, SAS Institute

This session brings together energy forecasting experts from both academics and the utility industry to discuss various topics in the energy forecasting field, such as data cleansing, short and long term load forecasting, demand response forecasting, PHEV forecasting, price forecasting, and wind power forecasting, etc. Followed by the presentations is the energy forecasting working group meeting.

PRESENTATIONS AND PANELISTS:

• GM1580, Load Curve Data Cleansing Methodologies and Tool
  W. LI, BC Hydro

• GM1579, Load Forecasting in Australian Energy Market
  S. FAN, Monash University

• GM1583, Long Term Probabilistic Load Forecasting at NCEMC
  J. WILSON, North Carolina Electric Membership Corporation

• GM1584, Knowing One's Limits – a DR Forecaster's Challenge
  J. DONNELL, PG&E

• GM1585, Modeling and Forecasting toward the Optimization of Regional Operation of PHEV Charging Stations
  W. LEE, University of Texas – Arlington

• GM1581, Price Forecasting in Modern Power Grids
  H. ZAREIPOUR, Univ. of Calgary

• GM1582, State of the Art in Wind Power Forecasting: Operations and Market Perspectives
  P. PINSON, Technical University of Denmark (DTU)

Data Mining for Operational and Economics Decisions (panel)

Monday, 22 July, 1:00 PM–3:00 PM REN – Ballroom III
Sponsored by: (PSACE) Intelligent Systems
Chair: Z. Vale, Politecnico di Porto
Chair: G. Lambert-Torres, PS Solutions

The intensive use of distributed energy resources in future smart grids and the operation in the scope of liberalized and competitive electricity markets involves a large number of players of different nature and size, and having diverse functions, characteristics and goals. This points to future power systems using multi-level decentralized decision and requiring adequate decision-support tools to support decentralized decision making. Those tools should be able to obtain the implicit knowledge contained in the large volumes of data produced by the installation and players' operation and that is of most value for operational and economic decisions. This panel will present new solutions and discuss the challenges ahead regarding the data analysis and mining techniques and tools that can be used to support decision makers in the new context.
PRESENTATIONS AND PANELISTS:

- GM0869, Data Mining for Real-Time Situation Awareness in a Smart Grid: Challenges and a Case Study
  P. DU, Pacific Northwest National Lab

- GM0867, Computational Approaches for Bad Data Detection in PMU Networks
  G. VENAYAGAMOORTHY, Clemson University

- GM0871, A Data Mining Technique for Electricity Price Zone Forecasting
  H. MORI, Meiji University

- GM0868, Data Association Mining for Demand and Price Forecasting in Smart Grids
  H. ZAREIPOUR, University of Calgary

- GM0870, Short-term Load Forecasting based on Load Profiling
  S. RAMOS, Polytechnic of Porto
  J. SOARES, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
  S. RAMOS, Polytechnic of Porto

- GM0872, Residential House Load Modeling based on Smart Meter Data for Low Voltage System Management
  D. HE, Georgia Institute of Technology

- GM0873, Estimation of Fuel Price Impacts on the Growth Paths of Electric Vehicle Market
  T. NIIMURA, Hosei University

- GM0866, Wave Height Forecasting to Improve Off-Shore Access and Maintenance Scheduling
  I. DINWOODIE, University of Strathclyde
  V. CATTERSON, University of Strathclyde
  D. MCMILLAN, University of Strathclyde

Multi-Agent Systems Test Beds and Applications (panel)

Multi-agent system test beds are designed to allow experimentation, validation, and demonstration of electrical systems, controlled using intelligent mechanisms, in a simulated environment that closely portrays actual deployed systems. The test bed is capable of interfacing with not only simulated devices, but also actual hardware devices, providing a virtualized environment that permits efficient design space exploration and extreme condition testing with minimal risk and cost. The panel aims to present multi-agent system test beds that are applied today or used to study or simulate several power system applications.

PRESENTATIONS AND PANELISTS:

- GM0964, Multi-Agent System Test Bed at Florida State University
  D. CARTES, Florida State University

  S. MCARTHUR, University of Strathclyde
  I. KOCKAR, University of Strathclyde

- GM0965, An Agent-Based Test Bed for the Integrated Study of Retail and Wholesale Power System Operations
  L. TESFATSION, Iowa State University

- GM0966, Multi-Agent based Smart Grid Management and Simulation – Situation Awareness and Learning in a Test Bed with Simulated and Real Installations and Players
  H. MORAI, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
  T. PINTO, Polytechnic of Porto
  L. GOMES, Polytechnic of Porto
  F. FERNANDES, Polytechnic of Porto
  P. OLIVEIRA, Polytechnic of Porto
  C. RAMOS, Polytechnic of Porto
  S. WIDERGREN, PNNL

- GM0970, Real-Time Pricing Field Agent Experience and Simulation Verification
  S. WIDERGREN, PNNL

- GM0967, Integrated Multi-Agent Testbed for Decentralized Control of Active Distribution Networks
  A. SALEEM, KTH Royal Institute of Technology
  N. HONETH, KTH Royal Institute of Technology
  Y. WU, KTH Royal Institute of Technology
  L. NORDSTRÖM, KTH Royal Institute of Technology
Monday Afternoon, continued

- GM0968, PowerMatcher Agent-Based Energy Management: Technology, Test Beds and Standardization
  K. KOK, TNO
- GM0971, Agent Based Applications for Microgrids
  A. DIMEAS, National Technical University of Athens
- GM0972, A Laboratory Platform for Intelligent Multi-Agent based Monitoring, Control and Optimization Studies for a Micro-Grid
  G. VENAYAGAMOORTHY, Clemsons
- GM0973, Risk based Multi-Agent Chilled Water Control System for a More Survivable Naval Ship
  Y. LU, Siemens

Fault Current Limiters (panel)

Monday, 22 July, 1:00 PM–5:00 PM VCC West - West Meeting Room 121TS
Sponsored by: Switchgear
Chair: M. Steurer, Florida State University
Chair: J.van de Ligt

This panel session, organized by the IEEE WG PC37.302 which develops a guide on testing of fault current limiters (FCLs), will discuss the development, specification, testing, and applications of emerging FCL technologies in the context of system integration and operation of these novel devices in the power grid. The goal of this session is to provide the broader power systems community with an update on this exciting field of apparatus development and share experiences from existing or emerging FCL applications. The panelists span the entire spectrum of stakeholders: developers/vendors of FCLs, utilities, testing labs, and academia. After an overview on the topic by the chairman the panelists will provide their individual perspective on FCL developments, aspects of testing FCLs, discuss system interrogation challenges, and present operational experiences in the field.

PRESENTATIONS AND PANELISTS:
- GM2655, Overview on Fault Current Limiters
  M. STEURER, Florida State University
- An Electric Utility’s Perspective on High Temperature Superconducting Fault Current Limiters
  S. AHMED, Southern California Edison
- Fault Current Limiter Development and Application Issues
  O.-B. HYUN, KEPRI
- Impact of Fault Current Limiters on Protection
  M. BZARGAN, Alstom
- Superconducting Fault Current Limiters Experiences with First Real Grid Installations
  J. BOCK, Achim Hobl
  J. SCHRAMM, Nexans SuperConductors
- Experience with High Power Testing and Commissioning of a Saturated-Core Fault Current Limiter in a Live Substation
  U. GARBI, GridON Ltd.
- EPRI/DOE Solid State Fault Current Limiter Development
  R. ADAPA, EPRI
  D. PICCONE, Silicon Power Corp.
- Progress in Transmission Level Fault Current Limiters
  P. J. MURPHY, Varian
- The Electron Tube Over-Current & Over-Voltage Regulator and Associated Test Facility
  J. G. KAPPENMAN, Storm Analysis Consultants
  C. BIRNBACH, Advanced Fusion Systems LLC
- Experiences from Testing Fault Current Limiters in High Power and High Voltage Laboratories
  J. VANDERMAAR, Powertech
  P. LEUKENS, KEMA

Power Quality Monitoring in Smart Grids (panel)

Monday, 22 July, 1:00 PM–3:00 PM REN – Port of Vancouver
Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: B. Howe, EPRI
Chair: F. Zavoda, IREQ

Continuous advances and falling prices in technologies such as monitoring equipment, communication, data storage and processing, etc. facilitated and triggered the next major step in the evolution of power systems, from traditional network to “Smart Grid”. Despite the fact that more performing models of PQ
monitors are available on the market and network operators show more will to assess the PQ level, there is a lack of knowledge and agreement on a number of aspects of the monitoring process. This Panel Session will address some application aspects of PQ monitoring including: overview of PQ monitoring, selection of monitoring locations, selection of monitoring parameters, and presentation of PQ monitoring results. These presentations will be coordinated with the following major objectives of the monitoring activity: compliance verification, benchmarking/performance analysis, site characterization, troubleshooting, advanced applications and studies, and active PQ management.

PRESENTATIONS AND PANELISTS:
• GM2460, Overview of PQ Monitoring
  B. HOWE, EPRI
• GM2459, Selection of Monitoring Parameters
  J. MEYER, Technische Universitaet Dresden
• GM2461, Presentation of PQ Monitoring Results
  L. TENTI, RSE
• GM2457, Advanced Applications and Studies
  P. RIBEIRO, Technical University of Eindhoven
• GM2462, PQ Monitoring and Analysis Techniques
  G. CHANG, National Chung Cheng University
• GM2458, Selection of Monitoring Locations
  F. ZAVODA, IREQ

Microgrids – Designing Their Role in Smart Grid (tutorial)
Monday, 22 July, 1:00 PM–5:00 PM REN – Salon B
Sponsored by: IEEE PES and Power & Energy Education Committee

INSTRUCTOR:
S. PULLINS, Horizon Energy Group

The tutorial introduces the concept and role that Microgrids will play in the evolution of the smart grid. The course material is based on the ongoing implementation of a utility Microgrid and a planned customer-owned Microgrid. Students will be introduced to Microgrid concepts, drivers that influence the Microgrid, as well the projected market for Microgrids. The course will address Microgrid design aspects, engineering considerations, and architectures based on developed use cases. The attendee will leave with an understanding of the key aspects pertaining to designing and implementing a Microgrid.

TOPICS
1. The case for microgrids
2. Considerations
3. Use cases and technical architecture
4. Technical Architecture
5. Microgrid design
6. Microgrid marketplace
7. Overview of a customer-owned Microgrid
8. Conclusion

PES GOLD Panel Session (panel)
Monday, 22 July, 2:00 PM–4:00 PM REN – Port of San Francisco
Sponsored by: Admin
Chair: A. St. Leger, United States Military Academy

This session is sponsored by the PES Graduates of the Last Decade (GOLD) committee. This panel session will highlight technical contributions in the Power and Energy field from the PES GOLD community. Invited GOLD members will provide presentations on their career progress since graduation, and current projects and research efforts.

Best Papers on Integrating Wind, Solar, and Energy Storage (paper)
Monday, 22 July, 2:00 PM–5:00 PM REN – Ballroom I
Sponsored by: IEEE Power & Energy Society
Chair: J. Liu, PJM
PAPERS AND AUTHORS:

• GM1931, Impact of Wind Active Power Control Strategies on Frequency Response of an Interconnection
  V. SINGHVI, Electric Power Research Institute (EPRI)
  Y. ZHANG, National Renewable Energy Laboratory
  V. GEVORGIAN, National Renewable Energy Laboratory
  P. POURBEIK, Electric Power Research Institute (EPRI)
  N. BHATT, Electric Power Research Institute (EPRI)
  D. BROOKS, Electric Power Research Institute (EPRI)
  E. ELA, National Renewable Energy Laboratory
  K. CLARK, National Renewable Energy Laboratory

• GM1932, Wind Hub Reactive Resource Coordination and Voltage Control Study by Sequence Power Flow
  E. HEREDIA, Bonneville Power Administration
  M. DONNELLY, Montana Tech
  D. KOSTEREV, Bonneville Power Administration

• GM0490, Wind Integrated Power System Well-Being Analysis
  W. WANGDEE, BC Hydro and Power Authority
  R. BILLINTON, University of Saskatchewan
  W. LI, BC Hydro and Power Authority

• GM0777, Importance of Weather Data Quality from Wind Generation on Generation Forecasting
  J. BLATCHFORD, California ISO
  K. YAGNIK, Iowa State University

• GM2260, Markov-Based Stochastic Unit Commitment Considering Wind Power Forecasts
  Y. YU, University of Connecticut
  P. LUH, University of Connecticut
  E. LITVINOV, ISO New England
  T. ZHENG, ISO New England
  F. ZHAO, ISO New England
  J. ZHAO, ISO New England

• GM1085, A Study on Fault Ride-Through of VSC-Connected Offshore Wind Farms
  M. MOHAMMADI, University of Manchester
  M. AVENDANO, University of Manchester
  M. BARNES, University of Manchester
  J. CHAN, Siemens

• GM2174, Overvoltages in LV Rural Feeders with High Penetration of Wind Energy
  S. CHALISE, South Dakota State University
  B. POUDEL, South Dakota State University
  R. TONKOSKI, South Dakota State University

• GM2411, Optimal Placement of Off-Shore Wind Turbines and Subsequent Micro-Siting Using Intelligently Tuned Harmony Search Algorithm
  N. PRABHU, National University of Singapore
  P. YADAV, National University of Singapore
  B. PRASAD, National University of Singapore
  S. PANDA, National University of Singapore

• GM0515, Improvements to LV Distribution System PV Penetration Limits Using a dSTATCOM with Reduced DC Bus Capacitance
  P. WOLFS, CQU
  A. MAUNGTHANOO, CQU

• GM0543, Solar Commercial Virtual Power Plant
  B. ZWAENEPOEL, Ghent University
  J. LAVEYNE, Ghent University
  T. VANDOORN, Ghent University
  B. MEERSMAN, Ghent University
  G. VAN EETVELDE, Ghent University
  L. VANDEVELDE, Ghent University

• GM1062, Design of an Energy Distribution Management System for the Vertical Management of Volatile Infeed
  R. SCHWERDFEGER, Ilmenau University of Technology
  D. WESTERMANN, Ilmenau University of Technology

• GM0861, Opportunities and Problems of Smart Grids with Large Penetration of Renewable Energy – Indian Perspective
  S. MJUKHOPADHYAY, GTBIT, GGS IP University
  S. SOONEE, POSOCO, POWERGRID
  B. SINGH, Indian Institute of Technology Delhi
  Y. SEHGAL, Powergrid Corporation of India Ltd.
Monday Afternoon, continued

- GM0898, A Real-time Power Allocation Algorithm for Dispersed Energy Storages and Its Communication Network Design
  M. ZHANG, Zhejiang University
  H. XIN, Zhejiang University
  Z. LU, Zhejiang University
  D. GAN, Zhejiang University
  J. SEUSS, Georgia Institute of Technology

- GM0304, Supplementary Automatic Generation Control Using Electric Vehicle Battery Swapping Stations
  P. XIE, Huazhong University of Science and Technology
  B. QIAN, Huazhong University of Science and Technology
  D. SHI, Huazhong University of Science and Technology
  J. CHEN, Huazhong University of Science and Technology
  L. ZHU, Huazhong University of Science and Technology

- GM0477, A Novel Method for Control of Distributed Storage Devices in Distribution: Ripple Voltage Injection with Frequency Droop
  D. FREGOSI, North Carolina State University

- GM1865, Power and Energy Capacity Requirements of Storages Providing Frequency Control Reserves
  T. BORSCHER, ETH Zürich, Power System Laboratory
  A. ULBIG, ETH Zürich, Power System Laboratory
  M. KOLLER, ETH Zürich, Power System Laboratory
  G. ANDERSSON, ETH Zürich, Power System Laboratory

- GM0337, Electric Vehicle Charging and Grid Constraints: Comparing Distributed and Centralized Approaches
  J. DE HOOG, University of Melbourne
  V. MUENZEL, University of Melbourne
  D. JAYASURIYA, University of Melbourne
  T. ALPCAN, University of Melbourne
  M. BRAZIL, University of Melbourne
  D. THOMAS, University of Melbourne
  I. MAREELS, University of Melbourne

Best Papers on System Operations and Market Economics (paper)
Monday, 22 July, 2:00 PM–5:00 PM MAR – Pinnacle I
Sponsored by: IEEE Power & Energy Society
Chair: A. Khodaei, University of Houston
Chair: K. Cheung, ALSTOM Grid Inc.

PAPERS AND AUTHORS:
- GM2261, An Efficient Approach for Short-Term Substation Load Forecasting
  X. SUN, University of Connecticut
  P. LUH, University of Connecticut
  L. MICHELE, University of Connecticut
  K. CHEUNG, Alstom Grid
  W. GUAN, Alstom Grid
  K. CHUNG, Alstom Grid
  S. CORBO, Alstom Grid

- GM2429, Advantages of Deterministic Optimization in Long-Term Hydrothermal Scheduling of Large-Scale Power Systems
  M. ZAMBELLI, University of Campinas
  L. MARTINS, University of Campinas
  S. SOARES FILHO, University of Campinas

- GM0545, Improving Grid Resiliency Using Hierarchical Wide Area Measurements
  S. ZHANG, Arizona State University
  V. VITTAL, Arizona State University

- GM1890, Real-Time Power System Dynamic Equivalencing to Preserve System Center of Oscillations via PMU-Based Dynamic State Estimator
  E. FARANTATOS, Georgia Institute of Technology
  R. HUANG, Georgia Institute of Technology
  G. COKKINIDES, Georgia Institute of Technology
  A. MELIOPoulos, Georgia Institute of Technology
Monday Afternoon, continued

- GM0575, Using Phase Shifters for Power Flow Adjustment
  R. OGAHARA, Waseda University
  Y. KAWAURA, Waseda University
  S. IWAMOTO, Waseda University

- GM2155, Effect of Earth Current Return Model on Transmission Line Fault Location – A Case Study
  S. DAS, University of Texas at Austin
  S. SANTOSO, University of Texas at Austin
  R. HORTON, Southern Company Services, Inc.
  A. GAIKWAD, Electric Power Research Institute

- GM1841, Line Parameter-Free Fault Location Algorithm for Series Compensated Transmission Lines
  S. PADMANABHAN, University of Manchester
  V. TERZIJA, University of Manchester

- GM1524, A New Approach for Event Classification and Novelty Detection in Power Distribution Networks
  A. LAZZARETTI, LACTEC
  V. FERREIRA, Federal University Fluminense
  H. VIEIRA-NETO, Federal University of Technology – Paraná
  L. TOLEDO, LACTEC
  C. PINTO, Companhia de Energia do Paraná (COPEL Distribuição)

- GM2193, Outage Detection in Power Distribution Networks with Optimally-Deployed Power Flow Sensors
  Y. ZHAO, Stanford University
  R. SEVLIAN, Stanford University
  R. RAJAGOPAL, Stanford University
  A. GOLDSMITH, Stanford University
  H. POOR, Princeton University

- GM2063, Multi-objective Evolutionary Algorithm with Non-Dominated Solutions and Strength Pareto Subpopulation Tables for Service Restoration in Distribution Systems
  D. SIPOLI SANCHES, Federal Technological University of Paraná
  M. MOREIRA GOIS, University of São Paulo
  A. BOTAZZO DELBEM, University of São Paulo
  J. LONDON JR., University of São Paulo

- GM2106, A Scenario Driven Reliability Assessment Approach for Microgrids
  D. LOVELADY, Siemens PTI
  D. YANG, Siemens PTI
  D. MUELLER, Siemens PTI
  L. TAO, Siemens PTI

- GM2287, Wavelet-Adaptive ANN Forecaster for Renewable Energy Sources for Continuous Supply in Microgrid Applications
  A. GHAREEB, Florida International University
  O. MOHAMMED, Florida International University

- GM0068, Intrusion Detection System for IEC 60870-5-104 Based SCADA Networks
  Y. YANG, Queen’s University of Belfast
  K. MCLAUGHLIN, Queen’s University of Belfast
  T. LITTLE, Queen’s University of Belfast
  S. PRANGGONO, Queen’s University of Belfast
  H. WANG, Brunel University

- GM0157, Value Analysis of 2 kW/4.4 hour Energy Storage in Residential PV Systems in Arizona
  A. NADKARNI, Arizona State University
  A. MAKTHAL, Arizona State University
  G. KARADY, Arizona State University
  K. ALTENEDER, Salt River Project

- GM1745, Economic Valuation of Wind Curtailment Rights
  N. YU, Southern California Edison
  H. SHENG, Southern California Edison
  R. JOHNSON, Southern California Edison

- GM2026, A Unifying Approach to Assessing Market Power in Deregulated Electricity Markets
  C. WU, Tsinghua University
  S. BOSE, California Institute of Technology
  A. WIERMAN, California Institute of Technology
  H. MOHSENAN-RAD, University of California Riverside

- GM0883, Efficient Surrogate Optimization for Payment Cost Co-Optimization with Transmission Capacity Constraints
  M. BRAGIN, University of Connecticut
Monday Afternoon, continued

P. LUH, University of Connecticut  
J. YAN, Southern California Edison  
N. YU, Southern California Edison  
G. STERN, Southern California Edison

- GM0643, The Effect of Incomplete Price Signals on a Price-Responsive Distribution Feeder  
  T. HARDY, Wichita State University  
  A. STANTON, Wichita State University

Best Papers on Network Analysis and Dynamic Performance (paper)

Monday, 22 July, 2:00 PM–5:00 PM REN – Salon A
Sponsored by: IEEE Power & Energy Society  
Chair: L. Fan, University of South Florida

PAPERS AND AUTHORS:

- GM0185, CIM Oriented Database Level Topology Processing and Integrating Power System Applications  
  R. GELLI, Indian Institute of Technology, Bombay  
  K. S. A, Indian Institute of Technology, Bombay  
  P. YEMULA, Washington State University – Pullman, Washington

- GM0136, Methods of Converting CIM Power System Models into Bus-Branch Formats Utilizing Topology Processing Algorithms and Minimal Schema Modifications to IEC 61968/70  
  J. MOSELEY, ERCOT  
  N. MAGO, Electric Reliability Council of Texas

- GM0549, Distribution State Estimation for Smart Grids  
  S. LEFEBVRE, Hydro-Quebec  
  J. PRÉVOST, Hydro-Quebec  
  L. LENOIR, Hydro-Quebec  
  H. DELMAS, Hydro-Quebec  
  A. AJAJA, Hydro-Quebec

- GM1088, Three Phase Linear State Estimation Using Phasor Measurements  
  K. JONES, Virgin Polytechnic Inst & State University  
  J. THORP, Virginia Polytechnic Inst & State University  
  R. GARDNER, Dominion Virginia Power

- GM1432, The Effect of Instrument Transformer Accuracy Class on the WLS State Estimator Accuracy  
  M. ASPROU, University of Cyprus  
  E. KYRIAKIDES, University of Cyprus  
  M. ALBU, Politehnica University of Bucharest

- GM0343, Multi Area State Estimation using Area Slack Bus Angle Adjustment with Minimal Data Exchange  
  A. SHARMA, Indian Institute of Technology Kanpur, India  
  S. SRIVASTAVA, Indian Institute of Technology Kanpur, India  
  S. CHAKRABARTI, Indian Institute of Technology Kanpur, India

- GM1976, Some Considerations in Using Prony Analysis to Estimate Electromechanical Modes  
  N. ZHOU, Pacific Northwest National Laboratory  
  J. PIERRE, University of Wyoming  
  D. TRUDNOWSKI, Montana Tech of the University of Montana

- GM2138, A Power System Dynamic Model in the Matrix Polynomial Description Form  
  F. FREITAS, University of Brasilia  
  S. VARRICCHIO, CEPEL

- GM2162, Linearizing Voltage Control of MVDC Power Systems Feeding Constant Power Loads: Stability Analysis under Saturation  
  G. SULLIGOI, University of Trieste  
  D. BOSIC, University of Trieste  
  G. GIACCHI, University of Trieste

- GM2314, Coordinated Design of Local and Wide-Area Damping Controllers for Power Systems Using Particle Swarm Optimization  
  D. MOLINA, Electrical and Computer Engineering  
  G. VENAYAGAMOUTH, Clemson University  
  R. HARLEY, Georgia Institute of Technology

- GM1546, PDCI Damping Control Analysis for the Western North American Power System  
  D. TRUDNOWSKI, Montana Tech  
  D. KOSTEREV, Bonneville Power Administration  
  J. UNDRILL, JMULLC
Monday Afternoon, continued

- GM1611, Impact of Cyber Attacks on Transient Stability of Smart Grids with Voltage Support Devices
  B. CHEN, Texas A&M University
  S. MASHAYEKH, Texas A&M University
  K. BUTLER-PURRY, Texas A&M University
  D. KUNDUR, Texas A&M University

- GM0383, Fictitious Losses in the DCOPF with a Piecewise Linear Approximation of Losses
  O. AKINBODE, Arizona State University
  K. HEDMAN, Arizona State University

- GM0901, LC Resonance Mechanism Analysis of Fault Transient for Single Phase Earth Fault in Non-Solidly Earthed Network
  Y. XUE, China University of Petroleum (East China)
  W. XUE, China University of Petroleum (East China)
  B. XU, Shandong University of Technology

- GM0060, Reliability Analysis of Grid Concepts
  C. WOUTERS, KU Leuven
  T. WIJNHOVEN, KU Leuven
  K. DE WIT, BASF Antwerp
  F. VANWYNSBERGHE, BASF Antwerp
  G. DECONINCK, KU Leuven

- GM0547, FREEDM ERC Precollege Programs: Motivating Careers in the Electric Power Industry
  K. HOLBERT, Arizona State University
  L. GRABLE, North Carolina State University
  A. OVERBAY, North Carolina State University
  B. NZEKWE, Florida State University

Best Papers on Power System Equipment and Load Characteristics (paper)

Monday, 22 July, 2:00 PM–5:00 PM REN – Ballroom II
Sponsored by: IEEE Power & Energy Society
Chair: B. Chiu, Southern California Edison Company

PAPERS AND AUTHORS:

- GM0411, Torque Measurements in Synchronous Generators Using Giant Magnetoresistive Sensor Arrays via the Maxwell Stress Tensor
  W. TRAORE, Texas Instruments
  R. MCCANN, University of Arkansas

- GM1521, Application of Stator Current Limiters: Impact during System Voltage Decrease
  R. KUTZNER, University of Applied Sciences Hannover
  M. LOESING, Amprion GmbH
  U. SEEGER, SIEMENS AG
  A. WENZEL, University of Applied Sciences Hannover

- GM1425, R/X Ratio Influence on Short Circuit Current of Doubly-Fed Induction Generator Based Wind Turbines
  I. ERLICH, University of Duisburg-Essen
  A. ELNAGGAR, University of Duisburg-Essen
  C. FELTES, RWE Innogy

- GM0651, Low Cross Regulation SIMO DC/DC Converter with Model Predictive Voltage Control
  B. WANG, Nanyang Technological University
  K. TAN, Nanyang Technological University
  P. SO, Nanyang Technological University

- GM0517, Inrush Identification by Applying Improved Morphological Gradient Algorithm
  W. WU, South China University of Technology
  T. JI, South China University of Technology
  L. ZHANG, South China University of Technology
  Q. WU, University of Liverpool

- GM0727, Environmental Impact Comparison between a 220 kV Gas-Insulated Substation and a 220 kV Air-Insulation Substation
  E. LARUELLE, Alstom Grid
  A. FICHEUX, Alstom Grid
  Y. KIEFFEL, Alstom Grid
  I. HUET, Alstom Grid

- GM1854, Overloading and Overvoltage Evaluation of a Transformerless Intelligent Power Substation
  J. CARR, ABB
  Z. WANG, ABB
  S. BHATTACHARYA, North Carolina State University
  K. HATUA, North Carolina State University
  S. MADHUSOODHANAN, North Carolina State University
Monday Afternoon, continued

- GM1577, Surge Protective Device Surge Testing: Noise Detection and Reduction
  R. HOTCHKISS, Surge Suppression Incorporated
  J. RUßS, Schneider Electric
  J. DEGREGORIA, Underwriters Laboratories Inc.
  M. GUY, T&B Power Solutions, LLC
  A. HAA, Independent
  G. HOEPFNER, Schneider Electric
  C. LEAVITT, T&B Power Solutions, LLC
  D. SMITH, Maida Development Company
  R. SYVERSON, ERICO

- GM2046, Methodology for Evaluating the Impact of GIC and GIC Capability of Power Transformer Designs
  R. GIRGIS, ABB Inc.
  K. VEDANTE, ABB

- GM1409, Energizing and De-Energizing of a 250 MVA Transformer of a Pumped Storage Power-plant: Modeling and Its Validation by On Site Tests
  M. RIQUAL, EDF R&D
  H. DIGARD, EDF R&D

- GM2302, Adaptive SRF-PLL with Reconfigurable Controller for Microgrid in Grid-Connected and Stand-Alone Modes
  T. YOUSSEF, Florida International University
  O. MOHAMMED, Florida International University

- GM0217, Ferroresonance Analysis Using 3D Bifurcation Diagrams
  J. COREA-ARAUJO, Universitat Rovira i Virgili
  F. GONZALEZ, Universitat Rovira i Virgili
  J. MARTINEZ, Universitat Politècnica de Catalunya
  J. BARRADO-RODRIGO, Universitat Rovira i Virgili
  L. GUASCH-PESQUER, Universitat Rovira i Virgili

- GM0491, Evaluating Substation Reliability Using a Combined State Enumeration and Linear Programming Method
  W. WANGDEE, BC Hydro and Power Authority
  W. LI, BC Hydro and Power Authority
  A. TACHE, BC Hydro and Power Authority
  P. CHOUDHURY, BC Hydro and Power Authority

- GM1343, Use of Inductive Power Transfer Sharing to Increase the Driving Range of Electric Vehicles
  P. DUTTA, Columbia University

- GM0585, Summation of harmonic currents of variable-speed induction motor drives
  V. CUK, Eindhoven University of Technology
  S. COBBEN, Eindhoven University of Technology
  P. RIBEIRO, Eindhoven University of Technology
  W. KLING, Eindhoven University of Technology

- GM1272, Grid-tied Power Converter for Battery Energy Storage Composed of 2-Stage DC-DC Converter
  B. HAN, Myongji University

- GM2157, Efficient Predictive Demand Response Using Laguerre Functions
  P. MC NAMARA, NUI Maynooth
  S. MCLOONE, NUI Maynooth

- GM1063, Energy Storage Capability of Battery Electric Vehicles
  S. SCHLEGEL, Ilmenau, Technology of University
  D. WESTERMANN, Ilmenau, University of Technology

International Practices in Developments, Standards and Techniques in Smart Grids (panel)
Monday, 22 July, 3:00 PM–5:30 PM  MAR – Shaughnessy II
Sponsored by: Energy Development and Power Generation
Chair: L. Lai, State Grid Energy Research Institute
Chair: K. Wong, IEEE

Power and energy are the most important business, political and social issues of the time. Electricity deregulation has created market demands and associated opportunities, and obligations. In the last two decades or so, the way electricity is generated and users that can have choices have resulted in a fundamental need to change electricity networks worldwide to meet future challenges. Global warming is influencing policies that require energy usage and greenhouse emissions to be measured and controlled. Market pressures, including increasing energy demands, assets management, quality and reliability of
Monday Afternoon, continued – Monday Evening

Energy supply, and growing social concern for the environment will force business that based upon innovation. This panel presents standards, techniques, methods applied in smart grid worldwide.

Presentations and Panelists:

Peak Demand Impact from Demand Side and Distributed Generation within a Smart Grid
Z. Y. Dong, University of Newcastle

A Comprehensive LVRT Solution for DFIG Wind Turbines
Z. Xu, Hong Kong Polytechnic University

Towards Real-Time Energy Generation Scheduling in Microgrids
M. Chen, Chinese University of Hong Kong

Application of Probabilistic Methods to Assess Guangdong System Expansion Plans
P. Zhang, Accenture

An Anti-Communication Delay and Anti-Packet Loss Differential Protection Algorithm
L. Yeping, Guodian Nanjing Automation Co, Ltd
Z. Yongbin, Guodian Nanjing Automation Co, Ltd
W. Ye, Southeast University
L. Yeping, Southeast University

Using a Microgrid Test Bed to Evaluate the Strategies for Seamless Renewable Energy Integration
W.-J. Lee, University of Texas at Arlington

Distributed Dynamic State Estimation with Synchrophasor Measurements Considering Speed Governor
T. BI, North China Electric Power University

Smart Grid Strategy and Standards in China
L. L. Lai, State Grid Energy Research Institute

Power Quality in Your Future (Panel)

Monday, 22 July, 3:00 PM–5:00 PM REN – Port of Vancouver

Sponsored by: Transmission and Distribution Committee and PSACE Committee

Chair: T. Unruh, U.S. Department of Energy

Power quality continues to be a challenge in business today. While design and mitigation methods have improved substantially, the quality of the power delivered to increasingly electronic equipment can still disrupt utility and business operations. This panel will explore the state of power quality today, provide a development status update of various power quality standards, and explore where Power Quality research, development, and standards should head in the future.

Presentations and Panelists:

• GM2466, Status of the Power Quality Roadmap
  T. Unruh, U.S. Department of Energy

• GM2465, Adoption of IEC Standards
  K. Sedziol, Duke Energy

• GM2463, Harmonics in the Future
  B. Moncrief, EnerNex

• GM2464, Impacts of Grid Modernization Activities (Smart Grid) on Power Quality
  D. Mueller, EnerNex

• GM2468, Unanswered Research Questions for PQ
  A. McEachern, Power Standards Labs

• GM2467, Power Disturbance Analytics: A New Direction of PQ Research and Application
  W. Xu, University of Alberta

Monday Evening

Electric Machinery Poster Session (Poster)

Monday, 22 July, 5:00 PM–7:00 PM VCC East – Exhibit Hall BC & Show Office

Sponsored by: Electric Machinery Committee

Papers and Authors:

• GM0247, Short circuit Analysis for Integration of 10MW Windfarm in Nigeria at the PCC
  O. Adio, Huazhong University of Science and Technology
  X. Lin, Huazhong University of Science and Technology
  F. Zhao, Huazhong University of Science and Technology
  Z. Bo, Smart Grid Institute, State Grid
Emerging Technologies Poster Session  (poster)
Monday, 22 July, 5:00 PM–7:00 PM  VCC East – Exhibit Hall BC & Show Office
Sponsored by:  Emerging Technologies Coordinating

PAPERS AND AUTHORS:
• GM0933, Optimization of PHEV Charging Strategy to Improve Power Quality in a Residential Distribution Grid
  J. TAN, University of Toledo
  L. WANG, University of Toledo
  Z. WANG, University of Toledo
  R. YANG, University of Toledo

• GM1142, Research on the Technology of Ultra-Long Power Supply in Low Voltage for Tunnel Construction
  X. JIAN, Beijing Jiao Tong University
  W. ZHENSHENG, Beijing Jiao Tong University
  K. SMEDLEY, University of California
  J. WANG, Beijing Jiao Tong University

• GM1873, DQ Current Control of a Bidirectional, Isolated, Single Stage AC-DC Converter for Vehicle-to-Grid Applications
  N. REIMENSNYDER, University of Maine
  N. WEISE, University of Maine

• GM1889, Assessing Load Flexibility in Smart Grids: Electric Vehicles for Renewable Energy Integration
  S. GOTTWALT, FZI Research Center for Information Technology
  A. SCHULLER, FZI Research Center for Information Technology
  C. FLATH, Karlsruhe Institute of Technology
  H. SCHMECK, Karlsruhe Institute of Technology
  C. WEINHARDT, Karlsruhe Institute of Technology

• GM1997, Simulation Study of PEM Fuel Cell and Its Dynamic Characteristics
  Y. ZHU, Iowa State University

• GM2134, A Methodology for Optimized Energy Storage Sizing with Stochastic Resources
  M. ROSS, McGill University
  C. ABBEY, Hydro-Quebec Research Institute
  G. JOOS, McGill University

• GM2215, Experimental Evaluation of the Harmonic Behavior of LED Light Bulb
  R. BRAVO, Southern California Edison
  N. ABED, Southern California Edison

Energy Development and Power Generation  (poster)
Monday, 22 July, 5:00 PM–7:00 PM  VCC East – Exhibit Hall BC & Show Office
Sponsored by:  Energy Development and Power Generation
Chair:  J. Romero Aguero, Quanta Technology
PAPERS AND AUTHORS:

• **GM0037, Studies on Operation Parameters of SOFC-Compressor Combine System**
  Y. ZHANG, Nanyang Technological University
  J. ZHAO, Nanyang Technological University
  L. XIAN, Nanyang Technological University

• **GM0103, Voltage Control of Distributed Generation Unit in Islanded Microgrid Based on Equivalent-Input-Disturbance Approach**
  M. DING, Waseda University
  J. SHE, Tokyo University of Technology
  B. HU, Waseda University
  Y. RYUICHI, Waseda University
  M. WU, Central South University

• **GM0140, A Novel Controller for Frequency Regulation in a Hybrid System with High PV Penetration**
  S. MISHRA, Indian Institute of Technology, Delhi
  Z. PP, Indian Institute of Technology, Delhi
  P. SEKHAR, Indian Institute of Technology, Delhi

• **GM0227, An Adaptive Optimum SMES Controller for a PMSG Wind Generation System**
  A. RAHIM, King Fahd University of Petroleum & Minerals
  M. KHAN, King Fahd University of Petroleum & Minerals

• **GM0245, A Novel Wind Speed Forecasting Method Based on Ensemble Empirical Mode Decomposition and GA-BP Neural Network**
  Y. WANG, Tianjin University
  S. WANG, Tianjin University
  N. ZHANG, Tianjin University

• **GM0251, Demand for Energy Storage and Grid Development in Germany with Increased Renewable Generation According to the Federal Government's Energy Concept**
  W. WELLSSOW, Technical University of Kaiserslautern
  H. PLUNTKE, Technical University of Kaiserslautern
  A. MOSER, RWTH Aachen
  N. ROTERING, RWTH Aachen

• **GM0348, A Quadratic Robust Optimization Model for Automatic Voltage Control on Wind Farm Side**
  D. TAO, Tsinghua University
  G. QINGLAI, Tsinghua University
  S. HONGBIN, Tsinghua University
  X. FENGDA, Tsinghua University
  W. BIN, Tsinghua University

• **GM0359, Fixed-Speed and Variable-Slip Wind Turbines Providing Spinning Reserves to the Grid**
  E. MULJADI, National Renewable Energy Laboratory
  M. SINGH, National Renewable Energy Laboratory
  V. GEVORGIAN, National Renewable Energy Laboratory

• **GM0395, Smart-Grid based Substation Testing Simulator Design for the South Korean Power Distribution System**
  S. LEE, KESRI, Seoul National University
  M. YANG, Chungnam National University
  K. KIM, Chungnam National University
  Y. YOON, Seoul National University
  S. MOON, Seoul National University
  J. PARK, Seoul National University

• **GM0396, Northeast Asia Power System Interconnection and Smart Grid Operation Strategies in South Korea**
  S. LEE, KESRI, Seoul National University
  M. YANG, Chungnam National University
  K. KIM, Chungnam National University
  Y. YOON, Seoul National University
  S. MOON, Seoul National University
  J. PARK, Seoul National University

• **GM0400, Smart Grid Based Nuclear Load-Following Operation Strategies in the South Korean Power System**
  S. LEE, KESRI, Seoul National University
  Y. YOON, Seoul National University
  S. MOON, Seoul National University
  J. PARK, Seoul National University

• **GM0401, Offshore Variability in Critical Weather Conditions in Large-Scale Wind Based Danish Power System**
  N. CUTULULIS, Technical University of Denmark
GM0447, Islanding Detection for Multi DG System Using Inverter Based DGs
O. FAQHRULDIN, University of Waterloo
E. EL-SAADANY, University of Waterloo
H. ZEINELDIN, Masdar Institute of Science and Technology

GM0487, Investigating the Performance of Fuel Cell Based Distributed Generation Systems Under Unbalanced Loading
W. GHAREEB, University of Waterloo
E. EL-SAADANY, University of Waterloo

GM0705, Linkages in Energy Policy and Technology: Grid-Scale Renewables Integration at High Penetration Levels Requires Sustained and Corrective Policy Support
N. MURTHY, Fujitsu Labs
K. BOJANCZYK, Goldwind Science and Technology Company

GM0817, VSC-HVDC Model-Based Power System Optimal Power Flow Algorithm and Analysis
S. LEE, KESRI, Seoul National University
Y. YOON, Seoul National University
S. MOON, Seoul National University
J. PARK, Seoul National University

GM0818, Energy Management for a Grid-Tied Photovoltaic-Wind-Storage System—Part II Operation Strategy
A. HUSSEIN, United Arab Emirates University
I. BATARSEH, University of Central Florida

GM0910, The Prediction of Flexible Load Demand in the UK in 2050
R. DUNN, University of Bath
K. SHEN, University of Bath

GM0920, Reliability Investigations for a DC Offshore Power System
K. RUDION, Otto-von-Guericke University Magdeburg
A. ORTHS, Energinet.dk
Z. STYCZYNSKI, Otto-von-Guericke University Magdeburg
M. POWALKO, Energinet.dk
H. ABILDGAARD, Energinet.dk

GM0928, The European North-Sea Countries' Offshore Grid Initiative – Results
D. GREEN, National Grid
L. FISHER, EirGrid Plc
E. PELGRUM, Tennet TSO BV
F. GEORGES, Elia

GM0935, A Novel Sensorless Support Vector Regression Based Multi-Stage Algorithm to Track the Maximum Power Point for Photovoltaic Systems
A. IBRAHIM, University of Waterloo
O. BASIR, University of Waterloo

GM1027, Generator Internal Fault Modeling and Analysis based on One-Machine Infinite-Bus Power System
S. LEE, KESRI, Seoul National University
Y. YOON, Seoul National University
S. MOON, Seoul National University
J. PARK, Seoul National University

GM1183, Input-Output DC Impedance Modeling and Stabilization of a Grid-Connected Current-Source Converter-Based PV system
A. RADWAN, University of Alberta
Y. MOHAMED, University of Alberta

GM1211, A Novel Short-Term Dispatch Scheme for Wind Farm with Battery Energy Storage System
F. LUO, University of Newcastle
Z. DONG, University of Newcastle
Y. CHEN, University of Newcastle
K. MENG, University of Newcastle
G. CHEN, University of Sydney
H. TIAN, University of Newcastle
K. WONG, University of Western Australia

GM1239, Improvements on Economic Analysis of Coal Transportation and Power Transmission
H. WANG, Tianjin University
Y. ZENG, Tianjin University

GM1246, A Control Methodology for DFIG Type Wind Turbines Connected to Distribution Networks
N. ROY, University of New South Wales
Monday Evening, continued

- H. POTA, University of New South Wales
- M. MAHMUD, University of New South Wales
- M. HOSSAIN, Griffith University
  - GM1278, Hybrid Power for Rural Communities in Western Africa
  - S. OGUNTONA, Brandenburg University of Technology
  - A. SALAUDEEN, Brandenburg University of Technology
- M. HIDAYAT, University of Bath
- F. LI, University of Bath
  - GM1281, Impact of Distributed Generation Technologies on Generation Curtailment
  - M. HIDAYAT, University of Bath
- GM1311, Operation Design of Distributed PV Generation with Battery Storage System Connected to the Grid
  - R. BASTOS, University of São Paulo
  - A. QUERUBINI, University of São Paulo
  - C. AGUIAR, University of São Paulo
  - R. NEVES, University of São Paulo
  - R. MACHADO, University of São Paulo
- GM1319, Optimal Weekly Usage of Cryogenic Energy Storage in an Open Retail Electricity Market
  - H. KHANI, University of Western Ontario
  - M. DADASH ZADEH, University of Western Ontario
  - R. SEETHAPATHY, Hydro One Networks Inc.
  - GM1340, Solar PV Power Generation Forecast Using a Hybrid Intelligent Approach
  - A. HAQUE, Montana State University
  - H. NEHRIR, Montana State University
  - P. MANDAL, University of Texas at El Paso
- GM1373, Control of a Large Scale Single-Stage Grid-Connected PV System Utilizing MPPT and Reactive Power Capability
  - V. LAL, Indian Institute of Technology Kanpur
  - S. SINGH, Indian Institute of Technology Kanpur
  - M. SIDDHARDHA, Indian Institute of Technology Kanpur
- GM1380, Dynamic Optimal Reactive Power Compensation Control Strategy in Wind Farms of DFIG
  - R. DUAN, Shanghai Jiaotong University
  - F. WANG, Shanghai Jiaotong University
  - Z. LING, Shanghai Jiaotong University
  - Z. JIN, Shanghai Jiaotong University
  - GM1386, Optimal Location and Rating of Wind Power Generator with Maximization of Social Welfare in Competitive Electricity Market
  - N. SHARMA, National Institute of Technology (N.I.T.)
  - Y. SOOD, National Institute of Technology (N.I.T.)
- GM1422, Systemic Impact Caused by the Integration of La Guajira Wind Farm
  - F. GONZÁLEZ-LONGATT, Coventry University
- GM1439, Energy Efficiency in Smart Cities
  - W. KLING, TU Eindhoven
  - J. MYRZIK, TU Dortmund
- GM1482, Comparing Renewable Energy Policies in Four Countries & Overcoming Consumers™ Adoption Barriers with REIS
  - C. FUNG, Murdoch University
  - S. TANG, Murdoch University
- GM1489, INTERGRID – Enabling a Sustainable Energy System by Large-Scale Intercontinental Power Transmission
  - S. NORRGA, KTH Royal Institute of Technology
  - M. HESAMZADEH, KTH Royal Institute of Technology
- GM1508, Feasibility and Simulation Study of High-Rise Building Micro-Grid with PV and Mini-Hydro Pumping
  - J. ZHANG, Hangzhou Dianzi University
  - Q. ZHANG, Arizona State University
- GM1532, Basic Design of UAE’s Smart Microgrid and the Simulation Analysis Using PSCAD
  - M. ELMOURSI, Masdar Institute
  - R. VEERAPPAN, Masdar Institute
  - V. KHADKIKAR, Masdar Institute
  - S. LEE, Research Institute of Industrial Science and Technology
  - J. LEE, Research Institute of Industrial Science and Technology
  - S. LEE, Research Institute of Industrial Science and Technology
- GM1563, Coordinated Control for Grid Integration of PV Array, Battery Storage, and Supercapacitor
  - H. ZHENG, University of Alabama
  - S. LI, University of Alabama
  - C. ZANG, Shenyang Institute of Automation
  - W. ZHENG, Xiamen Electric Power Supply Co.
Monday Evening, continued

- **GM1597**, Optimizing HVDC Transmission for Large-Scale Wind Power Base in China
  S. LOU, Huazhong University of Science and Technology
  T. HOU, Huazhong University of Science and Technology
  Y. WU, Huazhong University of Science and Technology
  Y. CUI, Huazhong University of Science and Technology

- **GM1663**, Optimal Power Management for LV Distribution Feeders with Finely Distributed PV and Co-Located Storage
  N. JAYASEKARA, Curtin University
  M. MASOUM, Curtin University
  P. WOLFS, Central Queensland University

  P. MUOKA, University of Tasmania
  E. HAQUE, University of Tasmania
  A. GARGOOM, University of Tasmania
  M. NEGRNEVITSKY, University of Tasmania

- **GM1801**, Wind Turbine with Flywheel for Improved Power Smoothening and LVRT
  G. NAIR S, Indian Institute of Technology Delhi
  N. SENROY, Indian Institute of Technology Delhi

- **GM1816**, Photovoltaic Cell Modeling for Maximum Power Point Tracking Using MATLAB/Simulink to Improve the Conversion Efficiency
  N. DAS, Curtin University, Australia
  H. WONGSODIYARDJO, Curtin University, Australia
  S. ISLAM, Curtin University, Australia

- **GM1829**, The Effect of Operational Considerations on the Return of Electricity Generation Investment
  M. LYNCH, University College Dublin
  A. SHORTT, University College Dublin
  R. TOL, University of Sussex
  M. O'MALLEY, University College Dublin

- **GM1887**, Effects of Power Electronic Compensation on Distribution Network Thermal and Voltage Violations
  J. BLOEMINK, Imperial College London
  T. GREEN, Imperial College London

- **GM1940**, Assessment of Carbon Efficiency for Power Sector with Consideration of Network Constrains
  Z. ZHENG, University of Bath
  F. LI, University of Bath
  V. HAMID, National Grid

- **GM1996**, Analysis of the Impact of Distributed Generation Placement on Voltage Profile in Distribution Systems
  P. CHEN, Texas A&M University
  M. KEZUNOVIC, Texas A&M University

- **GM2156**, A Generic Load Model for Simulation Studies of Microgrids
  A. HADDADI, McGill University
  A. YAZDANI, Ryerson University
  G. JOOS, McGill University
  B. BOULET, McGill University

- **GM2179**, Tandem Hydro Scheduling in Indian Electricity Market
  P. DATTARAY, Indian Institute of Technology Delhi
  A. ABHYANKAR, Indian Institute of Technology Delhi

  W. LEIGHTY, Alaska Applied Sciences, Inc.

  G. WU, Baylor University
  K. LEE, Baylor University
  W. YANG, Western Digital Corporation

- **GM2232**, Current-Based Fault Detection for Wind Turbine Systems via Hilbert-Huang Transform
  D. LU, University of Nebraska-Lincoln
  W. QIAO, University of Nebraska-Lincoln
  X. GONG, University of Nebraska-Lincoln
  L. OU, University of Nebraska-Lincoln

- **GM2272**, Fuzzy Modeling and Control of Boiler-Turbine Unit Using Clustering and Subspace Method
  X. WU, Southeast University
  J. SHEN, Southeast University
  Y. LI, Southeast University
  K. LEE, Baylor University
Monday Evening, continued

• GM2309, Multi-Agent System Implementation in JADE Environment for Power Plant Control
  D. ESTRADA, Baylor University
  K. LEE, Baylor University

• GM2319, Dynamic Model Analysis and Control of a Grid Connected Wind Energy System
  Integrated with a Super-Capacitor Bank
  M. ABEDI, Baylor University
  K. LEE, Baylor University

• GM2322, Protection Design and Coordination of DC Distributed Power Systems Architectures
  S. VANTEDDU, Florida International University
  A. MOHAMMED, Florida International University
  O. MOHAMMED, Florida International University

• GM2324, Permanent Magnet Synchronous Generator based Stand-Alone Wind Energy Supply
  System [Transaction Number: TSTE-00069-2010]
  S. MISHRA, IIT Delhi

• GM2327, Islanding Detection in MicroGrids
  M. CINTUGLU, Florida International University
  O. MOHAMMED, Florida International University

• GM2342, Study on Development Cost of Replacing Nuclear Power by Renewable Energy
  Z. DONG, State Grid Energy Research Institute

• GM2352, Low Voltage Ride-Through Protection Techniques for DFIG Wind Generator
  N. ABED, Southern California Edison
  M. KABSHA, Mansoura University
  G. ABDO, Mansoura University

• GM2412, A Cascade Voltage Controller for Three-Phase Islanded Microgrids
  B. BAHRANI, Ecole Polytechnique Fédéral de Lausanne (EPFL)
  A. RUFER, Ecole Polytechnique Fédéral de Lausanne (EPFL)

Intelligent Grid Coordinating Committee Poster Session (poster)
Monday, 22 July, 5:00 PM–7:00 PM VCC East – Exhibit Hall BC & Show Office
Sponsored by: Intelligent Grid Coordinating

PAPERS AND AUTHORS:

• GM0063, Robustness Analysis on Electric Vehicle Energy Distribution Networks
  G. LIN, Shanghai Jiao Tong University
  P. YI, Shanghai Jiao Tong University
  L. SI, Georgia Institute of Technology
  T. ZHU, State University of New York at Binghamton USA
  X. JIANG, Shanghai Jiao Tong University
  G. LI, Shanghai Jiao Tong University
  M. BEGOVIC, Georgia Institute of Technology

• GM0171, Vehicle-to-Grid Service Potential with Price Based PEV Charging/Discharging
  N. H. TEHRANI, NTU
  G. B. SHRESTHA, IIT Guwahati
  P. WANG, NTU

• GM0344, Proposing a Electricity Market Framework for the Energy Internet
  W. SU, North Carolina State University
  A. HUANG, North Carolina State University

• GM0483, Optimal Scheduling of a Natural Gas Processing Facility with Price-based Demand
  M. ABAHUSSAIN, University of Washington
  R. CHRISTIE, University of Washington

• GM0760, Characterization of Power System Outages Caused by Hurricanes through Localized
  Intensity Indices
  V. KRISHNAMURTHY, University of Texas at Austin
  A. KRWASKINSKI, University of Texas at Austin

• GM1066, Distributed Energy Management Under Smart Grid Plug-and-Play Operations
  Z. ZHANG, North Carolina State University
  Y. ZHANG, North Carolina State University
  M. CHOW, North Carolina State University

• GM1068, Consensus-Based Distributed Energy Management with Real-Time Pricing
  N. RAHIBARI ASR, NCSU
  Z. ZHANG, NCSU
  M. CHOW, NCSU
Monday Evening, continued

  A. NABAVI, University of Toronto
  R. IRAVANI, University of Toronto
  A. ABAS GODARZI, US Hybrid
  F. AHMADKHANLOU, US Hybrid

  C. JIN, Syracuse University
  X. SHENG, Syracuse University
  P. GHOSH, Syracuse University

- **GM1362**, The Analysis of Influence of SVC and TCSC on Voltage Stability
  J. LINGYUN, North China Electric Power University

- **GM1395**, A New Method to Eliminate Low-Frequency Oscillation
  Q. WEI, Henan Electric Power Research Institute
  W. GUO, Henan Electric Power Research Institute
  N. HE, Henan Electric Power Research Institute
  M. YANG, Shandong University

- **GM1430**, Advanced Dynamic Voltage Restorer to Improve Power Quality in Microgrid
  X. HAN, Taiyuan University of Technology
  R. CHENG, Taiyuan University of Technology
  P. WANG, Taiyuan University of Technology
  Y. JIA, Taiyuan University of Technology

- **GM1539**, Optimized Control of DFIG Based Wind Generation Using Swarm Intelligence
  Y. TANG, University of Rhode Island
  H. HE, University of Rhode Island
  J. WEN, Huazhong University of Science and Technology

- **GM1576**, Real Time Testing and Validation of Smart Grid Devices and Algorithms
  S. BISWAS, Washington State University
  F. SHARIATZADEH, Washington State University
  R. BECKSTROM, Washington State University
  A. SRIVASTAVA, Washington State University

- **GM1719**, Smart Home Energy Management with Integration of PV and Storage Facilities Providing Grid Support
  N. KUMAR, Indian Institute of Technology Guwahati
  S. TEJA, Indian Institute of Technology Guwahati
  G. NAVEEN, Indian Institute of Technology Guwahati
  M. SINGH, Indian Institute of Technology Guwahati
  P. KUMAR, Indian Institute of Technology Guwahati

- **GM1814**, Quantifying Flexibility for Smart Grid Services
  P. MACDOUGALL, TNO
  K. KOK, TNO
  B. ROOSSIEN, EnergyGO
  C. WARMER, Warmer Smart Grids

- **GM1836**, Optimal Voltage Control with Uncertain Wind Power Using FACTS Devices
  M. LI, South China University of Technology
  T. JI, South China University of Technology
  Y. LI, South China University of Technology
  Q. WU, University of Liverpool

- **GM1852**, Research on Unit Commitment in Power System with Electric Vehicles Classification
  Z. JING, South China University of Technology
  W. SHAO, South China University of Technology
  X. HE, South China University of Technology
  Q. WU, South China University of Technology

- **GM1886**, Combined Smart-Charging and Frequency Regulation for Fleets of Plug-in Electric Vehicles
  M. GONZALEZ VAYA, ETH Zurich
  G. ANDERSSON, ETH Zurich

- **GM2101**, Data Center Power Control for Frequency Regulation
  S. LI, Ohio State University
  B. MARCO, Ohio State University
  W. ZHANG, Ohio State University
  X. WANG, Ohio State University

- **GM2145**, Application of the Undetectability Index to Design Reliable Metering Systems for Bad Data Processing
  R. BENEDITO, Universidade Tecnológica Federal do Paraná – UTFPR
  N. BREITAS, Universidade de São Paulo – EESC/USP
  L. ALBERTO, Universidade de São Paulo – EESC/USP
  J. LONDON JR, Universidade de São Paulo – EESC/USP
Monday Evening, continued

- GM2281, Demand Side Load Control with Smart Meters
  F. SILVA, Florida International University
  O. MOHAMMED, Florida International University
- GM2297, Development and Assessment of a Robust Optimization Metric for WAMPAC Modeling
  P. BROGAN, Queen's University Belfast
- GM2337, Gain Scheduling Applications in Small Signal Stability of Power Systems
  K. VANCE, Virginia Polytechnic Institute and State University
  J. THORP, Virginia Polytechnic Institute and State University
- GM2431, Planning the Electrical Energy System 2.0 with Smart Grids
  R. CESPEDES, RCONSULTING GROUP

Power & Energy Education Poster Session  (poster)
Monday, 22 July, 5:00 PM–7:00 PM  VCC East – Exhibit Hall BC & Show Office
Sponsored by: Power & Energy Education
Chair: B. Johnson, University of Idaho

PAPERS AND AUTHORS:
- GM0685, Development of Smart Electric Power System (SEPS) Laboratory at the College of New Jersey
  A. DEESE, College of New Jersey
- GM1325, A MATLAB-Based PMU Simulator
  D. DOTTA, IFSC
  J. CHOW, RPI
  L. VANFRETTI, KTH
  M. ALMAS, KTH
  M. AGOSTINI, PLAN4
- GM1914, Development of an Open-Source Smart Energy House for K-12 Education
  F. GETH, University of Leuven
  J. VERVECKKEN, University of Leuven
  N. LEEMPUT, University of Leuven
  J. VAN ROY, University of Leuven
  J. BEERTEN, University of Leuven
  P. TIELENS, University of Leuven
  V. DE SMEDT, University of Leuven
  S. IACOVELLA, University of Leuven
  B. HUNYADI, University of Leuven
  N. KOOLEN, University of Leuven
  H. DE CLERCQ, University of Leuven
  G. GIELEN, University of Leuven
  R. PUERS, University of Leuven
  S. VAN HUFFEL, University of Leuven
  R. BELMANS, University of Leuven
  G. DECONINCK, University of Leuven
  W. DEHAENE, University of Leuven
  J. DRIESEN, University of Leuven
- GM2095, Neural Networks in RSCAD for Intelligent Real-Time Power System Applications
  B. LUITEL, Clemson University
  G. VENAYAGAMOORTHY, Clemson University
- GM2159, State-of-the-Art Laboratories for Training the Modern Power Workforce
  N. SISWORAHARDJO, UTC
  A. OFOLI, UTC
  S. CRAVEN, TVA
  A. ELTOM, UTC

Power System Communications Poster Session  (poster)
Monday, 22 July, 5:00 PM–7:00 PM  VCC East – Exhibit Hall BC & Show Office
Sponsored by: Power System Communications

PAPERS AND AUTHORS:
- GM0094, Secure Deployment of SmartGrid Equipment
  N. KUNTZE, Fraunhofer SIT
  C. RUDOLPH, Fraunhofer SIT
Monday Evening, continued

- GM0208, Performance of Lidar for Smart Wind Turbines Operating in Atmospheric Interference Environment
  X. LIU, University of Arkansas at Little Rock

- GM0414, Partial Discharge Impulsive Noise in Electricity Substations and the Impact on 2.4 GHz and 915 Mhz ZigBee Communications
  J. JIA, University of New Brunswick
  J. MENG, University of New Brunswick

- GM0546, Test Platform for Synchrophasor Based Wide-Area Monitoring and Control Applications
  K. ZHU, KTH Royal Institute of Technology
  S. DEO, KTH Royal Institute of Technology
  A. AL-HAMMOURI, Jordan University of Science and Technology
  N. HONETH, KTH Royal Institute of Technology
  M. CHENINE, KTH Royal Institute of Technology
  D. BABAZADEH, KTH Royal Institute of Technology
  L. NORDSTRÖM, KTH Royal Institute of Technology

- GM0595, Towards an Understand of the Tradeoffs in Adversary Models of Smart Grid Privacy Protocols
  M. CLARK, Air Force Research Laboratory
  K. HOPKINSON, Air Force Institute of Technology

- GM0930, Placement of Primary-Secondary Trust Nodes in Smart Grid Communication Network
  Y. ZHANG, University of Toledo
  W. SUN, University of Toledo
  L. WANG, University of Toledo

- GM1198, Challenges of Power Line Communications for Advanced Distribution Automation in Smart Grid
  C. CHAO, McGill University
  Q. HO, McGill University
  T. LE-NGOC, McGill University

- GM1223, Reliability and Availability for Substation Communication Systems Using IEC61850
  N. DAS, Curtin University, Australia
  S. SINGH, Curtin University, Australia
  S. ISLAM, Curtin University, Australia

- GM1283, Automated Event Management System for IEC 61850 Substations
  D. ISHCHENKO, ABB Inc.
  M. MOUSAVI, ABB Inc.

- GM1307, Inspiring Energy Conservation Through Open Source Power Monitoring and In-Home Display
  S. MAKONIN, Simon Fraser University
  F. POPOWICH, Simon Fraser University
  B. GILL, British Columbia Institute of Technology
  T. MOON, British Columbia Institute of Technology

- GM1316, The Next Generation Energy Information Gateway for Use in Residential and Commercial Environments
  D. ARNOLD, UC Berkeley
  M. SANKUR, UC Berkeley
  D. AUSLANDER, UC Berkeley

- GM1322, Transformer Load Tap Changer Control Using IEC 61850 GOOSE Messaging
  N. SICHWART, University of Tennessee at Chattanooga
  A. ELTOM, University of Tennessee at Chattanooga
  G. KOBET, Tennessee Valley Authority

- GM1350, False Data Injection Attacks Against Nonlinear State Estimation in Smart Power Grids
  A. RAHMAN, Texas Tech University
  H. MOHSENIAN-RAD, University of California at Riverside

- GM1608, A Preliminary Study of Power System Reliability Evaluation Considering Cyber Attack Effects
  Y. ZHANG, University of Toledo
  L. WANG, University of Toledo
  W. SUN, University of Toledo

- GM1632, Software Implementation of Risk-Based Dispatch
  Y. WEN, Zhejiang University
  S. DONG, Zhejiang University
  B. DENG, Zhejiang University
  J. CUI, Zhejiang University
  Y. WANG, Zhejiang University
  L. HUANG, China Hunan Electric Power Corporation
  C. GUO, Zhejiang University
- GM1671, An Embedded Communication Network Simulator for Power Systems Simulations in PSCAD
  N. NASIRIANI, West Virginia University
  R. RAMACHANDRAN, West Virginia University
  K. RAHIMI, West Virginia University
  Y. FALLAH, West Virginia University
  K. DODRILL, National Energy Technology Lab
  P. FAMOURI, West Virginia University

- GM1755, An Architecture for Integrated Commercial Building Demand Response
  M. SANKUR, University of California, Berkeley
  D. ARNOLD, University of California, Berkeley
  D. AUSLANDER, University of California, Berkeley

- GM2171, Mapping of IEC 61850 to Data Distribute Service for Smart Substation Communication
  Y. BI, University of Liverpool
  L. JIANG, University of Liverpool
  X. WANG, ShaanDong University
  L. CUI, Shandong University

- GM2300, Queuing-Theoretic Modeling of a PMU Communication Network
  S. MENIKE, University of Manitoba
  P. YAHAMPATH, University of Manitoba
  A. RAJAPAKSE, University of Manitoba
  A. ALFA, University of Manitoba

- GM2381, Wireless Communication for Controlling Microgrids: Co-Simulation and Performance Evaluation
  R. MAO, University of Tennessee
  H. LI, Oak Radge Associated Universities
  Y. XU, Oak Ridge National Laboratory
  H. LI, University of Tennessee

Monday Evening, continued

- GM0110, Enhance and Assess Wide Area Probing Responses in Low Level Probing Tests
  J. ZHANG, Tsinghua University
  C. LU, Tsinghua University
  S. ZHANG, Tsinghua University
  Y. HAN, Tsinghua University

- GM0382, Stability Analysis and Control of Medium–Voltage Micro-Grids with Dynamic Loads
  A. KAHROBAEIAN, University of Alberta
  Y. ABDEL-RADY I. MOHAMED, University of Alberta

- GM0406, STATCOM with Optimized POD Controller for Efficient Inter-Area Oscillation Damping
  S. TEEUWSEN, Siemens AG

- GM0424, The Sectionalized Homogeneous Model of Power Systems and Its Analytical Solution
  Y. YAN, North China Electric Power University
  T. BI, North China Electric Power University
  Q. YANG, North China Electric Power University

- GM0430, Coordinated Protection and Control between Large-Capacity Nuclear Power Plants and Power Grids
  G. WU, China Electric Power Research Institute
  X. SONG, China Electric Power Research Institute
  P. JU, Hohai University
  AUTHOR LIN, China Electric Power Research Institute
  W. ZHONG, China Electric Power Research Institute
  T. LIU, China Electric Power Research Institute
  X. YE, China Electric Power Research Institute

- GM0573, Supplementary Load Frequency Control with Storage Battery Operation Considering SOC under Large-Scale Wind Power Penetration
  M. TOGE, WASEDA University
  Y. KURITA, WASEDA University
  S. IWAMOTO, WASEDA University

- GM0594, Energization Study of Five-Terminal Multi-Level HVDC Converter Station
  N. SINGH, ABB Limited
  J. KARLSSON, ABB Limited
• GM0596, Effect of Numerical Integration on Critical Time Evaluation in Power System Stability Studies
  M. BORODULIN, New York Independent System Operator (NYISO)

• GM0630, Linear Ringdown Analysis Methods
  M. CROW, Missouri University of Science & Technology
  J. SANCHEZ-GASCA, General Electric
  J. CHOW, Rensselaer Polytechnic Institute
  J. HAUSER, Pacific Northwest National Laboratory
  H. HUANG, Pacific Northwest National Laboratory
  J. PIERRE, University of Wyoming
  D. TRUDNOWSKI, Montana Tech University
  L. VANFRETTI, KTH Royal Institute of Technology
  N. ZHOU, Pacific Northwest National Laboratory

• GM0702, Industry Responses to a Questionnaire on the Introduction, Performance and Usage of Modal Estimators in Practice
  D. VOWLES, University of Adelaide
  M. GIBBARD, University of Adelaide

• GM0765, Automatic Development of Small Signal Model for DC Distribution Network
  D. NGUYEN, HUU, Technische Universität Berlin
  D. NGUYEN, Technische Universität Berlin
  D. NGUYEN, HUU, Technische Universität Berlin

• GM0773, Effect of Synchronous Generator Loading on Automatic Voltage Regulation
  H. POTA, University of New South
  P. TILWALLI, Hill-Michael Consultants
  J. HOSSAINI, Griffith University

• GM0831, Excitation Prediction Control of Multi-Machine Power Systems Using Balanced Reduced Model
  Z. HONGSHAN, North China Electric Power University
  L. XIAOMING, North China Electric Power University Baoding

• GM0833, A Multi-Criteria Integrated Probabilistic Voltage Vulnerability Assessment Method
  Y. LIN, Tsinghua University
  L. SHI, Tsinghua University
  Z. JIAN, Tsinghua University
  L. YAO, China Electric Power Research Institute
  X. LIN, Guangxi University
  B. MASOUD, ALSTOM Grid Research &Technology Centre

• GM0853, A Mixed-Platform Framework for Dynamic Stability Assessment
  T. KYRIAKIDIS, EPFL
  G. LANZ, EPFL
  D. SALLIN, EPFL
  G. LILIS, EPFL
  L. FABRE, EPFL
  R. CHERKAOUI, EPFL
  M. KAYAL, EPFL

• GM0882, Impacts of Variable Quadrature Reactance on Power System Stabilizer Performance
  H. SU, BC Hydro
  R. MUTUKUTTI, BC Hydro
  D. APPS, BC Hydro

• GM0889, Characterization of All Robust PD-Based PSSs: An Interval Arithmetic Approach
  M. HELAL, Faculty of Engineering

• GM0944, Unambiguous Power System Dynamic Modeling and Simulation Using Modelica Tools
  L. VANFRETTI, KTH Royal Institute of Technology
  W. LI, KTH Royal Institute of Technology
  T. BOGDOROVA, KTH Royal Institute of Technology
  P. PANCIATICI, RTE

• GM1067, Practical Experience with Modal Estimation Tools at Swissgrid
  M. LARSSON, ABB Switzerland Ltd.
  W. SATTINGER, Swissgrid ag
  L. SANTOS, ABB Switzerland Ltd.
  R. NOTTER, Swissgrid ag

• GM1086, Post Contingency Shunt Reactive Switching in Voltage Stability Limited Load Areas
  G. COMEGYS, ColumbiaGrid

• GM1133, Trajectory Sensitivities: Applications in Power Systems and Estimation Accuracy Refinement
  L. TANG, Iowa State University
  J. MCCALLEY, Iowa State University

• GM1176, Placement of Supplementary Controllers for Multiple HVDC Systems
  W. XI, Sichuan University
Monday Evening, continued

- GM1193, Wind Generation Controls for Damping of Inter-Area Oscillations
  C. SILVA-MONROY, Sandia National Laboratories
  J. NEELY, Sandia National Laboratories
  R. BYRNE, Sandia National Laboratories
  R. ELLIOTT, Sandia National Laboratories
  D. SCHOENWALD, Sandia National Laboratories

- GM1204, A Line Weighted Frequency Drop Controller for Decentralized Enforcement of Transmission Line Power Flow Constraints in Inverter-Based Networks
  N. AINSWORTH, Georgia Institute of Technology
  S. GRIJALVA, Georgia Institute of Technology

- GM1210, Effects of Forced Oscillations on Spectral-Based Mode-Shape Estimation
  R. MYERS, Montana Tech of the University of Montana
  D. TRUDNOWSKI, Montana Tech of the University of Montana

- GM1288, Multi-Dimensional Wide-Area Visualization of Power System Dynamics Using Synchronphasors
  S. THAKUR, Renaissance Computing Institute
  A. CHAKRABORTTY, North Carolina State University

- GM1302, SimAGC – An Open-Source Power System Dynamic Simulator for AGC Study
  F. MA, ISO New England Inc.
  X. LUO, ISO New England Inc.

- GM1314, Evaluation of Volts/Hertz and Over-Excitation Limiters Acting under Unbalanced Load Conditions
  A. PIARDI, Western Parana State University
  J. PESENTE, Itaipu Power Plant
  R. OTTO, Itaipu Technological Park Foundation
  R. RAMOS, Engineering School of Sao Carlos / University of Sao Paulo

- GM1348, Random Load Fluctuations and Collapse Probability of a Power System Operating Near Codimension 1 Saddle-Node Bifurcation
  D. PODOLSKY, Massachusetts Institute of Technology
  K. TURITSYN, Massachusetts Institute of Technology

- GM1385, Intermittency Indexes for Renewable Energy Resources
  L. WANG, PTI, Siemens
  H. ZHANG, WECC
  D. CHEN, Energy Automation, Siemens

- GM1387, Stability Simulation of a MW-Scale PV-Small Hydro Autonomous Hybrid System
  J. ZHOU, Zhejiang Electric Power Corporation Research Institute

- GM1493, GA and ANFIS based Power System Stabilizer
  S. JOSHI, Faculty of Technology and Engineering
  P. GANDHI, Sardar Vallabhbhai Patel Institute of Technology

- GM1525, Synchronous Machine Exciter Circuit Model in a Simultaneous Field Winding Interface
  U. KARAAGAC, Ecole Polytechnique
  H. GRAS, Ecole Polytechnique
  J. MAHSEREDJIAN, Ecole Polytechnique
  A. EL-AKOUM, EDF
  X. LEGRAND, EDF

- GM1561, Efficient Estimation of Electromechanical Modes by Applying Modified Arnoldi Method (MAM) to Transfer Function and Eigenfunction Analysis (TFEA) Method
  R. JALAYER, McGill University
  B. OOI, McGill University

- GM1598, A Real-Time Dynamic Simulation Tool for Transmission and Distribution Power Systems
  V. JALILI-MARANDI, OPAL-RT Technology
  F. JOSE AYRES, OPAL-RT Technology
  E. GHAHREMANI, OPAL-RT Technology
  J. BELANGER, OPAL-RT Technology
  V. LAPOINTE, OPAL-RT Technology

- GM1650, Identifying Coherent Areas in Transmission System for Transient Stability Studies in Future Smart Grids
  S. ZADKHAST, University of British Columbia
  A. ALIMARDANI, University of British Columbia
  J. JATSKEVICH, University of British Columbia
  E. VAAHEDI, BC Hydro

- GM1656, Connecting Wind Power Plant with Weak Grid – Challenges and Solutions
  Y. ZHOU, Vestas Wind System A/S
  D. NGUYEN, Vestas Wind System A/S
  P. KJÆR, Vestas Wind System A/S
  S. SAYLORS, Vestas Wind System A/S
Monday Evening, continued

- GM1691, Effect of Wind Penetration on Power System Stability
  L. PUTHENPURAYIL KUNJUMUHAMMED, Imperial College London
  B. PAL, Imperial College London
  K. ANAPARTHI, GE Global Research- Germany
  N. THORNHILL, Imperial College London

- GM1692, Highly Accurate Frequency Estimation for FNET
  W. WANG, University of Tennessee
  L. LIU, University of Tennessee
  L. HE, University of Tennessee
  L. ZHAN, University of Tennessee
  H. OI, University of Tennessee
  Y. LIU, University of Tennessee

- GM1723, Enhanced Frequency Regulation Service Using Hybrid Energy Storage System Against Increasing Power-Load Variability
  Y. CHO, Yonsei University
  J. SHIM, Yonsei University
  S. KIM, Korea Electrotechnology Research Institute
  S. MIN, Korea Electrotechnology Research Institute
  K. HUR, Yonsei University

- GM1724, Utilizing Wide-Area Signals for Off-Center SVCs to Damp Interarea Oscillations
  R. GOLDOOST, QUT
  L. HE, University of Tennessee
  L. ZHAN, University of Tennessee
  H. QI, University of Tennessee

- GM1737, Fast Fault Screening Methodology for Transient Stability Analysis of Bulk Power Systems
  M. VAIMAN, V&R Energy
  M. VAIMAN, V&R Energy
  A. GAJKWAD, Electric Power Research Institute

- GM1800, PMU Measurement-Based Voltage Stability Indicators by Modified Multi-Port Equivalent Models
  J. LIU, National Tsing Hua
  C. CHU, National Tsing Hua

- GM1817, Dynamic Energy Storage – Field Operation Experience
  T. LARSSON, ABB
  R. GRUNBAUM, ABB
  N. WADE, Durham University
  P. LANG, UK Power Networks
  M. MICHEL, UK Power Networks

- GM1934, Dynamic Modeling of Doubly Fed Induction Machine During Unbalanced Voltage Dips with Control Effect Formulation
  Z. TAN, Georgia Institute of Technology
  L. SUN, Georgia Institute of Technology
  D. ZHAO, Georgia Institute of Technology
  S. MELIPOULOS, Georgia Institute of Technology

- GM1948, Using Synchronized Wide Area Measurements for Response-Based Switched Reactive Controls
  R. QUINT, Bonneville Power Administration
  D. KOSTEREV, Bonneville Power Administration
  E. HEREDIA, Bonneville Power Administration

- GM1970, Discrete Control for Transient Stability and Oscillations: Applications and Case Studies
  D. WILSON, Psymetrix Ltd

- GM1980, Corrective Control through HVDC Links: A Case Study on GB Equivalent System
  J. RANDALL, Bonneville Power Administration

- GM2036, Application of the WECC Composite Load Model for Use in Powerflow Studies
  J. RANDALL, Bonneville Power Administration

- GM2044, Phillips-Heffron Model for a PV-DG Grid Connected System
  S. MISHRA, Indian Institute of Technology Delhi
  D. RAMASUBRAMANIAN, Indian Institute of Technology Delhi

- GM2077, Generalized Control Energy Function for Controllable TCSC Devices
  D. SIQUEIRA, University of São Paulo
  L. ALBERTO, University of São Paulo
  N. BRETAS, University of São Paulo

- GM2102, Influence of Frequency-Droop Supplementary Control on Disturbance Propagation through VSC HVDC Links
  C. SPALLAROSSA, Imperial College London
  Y. PIPELZADEH, Imperial College London
  T. GREEN, Imperial College London
Monday Evening, continued

- GM2136, An Expectation-Maximization Method for Calibrating Synchronous Machine Models
  D. MENG, Pacific Northwest National Laboratory
  N. ZHOU, Pacific Northwest National Laboratory
  S. LIU, Pacific Northwest National Laboratory
  G. LIN, Pacific Northwest National Laboratory

- GM2153, Effective Wind Farm Iterative Sizing Method Using Voltage Stability Techniques
  A. TAMIMI, Kansas State University
  N. WILLIAMS, Sunflower Electric

- GM2196, FIDVR in Distribution Circuits
  R. BRAVO, Southern California Edison
  R. YINGER, Southern California Edison
  S. ROBLES, Southern California Edison
  J. ETO, Lawrence Berkeley National Laboratory

- GM2213, Multi-Scale Integration and Aggregation of Power System Modules for Dynamic Security Assessment
  Y. ZHANG, Texas A&M University
  Y. CHEN, Texas A&M University
  L. XIE, Texas A&M University

- GM2247, Transient Response Improvement of Doubly-Fed Induction Machine During Unbalanced Network
  L. SUN, Georgia Institute of Technology
  Z. TAN, Georgia Institute of Technology
  R. FAH, Georgia Institute of Technology
  A. MELIPOULOS, Georgia Institute of Technology

- GM2351, New Approach to Damp Subsynchronous Resonance by Reshaping the Output Impedance of Voltage-Sourced Converters
  K. ALAWASA, University of Alberta
  Y. ABDEL-RADY I. MOHAMED, University of Alberta
  W. XU, University of Alberta

- GM0024, Analysis of Wind Farm Dynamics Using Multiple Doubly Fed Induction Generators
  T. RUNOLFSSON, University of Oklahoma
  R. NAZIM, ATC Drivetrain

- GM0042, Joint Improvement of System Loadability and Stability through a Multi-Stage Planning of a UPFC with a PMU-Based Supplementary Damping Control
  E. GHAHREMANI, Opal-RT Technologies Inc.
  I. KAMWA, Hydro-Québec Research Institute (IREQ)

- GM0649, Estimation of Electromechanical Oscillations in the Nordic Grid Using Ambient Data Analysis
  L. VANFRETTI, KTH Royal Institute of Technology
  V. PERIC, KTH Royal Institute of Technology
  J. GJERDE, Statnett SF

PSIM Poster Session (poster)

Monday, 22 July, 5:00 PM–7:00 PM  VCC East – Exhibit Hall BC & Show Office

Sponsored by: Power System Instrumentation and Measurements
Chair: R. Arseneau, NRC Canada
Chair: F. Rahmatian, Quanta Technology

PAPERS AND AUTHORS:
- GM0058, A New Algorithm to Compute Fault Synchrophasor from Transient State Synchrophasor in PDC
  S. DAS, University of Western Ontario
  T. SIDHU, University of Ontario Institute of Technology

- GM0244, Partial Discharge Pattern Recognition Using Multi-Scale Feature Extraction and Support Vector Machine
  C. CHAN, University of Queensland
  H. MA, University of Queensland
  T. SAHA, University of Queensland

- GM0276, A Novel Frequency Estimation Method Based on ESPRIT
  H. XUE, China Agricultural University
  R. YANG, China Agricultural University

- GM0519, Phasor Measurement and CT Saturation Compensation Through Embedding
  T. JI, South China University of Technology
  M. LI, South China University of Technology
  Q. WU, University of Liverpool
• GM1200, Perturbation Measurements on HV Overhead Lines Using Electric Field Sensors
  P. ISSOURIBEHERE, IITREE FI-UNLP
  D. ESTEBAN, IITREE FI-UNLP
  F. ISSOURIBEHERE, IITREE FI-UNLP
  G. BARBERA, IITREE FI-UNLP
  G. MAYER, IITREE FI-UNLP

• GM1455, Application of Phasor Measurement Units to Estimate Power System Inertial Frequency Response
  P. ASHTON, Brunel University
  G. TAYLOR, Brunel University
  A. CARTER, National Grid
  M. BRADLEY, National Grid
  W. HUNG, National Grid

• GM1515, A Statistical Process Control Approach for Automatic Anti-Islanding Detection Using Synchronphasors
  Y. GUO, Energy Power and Intelligence Control

• GM1846, Metrological Determination of the Frequency Response of Inductive Voltage Transformers up to 20 kHz
  C. BUCHHAGEN, Leibniz Universität Hannover
  M. FISCHER, Leibniz Universität Hannover
  L. HOFMANN, Leibniz Universität Hannover
  H. DÄUMLING, RITZ Instrument Transformers GmbH

• GM1853, Analysis of an Inductive Medium Voltage Transformer with Compensated First Natural Frequency
  C. BUCHHAGEN, Leibniz Universität Hannover
  A. PAWELLEK, Leibniz Universität Hannover
  L. HOFMANN, Leibniz Universität Hannover
  H. DÄUMLING, RITZ Instrument Transformers GmbH

• GM2019, An Interpolated-DFT Synchronphasor Estimation Algorithm and Its Implementation in an FPGA-Based PMU Prototype
  P. ROMANO, Ecole Polytechnique Fédérale de Lausanne
  M. PAOLONE, Ecole Polytechnique Fédérale de Lausanne
  J. ARNOLD, National Instruments
  R. PIACENTINI, National Instruments

• GM2069, MEM Electric Field Sensor Using Force Deflection with Capacitance Interrogation
  T. CHEN, University of Manitoba
  C. SHAFAI, University of Manitoba

• GM2325, A Multi-Criteria Optimal Phasor Measurement Unit Placement for Multiple Applications
  J. FADIRAN, University of Cape Town
  S. CHOWDHURY, University of Cape Town

Power System Operations Poster Session (poster)
Monday, 22 July, 5:00 PM–7:00 PM VCC East – Exhibit Hall BC & Show Office
Sponsored by: Power System Operations
Chair: H. Chen, PJM

PAPERS AND AUTHORS:
• GM0013, Generator Thermal Stress During a Geomagnetic Disturbance
  A. REZAEI-ZARE, Hydro One Networks Inc.
  L. MARTI, Hydro One Networks Inc.

• GM0077, Impact of Series Compensation on the Voltage Profile of Transmission Lines
  S. KINCCIC, WECC
  M. PAPIC, Idaho Power Co

• GM0099, Impact of Demand Response and Electric Vehicles on the Operation of Microgrids
  M. KHERDZADEH, Power & Water University of Technology (PWUT)

• GM0127, PMU Application in Controlled Islanding
  A. MOSHREF, BBA
  A. MOSHREF, BBA

• GM0133, SIME and Trajectory Sensitivity-Based Transient Stability-Constrained Optimal Power Flow
  A. PIZANO-MARTINEZ, Universidad de Guanajuato
  E. ZAMORA-CARDENAS, Universidad de Guanajuato
  C. FUERTE-ESQUIVEL, Universidad Michoacana de San Nicolas de Hidalgo
  D. RUZ-VEGA, Instituto Politecnico Nacional
Monday Evening, continued

- GM0146, Investigation of Issues in Provision of Primary Control Ancillary Service by Loads in Interconnected Systems
  E. DIOUF, University of Manchester
  J. MUTALE, University of Manchester
  E. MONNOT, EDF Research & Development (EDF R&D)

- GM0206, Statistical Structure Learning of Smart Grid for Detection of False Data Injection
  H. SEDGHI, University of Southern California
  E. JONCKHEERE, University of Southern California

- GM0257, Accuracy Evaluation Indexes for Power System State Estimation Results
  Y. GUO, Tsinghua University
  B. ZHANG, Tsinghua University
  W. WU, Tsinghua University
  H. SUN, Tsinghua University

- GM0265, Magnetic Diffusion Method of Predicting Geomagnetic Induced Voltage
  B. OOI, McGill University
  R. SIDHU, McGill University

- GM0294, Integration of Solar Photovoltaics and Electric Vehicles in Residential Grids
  J. RADHAKRISHNA PILLAI, Aalborg University
  S. HUANG, Aalborg University
  P. THØGERSEN, KK-electronic A/S, Denmark
  B. BAK-JENSEN, Aalborg University
  P. MAHAT, Aalborg University
  J. MØLLER, Nylons, Denmark

- GM0355, Power Losses Minimization within Spanish Wind Farms Evacuation Networks
  E. SAIZ-MARÍN, Pontificia Comillas University
  E. LOBATO, Pontificia Comillas University
  I. EGIDO, Pontificia Comillas University
  L. ROUCO, Pontificia Comillas University

- GM0374, Planning Considerations of HVDC Link in Power Network
  R. PANDEY, Banaras Hindu University
  A. SIDDARTHAN, Banaras Hindu University

- GM0413, Performance of a Residential PV System in the Desert Southwest
  Y. BAI, Arizona State University
  B. KOKANOS, Arizona Public Service
  G. KARADY, Arizona State University

- GM0432, Dynamic Economic Dispatch with Spinning Reserve Constraints Considering Wind Power Integration
  Z. LI, Tsinghua University
  W. WU, Tsinghua University
  B. ZHANG, Tsinghua University
  W. WANG, Tsinghua University
  H. SUN, Tsinghua University

- GM0452, Horizontal Decomposition-Based Stochastic Day-Ahead Reliability Unit Commitment
  Y. GU, Texas A&M University
  X. WANG, Alstom Grid
  L. XIE, Texas A&M University

- GM0499, Configuration Based Combined Cycle Model in Resource Commitment
  M. TAMAYO, ALSTOM
  X. YU, ALSTOM
  X. WANG, ALSTOM
  J. ZHANG, MISO

- GM0523, Multi-Period Coordinated Active-Reactive Scheduling of Active Distribution System
  X. ZHAO, Tsinghua University
  Q. CHEN, Tsinghua University
  Q. XIA, Tsinghua University
  C. KANG, Tsinghua University
  W. HAO, China Southern Power Grid

- GM0586, Shunt Capacitor Operation Under Large-Scale Photovoltaic Energy Penetration
  K. SUZUKI, Waseda University
  T. SUZUKI, Waseda University
  S. IWAMOTO, Waseda University

- GM0637, Implementation of a New Phase Angle Measurement Algorithm
  N. ZHOU, Chongqing University
  J. ZHU, Alstom Grid Inc.
  Y. LIAO, Chongqing University

- GM0661, Active Boundary Identifying Technique for Steady-State Security Distance Assessment
  S. CHEN, Tsinghua University
Monday Evening, continued

Q. CHEN, Tsinghua University
Q. XIA, Tsinghua University
C. KANG, Tsinghua University
M. JING, Shandong Electric Power Corporation of China
Q. MA, Shandong Electric Power Corporation of China

- GM0762, Application of Real-Time Monitoring in Efficient Operation of Distributed Static Compensators
  S. BAHRAMIRAD, S&C Electric
  A. KHODAEI, University of Houston
  J. MCCLANAHAN, S&C Electric

- GM0776, Service Restoration of Distribution Systems Using Enhanced NDE with LCO
  X. HUANG, North China Electric Power University
  G. TAYLOR, Brunel University
  M. IRVING, Brunel University
  L. ZHANG, North China Electric Power University
  W. TAO, Beijing Huayizhishang Energy Consulting Center

- GM0806, Optimization of TOU Price of Electricity Based on Electric Vehicle Orderly Charge
  H. LIU, Tianjin University
  S. GE, Tianjin University

- GM0834, On Evaluating the Performance of Intentional Controlled Islanding Schemes
  J. QUIROS-TORTOS, University of Manchester
  M. PANTLEI, University of Manchester
  V. TERZIJA, University of Manchester
  P. CROSSLEY, University of Manchester

- GM0847, Control and Coordination of a Distribution Network via Decentralised Decision Making
  M. COLLINS, Imperial College London
  R. SILVERSIDES, Imperial College London
  T. GREEN, Imperial College London

- GM0860, External WECC Model Reduction in On-line Network Applications for Alberta Power Grid
  X. LIU, AESO
  J. SHEN, AESO
  E. VIRAY, AESO
  A. PHILLIP, AESO
  M. JIANG, AESO
  D. LEON, Siemens Canada Limited

- GM0862, Real Time Parameter Identification of Composite Load Model
  A. MAHDIKHANNAFABADI, Tennessee Tech University
  A. ALOUANI, Tennessee Tech University

- GM0864, Assessment of Droop-Controlled Islanded Microgrid Maximum Loadability
  M. ABDELAZIZ, University of Waterloo
  E. EL-SAADANY, University of Waterloo
  R. SEETHAPATHY, Hydro One Networks Inc.

- GM0875, BPA’s Experience of Implementing Remedial Action Schemes in Power Flow for Operation Studies
  R. RAMANATHAN, Maxisys Inc.
  R. RAMANATHAN, Maxisys Inc.

- GM0880, Special Reprocessing Logic for Contingency Analysis with Special Protection Systems
  M. HWANG, ALSTOM Grid Inc.
  S. RAMESH, ISO – New England

- GM0917, Fast Short Circuit Power Switch Fault detection in Cascaded H-Bridge Multilevel Converter
  M. SHAHBAZI, Sharif University of Technology
  M. ZOLGHADRI, Sharif University of Technology
  P. POURE, Université de Lorraine
  S. SAADATE, Université de Lorraine

- GM1020, Optimal Reconfiguration of Distribution Networks Using MILP and Supporting Hyperplanes (HYPER)
  A. AJAJA, Hydro-Quebec
  F. GALIANA, McGill University

  F. ZHANG, Tsinghua University
  Z. HU, Tsinghua University
  H. LIU, Tsinghua University
  Y. SONG, Tsinghua University

- GM1046, A Multi-Period Optimal Power Flow Model including Battery Energy Storage
  Z. WANG, University of Hong Kong
  J. ZHONG, University of Hong Kong
Monday Evening, continued

D. CHEN, Guangdong Power Grid Corporation
Y. LU, Guangdong Power Grid Corporation
K. MEN, CSG Electric Power Research Institute

• GM1070, Practical Testing of a Fault Location Method Based on Sparse Voltage Measurement
F. TRINDADE, University of Campinas
W. FREITAS, University of Campinas
M. ALMEIDA, University of Campinas
A. CESAR, CEMIG Distribuição S. A.

• GM1074, Voltage Control Optimization to Improve Transmission Efficiency Under Near Real-Time Conditions
S. HSIU, Southern Company Services-Transmission
L. TAYLOR, Southern Company Services-Transmission
M. RYLANDER, Electric Power Research Institute
A. DEL ROSSO, Electric Power Research Institute

• GM1114, Dispatch of Firm Wind Generation with Transmission Constraints
B. CHAKRABARTI, Transpower New Zealand Ltd.
D. GOODWIN, Transpower NZ Ltd.

• GM1134, A Deterministic Metric of Stochastic Operational Flexibility
K. STUDARUS, University of Washington
R. CHRISTIE, University of Washington

• GM1140, Cyber Physical System Approach for Design of Power Grids: A Survey
S. KHAIKAN, Iowa State University
J. MCCALLEY, Iowa State University

• GM1144, Reactive Power Substitution between Rapid and Slow Dynamic Var Compensators
X. WANG, Tsinghua University
B. WANG, Tsinghua University
Q. GUO, Tsinghua University
H. SUN, Tsinghua University
B. ZHANG, Tsinghua University
M. ZHANG, Tsinghua University

• GM1161, Transformation of Measurements for Using External Network Equivalents in State Estimation
M. VARDIKAR, Indian Institute of Technology Kanpur
S. CHAKRABARTI, Indian Institute of Technology Kanpur
E. KYRIAKIDES, University of Cyprus

• GM1174, Demand Response Potential of Water Heaters to Mitigate Minimum Generation Conditions
S. WONG, CanmetENERGY/NRCan
S. PELLAND, CanmetENERGY/NRCan

• GM1219, Vulnerability Assessment and Reconfiguration of Micro-Grid Based on Search Vector Artificial Physics Optimization Algorithm
X. ZHAN, Wuhan University
T. XIANG, Wuhan University
H. CHEN, Wuhan University
B. ZHOU, Wuhan University
Z. YANG, Wuhan University

• GM1226, Optimal Dispatch of Plug-in Hybrid Electric Vehicles to Reduce the Load Fluctuations on Distribution Networks
G. WANG, Zhejiang University
F. WEN, Zhejiang University
Z. XU, Hong Kong Polytechnic University
K. WONG, University of Western Australia

• GM1358, Black-Start Strategy for Power Grids Including Fast Cut Thermal Power Units
E. LU, China Southern Power Grid
N. WANG, China Southern Power Grid
Z. QIN, University of Hong Kong
H. LIU, University of Hong Kong
Y. HOU, University of Hong Kong

• GM1464, An Analytical Sensitivity Index for Load Shedding to Avoid Voltage Instability
X. MOU, Harbin Institute of Technology
W. LI, Harbin Institute of Technology
Y. SUN, Jilin Electric Power Company Limited
T. SUN, Harbin Institute of Technology
S. RONG, Harbin Institute of Technology

• GM1470, Start-Up Sequence of Generators in Power System Restoration Avoiding the Backtracking Algorithm
C. LIU, North China Electric Power University
M. WU, North China Electric Power University
Y. DENG, North China Electric Power University
• GM1485, A Benders Decomposition Approach to Corrective Security Constrained OPF with Power Flow Control Devices
  J. MOHAMMADI, Carnegie Mellon University
  G. HUG, Carnegie Mellon University
  S. KAR, Carnegie Mellon University

• GM1494, Flexible Fault Current Contribution with Inverter Interfaced Distributed Generation
  T. WIJNHOVEN, KU Leuven
  G. DECONINCK, KU Leuven

• GM1507, Networked Predictive Control Based Wide-Area Supplementary Damping Controller of SVC with Communication Delays Compensation
  W. YAO, University of Liverpool
  L. JIANG, University of Liverpool
  J. WEN, Huazhong University of Science and Technology
  S. CHENG, Huazhong University of Science and Technology
  Q. WU, University of Liverpool

• GM1547, Comparison of State-of-the-Art Transmission Constrained Unit Commitment Formulations
  H. PANDZIC, University of Washington
  T. QIU, University of Washington
  D. KIRSCHEN, University of Washington

• GM1609, Alleviating Contingency Violations through Visual Analytics and Suggested Actions
  M. RICE, Pacific Northwest National Laboratory
  Y. CHEN, Pacific Northwest National Laboratory
  Z. HUANG, Pacific Northwest National Laboratory
  C. ALLWARDT, Pacific Northwest National Laboratory
  P. MACKEY, Pacific Northwest National Laboratory

• GM1668, A Hybrid Simulation Method for EVs’ Operation considering Power Grid and Traffic Information
  S. XIN, Tsinghua University
  Q. GUO, Tsinghua University
  H. SUN, Tsinghua University
  Z. LI, Tsinghua University
  S. ZHANG, Tsinghua University

• GM1670, A Stepwise Regression Method for Forecasting Net Interchange Schedule
  M. VLACHOPOULOU, Pacific Northwest National Laboratory
  T. FERRYMAN, Pacific Northwest National Laboratory
  N. ZHOU, Pacific Northwest National Laboratory
  J. TONG, PJM Interconnection

• GM1675, Power Flow Algorithms Compare Based on Voltage Instability and Reliability Analysis
  W. QIN, Taiyuan University of Technology of China
  P. WANG, Taiyuan University of Technology of China
  W. ZHAO, Taiyuan University of Technology of China

• GM1705, Evaluating the Contribution of Intermittent Generation to Power System Adequacy at Different Demand Levels
  E. GIL, Universidad Técnica Federico Santa María
  I. ARAVENA, Universidad Técnica Federico Santa María

• GM1754, Application of Incentive Based Scoring Rule Deciding Pricing for Smart Houses
  S. CHAKRABORTY, Nagoya Institute of Technology
  T. ITO, Nagoya Institute of Technology
  R. KANAMORI, Nagoya Institute of Technology
  T. SENJYU, University of the Ryukyus

• GM1761, Frequency Regulation and AGC in Isolated Systems with DFIG-Based Wind Turbines
  M. JALALI, Kinectrics Inc.
  K. BHATTACHARYYA, University of Waterloo

• GM1776, Dual-Master Synchronous Operation Scheme in Taiwan Power System
  T. HSIAO, Taiwan Power Company
  J. FAN, Taiwan Power Company
  M. CHANG, Taiwan Power Company
  H. LAN, Taiwan Power Company

• GM1812, The Combined Energy Lab – A Test Environment for Testing μCHPs in Grid-Connected and Islanded Mode of Operation
  J. WERNER, TU Dresden

• GM1820, Capacity of Active Power Reserve for Frequency Control Enhanced by Distributed Generators
  A. RUEDA MEDINA, Universidade Estadual Paulista
  A. PADILHA FELTRIN, Universidade Estadual Paulista
  J. SANCHES MANTOVANI, Universidade Estadual Paulista
Monday Evening, continued

- GM1827, Value of Lost Load: How Much is Supply Security Worth?
  A. RATHA, ETH Zürich
  E. IGGLAND, ETH Zürich
  G. ANDERSSON, ETH Zürich

- GM1842, Modeling of Electricity Load for Forward Contract Pricing
  E. SOTIROPOULOS, ETH Zürich
  M. HILDRECHT, ETH Zürich
  Y. HE, ETH Zürich
  G. ANDERSSON, ETH Zürich

- GM1868, Unit Commitment Using Binary PSO for Solar Power Plant Integrated Smart Power System
  R. GADDAM, International Institute of Information Technology
  A. JAIN, Infotech Enterprises Ltd

- GM1870, SCUC with Battery Energy Storage System for Peak-Load Shaving and Reserve Support
  Z. HU, Tsinghua University
  F. ZHANG, Tsinghua University
  H. LU, University of Technology, Sydney

- GM1877, Improved Droop Control of Isolated Microgrid with Virtual Impedance
  H. LIU, Hohai University
  Y. CHEN, Hohai University
  L. SHANSHAN, Hohai University
  Y. HOU, University of Hong Kong

- GM1881, Coordination of System Planning and Operation Using Probabilistic Risk Assessment Method
  P. ZHANG, Accenture
  Y. HOU, University of Hong Kong
  G. LIU, Electric Power Research Institute

- GM1915, Fully Decentralized AC Optimal Power Flow Algorithms
  A. SUN, Georgia Institute of Technology
  D. PHAN, IBM Thomas J. Watson Research Center
  S. GHOSH, IBM Thomas J. Watson Research Center

- GM1929, Operation Risk Assessment of Wind Farm Integrated System Influenced by Weather Conditions
  X. LI, Key Laboratory of Power System Intelligent Dispatch and Control
  H. WANG, Key Laboratory of Power System Intelligent Dispatch and Control

- GM1936, Development of Simulation Platform of Distribution Systems with DGs and SVR for Voltage Control Studies
  S. AHN, Chonnam National University
  J. CHOI, Chonnam National University
  S. GO, Chonnam National University
  W. JUNG, KEPCO Research Institute
  I. SONG, KEPCO Research Institute

- GM2093, A Global Group of Preventive Controls for Critical Contingencies in the Context of Voltage Stability
  M. MANSOUR, University of São Paulo
  L. ALBERTO, University of São Paulo
  R. RAMOS, University of São Paulo

- GM2150, Overview of FERC Order No. 755 and Proposed MISO Implementation
  B. VENKATESH, Ryerson University
  D. CHENG, Ryerson University
  R. MILLER, Ryerson University

- GM2169, Wide Area Protection Scheme Preventing Cascading Events Caused by Load Flow Transferring
  Z. LIU, Aalborg University
  Z. CHEN, Aalborg University
  H. SUN, Huazhong University of Science and Technology
  Y. HU, Glyndwr University

- GM2203, Advanced Load Forecast with Hierarchical Forecasting Capability
  W. GUAN, Alstom Grid, Inc.
  K. CHUNG, Alstom Grid, Inc.
  K. CHEUNG, Alstom Grid, Inc.
  X. SUN, University of Connecticut
  P. LUH, University of Connecticut
  L. MICHEL, University of Connecticut
  S. CORBO, University of Connecticut

- GM2226, Unit Commitment in Power Systems with High Wind Power Penetration Using Information Gap Decision Theory
  A. JAFARI, University of Calgary
  H. ZAREIPOUR, University of Calgary
A. KIANI, University of Calgary
B. MOHAMMADI-IVATLOO, University of Tabriz

- GM2282, Secondary Voltage Control based on Estimation of Reactive Power Deficit
  M. DODO AMADOU, Quebec University (ETS)
  H. MEHRJERDI, Research Institute of Hydro Quebec
  M. SAAD, Quebec University (ETS)

- GM2299, Solution of the Reactive Power Procurement Problem Emphasizing Voltage Stability in Deregulated Environment
  M. DE, GIIMT
  N. DEV CHOUDHURI, NIT Silchar
  S. SOSWAMI, Jadavpur University

- GM2317, Fault Location for Distribution Networks with Distributed Generation Sources Using a Hybrid DE/PSO Algorithm
  Q. ZHOU, Chongqing University
  C. WANG, Wayne State University
  B. ZHENG, Chongqing University
  Y. WANG, Wayne State University

- GM2334, Optimal Wind Power Penetration in the Real-Time Energy Market Operation
  J. CERVANTES, University of Nebraska-Lincoln
  T. DAI, University of Nebraska-Lincoln
  W. QIAO, University of Nebraska-Lincoln

- GM2357, Optimal Operation of Energy-Efficiency Building: A Robust Optimization Approach
  P. LIU, Mississippi State University

- GM2366, Wide Area Phasor Measurements based Disturbance Monitoring for Line Trip Event
  G. ZHENG, Alstom Grid
  G. RADMAN, Tennessee Tech University
  W. GUAN, Alstom Grid
  S. YANG, Electrocon International Inc.

- GM0039, An Approach to Real Time Electricity Marginal Cost Pricing Calculation with Impact Factors and Carbon Emissions
  J. CHANG, National Kaohsiung University of Applied Sciences
  M. CHEN, National Kaohsiung University of Applied Sciences
  Y. WU, National United University

- GM0086, Optimal Reactive Power Planning Using Risk Analysis
  J. LOPEZ, Sao Paulo State University

- GM0287, Use of Energy Storage Systems for Peak Shaving in the Spanish Canary Islands
  E. LOBATO, Comillas University
  L. SIGRIST, Comillas University
  L. ROUCO, Comillas University

- GM0388, Reliability and Economic Study of Multi-Terminal HVDC with LCC & VSC Converter for Connecting Remote Renewable Generators to the Grid
  K. HASAN, University of Queensland
  T. SAHA, University of Queensland

- GM0391, GARCH in Mean Type Models for Wind Power Forecasting
  H. CHEN, Jiangsu Electric Power Company
  Q. WAN, Southeast University
  F. LI, University of Tennessee
  Y. WANG, Southeast University

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**Power System Planning and Implementation Topics (poster)**

*Monday, 22 July, 5:00 PM–7:00 PM*  
*VCC East – Exhibit Hall BC & Show Office*

**Sponsored by:** Power System Planning and Implementation  
**Chair:** A. Pahwa, Kansas State University

**PAPERS AND AUTHORS:**

- GM0039, An Approach to Real Time Electricity Marginal Cost Pricing Calculation with Impact Factors and Carbon Emissions
  J. CHANG, National Kaohsiung University of Applied Sciences
  M. CHEN, National Kaohsiung University of Applied Sciences
  Y. WU, National United University

- GM0287, Use of Energy Storage Systems for Peak Shaving in the Spanish Canary Islands
  E. LOBATO, Comillas University
  L. SIGRIST, Comillas University
  L. ROUCO, Comillas University

- GM0388, Reliability and Economic Study of Multi-Terminal HVDC with LCC & VSC Converter for Connecting Remote Renewable Generators to the Grid
  K. HASAN, University of Queensland
  T. SAHA, University of Queensland

- GM0391, GARCH in Mean Type Models for Wind Power Forecasting
  H. CHEN, Jiangsu Electric Power Company
  Q. WAN, Southeast University
  F. LI, University of Tennessee
  Y. WANG, Southeast University
Monday Evening, continued

- GM0461, A Model for Power System Transmission Network Expansion Planning under Low-Carbon Economy
  L. SIYU, Huazhong University of Science and Technology
  W. YAOWU, Huazhong University of Science and Technology
  L. SUHUA, Huazhong University of Science and Technology
  Y. XIANGGEN, Huazhong University of Science and Technology

- GM0779, TSC-Based Planning: A New Method to Exploit Asset Efficiency of Distribution Systems
  J. XIAO, Tianjin University
  T. ZHANG, Tianjin University
  C. WANG, Tianjin University
  P. ZHANG, Tianjin Electric Power Company
  X. WANG, Tianjin Electric Power Company
  S. YUAN, Tianjin Electric Power Company

- GM0827, Using Demand Side Management in Energy-Intensive Industries for Providing Balancing Power – The Estonian Case Study
  I. DROVTAR, Tallinn University of Technology
  P. UUEMAA, Tallinn University of Technology
  A. ROSIN, Tallinn University of Technology
  J. KILTER, Tallinn University of Technology
  J. VALTIN, Tallinn University of Technology

- GM1095, Development of a Simulation Environment for Economic Impacts of Distributed Generation and Energy Storage on Distribution Feeders
  S. CIALDEA, WPI
  J. ORR, WPI
  A. EMANUEL, WPI
  T. ZHANG, WPI

- GM1117, Optimal Placement of Energy Storage and Demand Response in the Pacific Northwest
  J. SONG, Oregon State University
  T. BREKKEN, Oregon State University
  J. COTILLA-SANCHEZ, Oregon State University
  A. VON JOUANNE, Oregon State University
  J. DAVISON, Oregon State University

- GM1189, Distribution System Reactive Power Management Under Defined Power Transfer Standards
  E. DISKIN, ESB Networks
  P. CUFFE, University College Dublin
  A. KEANE, University College Dublin

- GM1203, A Novel Market Simulation Methodology on Hydro Storage
  Y. GU, MISO
  J. BAKKE, MISO
  Z. ZHOU, MISO
  D. OSBORN, MISO

- GM1237, Optimal Large-Scale Storage Placement in Single Generator Single Load Networks
  C. THRAMPOULIDIS, California Institute of Technology
  S. BOSE, California Institute of Technology
  B. HASSIBI, California Institute of Technology

- GM1294, Specialized Genetic Algorithm to Solve the Electrical Distribution System Expansion Planning
  V. CAMARGO, Mato Grosso State University
  M. LAVORATO, FEIS/UNESP
  R. ROMERO, FEIS/UNESP

- GM1382, A Methodology to Maximize Benefits of Microgrids
  M. QUASHIE, McGill University
  G. JOOS, McGill University

- GM1540, Assessment of Plug-In Electric Vehicles Charging on Distribution Networks
  T. AU, University of Washington
  M. ORTEGA-VAZQUEZ, University of Washington

- GM1543, History of Demand Side Management and Classification of Demand Response Control Schemes
  I. LAMPROPOULOS, Eindhoven University of Technology
  W. KLING, Eindhoven University of Technology
  P. RIBEIRO, Eindhoven University of Technology
  J. VAN DEN BERG, Mountfjell consultancy

- GM1616, Business Case Justification for MISO MVPs
  A. JAYAM PRABHAKAR, MISO
  L. RAUCH, MISO
  L. HECKER, MISO
  J. LAWHORN, MISO
Monday Evening, continued

- GM1885, Pricing Schemes for Dealing with Limited Transmission Capacity – A Comparative Study
  M. SARFATI, Royal Institute of Technology
  M. HESAMZADEH, Royal Institute of Technology
  E. BACALHAU, University of Campinas
  F. USBERTI, University of Campinas
  C. LYRA FILHO, University of Campinas
- GM1950, Benchmarking of Indian Thermal Power Plants
  V. YADAV, Galgotias University
  D. JHA, Galgotias University
  N. KUMAR, National Institute of Technology Jamshedpur
  V. RAJAGOPAL PEESAPATIB, National Institute of Technology Jamshedpur
- GM2012, Power Planning for Renewable Energy Grid Integration – Case Study of South Africa
  M. BELLO, Eskom Holdings Limited
  I. DAVIDSON, University of Namibia
- GM2047, On Selection of Transmission Line Candidates for Optimal Transmission Switching in Large Power Networks
  J. WU, Alstom Grid
  K. CHEUNG, Alstom Grid Inc.
- GM2082, Electricity Demand Profile with High Penetration of Heat Pumps in Nordic Area
  Z. LIU, Technical University of Denmark
  Q. WU, Technical University of Denmark
  A. NIELSEN, Technical University of Denmark
  Y. DING, Technical University of Denmark
- GM2140, Load Design for a 25 kV Distribution Test Line
  M. KLEIMAER, RWTH Aachen University
  Y. BRISSETTE, Hydro-Québec’s Research Institute (IREQ)
  C. ABBEY, Hydro-Québec’s Research Institute (IREQ)
  G. JOÓS, McGill University
- GM2185, A Comparison of Forecast Error Generators for Modeling Wind and Load Uncertainty
  N. LU, North Carolina State University
  R. DIAO, Pacific Northwest National Laboratory
  R. HAFEN, Pacific Northwest National Laboratory
  N. SAMAAN, Pacific Northwest National Laboratory
  Y. MAKAROV, Pacific Northwest National Laboratory
- GM2223, Scenario Generation of Electricity Contracts for Ballast Analysis in Electricity Markets
  V. SANTIAGO, Federal University of Itajuba
  L. LIMA, Marangon Consultoria e Engenharia – MC&E
  A. QUEIROZ, Marangon Consultoria e Engenharia – MC&E
  J. LIMA, Federal University of Itajuba
- GM2224, A Stochastic Unit Commitment Policy for Wind Power Uncertainty Integrating Corrective Actions
  E. PEREIRA, University of Chile
  C. SUAZO, University of Chile
  R. PALMA-BEHNKE, University of Chile
Monday Evening, continued

PSRC Poster Session (poster)
Monday, 22 July, 5:00 PM–7:00 PM VCC East – Exhibit Hall BC & Show Office
Sponsored by: Power System Relaying Committee
Chair: M. McDonald, Ameren

PAPERS AND AUTHORS:

- GM0020, A Practical Improvement to Stator Ground Fault Protection Using Negative Sequence Current
  R. PATTERSON, Patterson Power Engineers, LLC
  A. ELTOM, University of Tennessee at Chattanooga

- GM0085, A Differential Zone Protection Scheme for Microgrids
  E. SORTOMME, Alstom Grid
  J. REN, Alstom Grid
  S.S. VENKATA, Alstom Grid

- GM0174, A Hybrid Protection Scheme to Mitigate the Effect of Distributed Generation on Relay Coordination in Distribution System
  M. SINGH, IIT DELHI
  B. PANIGRAHI, IIT DELHI
  A. ABHYANKAR, IIT DELHI

- GM0228, An Analytical Study on the Performance Evaluation of HVDC Travelling Wave Protection
  Y. CAI, South China University of Technology
  M. XU, South China University of Technology
  Z. CAI, South China University of Technology
  L. ZHU, South China University of Technology

- GM0242, Effects of Geomagnetically Induced Currents on Current Transformer and Differential Protection
  T. ZHENG, North China Electric Power University
  P. CHEN, North China Electric Power University
  T. LU, North China Electric Power University
  Y. JIN, North China Electric Power University
  L. LIU, North China Electric Power University

- GM0275, A Novel Substation Back-Up Protection Based on Communication Channel of Pilot Protection
  X. KONG, Huazhong University of Science and Technology
  Z. ZHANG, Huazhong University of Science and Technology
  F. WANG, Huazhong University of Science and Technology

- GM0567, Evaluation of Artificial Neural Network and Support Vector Machine for Fault Type Identification in Advanced Series Compensated Transmission Lines
  B. VYAS, Indian Institute of Technology, Roorkee
  R. MAHESHWARI, Indian Institute of Technology, Roorkee
  B. DAS, Indian Institute of Technology, Roorkee

  F. SUI, Hydro One Networks Inc.
  A. REZAEL-ZARE, Hydro One Networks Inc.
  M. KOSTIC, Hydro One Networks Inc.
  P. SHARMA, Hydro One Networks Inc.

- GM1268, Modelling and Simulation of Reverse Power Relay for Loss of Mains Protection of Distributed Generation in Microgrids
  C. BUQUE, University of Cape Town
  S. CHOWDHURY, University of Cape Town
  S. CHOWDHURY, University of Cape Town

- GM1449, Protection and Fault Identification in Presence of Power Swing Blocking/Unblocking Function
  S. DAMBHARE, College of Engineering, Pune
  P. GAWANDE, College of Engineering, Pune

- GM1660, Implementing Fuzzy Reasoning Spiking Neural P System for Fault Diagnosis of Power Systems
  G. XIONG, Huazhong University of Science and Technology
  D. SHI, Huazhong University of Science and Technology
  J. CHEN, Huazhong University of Science and Technology

- GM1727, Performance Comparison of Voltage and Frequency based Loss of Grid Protection Schemes for Microgrids
  R. NDOU, University of Cape Town
  J. FADIRAN, University of Cape Town
  S. CHOWDHURY, University of Cape Town
Monday Evening, continued

- GM1730, Optimal PMU Placement for Fault Observability in Distributed Power System by Using Simultaneous Voltage and Current Measurements
  H. NAZARIPOUYA, Louisiana State University
  S. MEHRAEEN, Louisiana State University

- GM1780, Impact of Shunt Capacitance of a SSSC-Compensated Transmission Line on Performance of Distance Relays
  A. ABDOULLAHZADEH, Islamic Azad University
  B. MOZAFARI, Islamic Azad University
  A. TAVIGHI, University of British Columbia
  J. MARTI, University of British Columbia

- GM1809, A Transmission Line Two-End Fault Location Approach Based on Mathematical Morphology
  P. CAVALCANTE, University of Campinas
  B. SÃO JOSÉ, University of Campinas
  F. TRINDADE, University of Campinas
  M. DE ALMEIDA, University of Campinas

- GM1813, Standardization of Power System Protection Settings Using IEC 61850 for Improved Interoperability
  Q. HONG, University of Strathclyde
  S. BLAIR, University of Strathclyde
  V. CATTERSON, University of Strathclyde
  A. DYSKO, University of Strathclyde
  J. BOOTH, University of Strathclyde
  T. RAHMAN, National Grid

- GM1806, Fault Location, Isolation, and Service Restoration (FLISR) Technique using IEC 61850 GOOSE
  I. VOLOH, GE Digital Energy
  P. PARikh, GE Digital Energy
  M. MAHONY, GE Global Research Center

- GM2148, Fault Location on Series-Compensated Lines Using Unsynchronized Measurements
  A. OSMAN, American University of Sharjah
  S. HUSSAIN, American University of Sharjah

- GM1527, Synchrophasor Standards and Guides for the Smart Grid
  K. MARTIN, EPG

- GM2099, Summary Changes in 2013 IEEE/IEC Dual Logo COMTRADE Standard
  R. DAS, ABB Inc.
  A. MAKKI, Softstuff Inc.

- GM2132, PMU Data Validation at ISO-NE
  Q. ZHANG, ISO New England
  X. LUO, ISO New England
  D. BERTAGNOLLI, ISO New England
  S. MASLENNIKOV, ISO New England
  B. NUBILE, ISO New England

- GM2206, Optimizing Wide Area Measurement System Architectures with Advancements in Phasor Data Concentrators (PDCs)
  M. KANABAR, GE Digital Energy
  M. ADAMIACK, GE Digital Energy
  J. RODRIGUES, GE Digital Energy

- GM2364, Impact of IEC 61850 on the Interoperability and Reliability of Protection Schemes
  A. APOSTOLOV, OMICRON

Power System Analysis, Computing and Economics Committee Poster Session (poster)

Monday, 22 July, 5:00 PM–7:00 PM       VCC East – Exhibit Hall BC & Show Office
Sponsored by: PSACE
Chair: K. Schneider, Pacific Northwest National Laboratory

PAPERS AND AUTHORS:
- GM0005, Towards a 3-level Blackout Probabilistic Risk Assessment: Achievements and Challenges
  P. HENNEAUX, Université libre de Bruxelles
  F. FAGHIHI, Université libre de Bruxelles
  P. LABEAU, Université libre de Bruxelles
  J. MAUN, Université libre de Bruxelles

- GM0012, Cross-Border Power Trading in South Asia: Modelling Analysis to Assess Economic Benefits
  D. CHATTOPADHYAY, University of Queensland
• GM0014, A Probabilistic Load Modelling Approach Using Clustering Algorithms
  M. ELNOZAHY, University of Waterloo
  M. SALAMA, University of Waterloo
  R. SEETHAPATHY, Hydro One Network Inc.

• GM0016, Bayesian Neural Network and Discrete Wavelet Transform for Partial Discharge Pattern Classification in High Voltage Equipment
  H. MA, University of Queensland
  J. CHAN, University of Queensland
  T. SAHA

• GM0067, Development of an Intelligent System for Preventing Large-Scale Emergencies in Power Systems
  M. NEGNEVITSKY, University of Tasmania
  N. VOROPAI, Energy Systems Institute
  V. KURBATSKY, Energy Systems Institute
  N. TOMIN, Energy Systems Institute
  D. PANASETSKY, Energy Systems Institute

• GM0079, Two-Part Regulating Reserve Compensation Formulation under Energy and Ancillary Service Co-Optimization
  Y. CHEN, Midwest ISO

• GM0122, Review on PJM’s Ancillary Products of Auction Revenue Rights
  Z. FAN, PJM

• GM0165, Trend Based Periodicity Detection for Load Curve Data
  Z. GUO, Simon Fraser University
  W. LI, BC Hydro
  A. LAU, BC Hydro
  T. INGA-ROJAS, BC Hydro
  K. WANG, Simon Fraser University

• GM0172, A Decentralized Coordinated Controller for Load Sharing in a Microgrid with Renewable Generation
  M. BARIK, University of New South Wales
  H. POTA, University of New South Wales
  AUTHOR RAVISHANKAR, University of New South Wales

• GM0212, Load Management Using Multi-Agent Systems in Smart Distribution Network
  M. AMINI, Tarbiat Modares University
  R. YAN, University of Queensland
  T. SAHA, University of Queensland
  S. GOODWIN, University of Queensland

• GM0239, Design Microgrid for a Distribution Network: A Case Study of the University of Queensland
  C. HO, University of Queensland
  R. YAN, University of Queensland
  T. SAHA, University of Queensland
  S. GOODWIN, University of Queensland

• GM0255, Capacity-Dependent Tariffs and Residential Energy Management for Photovoltaic Storage Systems
  M. SCHREIBER, Fraunhofer Institute for Wind Energy and Energy System Technology IWES
  P. HOCHLOFF, Fraunhofer Institute for Wind Energy and Energy System Technology IWES

• GM0408, Solving Optimal Dispatch Problem for a Competitive Wholesale Power Market by Using PowerWorld
  D. ZHANG, University of Alabama
  S. LI, University of Alabama

• GM0409, A Comparison Study of Demand Response Using Optimal and Heuristic Algorithms
  S. LI, University of Alabama
  D. ZHANG, University of Alabama

• GM0444, Novel Insights into Lossless AC and DC Power Flow
  F. DORFLER, UC Santa Barbara
  F. BULLO, UC Santa Barbara

• GM0454, An Improved Self-Daptive Harmony Search Algorithm for Distribution System Planning
  X. YANG, North China Electric Power University
  B. ZENG, North China Electric Power University
  J. ZHANG, North China Electric Power University

• GM0476, Krylov Subspace Based Model Reduction Method for Transient Simulation of Active Distribution Grid
  C. WANG, Tianjin University
  H. YU, Tianjin University
  P. LI, Tianjin University
  C. DING, Tianjin University
  C. SUN, Tianjin University
X. Guo, Guangdong Power Grid Corporation  
F. Zhang, Guangdong Power Grid Corporation  
Y. Zhou, Guangdong Power Grid Corporation  
Z. Yu, Guangdong Power Grid Corporation  

GM0525, Analysis of the Spanish Congestion Management Mechanism  
A. Delgadillo Vega, University Pontificia Comillas  
J. Reneses, University Pontificia Comillas  

GM0532, A Proposed Study on Economic Impacts due to Cyber Attacks in Smart Grid: A Risk Based Assessment  
C. Fung, Murdoch University  
M. Akbariromani, Murdoch University  
K. Wong, University of Western Australia  

GM0588, Reactive Power Management Strategies in Future Smart Grids  
H. Moraís, Polytechnic of Porto  
T. Sousa, Polytechnic of Porto  
P. Faria, Polytechnic of Porto  
Z. Vale, Polytechnic of Porto  

GM0659, A Comparative Study of Performance in Particle Swarm Optimization Methods with Reflection  
T. Ohba, Okayama University  
A. TakaHashi, Okayama University  
J. Imai, Okayama University  
S. Funabiki, Okayama University  

GM0801, Deployment of Real-time State Estimator and Load Flow in BC Hydro DMS  
D. Atanackovic, British Columbia Hydro and Power Authority  
V. Dabic, British Columbia Hydro and Power Authority  

GM0802, Spectral Energy Indices for Model Order Reduction  
S. Varricchio, CEPEL  
F. Freitas, University of Brasilia  
N. Martins, CEPEL  

GM0805, A Dynamic Pricing Model for Price Responsive Electricity Consumers in a Smart Community  
T. Wang, Waseda University Graduate School  
R. Yokoyama, Waseda University Graduate School  
T. Niimura, Hosei University  
H. Takamori, Waseda University Graduate School  

GM0807, Risk Sharing Strategy for Minimizing Imbalance Costs of Wind Power Forecast Errors  
J. Qiu, University of Newcastle  
Z. Dong, University of Newcastle  
K. Meng, University of Newcastle  
Y. Zheng, University of Newcastle  
Y. Chen, University of Newcastle  
H. Tian, University of Newcastle  

GM0820, Determination of Alternative Bidding Areas based on a Full Nodal Pricing Approach  
C. Breuer, RWTH Aachen University  
A. Moser, RWTH Aachen University  

GM1004, Financial Transmission Rights Perform Well in Power Markets with High Penetration of Wind Energy?  
Y. Yu, Stanford University  
R. Rajagopala, Stanford University  

GM1024, A Fuzzy Methodology to Improve Time Series Forecast of Power Demand in Distribution Systems  
L. Moraes, University of Sao Paulo  
R. Flauzino, University of Sao Paulo  
M. Araujo, University of Sao Paulo  
O. Batista, University of Sao Paulo  

GM1060, Active Network Management Using Distributed Constraint Optimisation  
D. Athanasiadis, University of Strathclyde  
S. Mcartthur, University of Strathclyde  

GM1061, An Improved Optimal Power Flow Model Incorporating Wind Power  
C. Jiang, Tianjin University  
H. Chiang, Cornell University  

GM1131, A Novel Method for Distribution System Feeder Reconfiguration Using Black-Box Optimization  
L. Tang, Iowa State University  
F. Yang, ABB US Corporate Research Center  
X. Feng, ABB US Corporate Research Center
Monday Evening, continued

- **GM1139, A Hardware-Based Approach for Saving Cache Energy in Multicore Simulation of Power Systems**
  S. KHATIAN, Iowa State University
  J. MCCALLEY, Iowa State University

- **GM1146, Droop Control for Islanded Microgrids**
  H. POTA, University of New South Wales at Canberra

- **GM1155, Prediction on Power Energy Mix of China Based on Neural Network Model**
  Y. LI, Tsinghua University
  G. ZHU, Tsinghua University

- **GM1195, Parallel Implementation of Power System Dynamic Simulation**
  S. JIN, Pacific Northwest National Laboratory
  Z. HUANG, Pacific Northwest National Laboratory
  R. DIAO, Pacific Northwest National Laboratory
  W. JI, Pacific Northwest National Laboratory
  Y. CHEN, Pacific Northwest National Laboratory

- **GM1196, Dynamic Balancing for Low Inertia Power Systems**
  X. FENG, ABB US Corporate Research Center

- **GM1228, Improving Performance of Dynamic State Estimators under Unknown Load Changes**
  A. ABUR, Northeastern University
  A. ROUHANI, Northeastern University

- **GM1389, The Eco-Min Model**
  N. PRAKASH, Arizona State University
  K. HEDMAN, Arizona State University
  A. PARALIKAR, Arizona State University

- **GM1488, Increase of the Delivered Power Probability in Distribution Networks Using Pareto DC Programming**
  B. CANIZES, Polytechnic of Porto
  J. SOARES, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
  C. LOBO, Polytechnic of Porto

- **GM1495, Feeder Level Power Loss Reduction through Reactive Power Control with Presence of Distributed Generation**
  V. RAVINDRAN, Wichita State University
  V. ARAVINTHAN, Wichita State University

- **GM1591, A PMU-Based Risk Assessment Framework for Power Control Systems**
  J. YAN, MISO
  M. GOVINDARASU, Iowa State University
  C. LIU, Washington State University
  U. VAIDYA, Iowa State University

- **GM1614, Modeling and Transient Simulation Studies of Smart Buildings Power Networks with UPS and Distribution Automation**
  M. SHIN, Power21 Corp.
  F. THERRIEN, University of British Columbia
  J. JATSKEVICH, University of British Columbia

- **GM1625, Fast Response DVR Control Strategy Design to Compensate Unbalanced Voltage Sags and Swells in Distribution Systems**
  A. TAVIGHI, University of British Columbia
  H. ABDOLLAHZADEH, Islamic Azad University
  J. MARTI, University of British Columbia

- **GM1630, Determining the Adjustment Baseline Parameters to Define an Accurate Customer Baseline Load**
  P. FARIA, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
  P. ANTUNES, Polytechnic of Porto

- **GM1649, Voltage Dependent Load Models of Charging Electric Vehicles**
  E. SORTOMME, Aistom Grid
  A. NEGASH, University of Washington
  S.S. VENKATA, Aistom Grid
  D. KIRSCHEN, University of Washington

- **GM1716, Smart Micro-Grid Optimization with Controllable Loads Using Particle Swarm Optimization**
  A. SABER, ETAP
  G. VENAYAGAMOORTHY, Clemson University

- **GM1718, A Thermal-Electric Decoupling Approach to Reduce the Wind Power Tripping Rate**
  S. RONG, Harbin Institute of Technology
  X. MOU, Harbin Institute of Technology
  Z. LI, Harbin Institute of Technology
  T. SUN, Harbin Institute of Technology
• GM1725, Distribution Network Topology Error Correction Using Smart Meter Data Analytics
  W. LUAN, BC Hydro
  J. PENG, BC Hydro
  M. MARAS, BC Hydro
  J. LO, BC Hydro

• GM1726, Analysis of Unbalanced Distribution Systems with Solar PV Penetration
  I. SHARMA, University of Waterloo
  M. CHEHREGHANI BOZCHALUI, NEC Labs America
  R. SHARMA, NEC Labs America

• GM1809, Intra-Day Unit Commitment for Wind Farm Using Model Predictive Control Method
  Y. GUI, Hanyang University
  C. KIM, Hanyang University
  C. CHUNG, Hanyang University
  Y. KANG, Chonbuk National University

• GM1821, Analysis of PV Generation Impacts on Voltage Unbalance and on Voltage Regulation in Distribution Networks
  J. VIEIRA, University of Sao Paulo
  J. ARAMIZU, University of Sao Paulo

• GM1823, Load Models Effects on Distribution System Losses Estimation: A Numerical Study
  A. ROSSONI, Federal University of Rio Grande do Sul
  R. DRESCH, Federal University of Rio Grande do Sul
  A. BRETAS, Federal University of Rio Grande do Sul
  A. BETTIOL, Vero Domino Consulting & Research
  A. CARNIATO, Vero Domino Consulting & Research
  L. DOS PASSOS, Vero Domino Consulting & Research
  R. MARTIN, Companhia Hidroeletérica São Patrício

• GM1830, Demand Side Management for Residential Consumers
  N. KINHEKAR, Indian Institute of Technology, Roorkee
  N. PADHY, Indian Institute of Technology, Roorkee
  H. GUPTA, Jaypee Institute of Information Technology

• GM1834, Voltage and Power Flow Oscillations Induced by PV Inverters Connected to a Weak Power Distribution Grid
  M. DUCKHEIM, Siemens Corporate Technology
  J. REINSCHKE, Siemens Corporate Technology
  P. GUDIVADA, University of British Columbia
  W. DUNFORD, University of British Columbia

• GM1947, Reconfiguration of Radial Distribution Networks with Distributed Generation for Reliability Improvement and Loss Minimization
  P. PAVANI, IITKanpur
  S. SINGH, IITKanpur

• GM1952, Photovoltaics in Distribution Systems – Integration Issues and Simulation Challenges
  J. SCHONE, EnerNex
  V. ZHEGLOV, EnerNex
  D. HOUSEMAN, EnerNex
  J. SMITH, UVI
  A. ELLIS, Sandia National Laboratories

• GM1987, Prevention of NERC C3 Category Outages in Idaho Power’s Network: Risk Based Methodology and Practical Application
  M. PAPIC, Idaho Power
  O. CINIGLIO, Idaho Power

• GM1995, Distribution Network Management System: An AC OPF Approach
  S. ALNASER, University of Manchester
  L. OCHOA, University of Manchester

• GM2060, MASCEM Restructuring: Ontologies for Scenarios Generation in Power Systems Simulators
  G. SANTOS, Polytechnic of Porto
  T. PINTO, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
  H. MORAIS, Polytechnic of Porto

• GM2091, Remote Control of Distributed Generation in Low Voltage Networks
  G. KAESLTE, Clausthal University of Technology

• GM2129, Multi-Agent Testbed for Emerging Power Systems
  M. STANOVIĆ, FSU
  S. SRIVASTAVA, FSU
  D. CARTES, FSU
  T. BEVIS, FSU
Monday Evening, continued

• GM2137, Comparative Analysis of Time-Series Studies and Transient Simulations for Impact Assessment of PV Integration on Reduced IEEE 8500 Node Feeder
  F. KATIRAEI, Quanta Technology
  D. PARADIS, University of Toronto
  B. MATHER, NREL

• GM2160, How to Remunerate Ramping Services?
  A. LAMADRID, Lehigh University
  T. MOUNT, Cornell University

• GM2178, Dimensionality Reduction and Early Event Detection Using Online Synchronphasor Data
  Y. CHEN, Texas A&M University
  L. XIE, Texas A&M University
  P. KUMAR, Texas A&M University

• GM2192, Solar Photovoltaic Inverters Transient Over-Voltages
  R. BRAVO, Southern California Edison
  R. SALAS, Southern California Edison
  R. YINGER, Southern California Edison
  S. ROBLES, Southern California Edison

• GM2229, A ZIP Model Based Feeder Load Forecasting Method for Distribution Automation Control
  D. HE, Georgia Institute of Technology
  M. MOUSAVI, ABB
  N. KANG, ABB
  T. HABETLER, Georgia Institute of Technology

• GM2252, North American Transmission Availability Trends
  J. BIAN, NERC
  M. LAUBY, NERC
  A. SONE, NERC

• GM2257, Requirement Design for a Reliable and Efficient Ramp Capability Product
  C. WANG, University of Connecticut
  P. LUH, University of Connecticut
  N. NAVID, MISO

• GM2273, Load Scheduling with Price Uncertainty and Coupling Constraints
  R. DENG, Zhejiang University
  J. CHEN, Zhejiang University

• GM2290, Treatment of Transformers and Voltage Regulators in Branch Current State Estimation for Distribution Networks
  M. HOIARI, Ecole Polytechnique
  F. THERRIEM, University of British Columbia
  J. LACROIX, Cooper Power Systems

• GM2291, Electrical Power Systems Fault Location with One-Terminal Data Using Estimated Remote Source Impedance
  R. FERRAZ, Federal University of Rio Grande do Sul
  A. BRETAG, Federal University of Rio Grande do Sul
  D. LIMA, Federal University of Rio Grande do Sul
  A. FILOMENA, Federal University of Rio Grande do Sul

• GM2303, A Hierarchical Power Management Strategy for Multiple Single-Phase Roadway Microgrids
  Y. JIAO, University of Nebraska-Lincoln
  W. QIAO, University of Nebraska-Lincoln

• GM2320, Study of Artificial Neural Network Based Short Term Load Forecasting
  A. WEBBERLEY, University of Denver
  W. GAO, University of Denver

• GM2321, Marginal Value of FACTS Devices in Transmission-Constrained Electricity Markets
  M. CHAIKA-ARDAKANI, Penn State University
  S. BLUMSACK, Penn State University

• GM2330, Design of an Online Intelligent Alarming System for Cascading Failures of Group of Wind Farms
  J. MU, Tsinghua University
  H. SUN, Tsinghua University
  Q. GUO, Tsinghua University
  W. WU, Tsinghua University
  B. ZHANG, Tsinghua University

• GM2331, Mitigating Risk of Random Resources within a Two-Settlement Electricity Market
  D. MUNOZ-ALVAREZ, Cornell University
  L. TONG, Cornell University

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Monday Evening, continued

- GM2365, Modeling and Coordinate Controller Design of a Microgrid System in RTDS
  J. HAN, West Virginia University
  S. SOLANKI, West Virginia University
  J. PRIGMORE, Arizona State University
  Z. WANG, ABB Corporate Research Center

- GM2370, Integration of Demand Resource into PJM Capacity Market Incremental Auction
  Y. XIAO, Alstom Grid
  Y. LEE, Alstom Grid
  F. BRESLER, PJM Interconnection
  J. BASTIAN, PJM Interconnection
  A. ENGEL, PJM Interconnection

- GM2385, Exploration of Multifrontal Method with GPU in Power Flow Computation
  X. LI, University of Tennessee
  F. LI, University of Tennessee
  J. CLARK, University of Tennessee

Stationary Battery Poster Session (poster)
Monday, 22 July, 5:00 PM–7:00 PM VCC East – Exhibit Hall BC & Show Office
Sponsored by: Stationary Battery Committee and Surge Protective Devices Committee
Chair: L. Varga, Quality Standby Services

PAPERS AND AUTHORS:
- GM0263, Optimally Sizing Battery Storage and Renewable Energy Sources on an Off-Grid Facility
  A. PURI, DNV KEMA

- GM0272, Component-Wise Physics-Based Modelling of a Lithium–Ion Battery for Power Equalization
  S. WEATHERHOG, University of Queensland
  R. SHARMA, University of Queensland

- GM1007, Multi-Timescale Modeling of Battery Energy Storage System and Its Application in Wind Power Balance
  Q. LU, Tsinghua University
  W. HU, Tsinghua University
  L. ZHEN, Tsinghua University
  W. LUO, Liaoning Electrical Power Co. Ltd.
  W. GE, Liaoning Electrical Power Co. Ltd.
  Z. WANG, Liaoning Electrical Power Co. Ltd.

Substations Poster Session (poster)
Monday, 22 July, 5:00 PM–7:00 PM VCC East – Exhibit Hall BC & Show Office
Sponsored by: Substations

PAPERS AND AUTHORS:
- GM0296, Review of Earth Conductivity Structure Modelling for Calculating Geo-Electric Fields
  B. DONG, North China Electric Power University
  Z. WANG, North China Electric Power University
  D. BOTELER, Natural Resources Canada
  R. PIRJOLA, Natural Resources Canada

- GM0522, The Discussion about the Application of GOOSE in Smart Substation of China
  Y. NI, China Electric Power Research Institute
  R. DOU, China Electric Power Research Institute

- GM0564, The Development about Multifunction Merging Unit Used in Smart Substation of China
  C. FAN, China Electric Power Research Institute

- GM0572, Online Monitoring of Substation Grounding Grid Conditions Using Touch and Step Voltage Sensors (Transaction Number: TSG-00175-2011)
  X. LONG, University of Alberta
  M. DONG, University of Alberta
  W. XU, University of Alberta
  Y. LI, University of Alberta

- GM1165, Power Electronic Converters for PV Systems in Extreme Environmental Conditions
  A. DOLARA, Politecnico di Milano
  R. FARANDA, Politecnico di Milano
  S. LEVA, Politecnico di Milano
  G. LAZAROU, University Politecnica of Bucharest
Monday Evening, continued

- GM1171, SVC for Reliability Improvement in the NSTAR 115 kV Cape Cod System
  A. BOSTROM, ABB Inc.
  H. OHEIM, NSTAR Electric & Gas Corporation
  R. GRUNBAUM, ABB Powersystems AB
  M. DAHLBLOM, ABB Powersystems AB

- GM1187, Improving the Reliability of Breaker-and-a-Half Substations Using Sectionalized Busbars
  B. STEVENS, University of Texas at Austin
  S. SANTOSO, University of Texas at Austin

- GM1469, Control Strategy for 2-Terminal High Power LCL DC-DC Converter
  W. LIN, University of Aberdeen
  D. JOVCIC, University of Aberdeen

Surge Protective Devices: Overvoltage Detection and Control (poster)

Monday, 22 July, 5:00 PM–7:00 PM
VCC East – Exhibit Hall BC & Show Office
Sponsored by: Surge Protective Devices
Chair: R. Hotchkiss, Surge Suppression Incorporated

PAPERS AND AUTHORS:

- GM0044, Power System Overvoltage Detection Based on a Morphological Filtering Algorithm
  P. ASSALA, South China University of Technology
  H. CHEN, South China University of Technology
  T. Ji, South China University of Technology

- GM0052, Power System Overvoltage Identification Using Feedforward Neural Network
  P. ASSALA, South China University of Technology
  H. CHEN, South China University of Technology
  T. Ji, South China University of Technology

- GM0600, Overvoltage Control Strategy and Techniques of the UHV Controllable Metal Oxide Surge Arrester
  X. CHEN, China Electric Power Research Institute
  W. CHEN, State Grid Cooperation of China
  Z. HE, China Electric Power Research Institute
  H. SHEN, China Electric Power Research Institute

Switchgear Poster Session (poster)

Monday, 22 July, 5:00 PM–7:00 PM
VCC East – Exhibit Hall BC & Show Office
Sponsored by: Switchgear

PAPERS AND AUTHORS:

- GM2419, Assessing Circuit Breaker Life Cycle Using Condition-Based Data
  Y. GUAN, Texas A&M University
  M. KEZUNOVIC, Texas A&M University
  P. DEHGHAHIAN, Texas A&M University
  G. GURRALA, Texas A&M University

Transformers Committee Poster Session (poster)

Monday, 22 July, 5:00 PM–7:00 PM
VCC East – Exhibit Hall BC & Show Office
Sponsored by: Transformers
Chair: D. Platts, SPX Transformers Solutions

PAPERS AND AUTHORS:

- GM0015, Impact of High PV Penetration on Distribution Transformer Life
  H. PEZESHKI, Queensland University of Technology
  P. WOLFS, Central Queensland University

- GM0285, Impact of PEV Charging and Rooftop PV Penetration on Distribution Transformer Life
  T. GEILES, Curtin University
  S. ISLAM, Curtin University

- GM0792, Modal Parameters Identification of Power Transformer Winding Based on Hilbert-Huang Transform
  C. GENG, Shanghai Jiaotong University
  F. WANG, Shanghai Jiaotong University
  Z. JIN, Shanghai Jiaotong University
Monday Evening, continued

- GM1252, Power Transformer Immune to Geomagnetically Induced Currents
  O. SAMUELSSON, Lund University
  C. XU, Shanghai Jiaotong University
  F. WANG, Shanghai Jiaotong University
  Z. JIN, Shanghai Jiaotong University
- GM1415, Impact of the Representation of the Upstream Network on the Energization of a 340 MVA Transformer: Modelling and Its Validation by On Site Tests
  M. RIOUAL, EDF R&D
  M. RIOUAL, EDF R&D
  B. BERNIN, ESME Sudria
- GM1717, A Topology for Three-Stage Solid State Transformer
  A. SHOJAEI, McGill University
  G. JOOS, McGill University

Transmission & Distribution Poster Session (poster)
Monday, 22 July, 5:00 PM–7:00 PM VCC East – Exhibit Hall BC & Show Office
Sponsored by: Transmission and Distribution

PAPERS AND AUTHORS:
- GM0091, Effectiveness of Anti-Islanding Schemes Following a Faulty Recloser Operation
  P. MITRA, Arizona State University
  V. VITTAL, Arizona State University
  G. HEYDT, Arizona State University
  R. AYYANAR, Arizona State University
- GM0107, New Trend in Transmission Power Lines and Related Stringing Equipment Development
  A. OSCAR, Tesmec SpA
- GM0119, Using Harmonic Measurements to Aid in Source Determination during Elevated Voltage Investigations
  S. MARTINO, Central Hudson Gas and Electric
  D. DORR, EPRI
  S. HANEUBTH, Power Survey Company
- GM0164, Electric Vehicle Charging Strategy in Metropolises in China
  G. ZHU, Advanced Electrical Technology
  Y. XING, Advanced Electrical Technology
- GM0356, Improvement of Active Power Sharing Ratio of P/V Droop Controllers in Low-Voltage Islanded Microgrids
  T. VANDOORN, Ghent University
  J. DE KOONING, Ghent University
  B. MEERSMAN, Ghent University
  L. VANDKELDE, Ghent University
- GM0433, A Novel Concept for Modular Multilevel Universal Power Controller (MUPC)
  F. HASSAN, Alstom Grid
- GM0463, Case Studies on Large PV Plants: Harmonic Distortion, Unbalance and Their Effects
  R. LANGELLA, Second University of Naples
  A. TESTA, Second University of Naples
  D. GALLO, Second University of Naples
  J. HERNANDEZ, University of Jaen
  I. PAPIC, University of Ljubljana
  B. BLAŽIC, University of Ljubljana
  J. MEYER, Technische Universitaet Dresden
- GM0503, Power Sharing Control with Frequency Droop in a Hybrid Microgrid
  M. GOYAL, Queensland University of Technology
  A. GHOSH, Queensland University of Technology
  F. ZARE, Queensland University of Technology
- GM0555, Accelerated Model of Modular Multilevel Converters in PSCAD/EMTDC
  J. XU, North China Electric Power University
  C. ZHAO, North China Electric Power University
  W. LIU, North China Electric Power University
  C. GUO, North China Electric Power University
- GM0558, Customized Reduction Techniques for Power Distribution System Reliability Analysis
  M. AL-MUHAINI, Arizona State University
  G. HEYDT, ASU
• GM0636, An Application of a Decision-Making Algorithm for an Intelligent Distribution Substation
  P. KADUREK, Eindhoven University of Technology
  A. ZIPPERER, Colorado State University
  S. SURYANARAYANAN, Colorado State University
  S. COBBEN, Eindhoven University of Technology

• GM0686, Study on a Novel Load Shedding Strategy for Voltage Stability Control
  P. LI, Jiangsu Electric Power Company Research Institute
  Y. WANG, Nanjing SAC Automation CO. LTD
  Y. YUAN, Jiangsu Electric Power Company Research Institute
  B. ZHANG, Xi’an Jiaotong University

• GM0710, Analysis of Voltage Variations and Short-Circuit Ratios of a Large-Scale Offshore Wind Farm Connected to a Practical Power System
  L. WANG, National Cheng Kung University
  C. YEH, National Cheng Kung University
  M. HSIEH, National Cheng Kung University
  C. WU, National Cheng Kung University
  C. LU, National Cheng Kung University

• GM0715, Modelling Geomagnetically Induced Currents in Xinjiang 750kV Power Grid in China
  C. LIU, North China Electric Power University
  Y. LI, North China Electric Power University
  L. CHEN, North China Electric Power University

• GM0822, Optimal Location and Size of DG for Enhancing Loading Margin and Reducing System Loss
  J. JIANG, Western University
  D. THAKUR, Western University

• GM0846, Current Transients based Phase Selection and Fault Location in Active Distribution Networks with Spurs Using Artificial Intelligence
  K. LOUT, University of Bath
  R. AGGARWAL, University of Bath

• GM0856, New Strategies for Estimating the Coupling Inductance in Grid-Connected Direct Power Control-Based Three-Phase Active Rectifiers
  J. G. NORRIELLA, University of Oviedo
  M. CANO, University of Oviedo
  G. A. ORCAJO, University of Oviedo
  C. ROJAS, University of Oviedo
  J. F. PEDRAYES, University of Oviedo
  M. F. CABANAS, University of Oviedo
  G. A. ORCAJO, University of Oviedo
  C. H. ROJAS, University of Oviedo
  J. F. PEDRAYES, University of Oviedo
  M. F. CABANAS, University of Oviedo

• GM0912, Mitigation of Voltage Band Violations through Distributed Active and Reactive Power Control of Inverter Based PV Generation on LV Networks
  S. GOODWIN, University of Queensland
  O. KRAUSE, University of Queensland

• GM1038, A Hypervolume Indicator Based Algorithm and Its Application to Voltage Coordinated Control
  A. ZHANG, Southwest Petroleum University

• GM1041, A Micro-Grid Battery Storage Management
  P. MAHAT, Aalborg University
  J. ESCRIBANO JIMENEZ, University of Zaragoza
  E. RODRIGUEZ MOLDES, Aalborg University
  S. IREN HAUG, Aalborg University
  I. GRZEGORZ SZCZESNY, Aalborg University
  K. OLLE POLESTAD, Aalborg University
  L. CRISTIANA TOTU, Aalborg University

• GM1059, Preliminary Estimate of GIC Risk in China’s Future Power Grid due to Geomagnetic Disturbance
  L. LIU, North China Electric Power University
  W. WU, North China Electric Power University
  K. ZHENG, North China Electric Power University

• GM1122, Maximizing Delivery Capability of Unbalanced Distribution Networks for High Penetration of Distributed Generation
  L. JIAN, Tianjin University
  H. CHANG, Cornell University

• GM1186, Understanding the Effects of Electric Vehicle Charging on the Distribution Voltages
  A. DUDEY, University of Texas at Austin
  S. SANTOSO, University of Texas at Austin
  M. CLOUD, United Illuminating Company
Monday Evening, continued

- GM1215, Optimal Planning of Distributed Generations with the Combination of Genetic Algorithm and Interval Numbers TOPSIS
  L. HAN, Tianjin University
  S. WANG, Tianjin University
  D. WANG, Tianjin University
  X. FAN, Tianjin University

- GM1312, Universal Controller for Smart Grid
  F. ZAVODA, IREQ

- GM1504, Development of Power Quality Analysis Platform for INER Microgrid
  G. CHANG, National Chung Cheng University
  H. SU, National Chung Cheng University

- GM1522, Convex Distribution System Reconfiguration Using Group Sparsity
  E. DALL'ANESE, University of Minnesota
  G. GIANNAKIS, University of Minnesota

- GM1530, Effects of HVDC Connection for Offshore Wind Turbines on AC Grid Protection
  L. HE, University College Dublin
  C. LIU, Washington State University, University College Dublin

- GM1545, The Use of Linear Superposition in Modelling Geomagnetically Induced Currents
  D. BOTELEER, Natural Resources Canada

- GM1564, Quantifying Operational Flexibility of VSC-HVDC Lines and SVCs
  A. PANDEY, CMU
  G. HUG, CMU

- GM1599, Fault Locator Comparison Tool and Designer for Distribution Network
  M. LOOS, Université Libre de Bruxelles
  J. MAUN, Université Libre de Bruxelles
  M. KEREIT, Siemens AG
  S. WERBEN, Siemens AG

- GM1658, Robust Computation of Voltage Stability Margins for Transmission and Distribution Grids
  C. CASTRO, UNICAMP – University of Campinas
  C. XAVIER, UNICAMP – University of Campinas
  M. BEDRINANA, UNICAMP – University of Campinas

- GM1665, Solid State Transformer in the Future Smart Electrical System
  X. SHE, North Carolina State University
  A. HUANG, North Carolina State University

- GM1703, Toward Model-Based Policy Design for Reliable and Efficient Integration of Distributed Generators
  M. HONARVAR NAZARI, Carnegie Mellon University
  M. ILIC, Carnegie Mellon University
  G. MORGAN, Carnegie Mellon University

- GM1709, Effectiveness of Traditional Mitigation Strategies for Neutral Current and Voltage Problems under High Penetration of Rooftop PV
  M. ALAM, University of Wollongong
  K. MUTTAQI, University of Wollongong
  D. SUTANTO, University of Wollongong

- GM1740, Estimating Benefits of Energy Storage for Aggregate Storage Applications in Electricity Distribution Networks in Queensland
  A. ABEYGUNAWARDANA, Queensland University of Technology
  G. LEDWICH, Queensland University of Technology

- GM1750, Robust Short-Term Load Forecasting Using a New Modeling Approach
  Y. CHAKHCHOUKH, Arizona State University
  P. PANCIATICI, RTE

- GM1753, Voltage Unbalance Reduction in Low Voltage Feeders by Dynamic Switching of Residential Customers among Three Phases
  F. SHAHINA, Curtin University
  P. WOLFS, Central Queensland University
  A. GHOSH, Queensland University of Technology

- GM1762, Simulations and Analyses of Parallel Resonance on Shunt Capacitor Banks
  T. XIA, Dominion Virginia Power

- GM1900, Aggregated Control of VSC HVDC Systems and Offshore Wind Farms
  S. VANDENBRUCKE, University of Leuven
  J. BEERTEN, University of Leuven
  R. BELMANS, University of Leuven

- GM2004, On Tracking Faulted Line or Bus in a Transmission Network
  G. CHANG, National Chung Cheng University
  H. SU, National Chung Cheng University
Monday Evening, continued – Tuesday Morning

- GM2011, Insulation Coordination Optimization Study for 800kV UHVDC Project with Increased Transmission Capacity
  Z. LIUCHUN, CEPRI
  Z. CUIXIA, CEPRI

- GM2080, Regression-Based Corrective Power Flow Control for System Risk Minimization
  R. YANG, Carnegie Mellon University
  G. HUG-GLANZMANN, Carnegie Mellon University

- GM2130, Smart MAS Restoration for Distribution System with Microgrids
  S. CHOUHAN, WVU
  J. GHORBANI, WVU
  H. INAN, WVU
  A. FELIACHI, WVU
  M. CHOUDHRY, WVU

- GM2166, Study of a DC/DC Converter in Alternate Discontinuous Mode
  C. SHERIDAN, Imperial College London
  M. MERLIN, Imperial College London

- GM2201, FIDVR Events Analysis Part 1 [Transaction Number: 1]
  R. BRAVO, Southern California Edison
  R. YINGER, Southern California Edison
  S. ROBLES, Southern California Edison
  J. ETO, Lawrence Berkeley National Laboratory

- GM2216, A Comparative Analysis of Direct Power Control Algorithms for Three-Phase Power Inverters
  M. MANTILLA, Universidad Industrial de Santander
  N. MENDOZA, Universidad Industrial de Santander
  J. PARDO, Universidad Industrial de Santander
  J. PETIT, Universidad Industrial de Santander

- GM2236, Optimal Voltage Control in Ungrounded Distribution Networks
  X. YU, Alstom Grid Inc
  D. ZHANG, Paragon Decision Technology Inc.
  M. JIN, Alstom Grid Inc.

- GM2288, Comparison of Solar Power Plant Interaction with Different Market Structures
  O. KONASH, Aramco
  R. CHRISTIE, University of Washington

- GM2318, A Variable Line Filter for Active and Reactive Power Control through Grid-Tie-Inverter as a Dynamic VAR Compensator for WECS
  M. AMIN, Manhattan College
  O. MOHAMMED, Florida International University

Tuesday Morning

Attendee Breakfast Co-located with the Student Poster Competition
Tuesday, 23 July, 7:00 AM–9:30 AM  VCC East – Exhibit Hall C

Presenter Breakfast
Tuesday, 23 July, 6:30 AM–8:30 AM  VCC East – Ballroom C

Late Breaking News Super Session: Managing Extreme Events and Developments Affecting Electrical Power Systems  (super session – panel)
Tuesday, 23 July, 8:00 AM–12:00 PM  VCC East – East Meeting Room 1 & Foyer S
Sponsored by:  IEEE Power & Energy Society
Chair:  D. Novosel, Quanta Technology, LLC

SESSION 1:
M. HENDERSON – Challenges and Solutions for Gas and Electrical Interaction
C. ROOT – Northeast Storm Experience and Improvements
T. GWALTNEY, FP&L – Storm Hardening and Preparedness
G. LEMLER, PG&E – Hardening Grid against Vandalism – Metcalf Substation Event
T. PIERPOINT, PHI – Technology Innovations to Improve Response to Extreme Events
Panel Discussion

SESSION 2:
V. ROMERO, SDG&E – Using Microgrids for Disaster Recovery
J. CASTANEDA/B. YINGER, SCE – Modeling and Simulating High Impact System Events
C. WARREN, NGrid – Innovation in Customer Communication during Big Events
S. C. SRIVASTAVA, Indian Institute of Technology Kanpur – Lessons Learnt from Indian Blackout and Future Solutions
Panel Discussion

Behavior of Wind Turbines during Unbalance Grid Conditions (panel)

Tuesday, 23 July, 8:00 AM–12:00 PM REN – Salon C
Sponsored by: Electric Machinery Committee
Chair: I. Erlich, University of Duisburg-Essen
Chair: M. El-Sharkawi, University of Washington

The panel will discuss the following topics:
- Grid and protection requirements; Effect of negative sequence current and voltage on wind turbines including generator and converter (Type 3 and Type 4 WT will be discussed separately); Control options of negative sequence response; Behavior during line to line and single line to ground faults; Negative sequence model of wind turbines

PRESENTATIONS AND PANELISTS:
- GM0464, Capability and Limitations of DFIG based Wind Turbines Concerning Negative Sequence Control
  S. ENGELHARDT, Woodward Kempen GmbH
  J. FORTMANN, REpower Systems
  I. ERLICH, University of Duisburg-Essen
  T. NEUMANN, University of Duisburg-Essen
  F. SHEWAREGA, University of Duisburg-Essen
  J. KRETSCCHMANN, Woodward Kempen GmbH
- GM2598, Impact of Negative Sequence Current Injection by Wind Power Plants
  S. CHAUDHARY, Aalborg University
  Ö. GÖKSU, Aalborg University
  R. TEDORESCU, Aalborg University
  P. C. KJAER, Vestas Wind System A/S
  F. IOV, Vestas Wind System A/S
- GM1953, Wind Turbine Negative Sequence Current Control and Its Effect on Power System Protection
  I. ERLICH, University of Duisburg-Essen
  T. NEUMANN, University of Duisburg-Essen
  F. SHEWAREGA, University of Duisburg-Essen
  P. SCHEGNER, Technical University of Dresden
  J. MEYER, Technical University of Dresden
- GM2631, Asymmetrical Current Injection by Wind Energy Converters During Normal Operation and Unbalanced Faults
  M. FISCHER, Enercon Canada Inc.
- GM2632, Behavior of Siemens Full Converter Turbines During Unbalanced Faults
  R. NELSON, SIEMENS
- GM2633, Negative Sequence Considerations for GE Double-Fed Wind Turbine Generators
  N. MILLER, General Electric

ETCC Combination Session (combo)

Tuesday, 23 July, 8:00 AM–12:00 PM MAR – Shaughnessy II
Sponsored by: Emerging Technologies Coordinating
Chair: B. Djokic, NRC

ETCC Combo Session consists of selected paper presentations on emerging technologies of interest to PES, and the subsequent Committee meeting.

PRESENTATIONS AND PANELISTS:
- GM1320, Control of Static Series Compensator for Mitigating Grid Voltage Disturbance and Load Current Harmonics
  A. IBRAHIM, University of Waterloo
  T. EL-FOULY, Natural Resources Canada
Tuesday Morning, **continued**

- GM0040, Planning of Electric Vehicle Charging Infrastructure  
  C. DHARMAKEERTHI, University of Queensland  
  N. MITHULANANTHAN, University of Queensland
- GM1279, Peak Power Measurement and Substation Capacity Calculation for DC On-Line Electric Vehicle System  
  S. JUNG, Korea University  
  G. JANG, Korea University
- GM1517, Electric Vehicle Charging Modulation Using Voltage Feedback Control  
  A. AL-AWAMI, King Fahd University of Petroleum & Minerals  
  E. SORTOMME, Alstom Grid
- GM0631, Electric Vehicle Lithium Polymer Battery Model Using PSCAD  
  Z. SALAMEH, University of Massachusetts Lowell  
  D. PATEL, University of Massachusetts Lowell  
  S. SHARMA, University of Massachusetts Lowell
  W. YUAN, University of Bath  
  H. ZHANG, University of Bath  
  J. ZHU, China Electric Power Research Institute  
  M. ZHANG, University of Cambridge  
  F. LI, University of Bath

**Planning and Design of Smart Grids: A Holistic Approach (panel)**

Tuesday, 23 July, 8:00 AM–11:00 AM  
VCC East – East Meeting Room 7

Sponsored by: Energy Development and Power Generation  
Chair: P. Ribeiro, Technical University of Eindhoven

The electrical infrastructure of the future will be much more complex than the current one. It will have to integrate traditional and sustainable energy sources, present and new distribution systems, customers with quite different consumption patterns, and smart control systems. However, at this moment there are no comprehensively enough engineering models that can cope with the higher level of complexity of future electric grids. Consequently, engineers use traditional models to design the next generation of electrical infrastructure with the result that important interactions between technical systems will be overlooked; non-technical dimensions like social behavior of customers or moral dimensions of smart control systems will be ignored; and the justified interests of economically weak stakeholders will be neglected.

The objective of the Panel Session is to ask philosophical and empirical questions and present analyses of cases which can assist engineers with the development of holistic planning and designs for electric grids.

**The European Offshore Grid – First Steps (panel)**

Tuesday, 23 July, 8:00 AM–11:00 AM  
MAR – Shaughnessy I

Sponsored by: Energy Development and Power Generation  
Chair: A. Orths, Energinet.dk  
Chair: K. Rudion, Otto-von-Guericke University Magdeburg

In Europe, a discussion is going on concerning the construction of an offshore grid in the North Seas. This implies different aspects from planning procedures up to the implementation of assets. The session comprises presentations related to all different stages. Planning procedures and technical issues are considered by presentations on modeling methodology issues up to building laboratory facilities and laboratory tests of new assets. Economic implications are considered by presentations on planning results and some national / international plans and visions. Legal and regulatory issues are considered in a presentation on today’s incompatibilities between national rules and models facilitating mitigation.

**Optimizing Long Term Expansion Planning of Onshore-Offshore Grid and Interconnectors**

A. MANSOLDO, EirGrid, IE  
M. NORTON, EirGrid, IE

**Technical and Regulatory Challenges for the Construction of an Offshore Grid in the North Sea**

M. GIBESCU, Delft University of Technology, NL  
S. S. TORBAGHAN, Delft University of Technology, NL  
M. A. M. M. VAN DER MEIJDEN, Delft University of Technology, NL  
H. K. MULLER, University of Groningen, NL  
M. M. ROGGENKAMP, University of Groningen, NL

**The GB Offshore Grid – Recent Developments**

J. BIALEK, Durham University, UK
Assets for an Offshore HVDC Grid: Operational Experiences and Test Results of Systems and Components
M. CALLAVIK, ABB, SE

Grid Connections of Offshore Wind Farms
H. KOCH, Siemens AG, DE

The European North-Sea Countries Offshore Grid Initiative – Results
A. ORTHS, Energinet.dk, DK
L. FISHER, EirGrid Plc, IE
D. GREEN, National Grid, GB
F. GEORGE, Elia, BE
E. PELGRUM, TenneT TSO B.V., NL

Design Approach of a VSC HVDC Laboratory Model for Behavioral Analysis of the Offshore Power System
S. RABE, OvG University Magdeburg, DE
M. RICHTER, OvG University Magdeburg, DE
K. RUDION, OvG University Magdeburg, DE
Z. STYCZYNSKI, OvG University Magdeburg, DE

Modeling and Dynamic Performance of Wind and Solar Generation (Combo Session with PSDP Dynamic Performance of Wind Power Generation Working Group)

Tuesday, 23 July, 8:00 AM–12:00 PM VCC West – West Meeting Room 110
Sponsored by: Power System Dynamic Performance
Chair: P. Pourbeik, EPRI

This session is a combo session of the IEEE PES Dynamic Performance of Wind Generation Working Group and the associated panel session. During the first hour the working group meeting will take place, which is a forum for discussing the latest developments related to the modeling and dynamic performance of wind generation typically involving brief technical presentations and group dialogue on future working group activities. The panel session that follows will consist of many technical presentations on various industry efforts in the development of models and model validation related to both wind and photovoltaic generation, as well as studies related to their dynamic performance. There will be ample time at the end of the presentations of dialogue and discussion with the panelists.

PRESENTATIONS AND PANELISTS:

• GM0772, Generic Stability Models for Type 3 & 4 Wind Turbine Generators for WECC
  P. POURBEIK, EPRI
  A. ELLIS, Sandia National Laboratory
  J. SANCHEZ-GASCA, GE
  Y. KAZACHKOV, Siemens PTI
  E. MULJADI, National Renewable Energy Laboratory
  J. SENTHIL, Siemens PTI
  D. DAVIES, WECC

• GM2520, Presentation on the Latest Changes to the Generic Models for Type 1 and 2 Wind Turbine Generators
  B. ZAVADIL, EnerNex

• GM0479, Modular Structure of Wind Turbine Models in IEC 61400-27-1
  P. SORENESEN, Technical University of Denmark
  B. ANDRESEN, Siemens Wind Power
  J. FORTMANN, REpower Systems AG
  P. POURBEIK, Electrical Power Research Institute

• GM1052, Acceptance Testing and Validation of Stability Type Models of Wind Power Plants
  B. BADRZADEH, Australian Energy Market Operator

• GM2524, Presentation on the Perspective of ISOs on the Use of Generic and Standard Models
  D. MANJURE, Midwest ISO

• GM2517, Presentation on the Latest Developments in the Modeling of Photovoltaic Systems for Distribution and Transmission Studies
  A. ELLIS, Sandia National Laboratories

• GM1605, Frequency Stability Support Requirements for WTs in Slow-Response Thermal Power Systems
  C. RAHMANN, University of Chile
  R. MÖLLER, University of Chile
  M. SALLES, University of São Paulo

• GM2518, Presentation on Impedance based Modeling Technique for Wind Turbine Modeling
  L. FAN, University of South Florida
Power System Dynamic Performance Committee – Transactions Paper Session #1

Tuesday, 23 July, 8:00 AM–12:00 PM
MAR – Point Grey

Sponsored by: Power System Dynamic Performance Committee
Chair: B. Pal, Imperial College London

PAPERS AND AUTHORS:

• GM0070, Automatic Reconnection from Intentional Islanding Based on Remote Sensing of Voltage and Frequency Signals [Transaction Number: TSG-00271-2011]
  T. ASSIS, Federal University of Rio de Janeiro
  G. TARANTO, Federal University of Rio de Janeiro

• GM0088, A Recursive Maximum Likelihood Estimator for the Online Estimation of Electromechanical Modes with Error Bounds [Transaction Number: 10.1109/TPWRS.2012.2203323]
  L. DOSIEK, University of Wyoming
  J. PIERRE, University of Wyoming
  J. FOLLUM, University of Wyoming

• GM0220, Dynamic Load Models for Industrial Facilities [Transaction Number: TPWRS-00533-2010.R3]
  W. XU, University of Alberta
  X. LIANG, University of Alberta

• GM0221, Online Tracking of Voltage-Dependent Load Parameters Using ULTC Created Disturbances [Transaction Number: TPWRS-00488-2011.R3]
  W. XU, University of Alberta
  A. AREFIFAR, University of Alberta

• GM0469, Cascading Stall of Many Induction Motors in a Simple System [Transaction Number: TPWRS-00803-2011]
  H. WU, Zhejiang University
  I. DOBSON, Iowa State University

• GM1476, Delay-Dependent Robust Load Frequency Control for Time Delay Power Systems [Transaction Number: TPWRS.2012.2228281]
  C. ZHANG, Central South University
  L. JIANG, University of Liverpool
  Q. WU, University of Liverpool
  Y. HE, Central South University
  M. WU, Central South University

PSIM and Transformer Committee – Transaction Papers (transactions paper)

Tuesday, 23 July, 8:00 AM–12:00 PM
VCC West – West Meeting Room 121

Sponsored by: Power System Instrumentation and Measurements Committee and Wind Power Coordinating Committee
Chair: J. McBride, JMX Services, Inc.
Chair: F. Rahmatian, Quanta Technology

PAPERS AND AUTHORS:

• GM0090, A Resonant Tertiary Winding-Based Novel Air-Core Transformer Concept [Transaction Number: TPWRD-00711-2011]
  P. BAGHERI, University of Alberta
  W. XU, University of Alberta
  W. FREITAS, University of Campinas

• GM0836, Analytical Calculation of Leakage Inductance for Low-Frequency Transformer Modeling [Transaction Number: TPWRD-00723-2012]
  M. LAMBERT, Ecole Polytechnique de Montréal
  F. SIROIS, Ecole Polytechnique de Montréal
  M. MARTINEZ-DURÓ, EDF R&D
  J. MAHSEREDJIAN, Ecole Polytechnique de Montréal

• GM0289, Simulation of Transformer Hot-Spot Heating due to Geomagnetically Induced Currents [Transaction Number: ID TPWRD-00219-2012]
  L. MARTI, Hydro One Networks Inc.
  A. REZAEI-ZARE, Hydro One Networks Inc.
  A. NARANG, Hydro One Networks Inc.
Tuesday Morning, continued

  - F. EDSTRÖM, Royal Institute of Technology
  - J. ROSENBLUND, Royal Institute of Technology
  - P. HILBER, Royal Institute of Technology
  - L. SÖDER, Royal Institute of Technology

- GM1222, Assessment of Voltage Sag Indices Based on Scaling and Wavelet Coefficient Energy Analysis [Transaction Number: TPWRD-00248-2012]
  - F. COSTA, UFRN
  - J. DRIESEN, K.U.Leuven

  - Q. HUANG, University of Electronic Science and Technology of China
  - W. ZHEN, Sichuan Electric Power Test & Research Institute
  - P. PONG, University of Hong Kong

  - D. SHI, NEC Laboratories America
  - D. TYLAVSKY, Arizona State University
  - N. LOGIC, Salt River Project

  - L. FAN, University of South Florida
  - Z. MIAO, University of South Florida
  - Y. WEHBE, University of South Florida

Renewable Resource Operations (transactions paper)

Tuesday, 23 July, 8:00 AM–12:00 PM  VCC West – West Meeting Room 112
Sponsored by: Power System Operations Committee and Power System Planning and Implementation Committee
Chair: J. Zhong, Univ. of Hong Kong

PAPERS AND AUTHORS:

  - S. BAHRAMIRAD, S&C Electric
  - A. KHODAEI, University of Houston
  - W. REDER, S&C Electric

- GM0053, Improved Low Voltage Grid-Integration of Photovoltaic Systems in Germany [Transaction Number: T STE2198925]
  - T. STETZ, Fraunhofer IWES
  - F. MARTEN, Fraunhofer IWES
  - M. BRAUN, Fraunhofer IWES

  - L. NGUYEN, LSIS Company
  - Y. SHIN, LSIS Co., Ltd.
  - J. SOHN, LSIS Co., Ltd.
  - D. WON, INHA University

- GM0426, Online Overvoltage Prevention Control of Photovoltaic Generators in Microgrids [Transaction Number: 10.1109/TSTE.2012.2210150]
  - P. ZHANG, University of Connecticut

- GM1858, Impact of Wind Forecast Error Statistics Upon Unit Commitment [Transaction Number: 10.1109/TSTE.2012.2210150]
  - C. LOWERY, UCD
  - M. O’MALLEY, UCD

  - C. OPATHELLA, Ryerson University
  - B. VENKATESH, Ryerson University

  - B. VENKATESH, Ryerson University
  - P. YU, Ryerson University
Tuesday Morning, continued

  A. KALANTARI, McGill University
  J. RESTREPO, SNC Lavalin
  F. GALIANA, McGill University

Asset Management (panel)

Tuesday, 23 July, 8:00 AM–12:00 PM  REN – Ballroom II
Sponsored by: Power System Planning and Implementation
Chair: A. McGrail, National Grid USA

This session will review the elements of asset management applied in particular to aspects of the electric supply industry and related industries. Short, focused presentations will promote discussion on key elements of asset management; in addition the development of international standards as a means to provide guidance and improvement in asset management will be discussed.

PRESENTATIONS AND PANELISTS:
- GM1587, What Have We Got and Where Is It?
  S. VARADAN, UISOL
- GM1586, What’s It Worth?
  J. BOUFORD, TRC
- GM1588, What Condition Is It In?
  S. HANEBUTH, Power Survey
- GM1589, What Do We Need To Do To/With It?
  K. CORCORAN, Toll Grade
- GM1590, When Do We Need To Act?
  G. BENNETT, Xcel Energy

Algorithms and Tools for Managing Future Power Grids and Electricity Markets (panel)

Tuesday, 23 July, 8:00 AM–10:00 AM  VCC East – East Meeting Room 2, 3 & Foyer S
Sponsored by: (PSACE) Computer Analytical Methods
Chair: E. Haq, California ISO

The increasing penetration of renewable energy sources in coming years in the electrical grid and the advances in smart grid technologies require new efficient algorithms and tools to efficiently manage the power grid and electricity markets while maintaining reliability in a cost effective manner. The variability associated with the renewable resources will require more efficient monitoring, situational awareness tools, advanced market applications and fast and sophisticated controls of the power grid. As the online rotating mass associated with the grid will be reduced due to the high penetration of renewable resources, there will be a high need for the fast evaluation of the system security under dynamic system operating conditions. There will also be a need for more advanced modeling and optimization techniques for the market applications.

PRESENTATIONS AND PANELISTS:
- GM0672, The Model and Data Management Issues across Control Center Applications
  A. BOSE, Washington State University
- GM0674, Toward Real-Time Detection of Critical Contingency of Large Power Systems
  H. CHIANG, Cornell University
  L. WANG, Tianjin University
- GM0675, Advanced Applications and Tools for Transmission Grid Reliability and Wholesale Electricity Markets
  K. ABDUL-RAHMAN, California ISO
- GM0673, Next Generation of Market Applications Required to Manage Grid Volatility
  A. PAPALEXOPoulos, ECCO International
- GM0676, Dynamic Optimal Power Flow for the Improved integration of Distributed Energy Resources
  I. KOCKAR, University of Strathclyde
  S. GILL, University of Strathclyde
- GM1988, Look Ahead to the Unforseen: ERCOT’s Non-Binding Look-Ahead SCED Study
  H. HUI, ERCOT
  C. YU, ABB/Ventyx
  R. SURENDRAN, ERCOT
  F. GAO, ABB/Ventyx
  S. MOORTY, ERCOT
  X. XU, ERCOT
Topics on Distribution System Analysis (panel)

Tuesday, 23 July, 8:00 AM–12:00 PM  REN – Ballroom I
Sponsored by:  (PSACE) Distribution System Analysis
Chair:  J. Fuller, Pacific Northwest National Laboratory

With the advent of new distribution technologies, including significant utility, industry, and government investment, detailed analysis of distribution systems have come to the forefront of power system analysis. Advanced control and optimization algorithms, rich simulation environments, demonstrations, and a score of other advancements have made for a rapidly evolving field, with new (and old) concepts emerging at an unseen before rate. This panel will explore some of the recent advancements in distribution system analysis, from advances in software tools to field demonstrations, the bridge between the two, and how they affect current and future operations of distribution systems.

PRESENTATIONS AND PANELISTS:

- GM0984, Capacitors and Resonance in an AMI/AMR PLC Implementation
  S. MCHANN, Milsoft Utility Solutions, Inc.
- GM0981, Effects of Load Models on Distribution System Losses: A Numerical Study
  A. BRETAG, UFRGS
- GM0985, Estimation of Automatic Voltage Regulation Device due to High-Penetration PV Using Quasi-Static Time-Series Distribution Circuit Analysis
  B. MATHER, NREL
- GM0983, Toward Comprehensive Power Delivery Capability Determination in Distribution Networks
  H. CHIANG, Cornell University
- GM0986, TBD
  L. DENTON, GL Noble Denton
- GM0982, Advances in Including Solar PV and Storage in Distribution Planning
  R. DUGAN, EPRI

Time-Varying and Probabilistic Methods for Harmonics Aggregation Analysis in a Smart Grid (panel)

Tuesday, 23 July, 8:00 AM–10:00 AM  REN – Port of Vancouver
Sponsored by:  Transmission and Distribution
Chair:  P. Ribeiro, Technical University of Eindhoven

The aim of this panel is to further discuss the use of spectral, time-varying and probabilistic methods for harmonic aggregation analysis within the context of smart grids. Different techniques will be presented and discussed for the analysis of harmonics produced by modern electronic loads and renewables sources. The panelists will present the theoretical aspects and practical applications of summation or harmonic aggregation.

PRESENTATIONS AND PANELISTS:

- GM2456, The Probabilistic Approach
  A. TESTA, Seconda Università di Napoli
- GM2489, Time-Varying Approach I
  G. CARPINELLI, Università degli Studi di Napoli Federico II
- GM2511, Time-Varying Approach II
  P. RIBEIRO, Technical University of Eindhoven
  W. XU, University of Alberta
- GM2493, Aggregation / Summation Aspect
  P. RIBEIRO, Technical University of Eindhoven
- GM2454, Case Studies on Wind
  D. MUELLER, Enernex
- GM2494, Case Studies: PV Power
  R. LANGElla, Second University of Naples
Tuesday Morning, continued

General Systems – Lightning Performance of Overhead Lines WG Combination Session (combo)
Tuesday, 23 July, 8:00 AM–12:00 PM VCC West – West Meeting Room 115
Sponsored by: Transmission and Distribution
Chair: E. Petrache, Kinectrics

The session includes a meeting of the Working Group on Lightning Performance of Overhead Lines. It also includes the presentation of several papers related to lightning protection.

PRESENTATIONS AND PANELISTS:
• GM1241, Underground Ground Wires for Transmission Lines: Electrical Behavior and Feasibility
  [Transaction Number: TPWRD-01109-2011]
  J. SEPPÄNEN, Aalto University
  P. TAMMI, Aalto University
  L. HAARLA, Aalto University

• GM1674, Lightning Performance Assessment of 500kV Transmission Lines in Southern China
  X. ZHAO, Huazhong University of Science and Technology

• GM0458, Numerical Simulation and Analysis of Lightning Induced Voltage on Overhead Line
  J. ZHU, Southwest Jiaotong University
  G. WU, Southwest Jiaotong University
  C. SHI, Southwest Jiaotong University
  J. WU, Southwest Jiaotong University
  L. ZHANG, Southwest Jiaotong University
  C. WU, Sichuan Electric Power Research Institute

Power System Flexibility in Operations and Planning (panel)
Tuesday, 23 July, 8:00 AM–12:00 PM VCC West – West Meeting Room 118
Sponsored by: Wind Power Coordinating
Chair: E. Lannoye, University College Dublin
Chair: R. Piwko, Wind Power Coord. Committee

As the penetration of installed variable renewable generation continues to grow around the world, research institutions and industry have developed new methods and metrics for assessing and managing the variability of system demand and the output from variable generation, which together may result in increased ramping requirements on various time scales. This panel session will combine academic research into the area of power system flexibility with summaries of the methods and policies being employed by power systems experiencing significant ramping requirements. Specifically the session will concentrate on the issue of system flexibility requirements in both a long-term planning context and in the context of electricity markets.

PRESENTATIONS AND PANELISTS:
• GM0320, Introduction to Flexibility Issues in Variable Generation Integration
  A. TUOHY, EPRI

• GM0321, The Irish Experience of Market Implementation of a Flexibility Product
  J. O’ Sullivan, EIRGRID

• GM0322, The MISO Experience of Market Implementation of a Flexibility Product
  N. NAVID, MISO

• GM0323, Restructuring Ancillary Reserve Products in Systems with High Penetrations of Variable Generation
  J. RYAN, University College Dublin

• GM0319, Flexi Ramp Market Design for Real-Time Operations: Can It Approach the Stochastic Optimization Ideal?
  B. HOBBS, Johns Hopkins University
  B. WANG, Southeast University

• GM0324, Evaluating and Planning Flexibility in Sustainable Power Systems
  J. MA, University of Manchester
  V. SILVA, Electricity de France (EDF)
  R. BELHOMME, EDF R&D
  D. KIRCHEN, University of Washington
  L. OCHOA, University of Manchester

• GM0325, Increased Flexibility in Power Systems Operations with Price-Based Demand Response
  P. PINSON, Technical University of Denmark (DTU)
  H. MADSEN, Technical University of Denmark (DTU)
  N. O’CONNELL, Technical University of Denmark (DTU)
  M. NIELSEN, Technical University of Denmark (DTU)
Advanced Automation Tech Hydro Wind  (panel)

Tuesday, 23 July, 8:00 AM–12:00 PM         MAR – Pinnacle III
Sponsored by:               Power & Energy Society
Chair:               D. Apps, TBD
Chair:               A. Mosher, BBA Engineering

Utilities are increasingly adopting the computer aided monitoring, control and management of electric power system to provide better services to consumers including advances in reliability, efficiency and environmental protection. Research and development activities worldwide are being carried out to automate the electric power system utilizing recent advancement in the area of Information Technology (IT), control, and communication systems. In view of the above, on-line information, remote control and efficient management of resources are becoming of paramount importance for utilities. This panel presents examples of computer based automation, control and optimization in dam spillway gates, hydroelectric generating units and systems intended to efficiently integrate distributed energy resources.

PANELISTS:
D. KERNIGAN (Innovative Automation)
C. MATTSON (City of Tacoma)
R. DIZZY (Enable Power Networks)
M. LANGEVIN (Opal-RT Technologies)

Protection, Control and PMUs  (paper forum)

Tuesday, 23 July, 8:00 AM–12:00 PM         VCC West – West Meeting Room 211
Sponsored by:               Power & Energy Society

•  GM0051, Dynamic Performance Analysis of Potential Current Control Strategies for Grid Connected Applications
  K. SALEH, Masdar Institute of Science and Technology
  A. AL-OBaidaI, Petroleum Institute
  K. AL-KHUFFASH, GASCO Ltd.
  L. LAMONT, Mott MacDonald Ltd
  E. EL-SAADANY, University of Waterloo

•  GM0095, Real-Time Distance Protective Relay on FPGA
  Y. WANG, University of Alberta
  V. DINAWAH, University of Alberta

•  GM0209, Line Parameter Estimation Using Phasor Measurements by the Total Least Squares Approach
  K. DASGUPTA, IIT Bombay
  S. SHREEVARDHAN, IIT Bombay

•  GM0459, A New Robust Identification Method for Ax of Synchronous Generator with Steady-State PMU Data
  A. XUE, North China Electric Power University
  J. ZHANG, North China Electric Power University
  S. CHEN, Electrical Power Company of Anhui Province
  W. TANG, Electrical Power Company of Anhui Province
  S. HU, Electrical Power Company of Anhui Province
  T. BI, North China Electric Power University

•  GM0620, Feasibility of Fast Pilot Protection for Multi-Load Distribution Systems
  G. KARADY, Arizona State University
  A. ROGERS, Arizona State University
  V. IYENGAR, Arizona State University

•  GM0881, Performance Bounds and Sensor Placement for State Estimation Using PMUs with Phase Mismatch
  P. YANG, Washington University in St. Louis
  Z. TAN, Washington University in St. Louis
  A. WIESEL, Hebrew University of Jerusalem
  A. NEHORAI, Washington University in St. Louis

•  GM0895, Calculation Method for One-Section Lumped-Circuit Model of Uniform Line
  L. JUAN, Shandong University
  G. HOU-LEI, Shandong University
  X. XONG-DUAN, China University of Petroleum (East China)
  Z. GUI-BIN, Shandong University
  X. BING-YIN, Shandong University of Technology
Tuesday Morning, continued

- GM0896, Non-Real-Time Hardware-In-Loop Electromagnetic Transient Simulation of Microcontroller-Based Power Electronic Control Systems
  G. CHONGVA, University of Manitoba
  S. FILIZADEH, University of Manitoba

- GM0936, Compressing Phasor Measurement Data
  P. TOP, Lawrence Livermore National Lab
  J. BRENEMAN, Lawrence Livermore National Lab

  P. BANERJEE, IIT Kanpur

- GM1049, Performance of a Parallel Hybrid Active Filter with Selective Harmonic Control
  L. HERMAN, University of Ljubljana
  B. BLAŽIC, University of Ljubljana
  I. PAPIC, University of Ljubljana

- GM1120, Eliminating Voltage Violations in Power Systems Using Secondary Voltage Control and Decentralized Neural Network
  H. MEHRJERDI, Research Institute of Hydro Quebec
  S. LEFEBVRE, Research Institute of Hydro Quebec
  M. SAAD, Quebec University (ETS)
  D. ASBER, Research Institute of Hydro Quebec

- GM1156, A Hierarchical WAMPAC System: Demonstration and Evaluation
  Y. TADA, Tokyo Electric Power Co.
  H. CHIANG, Cornell University
  H. LI, Bogwood Systems
  A. ISHIBASHI, Toshiba
  Y. SERIZAWA, Central Research Institute of Electric Power Industry

- GM1238, A Tank Vibration Model for Online Monitoring of Power Transformer
  B. LUO, Shanghai Jiaotong University
  F. WANG, Shanghai Jiaotong University
  Z. JIN, Shanghai Jiaotong University

- GM1462, Challenges for Special Protection Systems in the Chilean Electricity Market
  R. PALMA, University of Chile
  A. DE LA QUINTANA, CONECTA

- GM1866, Applying Power Domination with Hybrid Search to Optimal PMU Placement Problems
  X. GUO, National Tsing Hua University
  C. CHU, National Tsing Hua University
  C. LIAO, National Tsing Hua University
  T. HSIEH, National Tsing Hua University
  J. LIU, National Tsing Hua University

- GM2181, Optimal Placement of Phasor Measurement Units (PMU) Using a Novel Method based on Observability Gramian and Full Observability Rank
  S. KAMALASADAN, University of North Carolina at Charlotte
  N. KULKARNI, University of North Carolina at Charlotte

- GM2233, A Network Reconfiguration Algorithm for the Reduction of Expected Fault Currents
  P. VOIGOS, University of Parts
  H. SONG, National University of Science and Technology
  K. CHO, Korea Power Exchange
  T. KIM, Korea Power Exchange

- GM2311, Application of Modern Techniques for Detecting Subsynchronous Oscillations in Power Systems
  Y. XIA, University of Idaho
  H. XIA, University of Tennessee
  B. JOHNSON, University of Idaho
  N. FISCHER, Schweitzer Engineering Laboratories

- GM0796, Capacitor Placement and Control Experiment for Reconfigurable Distribution Automation and Control Laboratory
  A. DEESE, College of New Jersey
  V. CECCCHI, University of North Carolina, Charlotte
  K. MIU, Drexel University
Smart Grid and FACTS (paper forum)
Tuesday, 23 July, 8:00 AM–12:00 PM VCC West – West Meeting Room 208-209
Sponsored by: Power & Energy Society

- GM0563, Voltage Quality Improvement in Distribution Networks Containing DERs Using UPQC
  S. MAZUMDER, Queensland University of Technology
  A. GHOSH, Queensland University of Technology
  F. ZARE, Queensland University of Technology

- GM0899, Energy Efficient Demand Control for Air-Conditioning Systems
  Y. TOMITA, Hitachi, Ltd.
  K. KUWABARA, Hitachi, Ltd.
  N. KOBAYASHI, Hitachi, Ltd.
  J. MURATA, Kyushu University
  T. GODA, Kyushu University

- GM0941, Energy Management for a Customer Owned Grid-Tied Photovoltaic Micro Generator
  C. ADIKA, University of Toledo
  L. WANG, University of Toledo

- GM0974, A Control Strategy of Battery Energy Storage System and Allocation in Distribution Systems
  Y. ZHENG, University of Newcastle
  Z. DONG, University of Newcastle
  K. MENG, University of Newcastle
  F. LUO, University of Newcastle
  H. TIAN, University of Newcastle
  K. WONG, University of Western Australia

- GM1225, SGSim: A Unified Smart Grid Simulator
  S. SON, Gachon University
  J. KIM, Gachon University
  S. LEE, Gachon University
  S. PARK, Gachon University
  B. CHUNG, Gachon University

- GM1284, Optimal Dispatch of LTC and Switched Shunt Capacitors in Smart Grid with Plug-In Electric Vehicles
  S. DEILAMI, Curtin University
  M. MASOUM, Curtin University

- GM1291, MMC-UPQC: Application of Modular Multilevel Converter on Unified Power Quality Conditioner
  Y. LONG, North China Electric Power University
  X. XIAO, North China Electric Power University
  Y. XU, North China Electric Power University
  B. YU, North China Electric Power University
  Y. XU, North China Electric Power University
  J. HAO, North China Electric Power University

- GM1300, Privacy Preserving Smart Metering System Based Retail Level Electricity Market
  C. THOMA, University of Pittsburgh
  T. CUI, Carnegie Mellon University
  F. FRANCHETTI, Carnegie Mellon University

- GM1363, The Multi-Objective Voltage Stability Coordinated Control Strategy of FACTS
  Z. FEI, North China Electric Power University

- GM1374, Impact of Control Implementations on the Output Impedance of Voltage-Sourced Converters
  K. ALAWASA, University of Alberta
  Y. ABDEL-RADY I. MOHAMED, University of Alberta
  W. XU, University of Alberta

- GM1535, Optimal Industrial Load Control in Smart Grid: A Case Study for Oil Refineries
  A. GHOJIAN, University of California at Riverside
  H. MOHSENIAN-RAD, University of California at Riverside
  Y. HUA, University of California at Riverside
  J. OIN, University of Southern California

- GM1566, Smart Grid Opportunities in Islanding Detection
  L. MILLER, EnerNex
  J. SCHÖNE, EnerNex
  R. KUNTE, EnerNex
  G. YOUNG MORRIS, CEATI
Tuesday Morning, continued

- **GM1594**, Considerations on Signal Processing for Power Systems in the Context of Smart Grids
  T. CARVALHO, CEFET-MG
  C. DUQUE, UFJF
  P. SILVEIRA, Itajubá Federal University
  P. RIBEIRO, Eindhoven University of Technology

- **GM1631**, Data Traffic Analysis of Utility Smart Metering Network
  W. LUAN, BC Hydro
  D. SHARP, BC Hydro
  S. LAROC, BC Hydro

- **GM1810**, Coordinated Monitoring of Large Scale Interconnected Power Systems
  I. KOLOSOK, L.A. Melentiev Energy System Institute
  E. KORPIN, L.A. Melentiev Energy System Institute
  A. GLAZUNOVA, L.A. Melentiev Energy System Institute
  N. VOROPAI, L.A. Melentiev Energy System Institute
  A. MUTULE, Institute of Physical Energetics
  K. BRINKIS, Institute of Physical Energetics
  O. KOCHUKOV, Institute of Physical Energetics

- **GM1886**, Energy Efficient Residential Areas through Smart Grids
  E. KLAASSEN, Eindhoven University of Technology
  W. KLING, Eindhoven University of Technology
  H. SLOOTWEG, Eindhoven University of Technology

- **GM2122**, A Control Method for Angle-Controlled STATCOMs Under System Faults
  S. BABAEI, North Carolina State University
  B. PARKHIDEH, North Carolina State University
  S. BHATTACHARYA, North Carolina State University
  B. FARDANESH, New York Power Authority

- **GM2210**, Application of Smart Grid Technologies in Developing Areas
  E. KLAASSEN, Eindhoven University of Technology
  A. BALKEMA, Eindhoven University of Technology
  B. ASARE-BEDIAKO, Eindhoven University of Technology
  W. KLING, Eindhoven University of Technology

- **GM2251**, Average-Value Modeling of Thyristor Controlled Line-Commutated Converter Using Voltage and Current Source Formulations
  H. ATIGHECHI, University of British Columbia
  J. JATSKEVICH, University of British Columbia
  J. CANO, University of Oviedo

- **GM0556**, Progressive Switching Attacks for Instigating Cascading Failures in Smart Grids
  S. LIU, Texas A&M University
  B. CHEN, Texas A&M University
  D. KUNDUR, University of Toronto
  T. ZOURNOT, Texas A&M University
  K. BUTLER-PURRY, Texas A&M University

**Synchrophasor Fundamentals and Applications: Leveraging the Investment (tutorial)**

*Tuesday, 23 July, 8:00 AM–5:00 PM REN – Salon A*

*Sponsored by: IEEE PES and Power & Energy Education Committee*

**INSTRUCTORS:**

D. BRANCACCIO
J. CHOW
F. L. ELMENDORF
R. M. GARDNER
S. GHIOCEL
K. JONES
I. KAMWA
D. M. LAVERY
K. MARTIN
M. PAOLONE
S. STAPELS
J. S. THORP
K. UHLEN
L. VANFRETTE
A. D. WHITE
The past five years have seen an immense public and private interest, investment, and cooperation in the synchrophasor technology space. Many electric transmission owners and operators in North America were awarded grants to deploy a great number of PMUs across their respective service areas, along with the related communications and IT infrastructure.

The availability of this new infrastructure can enable the development and implementation of new applications that utilize time-synchronized dynamic measurements. However, unless properly managed, challenges involved in designing, deploying, and operating and, ultimately, extracting value from this new capital- and data-intensive synchrophasor infrastructure can be daunting. While the research indicates tremendous value in leveraging synchrophasor technology, a divide still exists between the current state of the technology and the possibilities that synchrophasor technology enable.

The purpose of this tutorial is to address the fundamentals of synchrophasor technology and synchrophasor-enabled applications at a practical level. The tutorial will be delivered by hands-on practitioners of the technology along with those in the research community. Covering topics across the spectrum of the technology space, the tutorial opens with a session on synchrophasor computation fundamentals, continues in sessions focusing on PMU installation and testing, designing IT and communications for synchrophasors, deploying synchrophasor applications from the lab to the field, managing the data, state estimation, and culminates in a session on synchrophasor-based widearea control implemented in a utility.

Application of IEC CIM Standards in Power System Modeling, Smart Grid and Enterprise Integration (tutorial)

Tuesday, 23 July, 8:00 AM–5:00 PM  REN – Salon B
Sponsored by: Power & Energy Education Committee and Power System Operations Committee

INSTRUCTORS:
J. BRITTON, CIM Task Force
A. MCMORRAN, CIM Task Force
M. GOODRICH, CIM Task Force
E. HAQ, CIM Task Force

This tutorial is organized by the CIM task force on power system information modeling under CAM subcommittee.

The common information model (CIM) is an established IEC standard for modeling power system data and information. Recently the CIM standard has been adopted by many utilities worldwide for exchanging power system network models and enterprise wide integration. It is necessary to educate the power system engineers, data modelers and IT integration personnel on the various aspects of this CIM standard so that more and more utilities worldwide can adopt this standard. This tutorial will provide the basic understanding of power system information modeling using CIM. It will provide in depth knowledge of power system model exchange between utilities and enterprise integration using CIM standard.

The attendees of this tutorial will become familiar with the use of the CIM standard as it relates to the various applications including smart grid. It is expected that the attendees will gain sufficient knowledge about the various aspects of CIM so that they can facilitate the adoption of the CIM standard in their respective enterprise.

Power System Basics – Understanding the Electric Utility Operation Inside and Out (tutorial)

Tuesday, 23 July, 8:00 AM–5:00 PM  REN – Salon F
Sponsored by: IEEE PES

INSTRUCTOR:
W. J. ACKERMAN

The focus of this course is to provide a fundamental foundation in electric power systems, from basic formulas to the planning, operations, and equipment involved in generating, transmitting, and distributing electric power. Basic electrical terminology will be explained in simple to understand language with regard to design, construction, operation and maintenance of power plants, substations and transmission and distribution lines. Topics covered in the course include an introduction to the fundamentals and basic formulas of electricity as well as the equipment involved in the electric power system. An overview of generation, substations, transmission, distribution, and utilization is provided. Protection, reliable operation, and safety are among the topics covered.
Tuesday Morning, continued

EMC Generation SubCommittee Combination Session (combo)

Tuesday, 23 July, 9:00 AM–12:00 PM MAR – Ambleside II
Sponsored by: Electric Machinery
Chair: K. Chen, Siemens Corporation

This session will combine the EMC Generation SubCommittee annual meeting with two papers whose subjects include a status update on the effort to harmonize IEEE C50.13 with IEC 60034 and a discussion on the calculation method of circulating current in parallel windings of large generators.

PRESENTATIONS AND PANELISTS:
- GM2289, 2013 Update on the Revision Plan for IEEE C50.13 and Harmonization with IEC 60034 Standards for Large Cylindrical Rotor Synchronous Machines
  M. SEDLAK, Midwest Generation EME LLC
- GM0250, Calculation Method of Circulating Current in Parallel
  J. YOSHIDA, Hitachi Ltd.
  N. HINO, Hitachi Ltd.
  K. TAKAHASHI, Hitachi Ltd.
  A. NAKAHARA, Hitachi Ltd.
  A. KOMURA, Hitachi Ltd.
  K. HATTORI, Hitachi Ltd.


Tuesday, 23 July, 9:00 AM–12:00 PM VCC East – East Meeting Room 17
Sponsored by: Power System Operations Committee
Chair: Y. Guan, University of Florida
Chair: L. Wu, Clarkson University

This Panel Session is Part I of a two-part series on Managing Uncertainty in Power System and Market Operations. In the future power grid, the increasing penetration of renewable energy and introduction of demand response programs increase power system operation uncertainties and require more flexible and reliable approaches for power supply and consumption. This panel is sponsored by Power System Operations Committee to discuss the operational security and economic issues in response to various uncertainties in power systems. The panel aims to address effective uncertainty modeling and mitigation strategies via the robust optimization methodologies that can advance the operational security and economy of power systems under uncertainty.

PRESENTATIONS AND PANELISTS:
- GM1076, Scheduling Energy and Reserve in Markets with Stochastic Producers via Robust Optimization: Achievements and Challenges Ahead
  A. CONEJO, Univ. Castilla – La Mancha
- GM1077, Robust Unit Commitment with Wind Power
  J. WANG, Argonne National Laboratory
- GM1078, Chance-Constrained and Robust OPF
  D. BIENSTOCK, Columbia University
- GM1079, Applying Robust Optimization to MISO Look-Ahead Commitment
  X. WANG, Alstom
  Y. Chen, MISO
- GM1080, Topics on Modeling and Solving the Energy and Reserve Scheduling Problem Under a Joint Generation and Transmission Security Criterion
  A. STREET, PUC-Rio

Advances in Power System Operation (panel)

Tuesday, 23 July, 9:00 AM–12:00 PM REN – Ballroom III
Sponsored by: Power System Operations Committee
Chair: E. Vaahedi, BC Hydro

The electricity deregulation in the last decade created a new landscape for the energy industry. This change coupled with the potential for increasing penetration of large amounts of integrated and variable generation and the move toward smart grid including advanced generation, transmission, distribution and customer enablement technologies continue to increase the complexity of power system operation.
This panel session explores technology advances to manage power system operation in the evolving energy landscape and capitalize on safety, reliability and efficiency opportunities.

**PRESENTATIONS AND PANELISTS:**

- **GM2084, Smarter Grid Operations – Solutions & Challenges**
  M. ATKINSON, Alstom Grid

- **GM2085, IT / OT Integration to Enable Smart Grid Operation**
  T. GODDART, Siemens

- **GM2086, Utility Prospective on Power System Operation Advances**
  M. HUANG, BC Hydro

- **GM2087, Meeting Emerging Challenges in Power System Operations**
  F. ALBUYEH, OATI

- **GM2088, Advanced Power System Operations to Drive Distribution Operational Effectiveness**
  G. RACKLIFFE, ABB

- **GM2089, Flexible Distribution: Myth or Reality?**
  E. DESCHENES, Schneider

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**Contact Voltages in the Public Right-of-Way (panel)**

**Tuesday, 23 July, 9:00 AM–12:00 PM VCC West – West Meeting Room 114**

**Sponsored by:** Transmission and Distribution Committee and PSACE Committee

**Chair:** C. DeNardo, We Energies

There is growing public awareness and concern about stray and contact voltages in the public right-of-way. In response several states have required electric utilities to implement contact voltage detection programs. This panel will discuss data from existing detection programs, contact voltage measurement methodology and complexity, technical advances in contact voltage detection and source determination, contact voltage as it pertains to manhole fires and explosion and a proposed matrix of allowable stray and contact voltage exposures.

**PRESENTATIONS AND PANELISTS:**

- **GM2437, The Results of Asset-Based Manual Testing of Utility-Owned Objects for Contact Voltage in New York State**
  S. HANEJIBUTH, Power Survey

- **GM2582, The Link Between Contact Voltage and Manhole Fires and Explosions**
  S. HANEJIBUTH, Power Survey

- **GM2436, Using Harmonic Measurements to Aid in Source Determination during Elevated Voltage Investigations**
  S. MARTINO, Central Hudson Gas and Electric

- **GM2435, A Recommended Standard for Utility Voltages Appearing Across Publicly Accessible Surfaces**
  J. BOUFORD, TRC

- **GM2576, Semiconductors as a Source of Voltage in Publicly and Privately Accessible Locations**
  M. VOIGTSBERGER, Premier Utility Services

- **GM2577, Measurement Techniques for the Evaluation of Contact Voltage on Publicly and Privately Accessible Locations**
  D. KALOKITIS, Power Survey Corporation

- **GM2578, Contact Voltage – Handheld versus Mobile Detection**
  J. JOY, Seattle City Light

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**PQ – Power Quality Interest Group Meeting Combination Session (combo)**

**Tuesday, 23 July, 9:00 AM–10:30 AM MAR – Dundarave**

**Sponsored by:** Transmission and Distribution

**Chair:** B. Moncrief, EnerNex

The SCC22 Standards Coordinating Committee on Power Quality organizes a Power Quality Interest Group Meeting once per year to host presentations on current topics in power quality. This interest group meeting includes presentations by SCC22 committee members as well as invited paper presentations.

**PRESENTATIONS AND PANELISTS:**

- **GM0205, Telephone Interference Caused by Harmonics in Distribution Systems: Analysis and Simulations**
  G. TODESCHINI, EnerNex LLC
  D. MUELLER, EnerNex LLC
  G. YOUNG MORRIS, CEATI International
Tuesday Morning, continued – Tuesday Afternoon

- **GM1537, A New Method for Flicker Severity Forecast**
  G. CHANG, National Chung Cheng University
  H. LU, National Chung Cheng University

**Intelligent OPF in an Uncertain and Variable Environment (panel)**

*Tuesday, 23 July, 10:00 AM–12:00 PM VCC East – East Meeting Room 8 & 15*

*Sponsored by: (PSACE) Intelligent Systems*

*Chair: G. Hug, CMU*

*Chair: G. Venayagamoorthy, Clemons*

High penetration of variable renewable energy demands major upgrades to the existing power grid transmission infrastructure. Increasing transmission capacities and interconnections creates larger balancing areas. With a larger balancing area, more grid-connected energy systems can be coordinated to achieve one or multiple control objectives (for example, balancing variable renewable energy), but how to achieve such an optimal coordination has not yet been fully answered. This panel will address possible ways to achieve optimal power flow in variable and uncertain operating conditions.

**PRESENTATIONS AND PANELISTS:**

- **GM1002, Optimal Power Flow – R meets D**
  B. SCOTT, Alsac, Inc.

- **GM1000, Dynamic Stochastic Optimal Power Flow**
  G. VENAYAGAMOORTHY, Clemson University

- **GM1003, Dealing Smartly with Uncertainties in OPFs**
  C. CANIZARES, University of Waterloo

- **GM1001, Distributed Optimization to Enable a Flexible Power Grid with Corrective Power Flow Control**
  G. HUG, CMU

**Distribution Reliability Analysis Tools and Methods (panel)**

*Tuesday, 23 July, 10:00 AM–12:00 PM REN – Port of Vancouver*

*Sponsored by: Transmission and Distribution Committee and PSACE Committee*

*Chair: I. Hoogendam, PacifiCorp*

This panel session will highlight some of the reliability analysis tools and methodologies that have been discussed within the Distribution Reliability Working Group’s Tools Task Force. Tool development aims to go beyond the calculation of standard reliability metrics and focuses on creative ways to utilize outage management system data for identifying potential reliability improvements.

**PRESENTATIONS AND PANELISTS:**

- **GM2544, Distribution Asset Ranking Techniques**
  D. ROSE, Westar Energy

- **GM2543, Investigating Distribution Devices Exceeding Reliability Thresholds**
  I. HOOGENDAM, PacifiCorp

- **GM2581, Examples of Fault Location Analysis Tools**
  D. SABIN, Electrotek Concepts

**Tuesday Afternoon**


*Tuesday, 23 July, 1:00 PM–5:00 PM VCC East – East Meeting Room 1 & Foyer S*

*Sponsored by: IEEE Power & Energy Society*

*Chair: D. Hilt, Quanta Technology*

Topics that will be discussed in this session include:

- J. DAGLE (Pacific Northwest Labs): Geomagnetic Storms and Long-Term Impacts on Power Systems – No super session paper, but PNNL has a paper that studied the effects on the WECC system
E. E. BERNAEBU (Dominion Power): He will present his work on understanding the impacts on their equipment.

J. KAPPEMAN (Storm Analysis Consultants): He will present his work described in the FERC Meta 322 report on mitigation strategies and updated work he has on mitigation strategies.

R. GIRGIS (ABB St. Louis): Dr. Girgis – Methodology for Evaluating the Impact of GIC and GIC Capability of Power Transformer Designs.

Transaction Presentations on Electric Machines (transactions paper)

Tuesday, 23 July, 1:00 PM–5:00 PM MAR – Point Grey
Sponsored by: Electric Machinery Committee

PAPERS AND AUTHORS:

- GM0200, Analysis of Permanent-Magnet Synchronous Generator with Vienna Rectifier for Wind Energy Conversion System [Transaction Number: 10.1109/TSTE.2012.2208660]
  - H. CHEN, MathWorks
  - N. DAVID, Iowa State University
  - D. ALIPRANTIS, Iowa State University

- GM0494, A Phase-Domain Synchronous Machine Model with Constant Equivalent Conductance Matrix for EMTP-Type Solution [Transaction Number: TEC-00307-2012]
  - L. WANG, ABB Corporate Research Center
  - J. JATSKEVICH, University of British Columbia

  - M. CHAPARII, University of British Columbia
  - L. WANG, ABB Corporate Research Center
  - J. JATSKEVICH, University of British Columbia
  - H. DOMMEL, University of British Columbia
  - S. PEKAREK, Purdue University

  - A. CRAMER, University of Kentucky
  - B. LOOP, PC Krause and Associates
  - D. ALIPRANTIS, Iowa State University

- GM1354, A Wavelet Filtering Scheme for Noise and Vibration Reduction in High-Frequency Signal Injection-Based Sensorless Control of PMSM at Low Speed [Transaction Number: DOI: 10.1109/TEC.2011.2181995, 6138299]
  - O. MOHAMMED, Florida International University
  - A. ARSHAN KHAN, Chrysler Group LLC
  - A. MOHAMED, Florida International University
  - A. NEJADPACK, Florida International University
  - M. ROBERTS, Naval Surface Warfare Center

- GM1378, HIL-Based Finite-Element Design Optimization Process for the Computational Prototyping of Electric Motor Drives [Transaction Number: DOI: 0.1109/TEC.2012.2200897, 06214993]
  - A. SARIKHANI, Florida International University
  - O. MOHAMMED, Florida International University

- GM2234, Dynamic Average-Value Modeling of 120° VSI-Commutated Brushless DC Motors with Trapezoidal Back EMF [Transaction Number: TEC-00276-2011]
  - K. TABARRAEE, Powertech Labs Inc.
  - J. JATSKEVICH, University of British Columbia

EMC Motor SubCommittee Combo Session (combo)

Tuesday, 23 July, 1:00 PM–5:00 PM MAR – Ambleside II
Sponsored by: Electric Machinery
Chair: A. Chiba, Tokyo Institute of Technology

This session will combine the annual meeting of the Motor SubCommittee of the Electric Machinery Committee and the presentation of the Field Award Recipient papers dealing with motor technology.

- Analysis, Design and Manufacturing of High Efficiency Machines – Technical Presentation
  - D. IONEL, IEEE Fellow
Tuesday Afternoon, continued

Advanced Controls for Wind and PV Systems (panel)

Tuesday, 23 July, 1:00 PM–5:00 PM  REN – Salon C
Sponsored by: Electric Machinery Committee
Chair: R. Nelson, Siemens

The following topics will be covered:

- Coordinated Volt / VAR Control of Utility-Scale Solar Photovoltaic Plants Using Reactive Power Capabilities of Inverters and Switched Assets; Offshore Wind Power Plant with HVDC-VSC; Operation of Full Converter Wind Turbines in Low-SCR Applications with a Weak Grid Stabilizer; Adaptive Control to Avoid Harmonic Resonance under Variable Grid Conditions; Connecting Wind Power Plant with Weak Grid – Challenges and Solutions; Operation of Wind Power Plants in High Impedance Grids: Loss of Stability Control for Maximizing Wind Power vs. Power Quality

PRESENTATIONS AND PANELISTS:

- GM2593, Adaptive Control to Avoid Harmonic Resonance Under Variable Grid Conditions
  J. SUN, Rensselaer Polytechnic

- GM2640, Wind Farms for Weak Grids
  S. NIKOLAI, Enercon

- GM2641, Operation of Full Converter Wind Turbines in Low SCR Applications
  B. YIN, Siemens Power

- GM2588, Offshore Wind Power Plant with HVDC-VSC
  E. Muljadi, NREL
  V. Gevorgian, NREL
  M. Singh, NREL

- GM2589, Connecting Wind Power Plant with Weak Grid – Challenges and Solutions
  Y. ZHOU, Vestas Wind System A/S
  D. NGUYEN, Vestas Wind System A/S
  P. KJÆER, Vestas Wind System A/S
  S. SAYLOR, Vestas Wind System A/S

- GM2590, Coordinated Volt/VAR Control of Utility Scale Solar Photovoltaic Plants Using Reactive Power Capabilities of Inverters
  J. BEBIC, GE Energy
  M. SHAO, GE Energy
  R. KONOPINSKI, GE Energy

- GM2591, Advanced Control for Voltage Stabilization Using Wind Turbines
  J. FORTMANN, RE Power

Prevention of Blackouts in Transmission Systems by System Security Improvement-Experiences with Cutting-Edge Solutions (panel)

Tuesday, 23 July, 1:00 PM–4:00 PM  MAR – Shaughnessy II
Sponsored by: Energy Development and Power Generation
Chair: R. Krebs, Siemens Infrastructure & Cities Sector
Chair: Z. Styczynski, Technical University Magdeburg

The session is addressing European developments and activities for an intelligent improvement of the flexibility and utilization of transmission systems and blackout prevention. In Europe the amount of fluctuating renewable infeeds to transmission networks as bulk generation of large windfarms or as distributed generation in MV networks requires new strategies in the system operation.

The panel comprises contributions related to high speed cutting-edge solutions for the assessment of the dynamic security and to their application in transmission control centers. Necessary dedicated measures to avoid risk of instability are presented in 2 research contributions.

Wide-area control systems will be mandatory in future smart transmission grids with fluctuating generations. Regular protection system audits and continuous adaption of relay settings is additionally a prerequisite for stable operation of smart transmission grids.

The session will be completed by the presentation of a European-Union project, that focuses on the vulnerability identification, defence and restoration.

State-of-the-Art Power System Security Assessments

AUTHOR KREBS, Siemens, Erlangen, Germany
AUTHOR LERCH, Siemens, Erlangen, Germany
AUTHOR STYCZYNSKI, OxG-University of Magdeburg, Germany
AUTHOR JÄGER, FA University, Erlangen
Power System Expansion: New Challenges, Developments and Best Practices in Systems with Strong Growth (panel)

Tuesday, 23 July, 1:00 PM–5:00 PM     MAR – Shaughnessy I

Sponsored by: Energy Development and Power Generation
Chair: R. Moreno, Imperial College London
Chair: B. Bezerra, PSR

Various actors in the energy world, from network operators to policy makers, are facing more and more challenges in the attempt to deliver economical and secure future energy systems with low environmental impact. The willingness to increase the amounts of renewable generation; advances in Smart Grid technology; market and regulatory uncertainty; the interaction between various energy sectors, regimes and countries; and the response of customers and the overall society, create a more complex environment for the decision making process of investment in power systems. In this context, this panel will present concepts and experiences worldwide to face challenges concerning power system expansion in systems with strong growth.

PAPERS
• Flexible Network Development under Uncertainty
  P. Mancarella, University of Manchester
• Coordinating Offshore, Onshore and Interconnector Regimes for the Future Development of Low-Carbon Transmission Networks in Great Britain
  G. Strbac, Imperial College London
  R. Moreno, Imperial College London
  C. Vasilakos, Imperial College London
  I. Konstantelos, Imperial College London
Tuesday Afternoon, continued

  F. D. MUNOZ, Johns Hopkins University
  B. F. HOBBES, Johns Hopkins University
  J. HO, Johns Hopkins University
  S. KASINA, Johns Hopkins University

- Transmission Planning with the Needed Reserves for Supporting Wind Generation
  E. SAUMA, Pontificia Universidad Católica de Chile
  C. MUÑOZ, Pontificia Universidad Católica de Chile
  J. CONTRERAS, Universidad de Castilla – La Mancha
  J. AGUADO, Universidad de Málaga
  S. DE LA TORRE, Universidad de Málaga

- Distributed Storage Resources for the Smart Grid
  M. NEGRETE-PINCETIC, University of California, Berkeley
  D. CALLAWAY, University of California, Berkeley
  K. POOLLA, University of California, Berkeley

- Ensuring Generation Expansion in Brazil through Energy Auctions: Lessons Learned and Improvements Still Needed
  B. BEZERRA, PSR
  L. BARROSO, PSR
  J. ROSENBLATT, PSR
  P. AVILA, PSR
  M. PEREIRA, PSR

- Social and Environmental Challenges in Power System Development in Chile
  S. MOCARQUE, Systep
  H. RUDNICK, Pontificia Universidad Católica de Chile

Hands-on Activities for Pre-Engineering Outreach (panel)
Tuesday, 23 July, 1:00 PM–5:00 PM VCC West – West Meeting Room 119-120
Sponsored by: Power & Energy Education
Chair: A. Srivastava, Avista Corporation

The goal of this panel is to provide an overview of existing hands-on activities for pre-engineering outreach, which can be easily adopted by interested individuals for outreach efforts. These hands-on activities are designed to target pre-engineering students, guidance counselors, school teachers, university professors, and parents to increase the awareness and image of the power engineering profession in an interesting manner. This is necessary to provide a solution for the problem with an aging workforce and with ongoing modernization of the electric power system.

Members of the power engineering career promotion and workforce development subcommittee have been in touch with several potential panelist who have been working on reaching out to pre-engineering students to promote our professions.

PRESENTATIONS AND PANELISTS:
- GM1644, Tinker, Observe, Engage, Excite: Preparing for Our Energy Future
  J. SEBASTIK, University of Illinois at Urbana-Champaign
- GM1643, Introducing Pre-Engineering Female Students to the Challenges and Opportunities of Renewable Generation: An Experience Report
  G. HUG, CMU
- GM1645, It's Blowing in the Wind! Kindergarten – College Wind Energy Education Initiatives
  M. ARQUIN, Kidwind Project
- GM1646, Development of a Novel K-12 Middle School Curriculum on Energy and Electricity
  G. REED, University of Pittsburgh
- GM2583, K-12 Power Engineering Outreach in Alberta Canada
  B. ROSEHART, University of Calgary
- GM2585, Project SOS: Science of Sustainability
  T. LIENHARD, Avista Corporation

Identification of Electromechanical Modes in Power Systems (Combo Session with PSDP Power System Stability Subcommittee Meeting)
Tuesday, 23 July, 1:00 PM–5:00 PM MAR – Pinnacle III
Sponsored by: Power System Dynamic Performance
Chair: J. Sanchez-Gasca, GE
PRESENTATIONS AND PANELISTS:

- **GM0630, Linear Ringdown Analysis Methods**
  M. CROW, Missouri University of Science & Technology
  J. SANCHEZ-GASCA, General Electric
  J. CHOW, Rensselaer Polytechnic Institute
  J. HAUER, Pacific Northwest National Laboratory
  H. HUANG, Pacific Northwest National Laboratory
  J. HAUER, University of Wyoming
  D. TRUDNOWSKI, Montana Tech University
  L. VANFRETTI, KTH Royal Institute of Technology
  N. ZHOU, Pacific Northwest National Laboratory

- **GM0649, Estimation of Electromechanical Oscillations in the Nordic Grid Using Ambient Data Analysis**
  L. VANFRETTI, KTH Royal Institute of Technology
  V. PERIC, KTH Royal Institute of Technology
  J. GJERDE, Statnett SF

- **GM2526, TBD**
  D. TRUDNOWSKI, Montana Tech

- **GM1710, Identification of Electromechanical Modes in Power Systems: A Nonlinear and Non-Stationary Perspective**
  A. MESSINA, Cinvestav

- **GM0702, Industry Responses to a Questionnaire on the Introduction, Performance and Usage of Modal Estimators in Practice**
  D. VOWLES, University of Adelaide
  M. GIBBARD, University of Adelaide

- **GM0648, Detailed and Averaged Models for a 401-Level MMC-HVDC System**
  J. PERALTA, Ecole Polytechnique
  H. SAAD, Ecole Polytechnique
  S. DENNETIERE, RTE-France
  J. MAHSEREDJIAN, Ecole Polytechnique
  S. NGUEFEU, RTE-France

- **GM0721, Adaptive Droop Control for Effective Power Sharing in Multi-Terminal DC (MTDC) Grids**
  N. CHAUDHURI, Imperial College London
  B. CHAUDHURI, Imperial College London

- **GM0724, System Frequency Support through Multi-Terminal DC (MTDC) Grids**
  N. CHAUDHURI, Imperial College London
  R. MAJUMDER, SIEMENS Energy
  B. CHAUDHURI, Imperial College London

- **GM1164, On the Accuracy Versus Transparency Trade-Off of Data-Mining Models for Fast-Response PMU-Based Catastrophe Predictors**
  I. KAMWA, Hydro-Quebec/IREQ
  S. SAMANTARAY, IIT Bhubaneswar
  G. JOOS, McGill University

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**Power System Dynamic Performance Committee – Transaction Paper Session #2 (transactions paper)**

Tuesday, 23 July, 1:00 PM–5:00 PM  VCC West – West Meeting Room 110
Sponsored by: Power System Dynamic Performance
Chair: TBD

PAPERS AND AUTHORS:

- **GM0083, PMU-Based Wide-Area Security Assessment: Concept, Method, and Implementation** [Transaction Number: TSG-00470-2011]
  P. DU, Pacific Northwest National Lab
  Y. MAKAROV, PNNL

- **GM0648, Detailed and Averaged Models for a 401-Level MMC-HVDC System** [Transaction Number: TPWRD-00671-2011.R2]
  J. PERALTA, Ecole Polytechnique
  H. SAAD, Ecole Polytechnique
  S. DENNETIERE, RTE-France
  J. MAHSEREDJIAN, Ecole Polytechnique
  S. NGUEFEU, RTE-France

- **GM0721, Adaptive Droop Control for Effective Power Sharing in Multi-Terminal DC (MTDC) Grids** [Transaction Number: 10.1109/TPWRS.2012.2203390]
  N. CHAUDHURI, Imperial College London
  B. CHAUDHURI, Imperial College London

- **GM0724, System Frequency Support through Multi-Terminal DC (MTDC) Grids** [Transaction Number: 10.1109/TPWRS.2012.2196805]
  N. CHAUDHURI, Imperial College London
  R. MAJUMDER, SIEMENS Energy
  B. CHAUDHURI, Imperial College London

- **GM1164, On the Accuracy Versus Transparency Trade-Off of Data-Mining Models for Fast-Response PMU-Based Catastrophe Predictors** [Transaction Number: TSG-00080-2011]
  I. KAMWA, Hydro-Quebec/IREQ
  S. SAMANTARAY, IIT Bhubaneswar
  G. JOOS, McGill University
Tuesday Afternoon, continued

  H. HUANG, Zhejiang University
  Z. XU, Zhejiang University
  X. LIN, Alstom

- GM2057, Nonlinear Control of FACTS Controllers for Damping Interarea Oscillations in Power Systems [Transaction Number: 11534228]
  M. ZARGHAMI, California State University, Sacramento
  M. CROW, Missouri University of Science and Technology
  J. SARANGAPANI, Missouri University of Science and Technology

Qualifying Sensor Systems for the Smart Grid (panel)
Tuesday, 23 July, 1:00 PM–5:00 PM VCC West – West Meeting Room 121
Sponsored by: Power System Instrumentation and Measurements
Chair: E. SO, National Research Council of Canada
Chair: J. Fitzpatrick, National Institute of Standards and Technology

Accurate and reliable sensors are a key component of a smart and flexible grid. This panel focuses on practical aspects of qualifying sensor systems for the Smart Grid, considering the actual performance, accuracy, reliability, and testing of the entire sensor system under practical operating conditions.

PRESENTATIONS AND PANELISTS:
- GM2038, Smart Grid Technology Readiness Levels
  H. KIRKHAM, Pacific Northwest National Lab

- GM2041, Smart Grid Technology Readiness Levels
  C. MARINOVICI, Pacific Northwest National Lab

- GM2042, Reliability Testing for Sensors
  LINDSEY, Lindsey Manufacturing Co.

- GM2043, Accuracy Evaluations for Distribution Smart Grid Sensor Systems Under Selected Operating Conditions
  J. MCBRIDE, JMX Services, Inc.

- GM2040, Smart Grid Sensor and Testing Needs
  J. FITZPATRICK, National Institute of Standards and Technology

- GM2037, Current/Voltage Sensors for Precise Measurements of Power Quality in Distribution Systems for the Smart Grid
  F. RAHMATIAN, Quanta Technology

- GM2039, Current/Voltage Sensors for Precise Measurements of Power Quality in Distribution Systems for the Smart Grid
  E. SO, National Research Council of Canada

System Aspects of High Penetration of Wind Power (transactions paper)
Tuesday, 23 July, 1:00 PM–5:00 PM VCC West – West Meeting Room 115
Sponsored by: Power System Operations
Chair: J. Liu, PJM

PAPERS AND AUTHORS:
- GM0192, The Effect of Large-Scale Wind Power on System Balancing in Northern Europe [Transaction Number: TSTE-00390-2011]
  T. AIGNER, Norwegian University of Science and Technology
  S. JAEHNERT, SINTEF Energy Research
  G. DOORMAN, Power Engineering

- GM0373, Short-Term Energy Balancing with Increasing Levels of Wind Energy [Transaction Number: 6298068]
  J. KIVILUOMA, VTT Technical Research Centre of Finland
  P. MEIBOM, Dansk Energi
  A. TUOHY, Electric Power Research Institute
  N. TROY, ElectroRoute
  M. MILLIGAN, National Renewable Energy Laboratory
  B. LANGE, Fraunhofer IWES
  M. GIBESCU, TU Delft
  M. O’MALLEY, University College Dublin
Tuesday Afternoon, continued

- GM0443, Regulation Adequacy Analysis Under High Wind Penetration Scenarios in ERCOT Nodal
  [Transaction Number: 1949-3029]
  H. CHAVEZ, UT-Austin

- GM0606, Computation of Dynamic Operating Balancing Reserve for Wind Power Integration for
  the Time-Horizon 1-48 Hours [Transaction Number: TSTE.2011.2181878]
  N. MENEMENLIS, Hydro-Québec
  M. HUNEAULT, Hydro-Québec
  A. ROBITAILLE, Hydro-Québec

- GM1536, Operational Analysis and Methods for Wind Integration Studies
  M. MILLIGAN, National Renewable Energy Laboratory
  E. ELA, National Renewable Energy Laboratory
  D. LEW, National Renewable Energy Laboratory
  D. CORBUS, National Renewable Energy Laboratory
  Y. WAN, National Renewable Energy Laboratory
  B. HODGE, National Renewable Energy Laboratory
  B. KIRBY, Consultant to National Renewable Energy Laboratory

- GM1559, Grid Impact of Voltage Control and Reactive Power Support by Wind Turbines Equipped
  with Direct-Drive Synchronous Machines [Transaction Number: 10.1109/TSTE.2012.2205167]
  S. DE RIJCKE, KULeuven
  H. ERGUN, KULeuven
  D. VAN HERTEM, KULeuven
  J. DRIESEN, KULeuven

- GM2139, Options based Reserve Procurement Strategy for Wind Generators – Using Binomial
  Trees [Transaction Number: TPWRS-01249-2011]
  B. VENKATESH, Ryerson University

- GM2433, Methodologies to Determine Operating Reserves due to Increased Wind Power
  H. HOLTTINEN, VTT Technical Research Center of Finland
  M. MILLIGAN, NREL National Renewable Energy Laboratory
  E. ELA, NREL National Renewable Energy Laboratory
  N. MENEMENLIS, Hydro-Québec, IREQ
  N. MENEMENLIS, Hydro-Québec, IREQ

Global Energy Forecasting Competition (GEFCom2012) Final Presentations
(panel)

Tuesday, 23 July, 1:00 PM–6:00 PM VCC East – East Meeting Room 8 & 15
Sponsored by: Power System Planning and Implementation Committee and Power &
Energy Education Committee
Chair: T. Hong, SAS Institute

To bring together the state-of-the-art techniques for energy forecasting, serve as the bridge to connect
academic research and industry practice, promote analytics in power engineering education, and prepare
the industry to overcome forecasting challenges in the smart grid world, IEEE Working Group on
Energy Forecasting organizes GEFCom2012, which is financially sponsored by IEEE PES and technically
sponsored by the Power System Planning and Implementation Committee (PSPI) and Power and Energy
Education Committee (PEEC). The competition includes two tracks: hierarchical load forecasting and
wind power forecasting. This session includes presentations from the GEFCom2012 award candidates of
both tracks.

PRESENTATIONS AND PANELISTS:
- GM2547, Global Energy Forecasting Competition: An Introduction
  T. HONG, SAS Institute

- GM2549, GEFCom2012 Hierarchical Load Forecasting: Exploratory Data Analysis
  S. MCMENAMIN, Itron

- GM2550, GEFCom2012 Hierarchical Load Forecasting: A Gradient Boosting Approach
  S. TAEIB, Université Libre de Bruxelles

- GM2551, GEFCom2012 Hierarchical Load Forecasting Using Multi-Scale Semi-Parametric Models
  R. NEDELLEC, EDF R&D

- GM2552, GEFCom2012 Hierarchical Load Forecasting Using Gradient Boosting Machines and
  Gaussian Process Regression
  J. LLOYD, University of Cambridge

- GM2553, GEFCom2012 Hierarchical Load Forecasting Using a Refined Parametric Model
  C. SINGLETON, CountingLab Ltd.

- GM2554, GEFCom2012 Wind Power Forecasting: An Ensemble Forecasting Approach with
  Gaussian Processes and Neural Networks
  D. LEE, University of Texas at Austin

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Impact of Plugin Hybrid Electric Vehicles (PHEV) on Distribution Systems

Tuesday, 23 July, 1:00 PM–5:00 PM VCC West – West Meeting Room 118
Sponsored by: (PSACE) Distribution System Analysis
Chair: S. Khushalani-Solanki, University of West Virginia

Electric Vehicles lead to the electrification of transport that is drawing increasing attention from governments all across the world. Recognizing the depleting oil resources, dependence on foreign oil and increasing greenhouse gas emissions the transition to electrification is inevitable and most promising path to secure energy future. This electrification defines new domain of problems and needs that have not been looked at before and are daunting. This panel will focus on the challenges of integrating electric vehicles with distribution systems including smart charging, overloads, pricing schemes and data security. These aspects of grid to vehicle and vehicle to grid without updating the existing infrastructure will be also discussed using field data.

PRESENTATIONS AND PANELISTS:

- GM0681, Electric Vehicles Economics, Challenges and Future Applications
  S. BOSSART, NETL
- GM0682, Impact of Plug-In Electric Vehicles – DTE Case
  H. ASGEIRSSON, DTE
- GM0678, Impact of High Power Charge Levels on Distribution Feeders
  A. MAITRA, EPRI
- GM0680, Optimization of PHEV Resource in Microgrid
  J. SOLANKI, West Virginia University
- GM0683, The Impact of PHEVs with V2G Capabilities on Distribution Systems
  S. SURYANARAYAN, Colorado State University
- GM0684, Impact of PHEV on the MV Distribution of Upper Austria Based on Real Traffic Data
  S. MATTHIAS, Austrian Institute of Technology
- GM0677, Network Coordinated Distributed Demand Management for Optimal Large-Scale Charging of PHEVs/PEVs
  N. RAHBARI ASR, NCSU
  M. CHOW, North Carolina State University
- GM0679, Development of a PEV Simulator to Study Impacts on the Distribution Grid
  J. ROMERO AGUERO, Quanta Technology

Coordinated Operation of Retail and Wholesale Power Markets

Tuesday, 23 July, 1:00 PM–5:00 PM VCC East – East Ballroom C
Sponsored by: (PSACE) Economic Systems
Chair: L. Tesfatsion, Iowa State University

“Smart grid” developments, such as dynamic pricing and distributed generation, are providing tighter linkages between retail and wholesale power markets, yet relatively little research has been done to date to investigate the implications of these linkages for system reliability and efficiency. This session will highlight research focused on these linkages.

PRESENTATIONS AND PANELISTS:

- GM0612, Dynamic Pricing to Activate Demand-Side Flexibility for Wholesale Market Trade Operations and Electricity Grid Management
  K. KOK, TNO
- GM0613, Demand Response Programs in Wholesale Energy Markets: Lessons Learned
  N. NAVID, MISO
- GM0614, Using Dynamic Pricing to Integrate Retail and Wholesale Markets for Electricity
  A. FARUQUI, Brattle Group
- GM0615, Impact of Wholesale Price Volatility on Real-Time Residential Demand Response
  A. SOMANI, PNNL
Change Management for Successful DMS Implementation (panel)

Tuesday, 23 July, 1:00 PM–3:00 PM REN – Port of Vancouver
Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: B. Uluski, Utility Integration Solutions

Grid modernization is transforming distribution operations from mostly manual, paper-driven business processes to electronic, computer assisted decision making. Operating procedures that in some cases have been in place for many years must be modified to reflect the new DMS-assisted business processes. System optimization has become an important activity for control room personnel, and new skills will be needed to effectively manage new applications effectively. In some cases, the level of engineering support to operations within the distribution control center must be increased significantly to provide technical support need to use the new applications. Training has become an even greater necessity for the DMS enabled control center, and training simulators are expected to play a significant role in the ongoing training and certification of control room personnel. This panel will provide practical examples of how electric utilities have managed the change during recent DMS implementation projects.

PRESENTATIONS AND PANELISTS:
• GM2481, Change Management for Grid Modernization at Alabama Power
  G. CLARK, Alabama Power Company
• GM2565, Change Management for Grid Modernization at BC Hydro
  M. BUCY, BC Hydro
• GM2483, Change Management for Grid Modernization at Duke Energy
  S. RUSSELL, Duke Energy
• GM2566, Change Management for Grid Modernization at Snohomish Public Utility District
  B. TOBIN, Snohomish County PUD No. 1

Bulk System Reliability Impacts of High Levels of Distributed Energy Resources (panel)

Tuesday, 23 July, 1:00 PM–3:00 PM MAR – Dundarave
Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: D. Brooks, EPRI
Chair: T. Key, EPRI

Many of the emerging resources expected to significantly impact the power system will be distributed resources that are integrated on a decentralized basis at MV or LV levels. These distributed resources include various types of distributed generation including solar PV, various demand response programs, plug-in hybrid electric vehicles (PHEVs), and stationary distributed energy storage. While these resources offer potential benefits to the bulk system, there are potential adverse bulk system reliability implications with widespread proliferation of small distributed resources that are not visible at the bulk system level. Potential adverse impacts may include abnormal voltage/frequency ride-through, voltage stability associated with displacement of dynamic reactive resources, reduced effectiveness of under-frequency load shed schemes, and general lack of visibility and control. This panel will present analysis of the potential magnitude of bulk system reliability impacts of high penetrations of distributed resources, actual operating experiences, and potential mitigating options.

PRESENTATIONS AND PANELISTS:
• GM2496, Summary of Potential DER Impacts to Bulk System
  D. BROOKS, EPRI
• GM2498, Operating Experience of Impacts of High Levels of Distributed PV on an Island System
  L. DANGELMAIER, Hawaii Electric Light Company
• GM2499, Study of Potential Impacts of High Levels of Distributed PV on CAISO Operations
  C. LOUTAN, California ISO
• GM2497, Potential Impact of Reduced Dynamic Reactive Capability from Displacing Conventional Generation
  A. TUOHY, EPRI
• GM2501, Capabilities of Distributed Inverters to Support Bulk System Reliability
  T. HOLLIS, SMA
• GM2500, Interconnection Standards to Ensure DER Supports Bulk System Reliability
  M. PATEL, PJM
Smart Grid Deployment – Challenges and Opportunities (panel)

Tuesday, 23 July, 1:00 PM–5:00 PM  VCC East – East Ballroom AB

Sponsored by: Power & Energy Society

Chair: A. Palizban, BCIT
Chair: B. Gill, BCIT
Chair: L. Wang, Powertech Labs

Smart grid generally refers to integration of modern telecommunication and intelligent computerised command and control technologies into power systems. Gradual evolution of the electricity grids towards a more reliable, efficient and secure grid, capable of exploiting and integrating all sources of energy, including alternative sources is underway. Utilities have begun to introduce distributed intelligence into their existing infrastructures to provide for pervasive control and monitoring using Smart Components, thus making them smart grids. This will allow optimal use of expensive assets, and thus deferment of further investments through demand response, fair energy pricing, peak shaving and reduction of GHG emissions and carbon footprint.

Despite pressing needs to roll out the Smart Grid, certain impediments have slowed down the implementation process. Most notable among these are the absence of standards, regulatory challenges, funding constraints, etc. In this presentation smart grids, their benefits, and challenges facing implementation of such systems is discussed.

SPEAKER TOPICS

Electric Vehicles and Smart Grid Interoperability
M. DUBOIS-PHILLIPS, Director, Smart Utilities, Powertech Labs Inc.

Synchrophasor PMU solutions for Grid Operations
J. GIRI, Director, Engineering Delivery, Alstom Grid

Utilization of Advanced Real-time Network Applications at BC Hydro Control Centre
D. ATANACKOVIC, Engineering Team Leader, Grid Operations, BC Hydro

Microgrid Deployment in Power System Planning
M. SHAHIDEHPOUR, Director, Robert W. Galvin Center for Electricity Innovation, Illinois Institute of Technology

AMI and Its Role in Facilitating or Inhibiting Smart Grid
H. FARHANGI, Director, British Columbia Institute of Technology

The Discipline of Engineering of Complex Systems – Frameworks for Learning
J. MARTI, University of British Columbia
K. D. SRIVASTAVA, University of British Columbia
J. JATSKEVICH, University of British Columbia
E. VAAHEDI, University of British Columbia

Impacts of Renewable Energy Generation and Micro-Grids (paper forum)

Tuesday, 23 July, 1:00 PM–5:00 PM  VCC West – West Meeting Room 211

Sponsored by: Power & Energy Society

• GM0027, Mitigation of Transient Overvoltages under Lightning in Networks with Wind Farms Connection using MOV Surge Arresters
  N. MALCOLM, University of Bath
  R. AGGARWAL, University of Bath

• GM0050, Hierarchical Risk Assessment of Transmission Network Considering Influence of Micro-Grid
  Z. LIU, Tianjin University
  B. WANG, Tianjin University
  H. JIA, Tianjin University
  Y. ZENG, Tianjin University
  T. XU, Tianjin University
  J. LIU, Guangdong Power Grid
  D. CHEN, Guangdong Power Grid
  Y. LIU, Guangdong Power Grid

• GM0075, Applying Probabilistic Collocation Method to Power Flow Analysis in Networks with Wind Farms
  K. WANG, Shanghai Jiaotong University
  G. LI, Shanghai Jiaotong University
  X. JIANG, Shanghai Jiaotong University

• GM0152, Study of DFIG Wind Turbine Fault Ride-Through According to the Danish Grid Code
  E. ABULANWAR, Aalborg University
• GM0233, Impact of Wind Farms on Power Systems Oscillations
  F. BERRUTTI, Universidad de la República Oriental del Uruguay
  A. GIUSTO, Universidad de la República Oriental del Uruguay
  M. ARTENSTEIN, Universidad de la República Oriental del Uruguay

• GM0425, Parameterizing Fluctuations in Solar Photovoltaic Generation Using Hidden Markov Models
  M. TABONE, University of California, Berkeley
  D. CALLAWAY, University of California, Berkeley

• GM0568, Voltage Impacts from Distributed Photovoltaics on Two Distribution Feeders
  M. RYLANDER, Electric Power Research Institute
  J. SMITH, Electric Power Research Institute
  S. STEFFEL, Pepco Holdings
  D. LEWIS, Southern Company

• GM0587, Grid Connection of Offshore Wind Farms
  H. KOCH, Siemens AG

  J. LIANG, ABB
  D. HE, Georgia Institute of Technology
  S. GRUJALVA, Georgia Institute of Technology
  R. HARLEY, Georgia Institute of Technology

• GM0618, Excessive Price Reduction and Extreme Volatility in Wind Dominant Electricity Markets; Solutions and Emerging Challenges
  M. F. ASTANEH, Aalborg University
  Z. CHEN, Aalborg University
  O. ALIZADEH MOUSAVI, EPFL

• GM0621, Assessment of Simulated Wind Data Requirements for Wind Integration Studies
  M. MILLIGAN, National Renewable Energy Laboratory
  E. ELA, National Renewable Energy Laboratory
  D. LEW, National Renewable Energy Laboratory
  D. CORBUS, National Renewable Energy Laboratory
  Y. WAN, National Renewable Energy Laboratory
  B. HODGE, National Renewable Energy Laboratory

• GM0660, Short-Term Prediction of Power Fluctuation in PV Systems Using Chaos
  K. SHIBATA, Okayama University
  A. TAKAHASHI, Okayama University
  J. IMAI, Okayama University
  S. FUNABIKI, Okayama University

• GM1221, Islanded Microgrids Black Start Procedures with Wind Power Integration
  J. DANG, Georgia Institute of Technology
  H. HALREY, Georgia Institute of Technology

• GM1308, Monte Carlo-Based Assessment of PV Impacts on Real UK Low Voltage Networks
  A. NAVARRO, University of Manchester
  L. OCHOA, University of Manchester
  D. RANDLE, Electricity North West Limited

• GM1768, Combining LP and MIP Approaches to Model the Impacts of Renewable Energy Generation on Individual Thermal Power Plant Operation
  M. HUBER, TU München
  C. ZIEMS, Universität Rostock
  H. WEBER, Universität Rostock

• GM1917, Wind Energy’s Emissions Reductions: A Statistical Analysis
  M. GOGGIN, American Wind Energy Association

• GM1991, Circuit Breaker Selection in a Wind Farm with Type 2 Wind Turbine Generators
  M. CHAUDHARY, New Mexico State University
  S. BRAHMA, New Mexico State University
  S. RANADE, New Mexico State University

• GM2177, Supplemental Energy Needed for Wind Integration
  M. O'CONNELL, Colorado State University
  D. ZIMMERLE, Colorado State University

• GM2286, Price Responsive Demand for Operating Reserves and Energy in Electricity Markets with Wind Power
  Z. ZHOU, Argonne National Laboratory
  A. BOTTERUD, Argonne National Laboratory

• GM2328, Assessing the Impacts of Microgrids on Composite Power System Reliability
  Q. CHEN, Virginia Tech
  L. MILI, Virginia Tech
Power System Planning, Operation and Dynamic Performance  

Tuesday System Planning, Operation and Dynamic Performance  

Tuesday, 23 July, 1:00 PM-5:00 PM  
VCC West – West Meeting Room 208-209  

Sponsored by: Power & Energy Society

- GM0116, Modeling and Simulation of PJM and Northeastern RTOs for Interregional Planning  
  J. LIN, PJM Interconnection

- GM0180, A Two-Level Online Parameter Identification Approach  
  R. CHEN, Tsinghua University  
  W. WU, Tsinghua University

- GM0698, Optimal Power Flow with Flexible Loading  
  Y. TAO, Ventyx, an ABB Company  
  Z. XU, Tsinghua University  
  A. MELIOPoulos, Georgia Institute of Technology  
  Z. HU, Tsinghua University

- GM0750, Scheduling Inefficient Storage  
  R. JESUDASAN, Swinburne University of Technology  
  L. ANDREW, Swinburne University of Technology  
  H. VU, Swinburne University of Technology

- GM1136, Parameter Identification of Doubly-Fed Induction Generator by the Levenberg-Marquardt-Fletcher Method  
  X. WANG, Carleton University  
  L. GENG, Tsinghua University  
  J. XIONG, Carleton University  
  J. ZHENG, Tsinghua University  
  S. ZHU, Tsinghua University

- GM1191, Study on the Structural Complexity of Large Scale Power Grids  
  C. BO, Tianjin University  
  Z. JINLI, Tianjin University  
  L. PENG, Tianjin University  
  Q. LULU, Tianjin University

- GM1216, Role of Electromechanical Wave Propagation in Power Systems  
  T. LI, Queensland University of Technology  
  G. LEDWICH, Queensland University of Technology  
  Y. MISHRA, Queensland University of Technology

- GM1273, Generation Dispatch with Air Pollutant Dispersion Consideration  
  Y. HOU, University of Hong Kong  
  X. WANG, South China Normal University  
  K. LIU, China Southern Power Grid Company  
  Z. QIN, University of Hong Kong  
  C. WANG, University of Hong Kong

- GM1274, UK Optimization of Electricity Generation Mix for 2030  
  D. TISCHNER, University of Newcastle

- GM1399, Prediction of Regulation Reserve Requirements in California ISO Balancing Authority Area based on BAAL  
  P. ETINGOV, Pacific Northwest National Laboratory  
  Y. MAKAROV, Pacific Northwest National Laboratory  
  N. SAMAN, Pacific Northwest National Laboratory  
  J. MA, Burns & McDonnell  
  C. LOUTAN, California ISO  
  M. ROTHLEDER, California ISO  
  S. CHOWDHURY, California ISO

- GM1443, Estimation of Recovery Cost with the Incorporation of an IPFC in a SCUC Problem  
  S. S, National Institute of Technology  
  S. SIMON, National Institute of Technology  
  P. N.P, IIT Roorkee

- GM1665, An Ensemble Approach for Forecasting Net Interchange Schedule  
  M. VLACHOPoulos, Pacific Northwest National Laboratory  
  L. GOSINK, Pacific Northwest National Laboratory  
  T. PULSIPHER, Pacific Northwest National Laboratory  
  T. FERRYMAN, Pacific Northwest National Laboratory  
  N. ZHOU, Pacific Northwest National Laboratory  
  J. TONG, PJM Interconnection

- GM1677, A Non-Linear Programming Approach to Maintenance Budgeting for Multi-Component Systems  
  R. FERREIRA, PSR  
  L. BARROSO, PSR  
  C. FEINSTEIN, Santa Clara University  
  C. BORGES, COPPE/UFRJ
Potential Impact of High-Performance Computing on the Power Grid (panel)

Tuesday, 23 July, 2:00 PM–5:00 PM VCC East – East Meeting Room 7
Sponsored by: Emerging Technologies Coordinating Committee and (PSACE) Computer Analytical Methods Committee
Chair: Z. Huang, Battelle – Pacific Northwest National Laboratory
Chair: Z. Tate, University of Toronto

1:00–2:00 PM
TF meeting – Task Force on High Performance Computing for Grid Analysis and Operation, IEEE PSACE Computing and Analytical Methods Subcommittee (CAMS)

2:00–5:00 PM
Joint ETCC/PSACE-CAMS Panel

PANEL SESSION
Potential Impact of High-Performance Computing on the Power Grid
Panel Co-Chairs: Z. Huang, Pacific Northwest National Laboratory
Z. Tate, University of Toronto
Co-Chairs: CAMS Task Force on High Performance Computing for Grid Analysis and Operation
Sponsoring Committees: Emerging Technology Coordinating Committee (ETCC) and PSACE Computing and Analytical Methods Subcommittee (CAMS)

PRESENTATIONS AND PANELISTS:
• GM2616, On Line Security Assessment based on Rules Learned Using Montecarlo Simulations and HPC (An European TSO perspective)
P. PANCIATICI, RTE
• GM2654, Computational Needs and High Performance Computing in Power System Operation and Planning
E. LITVINOV, ISO-New England
Tuesday Afternoon, continued

- GM2617, Applications of High Performance Computing for Dynamic Security Assessment of Power Systems
  L. WANG, Powertech Labs Inc.
- GM2618, From Data to Knowledge to Actions through an Open Computing Architecture
  Z. HUANG, Battelle – Pacific Northwest National Laboratory

Control Center Issues (panel)

Tuesday, 23 July, 2:00 PM–5:00 PM   MAR – Pinnacle I

Sponsored by: Power System Operations Committee
Chair: E. Dobrowolski, NERC

The Control Center Issues session is designed to provide a forum for topical discussions of anything and everything having to do with utility control centers and their operation. This session is provided at every general meeting and is the centerpiece for control center discussion at IEEE PES.

The emphasis for this year’s session is on technology and applications for control centers. The session will start with a presentation on identifying and addressing technology gaps. Then the next three presenters will follow up with specific presentations on new technologies – synchrophasors, transient security assessment, and real-time simulation.

At the conclusion of the formal presentations, the audience will be asked to provide any pertinent information from their control center operations that may be of value to the meeting attendees.

PRESENTATIONS AND PANELISTS:

- GM1082, Identifying and Addressing Technology Gaps and Needs for Control Center Operators
  N. BHATT, EPRI
- GM1083, Integration of Synchrophasor Applications in an EMS Control Center
  J. GIRI, Alstom
  V. MADANI, PG&E
- GM1081, On-Line Transient Security Assessment
  L. WANG, Powertech Labs Inc.
- GM1084, Knowledge Capture and Transfer Using Real Time Simulators
  R. PODMORE, Incremental Systems

ADDITIONAL PRESENTATION:
V. MADANI, PG&E

Managing Uncertainty in Power System and Market Operations II – Comparison between Stochastic and Robust Optimization (panel)

Tuesday, 23 July, 2:00 PM–5:00 PM   VCC West – West Meeting Room 114

Sponsored by: Power System Operations Committee
Chair: T. Zheng, ISO New England
Chair: A. Papavasiliou, Catholic University of Louvain

Robust and stochastic optimization have gained a lot of attention recently to deal with the uncertainties caused by the integration of variable generation. The concept of robust optimization is to optimize the system against the worst-case scenario. Such a philosophy is consistent with the current operating practice, for example, the N-1 protection operating criteria. Stochastic optimization has been used for decades in the power industry in mid-term hydrothermual scheduling, and a variety of algorithms have been developed for addressing the problem, including Benders decomposition, Lagrangian relaxation and progressive hedging. However, both approaches present challenges that need to be addressed in order to implement them in industrial scale problems within operationally acceptable time frames. This panel session will discuss the following topics: Recent advancement of the theory of robust and stochastic optimization, potential areas of application in markets, and system operation and planning, industry experience and computational challenges.

PRESENTATIONS AND PANELISTS:

- GM1093, State of the Art in Robust and Stochastic Optimization
  D. BERTSIMAS, MIT
- GM1094, Extended Two-Stage Robust Unit Commitment Models and Computing Methods
  B. ZENG, University of South Florida
- GM1092, A Computational Study of Stochastic Unit Commitment Using High Performance Computing
  A. PAPAVASILIOU, Catholic University of Louvain
  S. Oren, UC Berkeley
Managing Advanced Distribution Systems: ICT and Distributed Generation (panel)

Tuesday, 23 July, 2:00 PM–5:00 PM VCC East – East Meeting Room 17
Sponsored by: Power System Planning and Implementation
Chair: L. Ochoa, University of Manchester
Chair: J. McDonald, EDF

This panel will have two clear topics: ICT and Distributed Generation (DG). The use of ICT will become more widespread given the need to increase observability and controllability in distribution systems. It is therefore essential to have tools to assess its performance. The first topic of this panel will provide attendees an understanding of the range of the tools available to explicitly represent the performance of telecommunications in distribution systems for planning and/or operational studies. The second topic will focus on innovative aspects related to DG: from capacity credits to probabilistic impact analysis. The key findings from the IEEE Task Force on DG Planning and Optimization and the CIGRE WG C6.19 on Planning of Active Network Management will also be presented.

PRESENTATIONS AND PANELISTS:

- GM0756, Quantification of the Influence of Wireless Communications on Distribution Reliability
  G. Celli, University of Cagliari
- GM0754, Influence of Telecommunications on DG Performance
  R. Dugan, EPRI
- GM0753, Distributed Generation and Capacity Credits
  C. Dent, Durham University
- GM0757, CIGRE WG C6.19 Planning and Optimization Methods for Active Distribution
  F. Pilò, University of Cagliari
- GM0755, State of the Art Techniques and Challenges Ahead for DG Planning and Optimization
  A. Keane, University College Dublin
  L. Ochoa, University of Manchester
  C. Borges, Federal University of Rio de Janeiro
  G. Ault, University of Strathclyde
  A. Alarcon Rodriguez, Inter American Development Bank
  R. Currie, Smarter Grid Solutions
  F. Pilò, University of Cagliari
  C. Dent, Durham University
  G. Harrison, University of Edinburgh
- GM1569, Probabilistic Assessment of PV Impacts on LV Networks
  A. Navarro, University of Manchester
- GM1573, Feedback from their Deployment of Dedicated Monitoring Devices to Characterise the Telecommunications Performance of Smart Node
  J. McDonald, EDF

Smart Distribution Control Center (panel)

Tuesday, 23 July, 3:00 PM–5:00 PM REN – Port of Vancouver
Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: G. Clark, Alabama Power Company

Smart Grid applications emerging throughout the industry are targeting improved system efficiencies and distribution load management. Distribution Control Centers are beginning to implement Smart Distribution Grid applications. Management of the voltage profile and the reactive load flow has been traditional tasks within the distribution control center in addition to the daily switching responsibilities. SCADA functionality is a foundational technology in the distribution control center. Geographic switching displays on the desktop on a connected model are improving the presentation of the SCADA data and the real-time state of the distribution system. This new presentation platform is facilitating the implementations of near-
real time functions such as unbalanced load flow calculations, Conservation Voltage Reduction, Volt/Var Optimization and Control, Loss Minimization, etc. This panel will address the emerging Smart Distribution Control Center.

PRESENTATIONS AND PANELISTS:
• GM2477, Academic Perspective
  A. PAHWA, Kansas State University
• GM2478, Vendor Control Center System
  E. BOARDMAN, Alstom Grid
• GM2479, Vendor Feeder Automation
  C. MCCARTHY, S&C Electric
• GM2480, Utility Implementing Volt/Var Optimization and Control
  S. RUSSELL, Duke Energy
• GM2476, Utility Implementing Smart Grid Applications
  G. CLARK, Alabama Power Company

Senior Member Drive (panel)
Tuesday, 23 July, 5:00 PM–7:00 PM MAR – Pinnacle II
Sponsored by: Power & Energy Society
Chair: H. Louie, Seattle University
The Senior Member Drive is an event designed to assist PES members become IEEE Senior Members. Learn about the Senior Member application and process, and meet Senior Members that can serve as references for your application. Be sure to bring a resume.

Remembering Professor Don Koval (panel)
Tuesday, 23 July, 5:00 PM–6:00 PM MAR – Shaughnessy I
Sponsored by: Power & Energy Society
Chair: C. Vournas, NTUA
Chair: P. Sauer, University of Illinois at Urbana-Champaign
Prof. Don Koval of the University of Alberta, Edmonton passed away in 2011. Some of his colleagues and friends will gather to remember him and his work, and to exchange stories from our common past. All are invited to attend and contribute to the remembrance of Don.

Pre-Awards Dinner Reception
Tuesday, 23 July, 6:00 PM–7:00 PM REN – Ballroom Foyer
Sponsored by: IEEE Power & Energy Society

PES Awards Dinner (dinner – separate ticket required)
Tuesday, 23 July, 7:00 PM–9:30 PM REN – Ballroom I, II, III
Sponsored by: IEEE Power & Energy Society
Chair: M. Crow, Missouri University of Science & Technology

Wednesday Morning

Attendee Breakfast (breakfast)
Wednesday, 24 July, 6:30 AM–8:30 AM VCC East – East Ballroom AB

Presenter Breakfast (breakfast)
Wednesday, 24 July, 6:30 AM–8:30 AM VCC East – East Meeting Room 8 & 15
Innovation and Advancements in Protection, Automation and Control for Evolving Power Systems
(super session – panel)
Wednesday, 24 July, 8:00 AM–12:00 PM  VCC East – East Meeting Room 1 & Foyer S
Sponsored by:  IEEE Power & Energy Society
Chair:  C. Henville, Henville Consulting Inc.

PRESENTATIONS AND PANELISTS:
• Implementation of an Integrated OMS/DMS at San Diego Gas and Electric
  V. ROMERO, San Diego Gas and Electric
• Standard Profile for Use of IEEE Standard 1588-2008 Precision Time Protocol (PTP) in Power System Applications
  G. ANTONOVA, ABB
• Summary Changes in 2013 IEEE/IEC Dual Logo COMTRADE Standard
  R. DAS, ABB
• Synchronized Standards and Guides for the Smart Grid
  K. MARTIN, Electric Power Group
• Optimizing Wide Area Measurement System Architectures with Advancements in Phasor Data Concentrators (PDCs)
  M. KANABAR, GE Digital Energy
• Wide-Area Backup Fault Protection with Synchrophasors
  E. UDREN, Quanta Technology
• Impact of IEC 61850 on the Interoperability and Reliability of Protection Schemes
  A. APOSTOLOV, Omicron

Condition Monitoring of Electrical Machines
(pane1)
Wednesday, 24 July, 8:00 AM–12:00 PM  VCC West – West Meeting Room 120
Sponsored by:  Electric Machinery Committee
Chair:  D. Ionel, Vestas Corporation

This panel session covers recent developments in condition monitoring techniques for electrical machines. The presentations will review the typical faults and abnormalities, such as rotor eccentricity, stator winding insulation degradation, permanent magnet damage and demagnetization, effects such as unbalanced magnetic pull, noise and vibration, and associated recommended condition monitoring methods. A wide range of electric machine technologies, from low power rating permanent magnet (PM) motors to large power medium voltage induction motors will be discussed.

PRESENTATIONS AND PANELISTS:
• GM2608, A Review of Condition Monitoring Techniques for Permanent Magnet Machines
  S. CHOI, Nanyang Tech University
  S. DAS
  V. GARG
  D. IONEL, Vestas Corporation
  A. MASRUR
  B. MIRAFZAL
  Y. MURPHEY
• GM2609, The Evolution of Brushless PM ECM Technology for Fractional HP Electric Motor Drives
  D IONEL, University of Wisconsin
  D. IONEL, Vestas Corporation
• GM2610, Online Stator Ground Wall Insulation Monitoring of Industrial Motors Using a Novel Sensor
  P. NETI, GE Global Services
• GM2611, Evaluation of the Results of Electrical Testing of Motors when the Supply Cables is in the Test Circuit
  I. KERSZENBAUM, Exponent Consulting
• GM2612, Update on IEEE Standard Working Group P1812 on a Guide for Testing Permanent Magnet Machines
  H. KARMAKER, TECO Westinghouse
• GM2613, Diagnosis of Stator Inter-Turn Short Circuit Faults of an IPM Synchronous Machine Using a Space-Vector Pendulous Oscillation Method in Comparison to Other Well Established Techniques
  J. HE, Marquette University
  P. ZHANG, Marquette University
  A. STRANDT, Marquette University
  A. MANARIK, Marquette University
  N. DEMERDASH, Marquette University
Energy Efficiency in Smart Cities (panel)

Wednesday, 24 July, 8:00 AM–10:00 AM MAR – Shaughnessy II
Sponsored by: Energy Development and Power Generation
Chair: W. L. Kling, Eindhoven University of Technology
Chair: J. Myrzik, IEEE

The European energy policy of 20% efficiency in 2020 is only achievable by a consequent replacement of for example of incandescence lamps by CFL, standard drives and pumps by variable speed drives, classical oil or gas heating facilities by electrical heat pumps and central power stations by decentralized generators (DG) in order to bring the production closer to the demand. The increasing population in cities is an additional challenge and it requires an enormous effort for reducing the greenhouse gases. Especially, cities have a high and still increasing demand on electricity, gas, heating and cooling simultaneously. Therefore, an optimal use of multi energy systems (mostly based on DG) in the urban environment using smart control and communication technologies and the realization of a net zero energy living environment is the key towards highly efficient and carbon-reduced cities. Therefore, in the framework of Smart Grids, Smart Cities take a particular role.

PRESENTATIONS AND PANELISTS:
Assessing the Environomic Performance of the Smart Cities
P. Mancarella, University of Manchester

Energy Efficient Residential Areas through Smart Grids
E.A.M. Klaassen, TU Eindhoven
E. Veldman, TU Eindhoven
J.G. Slootweg, TU Eindhoven
W.L. Kling, Eindhoven

GreenLy: A System View Pilot Project for Smartgrids
N. Hadjsaid
J. Longuet
M. Terenti
B. Blez
N. Flechon
A. Galtigny

Net Zero Energy Building: Results from a Demo Project in Herten, Germany
B. Vanreeth
L. Spitalny
D. Unger
J.M.A. Myrzik

Optimal Utilization of Grid Structures for Maximized Integration of Renewable Generation
C. Rohrig, Otto-von-Guericke-University
I. Hauer, Otto-von-Guericke-University
K. Rudion, Otto-von-Guericke-University

The New Transmission Level – Smart European Overlay Grid (panel)

Wednesday, 24 July, 8:00 AM–11:00 AM VCC East – East Meeting Room 7
Sponsored by: Energy Development and Power Generation
Chair: D. Westermann, Ilmenau University of Technology
Chair: A. Orths, Energinet.dk

Bulk wind power integration in the north of Europe, as well as bulk solar power production in south, smart transmission becomes integral part of an entirely new power system where new controllable device will operate to make transmission smarter. In the last consequence a new network layer will be built which is referred to as an overlay grid. This panel session will focus on activities carried out in Europe with respect to erect a new smart transmission level, to operate it and to integrate it into the existing infrastructure.

PRESENTATIONS AND PANELISTS:
TWENTIES – A European Perspective
K. Bell, Strathclyde University
Grounding and topologies for an HVDC Overlay Grid
D. Van Herten, KU Leuven
Grid Integration of Energy Efficient Buildings (panel)

Wednesday, 24 July, 8:00 AM–12:00 PM REN – Salon B

Sponsored by: Power & Energy Education
Chair: S. Suryanarayanan, Colorado State University
Chair: M. O’Malley, University College Dublin

According to the US Energy Information Administration in 2010 approximately 41% of the total energy consumed by the US is in buildings, which accounted for 74% of the total US electricity consumption and 82% ($301.6 billion) of the total US electricity expenditures. As the Smart Grid emerges, energy management systems in buildings become a keystone avenue for attaining energy efficiency with the challenge of managing energy across the spectrum from end-user buildings to the bulk power system. Recognizing that the panel topic is a specific area within the broader perspective of energy systems integration, experts in the areas of building energy management and grid integration will provide insights, early results, challenges, and information on grid integration of energy efficient buildings.

PRESENTATIONS AND PANELISTS:

• GM0811, An Introduction to Energy Efficient Buildings and the Grid in the Perspective of Energy Systems Integration
  M. O’MALLEY, University College Dublin

• GM0813, A Unique User Facility Devoted to Research and Experimentation of Integrated Energy System, Including Building Technologies and Controls, for Evaluating Electrical, Thermal, Fuel and Information Systems up to the Megawatt Scale
  B. KROPOSKI, National Renewable Energy Laboratory

• GM0814, A Holistic Approach to Energy Management, and Experimental Results from a Proof-of-Concept Residential Energy Management System, Implemented in a Single-Family Residence, as well as Subsequent Approaches for Managing Energy across a Group of Residences in a Neighborhood, and for a Group of Commercial Buildings Assembled into a Microgrid
  A. PRATT, Intel Labs/Intel Corporation

• GM0815, Low-Exergy Building Systems for High Performance Building, and the Application of Advanced Controls in Commercial Buildings, including Associated Challenges
  G. HENZE, University of Colorado-Boulder

• GM0816, Theoretical, Practical and Market-Related Issues Associated with the Challenges of Making Buildings Responsive to Real-Time Power System Conditions
  J. Mathieu, ETH

• GM0812, An Agent-Based Approach to Pervasive Integration of Energy Efficient Buildings to the Grid
  R. ROCHE, Université de Technologie de Belfort-Montbéliard
From Wide-Area Warnings to Discrete Stability Controls  
(Combo Session with PSDP Power System Stability Controls Subcommittee Meeting)

Wednesday, 24 July, 8:00 AM–12:00 PM  
VCC West – West Meeting Room 117

Sponsored by:  
Power System Dynamic Performance

Chair:  
I. Kamwa, Institut de recherche d’Hydro-Québec (IREQ)

Chair:  
N. Zhou, Pacific Northwest National Laboratory

A very successful “Wide Area Early Warning Systems” panel was held in conjunction with the IEEE-PES-GM2012 by the PES Stability Subcommittee. From experts and panelists discussion, a conclusion was made that “warning” alone is useless and could become a nuisance to operators in today data rich control environment, if not properly and timely converted to effective remedial actions. The present 2013 panel is a follow-up which aims at investigating the various uses of wide-area early information in designing response-based discrete stability control schemes, able to mitigate or stop the impending catastrophes. Several types of stability controls, targeting various instability phenomena, over both automatic or dispatcher time frames will be discussed. The stability restoration means will include load/generation shedding, shunt/series reactance switching, sudden change of controller set points and controllable separation.

PRESENTATIONS AND PANELISTS:

• GM2558, Real-Time Transient Stability Assessment and Control Using SIME  
  D. RUIZ-VEGA, Instituto Politecnico Nacional

• GM2561, Synchronphasors based Controlled Separation in the WECC  
  V. VITTAL, Arizona State University

• GM2560, Emergency Control of Low or Unstable Voltages  
  T. VAN CUTSEM, University of Liege

• GM0541, Hydro-Québec's Defense Plan: Present and Future  
  A. HENICHE, Hydro-Québec Research Institute (IREQ)
  M. DOBRESCU, Hydro-Québec TransEnergie
  I. KAMWA, Hydro-Québec Research Institute (IREQ)

• GM2563, Discrete Stability Controls for Transient and Oscillatory Stability: Applications and Case Studies  
  D. WILSON, Psymetrix
  N. AL-ASHWAL, Psymetrix
  H. HALLDORSSON, Landsnet

• GM2564, Discrete Controls and Practical Security Criteria in Transmission Grids: Selected Results within the Italian Programme PRIN08  
  M. LA SCALA, Politecnico di Bari

• GM0553, Using Synchronphasors for Controlled Islanding – A Prospective Application for the Uruguayan Power System  
  [Transaction Number: 10.1109/TPWRS.2012.2224142]  
  R. FRANCO, UTE
  C. SENA, UTE
  G. TARANTO, Federal University of Rio de Janeiro
  A. GIUSTO, Universidad de la República

Power System Dynamic Performance Committee – Transactions Paper Session  
#3 (transactions paper)

Wednesday, 24 July, 8:00 AM–12:00 PM  
VCC West – West Meeting Room 121

Sponsored by:  
Power System Dynamic Performance

Chair:  
N. Hatziargyriou, National Tech. University

PAPERS AND AUTHORS:

• GM0010, Constrained Potential Function–Based Control of Microgrids for Improved Dynamic Performance  
  [Transaction Number: TSG-00282-2011]  
  A. MEHRIZI-SANI, Washington State University
  R. IRAVANI, University of Toronto

• GM0082, A Procedure to Study Sub-Synchronous Interactions in Wind Integrated Power Systems  
  [Transaction Number: TPWRS.2012.2204283]  
  D. SURIYARACHCHI, University of Manitoba
  U. ANNAKKAGE, University of Manitoba
  C. KARAWITA, TransGrid Solutions Inc.
  D. JACOBSON, Manitoba Hydro

• GM0118, Optimal Management Strategy of a Battery-based Storage System to Improve Renewable Energy Integration in Distribution Networks  
  [Transaction Number: TSG-00282-2010]  
  S. GRILLO, Politecnico di Milano
  M. MARINELLI, Università degli Studi di Genova
  S. MASSUCCO, Università degli Studi di Genova
  F. SILVESTRO, Università degli Studi di Genova
Power System Planning in the Smart Grid Era (panel)

Wednesday, 24 July, 8:00 AM–12:00 PM MAR – Shaughnessy I

Sponsored by: Power System Planning and Implementation
Chair: ML Chan, ML Consulting Group

This session will be a one-stop forum to discuss and learn the current pressing challenges that power system planners face when their utilities are embracing Smart Grid. We will address the issues from the entire electricity value chain, from energy forecast, through energy supply and T&D power delivery, to the customer sector, including asset management. Issues will cover data requirement and adequacy for planning, methodology for conducting planning, output products and their formats of the planning, and “customers” for such products. The session will be participatory for all parties, including the audience.

PRESENTATIONS AND PANELISTS:

- GM0732, Opportunities and Challenges of Energy Forecasting in the Smart Grid Era
  T. HONG, SAS Institute

  J. YAN, Southern California Edison

- GM0731, Impacts of Utility Scale Renewable and DERs on Transmission System Planning
  M. HENDERSON, ISO New England

- GM0734, Impacts of Utility Scale Renewable and DERs on Modern & Future Distribution System Planning
  L. OCHOA, University of Manchester

- GM0733, Asset Management & Power System Planning
  A. MCGRAIL, National Grid USA

- GM0737, Preliminary Evaluation of New Demand Response Programs on Power Systems Operations in Japan
  H. ASANO, CRIEPI

- GM0730, Defining EV Customers
  C. BATTISTELLI, University of Waterloo

- GM0738, Advances in Demand Management Customer Systems
  P. CLEVELAND, Duke Energy Florida

- GM0735, Integrated Intelligent Customer System Planning
  H. WELLER, SAIC
Mitigation and Prevention of Cascading Outages: Methodologies and Practical Applications (panel)

Wednesday, 24 July, 8:00 AM–12:00 PM  VCC West – West Meeting Room 115
Sponsored by: (PSACE) Computer Analytical Methods
Chair: M. Papic, Idaho Power
Chair: P. Hines, University of Vermont

The overall goal of this panel is to present state-of-the-art research and practical applications in the area of mitigation and prevention of cascading outage events in electric power systems. In response to recent large blackouts there is an increasing need to understand and mitigate blackout risk in electric power systems. This session will highlight the importance to further study mitigation and preventive actions as well as do future research in transforming data into actionable information to mitigate cascading blackout risk.

PRESENTATIONS AND PANELISTS:

- GM0666, Ex-post analysis of the Blackout on 8 September 2011 in the US Southwest
  M. PAPIC, Idaho Power
  R. CUMMINGS, NERC

- GM0664, Ex-post analysis of the Blackouts on 30 and 31 July 2012 in India
  A. GAIKWAD, EPRI

- GM0667, Ex-post analysis of the Blackout on 4 November 2006 in Europe
  J. TERZIJA, University of Manchester

- GM0668, Ex-post analysis of the Blackout on October 26 2012 in Brazil
  M. VÉIGA PEREIRA, PSR Inc

- GM0662, Preventing Cascading Outages by Islanding
  J. BIALEK, Durham University

- GM0665, Wide-Area Measurements in Prevention of Cascading Outages
  D. KOSTEREV, BPA

- GM0669, Mitigation and Prevention of Cascading Outages: Methodologies and Practical Applications
  S. MILLER, CAI Inc.

- GM0670, Benchmarking Models and Data for Cascading Failure Analysis
  P. HINES, University of Vermont

- GM0671, Using Branching Processes to Estimate Cascading Blackout Risk
  I. DOBSON, Iowa State University

FERC Order 1000 – Regional and Interregional Transmission Planning and Cost Allocation (panel)

Wednesday, 24 July, 8:00 AM–12:00 PM  REN – Ballroom I
Sponsored by: (PSACE) Economic Systems
Chair: C. Mensah-Bonsu, California ISO
Chair: M. Henderson, ISO New England

FERC Order 1000 – Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities sets out policy and requirements for grid planning at the regional level, cost allocation of new transmission facility solutions, non-incumbent developers, and compliance in regions with open competitive electricity markets as well as those with regulated electricity pricing. It also provides opportunities for competitive solicitation by stakeholders in the identification and evaluation of regional transmission solutions for addressing regional transmission planning needs.

This panel session will serve as a forum to help better understand the Order, learn about the inherent opportunities, potential implementation challenges and steps being taken by various entities towards achieving compliance. Also perspectives views of other regional and interregional entities as well as potential impacts will be discussed.

PRESENTATIONS AND PANELISTS:

- GM0949, FERC Order 1000 – Key Touch Points
  C. MENSAH-BONSU, California ISO

- GM0950, NYISO Response to FERC Order 1000: Regional and Interregional Aspects
  J. BUECHLER, New York ISO

- GM0951, Overview of PJM's FERC Order 1000 Compliance
  P. MCGILYNN, PJM

- GM0947, A PJM Consensus Transmission Cost Allocation Method for Order 1000 Compliance
  R. CHU, PECO Energy/Exelon Corporation
Wednesday Morning, continued

- GM0952, A State Regulator’s View of FERC Order No. 1000
  M. SMITH, Idaho Public Utilities Commission
- GM0953, What’s Beyond FERC Order 1000
  J. CASPARY, Southwest Power Pool
- GM0954, TBD
  M. TACKETT, Midwest ISO
- GM0955, TBD
  W. LASHER, ERCOT
- GM0948, TBD
  M. HENDERSON, ISO New England
- GM0956, FERC Order 1000 and the States: The Answer to the Regional Transmission Riddle?
  K. MAYES, ASU
- GM0957, CAISO – FERC Order 1000 Compliance
  N. MILLAR, CAISO

Power System Analysis, Computing and Economics Committee – Transaction Paper Session #1 (transactions paper)

Wednesday, 24 July, 8:00 AM–12:00 PM VCC East – East Meeting Room 9
Sponsored by: PSACE

PAPERS AND AUTHORS:

- GM0055, Fault Analysis on Distribution Feeders with High Penetration of PV Systems
  [Transaction Number: TPWRS-00655-2012]
  H. HOOSHYAR, Lulea University of Technology
  M. BARAN, North Carolina State University
- GM0096, A New Control Strategy to Mitigate the Impact of Inverter-Based DGs on Protection System
  [Transaction Number: TSG-00561-2011]
  H. YAZDANPANAH, University of Alberta
  Y. LI, University of Alberta
  W. XU, University of Alberta
- GM0106, Non-Technical Loss Detection Using State Estimation and Analysis of Variance
  [Transaction Number: TPWRS-00708-2012.R1]
  C. LU, National Sun Yat-Sen University
  S. HUANG, National Sun Yat-Sen University
  Y. LO, National Sun Yat-Sen University
- GM0261, Design Considerations of a Centralized Load Controller Using Thermostatically Controlled Appliances for Continuous Regulation Reserves
  [Transaction Number: TSG-00703-2011]
  N. LI, North Carolina State University
  Y. ZHANG, Pacific Northwest National Laboratory
- GM0718, Local Versus Centralized Charging Strategies for Electric Vehicles in Low Voltage Distribution Systems
  [Transaction Number: TSG-00371-2010]
  P. RICHARDSON, University College Dublin
  D. FLYNN, University College Dublin
  A. KEANE, University College Dublin
- GM2090, Estimating the Impact of Electric Vehicle Smart Charging on Distribution Transformer Aging
  [Transaction Number: TSG-00568-2011]
  A. HILSHEY, Penn State University
  P. HINES, University of Vermont
  P. REZAI, University of Vermont
  J. DOWDS, University of Vermont
- GM2114, Accelerated Computation of Multiphase Short Circuit Summary for Unbalanced Distribution Systems Using the Concept of Selected Inversion
  [Transaction Number: TPWRS2209462]
  J. LACROIX, Cooper Power Systems
  I. KOCAR, Ecole Polytechnique
  M. BELLETÊTE, Cooper Power Systems
- GM1826, State Estimation for Smart Distribution Substations
  [Transaction Number: TSG-00323-2010]
  C. GOMEZ-QUILES, University of Seville
  A. GOMEZ-EXPOSITO, University of Seville
  A. DE LA VILLA JAEN, University of Seville
HVDC Transmission & FACTS Education & Bibliography WG 15.05.14 & WG 15.05.17 Combination session (combo)

Wednesday, 24 July, 8:00 AM–10:00 AM  
REN – Port of Vancouver

Sponsored by: Transmission and Distribution

Chair: B. Johnson, University of Idaho

This session is a joint meeting of the Working Group on HVDC & FACTS Education and the Working Group on HVDC & FACTS Bibliography. It also includes a presentation of two conference papers. One paper presents a bibliography of HVDC papers and reports, while the second paper presents a bibliography of FACTS papers and reports.

PRESENTATIONS AND PANELISTS:

  A. MOHARANA, University of Western Ontario  
  R. VARMA, University of Western Ontario  
  W. LITZENBERGER, Retired from BPA

  S. RAHMAN, University of Western Ontario  
  A. MOHARANA, University of Western Ontario  
  R. VARMA, University of Western Ontario  
  W. LITZENBERGER, Retired from BPA

Transmission and Distribution Paper Session III (transactions paper)

Wednesday, 24 July, 8:00 AM–12:00 PM  
VCC West – West Meeting Room 114

Sponsored by: Transmission and Distribution

Chair: T. McDermott, University of Pittsburgh

PAPERS AND AUTHORS:

- GM0098, Reduction in Pressure Rise due to Internal Arcing Using Melting and Vaporization of Metal  
  [Transaction Number: TPWRD-00245-2012]  
  S. TANAKA, Central Research Institute of Electric Power Industry  
  T. MIYAGI, Central Research Institute of Electric Power Industry  
  M. IWATA, Central Research Institute of Electric Power Industry  
  T. AMAKAWA, Central Research Institute of Electric Power Industry

- GM0468, Modulation and Control for a New Hybrid Cascaded Multilevel Converter with DC Blocking Capability  
  [Transaction Number: TPWRD-00023-2012]  
  Y. XUE, ZheJiang University  
  Z. XU, ZheJiang University  
  Q. TU, ZheJiang University

- GM1448, LCL VSC Converter for High Power Applications  
  [Transaction Number: TPWRD-00512-2012]  
  D. JOVCIC, University of Aberdeen  
  L. ZHANG, University of Aberdeen  
  M. HAJIAN, University of Aberdeen

- GM0544, Analysis of Mixed Inverter/Rectifier Multi-Infeed HVDC Systems  
  [Transaction Number: 10.1109/TPWRD.2012.2187356]  
  X. CHEN, University of Manitoba  
  A. GOLE, University of Manitoba  
  M. HAN, North China Electric Power University

- GM0939, Analysis of Dual-Infeed HVDC with LCC-HVDC and VSC-HVDC  
  [Transaction Number: TPWRD-00717-2011]  
  C. GUO, North China Electric Power University  
  Y. ZHANG, RTDS Technologies, Inc  
  A. GOLE, University of Manitoba  
  C. ZHAO, North China Electric Power University

- GM1232, Fast Power Routing through HVDC  
  H. YIN, University of South Florida  
  L. FAN, University of South Florida  
  Z. MIAO, University of South Florida

- GM1795, Increasing the SSO Damping Effectiveness of IMDU by Raising Its Operating Frequency and Optimizing Its Parameters  
  [Transaction Number: TPWRS-00802-2012.R2]  
  S. WANG, Zhejiang University  
  Z. XU, Zhejiang University
Statistical Resource Modelling for Renewables Integration (panel)

Wednesday, 24 July, 8:00 AM–12:00 PM  
VCC East – East Meeting Room 2, 3 & Foyer S

Sponsored by: Wind Power Coordinating Committee and Stationary Battery Committee  
Chair: C. Dent, Durham University

Integration of renewable resources presents a range of very challenging statistical resource characterisation problems, for instance:

• Large scale estimation of multivariate distributions for network planning
• Assessment of renewable resource at times of extreme demand under inevitable limitations of available data
• Estimation of wind forecast error distributions, a non-stationary problem (error distribution depends for instance on prevailing weather system) in which distribution tails are very important

Management of uncertainty in all of these statistical estimation processes is vital, particularly where available data on extremes of demand or forecast errors is very sparse.

This panel will examine the state of the art in this field and discuss key priorities for future research and development, with particular emphasis on management of uncertainty in statistical estimation.

PRESENTATIONS AND PANELISTS:

• GM0326, Forecasting and Scheduling of Renewables in North American Power Systems: Current Status and Future Trends  
  M. AHLSTROM, Windlogics
• GM0330, Space-Time and Multivariate Aspects in Probabilistic Forecasting  
  P. PINSON, Technical University of Denmark (DTU)  
  J. TASTU, Technical University of Denmark (DTU)  
  H. MADSEN, Technical University of Denmark (DTU)
• GM0328, Recent Advances in Time Series Related to Renewables  
  I. ECKLEY, Lancaster University
• GM0839, Network Planning in Renewable Integration Studies: Changing the Planning Paradigms  
  P. RUIZ, Charles River Associates
• GM0850, Distribution Estimation for Generation Adequacy Assessment  
  C. DENT, Durham University

Future Power System Planning Challenges (panel)

Wednesday, 24 July, 8:00 AM–12:00 PM  
VCC West – West Meeting Room 118

Sponsored by: Power & Energy Society  
Chair: P. Choudhury, BC Hydro  
Chair: W. Li, BC Hydro

Future power system planning faces many new challenges as intermittent sources are integrated into systems and various uncertainties in load forecast, network configurations, generation locations and economic factors become more essential. This panel session addresses some of the new challenges including the adequacy assessment of systems with high penetration of intermittent energy sources, probabilistic system planning methodologies, integrated energy system planning, new HVDC technologies in transmission planning, and data management and new computing tools in planning. Concepts, methods, data issues and actual application examples will be discussed by the panelists from both academia and industry.

PRESENTATIONS AND PANELISTS:

• Adequacy Assessment Considerations in Wind Integrated Power Systems  
  R. BILLINTON, University of Saskatchewan
• Multi-Regional Energy System Planning  
  J. MCCALLEY, Iowa State University
• Probabilistic Transmission Planning at BC Hydro – Method and Example  
  W. WANGDEE, BC Hydro  
  W. LI, BC Hydro  
  P. CHOUDHURY, BC Hydro
• Enhancing Power System Security with HVDC Transmission in System Planning  
  X. LIN, Powertech Labs Inc. Canada  
  F. HOWELL, Powertech Labs Inc. Canada  
  S. ARABI, Powertech Labs Inc. Canada  
  L. WANG, Powertech Labs Inc. Canada
• Data Management and New Computing Tools in Transmission Planning  
  T. INGA-ROJAS, BC Hydro

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DC Applications and Electric Vehicles (paper forum)

Wednesday, 24 July, 8:00 AM–12:00 PM
VCC West – West Meeting Room 208-209

Sponsored by: Power & Energy Society

- GM0198, Marx-DC-DC Converter for Connecting Offshore Wind Farms to Multiterminal HVDC
  E. VEILLEUX, McGill University
  B. OOI, McGill University

- GM0284, 1400 MW New Zealand HVDC Upgrade: Introducing Power Modulation Controls and Round Power Mode
  S. TEEUWSEN, Siemens AG
  G. LOVE, Transpower Ltd.
  R. SHERRY, Transpower Ltd.

- GM0298, The Application of Superconducting Fault Current Limiters in Manitoba Hydro HVdc System
  C. ZHOU, Manitoba Hydro
  P. WANG, Manitoba Hydro
  D. JACOBSON, Manitoba Hydro

- GM0393, Coordinated Charging of PEVs in Unbalanced Residential Network Based on Worst Node Voltage Profile
  M. MOGHBEL, Curtin University
  M. MASOUM, Curtin University
  F. SHAH-NIA, Curtin University

- GM0470, Optimal Aggregated Charging Analysis for PEVs Based on Driving Pattern Model
  D. WANG, Xi’an Jiaotong University
  H. WANG, Xi’an Jiaotong University
  X. GUAN, Xi’an Jiaotong University
  P. LI, Xi’an Jiaotong University
  L. FU, Xi’an Jiaotong University

- GM0583, Development and Comparison of DC Grid Model in Powerfactory and Dymola for Controller Design
  R. MAJUMDER, ABB Corporate Research, Sweden
  M. LARSSON, ABB Corporate Research, Switzerland
  B. BERGGREN, ABB Corporate Research, Sweden

- GM0713, HVDC Development and Its Reliability in China
  L. CHENG, Tsinghua University
  H. FENG, Tsinghua University
  J. HE, China Electric Power Research Institute

- GM0778, A Practical Battery Wear Model for Electric Vehicle Charging Applications
  S. HAN, AIST
  H. AKI, AIST
  S. HAN, Konkuk University

- GM0832, More insight into the Effects of Load Cycles and Electrothermal Stress on HVDC Extruded Cable Reliability in the Prequalification Test
  G. MAZZANTI, University of Bologna
  M. MARZINOTTO, Terna Rete Italia S.p.A.

- GM1053, A DC-DC Interleaved Forward converter to Step-Up DC Voltage for DC Microgrid Applications
  D. HABUMUGISHA, University of Cape Town
  S. CHOWDHURY, University of Cape Town

- GM1208, Characterization of Prospective Charging Locations of Plug-In Vehicles Using Real-World Driving Data
  N. GHASANZIAD, University of Manitoba
  S. FILIZADEH, University of Manitoba

- GM1303, Reliability Assessment of Integrated Residential Distribution and PHEV Systems Using Monte Carlo Simulation
  Z. WANG, University of Toledo
  R. YANG, University of Toledo
  L. WANG, University of Toledo
  J. TAN, University of Toledo

- GM1315, DC Microgrids and Distribution Systems: An Overview
  A. GHAREEB, Florida International University
  A. MOHAMED, Florida International University
  O. MOHAMMED, Florida International University
• GM1428, Transient Stability Analysis of an Onshore Power System with Multi-Terminal Offshore VSC-HVDC Transmission: A Case Study for the Netherlands
  M. NDREKO, Delft University of Technology
  A. A. VAN DER MEER, Delft University of Technology
  M. GIBESCU, Delft University of Technology
  M. A. M. VAN DER MEIJDEN, Delft University of Technology
  J. A. BOS, TenneT TSO B.V.
  K. P. J. JANSSEN, TenneT TSO B.V.
• GM1480, A Transformer-Less DC-DC Converter with Large Voltage Transformation Ratio for Medium-Voltage DC Grid Applications
  H. ATHAB, Ryerson University
  A. YAZDANI, Ryerson University
  B. WU, Ryerson University
• GM1548, Effects of DC Voltage Control Strategy on Voltage Response on Multi-Terminal HVDC following Loss of a Converter Station
  F. GONZALEZ-LONGATT, Coventry University
  J. ROLDAN, Universidad de Sevilla
• GM1694, A DC Distribution System for Power System Integration of Plug-In Hybrid Electric Vehicles
  M. TABARI, University of Western Ontario
  A. YAZDANI, Ryerson University
• GM1792, Configurations and Earthing of HVDC Grids
  S. DE BOECK, KU Leuven
  P. TIELENS, KU Leuven
  W. LETERME, KU Leuven
  D. VAN HERTEM, KU Leuven
• GM1825, VSC Converters Control for Offshore Wind Farms HVDC Grid Connection
  K. JACEK, Gdansk University of Technology
  Z. LUBOSNY, Gdansk University of Technology
• GM0087, Parallelizing Power System Contingency Analysis Using D Programming Language
  S. KHAITAN, Iowa State University
  J. MCCALLEY, Iowa State University
• GM0184, Transient Stability Assessment of Power Systems in the Presence of Shunt Compensators Using Trajectory Sensitivity Analysis
  A. NASRI, KTH Royal Institute of Technology
  M. GHANDHARI, KTH Royal Institute of Technology
  R. ERIKSSON, KTH Royal Institute of Technology
• GM0313, Security Assessment of the Year 2020 Planned Western Interconnection
  G. HEYDT, ASU
  J. QUINTERO, Arizona State University
• GM0535, Schedule for Converters of a Meshed HVDC Grid and a Contingency Schedule for Adaption to Unscheduled Power Flow Changes
  A. MARTEN, Ilmenau University of Technology
  D. WESTERMANN, Ilmenau University of Technology
• GM0629, Stability Analysis of an Energy Managed Smart Distribution System
  J. BOYD, Arizona State University
  G. HEYDT, ASU
• GM0634, Design of a Hybrid Power Modulation PSS for Doubly-Fed Induction Generator
  L. WANG, Tsinghua University
  Y. SUN, Tsinghua University
  L. CHENG, Tsinghua University
  I. HISKENS, University of Michigan
• GM0652, Some Issues with Quasi-Steady State Model in Long-Term Stability
  X. WANG, Cornell University
  H. CHIANG, Cornell University
• GM0717, Real-Time Network Model Modification for Online Transient Security Assessment
  F. MA, ISO New England Inc.
  X. LUO, ISO New England Inc.
  E. LITVINOV, ISO New England Inc.
• GM0851, A Coherence Method for Detecting and Analyzing Oscillations
  N. ZHOU, Pacific Northwest National Laboratory

Power System Stability and Security (paper forum)

Wednesday, 24 July, 8:00 AM–12:00 PM VCC West – West Meeting Room 211
Sponsored by: Power & Energy Society

• GM0087, Parallelizing Power System Contingency Analysis Using D Programming Language
  S. KHAITAN, Iowa State University
  J. MCCALLEY, Iowa State University
• GM0184, Transient Stability Assessment of Power Systems in the Presence of Shunt Compensators Using Trajectory Sensitivity Analysis
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  G. HEYDT, ASU
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  L. WANG, Tsinghua University
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  X. WANG, Cornell University
  H. CHIANG, Cornell University
• GM0717, Real-Time Network Model Modification for Online Transient Security Assessment
  F. MA, ISO New England Inc.
  X. LUO, ISO New England Inc.
  E. LITVINOV, ISO New England Inc.
• GM0851, A Coherence Method for Detecting and Analyzing Oscillations
  N. ZHOU, Pacific Northwest National Laboratory
Wednesday GM Morning, continued

- **GM1021, Voltage Stability Margin Prediction by Ensemble Based Extreme Learning Machine**
  R. ZHANG, University of Newcastle
  Y. XU, University of Newcastle
  Z. DONG, University of Newcastle
  P. ZHANG, ACCENTURE
  K. WONG, University of Western Australia

- **GM1065, Look Ahead to the Unforeseen: ERCOT’s Non-Binding Look-Ahead SCED Study**
  H. HUI, ERCOT
  C. YU, ABB/Ventyx
  R. SURENDRAN, ERCOT
  F. GAO, ABB/Ventyx
  S. MOORTY, ERCOT
  X. XU, ERCOT

- **GM1468, Techno-Economic Evaluation of Corrective Actions for Efficient Attainment of (N-1)-Security in Operation and Planning**
  S. MÜLLER, TU Dortmund University
  M. OSTHUES, TU Dortmund University
  C. REKOWSKI, TU Dortmund University
  U. HÄGER, TU Dortmund University
  C. REHTANZ, TU Dortmund University

- **GM1471, Probabilistic N-1 Security Assessment Incorporating Dynamic Line Ratings**
  M. BUCHER, ETH Zurich
  M. VRAKOPOULOU, ETH Zurich
  G. ANDERSSON, ETH Zurich

- **GM1472, The Impact of Demand Response on Rural Island Power System Operation**
  W. LIN, Tsinghua University
  D. HE, Georgia Institute of Technology
  R. HARLEY, Georgia Institute of Technology
  T. HABETLER, Georgia Institute of Technology

- **GM1696, Power System Online Security Operational Trend Analysis and Simulation Results**
  F. ZHAO, Tsinghua University
  Q. GUO, Tsinghua University
  H. SUN, Tsinghua University
  M. WANG, Tsinghua University
  B. WANG, Tsinghua University

- **GM1738, Fast Selection of N-2 Contingencies for Online Security Assessment**
  K. TURITSYN, MIT
  P. KAPLUNOVICH, MIT

- **GM1897, Power System Stabilization Using Decentralized Hierarchical Generalized Predictive Control**
  E. BIJAMI, Shahid Bahonar University of Kerman
  M. M FARSANGI, Shahid Bahonar University of Kerman
  K. Y. LEE, Baylor University

- **GM2214, Eastern Interconnection Frequency Response Trends**
  J. BIAN, NERC
  M. LAUBY, NERC
  S. EKISHEVA, NERC
  M. VARGHÉSE, NERC

- **GM0362, Probabilistic Risk-Based Security Assessment for Power Systems with Wind Power Generation**
  H. NGUYEN, University of Tasmania
  M. NEGNEVITSKY, University of Tasmania

- **GM1486, Damping Low-Frequency Oscillations by Tuning the Operating Point of a DC-Segmented AC System**
  S. PIROOZ AZAD, University of Toronto
  R. IRAVANI, University of Toronto
  J. TATE, University of Toronto

- **GM1798, Bayesian Multiple Kernels Learning-Based Transient Stability Assessment of Power Systems Using Synchronized Measurements**
  Y. LI, North China Electric Power University

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**Basic Tutorial on Gas Insulated Lines (tutorial)**

Wednesday, 24 July, 8:00 AM–5:00 PM  
REN – Salon C  
Sponsored by: IEEE PES and Power & Energy Education Committee

INSTRUCTOR:  
H. KOCH, Siemens
Gas insulated technology today covers gas insulated substations (GIS) and gas insulated transmission lines (GIL). The GIS technology is now used worldwide for more than 40 years. GIL was mostly used world-wide inside substations or special applications like cavern hydro power plant and finds increasing interest also outside substations as a high power underground transmission technology.

The use of gas-insulated technology in North America is increasing due to the limited space in metropolitan areas, the high power ratings, the opposition coming from the public and the high reliability and availability of gas insulated substations and transmission lines. SF6 is the main insulating gas, which has a high global warming potential and is therefore restricted in use and has to follow precise handling processes. International Standards are defining requirements, testing and commissioning for the products of gas insulated technology.

The full day tutorial is structured in modules, which starts with basic information on the theory of gas-insulated technology. It gives deeper views on special topics related to SF6 GIS and GIL. A wide part of the tutorial is giving examples of typical applications and explains the reasons why GIS or GIL was chosen. The tutorial content has an international outreach and was created by users, manufacturers and consultants from all over the world. The tutorial content is focused on engineers who actually work on high voltage substation projects or who might start soon. The content has a practical orientation and is presented by experts with long time experiences in projects. The goal is to give an overview to the tutorial attendee about the gas insulated technology, how it can be used and what he shall think of when planning and ordering such equipment.

Renewable Energy Plant Design and System Interconnection  
(tutorial)

Wednesday, 24 July, 8:00 AM–5:00 PM  
REN – Salon A

Sponsored by: IEEE PES and Power & Energy Education Committee

INSTRUCTORS:
Y. LAWANDO, S&C Electric Company
P. PABST, PE, S&C Electric Company
E. CAMM, S&C Electric Company
S. S. ALI, PE; S&C Electric Company

This one-day tutorial has been designed to share industrial expertise in designing and integrating large wind and solar power plants with electrical engineers, technicians, developers, and others involved in the design of renewable power plants. The tutorial will include topics such as an introduction to wind turbine generators, photovoltaic, and concentrating solar power technologies, utility interconnection requirements, impacts of wind and solar plants on the utility electrical system, interconnection and collector substation design, collector system design, and reactive power compensation systems.

- Introduction to wind and solar technologies
- Interconnection process
- Impacts of renewable power plants
- Interconnection requirements
- Design of renewable power plants and engineering studies
- Communications and control of wind/solar power plant
- Reactive power compensation and energy storage systems

Distribution System – Delivering Power to the Customer  
(tutorial)

Wednesday, 24 July, 8:00 AM–5:00 PM  
REN – Salon F

Sponsored by: IEEE PES

The focus of this course is to provide attendees with an overview of the issues associated with the planning, engineering, design, operation, and automation of electrical distribution systems. Types of distribution systems and network circuits, as well as engineering issues related to distribution systems will be explored. New concepts in the design, challenges, and operation of smart grid will be addressed. This course is intended for those who are not familiar with the delivery of electricity to the end user.

Topics covered in the course include an introduction to the types of distribution systems, issues associated with distribution planning such as outages and reliability, distribution engineering considerations relating to radial and secondary networks, and distribution automation. The course also provides an overview of electrical distribution operations, including the roles of utility personnel, construction and maintenance considerations, and trends in the industry. Smart grid and its impact on the distribution system will be explored.

INSTRUCTORS:
J. L. KOEPFINGER
M. NEY
Storm Experiences: Toward Smarter and Robust Grid (panel)

Wednesday, 24 July, 9:00 AM–12:00 PM  VCC West – West Meeting Room 119
Sponsored by: Power System Operations Committee
Chair: H. Chen, PJM

Destructive storms could cause massive power outages across the grids and leave millions people out of power for extended time. Utilities and the society have gained valuable experiences in the past through major natural disasters such as the recent Superstorm Sandy in US East Coast. IEEE PES Technical Council has recently directed to form a special Task Force on “Natural Disaster Preparation and Recovery” to review the cases in the past and to provide suggestions for the future on this subject. This panel session will summarize the storm experiences of utilities and RTO/ISOs, and review technologies which would enhance our future responses to destructive natural events. The topics would cover, but not limited to, the following hot issues: How can we be better prepared in terms of storm preparation and response? How can new smart grid technologies, such as distributed generation, micro-grid, PMU, smart meter, come to help?

PRESENTATIONS AND PANELISTS:
• GM2572, Storm Experiences from NYISO
  H. CHAO, NYISO
• GM2573, Storm Experiences from PJM
  D. TURTLE, PJM
• GM2575, Practical Experiences with Storm Restoration and Hardening
  L. XU, Quanta
  D. NOVOSEL, Quanta
• GM2570, Power Infrastructure Performance during Natural Disasters: Key Lessons from Field Damage Assessments and Technology Alternatives for Enhanced Service Survivability
  A. KWISINSKI, University of Texas at Austin
• GM2571, Weathering the Bad Weather and the Role of IT/OT Converging Technology
  M. MOUSAVI, ABB

Advancements in Smart Grid Applications (transactions paper)

Wednesday, 24 July, 10:00 AM–12:00 PM  MAR – Dundarave
Sponsored by: Energy Development and Power Generation
Chair: B. WOJSZCZYK, GE Energy

PAPERS AND AUTHORS:
• GM0078, Multiobjective Battery Storage to Improve PV Integration in Residential Distribution Grids [Transaction Number: 10.1109/TSTE.2012.2211387]
  J. TANT, KU Leuven
  F. GETH, KU Leuven
  D. SIX, VITO, Flemish Institute for Technological Research
  P. TANT, KU Leuven
  U. DRIESEN, KU Leuven
• GM0084, Intelligent DC Microgrid with Smart Grid Communications: Control Strategy Consideration and Design [Transaction Number: 10.1109/TSG.2012.2217764]
  B. WANG, Université de Technologie de Compiegne
  M. SECHILARIU, Université de Technologie de Compiegne
  F. LACMONT, Université de Technologie de Compiegne
• GM0582, Active Power Management of Multihybrid Fuel Cell/Supercapacitor Power Conversion System in a Medium Voltage Microgrid [Transaction Number: 8]
  A. GHANAFARI, Sharif University of Technology
  M. HAMZEH, Sharif University of Technology
  H. MOKHTARI, Sharif University of Technology
  H. KARIMI, Sharif University of Technology
• GM0884, Performance Prediction of a Vanadium Redox Battery for Use in Portable, Scalable Microgrids [Transaction Number: 8]
  J. GUGGENBERGER, Missouri University of Science and Technology
  C. ELMORE, Missouri University of Science and Technology
  J. TICHENOR, Missouri University of Science and Technology
  M. CROW, Missouri University of Science and Technology
• GM1109, Integrated System Identification and State-of-Charge Estimation of Battery Systems [Transaction Number: TEC-00441-2011]
  L. LIU, Wayne State University
  L. WANG, Wayne State University
  Z. CHEN, Shanghai Jiao Tong University
African Development: Engineering Sustainability and The Role of Micro Grids (panel)

Wednesday, 24 July, 10:00 AM–12:00 PM  MAR – Point Grey

Sponsored by: Energy Development and Power Generation
Chair: B. Blyden, IEEE
Chair: P. Naidoo, IEEE

Case Studies of Experiences with Distributed Resource Interconnections on Distribution Systems (panel)

Wednesday, 24 July, 10:00 AM–12:00 PM  REN – Port of Vancouver

Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: B. Saint, NRECA

This panel will offer several case studies of experiences with Distributed Resource Integration on Electric Power Distribution Systems from several utilities and a vendor. Included in this session will be lessons learned, experience and questions, as well as solutions for applying IEEE 1547.

PRESENTATIONS AND PANELISTS:
- GM2449, Lessons Learned from DR Integration
  R. Arritt, EPRI
- GM2451, Distributed Generation Operational Issues – Experience and Questions – An Ontario Perspective
  B. McMillan, Greater Sudbury Hydro Inc.
- GM2450, DER Solutions for Smart Grid Utility Projects

D. Sun, Alstom Grid
- GM2452, Integrating a 21MW Wind Farm onto an Existing 34.5kV Distribution Circuit
  T. Schultz, Idaho Power
- GM2453, Case Studies of Distributed Resource Interconnection Witness Tests
  K. Harley, Georgia Power Company

Wednesday Afternoon

Student Faculty Industry Luncheon  (luncheon – separate ticket required)

Wednesday, 24 July, 12:00 PM–1:30 PM  MAR – Pinnacle Ballroom

Student Faculty Industry Job Fair

Wednesday, 24 July, 1:30 PM–3:00 PM  MAR – Pinnacle Foyer

Sponsored by: IEEE Power & Energy Society and Power & Energy Education Committee
Electricity Supply to Rural and Remote Communities  (super session – panel)

Wednesday, 24 July, 1:00 PM–5:00 PM  VCC East – East Meeting Room 1 & Foyer S
Sponsored by: IEEE Power & Energy Society
Chair: H. Rudnick, Pontificia Universidad Catolica de Chile

Access to electricity is an essential catalyst for social and economic development. There is global interest to achieve universal access to electricity in 2030, with important technological, social and cost implications. The session aims to give an overall view of the dimensions of sustainable electricity supply to rural and remote communities. In industrialized countries, though demand is still but modestly increasing, the emphasis is on maintaining electricity services and adapting existing rural grids to emerging technologies. Developing countries face a rather large demand growth and their emphasis is on creating an appropriate electric service and rural power system. The presentations will share different global electrification challenges, covering concrete experiences in Canada, Chile, India, US, and Zambia, providing insights into the lessons learned and the critical success factors, such as the institutional conditions and legislation, the business environment, and the political and social conditions. Both grid-based and off-grid solutions will be reviewed.

PRESENTATIONS AND PANELISTS:
- **The Context, Challenges and Obstacles: An Overview**
  A. N. Zomers, CIGRE
- **Electrification of Rural and Remote Communities: Perspectives on the Zambian Experience**
  J. Mutale, University of Manchester
- **A Sustainable Model for Rural Electrification**
  R. Saint, National Rural Electric Cooperative Association Contractor
- **Remote Microgrids in Canada**
  C. Canizares, University of Waterloo
- **Social SCADA and V2G Opportunities in Isolated Microgrids**
  R. Palmer, Universidad de Chile, Chile
- **Electrification of Remote Villages in India**
  D. Chattopadhyay, University of Queensland

Planning for Environmental Retirements and Renewable Integration  (panel)

Wednesday, 24 July, 1:00 PM–5:00 PM  MAR – Shaughnessy II
Sponsored by: Energy Development and Power Generation
Chair: N. Lu, North Carolina State University
Chair: M. Henderson, ISO New England

SPEAKERS:
1. P. McGlynn, General Manager, PJM
   Planning to talk about PJMs Effort and Perspective-PJM Compliance Filing
2. H. Chao or J. Buechler, New York ISO
3. M. Tackett, Midwest ISO Perspective
4. N. Millar, California ISO
5. W. Lasher, ERCOT
6. J. Caspary, SPP
7. G. Bennet, Nalcor
8. M. Henderson, ISO New England

How DOE-STEMS Program is Enriching Power Engineering Education  (panel)

Wednesday, 24 July, 1:00 PM–5:00 PM  REN – Salon B
Sponsored by: Power & Energy Education
Chair: M. Baran, North Carolina State University

Recognizing the emerging need for skilled engineering workforce for the smart grid, DOE has lunched the STEPS (Strategic Training and Education in Power Systems) program in 2010 to encourage universities to enrich their existing programs and introduce new programs. DOE has awarded 11 projects for this program and most of the projects are scheduled to finish by 2013. This panel will bring the main participants of this program to share their accomplishments with the PES community.

PRESENTATIONS AND PANELISTS:
- **GM1636, An Overview of DOE STEPS Program**
  G. Bindewald, US Department of Energy
Wednesday Afternoon, continued

- GM1637, Multi-Institutional Curriculum Development and Delivery
  M. CHILUKURI, Syracuse University
- GM1638, Training in Clean Energy Smart Grid Engineering
  B. OLSEN, Washington State University
- GM1634, Smart Grid Education and Workforce Training
  M. SHAHIDEPOUR, IIT
- GM1633, Revitalization of Electric Power Engineering Education through a Consortium
  N. MOHAN, University of Minnesota
- GM1639, Strategic Networking Training for Power Systems
  T. BROWN, University of Colorado
- GM1640, Integrated Curriculum for Smart Power Engineering
  J. WANG, Ohio State University
- GM1635, Professional Science Master in Electric Power Systems Engineering
  M. BARAN, North Carolina State University

Transactions Papers T2 (transactions paper)

Wednesday, 24 July, 1:00 PM–5:00 PM MAR – Point Grey
Sponsored by: Power & Energy Education
Session Chair: S. Brahma, New Mexico State University

PAPERS AND AUTHORS:

- GM0142, State Estimation and Control of Electric Loads to Manage Real-Time Energy Imbalance
  [Transaction Number: TPWRS-01115-2011]
  J. MATHIEU, ETH Zurich
  S. KOCH, ETH Zurich
  D. CALLAWAY, University of California, Berkeley

- GM0153, Application of Multiple Resistive Superconducting Fault Current Limiters for Fast Fault Detection in Highly-Interconnected Distribution Systems
  [Transaction Number: TPWRD-00757-2012.R1]
  S. BLAIR, University of Strathclyde
  C. BOOTH, University of Strathclyde
  G. BURT, University of Strathclyde
  C. BRIGHT, Rolls-Royce Plc

- GM0932, Green Energy Generation from Sugar Factory Wastewater Using a Membrane-Less Single Chamber Organic Microbial Fuel Cell
  [Transaction Number: PID2476029]
  S. PATIL, A.D.C.E.T.
  A. MULLA, ADCET

- GM0938, Enhancing Power and Energy Systems Concepts with Laboratory Experience
  B. CHOWDHURY, University of North Carolina at Charlotte
  B. PARKHIDEH, University of North Carolina at Charlotte
  A. MARTIN, University of North Carolina at Charlotte
  Z. SALAMI, University of North Carolina at Charlotte
  J. ENSLIN, University of North Carolina at Charlotte
  C. CECCHI, University of North Carolina at Charlotte
  S. KAMALASADAN, University of North Carolina at Charlotte
  M. NORAS, University of North Carolina at Charlotte

- GM1365, Laboratory-Based Smart Power System, Part I: Design and System Development
  [Transaction Number: TSG-00557-2011]
  V. SALEHI POUR MEHR, Florida International University
  A. MOHAMMED, Florida International University
  A. MAZLOOMZADEH, Florida International University
  O. MOHAMMED, Florida International University

- GM1377, Laboratory-Based Smart Power System, Part II: Control, Monitoring, and Protection
  [Transaction Number: TSG.2012.2194519]
  V. SALEHI POUR MEHR, Florida International University
  A. MOHAMMED, Florida International University
  A. MAZLOOMZADEH, Florida International University
  O. MOHAMMED, Florida International University

- GM1946, Transient Overvoltage Calculation and Filter Design: Application to On-Shore Converter Station for Hydrokinetic Energy Harvesting
  [Transaction Number: TPWRD-00876-2011.R1]
  M. KUSCHKE, Technische Universität Berlin
  K. STRUNZ, Technische Universität Berlin

- GM1909, Multi-Agent System for Real-Time Operation of a Microgrid in Real-Time Digital Simulator
  [Transaction Number: EEE Transactions Smart Grid on 3 (2), 925-933]
  D. SRINIVASAN, National University of Singapore
Modeling and Assessment of Cyber-Physical Power Systems Combo Session with PSDP Working Group on Dynamic Performance of Cyber-Physical Energy System (Combo)

Wednesday, 24 July, 1:00 PM–5:00 PM VCC West – West Meeting Room 119
Sponsored by: Power System Dynamic Performance
Chair: I. Hiskens, University of Michigan
Chair: D. Callaway, University of California-Berkeley

Power systems are moving towards greater operational reliance on cyber infrastructure (communications, computation and control.) As this cyber infrastructure becomes more tightly integrated into power system operation and control, its influence on dynamic performance will become increasingly important. However methods are required for assessing the effects of non-ideal characteristics, such as real-time market dynamics and requirements for distributed decision-making. The panel will provide a forum for considering the impact and implications of cyber-physical integration in the context of power system dynamic performance. It will address the modeling and analysis requirements for incorporating cyber infrastructure into the tools and techniques that underpin power system dynamic performance assessment.

PRESENTATIONS AND PANELISTS:

• GM2539, Pool Pumps and HVAC Regulate the Grid in Florida
  S. MEYN, University of Florida

• GM2540, Coordinated Resource Management of Cyber-Physical-Social Power Systems
  D. CALLAWAY, University of California-Berkeley

• GM2541, Cyber-Physical Power Systems: Efficiency and Robustness Tradeoffs in Design
  M. ROOZBEHANI, Massachusetts Institute of Technology

• GM2542, Uncertainty Management in Power System Operation
  U. TOPCU, University of Pennsylvania

  G. ANDERSSON, ETH Zurich

• GM2538, Security Aspects in Cyber-Physical Energy Systems
  A. STANKOVIC, Tufts University
G. GENG, Zhejiang University
Q. JIANG, Zhejiang University

GM1393, Two-Step Spectral Clustering Controlled Islanding Algorithm [Transaction Number: TPWRS-00251-2011]
L. DING, Shandong University
F. GONZALEZ-LONGATT, Coventry University
P. WALL, University of Manchester
V. TERZIJA, University of Manchester

R. SALIM, University of Sao Paulo
R. RAMOS, Engineering School of Sao Carlos / University of Sao Paulo

Future Generation of Smart Meters and Their Applications (panel)
Wednesday, 24 July, 1:00 PM–5:00 PM VCC West – West Meeting Room 121
Sponsored by: Power System Instrumentation and Measurements
Chair: E. So, National Research Council of Canada

Smart meters are in the core of the Smart Grid. With the vast deployment of smart meters in the recent years, the focus is now shifting to the value provided by them and the applications they support. This panel focuses on various aspects of the future generation of smart meters, their use in home energy monitoring, fault location, power quality metering, and other smart grid applications.

PRESENTATIONS AND PANELISTS:
- GM2050, Future Generation Meters, Smarter Grid Sensors
  W. LUAN, BC Hydro
- GM2049, Utilizing Smart Meters for Home Energy Use Monitoring: Method and Results
  W. XU, University of Alberta
- GM2051, Integration of AMI and Smart Meters Installed at Distribution Substations to Enhance Smart Grid Applications
  S. MAK, Consultant
- GM2052, Potential Contributions of Future Generation of Smart Meters to Fault Location
  W. FREITAS, University of Campinas
- GM2053, PQ Data from Smart Meters: Opportunities and Challenges
  B. HOWE, EPRI

New Synchrophasor Standards and Guides: Measurements, Data Transfer, Concentration and Implementation Requirements Combination Session (combo)
Wednesday, 24 July, 1:00 PM–5:00 PM VCC West – West Meeting Room 118
Chair: C. Henville, Henville Consulting Inc.
Chair: J. Chow, Rensselaer Polytechnic Institute
Chair: L. Vanfretti, KTH Royal Institute of Technology

In 2009 the US Department of Energy announced the award of $3.4 Billion under the Smart Grid Investment Grant Program. As a result, many operators in North America were awarded grants to deploy a great number PMUs across their service area, with its related communications and IT infrastructure. The availability of this new infrastructure will enable the development and implementation of new applications that utilize time-synchronized dynamic measurements.

This panel will present the recently developed IEEE standards PC37.118.1 and PC37.118.2, and guides PC37.242, and PC37.244, on synchrophasor measurement and associated issues.

This panel also provides a synergy between the activities of the Power System Instrumentation and Measurements Committee and the Power System Relaying Committee related to the development of synchrophasor standards and the Dynamic Measurements Working Group activities on phasor data application development.
Wednesday Afternoon, continued

SESSION CHAIRS:  C. HENVILLE (PSRC)
                 J. CHOW
                 L. VANFRETTI
Dynamics Measurements WG of the Power Systems Dynamic Performance Committee

PRESENTERS:
The History of Phasor Measurement Unit Development and the Emerging Wide Area Measurement Systems
A. PHADKE
PC37.118.1 “Standard for Synchrophasor Measurements for Power Systems”
K. MARTIN
PC37.118.2 IEEE Standard for Synchrophasor Data Transfer for Power Systems
V. GHARPURE
PC37.244 Guide for Phasor Data Concentrator Requirements for Power System Protection, Control and Monitoring
G. ANTONOVA
F. RAHMATIAN
Real-Time Data Mediation for Synchrophasor Application Development Compliant with IEEE C37.118.2
L. VANFRETTI
PMU Data Validation at ISO-NE
Q. ZHANG
1:00 PM–2:00 PM
Dynamics Measurements WG of the Power Systems Dynamic Performance Committee

BigData Analytics for Electric Power Grid Operations (panel)

Wednesday, 24 July, 1:00 PM–5:00 PM  VCC West – West Meeting Room 115
Sponsored by:  (PSACE) Computer Analytical Methods
Chair:  L. Xie, Texas A&M University
Chair:  G. Venayagamoorthy, Clemons

Big Data initiative in the US and throughout the world has provided a unique window of opportunity for improving the analytical methods in power system operations. This panel focuses on standards, management, and analytics of BigData (from PMUs, SCADA, Weather, GIS, etc.) for power grid operations. Creating information and knowledge from cause-effect understanding and dynamic models is an emerging technology to provide situational awareness and intelligence in control centers. New data analytics is a promising development that will enhance future EMS and DMS solutions.

PRESENTATIONS AND PANELISTS:

• GM0690, Gaining Insight from Operational Data, Historical, and Business Data to Draw Conclusions, Make Decisions, and Respond Appropriately
  R. SCHILLING, Space-Time Insight
• GM0688, Integration of Synchrophasor Big Data Analytics in the Control Center
  M. PARASHAR, Alstom Grid
• GM0687, A Hybrid Advanced Reasoning Tool to Improve Security for Smart Grids
  P. DU, Battelle – Pacific Northwest National Laboratory
• GM0691, Big Data for Disturbance Analysis
  M. KEZUNOVIC, Texas A&M
• GM0689, Cellular Computational Networks for Big Data Analysis
  G. VENAYAGAMOORTHY, Clemson University
• GM0692, Using Hadoop Structures to Analyze Behavior of 48,000 Data Streams of One Minute Interval Data at UCSD
  C. WELLS, OSIsoft
• GM0693, Big Data from Utilities’ Perspective
  J. CASTANEDA, SCE
• GM0694, The Energy Systems Toolbox: Organizing Solutions to Data-Intensive Problems
  N. GOLDSTEIN, LLNL
• GM0695, Using Big Data for Online Control
  M. ILIC, Carnegie Mellon

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On-Line Condition Monitoring – Value for the Future Grids (panel)

Wednesday, 24 July, 1:00 PM–5:00 PM VCC East – East Meeting Room 16
Sponsored by: Substations
Chair: N. Fantana, ABB

In recent years there has been an increased interest in on-line condition monitoring (OLCM) devices and systems, for better network and asset life management, for making future networks more reliable and available.

OLCM challenges include data collection, data analysis, security and robustness, device lifetime, but also: integration in existing utility systems, device maintenance and obtaining value from monitoring investment.

The session will address the above focusing on 2 preferential topics
1. On-line condition monitoring applications – experience and value
2. Chances, challenges and synergies in the view of future grids and new technologies.

The session will bring together experts from utility, manufacturers and research, to share their OLCM experience and best practices, to find synergies and to look together to future developments, technologies and potential.

Speakers and participation from various areas in PES dealing directly or supporting OLCM are expected: substations and equipment, protection and control, communication and IT.

PRESENTATIONS AND PANELISTS:
• GM2646, Importance of On-Line Condition Monitoring for Present and Future Grids
  N. FANTANA, ABB
• GM2653, Impact of Future Grid Intelligence & Monitoring on Substation Management
  J. SMIT, Technical University Delft
• GM2644, IEEE – Substations Committee: Activities Related to Online Condition Monitoring
  C. PREUSS, Black & Veatch
• GM2642, Applying and Benefitting from On-Line Monitoring in Real Terms as the Electric Supply Infrastructure Evolves
  A. MCGRAIL; National Grid USA
• GM2647, HV Equipment Monitoring System – Health and Risk Index Calculation and Visualization
  J. SKOG, MTEC2000
• GM2648, Condition-Based Maintenance Practices for SF6 High Voltage Circuit Breakers
  J. BARKER, ABB
• GM2649, Implementation of Condition Monitoring Techniques for Improved Asset Management
  I. PORTUGUES, Strath
• GM2650, Turning Data Collected by Monitoring and Condition Assessment into Transformer Reliability Information
  C. STIEGEMEIER, ABB Inc.
• GM2651, Chinese Experience and Prospects of OLCM to Future Chinese Grid
  T. ZHIGUO, North China Electric Power University
• GM2652, Discoveries from the Application of On-Line Monitoring to Substation Equipment
  B. SPARLING, Dynamic Ratings
• GM2645, The Experience and Outlook of the OLCM System and Its Data Analytics of Dominion
  T. XIA, Dominion Virginia Power
• GM2643, Future Grid Enabled Condition Monitoring
  P. MYRDA, EPRI

Modeling and Analysis of Power Systems (panel)

Wednesday, 24 July, 1:00 PM–5:00 PM MAR – Shaughnessy I
Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: J. Martinez, UPC

A system model is a mathematical description that is aimed at explaining the system and predicting its behavior. Models in power engineering can take many forms and depend on the application. Computer-based simulation refers to the running of a program that contains the system model. The excellence of a model depends on the quality of its mathematical description, while its applicability depends on the capabilities of the tool in which it has been implemented. The excellence of a computer tool depends of both hardware and software used involved in its implementation. Both models and tools are generally interconnected. This panel session covers many of the most important topics related to modeling and simulation of electric power systems. Presentations will deal with modeling of conventional and new power components, new developments in solution techniques, simulation tools, portability of models between different tools, and some traditional and new power system studies.
Distribution Feeder Hosting with High Penetration of Distributed PV  (panel)

Wednesday, 24 July, 1:00 PM–3:00 PM    REN – Port of Vancouver
Sponsored by:  Transmission and Distribution Committee and PSACE Committee  
Chair:  T. Key, EPRI

The photovoltaic (PV) energy market has been growing rapidly during the past years. With many distribution systems facing high penetration it is important to understand the technical challenges of PV output variability and the opportunity of inverter-based grid support. Moving clouds over PV plants can produce power ramping that is an order of magnitude higher than usual changes in customer load. On the other hand, the proximity of customer load with PV power systems provides new opportunities for coordination and management of these resources to better regulate power flow on distribution. This panel will discuss characterization and screening methods to determine individual feeder hosting capacity and compare this with application of uniform grid codes and requiring all inverters to provide grid support. We will discuss results from the IEA PV Power System Task 14. Cases with high penetration experience, and related mitigation measures, will also be covered.

PRESENTATIONS AND PANELISTS:

• GM2486, Case Studies of High PV Penetration in Distribution Grids
  B. KROPOSKI, National Renewable Energy Laboratory

• GM2487, High-Penetration of Photovoltaic in the German Distribution System
  T. STETZ, Fraunhofer IWES

• GM2485, Feeder Characterization Methods to Identify Key Indicators of Hosting Capacity
  J. SMITH, EPRI

• GM2495, Distribution Grid Codes and the Integration of Smart PV Inverters in Europe
  R. BRUENDLINGER, Austrian Institute of Technology GmbH
Transmission and Distribution Paper Session I (transactions paper)

Wednesday, 24 July, 1:00 PM–5:00 PM  MAR – Dundarave
Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: G. Clark, Alabama Power Company

PAPERS AND AUTHORS:

• GM0038, Traveling-Wave-Based Line Fault Location in Star-Connected Multiterminal HVDC Systems [Transaction Number: PWRD.2012.2202405]
  K. NANAYAKKARA, University of Manitoba
  A. RAJAPAKSE, University of Manitoba
  R. WACHAL, Manitoba HVDC Research Centre

• GM1253, A Hybrid Framework for Fault Detection, Classification, and Location V Part I: Concept, Structure and Methodology [Transaction Number: TPWRD-00879-2010]
  J. JIANG, National Taiwan University
  C. CHUANG, National Taiwan University
  Y. WANG, National Taipei University of Technology
  Y. HSIAO, National Taipei University of Education

• GM1902, A Hybrid Framework for Fault Detection, Classification, and Location V Part II: Implementation and Test Results [Transaction Number: TPWRD-00880-2010]
  J. JIANG, National Taiwan University
  C. CHUANG, National Taiwan University
  Y. WANG, National Taipei University of Technology
  Y. HSIAO, National Taipei University of Education

• GM1192, Elimination of Multiple Estimation for Fault Location in Radial Power Systems by Using Fundamental Single-End Measurements [Transaction Number: TPWRD-00202-2008]
  G. MORALES-ESPAÑA, Universidad Pontificia Comillas
  J. MORA-FLOREZ, Universidad Tecnológica de Pereira
  H. VARGAS-TORRES, Universidad Industrial de Santander

• GM0128, Fault Current Interruption by the Dynamic Voltage Restorer [Transaction Number: Manuscript ID: TPWRD-00434-2012.R2]
  F. BADRKHANI AJAEI, University of Toronto
  S. FARHANGI, University of Tehran
  R. IRAVANI, University of Toronto

• GM0650, Optimal Distribution Network Reinforcement Considering Load Growth, Line Loss and Reliability [Transaction Number: TPWRS-00105-2011 (TPWRS 2211626)]
  I. ZIARI, Queensland University of Technology
  G. LEDWICH, Queensland University of Technology
  A. GHOSH, Queensland University of Technology

• GM2432, Optimizing the Roles of Unit and Non-Unit Protection Methods within DC Microgrids [Transaction Number: TSG-00277-2011]
  S. FLETCHER, University of Strathclyde
  P. NORMAN, University of Strathclyde
  S. GALLOWAY, University of Strathclyde
  G. BURT, University of Strathclyde

• GM1022, Voltage Unbalance Emission Assessment in Radial Power Systems [Transaction Number: TPWRD.2012.2196294]
  U. JAYATUNGA, University of Wollongong
  S. PERERA, University of Wollongong
  P. CIUFO, University of Wollongong

Transmission and Distribution Paper Session II (transactions paper)

Wednesday, 24 July, 1:00 PM–5:00 PM  REN – Port of Singapore
Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: S. Ranade, New Mexico State University

PAPERS AND AUTHORS:

• GM0125, Interfacing Issues in Multi-Domain Simulation Tools [Transaction Number: TPWRC-00775-2011]
  O. FARUQUE, CAPS, Florida State University
  V. DINAVAHI, University of Alberta

• GM0423, Development of Data Translators for Interfacing Power-Flow Programs with EMTP-Type [Transaction Number: TPWRD-01092-2012]
  F. DE LEON, Polytechnic Institute of NYU
Wednesday Afternoon, continued

- GM0093, Characterizing the Harmonic Attenuation Effect of Compact Fluorescent Lamps  
  [Transaction Number: PESL-00101-2008]
  A. NASSIF, ATCO Electric
  W. XU, University of Alberta

- GM0528, High-Frequency Modeling and Simulation of Wind Turbine Transformer with Doubly-Fed Asynchronous Generator  
  [Transaction Number: TPWRD-00245-2011]
  B. BADRZADEH, Australian Energy Market Operator (AEMO)
  B. GUSTAVSEN, SINTEF Energy Research

- GM0361, Probabilistic Distribution Load Flow with Different Wind Turbine Models  
  [Transaction Number: TPWRS-00254-2012]
  M. AHMED, University of Waterloo
  K. BHATTACHARYA, University of Waterloo
  M. SALAMA, University of Waterloo

- GM1235, Impedance Model Based SSR Analysis for Type 3 Wind Generator and Series Compensated Network  
  [Transaction Number: TEC-00102-2012.R1]
  Z. MIAO, University of South Florida

- GM0628, A Wideband Line/Cable Model for Real-Time Simulations of Power System Transients  
  [Transaction Number: TPWRD-00017-2012.R1]
  O. RAMOS-LEANOS, Ecole Polytechnique
  L. NAREDO, Cinvestav
  C. DUFOUR, Opal-RT
  I. KOCA, Ecole Polytechnique

- GM0633, Steady-State Analysis of Maximum Photovoltaic Penetration Levels on Typical Distribution Feeders  
  [Transaction Number: TSTE.2012.2225115]
  A. HOKE, National Renewable Energy Laboratory
  R. BUTLER, National Renewable Energy Laboratory
  J. HAMBRICK, National Renewable Energy Laboratory
  B. KROPOSKI, National Renewable Energy Laboratory

Information Technology and Operation Technology in the Future Grid:  
Convergence or Collision?  (panel)

Wednesday, 24 July, 1:00 PM–5:00 PM  
VCC East – East Meeting Room 2, 3 & Foyer S

Sponsored by:  
Power & Energy Society

Chair:  
K. Morison, BC Hydro

E. Vaaheedi, BC Hydro

Historically, information technologies (IT) and operation technologies (OT) have existed, to a large degree, relatively independently in the utility business. IT systems are those systems used for commercial decision making, planning, business processes management and resource allocation. OT systems are systems that provide operational control of assets in the electric network in real time (or near real time) such as SCADA and EMS. As we move to a “smarter” future grid, the worlds of IT and OT are converging as these systems begin to share data, applications, infrastructure, telecom, and security. For many utilities, the line between IT and OT has become blurry and will continue to become more so into the future. While the need for this evolution is clear, (perhaps even inevitable), it may represent significant change for the business with impacts expected in key areas such as enterprise architecture, technology governance, infrastructure and data ownership, and process responsibility. This panel will explore the requirements, challenges, and benefits of this on-going IT/OT convergence.

SPEAKERS

P. SKARE, Pacific Northwest National Lab
J. LILLEYMAN, BC Hydro
M. GREENE, McKinsey
M. KEZUNOVIC, Texas A&M
V. MADANI, PG&E

Energy Efficiency and System Reliability  (paper forum)

Wednesday, 24 July, 1:00 PM–5:00 PM  
VCC West – West Meeting Room 208-209

Sponsored by:  
Power & Energy Society

- GM0021, Fast Frequency and Phase Estimation in Three Phase Power Systems
  Z. CHEN, Stevens Institute of Technology
  Z. SAHINOGLU, Mitsubishi Electric Research Laboratories
  H. LI, Stevens Institute of Technology
• GM0196, A Reliability-Based Strategy for Replacing Breakers at Transmission Stations
  G. HAMOUD, Hydro One

• GM0215, A Monte Carlo Approach for Distribution Reliability Assessment Considering Time Varying Load and System Reconfiguration
  J. MARTINEZ, UPC
  G. GUERRA, Universitat Politècnica de Catalunya

• GM0501, Case Study of an Improved Cascading Outage Analysis Model Using Outage Checkers
  Y. WANG, University of Texas at Austin
  R. BALDICK, University of Texas at Austin

• GM0511, Security-Based Circuit Breaker Maintenance Management
  P. DEHGHANIAN, Texas A&M University
  M. KEZUNOVIC, Texas A&M University
  G. GURRALA, Texas A&M University
  Y. GUAN, Texas A&M University

• GM0728, Expanding Transmission Planning Capabilities for NERC Standard TPL-001-2 Compliance
  Y. ZHU, Siemens PTI
  D. BROWN, Siemens PTI

• GM0835, Transient Overvoltage Rating and BIL of the Transformerless Intelligent Power Substation
  J. CARR, ABB
  Z. WANG, ABB
  S. BHATTACHARYA, North Carolina State University
  D. PATEL, North Carolina State University
  S. MADHUSODHANAN, North Carolina State University

• GM1110, Making Buildings Energy-Efficient through Retrofits: A Survey of Available Technologies
  S. BASUROY, Princeton University
  J. CHUH, Princeton University
  N. JHA, Princeton University

• GM1119, Study of Transformer Winding Deformation by Frequency Response Analysis
  M. MOHD YOUSOF, University of Queensland
  C. EKANAYAKE, University of Queensland
  T. SAHA, University of Queensland

• GM1212, Substation Bus Reliability Improvements at PG&E
  J. RANDOLPH, Pacific Gas & Electric
  B. FARMER, Pacific Gas & Electric

• GM1533, Proof-of-Concept Home Energy Management System Autonomously Controlling Space Heating
  A. PRATT, Intel Corporation
  B. BANERJEE, Michigan Technical University
  T. NEMARUNDE, Portland State University

• GM1575, A Novel Statistical-Based Analysis of WECC Bulk Transmission Reliability Data
  M. PAPIC, Idaho Power
  J. BIAN, NERC
  S. EKISHEVA, NERC

• GM1743, Mitigation and Prevention of Cascading Outages: Methodologies and Practical Applications
  M. VAIMAN, V&R Energy
  P. HINES, University of Vermont
  J. JIANG, University of Oklahoma
  S. NORRIS, Durham University
  M. PAPIC, Idaho Power Company
  Y. WANG, UT-Austin
  G. ZWEIGLE, Schweitzer Engineering Laboratories

• GM2054, Choice of AC Operating Voltage in HV DC/AC/DC System
  T. LÜTH, Imperial College London
  C. BARKER, Alstom Grid

• GM2176, Managing Critical Transmission Infrastructure with Advanced Analytics and Smart Sensors
  Q. QIU, American Electric Power
  J. FLEEMAN, American Electric Power
  D. BALL, American Electric Power
  G. RACKLIFFE, ABB, Inc
  L. CHEIM, ABB, Inc
Wednesday Afternoon, continued

- GM2231, State of Bulk Power System Reliability
  J. BIAN, NERC
  M. L Auby, NERC
  A. SLOANE, NERC
- GM1126, Improving Transformer's Utilization under Customer Reliability Requirements
  J. WANG, MIT
  P. CARVALHO, Technical University of Lisbon
  J. KIRTLEY, MIT

Distributed Energy Resources and Demand Response  (paper forum)

Wednesday, 24 July, 1:00 PM–5:00 PM  VCC West – West Meeting Room 211
Sponsored by: Power & Energy Society

- GM0148, Distribution Network Voltage Support Using Sensitivity-Based Dispatch of Distributed Generation
  S. ABBOTT, QUB
  B. FOX, QUB
  D. MORROW, QUB
- GM0163, Stability Analysis for Power Systems with Price-Based Demand Response Via Cobweb Plot
  L. WU, Clarkson University
- GM0279, Monitoring for Impacts of Distributed Resources: Initial Planning Considerations
  G. RODRIGUEZ, Southern California Edison Co.
  A. VON MEIER, University of California at Berkeley
- GM0923, Development of an Evaluation Tool for Demand Side Management of Domestic Hot Water Load
  K. WONG, University of Tasmania
  M. NEGRENEVITSKY, University of Tasmania
- GM1106, Participation Model for Small Customers Using Reliability Preference in Demand Dispatch
  J. ZHANG, University of Auckland
  N. NAIR, University of Auckland
- GM1180, Design of Anti-Windup Compensator for Superconducting Magnetic Energy Storage
  F. JIAKUN, Aalborg University
  Z. CHEN, Aalborg University
  W. YAO, Huazhong University of Science and Technology
  J. WEN, Huazhong University of Science and Technology
  C. SU, Aalborg University
- GM1496, The Effects of Renewable Energy Resources on the Implementation of Distributed Resources Islanded Systems
  H. FARAG, University of Waterloo
  M. ABDELAZIZ, University of Waterloo
  E. EL-SAADANY, University of Waterloo
- GM1518, Stochastic Short-Term Incentive-Based Demand Response Scheduling of Load-Serving Entities
  M. GHAZVINI, Polytechnic of Porto
  P. FARIA, Polytechnic of Porto
  H. MORAIS, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
- GM1544, Criteria for Demand Response Systems
  I. LAMPROPOULOS, Eindhoven University of Technology
  W. KUING, Eindhoven University of Technology
  P. VAN DEN BOSCH, Eindhoven University of Technology
  P. RIBEIRO, Eindhoven University of Technology
  J. VAN DEN BERG, Mountfjell consultancy
- GM1700, Damping of Inter-Area Oscillations Using Energy Storage
  J. NEELY, Sandia National Laboratories
  R. BYRNE, Sandia National Labs
  R. ELLIOTT, Sandia National Labs
  C. SILVA-MONROY, Sandia National Labs
  D. SCHOENWALD, Sandia National Labs
Wednesday Afternoon, continued

- D. TRUDNOWSKI, Montana Tech University
- M. DONNELLY, Montana Tech University
- GM1898, Fuzzy Positive Feedback for Islanding Mode Detection in Distributed Generation
  - C. AGUIAR, USP
  - R. BASTOS, USP
  - R. NEVES, USP
  - G. REIS, USP
  - R. MACHADO, USP
- GM1938, Dynamic Programming Solution to Distributed Storage Operation and Design
  - J. QIN, Stanford University
  - R. RAJAGOPAL, Stanford University
- GM2017, Optimal Operation of Electrical Energy Storage Systems for Industrial Applications
  - G. CARPINELLI, University of Napoli Federico II
  - S. KHORMALI, University of Napoli Federico II
  - F. MOTTOLA, University of Napoli Federico II
  - D. PROTO, University of Napoli Federico II
- GM2115, Characterizing Statistical Bounds on Aggregated Demand-Based Primary Frequency Control
  - A. ABIRI-JAHROMI, McGill University
  - F. BOUFFARD, McGill University
  - M. ABDULLAH, University of Wollongong
  - K. MUTTAQI, University of Wollongong
  - A. AGALGAONKAR, University of Wollongong
  - D. SUTANTO, University of Wollongong
- GM2246, 2011 North American Demand Response Availability
  - J. BIAN, NERC
  - M. LAUBY, NERC
  - J. POWELL, NERC
- GM1828, Integrating Demand-Side Resources into Distribution System Planning: A Proposal under Commercial Energy Service Environment
  - B. ZENG, North China Electric Power University
  - X. YANG, North China Electric Power University
  - Y. ZHANG, North China Electric Power University
  - J. DONG, North China Electric Power University
  - J. ZHANG, North China Electric Power University
  - W. LIU, North China Electric Power University
  - B. ZHANG, Texas A&M
  - M. KEZUNOVIC, Texas A&M
- GM2096, Area EPS and Distributed Resources Protection Best Practices
  - T. EL-FOULY, Natural Resources Canada
  - D. TURCOTTE, Natural Resources Canada
  - D. WILLISTON, Williston & Associates Inc.
  - A. SINCLAIR, Schweitzer Engineering Laboratories

Distribution Subcommittee Combination Session (combo)

Wednesday, 24 July, 1:30 PM–4:30 PM VCC West – West Meeting Room 114
Sponsored by: Transmission and Distribution
Chair: J. McDaniel, National Grid

The Distribution Subcommittee reports to the Transmission and Distribution Committee of the IEEE Power & Energy Society. The scope of the IEEE Distribution Subcommittee is the treatment of all matters related to the design, performance, installation and operation of overhead and underground electric distribution systems. The subcommittee is hosting a paper combo session in order to promote activities of the subcommittee and to highlight new research related to distribution systems.

PRESENTATIONS AND PANELISTS:
- GM0204, A New Two-Wire Distribution System Concept for Supplying Three-Phase Rural Loads
  - J. MACEDO JR, Federal University of Uberlandia
  - J. OLIVEIRA FANDI, Federal University of Triangulo Mineiro
  - I. NOQUEIRA GONDIM, Federal University of Uberlandia
  - J. OLIVEIRA, Federal University of Uberlandia
  - G. CAIXETA GUIMARAES, Federal University of Uberlandia
Flexible Infrastructure — A Necessary Ingredient for the Renewable Energy Future (panel)

Wednesday, 24 July, 2:00 PM–5:00 PM VCC West – West Meeting Room 120
Sponsored by: Power System Operations Committee
Chair: A. Tuohy, EPRI
Chair: J. Wang, Argonne National Laboratory

As the penetration of installed variable renewable generation continues to grow around the world, the operational cycle of traditional conventional generation technology may be required to change considerably in response to an increase in the net load variability which a power system experiences. Many different solutions have been proposed to supplement the ramping capacity in a system over a variety of time scales. This panel session will explore some of these flexible resource options including: demand response, energy storage, flexible mid-merit and peaking generators, upgrading existing generation to increase flexibility, increased transmission between regions and the ability to control the renewable plant themselves. It will examine how these resources currently are operated, how they participate in energy and ancillary service markets, and how this may change in a future with high variable renewable resources.

PRESENTATIONS AND PANELISTS:
• GM1101, Utilizing Demand Side Flexibility to Balance Renewables in the Pacific Northwest
  C. ASHLEY, EnerNOC
• GM1100, Examining the Flexibility from Demand Response and Storage to Integrate Variable Generation
  O. MA, US Dept of Energy
• GM1099, Transmission Networks in Power System Flexibility Analysis
  E. LANNIOYE, University College Dublin
• GM1096, Utilizing Flexibility from Wind Generation
  R. PIWKO, Wind Power Coord. Committee
• GM1098, Analysis of Central Generation and Distributed Energy Resources for Flexibility Services
  D. SUN, Alstom Grid
• GM1097, Coordination of Gas and Electricity Infrastructures
  M. SHAHIDEPOUR, IIT
• GM1102, Spanish Experience of Flexibility from Storage Technologies
  J. GARCIA, Red Electrica de Espana

Smart Dispatch with Demand Response and Distributed Energy Resources: Business Models, Methodology and Incentives (panel)

Wednesday, 24 July, 2:00 PM–5:00 PM MAR – Pinnacle II
Sponsored by: Power System Operations Committee
Chair: X. Wang, Alstom
Chair: A. Papalexopoulos, ECCO International

Due to Smart Grid initiatives and the need to provide balancing services to Variable Energy Resource, such as Wind and Solar, more and more Demand Response (DR) and Distributed Energy Resources (DERs) are becoming available.

In this panel smart dispatch and scheduling methodologies for DR and DER will be discussed. Various DR business models with emphasis on the residential market will be analyzed. We’ll discuss various business models for aggregating DR capacity and bidding it into the wholesale markets as a “negative power generator” with the use of advanced analytics to predict customer behavior and drive messaging and pricing. Finally, emerging DR technologies, based on distributed computing stochastic control that are voluntary, very precise on an aggregate basis, and can form the foundation for effective and accurate DR management will be presented.

PRESENTATIONS AND PANELISTS:
• GM2400, Impacts of Aggregator-Controlled Residential A/C Demand Response on Wholesale Power Markets
  D. ALIPRANTIS, Iowa State University
• GM2402, Scheduling and Dispatch of Demand Response Resource in PJM Wholesale Markets
  Y. XIAO, Alstom Grid
• GM2404, Concepts for a Wholesale Grid State Indicator to Enable Price Responsive Demand
  J. PRICE, California ISO
• GM2403, Demand Response Scheduling in Energy and Ancillary Service Markets with High Penetration Level of Renewable Resources
  N. NAVID, MISO
Wednesday Afternoon, continued

- GM2405, Demand Response Experiences at Florida Power and Light
  P. Patra, FP&L
- GM2401, A Distributed Computing-Based Stochastic Control Approach to the Demand Response for the Mass market
  A. Papalexopoulos, ECCO International

Value of Conventional Generation Resources in the ISO/RTO Markets with the Penetration of Intermittent Renewable Resources (panel)

Wednesday, 24 July, 2:00 PM–5:00 PM VCC East – East Meeting Room 7
Sponsored by: Power System Planning and Implementation
Chair: J. Yan, Southern California Edison

This year's panel session will build upon the conclusions reached in the previous year's session. The following questions will be discussed to address the questions and challenges identified in the previous year's panel session.

A. How do we define flexibility metrics and quantify and estimate the need for flexibility in the short and long term?
B. How the long-term capacity market (or equivalent non-market process) should be set up to provide appropriate incentives for generation investment that will lead to a flexible, efficient and reliable generation portfolio?
C. How should the DA/RT market be redesigned to send appropriate price signal to generation units that provide additional flexibility to accommodate increased penetration of intermittent resources?
D. What role renewable resources could play in reducing the volatility in net load and needs for additional products that provide "flexibility" to the system operator?

PRESENTATIONS AND PANELISTS:
- GM1964, A Utility Perspective on the Value of Conventional Generation Resources in ISO Markets with High Penetrations of Intermittent Renewable Resources
  G. Streun, SCE
- GM1963, Value of Conventional Resources in the CAISO Market with Penetration of Intermittent Renewable Resources
  M. Rothleder, CAISO
- GM1965, Power Grid Planning and Operation with Higher Penetration of Intermittent Resources and EPA Rules – MISO Perspective
  L. Zhang, MISO
  P. Sotkiewicz, PJM
- GM1962, Stochastic Simulation of Power Systems with Integrated Variable Energy Resources
  G. Gross, U of Illinois

Control of Converter Interfaced DER Connected at Distribution Networks (panel)

Wednesday, 24 July, 3:00 PM–5:00 PM REN – Port of Vancouver
Sponsored by: Transmission and Distribution Committee and PSACE Committee and Power System Dynamic Performance Committee
Chair: N. Hatziargyriou, National Tech. University

It is now widely understood that Distributed Energy Resources (DER) cannot be treated under the “fit and forget” approach, but they should be controlled in order to add support to the network. The basic idea is to regard distribution networks as “active networks” in contrast to passive appendices. In fact, the provision of support to transmission network operation by active distribution networks is considered as a viable possibility. Control can be basically exercised by exploiting the power electronic converters used to interconnect most types of DER. Since DER are mostly inertialess or decoupled from the network, power electronics are used to mimic the behavior of traditional thermal machines using equivalent “droop” techniques. The panel aims to discuss the development of these techniques for parallel connected DER in both interconnected and isolated distribution network operation (microgrids) and their application to provide frequency/voltage control also considering the characteristics of distribution networks.
PRESENTATIONS AND PANELISTS:

- GM2472, Microgrids: Technical Innovations
  R. LASSETER, University of Wisconsin-Madison
- GM2473, Control Strategy for Improving Inertial Response in Island Grids and Interconnected Grids
  P. STRAUSS, Fraunhofer Institute Wind Energy and Energy Systems Technology (IWES) & DER Lab
- GM2470, Incorporation of Converter-Interfaced DER in Studies of Fault Flow and Large and Small Signal Stability
  T. GREEN, Imperial College
- GM2474, Cooperative and Hierarchical Control of Microgrids
  J. GUERRERO, Aalborg University
- GM2475, Coordinated Dispatch of Dispersed Energy Sources for Voltage Control in Distribution Systems
  T. CUTSEM, University of Liège
- GM2471, DER Supporting the Grid By Means of Power-Hardware-in-the-Loop Simulation
  N. HATZIARGYRIOU, National Tech. University

Networking Reception Hosted by PES and IEEE PES WIP (reception)
Wednesday, 24 July, 5:00 PM–6:30 PM VCC East – East Meeting Room 11
Sponsored by: IEEE Power & Energy Society and IEEE PES Women in Power

GOLD Seminar and Networking Reception (reception)
Wednesday, 24 July, 6:00 PM–7:30 PM VCC East – East Meeting Room 8 & 15
Sponsored by: IEEE Power & Energy Society

Thursday Morning

Attendee Breakfast
Thursday, 25 July, 6:30 AM–8:30 AM VCC East – East Ballroom AB

Presenter Breakfast
Thursday, 25 July, 6:30 AM–8:30 AM VCC East – East Meeting Room 8 & 15

Transmission System Efficiency and Reliability Improvements (super session – panel)
Thursday, 25 July, 8:00 AM–12:00 PM VCC East – East Meeting Room 2, 3 & Foyer
Sponsored by: IEEE Power & Energy Society
Chair: D. Brooks, EPRI

Reducing the carbon footprint of the electricity business and increasing the role of renewable energy are crucial strategy components for developing a sustainable electric energy supply. Achieving aggressive carbon-reduction goals while ensuring reliability and satisfying demand requires that transmission system owners and operators evaluate their systems for efficiency improvements. Contributions from transmission systems can be achieved through deployment of measures that directly reduce transmission losses, as well as measures that reduce CO2 emissions via increased system utilization, opening access on lines for providers to meet renewable targets and deliver energy from generation sources that are less carbon-intensive, such as wind and solar. Increased utilization of the transmission system and of large amounts of variable generation also introduce potential reliability challenges that must be simultaneously addressed. Presenters in this panel session will address key initiatives that are being considered to improve transmission system efficiency and reliability to achieve sustainability goals.
Generation Mix Strategies: Solving Energy Production Challenges of the 21st Century  
**(super session – panel)**

**Thursday, 25 July, 8:00 AM–12:00 PM**  
**VCC East – East Meeting Room 1 & Foyer**

**Sponsored by:** IEEE Power & Energy Society  
**Chair:** H. Zareipour, Univ. of Calgary

Topics that will be discussed in this session include:

- **Evolution of the Future Generation Mix**  
  C. SMITH, UVIG, USA

- **Effects of Natural Gas Pricing in New England**  
  M. HENDERSON, ISO-NE, USA

- **The Potential Role of Small Lead Cooled Reactors in the Global Energy Mix**  
  J. WALLENVIUS, KTH, Sweden

- **High Penetration of Distributed Generation and Its Impact on Security and Reliability of Grid**  
  B. WOJSZCZYK, GE, Digital Energy

- **Do New Generation Mixes Lead to the Need for Probabilistic Planning and Operating Tools?**  
  M. O’MALLEY, UCD, Ireland

- **Emissions Policies and the Impact to Power Generation Investment: The Case of Alberta**  
  J. ESAIW, AESO, Alberta, Canada

Marine and Hydrokinetic (MHK) Generation  
***(panel)***

**Thursday, 25 July, 8:00 AM–12:00 PM**  
**MAR – Pinnacle III**

**Sponsored by:** Electric Machinery  
**Chair:** E. Muljadi, NREL

This panel will discuss various aspects of marine and hydrokinetic generation in a panel discussion forum, encourage electrical engineers especially within the Power and Energy Society to participate in research, development, and demonstration of MHK generation activities, and create an open dialog among many different experts and stakeholder organizations working in the area of MHK generation for possible future collaborations.

**PRESENTATIONS AND PANELISTS:**

- **GM2634, Hybrid Offshore Renewable Energy Generation System**  
  X. ZHANG, University of Birmingham

- **GM2635, Integration of Large Scale Marine Energy Resources into Future Electrical Networks**  
  J. KHAN, Powertech Lab Inc.

- **GM2636, The Benefits of Combining Wave and Offshore Wind Power Productions**  
  J. CHOZAS, Aalborg University

- **GM2637, The Potential Grid Impact of a Typical (Pre)-Commercial Wave Farm**  
  A. BLAVETTE, HMRC, University College Cork

- **GM2638, A Programmable Mooring Controller for Tank Testing of Scaled Wave Energy Converters**  
  T. BREKKEN, Oregon State University

- **GM2639, Wave Energy Harvesting Buoys for Marine Based Sensor Applications: Overview of Design, Numerical Modeling, and Laboratory and Field Experiments**  
  R. SEPE, Electro Standards Laboratories

IGCC Transaction Paper Session  
***(transactions paper)***

**Thursday, 25 July, 8:00 AM–12:00 PM**  
**VCC West – West Meeting Room 113**

**Sponsored by:** Intelligent Grid Coordinating  
**Chair:** S. Pullins, Horizon Energy Group

**PAPERS AND AUTHORS:**

- **GM0076, Hardware Demonstration of a Home Energy Management System for Demand Response Applications**  
  **[Transaction Number: 8]**  
  M. KUZLU, Virginia Tech – Advanced Research Institute  
  M. PIPATTANASOMPORN, Virginia Tech – Advanced Research Institute  
  S. RAHMAN, Virginia Tech – Advanced Research Institute

- **GM0097, Hierarchical Structure of Microgrids Control System**  
  **[Transaction Number: TSG-00664-2011.R1]**  
  A. BIDRAM, University of Texas-Arlington  
  A. DAVOUDI, University of Texas-Arlington
Thursday Morning, continued

- **GM0114, Reactive Power Compensation in Single-Phase Operation of MicroGrid**
  [Transaction Number: 11-1554-TIE]
  R. MAJUMDER, ABB Corporate Research

- **GM0145, Southern California Edison's Advanced Distribution Protection Demonstrations**
  [Transaction Number: TSG-00370-2010]
  R. YINGER, Southern California Edison
  S. S VENKATA, Alstom Grid
  V. CENTENO, Virginia Polytechnic Institute and State University

- **GM0231, Real-Time Central Demand Response for Primary Frequency Regulation in Microgrids**
  [Transaction Number: TSG-00252-2011.R2]
  S. POURMOUSAVI, Montana State University
  M. NEHRIR, Montana State University

- **GM0653, Autonomous Distributed V2G (Vehicle-to-Grid) Satisfying Scheduled Charging**
  [Transaction Number: 06062663]
  Y. OTA, University of Tokyo
  H. TANIGUCHI, University of Tokyo
  T. NAKAJIMA, Tokyo Electric Power Company
  K. LIYANAGE, University of Peradeniya
  J. BABA, University of Tokyo
  A. YOKOYAMA, University of Tokyo

- **GM0913, Secondary Control for Voltage Quality Enhancement in Microgrids**
  [Transaction Number: TSG-00294-2011]
  M. SAVAGHEBI, Iran Uni of Sci. and Tech.
  A. JALILIAN, Iran Uni of Sci. and Tech.
  J. VASQUEZ, Aalborg University
  J. GUERRERO, Aalborg University

- **GM1332, Front-End Electronic Circuit Topology Analysis for Model-Driven Classification and Monitoring of Appliance Loads in Smart Buildings**
  [Transaction Number: TSG-00638-2011]
  D. HE, Georgia Tech
  L. DU, Georgia Institute of Technology
  Y. YANG, Eaton
  R. HARLEY, Georgia Institute of Technology
  T. HABETLER, Georgia Institute of Technology

- **GM2279, Agent Based Restoration With Distributed Energy Storage Support in Smart Grids**
  [Transaction Number: TSG-00381-2010.R2]
  C. NGUYEN, New York ISO
  A. FLUECK, Illinois Institute of Technology

- **GM0201, Intelligent Residential Air-Conditioning System with Smart-Grid Functionality**
  [Transaction Number: 10.1109/TPWRS.2012.2215060]
  A. THOMAS, Iowa State University
  P. JAHANGIRI, Iowa State University
  D. WU, Pacific Northwest National Laboratory
  C. CAI, Iowa State University
  H. ZHAO, ISO-New England
  D. ALIPRANTIS, Iowa State University
  L. TESFATSION, Iowa State University

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**Operation, Control and Security (transactions paper)**

Thursday, 25 July, 8:00 AM–12:00 PM  
VCC West – West Meeting Room 112

Sponsored by:  
Power System Operations

Chair:  
F. Milano, University of Castilla – La Mancha

**PAPERS AND AUTHORS:**

- **GM0179, An Adaptive Zone Division Based Automatic Voltage Control System with Applications in China**
  [Transaction Number: 10.1109/TPWRS.2012.2228013]
  H. SUN, Tsinghua University
  Q. GUO, Tsinghua University
  B. ZHANG, Tsinghua University
  W. WU, Tsinghua University
  B. WANG, Tsinghua University

- **GM1125, Corrective Line Switching with Security Constraints for the Base and Contingency Cases**
  [Transaction Number: TPWRS-00653-2010]
  M. LI, North China Electric Power University
  P. LUH, University of Connecticut
L. MICHEL, University of Connecticut
Q. ZHAO, Tsinghua University
X. LUO, ISO New England Inc.
• GM1287, Predictive Control of a Modular Multilevel Converter for a Back-to-Back HVDC System
  [Transaction Number: TPWRD-00725-2011]
  J. QIN, Purdue University

• GM1337, Static Switching Security in Multi-Period Transmission Switching
  [Transaction Number: TPWRS-00535-2011]
  J. LIU, Argonne National Laboratory
  J. WANG, Argonne National Laboratory
  J. OSTRÓWSKI, University of Tennessee, Knoxville

• GM2109, A Two-Stage Framework for Power Transformer Asset Maintenance Management—
  Part I: Models and Formulations
  [Transaction Number: TPWRS-00167-2012]
  A. ABIRI-JAHROMI, McGill University
  M. PARVANIA, Sharif University of Technology
  F. BOUFFARD, McGill University
  M. FOTUHI-FIRUZABAD, Sharif University of Technology

• GM2117, A Two-Stage Framework for Power Transformer Asset Maintenance Management—
  Part II: Validation Results
  [Transaction Number: TPWRS-00168-2012]
  A. ABIRI-JAHROMI, McGill University
  M. PARVANIA, Sharif University of Technology
  F. BOUFFARD, McGill University
  M. FOTUHI-FIRUZABAD, Sharif University of Technology

• GM2414, A Geometrical View for Multiple Gross Errors Detection, Identification, and Correction in
  Power System State Estimation
  [Transaction Number: TPWRS-00897-2011]
  N. BREITAS, University of São Paulo-ESCC
  S. PIERETI, Universidade Federal do Mato Grosso
  A. MARTINS, UNESP-SP

Planning and Implementation Transactions Papers (transactions paper)

Thursday, 25 July, 8:00 AM–12:00 PM
MAR – Shaughnessy I
Sponsored by: Power System Planning and Implementation
Chair: F. Li, University of Tennessee

PAPERS AND AUTHORS:
• GM0155, Optimal Conductor Size Selection and Reconductoring in Radial Distribution Systems
  Using a Mixed-Integer LP Approach
  [Transaction Number: TPWRS-00112-2011]
  J. FRANCO, UNESP—Universidade Estadual Paulista
  M. RIDER, UNESP—Universidade Estadual Paulista
  M. LAVORATO, UNESP—Universidade Estadual Paulista
  R. ROMERO, UNESP—Universidade Estadual Paulista

• GM0159, Strategies to Reduce the Number of Variables and the Combinatorial Search Space of the
  Multistage Transmission Expansion Planning Problem
  [Transaction Number: TPWRS-01084-2011]
  M. RAHMANI, UNESP—Universidade Estadual Paulista
  R. ROMERO, UNESP—Universidade Estadual Paulista
  M. RIDER, UNESP—Universidade Estadual Paulista

• GM0178, Transmission System Topology Optimization for Large-Scale Offshore Wind Integration
  [Transaction Number: 1949-3029]
  H. ERGUN, KU Leuven
  D. VAN HERTEM, KU Leuven
  R. BELMANS, KU Leuven

• GM0193, Capability Chart for Distributed Reactive Power Resources
  [Transaction Number: TPWRS-00486-2012]
  P. CUFFE, University College Dublin
  P. SMITH, University College Dublin
  A. KEANE, University College Dublin

• GM0441, Reliability Evaluation of Active Distribution Systems Including Microgrids
  [Transaction Number: TPWRS-00200-2012]
  Z. BIE, Xi’an Jiaotong University
  P. ZHANG, University of Connecticut
  G. LI, Xi’an Jiaotong University
  B. HUA, Xi’an Jiaotong University
  M. MEEHAN, University of Connecticut
  X. WANG, Xi’an Jiaotong University
Flexible Ramping Products to Support Renewables Integration (panel)

Thursday, 25 July, 8:00 AM–10:00 AM REN – Port of Vancouver
Sponsored by: (PSACE) Economic Systems
Chair: S. Oren, UC Berkeley
Chair: B. Hobbs, Johns Hopkins University

The proliferation of renewable supply technologies into the electric power system creates new challenges to system operation due to the uncertainty and variability of such resources. In particular system operators around the country are experiencing and projecting increased need for flexible ramping capacity that will enable them to manage the fast ramps resulting from intermittency of uncontrollable renewable supplies. To address this problem several ISOs have initiated development of market solutions that involve new flexiramp reserve products or other means of securing the needed ramping capability. This panel brings together high level representatives from the six ISOs in the US to discuss the approaches they have introduced or are under development to address these challenges.

PRESENTATIONS AND PANELISTS:

• GM0961, Addressing Ramping Challenges Due to Renewables Penetration at ERCOT
  D. MAGGO, ERCOT
• GM0960, Ramp Capability Products in MISO Energy and Ancillary Service Markets
  N. NAVID, MISO
• GM0958, Flexibility and Ramp Management at ISO-NE
  E. LITVINOV, ISO-NE
  J. ZHAO, ISO New England
• GM0962, Design of Flexible Ramping Products to Support Renewables Integration at CAISO
  M. ROTHLEDER, CAISO
• GM0959, Addressing Ramping Challenges Due to Renewables Penetration at PJM
  A. OTT, PJM
• GM0963, Addressing Ramping Challenges Due to Renewables Penetration at NYISO
  R. PIKE, NYISO

Development of IEEE Test Systems for Economic Analysis (panel)

Thursday, 25 July, 8:00 AM–10:00 AM MAR – Dundarave
Sponsored by: (PSACE) Economic Systems
Chair: X.-P. Zhang, University of Birmingham

Test systems are crucial for power system planning, operations, and market simulations. The existing IEEE test systems developed are mainly used for reliability, power flow and stability analysis where there is a lack of data for economic analysis. Considering this, this panel will focus on the development of standard test systems of transmission and distribution systems for economic analysis. The session will in particular report test systems for Unit Commitment, hydro-thermal coordination, retail and wholesale market options, and smart distribution grid, etc. The panelists are expected to discuss the aspects of how to improve these test systems and hence develop standard IEEE test systems, which will be available to a broader power engineering community after the panel discussions.

PRESENTATIONS AND PANELISTS:

• GM0978, Benchmarking a Reduced Test-Bed Model of WECC Region for Unit Commitment and Flexible Dispatch
  J. PRICE, California ISO
• GM0979, Developments in Hydro-thermal Test Systems
  R. PALMA, University of Chile
• GM0976, Software System and Process for Electricity Market Studies
  E. LITVINOV, ISO-New England
  I. LELIC, ISO New England
• GM0980, A Small-Scale ISO-NE Test Case Study of Wholesale Electric Power Market Operations
  W. LI, ISU
• GM0975, Bid-to-Bill Market Test System at California ISO
  E. HAQ, California ISO
• GM0977, A Distribution System Test Bed for Retail Pricing Scheme Analysis and Information Management
  N. LU, North Carolina State University
Challenges of Widespread Implementation of Distribution Automation  (panel)

Thursday, 25 July, 8:00 AM–12:00 PM  REN – Ballroom III
Sponsored by:  Power & Energy Society
Chair:  C. Siew, BC Hydro
Chair:  F. Rahmatian, Quanta Technology

Distribution Automation (DA), one of the key elements of a Smart Grid, requires a consistent and systematic approach for implementation in order to achieve a wide range of dependent benefits. Two-way digital communications among smart sensors, smart breakers/reclosers, central applications (e.g., Distribution Management Systems [DMS]), and/or local/distributed applications (e.g., intelligent reclosing and line differential protection) enables many functionalities desired in an intelligent, self-healing, distribution grid. These DA systems require strict yet practical physical and cyber security in order to be easily operable and accessible by utility staff and other corporate applications. The panelists address a number of challenges associated with systematic deployment of intelligent distribution automation systems.

SPEAKERS:
•  Cyber Security Challenges for Distributed Automation
  T. Morris, Mississippi State University
•  Challenges in Deploying a Feature Rich DSM
  A. Mithani, BC Hydro
•  Medium Voltage Optical Sensors – Added Value for the Smart Grid
  D. Parker, Alabama Power
•  Measurement and Verification (M&V) of DA (VVO/FLISR) Benefits
  B. Uluski, UISOL
•  Implementing the Appropriate Communications for DA
  S. Lancashire, BC Hydro
•  Equipment Standardization for Widespread DA Deployment
  M. Pesin, Seattle City Light
•  Use of GOOSE Messaging and IEC 61850 in Distribution System Protection and Automation
  F. Rahmatian, Quanta Technology

Power System Analysis, Computing and Economics Committee Poster Forum  
(paper forum)

Thursday, 25 July, 8:00 AM–12:00 PM  VCC West – West Meeting Room 211
Sponsored by:  Power & Energy Society

• GM1012, Quantifying the Benefits of Energy and Ancillary Services Market
  Y. GU, MISO
  Z. ZHOU, MISO
  R. BO, MISO
  L. HECKER, MISO
  J. YAN, MISO
  J. OKULLO, MISO
• GM1732, A Decentralized Framework of Unit Commitment for Future Power Markets
  M. LI, North China Electric Power University
  P. LUH, University of Connecticut
• GM2280, Toward Scalable, Parallel Progressive Hedging for Stochastic Unit Commitment
  S. RYAN, Iowa State University
  R. WETS, University of California Davis
  D. WOODRUFF, University of California Davis
  C. SILVA-MONROY, Sandia National Laboratories
  J. WATSON, Sandia National Laboratories
• GM1408, Optimal Real-Time Pricing for Unbalanced Distribution Grids with Network Constraints
  S. WECKX, KULeuven
  R. D’HULST, VITO
  J. DRIESEN, KULeuven
• GM1612, Ramp Rate Modeling for ERCOT Look Ahead SCED
  X. XU, ERCOT
  R. HOWARD, ERCOT
• GM0081, Market Flow Calculation in Electricity Market Operations
  C. LUO, Midwest Independent Transmission System Operator, Inc. (MISO)
  Y. HOU, University of Hong Kong
• GM0360, Efficiency Estimation on DPC Active Front-End Rectifier Loads for SysteM–Level Transient Studies
  J. CANO RODRÍGUEZ, University of Oviedo
Thursday Morning, continued

J. GONZÁLEZ NORNIELLA, University of Oviedo
G. ALONSO ORCAJO, University of Oviedo
C. ROJAS GARCÍA, University of Oviedo
H. ATIGHECHI, University of British Columbia
J. JATSKEVICH, University of British Columbia

• GM0449, A Modified Balanced Truncation Method and its Application to Model Reduction of Power System
  C. HUANG, Southeast University
  K. ZHANG, Southeast University
  X. DAI, Southeast University
  W. TANG, Southeast University

• GM0644, Piecewise Linear Approximation of Generators Cost Functions Using Max-Affine Functions
  H. AHMADI, University of British Columbia
  J. MARTI, University of British Columbia
  A. MOSHREF, BBA

• GM1005, GPU-Accelerated Poincaré Map Method for Harmonic-Oriented Analyses of Power Systems
  N. GARCIA, Universidad Michoacana de San Nicolas de Hidalgo
  R. OLMOS, Universidad Michoacana

• GM1292, A Multi-Flock Approach to Rapid Dynamic Generator Coherency Identification
  J. WEI, University of Toronto
  D. KUNDUR, University of Toronto

• GM1463, The Suitability of Current Transmission Pricing Systems for Increased Renewable Energy Production
  K. ÖSTMAN, KTH Royal Institute of Technology
  M. HESAMZADEH, KTH Royal Institute of Technology

• GM1613, Parallel State Estimation Assessment with Practical Data
  Y. CHEN, Pacific Northwest National Laboratory
  M. RICE, Pacific Northwest National Laboratory
  Z. HUANG, Pacific Northwest National Laboratory
  S. JIN, Pacific Northwest National Laboratory

• GM1615, Constrained Optimum Generator Dispatch for Fuel Consumption Minimization
  Y. HAN, Colorado State University
  Y. HAN, Colorado State University
  P. YOUNG, Colorado State University
  D. ZIMMERLE, Colorado State University

• GM2045, Short-Term Electricity Price Forecasting
  A. ARABALI, University of Nevada, Reno
  E. CHALKO, University of Nevada, Reno
  M. ETEZADI-AMOLI, University of Nevada, Reno
  M. FADALI, University of Nevada, Reno

• GM2368, Model Predictive Control in Dynamic Economic Dispatch Using Weibull PDF
  C. KIM, Hanyang University
  Y. GUI, Hanyang University
  C. CHUNG, Hanyang University
  Y. KANG, Chonbuk National University

• GM2391, LMP Step Pattern Detection based on Real-Time Data
  H. YUAN, University of Tennessee
  F. LI, University of Tennessee
  Y. WEI, University of Tennessee

• GM0207, A New Method of Solving the Unit Commitment Problem
  X. LIU, University of Arkansas at Little Rock

• GM0300, State-space Model Generation of Distribution Networks for Model Order Reduction Application
  P. LI, Tianjin University
  H. YU, Tianjin University
  C. WANG, Tianjin University
  C. DING, Tianjin University
  C. SUN, Tianjin University
  Q. ZENG, Guangdong Power Grid Corporation
  B. LEI, Guangdong Power Grid Corporation
  H. LI, Guangdong Power Grid Corporation
  X. HUANG, Guangdong Power Grid Corporation

• GM0798, Comparative Assessment of MW-Mile and MVA-Mile Methods of Transmission Tariff Allocation and Revenue Reconciliation
  B. KHARBAS, MNIT
  M. FQI, MNIT
  H. TAWARI, MNIT
Power System Equipment (paper forum)

Thursday, 25 July, 8:00 AM–12:00 PM  VCC West – West Meeting Room 208-209
Sponsored by: Power & Energy Society

- GM0474, The Results of Asset-Based Manual Testing of Utility-Owned Objects for Contact Voltage in New York
  S. HANEBOUTH, Power Survey Company
  S. MARTINO, Central Hudson Gas and Electric

- GM0699, Three Core Cable Hot Field Distribution and Coaxial Heat Road Model Feasibility Study
  G. LIU, South China University of Technology
  Q. HU, South China University of Technology
  L. YAN, South China University of Technology
  X. YE, South China University of Technology

- GM0712, Error Analysis on Calculating Conductor Temperature Based on Error Analysis on Calculating Conductor Temperature Based on Outer Sheath Temperature of Cable
  Q. HU, South China University of Technology
  X. YE, South China University of Technology
  G. LIU, South China University of Technology
  F. ZHOU, South China University of Technology

- GM0751, On the Definition of Construction Grades for Wood Pole Power Lines
  M. LU, BC Hydro

- GM0863, Making a Smart Grid Case: Fault Circuit Indicators
  A. VUKOJEVIC, Baltimore Gas and Electric
  P. FREY, Baltimore Gas and Electric
  M. SMITH, Baltimore Gas and Electric

- GM0922, Battery Life Estimation in a Real-Time Energy Management System
  R. SHARMA, NEC Labs America, Cupertino, CA
  K. DVJOTHAM, University of Washington

- GM1264, Modeling of an All-Vanadium Redox Flow Battery and Optimization of Flow Rates
  B. XIONG, Nanyang Technological University
  J. ZHAO, Nanyang Technological University
  J. LI, Hubei Electric Power Research Institute

- GM1562, Investigation of Attenuation Characteristics of PD Pulse During Propagation in XLPE Cable
  A. KHAN, King Saud University

- GM1657, The Impact of Maritime Wind Speed on Submarine Cable Conductor Temperature
  Q. HU, South China University of Technology
  G. LIU, South China University of Technology
  X. YE, South China University of Technology

- GM1960, Partial Power Operation of Multi-Level Modular Converters under Subsystem Faults
  P. CLEMOW, Imperial College London
  T. GREEN, Imperial College London
  M. MERLIN, Imperial College London

- GM2075, SPDs Shown to Improve the Reliability of Medical Equipment – A Case Study
  R. HOTCHKISS, Surge Suppression Incorporated
  P. MIKESELL, PQ Solutions

- GM2098, Application of Point-On-Wave Controlled Closing for Temporary Protective Ground Testing
  E. MADESN, Pacific Gas & Electric Co.
  M. ETZADI-AMOLI, University of Nevada, Reno (UNR)

- GM2135, Impact of Axial Displacement on Power Transformer FRA Signature
  N. HASHEMNIA, Curtin University
  A. ABU SIADA, Curtin University

- GM0809, Multi-Objective Optimization of the Design of an Elevator Linear Motor
  N. TAKAHASHI, Okayama University
  S. MARKON, Kobe Institute of Computing
  A. ONAT, Sabanci University Istanbul

- GM1347, Generalized State-Space Saturable Induction Machine Model Using a Voltage-Behind-Reactance Formulation
  F. THERRENN, University of British Columbia
  M. CHAPARIAH, University of British Columbia
  J. JATSKEVICH, University of British Columbia

- GM1487, Estimation of Induction Motor Single-Cage Model Parameters from Manufacturer Data
  M. ABDELAZIZ, University of Waterloo
  E. EL-SAADANY, University of Waterloo
Distribution Overcurrent Protection and Coordination  (tutorial)

Thursday, 25 July, 8:00 AM–12:00 PM  
MAR – Pinnacle I

Sponsored by:  IEEE Power & Energy Society and Power & Energy Education Committee

INSTRUCTORS:
S. BAHRAMIRAD, S&C Electric Company
J. NIEMIRA, PE, S&C Electric Company

The tutorial describes the principles of selective coordination, in which removal of faulted equipment and line sections – followed by system restoration – occurs both quickly and reliably. The attendees learn how new technology protective devices can be applied to improve power quality. This half day tutorial instructs attendees on the selection and application of overcurrent protective devices for use in medium-voltage electric power distribution systems. Throughout the course, attendees are given assignments to reinforce the concepts and procedures covered. Also, a comprehensive system protection and coordination example is developed, connecting many of the tutorial topics.

- System parameters
- Symmetrical components
- Protective devices: Circuit breakers and relays, fuses, pulse closers, sectionalizers
- Coordination of overcurrent protective devices

Smart Grid 203: Distribution System  (tutorial)

Thursday, 25 July, 8:00 AM–12:00 PM  
MAR – Ambleside I

Sponsored by:  IEEE PES and Power & Energy Education Committee

INSTRUCTOR:
D. HOUSEMAN, EnerNex

The distribution impacts of smart grid, including:
- Smart Distribution Systems Fundamentals
- Smart Distribution Systems Applications
- Distribution Automation
- Volt and Var Control
- Distribution System Monitoring (sensors, fault location, waveshape analysis)
- Distribution Management System
- Distributed Resource Integration
- Telecommunication for Smart Distribution Systems
- Distribution System Applications Integration
- Who Should Attend: Smart Distribution System educators, developers, engineers and managers who are considering the deployment of Smart Distribution System technology. The participants will be involved in the complete chain of energy delivery from generation, transmission and distribution to the customers.
Transmission System – The Interconnected Bulk Electric System  *(tutorial)*

**Thursday, 25 July, 8:00 AM–5:00 PM**  
**REN – Salon F**  
**Sponsored by:** IEEE PES

The focus of this course is to provide participants with knowledge of how electric power is transferred from generation sources to distribution systems via the interconnected electric bulk power system known as “the grid.” Basic physical laws governing the grid will be introduced, as well as the regulatory agencies involved in its governance. The great blackouts will be explored. This course is intended to increase participant’s understanding of the electric grid and how it functions in the electric power system.

Topics covered in the course include an introduction to the fundamental concepts of power, energy, and power system stability as they relate to the grid. The grid is explored in terms of its interconnections, power flow, North American interconnections, and governing bodies such as NERC/ERO, ISOs, and RTOs. Reliability standards and contingency analysis are addressed. Issues related to the planning and operation of the grid, such as transmission and economic constraints, determining transmission transfer capability, and dealing with congestion are reviewed. The course also discusses the great blackouts, their root causes, and lessons learned.

**INSTRUCTOR:**  
R. W. WALDELE

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Energy and Water: Essential, Interdependent Commodities and Strategies  *(panel)*

**Thursday, 25 July, 9:00 AM–12:00 PM**  
**MAR – Shaughnessy II**  
**Sponsored by:** Energy Development and Power Generation  
**Chair:** W. Leighty, Leighty Foundation

Large quantities of both fresh and salt water are required for thermal electricity generation – both fossil and nuclear – in competition with many other users. Some is “withdrawn”, returned warmer to the source water body. Some is “consumed”, usually evaporated. Much electric energy is used for water pumping: producing, distributing, and disposing. “Fracking” natural gas production, much of it for electricity generation fuel, adds great new burdens of freshwater supply and wastewater recycling and disposal. Most renewable-source generation requires less water, or none. Transmission and storage of large, stranded, renewable resources as hydrogen or ammonia fuels requires consumption of freshwater feedstock, but generally less than is required for thermal generation. Depletion of major aquifers and rapid climate change further stress the energy-water nexus and exacerbate competition among users. We need strategic planning, guided by interdisciplinary engineering and long-term economics thinking; fortunately, this has begun, but now needs to proliferate and propagate.

1. M. HIGHTOWER, Sandia National Laboratories, Energy Systems Analysis Department  
2. K. TWOMEY SANDERS, PhD, University of Texas at Austin  
3. J. MACKNICK, Energy and Environmental Analyst, National Renewable Energy Laboratory (NREL)  
4. O. LE GALUDEC, Head of Performance Group for Gas and Steam Business, Alstom Power  
5. L. WHITE, GEI Consultants, Inc.  
6. R. S. FAIBISH, Principal Chemical and Nuclear Engineer Argonne National Laboratory

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Modeling of Cascading Power System Events in an Integrated EMS/DSA Environment – User Requirements and State of the Arts  *(panel)*

**Thursday, 25 July, 9:00 AM–12:00 PM**  
**VCC West – West Meeting Room 120**  
**Sponsored by:** Power System Operations Committee  
**Chair:** Z. Yao, BC Hydro  
**Chair:** V. Vinnakota, CAISO

In order to increase the situational awareness for real-time operations in control centers, more and more utilities have installed various real-time tools for power system security assessment. The main stream of these tools is still model-based methodology, which rely on the accuracy of the models of system events among other models. Therefore, system event modeling plays a crucial role in evaluating the impacts of potential cascading outages for increasing situational awareness.

The objective of the panel is to provide a platform for users/vendors to share experiences on modeling cascading system events in an integrated EMS/DSA environment. To achieve this, the panel will invite EMS/DSA users who are using EMS/DSA in control centers for real-time operations. They will be encouraged to prepare the panel presentation with vendors to cover details about the modeling processes and the state-of-the-arts.
PRESENTATIONS AND PANELISTS:
• GM2397, Practice of On-Line Transient Stability Assessment Application in PJM System
  J. TONG, PJM Interconnection
• GM2395, BCH’s Experiences on Power System Event Modeling in Real-Time DSA Applications
  D. ATANACKOVIC, British Columbia Hydro and Power Authority
• GM2396, Integrated System Stability Analysis Tools at California ISO
  E. HAQ, California ISO
• GM2398, How to Use the Information of Breaker and Switch in Online DSA System in China
  Y. BAO, NARI
• GM2510, Real-Time State Estimator Driven Voltage Stability Analysis Studies at Southern California Edison
  G. ZHAO, GE

State Estimation for Distribution Operations: Sharing the Experiences of Implementation, Usage and Complexities (panel)
Thursday, 25 July, 9:00 AM–12:00 PM  VCC West – West Meeting Room 119
Sponsored by:  Power System Operations Committee
Chair:  Professor Yaman, Virginia Tech
Chair:  V. Vinnakota, CAISO

Implementation of state estimation at transmission level was successfully realized due to redundancy of measurements supported by up-to-date network models in real time, and also due to the end user efforts in upkeep of the network models. State estimator has become a critical tool in system operations.

PRESENTATIONS AND PANELISTS:
• GM2514, State Estimator Deployment in BCH DMS – Challenges and Opportunities
  D. ATANACKOVIC, BC Hydro
  V. DABIC, BC Hydro
• GM2515, Distribution State Estimation: Wishes and Practical Possibilities
  G. SVENDA, University of Novisad
• GM2516, Distributed State Estimator: Extension to Distribution Feeders
  A. MELIPOULOS, Georgia Tech
  C. HEDRINGTON, USVI-WAPA
• GM2513, State Estimation for Advanced Distribution Automation
  M. BARAN, North Carolina State University
• GM2512, Dealing with Two Time Scales in Distribution System State Estimators
  A. GOMEZ-EXPOSITO, Universidad de Sevilla
  C. GOMEZ-QUILES, University of Seville
  I. DAZFIC, Siemens AG
• GM2546, Distribution State Estimation: Experiences Incorporating the Evolving Spectrum of Distribution Measurement Capabilities and Operating Needs
  G. CLARK, Alabama Power Company
  K. DEMAREE, Alstom Grid Inc.

Integrated Power System Model for Operations and Planning – Reality or Myth? (panel)
Thursday, 25 July, 9:00 AM–12:00 PM  VCC East – East Meeting Room 7
Sponsored by:  Power System Planning and Implementation
Chair:  D. Manjure, Midwest ISO

Operations models represent the existing system while Planning models also include future facilities expected to be built through a 10/20-year planning horizon. While appropriately modeling planned facilities is difficult, ensuring accurate representation of the existing system in Planning models has also been challenging. Models developed for Operations and Planning follow independent processes with limited touch points thereby potentially resulting in inconsistent information and possibly redundant effort. Use of different formats – “node-breaker” for Operations and “bus-branch” for Planning aggravates the situation. On various instances, results obtained using Operations models have not been able to be replicated using Planning models. The objective of this Panel session is to have a robust discussion on reconciliation of Operations and Planning models and will seek perspectives of experts from different industry sectors such as ISOs, consultants and vendors.

PRESENTATIONS AND PANELISTS:
• GM0747, The Biggest Challenge in Integrated Network Model Management: It's Not the Technology
  P. BROWN, EPRI
The Use of CIM Standards in Smart Grid Applications (panel)

Thursday, 25 July, 10:00 AM–12:00 PM REN – Port of Vancouver

Sponsored by: (PSACE) Computer Analytical Methods
Chair: E. Haq, California ISO
Chair: M. Goodrich, SISCO System

Many Electric Utility Companies worldwide have adopted the CIM standard as a platform to assist in the integration of systems in support of the Smart Grid. In order to achieve the goals of the Smart Grid initiatives in the US and around the world, the primary systems within the utility, from the Energy Management Systems to the Back Offices systems to the equipment in the field have to be completely interoperable and be able to exchange information seamlessly. Starting in the early part of this century, the interoperability of the various systems in the Utility industry have used the CIM standards as a mechanism to exchange information and that standard is now in use at Transmission, Generation and Distribution companies. The CIM standard is now being used as the integration interface to achieve the interoperability required for Smart Grid applications.

PRESENTATIONS AND PANELISTS:

- GM0625, Integration of Green Button with CIM
  S. KHAPARDE, IIT

- GM0626, Modelling Big Data for the Smart Grid
  A. MCMORRAN, Opengrid

- GM0622, Managing Versions and Variants of the CIM Canonical Model
  J. BRITTON, Alstom Grid

- GM0623, CIM Standard Activities for Smart Grid
  M. GOODRICH, SISCO System

- GM0624, Potential Integration of Phasor Measurement Units and Wide Area Monitoring Systems Based Upon National Grid Enterprise Level CIM
  G. TAYLOR, Brunel University
  N. HARGREAVES, Brunel University
  P. ASHTON, Brunel University
  M. BRADLEY, National Grid
  A. CARTER, National Grid
  A. MCMORRAN, Open Grid Systems Ltd

Challenges and Opportunities of Modern Heuristic Methods in Power System Operation and Planning (panel)

Thursday, 25 July, 10:00 AM–12:00 PM REN – Port of Singapore

Sponsored by: (PSACE) Intelligent Systems
Chair: Z. Fan, PJM

Modern heuristic methods have been introduced to power industry for more than a decade. The research and development on those methods has proved their significant potential benefit to the current power system, especially with smart grid in place. This panel will focus on industry experiences or applications using one or more modern heuristic methods. The challenges and the potential opportunities of the applications will be discussed. The panelists will be very mixed from university, vendor, consulting company, national lab and ISO/TRO. The topics will cover the application basics, operation, asset condition management, distribution planning and micro-grid.

PRESENTATIONS AND PANELISTS:

- GM0609, Modern Heuristic Methods Application in Power System
  K. LEE, Baylor University

- GM0610, Using Asset Condition Data to Drive System Decisions
  S. VARADAN, UISOL

- GM0608, Power System Real Time Operations and Controls with Heuristic Approaches
  J. TONG, PJM Interconnection
Thursday Afternoon

Monitoring and Diagnostics of Wind Turbine Generators  (panel)

Thursday, 25 July, 1:00 PM–5:00 PM  REN – Ballroom I
Sponsored by:  Electric Machinery
Chair:  P. Neti, GE Global Services

The following topics will be part of this panel:
State-of-the-art operations, maintenance and repair practices of large scale wind farms; What should be monitored on Wind Turbines?: Industry practices for the repair & servicing of Wind Turbines; Advanced monitoring and forecasting of wind turbines to increase AEP

PRESENTATIONS AND PANELISTS:
• GM2626, Value Adds of Wind Turbine Monitoring and Diagnostics in the US Market Place
  M. MANJREKAR, University of North Carolina
• GM2627, Industry Practices for the Repair & Servicing of Wind Turbines
  G. Moore, General Electric
• GM2628, Fault Detection and Health Monitoring for Wind Turbines
  P. SEILER, University of Minnesota
• GM2629, Condition Monitoring of Permanent Magnet Generator Systems
  D. IONEL, University of Wisconsin

Advancements in Wind Generation  (transactions paper)

Thursday, 25 July, 1:00 PM–3:00 PM  VCC East – East Meeting Room 7
Sponsored by:  Energy Development and Power Generation
Chair:  J. Enslin, UNCC

PAPERS AND AUTHORS:
• GM0105, Adaptive Speed Observer for a Stand-Alone Doubly Fed Induction Generator Feeding Nonlinear and Unbalanced Loads  [Transaction Number:  TEC-00165-2012]
  M. PATTNAIK, National Institute of Technology, Rourkela
  D. KASTHA, Indian Institute of Technology Kharagpur
• GM0293, Frequency Response of Power Systems with Variable Speed Wind Turbines  [Transaction Number:  2202928]
  L. RUTTLEDGE, Electricity Research Centre
  J. O’SULLIVAN, EirGrid
  N. MILLER, GE Energy
  D. FLYNN, Electricity Research Centre
  S. MURTHY, Indian Institute of Technology Delhi
  B. SINGH, Indian Institute of Technology Delhi
  V. SANDEEP, Indian Institute of Technology Delhi
  X. GONG, University of Nebraska-Lincoln
  W. QIAO, University of Nebraska-Lincoln
International Practices and Techniques in Developing Alternative Energy
(panel)
Thursday, 25 July, 1:00 PM–3:00 PM  MAR – Shaughnessy II
Sponsored by: Energy Development and Power Generation
Chair: L. Lai, State Grid Energy Research Institute
Chair: K. Wong, IEEE

The panel will cover the international practices and challenges in producing alternative energy together with the realistic prospects for widespread deployment of cost effective, green and emerging technologies.

PRESENTATIONS:
Financial Opportunities by Implementing Renewable Energy and Energy Storage Devices for Households under ERCOT Demand Response Programs Design
W.-J. LEE, Fellow,IEEE, University of Texas at Arlington

The Fault Contributions of Different Kinds of Renewable Generators with FRT Capabilities
Presenter: T. Bi, North China Electric Power University

Emission Trading System in China
L. L. LAI, State Grid Energy Research Institute, Beijing

Direct Probabilistic Interval Forecast of Wind Power
Z. XU, Hong Kong Polytechnic University

Distributed Generation Influence on the Analysis of Distribution Management System
L. YUPING, Guodian Nanjing Automation Co., Ltd., Nanjing

Electric Vehicle Integration with Renewable Energy Systems (panel)
Thursday, 25 July, 1:00 PM–3:00 PM  VCC West – West Meeting Room 113
Sponsored by: Energy Development and Power Generation
Chair: E. Sortomme, Alstom Grid

Renewable energy systems such as wind, solar, and electric vehicles are being used as a way to decrease CO2 emissions. There is an opportunity for a synergy of leveraging the battery storage of EVs to facilitate a higher penetration level of uncontrollable renewables. This panel will discuss the potential benefits of EV charge control as well as the necessary technology developments and the challenges with implementation. Lessons learned from simulation studies and pilot projects will also be discussed.

Enhancing Renewable Energy Grid Penetration with Plug-in Electric Vehicles
G. K. VENAYAGAMOORTHY, Professor, Clemson University

Defining Advanced Control and Management Solutions to Allow a Large Deployment of EV on Electrical Grids
J. A. P. LOPES, INESC Porto and Faculdade de Engenharia da Universidade do Porto

Leveraging the Power of Electric Vehicles
J. USHER, Co-Founder MistyWest, Former Director of Grid Technology for REV Technologies

Bi-Directional Electric Vehicles for Microgrid Stability Support
M. D. JOHNSON, U.S. Army Corps of Engineers
D. Z. MCGREW, U.S. Army Corps of Engineers
S. EICK, U.S. Army Corps of Engineers
J. BOTHOF, U.S. Army Corps of Engineers

Advanced Pumped Storage Modeling Combo Session with PSDP Task Force on Advanced Pumped Storage Modeling (combo)
Thursday, 25 July, 1:00 PM–5:00 PM  VCC West – West Meeting Room 120
Sponsored by: Power System Dynamic Performance
Chair: P. Donalek, MWH Global

The panel session participants will present descriptions of the work being done to develop models for pumped storage plants with advanced technologies. The advanced technologies include: adjustable speed machines and ternary pumped storage. The models will include those needed to carry out dynamic response studies for transmission interconnection studies and models to evaluate potential economic benefits.

PRESENTATIONS AND PANELISTS:
• GM2532, TBD
  R. HOVSAPIAN, Idaho National Laboratory
Thursday Afternoon, continued

- GM2534, TBD
  J. FELTES, Siemens PTI
- GM2535, TBD
  Y. KAZACHKOV, Siemens PTI
- GM2533, TBD
  A. BOTTERUD, Argonne National Lab
- GM2531, TBD
  E. ELA, National Renewable Energy Laboratory
- GM2536, TBD
  T. GUO, Energy Exemplar

**Electric Power Definitions: A Debate (panel)**
Thursday, 25 July, 1:00 PM–5:00 PM  
VCC East – East Meeting Room 9
Sponsored by: Power System Instrumentation and Measurements
Chair: A. Emanuel, WPI
Chair: A. McEachern, Power Standards Labs

**PRESENTATIONS AND PANELISTS:**
- GM2619, Electric Power Definitions: A Debate  
  R. ARSENEAU, NRC Canada
- GM2620, Electric Power Definitions: A Debate  
  B. HUGHES, MBH Consulting Ltd.
- GM2621, Electric Power Definitions: A Debate  
  R. POYATO, Fluke
- GM2622, Electric Power Definitions: A Debate  
  V. LEÓN-MARTÍNEZ, Universidad Politécnica de Valencia
- GM2623, Electric Power Definitions: A Debate  
  J. MONTAÑANA-ROMEU, Universidad Politécnica de Valencia
- GM2624, Electric Power Definitions: A Debate  
  A. BERRISFORD, BC Hydro
- GM2625, Electric Power Definitions: A Debate  
  T. LEYSHOCK, Alstom Grid

**Unit Scheduling and Market Topics (transactions paper)**
Thursday, 25 July, 1:00 PM–5:00 PM  
VCC West – West Meeting Room 112
Sponsored by: Power System Operations
Chair: K. Hedman, Arizona State University

**PAPERS AND AUTHORS:**
- GM0061, Impact of Natural Gas System on Risk-Constrained Midterm Hydrothermal Scheduling  
  [Transaction Number: TPWRS-00342-2009]  
  C. SAHIN, TUBITAK MAM  
  Z. LI, IIT  
  M. SHAHIDEPOUR, IIT  
  E. ERKEMEN, METU
- GM0080, A Bilevel Approach to Operational Decision Making of a Distribution Company in Competitive Environments  
  [Transaction Number: TPWRS-00420-2011]  
  H. HAGHIGHAT, Islamic Azad University, Jahrom Branch  
  S. KENNEDY, Masdar Institute of Science and Technology
- GM0194, Balancing Market Integration in the Northern European Continent: A 2030 Case Study  
  [Transaction Number: TSTE-00439-2011]  
  H. FARAHMAND, SINTEF Energy Research  
  T. AIGNER, Norwegian University of Science and Technology (NTNU)  
  G. DOORMAN, Norwegian University of Science and Technology (NTNU)  
  M. KORPÅS, SINTEF Energy Research  
  D. HERNANDO, SINTEF Energy Research
- GM0232, Risk-Constrained Scheduling and Offering Strategies of a Price-Maker Hydro Producer under Uncertainty  
  [Transaction Number: TPWRS-00749-2012.R1]  
  H. POUSINHO, Univ. Beira Interior  
  J. CONTRERAS, University of Castilla-La Mancha  
  A. BAKIRTZIS, Aristotle University of Thessaloniki  
  J. CATALÃO, Univ. Beira Interior
Thursday Afternoon, continued

- GM1190, Tight and Compact MILP Formulation of Start-Up and Shut-Down Ramping in Unit Commitment [Transaction Number: TPWRS-00080-2012]
  G. MORALES-ESPAÑA, Universidad Pontificia Comillas
  J. LATORRE, Universidad Pontificia Comillas
  A. RAMOS, Universidad Pontificia Comillas
  C. HAMON, Royal Institute of Technology
  M. PERNINGE, Royal Institute of Technology
  L. SOEDER, Royal Institute of Technology
  Y. LEE, Alstom Grid
  R. BALDICK, University of Texas at Austin
- GM2430, Real Option Valuation of FACTS Investments Based on the Least Square Monte Carlo Method [Transaction Number: TPWRS-00168-2010]
  G. BLANCO, Universidad Nacional de Asunción
  F. OLSINA, Universidad Nacional de San Juan
  F. GARCÉS, Universidad Nacional de San Juan
  C. REHTANZ, Technische Universität Dortmund

Cyber Security of WAMPAC (panel)
Thursday, 25 July, 1:00 PM–3:00 PM MAR – Shaughnessy I
Sponsored by: (PSACE) Computer Analytical Methods
Chair: M. Govindarasu, Iowa State University

The electric power grid is a highly automated network that uses a variety of sensors, information/control systems, and communication networks for the purpose of sensing, monitoring, protection, and control of the physical grid. As part of the smart grid efforts throughout the world, the bulk power systems undergo major technological changes including the deployment of synchrophasors (PMUs), real-time communication networks to support operational and market applications, and advanced data analytics and decision support algorithms. The recent findings, as documented in federal reports and in the literature, indicate the growing threat of cyber-based attacks in numbers and sophistication on the nation’s electric grid. Therefore, cyber security of the power grid—encompassing attack prevention, detection, mitigation, and resilience—is among the most important research issues today and in the emerging smart grid.

PRESENTATIONS AND PANELISTS:
- GM0989, Securing the Substations Against Multiple Cyber Attacks
  C. LIU, WSU
- GM0990, Cyber Security and Privacy in the Smart Grid Context: Challenges and Opportunities
  Author AMIN, University of Minnesota
- GM0991, Progressive Switching Attacks for Instigating Cascading Failures in Smart Grid
  Author KUNDUR, University of Toronto
- GM0992, Smart Grid Cybersecurity and the Importance of System Architecture
  P. SKARE, PNNL
- GM0998, Causal Event Graphs for Power System Intrusion Detection
  T. MORRIS, Mississippi State University
- GM0993, Cyber Security Issues and Challenges in Bulk Power System
  S. KELAPURE, GE

Power System Analysis, Computing and Economics Committee – Transaction Paper Session #2 (transactions paper)
Thursday, 25 July, 1:00 PM–5:00 PM REN – Port of Singapore
Sponsored by: PSACE

PAPERS AND AUTHORS:
  C. WALLNERSTRÖM, KTH
  P. HILBER, KTH
  P. DEHGHANIAN, Texas A&M University
  M. FOTUHI-FIRUZABAD, Sharif University of Technology
Power System Analysis, Computing and Economics Committee – Transaction Paper Session #3 (transactions paper)

Thursday, 25 July, 1:00 PM–5:00 PM MAR – Dundarave
Sponsored by: PSACE

PAPERS AND AUTHORS:

- **GM0073**, The Value of Wind Resource Geographic Diversity for Wind Farm Profitability [Transaction Number: DOI: 10.1109/TPWRS.2012.2195337]
  - C. GOMEZ-QUILES, University of Seville
  - H. GIL, University of Seville

- **GM0280**, Electric Vehicle Aggregator/System Operator Coordination for Charging Scheduling and Services Procurement [Transaction Number: TPWRS.2012.2221750]
  - M. ORTEGA-VAZQUEZ, University of Washington
  - F. BOUFFARD, McGill University
  - V. SILVA, EDF

- **GM0524**, Effect of Network Congestions Between Areas on Single-Price Electricity Markets [Transaction Number: 10.1109/TPWRS.2012.2198079]
  - A. DELGADILLO VEGA, University Pontificia Comillas
  - J. RENESES, University Pontificia Comillas
  - J. BARQUIN, ENDESA

  - N. NAVID, MISO

  - A. BOTTERUD, Argonne National Laboratory
  - Z. ZHOU, Argonne National Laboratory
  - J. WANG, Argonne National Laboratory
  - J. SUMAILI, INESC TEC
  - H. KEKO, INESC TEC
  - J. MENDES, INESC TEC
Power System Analysis, Computing and Economics Committee – Transaction Paper Session #4 (transactions paper)

Thursday, 25 July, 1:00 PM–5:00 PM REN – Ballroom III
Sponsored by: PSACE

PAPERS AND AUTHORS:
• GM0203, Lossless Compression of Wind Plant Data [Transaction Number: TSTE-00004-2012]
  H. LOUIE, Seattle University
  A. MIGUEL, Seattle University
  R. FERNANDEZ BLANCO, Universidad de Castilla-La Mancha
  J. ARROYO, Universidad de Castilla-La Mancha
  N. ALGUACIL, Universidad de Castilla-La Mancha
• GM1840, Equality-Constrained Bilinear State Estimation [Transaction Number: TPWRS-01068-2011]
  C. GOMEZ-QUILES, University of Seville
  H. GIL, University of Seville
  A. DE LA VILLA JAEN, University of Seville
  A. GOMEZ-EXPOSITO, University of Seville
  J. BEERTEN, University of Leuven
  S. COLE, Tractebel Engineering
  R. BELMANS, University of Leuven
  J. ZENG, University of Nebraska-Lincoln
  W. QIAO, University of Nebraska-Lincoln
• GM2094, Predicting Critical Transitions from Time Series Synchrophasor Data [Transaction Number: TSG-00654-2011]
  E. COTILLA-SANCHEZ, Oregon State University
  P. HINES, University of Vermont
  C. DANFORTH, University of Vermont

Smart Distribution Analytics and Microgrids for Integration of DER – Part 1 (panel)

Thursday, 25 July, 1:00 PM–3:00 PM REN – Port of Vancouver
Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: A. Jayantilal, Alstom

Smart Distribution Grid initiatives are introducing a new generation of Distributed Energy Resources (DER), Distribution Automation (DA) and Smart Meters for enhanced grid operations and management. Smart Distribution will enable electric utilities to further improve grid operations whilst continuing to effectively manage the cost of supply. Smart Grid pilot projects are innovating new technologies and control methodologies for enhanced DER integration. DER has the potential of revolutionizing how consumers perceive and use electricity, and could potentially create a chaotic situation for distribution grid operators. Innovation in DER operations will enable this chaos to be managed to accomplish Smart Distribution objectives. This panel will discuss emerging microgrids, evolutionary big data analytics, advanced state estimation applications and enhanced situational awareness technologies that are being developed for distribution grid operations.

PRESENTATIONS AND PANELISTS:
• GM2504, Data Analytics for Utilities: A Project about Micro Synchrophasors
  G. SIMARD, S.I.M.A.R.D. SG Inc

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HVDC Grid Reliability (panel)

Wednesday, 24 July, 1:00 PM–5:00 PM   REN – Ballroom III
Sponsored by: (PSACE) Reliability and Risk Analysis
Chair: L. B. Tjernberg, Chalmers University of Technology

The electric power system is facing a major ongoing change. Main drivers include climate, system reliability and the fundamental goal of reducing transmission losses. One technology solution to this development involves using HVDC for long distance transmission and/or integrating HVDC systems into existing electric power grids. There are several ongoing projects around the world investigating these new developments using HVDC technology and considering the effect of HVDC transmission on the reliability performance of electric power systems. This panel invites leading experts in the area from around the world to provide discussions on HVDC grid reliability. The purpose is to show the various ongoing projects, research, and studies on the development and utilization of HVDC technology and with a special focus on how the reliability of power systems would be affected by HVDC integration. Preliminary results will be presented from a working group within Cigré studying HVDC grid reliability (B460).

PRESENTATIONS AND PANELISTS:

GM0994, Experiences from HVDC Technologies
A. GOLE, University of Manitoba

GM0995, Industry Experience of HVDC Reliability Data Collection and Utilization
N. DHALIWAL, Manitoba Hydro

GM0996, Preliminary Results from Cigré B 460 on HVDC Grid Reliability
N. MACLEOD, PbWorld

GM0997, HVDC Grid Developments in China
L. CHENG, Tsinghua University

GM0998, Examples of HVDC Grid Projects
N. KIRBY, Alstom

GM0999, Examples of HVDC Grid Projects
J. GIRI, Alstom

Geomagnetic Disturbances, Micro-Grids and Power System Analysis (paper forum)

Thursday, 25 July, 1:00 PM–5:00 PM   VCC West – West Meeting Room 211
Sponsored by: Power & Energy Society

GM0453, Power Dispatch Strategy in Microgrid Integrated with Solid State Transformer
J. YU, Southeast University
Z. WU, Southeast University
S. BHATTACHARYA, North Carolina State University

GM0502, The Importance of Non-Uniform Geoelectric Fields in Calculating GIC Distributions
E. BURSTINGHAUS, University of Queensland
T. SAHA, University of Queensland
K. YUMOTO, Kyushu University
R. MARSHALL, Bureau of Meteorology
C. WATERS, University of Newcastle

GM0559, Dynamic Performance of a Low Voltage MicroGrid with Droop Controlled Distributed Generation
T. PAPADOPOULOS, Aristotle University of Thessaloniki
P. PAPADOPOULOS, Aristotle University of Thessaloniki
P. CROLLA, University of Strathclyde
A. ROSCOE, University of Strathclyde
G. PAPAGIANNIS, Aristotle University of Thessaloniki
G. BURT, University of Strathclyde

GM0658, A Novel Bus-Type Extended Continuation Power Flow Considering Remote Voltage Control
J. ZHAO, Hohai University
C. ZHOU, Hohai University
G. CHEN, Hohai University
Thursday Afternoon, continued

- GM0701, Calculation Analysis of Geomagnetically Induced Currents with Different Network Topologies
  K. ZHENG, North China Electric Power University
  D. BOTELE, Natural Resources Canada
  R. PIRJOLA, Natural Resources Canada
  L. LIU, North China Electric Power University

- GM0787, Outlier Detection Based on Improved SOM and Its Application in Power System
  Y. YANG, Tsinghua University
  W. HU, Tsinghua University
  Y. MIN, Tsinghua University
  W. LUO, Liaoning Electric Power Company Limited
  W. GE, Liaoning Electric Power Company Limited
  Z. WANG, Liaoning Electric Power Company Limited

- GM0886, Simulation Analysis of Geomagnetically-Induced Currents (GIC) Effects on Shell-Form Transformers
  R. NISHIURA, Mitsubishi Electric Corporation
  S. YAMASHITA, Mitsubishi Electric Corporation
  S. KANO, Mitsubishi Electric Corporation
  C. SWINDERMAN, Mitsubishi Electric Power Products, Inc.

- GM1105, A Review of Geomagnetic Disturbance (GMD) Effects in Manitoba
  W. CHANDRASENA, Manitoba Hydro
  S. SHELEMY, Manitoba Hydro
  D. JACOBSON, Manitoba Hydro

- GM1126, Risk Assessment of the Impact of Geomagnetic Disturbances on the Transmission Grid in Switzerland
  T. DEMIRAY, Swiss Federal Institute of Technology Zurich
  G. BECCUTI, Swiss Federal Institute of Technology Zurich
  G. ANDERSSON, Swiss Federal Institute of Technology Zurich

- GM1619, Optimal Selection of Generators in a Microgrid for Fuel Usage Minimization
  Y. HAN, Colorado State University
  P. YOUNG, Colorado State University
  D. ZIMMERLE, Colorado State University

- GM1742, Autonomous Operation of Multiple Interconnected Microgrids with Self–Healing Capability
  F. SHAHINA, Curtin University
  R. CHANDRASENA, Curtin University
  S. RAJAKARUNA, Curtin University
  A. GHOSH, Queensland University of Technology

- GM1920, Aspects of Network Harmonic Impedance Modelling in High Voltage Distribution Networks
  D. CHAKRAVORTY, Indian Institute of Technology
  J. MEYER, Technische Universitaet Dresden
  P. SCHEGNER, Technische Universitaet Dresden

- GM1954, Geomagnetic Disturbance Modeling Results for the AEP System: A Case Study
  K. SHETYE, University of Illinois at Urbana-Champaign
  T. OVERBYE, University of Illinois at Urbana-Champaign
  Q. QIU, American Electric Power
  J. FLEEMAN, American Electric Power

- GM2005, Potential Impacts of Harmonics on Bulk System Integrity during Geomagnetic Disturbances
  R. WALLING, Walling Energy Systems Consulting, LLC

- GM2006, Analysis of Geomagnetically Induced Currents
  A. YAN, Hydro One Networks
  D. ZHOU, Hydro One Networks
  L. MARTI, Hydro One Networks

- GM2195, Equivalent Circuits for Modelling Geomagnetically Induced Currents from a Neighbouring Network
  D. BOTELE, Natural Resources Canada
  A. LACKEY, Natural Resources Canada
  L. MARTI, Hydro One
  S. SHELEMY, Manitoba Hydro

- GM2025, Towards Real-Time Energy Scheduling in Microgrids with Performance Guarantee
  L. LU, Chinese University of Hong Kong
  J. TU, Chinese University of Hong Kong
  C. CHAU, Masdar Institute
  M. CHEN, Chinese University of Hong Kong
  Z. XU, Hong Kong Polytechnic University
  X. LIN, Purdue University
• GM1158, A Method for the Topology Identification of Distribution System
  Y. GAO, North China Electric Power University
  Z. ZHANG, North China Electric Power University
  W. WU, Tsinghua University
  H. LIANG, North China Electric Power University

• GM1249, An Efficient Approach for Parameter Correction in State Estimation
  A. MOHAPATRA, Indian Institute of Technology, Delhi
  P. BIJWE, Indian Institute of Technology, Delhi
  B. PANIGRAHI, Indian Institute of Technology, Delhi

• GM1981, A Laboratory Microgrid for Studying Grid Operations with PMUs
  O. ANTOINE, Université Libre de Bruxelles
  P. JANSSEN, Université Libre de Bruxelles
  Q. JOSSEN, Université Libre de Bruxelles
  J. MAUN, Université Libre de Bruxelles

Wind and Solar Power (paper forum)
Thursday, 25 July, 1:00 PM–5:00 PM  VCC West – West Meeting Room 208-209
Sponsored by: Power & Energy Society

• GM0002, Development and Planning of Solar Power in China
  X. XU, S and C Electric Company
  C. HAO, S and C Electric Company
  M. BISHOP, S and C Electric Company
  M. EDMONDS, S and C Electric Company
  J. SEMBER, S and C Electric Company
  J. ZHANG, North China Electric Power University

• GM0109, Wind Turbines Voltage Support in Weak Grids
  F. SULLA, Lund University
  J. SVENSSON, Lund University
  O. SAMUELSSON, Lund University

• GM0645, Control Strategy for Wind Generation Units to Mitigate Voltage Sags in Distribution Systems
  A. COMELLI, Federal Technological University of Parana
  R. OLIVEIRA, Federal Technological University of Parana
  M. FIORIN, Federal Technological University of Parana

• GM1229, Increasing Wind Capacity Value in Tasmania Using Wind and Hydro Power Coordination
  M. MOSADEGHY, University of Queensland
  T. SAHA, University of Queensland
  R. YAN, University of Queensland

• GM1233, Quantifying the Effect of Wind Turbine Size and Technology on Wind Power Variability
  T. BOUTSIKA, University of Texas at Austin
  S. SANTOSO, University of Texas at Austin

• GM1286, Domestic Heat Load Aggregation Strategies for Wind Following in Electric Distribution Systems
  F. BACCINO, University of Genova
  S. MASSUCCO, University of Genova
  L. NORDSTROM, KTH – Royal Institute of Technology

• GM1367, A Generalized Data Preprocessing Method For Wind Power Prediction
  J. AN, Xi’an Jiaotong University
  Z. BIE, Xi’an Jiaotong University
  X. CHEN, Xi’an Jiaotong University
  B. HUA, Xi’an Jiaotong University
  S. LIU, Hohai University

• GM1429, Frequency Control by Aluminum Smelter Load Response in an Isolated Wind Power System a Case Study for an Industrial System Final
  H. JIANG, Tsinghua University
  J. LIN, Tsinghua University
  Y. SONG, Tsinghua University
  X. LI, China Power Investment Corporation
  J. DONG, China Power Investment Corporation

• GM1610, A Low-Cost Distributed Control Strategy for Rooftop PV with Utility Benefits
  J. SEUSS, Georgia Institute of Technology
  R. HARLEY, Georgia Institute of Technology
Thursday Afternoon, continued

- GM1697, A Distributed Control Based Coordination Scheme of Household PV Systems for Overvoltage Prevention
  G. NOURBAKHSH, QUT
  D. DARCY REEVES, QUT
  G. MOKHTARI, QUT
  A. GHOSH, QUT

- GM1767, Probabilistic Power Flow for Distribution Networks with Photovoltaic Generators
  Z. REN, Chongqing University
  W. YAN, Chongqing University
  X. ZHAO, Chongqing University
  Y. LI, Chongqing University
  J. YU, Chongqing University

- GM1851, Study on the Adaptability of Day-Ahead Wind Power Forecast System for On-Site Use
  M. XU, Tsinghua University
  Z. LU, Tsinghua University
  Y. QIAO, Tsinghua University
  N. WANG, Wind Power Technology Center of Gansu Electric Power Corporation
  S. ZHOU, Wind Power Technology Center of Gansu Electric Power Corporation
  Y. MA, Wind Power Technology Center of Gansu Electric Power Corporation

- GM1943, Optimal VAR Expansion Considering Capability Curve of DFIG Wind Farm
  E. EL-ARABY, Qassim University

- GM2164, Harmonic Analysis for Fixed-Speed Wind Turbines
  P. CHIRAPONGSANANURAK, University of Texas at Austin
  S. SANTOSO, University of Texas at Austin

- GM2183, Three Phase Solar Photovoltaic Inverter Testing
  R. BRAVO, Southern California Edison
  R. YINGER, Southern California Edison
  S. ROBLES, Southern California Edison

- GM2284, Novel MIMO Linear Zero Dynamic Controller for the Grid-Connected Photovoltaic System with Weather Disturbances
  M. ALI, UNSW@ADFA
  M. MAHMUD, UNSW@ADFA
  M. HOSSAIN, GU

- GM0900, Evaluation of Forecast Accuracy of Aggregated Photovoltaic Power Generation by Unit Commitment
  T. KATO, Nagoya University
  K. KAWAI, Nagoya University
  Y. SUZUOKI, Nagoya University

- GM0946, Comprehensive Optimization of PV Inverter Reactive and Real Power Flows in Unbalanced Four Wire LV Distribution Network Operations
  X. SU, Curin University
  M. MASOUM, Curin University
  P. WOLFS, Central Queensland University

- GM1874, Equivalent Modeling of DFIG Based Wind Farm Using Equivalent Maximum Power Curve
  F. XUE, China Electric Power Research Institute
  T. XU, Hohai University
  F. WU, Hohai University
  X. SONG, China Electric Power Research Institute
  Y. JIN, Hohai University
  K. CHANG, China Electric Power Research Institute

Smart Grid 308: Distributed Energy Resources (tutorial)
Thursday, 25 July, 1:00 PM–5:00 PM  MAR – Ambleside I
Sponsored by: IEEE PES and Power & Energy Education Committee

INSTRUCTOR: D. HOUSEMAN, EnerNex

This tutorial will cover the following topics:
- Overview of DER and its components
- Understanding variable generation issues
- Limits to DER implementation in a conventional distribution grid
- Interconnect and other standards for DER
- Engineering considerations for DER planning and approval
• Issues in customer owned DER (e.g. maintenance, overrides, etc)

• Who Should Attend: Anyone who is interested in Distribution level DER, its impact on the grid and limits in the distribution grid today.

**Linkage between Energy and Water (panel)**

Thursday, 25 July, 3:00 PM–5:00 PM  
MAR – Shaughnessy II

Sponsored by:  
Energy Development and Power Generation

Chair:  
K. V. Rupchand, Tamil Nadu Electricity Board

Hydro Power will be a key factor in the electricity grids of the future. With solar and wind power contributing the bulk of renewables, large reversible hydros will be needed to ensure reliability of grid and optimization of renewables. Electric vehicles will constitute the major consumer of electricity in the coming decades in view of the diminishing oil reserves and its escalating cost, besides the concern for reducing the carbon emissions. The drinking, agricultural and industrial water needs will need enormous energy in the form of electricity. Water is inextricably linked with energy from time immemorial. More water will be needed for increased hydro power production. Where surface water is not available, energy in the form of electricity will be needed to extract ground water. It is essential to chalk out a clear-cut program for hydros of the future to sustain the availability of electrical energy for all needs.

**Open Source Tools for Smart Grid Applications (panel)**

Thursday, 25 July, 3:00 PM–5:00 PM  
VCC East – East Meeting Room 7

Sponsored by:  
(PSACE) Computer Analytical Methods

Chair:  
L. Vanfretti, KTH Royal Institute of Technology

The transition of the current power transmission and distribution infrastructure into a “Smart Grid” can benefit from the Free and Open Source (FOSS) model for development and distribution of different software tools and applications. This panel brings together different facets of the FOSS that can aid in the development of Smart Grid applications. This includes Python-based and HPC software for analytics, software and hardware platforms for measuring and managing PMU, open implementation of key analytic functions (i.e. topology processors for state estimation), and software tools that allow enhancing engineering practice.

**PRESENTATIONS AND PANELISTS:**

• **GM0739, A Python-Based Software Tool for Power System Analysis**  
  F. MILANO, University of Castilla – La Mancha

• **GM0740, An Advanced Math and Computing Framework for Rapidly Developing Parallel Smart Grid Applications**  
  S. ABHYANKAR, Argonne National Laboratory

• **GM0742, Open Source Lightning Protection and Electromagnetic Transients Software**  
  T. MCDERMOTT, University of Pittsburgh
  T. SHORT, EPRI
  F. VELEZ, Dominion Virginia Power
  J. MCDANIEL, National Grid U.S.

• **GM0741, Co-Simulation of Components, Controls and Power Systems based on Open Source Software**  
  S. MATTHIAS, AIT Austrian Institute of Technology
  E. WIDL, AIT Austrian Institute of Technology
  F. ANDREZ, AIT Austrian Institute of Technology
  A. ELSHEIKH, AIT Austrian Institute of Technology
  T. STRASSER, AIT Austrian Institute of Technology
  P. PALENSKY, AIT Austrian Institute of Technology

• **GM0743, Open Source Software for Automated Topology Processing of Power Transmission Networks**  
  M. FARROKHABADI, University of Waterloo

• **GM0744, The OpenPMU Project: Challenges and Perspectives**  
  D. LAVERTY, QUB Queen’s University Belfast
  L. VANFRETTI, KTH
  I. AL KHATID, KTH
  V. APPLEGREEN, KTH
  R. BEST, QUB
  D. MORROW, QUB

• **GM0745, Grid Open Source Software Alliance (GOSSA) Overview**  
  R. CARROLL, Grid Protection Alliance
Smart Distribution Analytics and Microgrids for Integration of DER – Part 2

Thursday, 25 July, 3:00 PM–5:00 PM REN – Port of Vancouver
Sponsored by: Transmission and Distribution Committee and PSACE Committee
Chair: A. Jayantilal, Alstom

Smart Distribution Grid initiatives are introducing a new generation of Distributed Energy Resources (DER), Distribution Automation (DA) and Smart Meters for enhanced grid operations and management. Smart Distribution will enable electric utilities to further improve grid operations whilst continuing to effectively manage the cost of supply. Smart Grid pilot projects are innovating new technologies and control methodologies for enhanced DER integration. DER has the potential of revolutionizing how consumers perceive and use electricity, and could potentially create a chaotic situation for distribution grid operators. Innovation in DER operations will enable this chaos to be managed to accomplish Smart Distribution objectives. This panel will discuss emerging microgrids, evolutionary big data analytics, advanced state estimation applications and enhanced situational awareness technologies that are being developed for distribution grid operations.

PRESENTATIONS AND PANELISTS:

- GM2506, DC versus AC Microgrids in Smart Distribution Systems
  M. SHAHIDEPOUR, IIT
- GM2508, The Role of Data and Communications in Advanced Distribution System Operations
  T. BIALEK, Sempra Energy / SDG&E
- GM2509, How Microgrids Enhance the Operation of the Smart Grid
  G. WETZEL, S&C Electric
- GM2507, DER Solutions for Smart Grid Utility Projects
  D. SUN, Alstom Grid
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IEEE POWER & ENERGY SOCIETY
2013 GENERAL MEETING

Maps

ROOM LOCATIONS

VANCOUVER MARRIOTT PINNACLE DOWNTOWN HOTEL

THIRD FLOOR
Pinnacle Ballroom
Pinnacle I
Shaughnessy Salon
Shaughnessy I
Point Grey
Lonsdale

Pinnacle II
Shaughnessy II
Caulfeild
Dundarave

Pinnacle III
Hollyburn
3rd Floor Patio

FOURTH FLOOR
Ambleside I
Ambleside II

RENAISSANCE VANCOUVER HARBOURSIDE HOTEL

SECOND LEVEL
Port of Vancouver
Harbourside Ballroom
Ballroom I

Ballroom II
Ballroom III

THIRD LEVEL
Port of Singapore
Port of Macau
Port of Hong Kong
Port of Shanghai
Port of New York
Port of Sydney
Port of San Francisco

A LEVEL
Salon A
Salon E
Salon B
Salon F
Salon C
Salon D

VANCOUVER CONVENTION CENTER

EAST CONVENTION LEVEL
Ballrooms: A, B, C

EAST MEETING LEVEL
Meeting Rooms: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 8 & 15, 16, 17, 18, 19, 20, 19 & 20

WEST EXHIBITION LEVEL
Exhibition Halls: A, B, B1, B2, B3, C

WEST LEVEL 1

WEST LEVEL 2
Meeting Rooms: 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224

WEST LEVEL 3
Meeting Rooms: 301, 302, 303, 304, 305, 306
VANCOUVER MARRIOTT PINNACLE DOWNTOWN HOTEL

THIRD FLOOR

FOURTH FLOOR
RENAISSANCE VANCOUVER HARBOURSIDE HOTEL

SECOND LEVEL

[Diagram of the second level of the hotel showing areas such as the Port of Vancouver, the Foyer, and the Ballrooms.]
RENAISSANCE VANCOUVER HARBOURSIDE HOTEL

THIRD LEVEL

A LEVEL

Maps, continued
Maps, continued

[Diagram of the West Exhibition Level of the Vancouver Convention Center]
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