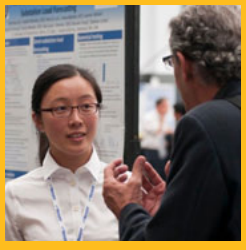
2014 IEEE PES GENERAL MEETING

July 27–31, 2014
National Harbor, MD



2014 IEEE Power & Energy Society
General Meeting
27–31 July 2014
National Harbor, MD, USA

IEEE POWER & ENERGY SOCIETY

2014 GENERAL MEETING

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Introductory Information

WELCOME

The IEEE Power & Energy Society (PES) is proud to be holding its 2014 General Meeting in National Harbor, Maryland, USA. The technical program theme of *"Charting the Course to a New Energy Future"* 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, PES Technical Committees and the General Meeting Coordinating Committee 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 2014 General Meeting's host utilities, PEPCO, PJM, and BG&E, 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 2014 General Meeting will be held at the Gaylord National Resort & Convention Center, located in National Harbor, Maryland, USA. A sleeping room block has been arranged for conference attendees at this hotel.

National Harbor is a 300-acre multi-use waterfront development on the shores of the Potomac River in Prince George's County, Maryland just south of Washington, D.C. near the Woodrow Wilson Bridge.

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.

**Tutorials, Technical and Leisure/Companion Tours and Evening Events, Student, Industry and Faculty 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 Plain Talk courses http://pes-gm.org/2014.*

Day	Time	Event / Sessions
Sunday	All Day	Registration/Information
	AM and PM	Committee Meetings Tutorials*
	PM	Companion Tour*
	PM	New Attendees Orientation *(3:00–4:00 PM)*
	4:00 PM	IEEE PES Scholarship Plus Reception
	Evening	Welcome Reception at the Gaylord National Resort & Convention Center
Monday	All Day	Registration/Information
		Companion Lounge for registered companions and registered children
	AM	Attendee and Presenter Breakfasts, Poster Presenter Breakfast, Companion Breakfast
		PES Members Meeting *(8:00–9:00 AM)*
		Plenary Session *(9:00–11:30 AM)*
		Companion Tour*

	11 AM	Committee Meetings start
	PM	Committee Meetings, Technical Sessions, Technical Tours*, Companion Tour*
	Evening	Committee Poster Sessions, Fellows Reception, Candidates Meet-and-Greet (all co-located) *(5:00–7:30 PM)*
Tuesday	All Day	Registration/Information
		Super Sessions, Committee Meetings, Tutorials*, Technical Sessions
		Plain Talk Course *(co-located event, separate registration required)*
		Companion Lounge Program for registered companions and registered children
	AM	Student Poster Contest and Attendee Breakfast *(co-located with the Student Poster Contest)*, Presenter Breakfast, Companion Breakfast, Companion Tour*
	PM	Technical Tours*
	Evening	Awards Dinner and Ceremony *(7:00–9:30 PM)*
Wednesday	All Day	Registration/Information
		Tutorials*, *Plain Talk* Course *(co-located event, separate registration required)*
		Companion Lounge Program for registered companions and registered children
	AM	Attendee and Presenter Breakfasts, Companion Breakfast
		Committee Meetings, Technical Sessions
		Companion Tour* and Lounge Program
	Noon	Student / Industry / Faculty Luncheon – *Ticket required*
	1:00 PM	Student / Industry / Faculty Job Fair
	PM	Committee Meetings, Tutorial*, Technical Sessions
		Technical Tour*, Companion Tour*
	Evening	IEEE PES Women in Power Networking Reception, Young Professionals Seminar and Networking Reception
Thursday	All Day	Registration/Information
		Tutorials*, *Plain Talk* Course (co-located event, separate registration required)
		Companion Lounge Program for registered companions and registered children *(until 2:00 pm)*
	AM	Attendee and Presenter Breakfasts, Companion Breakfast
		Committee Meetings, Technical Sessions
	PM	Committee Meetings, Technical Sessions
Friday	All Day	Committee Meeting

REGISTRATION AND INFORMATION

Convention Center Pre-Function (Level 2)

Sunday, 27 July	*7:30 AM – 7:00 PM*
Monday, 28 July–Tuesday, 29 July	*6:30 AM – 7:00 PM*
Wednesday, 30 July	*6:30 AM – 4:00 PM*
Thursday, 31 July	*6:30 AM – 12:00 PM*

All attendees are required to register for the 2014 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 Monday–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 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, participation 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 Washington, D.C. and Maryland 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.

WIRELESS INTERNET INSTRUCTIONS

Network name: IEEE PES General Meeting
Username: PESGM2014
Password: PESGM

NEW ATTENDEES ORIENTATION SESSION

Sunday, 27 July *3:00 – 4:00 PM* *Azalea 2*

A short orientation session will familiarize first-time attendees with PES and the PES General Meeting. 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. Session will include a question and answer period.

WELCOME RECEPTION

Sunday, 27 July *6:00 – 8:00 PM* *Potomac Ballroom Foyer*

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 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: Convention Center Pre-Function – Level 2)*

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

ATTENDEE BREAKFASTS

Monday, 28 July	*6:30 – 7:45 AM*	*Potomac Ballroom Foyer*
Tuesday, 29 July (with Student Poster Contest)	*7:00 – 9:30 AM*	*Prince George's E*
Wednesday, 30 July	*6:30 – 8:30 AM*	*Potomac Ballroom Foyer*
Thursday, 31 July	*6:30 – 8:30 AM*	*Potomac Ballroom Foyer*

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, 28 July	*6:30 – 7:45 AM*	*National Harbor 2&3*
Tuesday, 29 July	*6:30 – 8:30 AM*	*National Harbor 2&3*
Wednesday, 30 July	*6:30 – 8:30 AM*	*National Harbor 2&3*
Thursday, 31 July	*6:30 – 8:30 AM*	*National Harbor 2&3*

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 6:45–7:45 AM. See additional information in the "Information for Presenters" section of this program.

PES MEMBERS MEETING

Monday, 28 July *8:00 – 9:00 AM* *Potomac Ballroom A&B*

PES President Miroslav M. Begovic will provide an update about PES progress and activities of the past year. The candidates for the office of the PES candidates for the Division VII Director-Elect 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, 5:00–7:30 PM, Monday, 28 July.)*

PLENARY SESSION

Monday, 28 July *9:00 AM – 11:30 AM* *Potomac Ballroom A&B*

PES President Miroslav M. Begovic 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, "Charting the Course to a New Energy Future" are:

Mike Howard, President and CEO of EPRI, EPRI's 'Integrated Grid';

Terry Boston, President & CEO of PJM, RTO/Transmission Perspectives;

Joe Rigby, Chairman of the Board, President, and CEO of Pepco Holdings, Distribution System Insights;

Christopher Curtis, Senior Advisor, Schneider Electric, Chairman of the Board of Governors, NEMA, How Manufacturers/Vendors Are Helping Their Customers Transition to the Future Grid;

Dan Yates, CEO, Opower, The Role of Consumer Behavior in Optimizing Our Energy Resources

Liu Zhenya, Chairman of State Grid Corporation of China, Global Energy Internet – Roadmap for Sustainable Development of Human Being

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, 27 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 as well as via push notifications for those who will be using mobile app.

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 as well as via push notifications for those who will be using mobile app. 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
— Energy Policy
— Cyber and Physical Security
— Natural Disaster Preparedness, Planning and Response
— Grid Operations: Practices and Challenges
— Implementation of Smart Grid Projects: Results and Lessons Learned

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.

Student Poster Contest: The Student Poster Contest will be held in conjunction with the Tuesday morning attendee breakfast (on 29 July) in the Prince George's E.

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:

— Microgrids
— Electric Vehicle Charging
— Smart Grid Data and Analytics
— Power Quality
— Energy Forecasting
— Voltage Sourced Converters
— Smart Substations
— Synchrophasor Systems
— Distribution Overcurrent
— Smart Distribution Systems

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, 28 July *5:00 – 7:30 PM* *Prince George's D&E*
(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, 7:30–9:00 in the Prince George's E, during which an Attendees' Breakfast will be available.)*

CANDIDATES MEET & GREET RECEPTION

Monday, 28 July *5:00 – 7:00 PM* *Prince George's D&E*
(co-located with the Poster Session and New Fellows Reception)

The PES candidates for the Division VII Director-Elect 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, 28 July *5:00 – 7:00 PM* *Prince George's D&E*
(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 2014 who are members of PES.

SCHOLARSHIP PLUS RECEPTION

Monday, 28 July *5:00 – 7:00 PM* *Prince George's D&E*
(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, 29 July *7:30 – 9:30 AM* *Prince George's E*
(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, 29 July *7:00 – 9:30 PM* *Potomac Ballroom A*

US$80; After 20 June US$95

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/2014/ 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, 30 July *11:45 AM – 1:30 PM* *Potomac Ballroom A*

US$50; After 20 June US$55
Students US$25; After 20 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. 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, 30 July *1:30 – 3:00 PM* *Potomac Ballroom A*

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 PES WiP (WOMEN IN POWER) COMMITTEE

Wednesday, 30 July *5:00 – 6:30 PM* *Lower Atrium*

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 – 6:45 PM, interact with one or more of the woman successful in the power industry who has 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.

YOUNG PROFESSIONALS – SEMINAR AND RECEPTION

Wednesday, 30 July *6:00 – 7:30 PM* *Eastern Shore 2*

The Young Professionals 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 Eastern Shore 1 Room on the Lower Atrium Level. The lounge will be open:

Sunday	12:00 PM – 5:00 PM
Monday through Wednesday	7:00 AM – 5:00 PM
Thursday	7:00 AM – 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 Maryland Bus Loop outside Maryland Ballroom.

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.

The Distinctive District City Tour

Sunday, 27 July *12:00 PM – 5:00 PM*

A city of history, innovation and intrigue, Washington offers an unrivaled combination of museums and cultural institutions, monuments and memorials, parks and gardens and diverse neighborhoods. The Nation's Capital will come alive on this one-of-a-kind voyage of discovery. Guests will experience the most exciting and distinctive sites that define the District, all the while learning fascinating little-known facts and stories about the sites along the way.

Guests will experience some of Washington's iconic and most storied sites, such as the Capitol Building, the National Mall, Federal Triangle, the FBI Building, the landmark Old Post Office Pavilion, The National Archives, The White House and Ellipse, Washington Monument and more! See the District's majestic monuments and memorials, including the Lincoln Memorial, the Korean and Vietnam War Memorials, the new Martin Luther King, Jr. Memorial, WWII Memorial, The Jefferson Memorial, and so much more! Guests will have the opportunity to see many of the major monuments up close, and have an up-close and personal District experience! (Sites visited may vary pending traffic conditions and final itinerary).

Price: US$45.00

Inclusions: Guided Tour of Washington, D.C.'s Major Sites and Monuments, Tour Guide and Staff, Deluxe Motorcoach Transportation, Taxes, Gratuities, Coordination and Management

Activity Level: Moderate with little walking around select sites.

Recommended Attire: Tennis shoes and comfortable clothing.

Note: This tour requires moderate walking at select sites; however guests may opt out of any of the stops and stay on board the bus. For guests with accessibility issues, a handicap-accessible vehicle can be provided.

The Charms of Old Town Alexandria – Walking Tour and Boutique Shopping

Monday, 28 July *12:35 – 4:35 PM*

History will come alive on this captivating walking tour of Old Town Alexandria! This quaint historic town just on the other side of the Potomac River from Washington, D.C. dates back to 1749, when Alexandria's river-

front was an important colonial port during the colonial, revolutionary and Civil War periods. Old Town was the site of many "firsts" in our nation's history, including the first casualties of the Civil War. Today, Old Town Alexandria is a revitalized waterfront town with cobblestone streets, charming colonial houses and churches, museums, shops and restaurants. Guests will walk in the footsteps of George Washington and Robert E. Lee along Old Town's brick-lined streets and cobblestone alleyways, bordered by elegant Federal homes. After the tour, guests will have the chance to explore the many boutiques and arts and crafts establishments in Old Town, including the Torpedo Factory—home to independent artists' studios, where they make and sell their crafts.

Price: US$45.00

Inclusions: Two-Hour Guided Walking Tour through Historic Old Town, Tour Guide and Staff, Roundtrip Water Taxi Transportation, Taxes and Gratuities, Coordination and Management

Activity Level: Heavy Walking around Alexandria. For guests with accessibility issues, a handicap-accessible vehicle can be provided, but may limit the maximum number of guests.

Tour the Smithsonian: A Shuttle to America's Most Coveted Museums

Tuesday, 29 July *10:00 AM – 4:00 PM*

The Smithsonian Institution—the world's largest museum and research complex—includes 19 museums and galleries. From Natural History, to American History, Art and Culture to Gardens and more, the Smithsonian Institution has something of interest for everyone. While it would be impossible to see ALL attractions in a day, this shuttle service offers the opportunity to explore the best of the Smithsonian while in town.

Most Smithsonian Institutions are free of charge. This shuttle and guide service will offer guests the option to hop-on, hop-off the shuttle along different sites at specified pick-up/drop-off locations along The National Mall. The guide will provide commentary on the bus and will be available to answer questions that guests will have about the museums and history along the way.

Price: US$55.00

Inclusions: Shuttle to the Smithsonian museums of D.C., Expert Guide Commentary Aboard the Coach, Deluxe Minicoach Transportation, All Taxes and Gratuities, Coordination and Management

Activity Level: Light to Moderate Walking

Note: This tour requires moderate walking around the National Mall and Smithsonian museums. Level of activity is up to each individual guest. For guests with accessibility issues, a handicap-accessible vehicle can be provided.

The First Ladies of Washington Tour

Wednesday, 30 July *9:00 AM – 1:00 PM*

Guests will travel in the footsteps of the women who have helped shape our American culture and the role of women throughout American history. This tour will focus on the lives, times and stories of our nation's first ladies. Led by a First Ladies connoisseur, guests will be introduced to the First Ladies and will get insight into what it was actually like to walk in their shoes. Travel past the White House and Lafayette Square, hear stories of what is what like to be Abigail Adams and live in there!! Hear letters sent by children of the Depression to Eleanor Roosevelt, hear Dolley Madison recall the arrival of the British during the War of 1812, learn about Jackie Kennedy and the legacy that she left.

Guests will have the exciting opportunity to visit the recently renovated First Ladies exhibit at the National Museum of American History. Located on the Museum's third floor, this new exhibit looks at the ways First Ladies have shaped their role as the role of women in society evolved. This display will feature more than two-dozen gowns, including those of Michelle Obama, Barbara Bush, Nancy Reagan and Jacqueline Kennedy. Four cases will provide in-depth looks at Dolley Madison, Mary Lincoln, Edith Roosevelt and Lady Bird Johnson and their contributions to their husband's presidential administrations. Explore the neighborhood of Historic Georgetown, the tony neighborhood that Jackie Kennedy called home.

Price: US$45.00

Inclusions: Guided First Ladies Tour and First Ladies Exhibit, Tour Guides and Staff, Deluxe Motorcoach Transportation, Taxes and Gratuities, Coordination and Management

Activity Level: Moderate Walking at Select Sites. For guests with accessibility issues, a handicap-accessible vehicle can be provided.

An Epicurean Escapade: Gastronomic Georgetown

Wednesday, 30 July *12:00 – 4:00 PM*

Washington, D.C. has one of the most vibrant dining scenes in the country, and we love to show it off! This unique experience takes guests on a culinary adventure through the unique neighborhoods in and around

the Washington area. Each tour takes guests to approximately three restaurants on a progressive lunch, where they are enraptured by the sights, scents and unique tastes at each location. This is no ordinary dining tour—throughout the evening, guests traverse on foot throughout the neighborhood and between restaurants, where they learn about the historical and cultural significance of each location. All the while, guests can mingle with their friends and colleagues and enjoy a unique evening out in the District!

Long before it became popular by the Kennedys and the home of high end retail and fashion, Georgetown was a working class port city older than the Federal City of Washington, D.C. Its roots are still very much alive and can be seen in the colonial and federal town homes, and turn of the century factories found throughout the area. The Gastronomic Georgetown Culinary Tour will take you to the historic yet ultra-chic Northwest neighborhood that pre-dated Washington, D.C. Guests will be transported across 250+ years of history, and enjoy flavors closely connected to the neighborhood. The Food Tour will bring together progressive, high-end cuisine, with long standing DC institutions. Traditional and modern tastes and styles will mingle throughout the food tour.

Pricing: US$125.00

Inclusions: Guided Culinary and Historical Walking Tour through one of the DC-area's historic neighborhoods, A multi-course progressive meal held at critically-acclaimed local restaurants (non-alcoholic beverages incl.), Tour Guide and Staff, Deluxe Motorcoach Transportation, Taxes and Gratuities, Coordination and Management

Activity Level: Moderate to Heavy Walking. Guests will be walking from restaurant to restaurant in between courses. For guests with accessibility issues, a handicap-accessible vehicle can be provided.

Note: Guests will be split into two groups.

PLAIN TALK ABOUT THE ELECTRIC POWER SYSTEM FOR POWER INDUSTRY 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 part 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 1 July, 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, 29 July *8:00 AM – 5:00 PM* *Chesapeake J*

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: Jack Feinstein

Distribution System – Delivering Power to the Customer

Wednesday, 30 July *8:00 AM – 5:00 PM* *Chesapeake J*

(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 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

Transmission System – The Interconnected Bulk Electric System

Thursday, 31 July *8:00 AM – 5:00 PM* *Chesapeake J*

(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, 28 July	*6:30 – 7:45 AM*	*National Harbor 2&3*
Tuesday, 29 July	*6:30 – 8:30 AM*	*National Harbor 2&3*
Wednesday, 30 July	*6:30 – 8:30 AM*	*National Harbor 2&3*
Thursday, 31 July	*6:30 – 8:30 AM*	*National Harbor 2&3*

Poster Session Presenter Breakfast

Monday, 28 July	*6:45 – 7:45 AM*	*Potomac Ballroom 1–6*

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 Registration area, 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. Any course that offers CEUs which is presented by an IEEE entity has been reviewed and approved according to standards set by IEEE. All registered students who complete an IEEE course offering CEUs will receive a certificate via email 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. 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 and/or employer 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. All tours depart from the Maryland Bus Loop outside Maryland Ballroom. 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.

SMECO 5MW Solar Farm

Monday, 28 July *12:30 – 3:30 PM*

Southern Maryland's first utility-scale solar generating facility was developed by SMECO Solar, LLC, a wholly owned subsidiary of Southern Maryland Electric Cooperative, Inc., on a 47-acre parcel near the Co-op's new Engineering and Operations facility in Hughesville.

The site has a generation capacity of approximately 5.5 megawatts (MW) that can produce nearly 8,700 megawatt-hours (MWh) of clean, renewable energy annually. Approximately 90% of energy produced will be used by customer-members and will supplement SMECO's power portfolio. Additionally, 10% of the energy produced will power SMECO's new Engineering and Operations facility. The site contributes to the fulfillment of SMECO's state renewable energy portfolio obligation.

SMECO's Solar Farm officially started producing electricity Nov. 18, 2012 and will generate renewable power for at least the next 20 years.

Price: US$30.00

Inclusions: Guided Tour, Deluxe Motorcoach Transportation, Taxes, Gratuities, Coordination and Management

Note: Background check required

Pepco Control Center and Network Operation Center

Monday, 28 July *12:30 – 3:30 PM*

Pepco is the eletricity provider for the National Capita Region and serves over 793, 000 customers in the District of Columbia and major portions of suburban Maryland. The Pepco Control Center manages and operates the transmission and distribution system for all of Pepco's Maryland and DC Customers. In addition, Pepco's Network Operating Center monitors Pepco's Smart Grid, AMI and other key networks and systems. The tour will consist of an overview of Pepco System operations, a demonstration of the integration of AMI data with Pepco's Outage Management System, a tour of the control room and a tour of the Network Operating Center.

Price: US$25.00

Inclusions: Guided Tour, Deluxe Motorcoach Transportation, Taxes, Gratuities, Coordination and Management

Note: Background check required

Pepco Watershed Center for Sustainable Research

Tuesday, 29 July *12:30 – 4:00 PM*

WaterShed was designed and built by students at the University of Maryland and was the overall winner of the 2011 DOE Solar Decathlon. Through an arrangement with the University of Maryland, Pepco has provided a permanent home for this facility so it can continue the mission of public education, focused around sustainable energy and water practices. A collaboration with the University will continue for years to come, offering opportunities for student interaction and applied research data collection of the overall functionality of the house. Additionally, separate module was constructed as a working laboratory for Pepco to help communicate energy efficiency through displays, while showcasing various technologies and systems, helping to preserve WaterShed as a model residential home.

Pepco welcomes you to experience WaterShed and learn more about sustainable energy practices and how Smart Grid technologies can help create a more sustainable future for all of us.

Price: US$25.00

Inclusions: Guided Tour, Deluxe Motorcoach Transportation, Taxes, Gratuities, Coordination and Management

FERC Market Monitoring Facility

Tuesday, 29 July *12:30 – 3:00 PM*

The Federal Energy Regulatory Commission, or FERC, is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. FERC also reviews proposals to build liquefied natural gas (LNG) terminals and interstate natural gas pipelines as well as licensing hydropower projects. The Division of Energy Market Oversight (Market Oversight) serves the public by performing daily oversight of the Nation's natural gas and electric power markets, identifying market events and trends, reporting them to the Commission and, as appropriate, the public, and proposing policy options and regulatory strategies for addressing issues identified. The tour will include a visit to FERC's Market Monitoring Center and a presentation on the Role FERC plays in the regulation of electricity on a national basis.

Price: US$30.00

Inclusions: Guided Tour, Deluxe Motorcoach Transportation, Taxes, Gratuities, Coordination and Management

Note: Background check required

Lockheed Martin Cyber Threat and Information Center

Wednesday, 30 July *12:00 – 4:00 PM*

As the government's largest provider of IT services, the security and integrity of Lockheed Martin's systems are vital, not only to its own mission, but to the national security infrastructure. Cyber attackers' efforts to achieve economic and military gain are becoming more sophisticated and stealthy. In the face of this Advanced Persistent Threat (APT), Lockheed Martin focuses on an intelligence driven response and has made significant investments in people, processes and technology to ensure the resiliency of its systems and the ability to meet the security challenges of our government and commercial customers. Through their dedicated and experienced security professionals – and the opening of facilities such as the Security Intelligence Center (SIC) – the company is: focusing on risk-based solutions that prioritize threats, risks and vulnerabilities, providing robust, seamless and end-to-end defense capabilities and recognizing and preventing unknown threats using pattern recognition and predictive analysis.

Price: US$30.00

Inclusions: Guided Tour, Deluxe Motorcoach Transportation, Taxes, Gratuities, Coordination and Management

Note: Background check required

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

Microgrids – Designing Their Role in Smart Grid

Date: *Sunday, 27 July* *1:00 – 5:00 PM*

Price: *Early Bird $195, Regular $240* *Student Early Bird $50, Student Regular $75*

Instructor: *Steve Pullins, Green Energy Corp.*

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 used cases. The attendee will leave with an understanding of the key aspects pertaining to designing and implementing a Microgrid. Topics include:

- The Case for Microgrids
- Considerations
- Use Cases and Technical Architecture
- Technical Architecture
- Microgrid Design
- Microgrid Marketplace
- Overview of a Customer-Owned Microgrid

Electric Vehicle Charging Integration in Distribution Grids

Date: *Thurday, 31 July* *8:00 AM – 12:00 PM*

Price: *Early Bird $195, Regular $240* *Student Early Bird $50, Student Regular $75*

Instructor: *Johan Driesen, KU Leuven*

This tutorial starts with an overview of the main charging principles that are in use for powering up battery electric vehicles and plug-in electric vehicles. After a short introduction on e-mobility, the main standardized systems (AC, DC, different modes) and advanced principles such as wireless charging are discussed, referring to practical cases where vehicles have to be charged in different environments and different use cases or business models. The link with power system integration is made by addressing the impact of this new type of power consumption on the power flow and stability. "Smart" solutions are proposed, such as droop control and demand side management implementation. Modeling techniques and hardware implementations are briefly discussed. Examples from on-going research and living–lab trials are given. This tutorial intends to make a bridge between developments in smart grids, e-mobility and intelligent hard- and software solutions enabling the deployment of electric vehicles.

Introduction to Smart Grid Data and Analytics

Date: *Thursday, 31 July* *1:00 – 5:00 PM*

Price: *Early Bird $195, Regular $240* *Student Early Bird $50, Student Regular $75*

Instructor: *Doug Houseman, EnerNex*

This is an introductory level course to look at smart grid data and analytics, the focus is on the distribution and customer domains of the NIST model. The course covers the following key topics:

- What data is available from which devices, from the in home controller to meters to relays and substation automation.
- What applications can be done with the data, with a heavy focus on AMI and line devices.
- What is the value of each of the applications to the various stakeholders that are associated with the grid, using the Illinois Collaborative definitions of stakeholders.

The course will look at the process of collecting and verifying data, including all of the pitfalls that may occur and provide a 20 step process to go from no data to running analytics. The course is suitable for non-technical, as well as technical audiences, including regulatory, legislative, and utility staff members. The course will also compare and contrast the two major privacy contenders and the impact each would have on the ability to perform the analytic applications based on the principles of each contender. Included in the course will be a summary of the ARRA analytics that have been highlighted by the EPRI and DOE reports.

FULL DAY TUTORIALS

Power Quality-From Lightning and Harmonics to Variable Energy Resources

Date: *Sunday, 27 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, 27 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.

Voltage Sourced Converters

Date: *Sunday, 27 July* *8:00 AM – 5:00 PM*

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

Instructors: *Ben Mehraban, AEP (Chair); Geza Joos, McGill University (Vice-Chair); Hubert Bilodeau, Hydro-Québec; George Karady, Arizona State University; Chris Horwill, AREVA T&D; Anthony Ho, BC Hydro*

This tutorial provides an overview of the principles of the implementation and the applications of the Voltage Sourced Converter (VSC) in transmission system functions such as Static VAR Compensators (STATCOM), VSC-HVDC, and Unified Power Flow Controllers (UPFC). It provides the power utility industry with the justifications for using VSC technology in different applications in transmission systems, and the information required for developing requirements for the use of VSC-based systems. It addresses the general characteristics of power electronic converters, and the special requirements for dc capacitors, valve assemblies, cooling systems, reactors, magnetic interface, protective features and control modes of operation. It discusses safety measures, design and production tests, equipment ratings, control and protection, installation, maintenance, field commissioning, testing and operations. It presents typical implementations and installations, including the newer applications to wind energy systems.

Smart Substations – Protection, Control, Communications, Wide Area Measurements, and Enterprise Applications

Date: *Tuesday, 29 July* *8:00 AM – 5:00 PM*

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

Instructors: *David Boroughs, Eric Udren, Quanta Technology*

What substation and system-wide protection, control, and communications designs lead to reliability, efficiency, sustainability, and effective management information for the enterprise? Modern protective relays, switchyard data acquisition units, and intelligent electronic devices (IEDs) are the essential eyes and ears for smart substations. They collect information, control apparatus, monitor equipment condition, and protect power apparatus. The substation IEDs aggregate data for Smart Grid functions; serial or Ethernet communications networks exchange data with the utility enterprise. Modern IEDs can also stream synchrophasors

for wide area monitoring (visualization), protection, automation, and control (WAMPAC). These measurements and communications are only a platform for Smart Grid functions – the utility must plan how to use this platform effectively.

This tutorial explains sea changes in measurement technology, intelligent relays and IEDs, data communications, substation integration design, and wide area measurement and control in the context of Smart Grid trends. Attendees get an extensive overview of rapidly advancing technology, specific functions and implementations, plus practical guidance on how to select designs and take advantage of the potential benefits.

Implementation of Synchrophasor Systems

Date:	*Wednesday, 30 July*	*8:00 AM – 5:00 PM*
Price:	*Early Bird $295, Regular $395*	*Student Early Bird $100, Student Regular $150*
Instructors:	*Vahid Madani (Chair), Alexander Apostolov, Gerald FitzPatrick, Allen R. Goldstein, Roger Hedding, Mital Kanabar, Roger King, Harold Kirkham, Zhenyu Huang, Ken Martin, Sakis Meliopoulos, Thomas Morris, R. Jay Murphy, Damir Novosel, Manu Parashar, Ravi Subramaniam*	

The electric power industry has experienced significant investment in the deployment of phasor measurement units (PMUs) and the associated infrastructure for making synchrophasor measurements and data collection. From a system reliability standpoint, real-time measurements allow early identification of potential problems both locally and regionally. The distinction of PMU technology comes from its unique ability to provide synchronized power system phasor measurements from widely dispersed locations in an electric power grid. From a broader perspective, the synchrophasor technology offers means to solve a series of challenges, thus attracting the industry worldwide.

This tutorial is intended for the power system practitioners considering investment in synchrophasor technology and the associated business case considerations. In addition to the benefits enabled by technology, the topics covered include understanding phasors, synchronization mechanisms including standards for distributing accurate timing information, the computation processing and accuracy of measurement, performance requirements for phasor data concentrators (PDCs), PDC function descriptions and functional requirements, data aggregation and alignment, configuration set points, and balancing data latency and integrity. Relevant industry standards and guides, phasor data communication and archival, approaches and architectures to build wide-area measurement systems, and applications using synchrophasor data such as situational awareness, advanced warning systems, adaptive protection, state estimation, and voltage stability monitoring will be presented. The tutorial will also include a review of the IEEE guides for installation and testing of PMUs and PDCs, and the need for conformance to the standards and calibration of the entire measurement chain.

Distribution Overcurrent Protection and Coordination

Date:	*Wednesday, 30 July*	*8:00 AM – 5:00 PM*
Price:	*Early Bird $295, Regular $395*	*Student Early Bird $100, Student Regular $150*
Instructors:	*James K. Niemira, PE, S&C Electric Company, and Ali Tatari, P.Eng, S&C Electric Canada, Ltd.*	

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 full 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
- Overcurrent Protective devices : Circuit breakers and relays, fuses, pulse closers, sectionalizers
- Coordination of overcurrent protective devices

Smart Distribution Systems

Date:	*Thursday, 31 July*	*8:00 AM – 5:00 PM*
Price:	*Early Bird $295, Regular $395*	*Student Early Bird $100, Student Regular $150*
Instructors:	*Larry Clark, Alabama Power Company, Anil Pahwa – Kansas State University, Georges Simard – S.I.M.A.R.D.SG Inc., Brian Deaver – EPRI, Robert Uluski – UISOL, Grant Gilchrist – EnerNex, Ethan Boardman – Alstom GRID, Terry Saxton – Xtensible Solutions, Julio Romero Aguero - Quanta Technology*	

The concept of Smart Grid involves the complete chain of energy delivery from generation to the customers. Many of the smart grid applications will occur at the distribution level since this is where new communication infrastructure will enable new automation schemes, integration of distributed generation, and integration of customer systems with the operation of the power delivery system. This tutorial covers the most recent evolution of smart distribution applications and technologies involved in the smart distribution system. Important applications include traditional distribution automation functions along with advancements in Volt and Var Control, System Monitoring, Distribution Management Systems and Distributed resource integration. Telecommunication and Standards on Smart Distribution systems will also be part of the tutorial. A summary of topics and a brief description of what is covered by each topic:

- Smart Distribution Systems Fundamentals
- Smart Distribution Systems
- Smart Distribution Circuit Automation
- Volt/VAR Control
- Smart Distribution Monitoring
- Integrated Distribution Management Systems
- Distributed Energy Resource Integration
- Smart Communications
- Smart Distribution Applications Integration

PHOTOGRAPHY

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http://www.ieee.org/about/corporate/governance/p9-26.html?WT.mc_id=hpf_pol

Super Sessions at a Glance

DAY / TIME / LOCATION	SESSION NAME AND DESCRIPTION	PG
Tuesday, 29 July 8:00 AM–12:00 PM Potomac C	***Late Breaking News:*** **Energy Policy** Energy policy decisions can have significant impacts on the planning, design, operation and maintenance of the power system. Aspects of energy policy may include legislation, regulatory requirements, international treaties, investment incentives, taxation or other public policy techniques. All of these can have economic, reliability, social and/or environmental implications. This session will provide various perspectives on energy policies, and the requirements and impacts they have on the power industry. Attendees will have ample opportunity to pose questions to the panel of speakers at the end of the session.	102
Tuesday, 29 July 1:00 PM–5:00 PM Potomac C	**Natural Disaster Preparedness, Planning and Response** Natural disasters, such as hurricanes, storms, earthquakes, and the Polar Vortex this winter, caused massive power outages across countries and left millions of people out of power for an extended time. Looking back, it is important to summarize the experiences and challenges and learn from them. How can we be better prepared in the future in terms of planning, response and recovery? How can new technologies come to help, so that in the future, the grid will be better prepared for the disasters, be less impacted, and recover faster? This supersession will gather the experts from RTO/ISO, utilities, vendor/consulting companies and academia, to discuss the experiences on natural disaster planning and restoration, infrastructure hardening and system resiliency through strategic asset management, micro-grids, as well as new decision support technologies.	117
Wednesday, 30 July 8:00 AM–12:00 PM Potomac C	**Grid Operations: Practices and Challenges** This supersession will bring together several panelists to share past experiences and challenges as well as new approaches to grid operations from the perspective of both market and non-market operations. In addition to operators, the panel will feature vendor expertise in the area of energy management systems and power system analysis tools used in real time operations. The panel will also include presenters with a perspective from the international community as well as the academic viewpoint on operating reliable power grids. The real focus of the panel will be on the operations and control room side of running a power system, but will include some insight from various parts of the professional spectrum and will touch on many of the impacts that have both improved the operations of electric systems as well as challenged the way that system operators need to tackle grid operations going forward.	131
Wednesday, 30 July 1:00 PM–5:00 PM Potomac C	**Implementation of Smart Grid Projects: Results and Lessons Learned** This session will engage participants in a discussion of the results, lessons learned, and benefits of Smart Grid investments by industry and the U.S. Department of Energy, and what the future may bring. Session panelists include representatives from leading utilities, equipment providers, national laboratories, and the U.S. Department of Energy. The presentations and resulting discussion will set the stage for the future, laying out opportunities to drive further value and discovering key technical and policy needs.	146
Thursday, 31 July 8:00 AM–12:00 PM Potomac C	**Cyber and Physical Security** This panel of industry leaders and practitioners will cover a wide range of topics related to Cyber and Physical security on the grid. The panelists cover the whole grid from meters and in-home devices to generation facilities. This includes critical infrastructure protection – both cyber and physical and the identification of critical assets. The panel will also cover cyber threats and attacks, as well as cyber risk assessment and mitigation. Standards, industry best practice, key organizations and industry activities will also be covered during this panel. With the recent discussions of physical security on the transmission grid and in substations, some additional focus will be put on that topic.	161

IEEE POWER & ENERGY SOCIETY

2014 GENERAL MEETING

Committee and Other Entity Meetings

Administrative Committees

Regions 1–7 Chapter Chairs Meeting	Su	8:00 A	5:00 P	Chesapeake 4 and 5
IEEE PES Scholarship Plus Initiative	Su	8:00 A	5:00 P	Chesapeake 9
Regions 1–7 Chapter Chairs Meeting *(lunch)*	Su	12:00 P	1:00 P	Chesapeake 6
Women in Power Advisory Board Meeting	Su	12:00 P	4:00 P	Presidential Boardroom
ISGT Steering Committee	M	11:00 A	12:00 P	Presidential Boardroom
Joint US-China Collaborative Research Meeting	M	12:00 P	2:00 P	National Harbor 4
Power Africa Steering Committee Meeting	M	2:00 P	3:00 P	Presidential Boardroom
APEEC Conference Meeting	M	3:00 P	4:00 P	Presidential Boardroom
Power Tech Steering Committee	M	4:00 P	6:00 P	Presidential Boardroom
Meetings Department Executive Committee	Tu	8:00 A	10:00 A	Mezzanine Room 3
Technical Council, Operation & Procedures Committee	Tu	8:00 A	10:00 A	Azalea 1
Chapters Leadership Meeting	Tu	8:30 A	12:00 P	Chesapeake 1
Technical Council, Standards Coordination Committee	Tu	10:00 A	12:00 P	Azalea 1
Chapters Leadership Luncheon and Awards Presentation	Tu	12:00 P	1:00 P	Chesapeake 1
Transactions on Power Systems Editorial Board	Tu	12:30 P	2:30 P	Chesapeake 10
Technical Council, Technical Sessions Committee	Tu	12:30 P	3:30 P	Azalea 1
Transactions on Sustainable Energy Editorial Board Meeting	Tu	2:30 P	4:00 P	Chesapeake 10
Technical Council Meetings and Marketing	Tu	3:30 P	4:30 P	Azalea 1
Electrification Magazine Editorial Board Meeting	Tu	4:00 P	5:30 P	Camellia 3
Technical Council, Awards Committee	Tu	4:30 P	5:30 P	Azalea 1
Transactions on Smart Grid Editorial Board Meeting	Tu	4:30 P	5:30 P	Presidential Boardroom
Information Session for Authors, Reviewers and Editors of IEEE Transactions on Power Delivery	Tu	5:00 P	6:00 P	Potomac 6
PES Major Awards Committee and PES Technical Committee Awards Meeting	W	7:00 A	9:00 A	Azalea 1
Transactions on Energy Conversion Editorial Board	W	8:00 A	10:00 A	Presidential Boardroom
Community Solutions Initiative Workshop	W	8:00 A	12:00 P	Chesapeake 9
Technical Council Planning Committee	W	8:00 A	12:00 P	Camellia 3
SG Initiative Transition	W	8:00 A	12:00 P	Potomac 5
INTELECT Committee Meeting	W	9:00 A	10:00 A	Chesapeake 1
PES Technical Co-Sponsored Meetings Steering Committee	W	10:00 A	11:00 A	Chesapeake 1
Transactions on Power Delivery Editorial Board Meeting	W	10:00 A	12:00 P	Azalea 1
Conferences in Regions 7, 8, 9 and 10	W	11:00 A	12:00 P	Chesapeake 1
Power & Energy Magazine Editorial Board	W	12:00 P	3:00 P	Azalea 1
Technical Council/Lunch and Meeting	W	12:00 P	6:00 P	Camellia 3
Membership Committee Meeting	W	1:00 P	3:00 P	Chesapeake 1
Community Solutions Initiative Committee Meeting	W	1:00 P	5:00 P	Chesapeake 9
Publications Board Meeting	W	3:00 P	5:00 P	Presidential Boardroom
Web Presence Committee Meeting	W	3:00 P	5:00 P	Chesapeake 1
Governing Board Meeting	Th	1:00 P	5:00 P	Chesapeake 1 and 2
Governing Board Meeting	F	7:00 A	5:00 P	Chesapeake 1 and 2

Electric Machinery Committee

EMC WG Revision of IEEE 112	Su	8:00 A	12:00 P	Camellia 4
EMC Long Range Planning Meeting	Su	10:00 A	12:00 P	National Harbor 1
EMC WG 12 Revision to IEEE 1415	Su	1:00 P	5:00 P	Camellia 4
EMC Renewable Energy Subcommittee	M	9:00 A	12:00 P	Camellia 1
EMC WG-8 Revision to IEEE C50.13	M	10:00 A	12:00 P	Chesapeake 7
EMC Generator Subcommittee Meeting	M	1:00 P	5:00 P	Camellia 1
EMC Motor Sub Committee Meeting Combo Session	Tu	8:00 A	12:00 P	Chesapeake 8
EMC Committee Meeting	W	1:00 P	5:00 P	Potomac 4

Emerging Technologies Coordinating Committee

Emerging Technologies Coordinating Committee	W	1:00 P	3:00 P	Potomac 5

Energy Development and Power Generation Committee

IPSC Latin America Infrastructure WG	M	11:00 A	12:00 P	Chesapeake 6
EDPGC Renewable Technologies Subcommittee	M	3:00 P	4:00 P	Magnolia 2
EDPG Fellows	M	4:00 P	5:00 P	Chesapeake 6
RTSC – Electric Vehicles WG	M	4:00 P	5:00 P	Chesapeake 7
RTSC – Photovoltaics WG	M	4:00 P	5:00 P	National Harbor 1
EDPG Award Working Group	Tu	8:00 A	9:00 A	Chesapeake 6
IPSC Asian and Australian Infrastructure WG	Tu	8:00 A	9:00 A	Camellia 4
IEEE 666 Working Group	Tu	8:00 A	9:00 A	Chesapeake 4
ES&CSC WG: Combo Session on Performance and Modeling	Tu	8:00 A	10:00 A	Chesapeake 10
EDPG Climate Change Technologies SC, P1595 WG, T&D Energy Efficiency WG	Tu	8:00 A	11:00 A	Presidential Boardroom
ES&CSC WG: Combo Session on Performance and Modeling: Updates to IEEE Std 421.2 & Stator Current Limiters	Tu	10:00 A	12:00 P	Chesapeake 10
ESCSC Equipment WG	Tu	1:00 P	3:00 P	Chesapeake 1
ES&CSC TF: Field Discharge	Tu	3:00 P	5:00 P	Potomac 3
IPSC Europe Electricity Infrastructure WG	Tu	4:00 P	5:00 P	Chesapeake 5
EDPGC Distributed Generation and Energy Storage Subcommittee	Tu	5:00 P	6:00 P	Chesapeake 5
DGESSC – WG Microgrid Applications and Implementation	Tu	6:00 P	6:30 P	Chesapeake 3
DGESSC – WG Large Scale Battery Management	Tu	6:30 P	7:00 P	Chesapeake 3
IPSC Africa Electricity Infrastructure WG	W	8:00 A	9:00 A	Potomac 2
IPSC Chinese Electricity Infrastructure WG	W	8:00 A	9:00 A	Chesapeake 3
EDPG AdCom	W	8:00 A	10:00 A	Potomac 3
EDPG Station Design & Control Subcommittee	W	10:00 A	11:00 A	Potomac 3
IPSC Distributed Generation WG	W	12:00 P	1:00 P	Chesapeake 10
ES&C Subcommittee	W	2:00 P	4:00 P	Potomac 2
IPSC Subcommittee	W	2:00 P	4:00 P	Chesapeake 6
EDPG – All (Committee)	Th	8:00 A	12:00 P	Chesapeake B

Intelligent Grid Coordinating Committee

PES Roadmap	M	8:00 A	12:00 P	Chesapeake 2
IGCC & Microgrid Task Group Meeting	Tu	8:00 A	12:00 P	Potomac 4
DC@Home	Tu	1:00 P	5:00 P	Potomac 6

Power & Energy Education Committee

Outstanding Power Engineering Educator Working Group	Su	1:00 P	2:00 P	National Harbor 1
PEEC Research Subcommittee	Su	2:00 P	4:00 P	Azalea 3
PEEC AdCom	M	11:00 A	1:00 P	Chesapeake 4
Career Promotion and Workforce Development Subcommittee	M	1:00 P	2:00 P	Chesapeake 1
Life Long Learning Subcommittee	M	2:00 P	4:00 P	Chesapeake 7
University Education Subcommittee	M	3:30 P	5:00 P	Potomac 5
PEEC Fellows Working Group	M	4:00 P	5:00 P	Mezzanine Room 3
PEEC Main	Tu	10:00 A	12:00 P	Chesapeake 9
Student Meetings Subcommittee	Tu	1:00 P	3:00 P	Presidential Boardroom
PEEC Awards Subcommittee	Tu	4:00 P	5:00 P	Chesapeake 8

Power System Analysis, Computing, and Economics Committee

PSACE WG on Test Case Coordination	M	11:00 A	1:00 P	Chesapeake 3
PSACE WG on Awards	Tu	12:00 P	1:00 P	Presidential Boardroom
PSACE Administrative Meeting	W	8:00 A	9:00 A	Chesapeake 12
PSACE Committee Meeting	W	9:00 A	12:00 P	Chesapeake 12

Computer and Analytical Methods Subcommittee

CAMS TF on Power System Modeling in CIM	M	11:00 A	12:00 P	Potomac 5
CAMS TF on Cyber Security in Power Systems	M	12:00 P	1:00 P	Potomac 5
CAMS WG on the Understanding, Prediction, Prevention and Restoration of Cascading Failures	M	1:00 P	2:00 P	Potomac 5
CAMS WG on Test Systems	M	2:00 P	3:00 P	Chesapeake D
CAMS Subcommittee Meeting	M	3:00 P	4:00 P	Chesapeake D
CAMS TF on Open Source Software	Tu	8:00 A	9:00 A	Chesapeake 9
CAMS TF on High Performance Computing for Grid Analysis and Operation	Tu	1:00 P	2:00 P	Camellia 3
CAMS TF Big Data Driven Analytics for Smart Grid Operations	Tu	2:00 P	4:00 P	Potomac 5

Distribution System Analysis Subcommittee

DSA Subcommittee Meeting	M	1:00 P	2:00 P	Azalea 3
DSA WG on Test Feeders	M	2:00 P	3:00 P	Azalea 3
DSA WG on State Estimations for Distribution Systems	M	3:00 P	4:00 P	Azalea 3
DSA TF on Recommended Distribution Practices	M	4:00 P	5:00 P	Azalea 3

Intelligent Systems Subcommittee

ISS WG on Multi Agent Systems	M	11:00 A	12:00 P	Azalea 3
ISS WG on Intelligent Data Mining and Analysis	M	12:00 P	1:00 P	Chesapeake 1
ISS TF on Micro-Grid Control Systems	M	1:00 P	2:00 P	Chesapeake 3
ISS TF on Agent-Based Modeling	Tu	8:00 A	10:00 A	Potomac 5
ISS WG on Modern Heuristic Optimization	Tu	9:00 A	10:00 A	Chesapeake 12
ISS WG on Intelligent Control Systems	Tu	10:00 A	11:00 A	Potomac 5
ISS Subcommittee Meeting	Tu	11:00 A	1:00 P	Potomac 5

Risk, Reliability and Probability Applications Subcommittee

RRPA WG on LOLE Best Practices Planning Session	M	11:00 A	12:00 P	Potomac 3

Committee and Other Entity Meetings, *continued*

RRPA WG on Probability Application for Common Mode Events in Electric Power Systems	Tu	9:00 A	10:00 A	Chesapeake 9
RRPA Subcommittee Meeting	Tu	10:00 A	12:00 P	National Harbor 2
RRPA TF on Awards	W	1:00 P	3:00 P	Camellia 4
RRPA TF Reliability Impact of Demand Side Resources	W	3:00 P	5:00 P	Camellia 4

System Economics Subcommittee

SES WG on Prize Paper Award Nomination	M	11:00 A	12:00 P	National Harbor 2
SES TF on Sustainable Electricity Systems for Developing Countries	M	11:00 A	12:00 P	National Harbor 3
SES WG Demand Response	M	12:00 P	1:00 P	Azalea 1
SES WG on Distribution Network Charging	M	12:00 P	1:00 P	National Harbor 2
SES WG on Test Systems for Economic Analysis	M	5:00 P	6:00 P	Azalea 3
SES WG on the Economics of Energy Storage	Tu	12:00 P	1:00 P	National Harbor 2
SES Subcommittee Meeting	Tu	2:00 P	4:00 P	Camellia 3

Power System Dynamic Performance Committee

CIGRE JWG C4/C6.35/CIRED Modelling and Dynamic Performance of Inverter Based Generation in Power System Transmission and Distribution Studies	Su	12:00 P	5:00 P	Camellia 1
CIGRE WG C4.34 Application of Phasor Measurement Units for Monitoring Power System	Su	12:00 P	5:00 P	Camellia 2
CIGRE WG C4.603 Analytical Techniques and Tools for Power Balancing Assessment	Su	12:00 P	5:00 P	Camellia 3
PSDP Task Force on Benchmark Systems for Stability Controls	M	11:00 A	12:00 P	Potomac 1
PSDP Working Group on Power System Dynamic Modeling	M	1:00 P	2:00 P	Potomac 4
PSDP Task Force on Modeling of Large Interconnected Systems for Stability Analysis	M	1:00 P	3:00 P	Chesapeake 8
PSDP Working Group on Power System Dynamic Measurements	M	2:00 P	4:00 P	Potomac 4
PSDP Task Force on Restoration Dynamics	M	3:00 P	4:00 P	Chesapeake 8
PSDP Task Force on Measurements, Monitoring, and Reliability Issues Related to Primary Governor Frequency Response	M	4:00 P	5:00 P	Chesapeake D
PSDP Task Force on Contribution to Bulk System Control and Stability by Distributed Energy Resources Connected at Distribution Networks	Tu	10:00 A	12:00 P	Chesapeake 12
PSDP Task Force on Microgrid Control	Tu	1:00 P	2:00 P	Chesapeake 7
PSDP Task Force on Test Systems for Voltage Stability and Security Assessment	Tu	2:30 P	5:00 P	Chesapeake 12
PSDP Power Systems Stability Controls Subcommittee	W	8:00 A	9:00 A	Potomac 6
PSDP Working Group on Dynamic Security Assessment	W	8:00 A	9:00 A	National Harbor 6
PSDP Working Group on Dynamic Performance of Wind Generation	W	8:00 A	9:20 A	Azalea 2
PSDP Power Systems Stability Subcommittee	W	1:00 P	2:00 P	Camellia 1
PSDP Working Group on Dynamic Performance of Cyber-Physical Energy Systems	W	1:00 P	2:00 P	Chesapeake 8
PSDP ADComm	W	5:00 P	7:00 P	Chesapeake 10
PSDP Committee	Th	9:00 A	12:00 P	Potomac 1
PSDP Task Force on Advanced Pumped Storage Modeling	Th	1:00 P	2:00 P	Potomac 1
PSDP Working Group on Voltage Stability	Th	1:00 P	3:00 P	Chesapeake I

Power System Instrumentation and Measurements Committee

PSIM Committee Meeting	W	9:00 A	12:00 P	Camellia 4

Power System Operations Committee

Power System Operations AdCom	M	12:00 P	1:00 P	Chesapeake 7
Working Group Meeting on State Estimation Algorithms	Tu	8:00 A	9:00 A	Chesapeake 12
Electricity Market Economics Subcommittee Meeting	Tu	12:00 P	1:00 P	Camellia 3
Task Force Meeting on State Estimation Concepts	Tu	5:00 P	6:00 P	Potomac 2
Power System Operations Main	W	12:00 P	1:00 P	Potomac 1
Task Force Meeting on Natural Disaster Preparation and Recovery	W	5:00 P	6:00 P	Camellia 4
Task Force Meeting on Bulk Power System Operations with Variable Generation	Th	12:00 P	1:00 P	Potomac D

Power System Planning and Implementation Committee

Conventional and Renewable Energy Supply Planning Working Group	M	2:00 P	3:30 P	Chesapeake 1
Modern and Future Distribution System Planning Working Group	M	3:30 P	5:00 P	Chesapeake 4
Transmission Planning Working Group Combo *(combination, see page 98)*	Tu	8:00 A	12:00 P	Chesapeake 7
Asset Management Working Group Combo *(combination, see page 115)*	Tu	1:00 P	5:00 P	Chesapeake 2
Energy Forecasting Working Group	Tu	2:00 P	4:00 P	Chesapeake 8
PSPI Main Combo *(combination, see page 129)*	W	8:00 A	12:00 P	Potomac 1
Integrated Intelligent Customer Planning Working Group	W	2:00 P	5:00 P	Chesapeake 10
Assessment of Power System Flexibility Working Group Combo *(combination, see page 157)*	Th	8:00 A	12:00 P	Potomac 3

Substations Committee

TF1 of WG I8 Power Electronics Control Concepts	M	8:00 A	12:00 P	Chesapeake 5
TF2 of WG I8 Design Tools for PEBB Based Systems	M	1:00 P	5:00 P	Chesapeake 5
WG I4 Static Var Compensator	M	1:30 P	5:00 P	Chesapeake 9
WG I5 Voltage Sources Converter	Tu	8:00 A	12:00 P	National Harbor 1
K10 GIS Handbook	Tu	10:00 A	12:00 P	Mezzanine Room 3
WG I8 Power Electronic Building Block (PEBB) Concepts	Tu	1:00 P	5:00 P	National Harbor 1
WG I9 Modern Protection SVC	Tu	1:30 P	5:00 P	National Harbor 2
Substations Committee B0 Meeting	W	8:00 A	12:00 P	National Harbor 1

Transmission and Distribution Committee

Transmission & Distribution Administrative Committee	Th	8:00 A	11:00 A	Presidential Boardroom

Capacitor Subcommittee

TF Capacitor GMD Mitigation	M	2:00 P	4:00 P	Chesapeake 6
Series Capacitor WG	Tu	8:00 A	12:00 P	Chesapeake 3
Shunt Capacitor App Guide P1036 WG	Tu	1:30 P	5:30 P	Chesapeake 3
Capacitor Switching Application Paper TF	W	8:00 A	10:00 A	Chesapeake 10
Capacitor Subcommittee	W	10:00 A	12:00 P	Chesapeake 10

Distribution Subcommittee				
Smart Distribution WG	M	1:00 P	3:00 P	National Harbor 3
Stray and Contact Voltage WG	M	2:00 P	5:00 P	National Harbor 2
DMS Task Force	M	3:00 P	5:00 P	Potomac C
Distributed Resource Integration WG	Tu	8:00 A	10:00 A	Potomac 3
Volt/Var Task Force	Tu	8:00 A	10:00 A	Camellia 3
Switching and Overcurrent WG	Tu	10:00 A	12:00 P	National Harbor 3
Distribution Reliability WG Part 1	Tu	1:30 P	4:30 P	Chesapeake 9
Distribution Reliability WG Part 2	W	8:00 A	12:00 P	Potomac B
Distribution Subcommittee	W	1:30 P	4:30 P	Chesapeake 5

ESMOL Subcommittee				
ESMOL Steering Committee *(Private)*	Su	1:00 P	3:30 P	National Harbor 8
ESMO Conference Committee *(Private)*	Su	3:30 P	5:00 P	National Harbor 8
IEEE 1882 – Guide for Establishing a Live Working Program	M	1:00 P	3:00 P	Potomac C
Development of a Fall Protection Application Guide	M	3:00 P	3:45 P	Potomac D
Live Line Friendly Tower Design	M	4:00 P	5:00 P	Potomac D
IEEE 1307 Fall Protection	Tu	8:00 A	10:00 A	Potomac B
IEEE 516 Live Working Guide	Tu	10:00 A	12:00 P	Potomac B
Development of an Application Guide for Engineered Restoration Structures	Tu	1:00 P	2:30 P	National Harbor 3
IEEE 957 Insulator Cleaning	W	8:00 A	9:00 A	Camellia 4
MAD Paper	W	9:00 A	10:00 A	Potomac 2
IEEE 1048 Grounding	W	10:00 A	12:00 P	National Harbor 3
IEC TC 78	W	1:00 P	2:00 P	Potomac B
ESMOL Subcommittee	Th	8:00 A	10:00 A	Potomac D
Mechanical Equipment Grounding	Th	10:00 A	11:30 A	National Harbor 9
IEEE 1654 RF	Th	1:00 P	2:00 P	Potomac D

General Systems Subcommittee				
Gen Sys – TF on Frequency Domain Methods for Transient Studies	M	11:00 A	12:00 P	Azalea 1
Gen Sys – TF on Analysis Tools	M	1:00 P	2:00 P	Azalea 1
Gen Sys – TF on Modeling and Analysis of Rotating Machine-Based Distributed Resources	M	2:00 P	3:00 P	Azalea 1
Gen Sys – TF on Modeling and Analysis of Electronically Coupled Distributed Resources	M	3:00 P	4:00 P	Azalea 1
Gen Sys – WG on Distributed Resources: Modeling and Analysis	M	4:00 P	5:00 P	Azalea 1
Gen Sys – TF on Interfacing Techniques for Simulation Tools	M	5:00 P	6:00 P	Azalea 1
Gen Sys – Lightning Performance of Overhead Lines WG	Tu	8:00 A	12:00 P	Chesapeake 5
Gen Sys – TF on Real-Time Simulation of Power & Energy Systems	Tu	9:00 A	10:00 A	Chesapeake 6
Gen Sys – WG Practical Aspects of Ferroresonance	Tu	9:00 A	10:30 A	Camellia 4
Gen Sys – TF on EMT-Type Modeling of Wind Turbine Generators and Parks	Tu	10:00 A	11:00 A	Chesapeake 6
Gen Sys – WG on Field Measured Overvoltages and Their Analysis	Tu	10:30 A	12:00 P	Potomac 3
Gen Sys – TF on Electromagnetic Transients Modeling and Analysis of FACTS and HVDC VSC Converters	Tu	11:00 A	12:00 P	Chesapeake 6

Gen Sys – TF on Dynamic Average Modeling Techniques	Tu	1:00 P	2:00 P	Chesapeake 5
Gen Sys – TF on Dynamic System Equivalents	Tu	2:00 P	3:00 P	Chesapeake 5
Gen Sys – TF on GIC Modeling and Analysis	Tu	2:00 P	3:00 P	Chesapeake 6
Gen Sys – TF on Superconductivity T&D - Products, Application & Analysis	Tu	3:00 P	4:00 P	Chesapeake 6
Gen Sys – TF on Portable Data & Modeling for Electromagnetic Transient Analysis Programs	Tu	3:00 P	4:00 P	Chesapeake 5
Gen Sys – TF on Modeling of Induction Machines	Tu	4:00 P	5:00 P	Chesapeake 6
Gen Sys – WG on Modeling and Analysis of System Transients Using Digital Programs	Tu	5:00 P	6:00 P	Chesapeake 6
Gen Sys – Geomagnetic Induced Currents WG	W	8:00 A	10:00 A	Chesapeake 5
Gen Sys – General System Subcommittee	W	10:00 A	11:00 A	Chesapeake 5

HVDC & FACTS Subcommittee				
HVDC & FACTS – Economics and Operating Strategies (WG 15.05.08)	M	11:00 A	1:00 P	Potomac 2
HVDC & FACTS – Dynamic Performance and Modeling (WG 15.05.02)	M	2:00 P	5:00 P	Potomac 1
HVDC & FACTS – Use of Power Electronics in Major Grids for Wind Generation Projects (WG 15.05.15)	Tu	1:30 P	4:30 P	Camellia 4
HVDC & FACTS – Education and HVDC and FACTS Bibliography (WG 15.05.14 & WG 15.05.17) *(combination, see page 131)*	W	8:00 A	10:00 A	Potomac 4
HVDC & FACTS Subcommittee	W	1:30 P	4:30 P	Camellia 2

Integration of Renewable Energy into the Transmission & Distribution Grids Subcommittee				
CIGRE WG C4/C6.29 "Power Quality Aspects of Solar PV"	Tu	1:00 P	5:00 P	Potomac B
Wind and Solar Plant Collector Design Working Group	W	8:00 A	10:00 A	Chesapeake 8
Wind Farm Collector System Grounding for Personal Safety Task Force	W	10:15 A	12:00 P	Potomac 2
Wind and Solar Power Plants System Impacts and Interconnection Requirements Working Group	W	1:00 P	3:00 P	Potomac 3
C17 – Joint Working Group on Wind Plant Short-Circuit Contributions	Th	8:00 A	10:00 A	National Harbor 9
Integration of Renewable Energy into the Transmission & Distribution Grids Subcommittee	Th	1:00 P	2:00 P	Chesapeake D

Overhead Lines Subcommittee				
IEEE STD 524 TF	M	1:00 P	3:00 P	Potomac 3
HVDC Line Design Guide TF	M	1:00 P	3:00 P	Potomac 2
Fiberglass Components TF	M	3:00 P	5:00 P	Potomac 2
IEEE STD P430 (Measurements of Radio Noise) TF	M	3:00 P	5:00 P	Potomac 3
Practical Vibration TF	M	3:00 P	5:00 P	National Harbor 3
WG on HVDC Lines – 15.11.13	Tu	9:00 A	10:00 A	Potomac D
WG on T&D Corrosion Management – 15.11.12	Tu	10:00 A	12:00 P	Potomac D
WG on Management of Existing O.H. Transmission Lines – 15.11.09	Tu	1:00 P	3:00 P	Potomac D
WG on Construction of Overhead Lines – 15.11.03	Tu	3:00 P	5:00 P	Potomac D
Lunch & Steering Working Group – 15.11.01	W	12:00 P	1:00 P	Chesapeake 5
OHL Subcommittee	W	1:00 P	2:30 P	Potomac D

Committee and Other Entity Meetings, *continued*

OHL/ESMOL Joint Meeting	W	2:30 P	5:00 P	Potomac D
WG on T&D Overhead Line Structural Materials & Hardware – 15.11.08/10	Th	8:00 A	10:00 A	National Harbor 3
WG on T&D Overhead Conductors & Accessories – 15.11.02/06	Th	10:00 A	12:00 P	National Harbor 3
WG on Corona & Field Effects – 15.11.11	Th	1:00 P	2:30 P	Potomac 3
WG on Insulator Performance and Applications – 15.11.14	Th	2:30 P	5:00 P	Potomac 3
TC36 TAG TF	F	8:00 A	8:30 A	Magnolia 1
ANSI C29 TF	F	9:00 A	5:00 P	Magnolia 1

Power Quality Subcommittee				
PQ – WG on Monitoring Electric Power Quality (1159)	M	2:00 P	3:00 P	Potomac D
PQ – CIGRE/CIRED C4.24	M	3:00 P	6:00 P	Camellia 4
PQ – Power Quality Interest Group *(combination, see page 102)*	Tu	8:00 A	9:00 A	Potomac 2
PQ – SCC22 Power Quality Standards Coordination Committee	Tu	9:00 A	10:00 A	Potomac 2
PQ – TF on Voltage Sag Indices	Tu	10:00 A	10:30 A	Potomac 2
PQ – TF on Transfer of Power Quality Data (1159.3)	Tu	10:30 A	12:00 P	Potomac 2
PQ – Harmonics WG (519, 519.1, Probabilistic Aspects of Harmonics TF, Harmonics Modeling & Simulation TF)	Tu	1:30 P	3:00 P	Potomac 2
PQ – Power Quality Disturbances Analytics WG	Tu	3:00 P	4:00 P	Potomac 2
PQ – International Conference on Harmonics and Quality of Power (ICHQP) Executive Committee	Tu	4:00 P	5:00 P	Potomac 2
PQ – TF on Flicker (1453)	W	8:00 A	9:00 A	Chesapeake 6
PQ – Voltage Quality WG (1250)	W	9:00 A	10:00 A	Chesapeake 6
PQ Issues with Grid Modernization Technologies WG	W	10:00 A	11:00 A	Chesapeake 6
PQ – Power Quality Subcommittee	W	11:00 A	12:30 P	Chesapeake 6

Wind and Solar Power Coordinating Committee

Wind and Solar Power Coordinating Committee	Th	8:00 A	12:00 P	Chesapeake D

Non-Committee

CIGRE Executive Committee Meeting	M	2:00 P	4:00 P	Chesapeake 3
IEEE PES/CIGRE USNC Meeting	M	4:00 P	5:00 P	Chesapeake 3
NESC Executive Subcommittee	Tu	8:00 A	5:00 P	Mezzanine Room 4
Power Engineering Professors of the Canadian Universities	Tu	5:00 P	7:00 P	Potomac 3

TECHNICAL AND OTHER SESSIONS

Event Start	Event End	Event Type	Primary Committee	Title	Room
SUNDAY, JULY 27, 2014					
8:00 AM	12:00 PM	COM	EM	EMC WG Revision of IEEE 112	Camellia 4
8:00 AM	5:00 PM	COM	Admin	Regions 1-7 Chapter Chairs Meeting	Chesapeake 4 and 5
8:00 AM	5:00 PM	COM	Admin	IEEE PES Scholarship Plus Initiative	Chesapeake 9
8:00 AM	5:00 PM	T	Other	Power Quality-From Lightning and Harmonics to Variable Energy Resources	Chesapeake D
8:00 AM	5:00 PM	T	Other	Energy Forecasting in the Smart Grid Era	Chesapeake G
8:00 AM	5:00 PM	T	Other	Voltage Sourced Converters	Chesapeake J
10:00 AM	12:00 PM	COM	EM	EMC Long Range Planning Meeting	National Harbor 1
12:00 PM	1:00 PM	COM	Admin	Regions 1-7 Chapter Chairs Meeting (lunch)	Chesapeake 6
12:00 PM	4:00 PM	COM	Admin	Women in Power Advisory Board Meeting	Presidential Boardroom
12:00 PM	5:00 PM	COM	PSDP	CIGRE JWG C4/C6.35/CIRED Modelling and Dynamic Performance of Inverter based Generation in Power System Transmission and Distribution Studies	Camellia 1
12:00 PM	5:00 PM	COM	PSDP	CIGRE WG C4.34 Application of Phasor Measurement Units for Monitoring Power System	Camellia 2
12:00 PM	5:00 PM	COM	PSDP	CIGRE WG C4.603 Analytical Techniques and Tools for Power Balancing Assessment	Camellia 3
1:00 PM	2:00 PM	COM	PEEC	Outstanding Power Engnineering Educator Working Group	National Harbor 1
1:00 PM	3:30 PM	COM	T&D	ESMOL Steering Committee (Private)	National Harbor 8
1:00 PM	5:00 PM	COM	EM	EMC WG 12 Revision to IEEE 1415	Camellia 4
1:00 PM	5:00 PM	T	Other	Microgrids-Designing Their Role in Smart Grid	Chesapeake 12
2:00 PM	4:00 PM	COM	PEEC	PEEC Research Subcommittee	Azalea 3
3:00 PM	4:00 PM	PL	Admin	New Attendees Orientation	Azalea 2
3:30 PM	5:00 PM	COM	T&D	ESMO Conference Committee (Private)	National Harbor 8
4:00 PM	5:00 PM		Admin	Scholarship Plus Reception	Chesapeake 6
6:00 PM	8:00 PM		Admin	Welcome Reception	Potomac 1-6 Foyer
MONDAY, JULY 28, 2014					
8:00 AM	9:00 AM	PL	Admin	PES Members Meeting	Potomac AB
8:00 AM	12:00 PM	COM	IGC	PES Roadmap	Chesapeake 2
8:00 AM	12:00 PM	COM	SUBS	TF1 of WG I8 Power Electronics Control Concepts	Chesapeake 5
9:00 AM	11:30 AM	PL	Admin	Plenary Session	Potomac AB
9:00 AM	12:00 PM	COM	EM	EMC Renewable Energy Subcommittee	Camellia 1
10:00 AM	12:00 PM	COM	EM	EMC WG-8 Revision to IEEE C50.13	Chesapeake 7
11:00 AM	12:00 PM	COM	T&D	Gen Sys – TF on Frequency Domain Methods for Transient Studies	Azalea 1
11:00 AM	12:00 PM	COM	(PSACE) IS	ISS WG on Multi Agent Systems	Azalea 3
11:00 AM	12:00 PM	COM	PSDP	PSDP Task Force on Benchmark Systems for Stability Controls	Potomac 1
11:00 AM	12:00 PM	COM	(PSACE) RRA	RRPA WG on LOLE Best Practices Planning Session	Potomac 3

11:00 AM	12:00 PM	COM	(PSACE) ES	SES WG on Prize Paper Award Nomination	National Harbor 2
11:00 AM	12:00 PM	COM	(PSACE) ES	SES TF on Sustainable Electricity Systems for Developing Countries	National Harbor 3
11:00 AM	12:00 PM	COM	(PSACE) CAM	CAMS TF on Power System Modeling in CIM	Potomac 5
11:00 AM	12:00 PM	COM	Admin	ISGT Steering Committee	Presidential Boardroom
11:00 AM	12:00 PM	COM	EDPG	IPSC Latin America Infrastructure WG	Chesapeake 6
11:00 AM	1:00 PM	COM	T&D	HVDC & FACTS- Economics and Operating Strategies (WG 15.05.08)	Potomac 2
11:00 AM	1:00 PM	COM	PEEC	PEEC AdCom	Chesapeake 4
11:00 AM	1:00 PM	COM	PSACE	PSACE WG on Test Case Coordination	Chesapeake 3
11:30 AM	2:00 PM			CIGRE U.S. National Committee Luncheon	Potomac 6
12:00 PM	1:00 PM	COM	(PSACE) IS	ISS WG on Intelligent Data Mining and Analysis	Chesapeake 1
12:00 PM	1:00 PM	COM	PSO	Power System Operations AdCom	Chesapeake 7
12:00 PM	1:00 PM	COM	(PSACE) ES	SES WG Demand Response	Azalea 1
12:00 PM	1:00 PM	COM	(PSACE) ES	SES WG on Distribution Network Charging	National Harbor 2
12:00 PM	1:00 PM	COM	(PSACE) CAM	CAMS TF on Cyber Security in Power Systems	Potomac 5
12:00 PM	2:00 PM	COM	Admin	Joint US-China Collaborative Research Meeting	National Harbor 4
1:00 PM	2:00 PM	COM	(PSACE) DSA	DSA Subcommittee Meeting	Azalea 3
1:00 PM	2:00 PM	COM	T&D	Gen Sys – TF on Analysis Tools	Azalea 1
1:00 PM	2:00 PM	COM	(PSACE) IS	ISS TF on Micro-Grid Control Systems	Chesapeake 3
1:00 PM	2:00 PM	COM	PSDP	PSDP Working Group on Power System Dynamic Modeling	Potomac 4
1:00 PM	2:00 PM	COM	(PSACE) CAM	CAMS WG on the Understanding, Prediction, Prevention and Restoration of Cascading Failures	Potomac 5
1:00 PM	2:00 PM	COM	PEEC	Career Promotion and Workforce Development Subcommittee	Chesapeake 1
1:00 PM	3:00 PM	COM	T&D	HVDC Line Design Guide TF	Potomac 2
1:00 PM	3:00 PM	COM	T&D	IEEE 1882 – Guide for Establishing a Live Working Program	Potomac C
1:00 PM	3:00 PM	COM	T&D	IEEE STD 524 TF	Potomac 3
1:00 PM	3:00 PM	COM	PSDP	PSDP Task Force on Modeling of Large Interconnected Systems for Stability Analysis	Chesapeake 8
1:00 PM	3:00 PM	COM	T&D	Smart Distribution WG	National Harbor 3
1:00 PM	3:00 PM	PL	EDPG	The Water – Energy – Food Nexus in the Face of the Changing Global Climate	Magnolia 1
1:00 PM	4:30 PM	PL	EM	Condition on Monitoring and Harsh Environment Motors and Drives	Chesapeake 10
1:00 PM	5:00 PM	COM	EM	EMC Generator Subcommittee Meeting	Camellia 1
1:00 PM	5:00 PM	COM	SUBS	TF2 of WG I8 Design Tools for PEBB Based Systems	Chesapeake 5
1:00 PM	5:00 PM	PL	(PSACE) RRA	Reliability Impacts of Demand Response Integration	Chesapeake J
1:00 PM	5:00 PM	PL	T&D	New Harmonic Sources in Modern Buildings: Characterization and Modeling	Chesapeake G
1:00 PM	5:00 PM	PL	(PSACE) ES	Wholesale Power Markets and Demand Response: What will it Take to Reach the Promised Land	Chesapeake 11
1:00 PM	5:00 PM	PL	T&D	Everything Old Is New Again! Refurbishing FACTS and HVDC	Chesapeake A

1:00 PM	5:00 PM	PL	EDPG	Practical Experience with Smart Grid Applications - Asian and Australasian Experience	Azalea 2
1:00 PM	5:00 PM	PL	(PSACE) DSA	State Estimation for Distribution System Monitoring and Control- Implementation Challenges	Magnolia 3
1:00 PM	5:00 PM	PS	Best Paper Sessions	Best Conference Papers on Integrated Power System Operations	National Harbor 5
1:00 PM	5:00 PM	PS	Best Paper Sessions	Best Conference Papers on Power System Analysis and Modeling	National Harbor 8
1:00 PM	5:00 PM	PS	Best Paper Sessions	Best Conference Papers on Markets, Economics, and Planning	National Harbor 7
1:00 PM	5:00 PM	PS	Best Paper Sessions	Best Conference Papers on Power System Stability and Protection	National Harbor 6
1:30 PM	5:00 PM	COM	SUBS	WG I4 Static Var Compensator	Chesapeake 9
2:00 PM	3:00 PM	COM	(PSACE) DSA	DSA WG on Test Feeders	Azalea 3
2:00 PM	3:00 PM	COM	T&D	Gen Sys – TF on Modeling and Analysis of Rotating Machine -Based Distributed Resources	Azalea 1
2:00 PM	3:00 PM	COM	T&D	PQ – WG on Monitoring Electric Power Quality (1159)	Potomac D
2:00 PM	3:00 PM	COM	(PSACE) CAM	CAMS WG on Test Systems	Chesapeake D
2:00 PM	3:00 PM	COM	Admin	Power Africa Steering Committee Meeting	Presidential Boardroom
2:00 PM	3:30 PM	COM	PSPI	Conventional and Renewable Energy Supply Planning Working Group	Chesapeake 1
2:00 PM	4:00 PM	COM	PEEC	Life Long Learning Subcommittee	Chesapeake 7
2:00 PM	4:00 PM	COM	PSDP	PSDP Working Group on Power System Dynamic Measurements	Potomac 4
2:00 PM	4:00 PM	COM	T&D	TF Capacitor GMD Mitigation	Chesapeake 6
2:00 PM	4:00 PM	COM	Other	CIGRE Executive Committee Meeting	Chesapeake 3
2:00 PM	4:00 PM	PL	Admin	PES Young Professional Panel Session	Chesapeake 2
2:00 PM	5:00 PM	COM	T&D	HVDC & FACTS- Dynamic Performance and Modeling (WG 15.05.02)	Potomac 1
2:00 PM	5:00 PM	COM	T&D	Stray and Contact Voltage WG	National Harbor 2
2:00 PM	5:00 PM	PL	PSPI	Load Forecasting: the State of the Practice	National Harbor 4
3:00 PM	3:45 PM	COM	T&D	Development of a Fall Protection Application Guide	Potomac D
3:00 PM	4:00 PM	COM	(PSACE) DSA	DSA WG on State Estimations for Distribution Systems	Azalea 3
3:00 PM	4:00 PM	COM	T&D	Gen Sys – TF on Modeling and Analysis of Electronically Coupled Distributed Resources	Azalea 1
3:00 PM	4:00 PM	COM	(PSACE) CAM	CAMS Subcommittee Meeting	Chesapeake D
3:00 PM	4:00 PM	COM	PSDP	PSDP Task Force on Restoration Dynamics	Chesapeake 8
3:00 PM	4:00 PM	COM	EDPG	EDPGC Renewable Technologies Subcommittee	Magnolia 2
3:00 PM	4:00 PM	COM	Admin	APEEC Conference Meeting	Presidential Boardroom
3:00 PM	5:00 PM	COM	T&D	DMS Task Force	Potomac C
3:00 PM	5:00 PM	COM	T&D	Fiberglass Components TF	Potomac 2
3:00 PM	5:00 PM	COM	T&D	IEEE STD P430 (Measurements of Radio Noise) TF	Potomac 3
3:00 PM	5:00 PM	COM	T&D	Practical Vibration TF	National Harbor 3
3:00 PM	5:00 PM	PL	EDPG	Microgrid Operation in Contingencies and Recovery	Magnolia 1

3:00 PM	6:00 PM	COM	T&D	PQ- CIGRE/CIRED C4.24	Camellia 4
3:30 PM	5:00 PM	COM	PSPI	Modern and Future Distribution System Planning Working Group	Chesapeake 4
3:30 PM	5:00 PM	COM	PEEC	University Education Subcommittee	Potomac 5
4:00 PM	5:00 PM	COM	(PSACE) DSA	DSA TF on Recommended Distribution Practices	Azalea 3
4:00 PM	5:00 PM	COM	T&D	Gen Sys – WG on Distributed Resources: Modeling and Analysis	Azalea 1
4:00 PM	5:00 PM	COM	T&D	Live Line Friendly Tower Design	Potomac D
4:00 PM	5:00 PM	COM	PEEC	PEEC Fellows Working Group	Mezzanine Room 3
4:00 PM	5:00 PM	COM	PSDP	PSDP Task Force on Measurements, Monitoring, and Reliability Issues Related to Primary Governor Frequency Response	Chesapeake D
4:00 PM	5:00 PM	COM	EDPG	EDPG Fellows	Chesapeake 6
4:00 PM	5:00 PM	COM	EDPG	RTSC - Electric Vehicles WG	Chesapeake 7
4:00 PM	5:00 PM	COM	EDPG	RTSC - Photovoltaics WG	National Harbor 1
4:00 PM	5:00 PM	COM	Other	IEEE PES/CIGRE USNC meeting	Chesapeake 3
4:00 PM	6:00 PM	COM	Admin	Power Tech Steering Committee	Presidential Boardroom
4:00 PM	6:00 PM	PL	PEEC	Global Experiences in Attracting Quality Undergraduates in University Power Engineering Programs through Innovative Approaches	Chesapeake 2
5:00 PM	6:00 PM	COM	T&D	Gen Sys – TF on Interfacing Techniques for Simulation Tools	Azalea 1
5:00 PM	6:00 PM	COM	(PSACE) IS	SE WG on Test Systems for Economic Analysis	Azalea 3
5:00 PM	7:00 PM	PO	SPD	Application and Analysis of Surge Protective Devices	Chesapeake J
5:00 PM	8:00 PM	PO	PSPI	Planning and Implementation Posters	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	IGC	IGCC Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	PSACE	PSACE Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	PSDP	Poster session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	SB	Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	PSR	PSR Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	ETC	Emerging Technologies Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	T&D	Transmission and Distribution Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	EM	EMC Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	PSIM	PSIM Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	PSC	Power System Communications Poster	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	EDPG	Energy Development & Power Generation Poster	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	MSC	Marine Systems Coordinating Committee Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	IC	Insulated Conductors Committee Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	PSO	Power System Operations Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	SUBS	Substations Committee Poster Session	Prince George's Exhibit Hall DE

5:00 PM	8:00 PM	PO	SWITCH	Switchgear Committee Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	TRANS	Transformers Committee Poster Session	Prince George's Exhibit Hall DE
5:00 PM	8:00 PM	PO	PEEC	Power & Energy Education Poster	Prince George's Exhibit Hall DE
8:00 PM	10:00 PM	PL	Other	North America Chinese Power Professional Association: Social Event	Potomac D
TUESDAY, JULY 29, 2014					
8:00 AM	9:00 AM	COMBO	T&D	PQ – Power Quality Interest Group	Potomac 2
8:00 AM	9:00 AM	COM	PSO	Working Group meeting on State Estimation Algorithms	Chesapeake 12
8:00 AM	9:00 AM	COM	(PSACE) CAM	CAMS TF on Open Source Software	Chesapeake 9
8:00 AM	9:00 AM	COM	EDPG	EDPG Award Working Group	Chesapeake 6
8:00 AM	9:00 AM	COM	EDPG	IPSC Asian and Australian Infrastructure WG	Camellia 4
8:00 AM	9:00 AM	COM	EDPG	IEEE 666 Working Group	Chesapeake 4
8:00 AM	10:00 AM	COM	T&D	Distributed Resource Integration WG	Potomac 3
8:00 AM	10:00 AM	COM	T&D	IEEE 1307 Fall Protection	Potomac B
8:00 AM	10:00 AM	COM	(PSACE) IS	ISS TF on Agent-based Modeling	Potomac 5
8:00 AM	10:00 AM	COM	T&D	Volt/Var Task Force	Camellia 3
8:00 AM	10:00 AM	COM	Admin	Meetings Department Executive Committee	Mezzanine Room 3
8:00 AM	10:00 AM	COM	Admin	Technical Council, Operation & Procedures Committee	Azalea 1
8:00 AM	10:00 AM	COM	EDPG	ES&CSC WG: Combo Session on Performance and Modeling	Chesapeake 10
8:00 AM	10:00 AM	PL	(PSACE) IS	Forecasting and Intelligent Control of Microgrids	Azalea 2
8:00 AM	10:00 AM	PL	(PSACE) CAM	The Dynamic Security Assessment of the Next Generation Electrical Grid Theory and Practice	National Harbor 7
8:00 AM	10:00 AM	PL	T&D	Wind and Solar Plant System Impacts and Interconnection Requirements	National Harbor 4
8:00 AM	11:00 AM	COM	EDPG	EDPG Climate Change Technologies SC, P1595 WG, T&D Energy Efficiency WG	Presidential Boardroom
8:00 AM	11:30 AM	TR-P	PSDP	Transactions Paper Session #1	Chesapeake 2
8:00 AM	12:00 PM	COMBO	EM	EMC Motor Sub Committee Meeting Combo Session	Chesapeake 8
8:00 AM	12:00 PM	COM	T&D	Gen Sys – Lightning Performance of Overhead Lines WG	Chesapeake 5
8:00 AM	12:00 PM	COM	IGC	IGCC & Microgrid Task Group Meeting	Potomac 4
8:00 AM	12:00 PM	COM	T&D	Series Capacitor WG	Chesapeake 3
8:00 AM	12:00 PM	COM	PSPI	Transmission Planning Working Group Combo	Chesapeake 7
8:00 AM	12:00 PM	COM	SUBS	WG I5 Voltage Sources Converter	National Harbor 1
8:00 AM	12:00 PM	PL	PSPI	Planning Transmission for Co-optimization with Resource Expansion	Chesapeake 7
8:00 AM	12:00 PM	PL	LOC	Using Smart Grid Data to Improve Planning, Analytics, and Operation of the US Capital Region T&D Systems	National Harbor 5
8:00 AM	12:00 PM	PL	PSDP	Industry Experience with Wide-Area Coordinated Voltage Control	Azalea 3
8:00 AM	12:00 PM	PL	EM	Advanced Control of Wind and Solar Power Plants	Camellia 1
8:00 AM	12:00 PM	PL	EDPG	Extreme Events and Disaster Management – Global Perspective	Camellia 2
8:00 AM	12:00 PM	PL	ETC	Energy Storage Technologies	National Harbor 6

8:00 AM	12:00 PM	SS	PES Super Session	Late Breaking News: Energy Policy	Potomac C
8:00 AM	12:00 PM	TR-P	PSACE	PSACE 1	Baltimore 1
8:00 AM	12:00 PM	TR-P	PSO	Wind Power Related Operation Topics	Chesapeake A
8:00 AM	12:00 PM	TR-P	PSR	IEEE Transaction Paper Presentations	Potomac 1
8:00 AM	5:00 PM	COM	Other	NESC Executive Subcommittee	Mezzanine Room 4
8:00 AM	5:00 PM	T	Other	Smart Substations – Protection, Control, Communications, Wide Area Measurements, and Enterprise Applications	Chesapeake G
8:00 AM	5:00 PM	T	Other	Power System Basics – Understanding the Electric Utility Operation Inside and Out	Chesapeake J
8:30 AM	12:00 PM	COM	Admin	Chapters Leadership Meeting	Chesapeake 1
9:00 AM	10:00 AM	COM	T&D	Gen Sys – TF on Real-Time Simulation of Power & Energy Systems	Chesapeake 6
9:00 AM	10:00 AM	COM	T&D	PQ – SCC22 Power Quality Standards Coordination Committee	Potomac 2
9:00 AM	10:00 AM	COM	(PSACE) RRA	RRPA WG on Probability Application for Common Mode Events in Electric Power Systems	Chesapeake 9
9:00 AM	10:00 AM	COM	T&D	WG on HVDC Lines – 15.11.13	Potomac D
9:00 AM	10:00 AM	COM	(PSACE) IS	ISS WG on Modern Heuristic Optimization	Chesapeake 12
9:00 AM	10:30 AM	COM	T&D	Gen Sys – WG Practical Aspects of Ferroresonance	Camellia 4
9:00 AM	12:00 PM	PL	EDPG	Frameworks and Roadmaps for Designing Smart Grids	Magnolia 3
9:00 AM	12:00 PM	PL	PSO	Advances in Power System Operation	National Harbor 8
9:00 AM	12:00 PM	PL	PSO	Grid Resilience: Modernization Strategies and Advanced Power System Operations	Chesapeake 4
9:00 AM	12:00 PM	PF	Admin	State Estimation, Smart Grid and FACTS	Magnolia 2
9:00 AM	12:00 PM	PF	Admin	Protection, Control and PMUs	Magnolia 1
9:00 AM	12:00 PM	TR-P	SUBS	Transactions Paper Session	Potomac 6
10:00 AM	10:30 AM	COM	T&D	PQ – TF on Voltage Sag Indices	Potomac 2
10:00 AM	11:00 AM	COM	T&D	Gen Sys – TF on EMT-type Modeling of Wind Turbine Generators and Parks	Chesapeake 6
10:00 AM	11:00 AM	COM	(PSACE) IS	ISS WG on Intelligent Control Systems	Potomac 5
10:00 AM	12:00 PM	COM	T&D	IEEE 516 Live Working Guide	Potomac B
10:00 AM	12:00 PM	COM	SUBS	K10 GIS Handbook	Mezzanine Room 3
10:00 AM	12:00 PM	COM	PEEC	PEEC Main	Chesapeake 9
10:00 AM	12:00 PM	COM	PSDP	PSDP Task Force on Contribution to Bulk System Control and Stability by Distributed Energy Resources connected at Distribution Networks	Chesapeake 12
10:00 AM	12:00 PM	COM	(PSACE) RRA	RRPA Subcommittee Meeting	National Harbor 2
10:00 AM	12:00 PM	COM	T&D	Switching and Overcurrent WG	National Harbor 3
10:00 AM	12:00 PM	COM	T&D	WG on T&D Corrosion Management – 15.11.12	Potomac D
10:00 AM	12:00 PM	COM	Admin	Technical Council, Standards Coordination Committee	Azalea 1
10:00 AM	12:00 PM	COM	EDPG	ES&CSC WG: Combo Session on Performance and Modeling: Updates to IEEE Std 421.2 & Stator Current Limiters	Chesapeake 10
10:00 AM	12:00 PM	PL	(PSACE) ES	Coordination of Regional Electricity Markets	Baltimore 2
10:00 AM	12:00 PM	PL	(PSACE) IS	Challenges and Solutions of Big Data for Power System Operations	Azalea 2

10:00 AM	12:00 PM	PL	T&D	Technologies for Advanced Volt/Var Control Implementation	National Harbor 7
10:00 AM	12:00 PM	PL	(PSACE) CAM	Cyber Security Testbeds for the Smart Grid Present and Future	Chesapeake 11
10:00 AM	12:00 PM	PL	Admin	Transformation and Innovation in Power Systems	National Harbor 4
10:30 AM	12:00 PM	COM	T&D	Gen Sys – WG on Field Measured Overvoltages and Their Analysis	Potomac 3
10:30 AM	12:00 PM	COM	T&D	PQ – TF on Transfer of Power Quality Data (1159.3)	Potomac 2
11:00 AM	12:00 PM	COM	T&D	Gen Sys – TF on Electromagnetic Transients Modeling and Analysis of FACTS and HVDC VSC Converters	Chesapeake 6
11:00 AM	1:00 PM	COM	(PSACE) IS	ISS Subcommittee Meeting	Potomac 5
12:00 PM	1:00 PM	COM	PSO	Electricity Market Economics Subcommittee Meeting	Camellia 3
12:00 PM	1:00 PM	COM	PSACE	PSACE WG on Awards	Presidential Boardroom
12:00 PM	1:00 PM	COM	(PSACE) ES	SES WG on the Economics of Energy Storage	National Harbor 2
12:00 PM	1:00 PM	COM	Admin	Chapters Leadership Luncheon and Awards Presentation	Chesapeake 1
12:30 PM	2:30 PM	COM	Admin	Transactions on Power Systems Editorial Board	Chesapeake 10
12:30 PM	3:30 PM	COM	Admin	Technical Council, Technical Sessions Committee	Azalea 1
1:00 PM	2:00 PM	COM	T&D	Gen Sys – TF on Dynamic Average Modeling Techniques	Chesapeake 5
1:00 PM	2:00 PM	COM	PSDP	PSDP Task Force on Microgrid Control	Chesapeake 7
1:00 PM	2:00 PM	COM	(PSACE) CAM	CAMS TF on High Performance Computing for Grid Analysis and Operation	Camellia 3
1:00 PM	2:30 PM	COM	T&D	Development of an Application Guide for Engineered Restoration Structures	National Harbor 3
1:00 PM	3:00 PM	COM	PEEC	Student Meetings Subcommittee	Presidential Boardroom
1:00 PM	3:00 PM	COM	T&D	WG on Management of Existing O.H. Transmission Lines – 15.11.09	Potomac D
1:00 PM	3:00 PM	COM	EDPG	ESCSC Equipment WG	Chesapeake 1
1:00 PM	3:00 PM	PL	EM	New Wind Turbine Concepts	Azalea 2
1:00 PM	3:00 PM	PL	(PSACE) IS	Data Mining for Power Market Regulatory Issues	Magnolia 3
1:00 PM	3:00 PM	PL	T&D	Detection of Incipient Faults Using Waveform Analytics	National Harbor 8
1:00 PM	5:00 PM	COM	IGC	DC@Home	Potomac 6
1:00 PM	5:00 PM	COM	PSPI	Asset Management Working Group Combo	Chesapeake 2
1:00 PM	5:00 PM	COM	SUBS	WG I8 Power Electronis Building Block (PEBB) Concepts	National Harbor 1
1:00 PM	5:00 PM	COM	T&D	CIGRE WG C4/C6.29 – Power Quality Aspects of Solar PV	Potomac B
1:00 PM	5:00 PM	PL	PSPI	Asset Management	Chesapeake 2
1:00 PM	5:00 PM	PL	PEEC	Cyber Physical Systems Challenges for the Power Grid of the Future	National Harbor 7
1:00 PM	5:00 PM	PL	PSO	Complexity Versus Simplification in Electricity Markets	National Harbor 5
1:00 PM	5:00 PM	PL	LOC	Strategies for Integrating Distributed Renewables with Grid Operation in the US Capital Region	Potomac 1
1:00 PM	5:00 PM	PL	EM	Advanced Motors and Drives for Transportation	Chesapeake 11
1:00 PM	5:00 PM	PL	PSIM	Energy Saving Devices – Combo Session with ESD Working Group	Camellia 1

1:00 PM	5:00 PM	PL	EDPG	Network Development in Europe – The DC Grid Option	
1:00 PM	5:00 PM	SS	PES Super Session	Natural Disaster Preparedness, Planning and Response	Potomac C
1:00 PM	5:00 PM	TR-P	PSO	System Control Realated Topics	Chesapeake 4
1:00 PM	5:00 PM	TR-P	EM	Transaction Presentations on Electric Machines, Energy Development and Power Generation	National Harbor 6
1:30 PM	3:00 PM	COM	T&D	PQ – Harmonics WG (519, 519.1, Probabilistic Aspects of Harmonics TF, Harmonics Modeling & Simulation TF)	Potomac 2
1:30 PM	4:30 PM	COM	T&D	Distribution Reliability WG Part 1	Chesapeake 9
1:30 PM	4:30 PM	COM	T&D	HVDC & FACTS- Use of Power Electronics in Major Grids for Wind Generation Projects (WG 15.05.15)	Camellia 4
1:30 PM	5:00 PM	COM	SUBS	WG I9 Modern Protection SVC	National Harbor 2
1:30 PM	5:30 PM	COM	T&D	Shunt Capacitor App Guide P1036 WG	Chesapeake 3
2:00 PM	3:00 PM	COM	T&D	Gen Sys – TF on Dynamic System Equivalents	Chesapeake 5
2:00 PM	3:00 PM	COM	T&D	Gen Sys – TF on GIC Modeling and Analysis	Chesapeake 6
2:00 PM	4:00 PM	COM	PSPI	Energy Forecasting Working Group	Chesapeake 8
2:00 PM	4:00 PM	COM	(PSACE) CAM	CAMS TF Big Data Driven Analytics for Smart Grid Operations	Potomac 5
2:00 PM	4:00 PM	COM	(PSACE) ES	SES Subcommittee Meeting	Camellia 3
2:00 PM	5:00 PM	PL	PSO	Modern Information Technologies in the Computerized Operation of Power Systems	Chesapeake A
2:00 PM	5:00 PM	PF	Admin	Impacts of Renewable Generation	Magnolia 1
2:00 PM	5:00 PM	PF	Admin	Power System Operations	Magnolia 2
2:00 PM	5:00 PM	TR-P	PSPI	Electric Vehicles and Wind Power	Camellia 2
2:00 PM	5:30 PM	PL	PSDP	Microgrid Control	Chesapeake 7
2:30 PM	4:00 PM	COM	Admin	Transactions on Sustainable Energy Editorial Board Meeting	Chesapeake 10
2:30 PM	5:00 PM	COM	PSDP	PSDP Task Force on Test Systems for Voltage Stability and Security Assessment	Chesapeake 12
3:00 PM	4:00 PM	COM	T&D	Gen Sys – TF on SuperconductivityT&D – Products, Application & Analysis	Chesapeake 6
3:00 PM	4:00 PM	COM	T&D	Gen Sys – TF on Portable Data & Modeling for Electromagnetic Transient Analysis Programs	Chesapeake 5
3:00 PM	4:00 PM	COM	T&D	PQ – Power Quality Disturbances Analytics WG	Potomac 2
3:00 PM	5:00 PM	COM	T&D	WG on Construction of Overhead Lines – 15.11.03	Potomac D
3:00 PM	5:00 PM	COM	EDPG	ES&CSC TF: Field Discharge	Potomac 3
3:00 PM	5:00 PM	PL	(PSACE) IS	Modern Heuristic Optimization Test Bed on OPF	Azalea 2
3:00 PM	5:00 PM	PL	T&D	Case Studies of Experiences with Distributed Resource Interconnections on Distribution Systems	National Harbor 8
3:30 PM	4:30 PM	COM	Admin	Technical Council Meetings and Marketing	Azalea 1
4:00 PM	5:00 PM	COM	T&D	Gen Sys – TF on Modeling of Induction Machines	Chesapeake 6
4:00 PM	5:00 PM	COM	PEEC	PEEC Awards Subcommittee	Chesapeake 8
4:00 PM	5:00 PM	COM	T&D	PQ – International Conference on Harmonics and Quality of Power (ICHQP) Executive Committee	Potomac 2
4:00 PM	5:00 PM	COM	EDPG	IPSC Europe Electricity Infrastructure WG	Chesapeake 5
4:00 PM	5:30 PM	COM	Admin	Electrification Magazine Editorial Board Meeting	Camellia 3

4:30 PM	5:30 PM	COM	Admin	Technical Council, Awards Committee	Azalea 1
4:30 PM	5:30 PM	COM	Admin	Transactions on Smart Grid Editorial Board Meeting	Presidential Boardroom
5:00 PM	6:00 PM	COM	T&D	Gen Sys – WG on Modeling and Analysis of System Transients using Digital Programs	Chesapeake 6
5:00 PM	6:00 PM	COM	PSO	Task Force Meeting on State Estimation Concepts	Potomac 2
5:00 PM	6:00 PM	COM	EDPG	EDPGC Distributed Generation and Energy Storage Subcommittee	Chesapeake 5
5:00 PM	6:00 PM	COM	Admin	Information Session for Authors, Reviewers and Editors of IEEE Transactions on Power Delivery	Potomac 6
5:00 PM	7:00 PM	COM	Other	Power Engineering Professors of the Canadian Universities	Potomac 3
5:00 PM	7:00 PM	PL	Admin	Senior Member Information Session	National Harbor 5
5:00 PM	7:00 PM	PL	Other	North America Chinese Power Professionals Association – Panel Session	National Harbor 4
5:00 PM	7:00 PM			Private PES Awards Reception	Potomac 5
6:00 PM	6:30 PM	COM	EDPG	DGESSC – WG Microgrid Applications and Implementation	Chesapeake 3
6:00 PM	7:00 PM			Pre Awards Dinner General Reception	Potomac A/C Lobby
6:30 PM	7:00 PM	COM	EDPG	DGESSC – WG Large Scale Battery Management	Chesapeake 3
7:00 PM	9:30 PM			PES Awards Dinner	Potomac AB

WEDNESDAY, JULY 30, 2014

7:00 AM	9:00 AM	COM	Admin	PES Major Awards Committee and PES Technical Committee Awards Meeting	Azalea 1
8:00 AM	9:00 AM	COM	T&D	IEEE 957 Insulator Cleaning	Camellia 4
8:00 AM	9:00 AM	COM	T&D	PQ – TF on Flicker (1453)	Chesapeake 6
8:00 AM	9:00 AM	COM	PSACE	PSACE Administrative Meeting	Chesapeake 12
8:00 AM	9:00 AM	COM	PSDP	PSDP Power Systems Stability Controls Subcommittee	Potomac 6
8:00 AM	9:00 AM	COM	PSDP	PSDP Working Group on Dynamic Security Assessment	National Harbor 6
8:00 AM	9:00 AM	COM	EDPG	IPSC Africa Electricity Infrastructure WG	Potomac 2
8:00 AM	9:00 AM	COM	EDPG	IPSC Chinese Electricity Infrastructure WG	Chesapeake 3
8:00 AM	9:20 AM	COM	PSDP	PSDP Working Group on Dynamic Performance of Wind Generation	Azalea 2
8:00 AM	10:00 AM	COMBO	T&D	HVDC & FACTS – Education and HVDC and FACTS Bibliography (WG 15.05.14 & WG 15.05.17)	Potomac 4
8:00 AM	10:00 AM	COM	T&D	Gen Sys – Geomagnetic Induced Currents WG	Chesapeake 5
8:00 AM	10:00 AM	COM	T&D	Capacitor Switching Application Paper TF	Chesapeake 10
8:00 AM	10:00 AM	COM	T&D	Wind and Solar Plant Collector Design Working Group	Chesapeake 8
8:00 AM	10:00 AM	COM	Admin	Transactions on Energy Conversion Editorial Board	Presidential Boardroom
8:00 AM	10:00 AM	COM	EDPG	EDPG AdCom	Potomac 3
8:00 AM	10:00 AM	PL	T&D	Advances in State Estimation for Distribution Networks – Part 1	Chesapeake A
8:00 AM	10:00 AM	PL	PSO	Multi-stage Optimization and Its Impact on Electricity Market	Chesapeake 4
8:00 AM	10:00 AM	PL	PEEC	Existing and Proposed Power Systems Laboratories for the Undergraduate Curriculum	National Harbor 7
8:00 AM	10:00 AM	PL	SB	NERC PRC 005 Requirements for Battery Systems in Electric Utilities	Chesapeake 2
8:00 AM	10:00 AM	PL	PSPI	New Power System Planning (NewPSP) Combo Session	Potomac 1

8:00 AM	10:00 AM	PL	T&D	Assessment Strategies and Benefits of Advanced Volt/Var Control	Magnolia 3
8:00 AM	12:00 PM	COM	T&D	Distribution Reliability WG Part 2	Potomac B
8:00 AM	12:00 PM	COM	PSPI	PSPI Main Combo	Potomac 1
8:00 AM	12:00 PM	COM	SUBS	Substations Committee B0 Meeting	National Harbor 1
8:00 AM	12:00 PM	COM	Admin	Community Solutions Initiative Workshop	Chesapeake 9
8:00 AM	12:00 PM	COM	Admin	Technical Council Planning Committee	Camellia 3
8:00 AM	12:00 PM	COM	Admin	SG Initiative Transition	Potomac 5
8:00 AM	12:00 PM	PL	PSDP	Future Trends and Directions in Dynamic Security Assessment	National Harbor 6
8:00 AM	12:00 PM	PL	EM	Experience with the Use of Energy Storage in Renewable Power Plants	Azalea 3
8:00 AM	12:00 PM	PL	T&D	Overview of 2017 National Electrical Safety Code (NESC) Proposed Changes	National Harbor 4
8:00 AM	12:00 PM	PL	LOC	Reliability and Resiliency in the US Capital Region / Hardening the Grid: One Year after Hurricane Sandy	National Harbor 8
8:00 AM	12:00 PM	PL	EDPG	System Security	Chesapeake 11
8:00 AM	12:00 PM	SS	PES Super Session	Grid Operations: Practices and Challenges	Potomac C
8:00 AM	12:00 PM	TR-P	PSDP	Transactions Paper Session #3	Camellia 1
8:00 AM	12:00 PM	TR-P	PSDP	Transactions Paper Session #2	Chesapeake 7
8:00 AM	5:00 PM	T	Other	Implementation of Synchrophasor Systems	Chesapeake D
8:00 AM	5:00 PM	T	Other	Distribution Overcurrent Protection and Coordination	Chesapeake G
8:00 AM	5:00 PM	T	Other	Distribution System – Delivering Power to the Customer	Chesapeake J
9:00 AM	10:00 AM	COM	T&D	PQ – Voltage Quality WG (1250)	Chesapeake 6
9:00 AM	10:00 AM	COM	T&D	MAD Paper	Potomac 2
9:00 AM	10:00 AM	COM	Admin	INTELECT Committee Meeting	Chesapeake 1
9:00 AM	12:00 PM	COM	PSACE	PSACE Comittee Meeting	Chesapeake 12
9:00 AM	12:00 PM	COM	PSIM	PSIM Committee Meeting	Camellia 4
9:00 AM	12:00 PM	PL	PSDP	Test Systems for Oscillation Damping and Voltage Stability Analysis	Potomac 6
9:00 AM	12:00 PM	PL	PSDP	Modeling and Model Validation of Renewable Energy Power Plants	Azalea 2
9:00 AM	12:00 PM	PL	EM	Advanced Topics in Electrical Machines	Camellia 2
9:00 AM	12:00 PM	PL	EDPG	Energy Efficiency and Smart Cities	National Harbor 5
9:00 AM	12:00 PM	PF	Admin	DC Applications and Electric Vehicles	Magnolia 1
9:00 AM	12:00 PM	PF	Admin	Power System Stability	Magnolia 2
10:00 AM	11:00 AM	COM	T&D	Gen Sys – General System Subcommittee	Chesapeake 5
10:00 AM	11:00 AM	COM	T&D	PQ Issues with Grid Modernization Technologies WG	Chesapeake 6
10:00 AM	11:00 AM	COM	Admin	PES Technical Co-Sponsored Meetings Steering Committee	Chesapeake 1
10:00 AM	11:00 AM	COM	EDPG	EDPG Station Design & Control Subcommittee	Potomac 3
10:00 AM	12:00 PM	COM	T&D	IEEE 1048 Grounding	National Harbor 3
10:00 AM	12:00 PM	COM	T&D	Capacitor Subcommittee	Chesapeake 10
10:00 AM	12:00 PM	COM	Admin	Transactions on Power Delivery Editorial Board Meeting	Azalea 1
10:00 AM	12:00 PM	PL	T&D	Advances in State Estimation for Distribution Networks – Part 2	Chesapeake A
10:00 AM	12:00 PM	PL	(PSACE) DSA	Development of New Distribution Test Feeders	National Harbor 7
10:00 AM	12:00 PM	PL	PSO	Design and Implementation of Ancillary Service Markets that Enable a Reliable and Efficient Power System with Increasing Penetrations of Variable Energy Resources	Chesapeake 4

10:00 AM	12:00 PM	PI	SB	Battery Safety and DC Systems – Evolution of DC Arc Flash and Other Battery Safety Issues Through Codes and Government Regulations	Chesapeake 2
10:15 AM	12:00 PM	COM	T&D	Wind Farm Collector System Grounding for Personal Safety Task Force	Potomac 2
11:00 AM	12:00 PM	COM	Admin	Conferences in Regions 7,8,9 and 10	Chesapeake 1
11:00 AM	12:30 PM	COM	T&D	PQ – Power Quality Subcommittee	Chesapeake 6
11:45 AM	1:30 PM			Student Faculty Industry Luncheon	Potomac A
12:00 PM	1:00 PM	COM	T&D	Lunch & Steering Working Group – 15.11.01	Chesapeake 5
12:00 PM	1:00 PM	COM	PSO	Power System Operations Main	Potomac 1
12:00 PM	1:00 PM	COM	EDPG	IPSC Distributed Generation WG	Chesapeake 10
12:00 PM	1:00 PM	PL	Admin	Publications Town Hall – PETS-J – PES Open Access Journal	Potomac C
12:00 PM	3:00 PM	COM	Admin	Power & Energy Magazine Editorial Board	Azalea 1
12:00 PM	6:00 PM	COM	Admin	Technical Council/Lunch and Meeting	Camellia 3
1:00 PM	2:00 PM	COM	T&D	IEC TC 78	Potomac B
1:00 PM	2:00 PM	COM	PSDP	PSDP Power Systems Stability Subcommittee	Camellia 1
1:00 PM	2:00 PM	COM	PSDP	PSDP Working Group on Dynamic Performance of Cyber-Physical Energy Systems	Chesapeake 8
1:00 PM	2:30 PM	COM	T&D	OHL Subcommittee	Potomac D
1:00 PM	3:00 PM	COM	ETC	Emerging Technologies Coordinating Committee	Potomac 5
1:00 PM	3:00 PM	COM	(PSACE) RRA	RRPA TF on Awards	Camellia 4
1:00 PM	3:00 PM	COM	T&D	Wind and Solar Power Plants System Impacts and Interconnection Requirements Working Group	Potomac 3
1:00 PM	3:00 PM	COM	Admin	Membership Committee Meeting	Chesapeake 1
1:00 PM	3:00 PM	PL	T&D	Voltage Stability Impacts of Geomagnetically Induced Currents	Potomac 6
1:00 PM	3:00 PM	PL	(PSACE) CAM	The Use of CIM Standards in Managing BIG Utility Data	Chesapeake A
1:00 PM	3:00 PM	PL	T&D	Utility Current Practices and Challenges of Predictive Distribution Reliability	Chesapeake 4
1:00 PM	5:00 PM	COM	EM	EMC Committee Meeting	Potomac 4
1:00 PM	5:00 PM	COM	Admin	Community Solutions Initiative Committee Meeting	Chesapeake 9
1:00 PM	5:00 PM	PL	(PSACE) ES	Transactive Energy Techniques for End-to-End Power System Operation	Potomac 1
1:00 PM	5:00 PM	PL	EDPG	The Market, the Prices and the Subsidies: The Real Cost of Power	Azalea 3
1:00 PM	5:00 PM	PL	LOC	Grid Modernization and Infrastructure Replacement in the US Capital Region Under an Uncertain Regulatory, Economic, and Generation Mix Environment	National Harbor 8
1:00 PM	5:00 PM	PL	PSIM	On-Site Diagnostic Measurements for Power Apparatus and their Importance in the Era of Smart Grid – Combo Session with Smart Sensors WG	National Harbor 6
1:00 PM	5:00 PM	PL	(PSACE) ES	System Economic/Technical Benefits of Unconventional Transmission Provision: Transmission Switching, Embedded HVDC, and Others	National Harbor 5
1:00 PM	5:00 PM	SS	PES Super Session	Implementation of Smart Grid Projects: Results and Lessons Learned	Potomac C
1:00 PM	5:00 PM	TR-P	PSACE	PSACE 2	Magnolia 3
1:00 PM	5:00 PM	TR-P	IGC	T2 – IGCC Transaction Paper Session	Chesapeake 11

1:00 PM	5:00 PM	TR-P	T&D	Transmission and Distribution Paper Session I	Azalea 2
1:30 PM	3:00 PM	PL	Admin	Student Job Fair	Potomac A
1:30 PM	4:30 PM	COM	T&D	Distribution Subcommittee	Chesapeake 5
1:30 PM	4:30 PM	COM	T&D	HVDC & FACTS Subcommittee	Camellia 2
2:00 PM	4:00 PM	COM	EDPG	ES&C Subcommittee	Potomac 2
2:00 PM	4:00 PM	COM	EDPG	IPSC Subcommittee	Chesapeake 6
2:00 PM	5:00 PM	COM	PSPI	Integrated Intelligent Customer Planning Working Group	Chesapeake 10
2:00 PM	5:00 PM	PL	PSO	Robust Optimization in Power Systems: Recent Advances and Potential Applications	Chesapeake 2
2:00 PM	5:00 PM	PL	PSPI	Value of Flexible Resources in the ISO/RTO Markets with the Penetration of Grid-Scale Intermittent Renewable Resources and Distributed Generations	Chesapeake 7
2:00 PM	5:00 PM	PF	Admin	Distributed Energy Resources and Demand Response	Magnolia 1
2:00 PM	5:00 PM	PF	Admin	Power System Planning and System Reliability	Magnolia 2
2:00 PM	5:00 PM	TR-P	PSDP	Transactions Paper Session #4	Camellia 1
2:30 PM	5:00 PM	COM	T&D	OHL/ESMOL Joint Meeting	Potomac D
3:00 PM	5:00 PM	COM	(PSACE) RRA	RRPA TF Reliability impact of Demand Side Resources	Camellia 4
3:00 PM	5:00 PM	COM	Admin	Publications Board Meeting	Presidential Boardroom
3:00 PM	5:00 PM	COM	Admin	Web Presence Committee Meeting	Chesapeake 1
3:00 PM	5:00 PM	PL	T&D	PQ Monitoring in the Era of the Smart Grid	Chesapeake 4
3:00 PM	5:00 PM	PL	T&D	GIC Monitoring and Situational Awareness	Chesapeake A
5:00 PM	6:00 PM	COM	PSO	Task Force Meeting on Natural Disaster Preparation and Recovery	Camellia 4
5:00 PM	6:30 PM			Networking Reception Hosted by PES and IEEE PES WIP	Atrium
5:00 PM	7:00 PM	COM	PSDP	PSDP ADComm	Chesapeake 10
6:00 PM	7:30 PM			PES Young Professionals Seminar and Networking Reception	Eastern Shore 2
8:00 AM	10:00 AM	COM	T&D	ESMOL Subcommittee	Potomac D
8:00 AM	10:00 AM	COM	T&D	C17 – Joint Working Group on Wind Plant Short-Circuit Contributions	National Harbor 9
8:00 AM	10:00 AM	COM	T&D	WG on T&D Overhead Line Structural Materials & Hardware – 15.11.08/10	National Harbor 3
8:00 AM	10:00 AM	PL	PEEC	Educational Tools for the Workforce Development for the Future Grid to Enable Sustainable Energy Systems	National Harbor 4
8:00 AM	10:00 AM	PL	(PSACE) IS	Benefits and Challenges of Deploying Multi-Agent Systems	Chesapeake L
8:00 AM	10:00 AM	PL	EDPG	Impacts of Distributed Energy Resources on Transmission and Distribution System Planning	Camellia 1
8:00 AM	10:00 AM	PL	(PSACE) DSA	Distribution System Modeling for PV Integration Impacts	Potomac 4
8:00 AM	11:00 AM	COM	T&D	Transmission & Distribution Administrative Committee	Presidential Boardroom
8:00 AM	11:00 AM	PL	EDPG	International Practices in Research and Developments in Smart Grids	National Harbor 1
8:00 AM	11:00 AM	PL	EDPG	International Practices for Alternative Energy Worldwide	Camellia 3
8:00 AM	11:00 AM	TR-P	PSIM	PSIM Transaction Paper Session	Chesapeake G
8:00 AM	12:00 PM	COM	PSPI	Assessment of Power System Flexibility Working Group Combo	Potomac 3
8:00 AM	12:00 PM	COM	EDPG	EDPG – All (Committee)	Chesapeake B
8:00 AM	12:00 PM	COM	WPC	Wind and Solar Power Coordinating Committee	Chesapeake D

8:00 AM	12:00 PM	PL	EDPG	Implications of Large-Scale Wind Energy on Power Systems and Supporting Measures for Better Integration	Potomac 6
8:00 AM	12:00 PM	PL	(PSACE) RRA	Adequacy of Power Systems with Renewable Energy Sources	National Harbor 8
8:00 AM	12:00 PM	PL	PSPI	Planning for Near-Term Flexibility Challenges	Potomac 3
8:00 AM	12:00 PM	PL	LOC	Electric Transportation Integration in the US Capital Region	Chesapeake H
8:00 AM	12:00 PM	PL	EM	Marine and Hydrokinetic (MHK) Generation	Chesapeake K
8:00 AM	12:00 PM	PL	EDPG	Energizing Africa's Emerging Economies A Status of Renewable Energy Projects and Cross Border Interconnections	Camellia 4
8:00 AM	12:00 PM	SS	PES Super Session	Cyber and Physical Security	Potomac C
8:00 AM	12:00 PM	TR-P	PSACE	PSACE 3	Camellia 2
8:00 AM	12:00 PM	TR-P	PSO	Operation Methods	National Harbor 7
8:00 AM	12:00 PM	TR-P	T&D	Transmission and Distribution Paper Session II	Potomac 5
8:00 AM	12:00 PM	T	Other	Electric Vehicle Charging Integration in Distribution Grids	Chesapeake F
8:00 AM	5:00 PM	T	Other	Smart Distribution Systems	Chesapeake C
8:00 AM	5:00 PM	T	Other	Transmission System – The Interconnected Bulk Electric System	Chesapeake J
9:00 AM	12:00 PM	COM	PSDP	PSDP Committee	Potomac 1
9:00 AM	12:00 PM	PL	PSO	Evolving Distribution Operation	National Harbor 5
9:00 AM	12:00 PM	PL	PSIM	Discussions on IEEE Std.4-2013: High-Voltage Testing Techniques	Potomac 2
9:00 AM	12:00 PM	PF	Admin	Power System Equipment	Magnolia 1
9:00 AM	12:00 PM	PF	Admin	Power System Analysis	Magnolia 2
10:00 AM	11:30 AM	COM	T&D	Mechanical Equipment Grounding	National Harbor 9
10:00 AM	12:00 PM	COM	T&D	WG on T&D Overhead Conductors & Accessories – 15.11.02/06	National Harbor 3
10:00 AM	12:00 PM	PL	(PSACE) CAM	The Future of OPF Algorithms	Chesapeake L
10:00 AM	12:00 PM	PL	EDPG	Energy Systems Integration, Research Challenges and Opportunities	Magnolia 3
11:00 AM	3:00 PM	TR-P	T&D	Transmission and Distribution Paper Session III	Potomac 4
12:00 PM	1:00 PM	COM	PSO	Task Force Meeting on Bulk Power System Operations with Variable Generation	Potomac D
1:00 PM	2:00 PM	COM	T&D	IEEE 1654 RF	Potomac D
1:00 PM	2:00 PM	COM	T&D	Integration of Renewable Energy into the Transmission & Distribution Grids Subcommittee	Chesapeake D
1:00 PM	2:00 PM	COM	PSDP	PSDP Task Force on Advanced Pumped Storage Modeling	Potomac 1
1:00 PM	2:30 PM	COM	T&D	WG on Corona & Field Effects – 15.11.11	Potomac 3
1:00 PM	3:00 PM	COM	PSDP	PSDP Working Group on Voltage Stability	Chesapeake I
1:00 PM	4:00 PM	PL	EDPG	Large Scale PV Generation on Transmission and Distribution Networks	Potomac 5
1:00 PM	4:00 PM	PL	PSPI	Advanced Modelling and Control of Future Low Voltage Networks	Chesapeake K
1:00 PM	5:00 PM	COM	Admin	Governing Board Meeting	Chesapeake 1 and 2
1:00 PM	5:00 PM	PL	(PSACE) CAM	Faster than Real-time Dynamics Simulation	Potomac 2
1:00 PM	5:00 PM	PL	LOC	Making Policy and Future Grid / How Federal Laws and Regulations Are Impacting the Electric Grid	Magnolia 3
1:00 PM	5:00 PM	TR-P	PSACE	PSACE 4	Camellia 2
1:00 PM	5:00 PM	TR-P	PSO	Smart Grid Related Topics	Potomac C
1:00 PM	5:00 PM	TR-P	PSPI	Generation and Transmission Planning	Camellia 4

Meeting at a Glance by Day, *continued*

1:00 PM	5:00 PM	T	Other	Introduction to Smart Grid Data and Analytics	Chesapeake F
2:00 PM	5:00 PM	PL	PSO	External Model and Internal Model Inaccuracies Impacting State Estimator Solution Quality for Reliability and Market Operations	Potomac 6
2:00 PM	5:00 PM	PF	Admin	Power System Economics	Magnolia 1
2:00 PM	5:00 PM	PF	Admin	Micro-Grids & Power System Dynamics	Magnolia 2
2:30 PM	5:00 PM	COM	T&D	WG on Insulator Performance and Applications – 15.11.14	Potomac 3
3:00 PM	5:00 PM	PL	T&D	Smart Distribution Analytics to Integrate Distributed Energy Resources and Microgrids for Flexible Distribution Grid Operations	Potomac 4
FRIDAY, AUGUST 1, 2014					
7:00 AM	5:00 PM	COM	Admin	Governing Board Meeting	Chesapeake 1 and 2
8:00 AM	8:30 AM	COM	T&D	TC36 TAG TF	Magnolia 1
9:00 AM	5:00 PM	COM	T&D	ANSI C29 TF	Magnolia 1

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

Registration Sunday *(meeting preparations)*

Sunday, 27 July, 7:00 AM–8:00 PM *Convention Center Prefunction*

Power Quality – From Lightning and Harmonics to Variable Energy Resources *(tutorial)*

Sunday, 27 July, 8:00 AM–5:00 PM *Chesapeake D*

Sponsored by: *IEEE PES*

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 *(tutorial)*

Sunday, 27 July, 8:00 AM–5:00 PM *Chesapeake G*

Sponsored by: *Power System Planning & Implementation*

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.

Voltage Sourced Converters *(tutorial)*

Sunday, 27 July, 8:00 AM–5:00 PM *Chesapeake J*

Sponsored by: *Substations*

This tutorial provides an overview of the principles of the implementation and the applications of the Voltage Sourced Converter (VSC) in transmission system functions such as Static VAR Compensators (STATCOM), VSC-HVDC, and Unified Power Flow Controllers (UPFC). It provides the power utility industry with the justifications for using VSC technology in different applications in transmission systems, and the information required for developing requirements for the use of VSC-based systems. It addresses the general characteristics of power electronic converters, and the special requirements for dc capacitors, valve assemblies, cooling systems, reactors, magnetic interface, protective features and control modes of operation. It discusses safety measures, design and production tests, equipment ratings, control and protection, installation, maintenance, field commissioning, testing and operations. It presents typical implementations and installations, including the newer applications to wind energy systems.

Sunday Afternoon

Microgrids – Designing Their Role in Smart Grid *(tutorial)*

Sunday, 27 July, 1:00 PM–5:00 PM *Chesapeake 12*
Sponsored by: *Intelligent Grid Coordinating Committee*

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 used cases. The attendee will leave with an understanding of the key aspects pertaining to designing and implementing a Microgrid. Topics include:

The Case for Microgrids Considerations Use Cases and Technical Architecture

Technical Architecture Microgrid Design

Microgrid Marketplace Overview of a Customer-Owned Microgrid

New Attendees Orientation *(panel)*

Sunday, 27 July, 3:00 PM–4:00 PM *Azalea 2*
Sponsored by: *IEEE PES*
Chair: *J. Nelson, TVA*

A short orientation session will familiarize first-time attendees with PES and the PES General Meeting. The 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. The session will have a question and answer period.

Scholarship Plus Reception *(reception)*

Sunday, 27 July, 4:00 PM–5:00 PM *Chesapeake 6*
Sponsored by: *IEEE PES*

Welcome Reception *(reception)*

Sunday, 27 July, 6:00 PM–8:00 PM *Potomac 1-6 Foyer*
Sponsored by: *IEEE PES*

Monday Morning

Registration Monday *(meeting preparations)*

Monday, 28 July, 6:00 AM–8:00 PM *Convention Center Prefunction*

Attendee Breakfast *(breakfast)*

Monday, 28 July, 6:30 AM–7:45 AM *Potomac A/C Lobby*

Presenter Breakfast *(breakfast)*

Monday, 28 July, 6:30 AM–7:45 AM *National Harbor 2 and 3*

Poster Presenters Breakfast *(breakfast)*

Monday, 28 July, 6:30 AM–7:45 AM *Potomac 1-4*

Companion Hospitality Lounge *(other)*

Monday, 28 July, 7:00 AM–5:00 PM *Eastern Shore 1*

PES Members Meeting *(panel)*

Monday, 28 July, 8:00 AM–9:00 AM *Potomac AB*
Sponsored by: *IEEE PES*

PES President, Miroslav Begovic, will update the membership on various PES activities.

Plenary Session *(panel)*

Monday, 28 July, 9:00 AM–11:30 AM *Potomac AB*
Sponsored by: *IEEE PES*

CIGRE U.S. National Committee Luncheon *(luncheon)*

Monday, 28 July, 11:30 AM–2:00 PM *Potomac 6*
Sponsored by: *CIGRE*

Monday Afternoon

Condition on Monitoring and Harsh Environment Motors and Drives *(panel)*

Monday, 28 July, 1:00 PM–4:30 PM *Chesapeake 10*
Sponsored by: *Electric Machinery*
Chair: *K. Haran, University of Illinois, Urbana-Champaign*
Co-Chair: *P. Neti, GE*

Some latest methods of conditioning monitoring of electric machines will be presented by experts in this area. Subsea motors and drives used in oil and gas industries are also presented. The latest technologies in these motors and drives will be presented by the panelists.

PRESENTATIONS AND PANELISTS:

- 14PESGM2598, Present and Future of Motors and Drives for Subsea Oil & Gas Applications
  Y. DUAN, FUC Technologies
- 14PESGM2599, Bearing fault Detection of Induction Machines using Stator Current Frequency Signature Analysis
  S. PANDA, National University of Singapore
- 14PESGM2600, Condition Monitoring of Marine Generator for Condition Based Maintenance
  S. PANDA, National University of Singapore
- 14PESGM2601, Subsea Permanent Magnet Machines in Harsh Environments
  C. IFRIM, Direct Drive Systems
- 14PESGM2602, Motors in Harsh Environments: Solid Rotor Canned Pump Motors
  S. SALON, Rensselaer Polytechnic Institute
- 14PESGM2603, Advanced Condition Monitoring, Diagnosis, Alarming, and Maintenance
  S. CHOI, University of Akron
- 14PESGM2074, Online Bearing Fault Detection of Induction Machine using Spectrum and Its Advantage over Single Phase Current Spectrum
  S. ATHIKESSAVAN, National University of Singapore
  S. NADARAJAN, National University of Singapore
  A. GUPTA, National University of Singapore
  S. PANDA, National University of Singapore

Practical Experience with Smart Grid Applications – Asian and Australian Experience *(panel)*

Monday, 28 July, 1:00 PM–5:00 PM *Azalea 2*
Sponsored by: *Energy Development and Power Generation*
Chair: *S. Mukhopadhyay, GTBIT, GGSIP University*
Co-Chair: *M. Negnevitsky, University of Tasmania*

The Smart Grid concept suggests 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 and opportunities, but also creates certain technical, economic, legal and other problems.

Electricity industry in the Asian and Australasian countries is developing at a rapid pace. 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 practical experience gained by the Asian and Australasian countries in the considered area, which suggests discussing various relevant issues associated with Smart Grid Applications, right from generation to demand side management via transmission and distribution.

PRESENTATIONS AND PANELISTS:

- 14PESGM2693, Introduction to Panel Session on Practical Experience with Smart Grid Applications – Asian and Australasian Experience
  S. MUKHOPADHYAY, GTBIT, GGSIP University
- 14PESGM2687, Northeast Asia Power System Interconnection and ESS Based Balance Strategies in South Korea
  S. LEE, KESRI, Seoul National University
- 14PESGM2688, DSM and DR Strategies for the Sudden Demand Increases in the South Korean Power System
  S. LEE, KESRI, Seoul National University
- 14PESGM2689, Fast Demand Response as an Enabling Technology for High Renewable Energy Penetration in Isolated Power Systems
  M. NEGNEVITSKY, University of Tasmania
- 14PESGM2690, Voltage and Power Management in a Microgrid System with Diesel Generator and Energy Storage
  M. NEGNEVITSKY, University of Tasmania
- 14PESGM2691, Indian Experience with Smart Grid Applications – Transmission Sector
  S. MUKHOPADHYAY, GTBIT, GGSIP University
- 14PESGM2692, Indian Experience with Smart Grid Applications – Distribution Sector
  S. MUKHOPADHYAY, GTBIT, GGSIP University

The Water – Energy – Food Nexus in the Face of the Changing Global Climate *(panel)*

Monday, 28 July, 1:00 PM–3:00 PM *Magnolia 1*

Sponsored by: *Energy Development and Power Generation*
Chair: *M. Luiken, Luiken International Inc.*

The debate on Climate Change has been changing from whether our climate is changing to "by how much" and "how quickly".

The Word Economic Forum Global Risks Report 2011 declared Risks/focus 3: the water – food – energy nexus. The 2013 report identifies Water Supply Crises and Rising Greenhouse Gas Emissions as 2 of the top 5 risks likely to manifest in the next 10 years with Water Supply Crises and Failure of Climate Change Adaptation being 2 of the top 5 risks with the highest impact. Exploring new systems approaches with a climate-smart mind-set, this panel will discuss: The resource and supply interplay between energy and water: energy is required to supply water to residential customers, industry, power generation, to transport water and treat waste water versus water is required for many modes of energy generation. Sufficient water and energy enable food supply for growing populations.

PRESENTATIONS AND PANELISTS:

- 14PESGM2728, Water-Energy-Food Nexus: What is the Problem?
  M. LUIKEN, Luiken International Inc.
- 14PESGM2733, Implications of Changes in Long-Term Trends of the Energy-Water-Food Nexus
  C. KING, University of Texas at Austin
- 14PESGM2732, Synergies Between Electric Power, Water Use and GHG Mitigation
  P. FAETH, Institute for Public Research, Centre for Naval Analyses (CNA)
- 14PESGM2731, Managing Water Supply Systems to Optimize the Operation of the Electric Grid
  M. METCALFE, ENBALA Power Networks
- 14PESGM2729, Ensuring Security of Water-Energy-Food for Adverse Climatic Conditions
  K. RUPCHAND, Tamil Nadu Electricity Board
- 14PESGM2739, Thirsty Energy: Securing Energy in a Water Constraint World
  A. DELGADO-MARTIN, The World Bank
- 14PESGM2773, Meeting the Water Needs of Agriculture and Energy Production in Arid Environments
  D. REIBLE, Texas Tech University

State Estimation for Distribution System Monitoring and Control-Implementation Challenges *(panel)*

Monday, 28 July, 1:00 PM–5:00 PM *Magnolia 3*

Sponsored by: *(PSACE) Distribution System Analysis*
Chair: *M. Baran, North Carolina State University*

Implementing a state estimation (SE) application as part of a Distribution Management system has many challenges. SE can estimate the operating point on a feeder for monitoring and control applications. Recently, methods have been proposed for this purpose. However, deploying these methods on actual systems faces many challenges. This panel aims at bringing together speakers who have faced these challenges and can share their experiences.

PRESENTATIONS AND PANELISTS:

- 14PESGM2757, Distribution State Estimation Deployment at BC Hydro
  D. ATANACKOVIC, British Columbia Hydro and Power Authority
- 14PESGM2758, Experience in Distribution State Estimation Preparation and Operation in Complex Radial Distribution Networks
  I. DZAFIC, Siemens AG
- 14PESGM2759, Distribution State Estimation Deployment at BC Hydro
  V. DABIC, BH Hydro
- 14PESGM2760, Application of Distribution State Estimation in Duke Energy's DSDR Carolinas project
  M. JOHNSON, Duke Energy
- 14PESGM2761, Distribution State Estimation in Real-Life – Challenges and Experiences
  G. ŠVENDA, Schneider Electric
- 14PESGM2762, Actual Use of DSE in a Real French Network
  L. DE-ALVARO, EDF
- 14PESGM2763, Improving Distribution State Estimation Robustness
  X. FENG, ABB

Wholesale Power Markets and Demand Response: What Will it Take to Reach the Promised Land *(panel)*

Monday, 28 July, 1:00 PM–5:00 PM *Chesapeake 11*

Sponsored by: *(PSACE) Economic Systems*
Chair: *A. Papalexopoulos, ECCO*

Demand response has been identified as a valuable resource for meeting the power system energy needs. The benefits of Demand Response are well understood. However, according to several studies current demand response programs tap less than a quarter of the total market potential for demand response. As a result emphasis has been placed as of late on developing and implementing specific action plans to maximize the value of demand response products and the benefits they provide in market and system operations. In this panel we evaluate and analyze the barriers for maximizing the benefits of Demand Response Products. The barriers we analyze and propose solutions are: A) Market Barriers, b) Regulatory Barriers, C) Customer Participation Barriers, D) Infrastructure and technology Barriers and E) Operational Barriers We further propose methodologies for integrating Demand Response Products into the wholesale energy markets and minimizing the potential of gaming.

PRESENTATIONS AND PANELISTS:

- 14PESGM2464, Demand Response in PJM's Wholesale Markets
  P. SOTKIEWICZ, PJM Interconnection, LLC
- 14PESGM2465, Demand Response in New York – Current Successes and Future Direction
  R. MUKERJI, NYISO
- 14PESGM2785, What Does the "Promised Land" Look Like
  D. SMITH, ISO – NE
- 14PESGM2467, Planning for the Future: Demand Response Addressing Future Grid Needs
  J. HERNANDEZ, Pacific Gas and Electric
- 14PESGM2468, Moving Demand Response Back to the Demand-Side of the Market
  F. AHMAD, The Brattle Group
- 14PESGM2764, A Business Model for Residential Load Control Aggregation
  S. OREN, UC Berkeley

Reliability Impacts of Demand Response Integration *(panel)*

Monday, 28 July, 1:00 PM–5:00 PM *Chesapeake J*

Sponsored by: *(PSACE) Reliability and Risk Analysis*
Chair: *M. Parvania, University of California, Davis*
Co-Chair: *M. Fotuhi-Firuzabad, Sharif University of Technology*

Demand response (DR) is one of the main ingredients of future smart electricity grids, and is expected to have a significant impact on power system operation and planning procedures. DR integration impacts the reliability of power system at all levels (generation, transmission, distribution) and requires new methods for reliability assessment or appropriate modification of the existing power system security and adequacy evaluation methods. This panel session will present the state-of-the-art research from academia and implementation updates from industry on the issues related to this important subject.

PRESENTATIONS AND PANELISTS:

- 14PESGM1197, Where Is Demand Response Going?
  J. BIAN, NERC
- 14PESGM0794, Demand Response Applications to the Co-optimization Planning of Generation and Transmission
  M. SHAHIDEHPOUR, IIT
- 14PESGM1282, Demand Response for Ancillary Services
  D. CALLAWAY, University of California-Berkeley
- 14PESGM0938, Characterizing Statistical Bounds on Aggregated Demand Response-Based Reserve Resources
  A. ABIRI-JAHROMI, McGill University
  F. BOUFFARD, McGill University
- 14PESGM1765, Mitigating Uncertainty with Flexibility: Analytical Models for the Risk of Following Distributed Renewable Generation with Demand Response
  A. SCAGLIONE, UC Davis
- 14PESGM0805, Impacts of Demand Response on Power Systems with High Penetration of Wind Generation
  L. WU, Clarkson University
- 14PESGM0813, Demand Response and Reliability in ComEd
  S. BAHRAMIRAD, S and C Electric
- 14PESGM0811, Demand Response: Good or Bad for Reliability?
  M. BOLLEN, STRI AB

New Harmonic Sources in Modern Buildings: Characterization and Modeling *(panel)*

Monday, 28 July, 1:00 PM–5:00 PM *Chesapeake G*

Sponsored by: *Transmission and Distribution Committee*
Chair: *R. Langella, Second University of Naples*

The panel session is intended to discuss characterization and modeling aspects related to the wide diffusion of new electronic devices in modern buildings. Lighting and HVAC systems together with Plug-in vehicles charge converters and PV inverters will be analyzed. The panelists will present theoretical aspects and practical applications.

PRESENTATIONS AND PANELISTS:

- 14PESGM1019, Switching Power Supplies: Analysis of Waveform Distortion and Absorbed Powers
  A. TESTA, Second University of Naples
- 14PESGM2738, Lighting Systems (CFLs, LED, ….)
  J. DRAPELA, Brno University of Technology
- 14PESGM1018, Measuring Harmonics Generated by Modern Energy-Efficient Lighting Devices – A Teaching Tool
  G. CHANG, Chia-Yi
- 14PESGM2740, Inverter Air Conditioners (HVAC)
  B. HEFFERNAN, University of Canterbury
- 14PESGM2765, Harmonic Effects in Electrical Distribution Networks due to EV Charging
  L. KÜTT, Aalto University School of Electrical Engineering
- 14PESGM1016, Comparing the Harmonic Impact of Modern Loads – Methodology and Results
  W. XU, University of Alberta
- 14PESGM1020, Assessment of Harmonic Levels and Impact of New Equipment in LV Networks by Lab and Grid Measurements
  J. MEYER, Technical University of Dresden

- 14PESGM1017, Simulating Buildings to Predict Harmonic Level
  W. GRADY, Baylor University

Everything Old Is New Again! Refurbishing FACTS and HVDC *(panel)*

Monday, 28 July, 1:00 PM–5:00 PM *Chesapeake A*

Sponsored by: *Transmission and Distribution Committee*
Chair: *Michael Henderson, ISO New England*

Many FACTS and HVDC facilities physically reach the end of their useful life, but are still fulfilling critical system needs. This panel session summarizes the justification for refurbishing the facilities and the challenges that must be overcome for replacing and upgrading existing FACTS and HVDC equipment and control systems.

PRESENTATIONS AND PANELISTS:

- 14PESGM2472, New Life for Critical Assets
  G. WOLF, Lone Wolf Consulting
- 14PESGM2470, Back to DC – Converting AC Lines to DC
  D. WOODFORD, Electranix Corp
- 14PESGM2469, Opportunities for Reliability Improvements of Power Electronics Based Transmission Class HVdc and FACTs Systems
  M. REYNOLDS, Power Engineers
- 14PESGM2473, Refurbishment Alternatives for HVDC Installations
  N. KIRBY, Alstom Grid
- 14PESGM2480, HVDC Refurbishments
  M. BAHRMAN, ABB
- 14PESGM2474, HVDC Refurbishment in New Zealand and FACTS Refurbishments
  R. MAJUMDER, Siemens
- 14PESGM2476, Nelson River HVDC System – Asset Management Experience
  R. VALIQUETTE, Teshmont
- 14PESGM2475, HVDC and FACTS Refurbishment in Quebec
  M. ZANCHETTE, Hydro-Quebec TransÉnergie
- 14PESGM2477, CSC and Other FACTS Maintenance and Refurbishments
  E. UZUNOVIC, WPI
- 14PESGM2478, Eel River Life Extension
  A. BRIGGS, NB Power
- 14PESGM2479, FACTS Refurbishments
  P. MARKEN, GE
- 14PESGM2471, HVDC and FACTS Refurbishments in New England
  M. HENDERSON, ISO New England
- 14PESGM2782, Addressing Chester SVC Filter, Control, and Valve Issues
  J. FENN, SGC Engineering
- 14PESGM2783, Sandy Pond Terminal Refurbishment
  J. WINN, National Grid
- 14PESGM2784, Highgate Converter Station Life Extension Project
  J. BURROUGHS, VELCO

Best Conference Papers on Integrated Power System Operations *(paper)*

Monday, 28 July, 1:00 PM–5:00 PM *National Harbor 5*

Sponsored by: *Best Paper Sessions*
Chair: *J. Liu, PJM*
Co-Chair: *L. J. Kotewa, Elevate Energy*

PAPERS AND AUTHORS:

- 14PESGM0674, Real-Time Dispatch Based on Effective Steady-State Security Regions of Power Systems
  F. CHENG, Shandong University
  M. YANG, Shandong University
  X. HAN, Shandong University
  J. LIANG, Shandong University
- 14PESGM1430, Toward Combining Intra-Real Time Dispatch (RTD) and AGC for On-Line Power Balancing
  M. ILIC, Carnegie Mellon University
  X. YIN, Carnegie Mellon University
  Q. LIU, China Southern Power Grid Co., Ltd.
  Y. WENG, Carnegie Mellon University

- 14PESGM1598, On the Failure of Power System Automatic Generation Control Due to Measurement Noise
  J. ZHANG, University of Illinois at Urbana-Champaign
  A. DOMINGUEZ-GARCIA, University of Illinois at Urbana-Champaign
- 14PESGM0827, Scenario Reduction for Stochastic Unit Commitment with Wind Penetration
  Y. FENG, Iowa State University
  S. RYAN, Iowa State University
- 14PESGM1828, Effect of Time Resolution on Unit Commitment Decisions in Systems with High Wind Penetration
  H. PANDZIC, University of Washington
  Y. DVORKIN, University of Washington
  Y. WANG, University of Washington
  T. QIU, University of Washington
  D. KIRSCHEN, University of Washington
- 14PESGM1815, Distributed Scheduling of Demand Resources in a Congested Network
  J. JOO, Carnegie Mellon University
  M. ILIC, Carnegie Mellon University
- 14PESGM1010, Distributed Electric Vehicles Cooperative Charge Control with Wind Power
  C. SHAO, Xi'an Jiaotong University
  X. WANG, Xi'an Jiaotong University
- 14PESGM2115, Development of a Controller to Provide Primary Frequency Response Capability for a Wind Farm
  J. FELTES, Siemens Industry Inc., Siemens PTI
  B. FERNANDES, Siemens Industry Inc., Siemens PTI
  J. SENTHIL, Siemens Industry Inc., Siemens PTI
- 14PESGM1141, Robust H_∞ Load Frequency Control of Future Power Grid with Energy Storage Considering Parametric Uncertainty and Time Delay
  L. ZHANG, University of Sydney
  G. CHEN, University of Sydney
  Z. WANG, University of Sydney
  Z. DONG, University of Sydney
  D. HILL, University of Hong Kong
- 14PESGM1480, Rooftop PV with Battery Storage Solar Smoother
  N. JABALAMELI, Curtin University
  S. DEILAMI, Curtin University
  M. MASOUM, Curtin University
  M. ABSHAR, Magellan Power
- 14PESGM1976, Dynamic Adjustment of OLTC Parameters Using Voltage Sensitivity while Utilizing DG for Volt/VAr Support
  D. RANAMUKA, University of Wollongong
  A. AGALGAONKAR, University of Wollongong
  K. MUTTAQI, University of Wollongong
- 14PESGM0994, A Voltage Sag Severity Index Considering the Power System and Consumer Equipment
  X. ZHOU, Shanghai Jiaotong University
  F. WANG, Shanghai Jiaotong University
  J. ZHANG, Shanghai Jiaotong University
  R. HUANG, Shenzhen Power Gr id Co.Ltd
- 14PESGM1342, Local Distribution Voltage Control by Reactive Power Injection from PV Inverters Enhanced with Active Power Curtailment
  S. GHOSH, Virginia Tech
  S. RAHMAN, Virginia Tech
  M. PIPATTANASOMPORN, Virginia Tech
- 14PESGM1978, A New Approach to Optimization of Dynamic Reactive Power Sources Addressing FIDVR Issues
  W. HUANG, University of Tennessee
  K. SUN, University of Tennessee
  J. QI, University of Tennessee
  Y. XU, Oak Ridge National Laboratory
- 14PESGM1008, An Approach for Micro Grid Management with Hybrid Energy Storage System Using Batteries and Ultra Capacitors
  G. DESHPANDE, University of North Carolina at Charlotte
  S. KAMALASADAN, University of North Carolina at Charlotte
- 14PESGM0505, Real-Time Energy Management of an Islanded Microgrid Using Multi-Objective Particle Swarm Optimization
  A. LITCHY, Montana State University
  H. NEHRIR, Montana State University

- 14PESGM0352, Probabilistic Optimal Operation Management of Microgrid Using Point Estimate Method and Improved Bat Algorithm
  P. LI, North China Electric Power University
  Z. ZHOU, North China Electric Power University
  R. SHI, Suzhou Power Supply Company
- 14PESGM2206, Leveraging Substation Automation for Faulted Segment Identification
  N. KANG, ABB Inc
  M. MOUSAVI, ABB Inc

Best Conference Papers on Power System Analysis and Modeling *(paper)*

Monday, 28 July, 1:00 PM–5:00 PM *National Harbor 8*

Sponsored by: *Best Paper Sessions*
Chair: *E. Gunther, EnerNex Corporation*

PAPERS AND AUTHORS:

- 14PESGM0920, Criteria for the Equivalent Modeling of Large Photovoltaic Power Plants
  A. BONFIGLIO, University of Genoa
  F. DELFINO, University of Genoa
  M. INVERNIZZI, University of Genoa
  R. PROCOPIO, University of Genoa
  P. SERRA, ABB S.p.A.
- 14PESGM1622, Grid Topology Identification Using Electricity Prices
  V. KEKATOS, University of Minnesota
  G. GIANNAKIS, University of Minnesota
  R. BALDICK, University of Texas at Austin
- 14PESGM1967, A New Approach for Event Detection Based on Energy Functions
  R. KAVASSERI, North Dakota State University
  Y. CUI, North Dakota State University
  S. BRAHMA, New Mexico State University
- 14PESGM2141, A Fast EMT Simulation Method for Control and Protection Studies of Microgrids
  Y. XU, Washington State University
  H. GAO, Tsinghua University
  Y. CHEN, Tsinghua University
  C. LIU, Washington State University
- 14PESGM0098, General Bad Data Identification and Estimation in the Presence of Critical Measurement Sets
  F. FUSCO, IBM Research Ireland
- 14PESGM0439, Modeless Reconstruction of Missing Synchrophasor Measurements
  P. GAO, Rensselaer Polytechnic Institute
  M. WANG, Rensselaer Polytechnic Institute
  S. GHIOCEL, Rensselaer Polytechnic Institute
  J. CHOW, Rensselaer Polytechnic Institute
- 14PESGM2081, Data Issues in Spatial Electric Load Forecasting
  J. MELO, UNESP
  A. PADILHA-FELTRIN, UNESP
  E. CARRENO FRANCO, UNIOESTE
- 14PESGM1691, Accurate Power Prediction of Spatially Distributed PV Systems Using Localized Irradiance Measurements
  P. GOTSEFF, National Renewable Energy Laboratory
  J. CALE, National Renewable Energy Laboratory
  M. BAGGU, National Renewable Energy Laboratory
  D. NARANG, Arizona Public Service
  K. CARROLL, Arizona Public Service
- 14PESGM1889, Development of a GIC Simulator
  D. BOTELER, Natural Resources Canada
  R. PIRJOLA, Natural Resources Canada
  C. BLAIS, Natural Resources Canada
  A. FOSS, ANF Energy Solutions Inc.
- 14PESGM0579, Distribution State Estimation: A Necessary Requirement for the Smart Grid
  S. LEFEBVRE, Hydro-Quebec, IREQ
  J. PREVOST, Hydro-Quebec, IREQ
  L. LENOIR, Hydro-Quebec, IREQ
- 14PESGM0647, Distribution System State Estimation Considering the Characteristics of Power Electronic Loads
  X. YANG, Hohai University
  Z. WEI, Hohai University

G. SUN, Hohai University
Y. YUAN, Hohai University
Y. SUN, Hohai University
H. SHEN, State Grid Corporation of China

- 14PESGM1135, Power Flow Analysis under Uncertainty Using Symmetric Fuzzy Arithmetic
  M. MARIN, University of Perpignan
  D. DEFOUR, University of Perpignan
  F. MILANO, University College Dublin
- 14PESGM0045, Appearance of Multiple Stable Load Flow Solutions under Power Flow Reversal Conditions
  H. NGUYEN, Massachusetts Institute of Technology (MIT)
  K. TURITSYN, Massachusetts Institute of Technology (MIT)
- 14PESGM1863, Dynamic Security Constrained Optimal Power Flow Using Finite Difference Sensitivities
  S. ABHYANKAR, Argonne National Laboratory
  V. RAO, Virginia Tech
  M. ANITESCU, Argonne National Laboratory
- 14PESGM2085, Assessment of DG Security Contribution on Transmission Levels
  Z. ZHANG, University of Bath
  J. LI, University of Bath
  F. LI, University of Bath
  C. BUDD, University of Bath
  V. HAMIDI, National Grid
- 14PESGM2225, Use of Intelligent Search Methods in Performing Sensitivity Analysis of Power System Reliability Indices
  M. BENIDRIS, Michigan State University
  J. MITRA, Michigan State University
- 14PESGM2184, Surrogate Lagrangian Relaxation and Branch-and-Cut for Unit Commitment with Combined Cycle Units
  M. BRAGIN, University of Connecticut
  P. LUH, University of Connecticut
  J. YAN, Southern California Edison
  G. STERN, Southern California Edison

Best Conference Papers on Markets, Economics, and Planning *(paper)*

Monday, 28 July, 1:00 PM–5:00 PM *National Harbor 7*

Sponsored by: *Best Paper Sessions*
Chair: *J. Jin, ERCOT*

PAPERS AND AUTHORS:

- 14PESGM0312, Impacts of Generation-Cycling Costs on Future Electricity Generation Portfolio Investment
  P. VITHAYASRICHAREON, University of New South Wales
  I. MACGILL, University of New South Wales
- 14PESGM2238, Planing for Energy Futures: The WECC Interconnection-Wide Transmision Expansion Experience
  M. BAILEY, Western Electricity Coordinating Council (WECC)
  B. BROWNLEE, Western Electricity Coordinating Council (WECC)
  K. MOYER, Western Electricity Coordinating Council (WECC)
  H. ZHANG, ALSTOM Grid
- 14PESGM2087, International Assessment of Smart Grid Drivers and Technologies: Analysis across Countries and by Economy and Continent
  W. WANG, Energy & Environmental Resources Group, LLC
  E. LIGHTNER, U.S. Department of Energy
- 14PESGM0360, Technical Resource Potential of Non-Disruptive Residential Demand Response in Denmark
  J. MATHIEU, University of Michigan
  T. BO RASMUSSEN, Technical University of Denmark
  M. SORENSEN, Technical University of Denmark
  H. JOHANNSSON, Technical University of Denmark
  G. ANDERSSON, ETH Zurich
- 14PESGM0622, Expansion Co-Planning with Uncertainties in a Coupled Energy Market
  J. QIU, University of Newcastle
  Z. DONG, University of Sydney
  J. ZHAO, University of Newcastle

K. MENG, University of Newcastle
H. TIAN, University of Newcastle
K. WONG, University of Western Australia

- 14PESGM1200, Multi-objective Optimization of Generation Maintenance Scheduling
  X. CHEN, South China University of Technology
  J. ZHAN, Zhejiang University
  Q. WU, South China University of Technology
  C. GUO, Zhejiang University
- 14PESGM1161, Effect of Load Forecasting Uncertainties on the Reliability of North American Bulk Power System
  N. ABDEL-KARIM, North American Electric Reliability Corporation
  E. NETHERCUTT, North American Electric Reliability Corporation
  J. MOURA, North American Electric Reliability Corporation
  T. BURGESS, North American Electric Reliability Corporation
  T. LY, North American Electric Reliability Corporation
- 14PESGM2133, Dynamic Line Rating Systems: Research and Policy Evaluation
  J. GENTLE, Idaho National Laboratory
  K. MYERS, Idaho National Laboratory
  J. BUSH, Idaho National Laboratory
  S. CARNOHAN, Washington State University
  M. WEST, University of Idaho
- 14PESGM0708, Study of Intelligent Overloading in Power Delivery Systems
  X. FENG, ABB US Corporate Research
  M. MOUSAVI, ABB US Corporate Research
- 14PESGM0357, Financial Rights and Tracing for Energy Storage
  J. TAYLOR, U Toronto
- 14PESGM1095, Energy Storage in an Open Electricity Market with Contribution to Transmission Congestion Relief
  H. KHANI, University of Western Ontario
  M. DADASH ZADEH, University of Western Ontario
- 14PESGM2284, A Random Forest Method for Real-Time Price Forecasting in New York Electricity Market
  J. MEI, Georgia Tech
  D. HE, Georgia Tech
  R. HARLEY, Georgia Tech
  T. HABETLER, Georgia Institute of Technology
  G. QU, Tsinghua University
- 14PESGM2194, Market Implications of Reliability Unit Commitment Formulations for Day-Ahead Scheduling
  G. LABOVE, Arizona State University
  R. HYTOWITZ, Johns Hopkins University
  K. HEDMAN, Arizona State University
- 14PESGM0231, Optimizing Demand Response Price and Quantity in Wholesale Markets
  A. NEGASH, University of Washington
  D. KIRSCHEN, University of Washington
- 14PESGM1851, A Probabilistic Spot Market Design for Reducing Real-Time Balancing Costs
  M. SARFATI, KTH Royal Institute of Technology
  M. HESAMZADEH, KTH Royal Institute of Technology
  P. MARTINEZ, Deloitte
- 14PESGM0689, Impact of Wind Energy Support Schemes on the Development of an Offshore Grid in the North Sea
  S. SHARIAT TORBAGHAN, TU Delft
  H. MULLER, University of Groningen
  M. GIBESCU, TU Delft
  M. VAN DER MEIJDEN, TU Delft
  M. ROGGENKAMP, University of Groningen

Best Conference Papers on Power System Stability and Protection *(paper)*

Monday, 28 July, 1:00 PM–5:00 PM *National Harbor 6*

Sponsored by: *Best Paper Sessions*
Chair: *W. Freitas, UNICAMP*
Co-Chair: *F. Bouffard, McGill University*

PAPERS AND AUTHORS:

- 14PESGM0089, Comparison of Point Estimate and Cumulant Techniques for Efficient Estimation of Critical Oscillatory Modes
  R. PREECE, University of Manchester
  K. HUANG, University of Manchester
  J. MILANOVIC, University of Manchester
- 14PESGM1624, Distributed Estimation of Inter-area Oscillation Modes in Large Power Systems Using Alternating Direction Multiplier Method
  S. NABAVI, North Carolina State University
  A. CHAKRABORTTY, North Carolina State University
- 14PESGM0216, Analysis of Time Delay Effects for Wide-Area Damping Control Design Using Dominant Path Signals
  Y. CHOMPOOBUTRGOOL, KTH Royal Institute of Technology
  L. VANFRETTI, KTH Royal Institute of Technology
- 14PESGM0431, Cascading Outage Preventive Control for Large-Scale AC-DC Interconnected Power Grid
  R. YAO, Tsinghua University
  X. ZHANG, Tsinghua University
  S. HUANG, Tsinghua University
  S. MEI, Tsinghua University
  Z. ZHANG, Henan Electric Power Corporation
  X. LI, Henan Electric Power Corporation
  Q. ZHU, Henan Electric Power Corporation
- 14PESGM1447, On the Convergence of Relaxation Schemes to Couple Phasor-Mode and Electromagnetic Transients Simulations
  F. PLUMIER, University of Liege
  C. GEUZAINE, University of Liege
  T. VAN CUTSEM, University of Liege
- 14PESGM2269, A Two-Level Approach to Tuning FACTS for Transient Stabilization
  M. CVETKOVIC, Carnegie Mellon University
  M. ILIC, Carnegie Mellon University
- 14PESGM0595, Issues and Solutions for Voltage Stability Analysis using the Node/Breaker Model
  R. RAMANATHAN, Maxisys Inc
  B. TUCK, Bonneville Power Administration
  S. DAUBENBERGER, Bonneville Power Administration
  T. DOERN, AEROTEK
  K. TRAN, Bonneville Power Administration
- 14PESGM1115, On-Line Voltage Stability Monitor in a Smart Grid with Phasor Measurements
  V. BRANDWAJN, ABB
  D. RANBHISE, ABB
  R. KUMAR, ABB
  J. WANG, ABB
  E. KHODAVERDIAN, ABB
  M. KHADEM, ABB
  R. HARNOOR, ABB
  D. SOBAJIC, Grid Enginnering LLC
  D. TRAN, New York Independent System Operator
  A. HARGRAVE, New York Independent System Operator
  P. LEMME, New York Independent System Operator
  J. MCNIERNEY, New York Independent System Operator
  K. DALPE, New York Independent System Operator
- 14PESGM0692, Transient Voltage Compensation by a Power Electronics-Based Device
  G. MEJIA, Universidad de Antioqiua
  N. MUÑOZ, Universidad de Antioqiua
  J. RAMIREZ, CINVESTAV
- 14PESGM1601, Effect of Reactive Power Control on Stability of DC-Link Voltage Control in VSC Connected to Weak Grid
  Y. HUANG, Huazhong University of Sci. and Tech.
  X. YUAN, Huazhong University of Sci. and Tech.
  J. HU, Huazhong University of Sci. and Tech.

- 14PESGM1891, A Wide-Area Loss-Index Based Method for Voltage Instability Protection
  M. ZARGHAMI, California State University, Sacramento
  R. NUQUI, ABB Inc.
- 14PESGM2111, Stability of Distributed, Asynchronous VAR-based Closed-Loop Voltage Control Systems
  A. KAM, Gridco Systems
  J. SIMONELLI, Gridco Systems
- 14PESGM0012, Investigating the Energy Handling Capability of Low Voltage Surge Arresters in a Wind Farm Under Direct Lightning Strikes on Wind Turbine Blades
  N. MALCOLM, University of Bath
  R. AGGARWAL, University of Bath
- 14PESGM0349, Control Aspects of the Dynamic Negative Sequence Current Injection of Type 4 Wind Turbines
  T. WIJNHOVEN, KU Leuven
  G. DECONINCK, KU Leuven
  T. NEUMANN, University of Duisburg-Essen
  I. ERLICH, University of Duisburg-Essen
- 14PESGM0848, Stability Improvement of an Integration of an Offshore Wind Farm and a Marine-Current Farm Using a Static VAR Compensator
  L. WANG, National Cheng Kung University
  D. TRUONG, National Cheng Kung University
- 14PESGM0228, Dynamic Voltage Stability Analysis of Sub-Transmission Networks with Large-Scale Photovoltaic Systems
  S. KABIR, University of Queensland
  O. KRAUSE, University of Queensland
  R. BANSAL, University of Queensland
  J. RAVISHANKER, University of New South Wales
- 14PESGM1518, On the Cascading Effects of Residential-Scale PV Disconnection Due to Voltage Rise
  A. NAVARRO-ESPINOSA, University of Manchester
  L. OCHOA, University of Manchester
- 14PESGM1679, Analysis of Fault Current Contribution from Inverter Based Distributed Generation
  N. RAJAEI, University of Waterloo
  M. AHMED, IBM Canada/University of Waterloo
  M. SALAMA, University of Waterloo
  R. VARMA, University of Western Ontario
- 14PESGM1231, Power System Stability Using Decentralized Under Frequency and Voltage Load Shedding
  B. HOSEINZADEH, Aalborg University
  F. FARIA DA SILVA, Aalborg University
  C. LETH BAK, Aalborg University
- 14PESGM0868, Integrated Backup Protection Scheme in Smart Grids
  X. DONG, Tsinghua University
  R. CAO, Tsinghua University
  L. CUI, Tsinghua University
  B. WANG, Tsinghua University
  S. SHI, Tsinghua University
  D. BAK, Tsinghua University
  S. HE, Gansu Electric Power Cooperation

Load Forecasting: the State of the Practice *(panel)*

Monday, 28 July, 2:00 PM–5:00 PM *National Harbor 4*

Sponsored by: *Power System Planning and Implementation*
Chair: *T. Hong, University of North Carolina at Charlotte*
Co-Chair: *H. Zareipour, Univ. of Calgary*

Load forecasting is vital to planning and operations of the power systems. While thousands of papers on load forecasting are being published every year, most are far away from real-world practice. To continue advancing the field, it is important for the scholars to understand why utilities do business the way they are doing today. This session brings together 6 seasoned practitioners from 4 countries to share with the audience their experiences on various aspects of load forecasting. It covers virtually all of the load forecasting problems, from short, medium and long term forecasting to spatial load forecasting. It also covers the load forecasting processes, such as data issues and combination of multiple vendors' forecasts. This panel is formulated by the case studies with diverse organizational backgrounds, which include a developing country, a largest utility in the world, two system operators and two cooperatives.

PRESENTATIONS AND PANELISTS:

- 14PESGM2406, Combining Load Forecasts from Multiple Vendors
  T. HONG, University of North Carolina at Charlotte
- 14PESGM2407, Data Issues in Spatial Electric Load Forecasting
  E. FRANCO, UNIOESTE
  J. MELO, UNESP
  A. PADILHA-FELTRIN, UNIOESTE
- 14PESGM2408, Preparing EKPC's Load Forecasting Process for PJM Integration
  J. HALL, East Kentuky Power Cooperative
- 14PESGM2409, Local Short and Middle Term Electricity Load Forecasting with Semi-Parametric Additive Models
  R. NÉDELLEC, EDF R&D
- 14PESGM2410, Long-Term Load Forecasting at ERCOT
  C. OPHEIM, ERCOT
- 14PESGM2411, Supply and Demand Forecasting in Competitive Markets: The Case of Alberta
  J. ESAIW, Alberta Electric System Operator

PES Young Professional Panel Session *(panel)*

Monday, 28 July, 2:00 PM–4:00 PM *Chesapeake 2*

Sponsored by: *IEEE PES*
Chair: *A. St. Leger, United States Military Academy*

Microgrid Operation in Contingencies and Recovery *(panel)*

Monday, 28 July, 3:00 PM–5:00 PM *Magnolia 1*

Sponsored by: *Energy Development and Power Generation*
Chair: *M. Johnson, U.S. Army ERDC-CERL*
Co-Chair: *A. Srivastava, Washington State University*

Microgrids improve the ride-through capabilities of critical loads in natural disasters and grid disturbances. This panel will review several examples where microgrids provided critical loads with uninterrupted, extended, or flexible operation during a contingency situation where grid power was not available or unreliable. The panelists will relate their experiences with microgrids during and after natural disaster events and large scale grid outages.

PRESENTATIONS AND PANELISTS:

- 14PESGM1838, Microgrid Control during System Recovery
  C. WELLS, University of California at San Diego
- 14PESGM1839, Hurricane Sandy Ride-Through at FDA White Oak Microgrid
  J. PUFFER, Honeywell Buliding Solutions
- 14PESGM1840, Microgrid for Disaster Preparedness and Recovery (MDR) Project, IEC
  H. AKI, National Institute of Advanced Industrial Science and Technology (AIST)
- 14PESGM1841, Planning for Contingencies: Microgrid Design and Implementation
  E. PUTNAM, Burns and McDonnell
- 14PESGM1842, Microgrid as a Resource in Distribution System Restoration
  C. LIU, Washington State University

Global Experiences in Attracting Quality Undergraduates in University Power Engineering Programs through Innovative Approaches *(panel)*

Monday, 28 July, 4:00 PM–6:00 PM *Chesapeake 2*

Sponsored by: *Power & Energy Education Committee*
Chair: *S. Islam, Curtin University*

Universities world-wide are experiencing a revival in power programs. Thanks to increased hiring of power graduates, University's are providing resources to power programs for development of a smart, tech-savvy grid. However, there is concern about the quality of students entering power programs. Key issues are: top local students are attracted to other disciplines by better job prospects and starting salaries; increases in less academically strong international students; lack of awareness of power industry careers; perception that electrical engineering is too difficult, too mathematical, and less interesting! The quality of intake is bound to impact the quality of graduates. This will impact the industry supply chain and tarnish the image of power programs. We must address this issue through innovative teaching,

embedding real life examples, bursaries, outreach activities, tours etc. This session presents innovative approaches adopted by Universities world-wide to attract top quality students in power programs.

PRESENTATIONS AND PANELISTS:

- 14PESGM2346, Australian Effort in Reenergising and Enriching Power Engineering Education
  S. ISLAM, Curtin University
- 14PESGM2348, Creating Interest in Electric Power Engineering at Illinois and Around the World
  P. SAUER, University of Illinois.at Urbana-Champaign
- 14PESGM2349, Innovative Curricula to Improve Enrolment in Power and Energy Systems
  B. CHOWDHURY, University of North Carolina
- 14PESGM2347, Re-Energizing the Entry Pipeline of Future Electrical Engineering Students: A New Zealand Experience
  N. NAIR, University of Auckland
- 14PESGM2350, Observations on Undergraduate Student Enrollments in Electric Power Engineering
  G. HEYDT, Arizona State University
- 14PESGM2351, Transformation of Electric Power Engineering Program: From Past Electromechanics to Future Smart Grids
  A. OZDEMIR, Istanbul Technical University

Monday Evening

EMC Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Electric Machinery*
Chair: *K. Mayor, Alstom AG (Schweiz)*

PAPERS AND AUTHORS:

- 14PESGM1345, Reactive Power Limits in Distributed Generators from Generic Capability Curves
  G. VALVERDE, University of Costa Rica
  J. OROZCO, University of Costa Rica
- 14PESGM1389, An Approach for On-Line Electrical Machine Winding Inter-Turn Fault Detection
  M. ZHANG, Nanyang Technological University
  K. TSENG, Nanyang Technological University
- 14PESGM1549, Improved Brushless Synchronous Generator Model to Study the Turn-to-Turn Short Circuit Fault
  S. NADARAJAN, National University of Singapore
  B. BHANGU, Rolls-Royce Singapore Pte Ltd
  S. PANDA, National University of Singapore
  A. GUPTA, Rolls-Royce Singapore Pte Ltd
- 14PESGM0069, Identifying Root Causes of Failures in Small Electric Motors
  S. PURUSHOTHAMAN, FM Global
- 14PESGM0769, Determination of Three-Phase Induction Motors Model Parameters from Catalog Information
  J. GUIMARÃES, UNIFEI
  J. BERNARDES JR., UNIFEI
  A. HERMETO, UNIFEI
  E. BORTONI, UNIFEI
- 14PESGM1126, Influence of Auxiliary Winding Resonance on the Harmonic Behavior of Single Phase Capacitor Motors
  G. SINGH, Clemson University
  E. COLLINS, Clemson University
- 14PESGM0770, Application of SMES Unit to Improve the Overall Performance of DFIG-Based WECS
  M. KHAMAIRA, Curtin University
  A. ABU-SIADA, Curtin University
  S. ISLAM, Curtin University
  M. MASOUM, Curtin University
- 14PESGM1845, Induction Generators Phasor Simulation in DQ Coordinates with Unbalanced Operating Conditions
  R. REGINATTO, UNIOESTE
  R. BAINY, UNIOESTE

- 14PESGM1329, Design, Build and Testing of a Hydrokinetic H-Darrieus Turbine for Developing Countries
  F. TANIER-GESNER, Oregon Institute of Technology
  C. STILLINGER, Oregon Institute of Technology
  A. BOND, Oregon Institute of Technology
  P. EGAN, Oregon Institute of Technology
  J. PERRY, Oregon Institute of Technology

Emerging Technologies Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Emerging Technologies Coordinating*
Chair: *N. Hadjsaid, Grenoble-INP*
Co-Chair: *N. Rostamkolai, Rose-Hulman Institute of Technology*

PAPERS AND AUTHORS:

- 14PESGM2268, PEVs Real-Time Coordination in Smart Grid based on Moving Time Window
  M. SHAABAN, University of Waterloo
  M. ISMAIL, Texas A&M University at Qatar
  E. EL-SAADANY, University of Waterloo
- 14PESGM0836, Assessing Electric Vehicle Distributed Energy Resource Potential and Transport Energy Requirement Constraints
  G. MILLS, University of New South Wales
  I. MACGILL, University of New South Wales
- 14PESGM1824, Modeling and Revenue Estimation of EV as Reactive Power Service Provider
  M. NIKKHAH MOJDEHI, Syracuse University
  P. GHOSH, Syracuse University
- 14PESGM1117, Estimating the Harmonic Distortions in a Distribution Network Supplying EV Charging Load Using Practical Source Data – Case Example
  L. KÜTT, Aalto University School of Electrical Engineering
  E. SAARIJÄRVI, Aalto University School of Electrical Engineering
  M. LEHTONEN, Aalto University School of Electrical Engineering
  H. MÕLDER, Tallinn University of Technology
  J. NIITSOO, Tallinn University of Technology
- 14PESGM1898, Hybrid PV-Battery System Based on Trans Quasi Z-Source Inverter: Application in Microgrids
  J. KHAJEHSALEHI, Shahid Beheshti University
  K. SHESHYEKANI, Shahid Beheshti University
  M. HAMZEH, Shahid Beheshti University
  E. AFJEI, Shahid Beheshti University
- 14PESGM0168, Residential Heating System in Multi-Physical Domains
  B. ASARE-BEDIAKO, Eindhoven University of Technology
  W. KLING, Eindhoven University of Technology
  P. RIBEIRO, Eindhoven University of Technology
- 14PESGM1593, Leveraging Smart Meters for Residential Energy Disaggregation
  A. IWAYEMI, Illinois Institute of Technology
  C. ZHOU, Illinois Institute of Technology
- 14PESGM1324, Demand Flexibility from Residential Heat Pump
  B. BHATTARAI, Aalborg University
  B. BAK-JENSEN, Aalborg University
  J. PILLAI, Aalborg University
  M. MAIER, Institut National de la Recherche Scientifique (INRS)
- 14PESGM1349, Multi-Criteria Optimization for Determining Installation Locations for the Power-to-Gas Technologies
  N. MOSKALENKO, Otto-von-Guericke University Magdeburg
  P. LOMBARDI, Fraunhofer Institute for Factory Operation and Automation IFF
  P. KOMARNICKI, Fraunhofer Institute for Factory Operation and Automation IFF
- 14PESGM0599, Quantifying the Operational Benefits of Conventional and Advanced Pumped Storage Hydro on Reliability and Efficiency
  I. KRAD, National Renewable Energy Laboratory
  E. ELA, National Renewable Energy Laboratory
  V. KORITAROV, Argonne National Laboratory
- 14PESGM1664, Decomposition Methods for Stochastic Optimal Coordination of Energy Storage and Generation
  D. ZHU, Carnegie Mellon University
  G. HUG-GLANZMANN, Carnegie Mellon University

- 14PESGM0919, Pressure-Retarded Osmotic Power for Remote Communities in Quebec
  J. MAISONNEUVE, Concordia University
  P. PILLAY, Concordia University
- 14PESGM1684, DSR Design Fundamentals: Power Flow Control
  S. OMRAN, Virginia Tech
  R. BROADWATER, Virginia Tech
  J. HAMBRICK, Electrical Distribution Design (EDD)
  M. DILEK, Electrical Distribution Design (EDD)
- 14PESGM2157, Power Flow Analysis for Droop Controlled LV Hybrid AC-DC Microgrids with Virtual Impedance
  C. LI, Aalborg University
  S. CHAUDHARY, Aalborg University
  J. VASQUEZ, Aalborg University
  J. GUERRERO, Aalborg University
- 14PESGM1162, A Causal Event Graph for Cyber-Power System Events Using Synchrophasor
  U. ADHIKARI, Mississippi State University
  T. MORRIS, Mississippi State University
  S. PAN, Mississippi State University
- 14PESGM1110, A Cyber-Physical Power System Test Bed for Intrusion Detection Systems
  U. ADHIKARI, Mississippi State University
  T. MORRIS, Mississippi State University
  S. PAN, Mississippi State University
- 14PESGM2167, Fault Diagnosis for Drivetrain Gearboxes Using PSO-Optimized Multiclass SVM Classifier
  D. LU, University of Nebraska-Lincoln
  W. QIAO, University of Nebraska-Lincoln

Energy Development & Power Generation Poster *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Energy Development and Power Generation*

PAPERS AND AUTHORS:

- 14PESGM0022, Modeling Applied in the Modernization and Revamping of Power Plants
  J. VAZQUEZ-BUSTOS, Instituto de Investigaciones Electricas
  B. ZAYAS-PÉREZ, Instituto de Investigaciones Electricas
- 14PESGM0023, A Model Predictive Approach for Community Battery Energy Storage System Optimization
  H. PEZESHKI, Queensland University of Technology
  P. WOLFS, Central Queensland University
  G. LEDWICH, Queensland University of Technology
- 14PESGM0026, A Decentralized Control Strategy for Multiple Distributed Generation in Islanded Mode
  A. TAVAKOLI, University of Tasmania (UTAS)
  M. NEGNEVITSKY, University of Tasmania (UTAS)
  S. LYDEN, University of Tasmania (UTAS)
  O. HARUNI, Institute of Chemical and Engineering Sciences
- 14PESGM0084, Effect of Cost Related Parameters on Optimization of Zero Net Energy Buildings
  V. BALIJEPALLI, India Smart Grid Task Force
  S. KHAPARDE, IIT Bombay
- 14PESGM0091, A Combined Centralized/Decentralized Voltage Regulation Method for PV Inverters in LV Distribution Networks
  A. MOLINA-GARCIA, Universidad Politécnica de Cartagena
  R. MASTROMAURO, Politecnico di Bari
  M. LISERRE, Christian-Albrechts University of Kiel
- 14PESGM0100, Bidirectional Power Management in Hybrid AC-DC Islanded Microgrid System
  A. RADWAN, University of Alberta
  Y. MOHAMED, University of Alberta
- 14PESGM0114, An Adaptive Wind Power Smoothing Method with Energy Storage System
  H. XU, Tsinghua University
  C. WANG, Tsinghua University
  C. LU, Tsinghua University
  Z. LU, China Southern Power Grid
- 14PESGM0172, Online Fault Detection and Fault Tolerance in Electrical Energy Storage Systems
  Y. WANG, University of Southern California
  X. LIN, University of Southern California
  M. PEDRAM, University of Southern California
  N. CHANG, Seoul National University

- 14PESGM0176, Optimal Switch Configuration Design for Reconfigurable Photovoltaic Modules
  X. LIN, University of Southern California
  Y. WANG, University of Southern California
  M. PEDRAM, University of Southern California
  N. CHANG, Seoul National University
- 14PESGM0202, Electric Vehicle Grade Lithium Polymer Battery Model Using PSCAD
  D. PATEL, University of Massachusetts Lowell
  S. SHARMA, University of Massachusetts Lowell
  Z. SALAMEH, University of Massachusetts Lowell
- 14PESGM0207, The Realization of Flexible Photovoltaic Power Grid-Connection μ-Synthesis Robust Control in Microgrid
  P. LI, North China Electric Power University
  Z. YIN, North China Electric Power University
  Y. LI, North China Electric Power University
- 14PESGM0213, Power Flow Solution of Power Networks with Photovoltaic Generation and a Battery Energy Storage System
  M. VARGAS, UMSNH
  N. GARCÍA, UMSNH
- 14PESGM0275, Integration of IEC 61850 into a Distributed Energy Resources System in a Smart Green Building
  R. HUANG, University of California Los Angeles
  E. LEE, University of California Los Angeles
  C. CHU, University of California Los Angeles
  R. GADH, University of California Los Angeles
- 14PESGM0369, Performance Assessment of Solar Thermal Power Plants: A Case Study in Queensland
  R. SHAH, University of Queensland, Australia
  R. YAN, University of Queensland, Australia
  T. SAHA, University of Queensland, Australia
- 14PESGM0371, Simulation of and Controls Design for a Whole-Feeder Microgrid
  D. SCHUTZ, Northern Plains Power Technologies
  M. ROPP, Northern Plains Power Technologies
  K. WHITENER, Portland General Electric
  M. OSBORN, Five Stars International Ltd.
- 14PESGM0386, A Two Stage Hybrid Maximum Power Point Tracking Technique for Photovoltaic Applications
  H. SHER, King Saud University
  A. MURTAZA, Politecnico di Torino
  K. ADDOWEESH, King Saud University
  M. CHIABERGE, Politecnico di Torino
- 14PESGM0408, Simulation Study of Islanding in Two Synchronous Generator DG Applications
  C. MOUW, Northern Plains Power Technologies
  M. ROPP, Northern Plains Power Technologies
  B. ENAYATI, National Grid
  R. EASTHAM, National Grid
  B. FEDELE, National Grid
- 14PESGM0444, An Active Power Control Strategy for Large-Scale Clusters of Photovoltaic Power Stations
  Z. LIANG, China Electric Power Research Institute
  Q. LINAN, China Electric Power Research Institute
  G. LUMING, China Electric Power Research Institute
  C. NING, China Electric Power Research Institute
  Z. LINGZHI, China Electric Power Research Institute
- 14PESGM0449, Hydro and Gas Turbine Blackout Restoration Strategies in the South Korean Power System
  S. LEE, KESRI, Seoul National University
- 14PESGM0457, An Analytical Approach to Assess Static Voltage Stability of Distribution System with Rooftop PV Units
  J. YAGHOOBI, University of Queensland
  N. MITHULANANTHAN, University of Queensland
  T. KUMAR SAHA, University of Queensland
  R. BANSAL, University of Pretoria
- 14PESGM0517, Utilization of Natural Gas Infrastructure as Long-Term Energy Storage
  C. BAUMANN, RWTH Aachen University
  D. SIEGLER, RWTH Aachen University
  A. MOSER, RWTH Aachen University

- 14PESGM0578, Optimally Smoothing Output of PV Farms
  A. PURI, DNV-GL Energy
- 14PESGM0648, Online Optimal Power Distribution between Units of a Hydro Power Plant
  E. BORTONI, UNIFEI
  G. BASTOS, UNIFEI
  T. FERREIRA, UNIFEI
- 14PESGM0666, A Novel Power Sharing Control Strategy in Low Voltage MicroGrid with a Variety of Distributed Generations
  P. LI, North China Electric Power University
  P. DOU, North China Electric Power University
  X. WANG, North China Electric Power University
  X. ZHOU, North China Electric Power University
- 14PESGM0728, Compressed Air Energy Storage: Thermodynamic and Economic Review
  A. ROGERS, University of Tasmania
  A. HENDERSON, University of Tasmania
  X. WANG, University of Tasmania
  M. NEGNEVITSKY, University of Tasmania
- 14PESGM0788, Simulation Studies for Refurbishment and Uprating of Hydro Power Plants
  O. RAHI, NIT Hamirpur
  G. KUMAR, NIT Hamirpur
- 14PESGM0822, Control Scheme of PV Inverter Under Unbalanced Grid Voltage
  H. HUANG, North China Electric Power University
  Y. XU, North China Electric Power University
  L. YANG, North China Electric Power University
- 14PESGM0846, Harmonic Emissions in Grid Connected PV Systems: A Case Study on a Large Scale Rooftop PV Site
  A. CHIDURALA, University of Queensland
  T. SAHA, University of Queensland
  N. MITHULANANTHAN, University of Queensland
  R. BANSAL, University of Pretoria
- 14PESGM0872, Coordinated Reactive Power Control Strategy Based on the Improved Doubly Fed Induction Generator
  D. LI, Shanghai University of Electric Power
  Z. LIANG, Shanghai University of Electric Power
  C. YE, Shanghai University of Electric Power
- 14PESGM0946, Long Term Energy Storage Capacity Optimization in Energy Buffer System
  A. ABUELRUB, Texas A&M University
  C. SINGH, Texas A&M University
- 14PESGM0966, Generation of Solar Radiation Data in Unmeasurable Areas for Photovoltaic Power Station Planning
  C. YANG, Southeast University, China
  Q. XU, Southeast University, China
  X. XU, China Electric Power Research Institute
  P. ZENG, China Electric Power Research Institute
  X. YUAN, Jiangsu Electric Power Company Research Institute
- 14PESGM1022, Effects of Operational Modes of Distributed Wind Generators on Distribution Networks
  N. ROY, University of New South Wales
  H. POTA, University of New South Wales
  M. MAHMUD, Swinburne University of Technology
- 14PESGM1078, Impact Study of Integrating Solar Plant in an 11kV Urban Distribution System
  R. JAMEEL, American International University-Bangladesh (AIUB)
  S. HANI, American International University-Bangladesh (AIUB)
  T. AZIZ, Ahsanullah University of Science and Technology
- 14PESGM1087, Determination of Design Parameters for Direct-Drive Wind Turbines
  Y. NIU, University of Texas at Austin
  S. SANTOSO, University of Texas at Austin
- 14PESGM1114, Use of a Wind Tunnel for Urban Wind Power Estimation
  A. AL-QURAAN, Concordia University
  P. PILLAY, Concordia University
  T. STATHOPOULOS, Concordia University
- 14PESGM1118, Electric Generators for Biomass Waste to Energy Systems
  N. CURRY, Concordia University
  D. PILLAY, Concordia University
- 14PESGM1140, Case Study: Performance of a Small Grid-Tie Wind-Solar Generation System
  O. SOYSAL, Frostburg State University
  H. SOYSAL, NA

- 14PESGM1245, Prediction and Efficiency Evaluation of Solar Energy Resources by Using Mixed ANN and DEA Approaches
  A. YADAV, National Institute of Technology Jamshedpur
  N. KUMAR, National Institute of Technology Jamshedpur
  A. AKELLA, National Institute of Technology Jamshedpur
- 14PESGM1250, Alleviation of Oscillations Power of Wind Farm Using Flywheel Energy Storage
  J. TAN, Southwest Jiaotong University
  X. WANG, Southwest Jiaotong University
  T. WANG, Southwest Jiaotong University
  Y. ZHANG, Southwest Jiaotong University
- 14PESGM1254, An Energy Storage System Configuration Method to Stabilize Power Fluctuation in Different Operation Periods
  M. CAO, Southeast University
  Q. XU, Southeast University
  P. ZENG, China Electric Power Research Institute
  X. XU, China Electric Power Research Institute
  X. YUAN, Jiangsu Province Power Company Research Institute
- 14PESGM1303, Probabilistic Approach to Describe Greenhouse Gas Emissions and Their Impact in the Operation of Insular Power Systems
  J. LUJANO-ROJAS, University Beira Interior
  G. OSÓRIO, University Beira Interior
  J. CATALAO, University Beira Interior
- 14PESGM1311, High-rise Building Mini-Hydro Pumped-Storage Scheme with Shanghai Jinmao Tower as a Case Study
  J. ZHANG, Hangzhou Dianzi University
  Q. ZHANG, Arizona State University
- 14PESGM1360, Analysing the PV Output Variability and Its Mitigation through Aggregation in Queensland, Australia
  S. VEYSI RAYGANI, University of Queensland
  R. SHARMA, University of Queensland
  T. SAHA, University of Queensland
- 14PESGM1396, An Optimal Capacity Configuration Method of Wind/PV and Energy Storage Co-generation System
  L. LI, North China Electric Power University
  L. LIANGYU, North China Electric Power University
  J. LINLI, Shanxi Electrical Power Corporation
- 14PESGM1400, Operation Optimization Model for Micro-Turbine Based CCHP Systems
  A. XU, South China University of Technology
  S. LIN, South China University of Technology
  J. LEI, South China University of Technology
  Z. JING, South China University of Technology
  M. LIAO, South China University of Technology
  Z. SHEN, South China University of Technology
  X. HE, South China University of Technology
  Q. WU, South China University of Technology
- 14PESGM1436, A Controlled Electric Vehicle Charging Strategy Considering Regional Wind and PV
  H. LIU, Tianjin University
  J. GUO, Tianjin University
  P. ZENG, Electric Power Research Institute of China
- 14PESGM1467, Short-Term Solar Photovoltaic Irradiation Predicting Using a Nonlinear Prediction Method
  D. CAI, University of Electronic Science and Technology of China
  T. XIE, University of Electronic Science and Technology of China
  Q. HUANG, University of Electronic Science and Technology of China
  J. LI, University of Electronic Science and Technology of China
- 14PESGM1481, Distributed Control Scheme to Regulate Power Flow and Minimize Interactions in Multiple Microgrids
  M. HOSSAIN, Griffith University
  M. MAHMUD, Swinburne University of Technology
  H. POTA, University of New South Wales
  N. MITHULANANTHAN, University of Queensland
  R. BANSAL, University of Pretoria
- 14PESGM1516, Optimal Dynamic Load Dispatch with the Coordination of Wind Farm and AGC Units
  C. HE, Shandong University
  H. WANG, Shandong University
  X. CAO, Shandong University

- 14PESGM1546, Reactive Power Control Strategy of DFIG Wind Farms for Regulating Voltage of Power Grid
  J. ZHAI, Nanjing Institute of Technology
  H. LIU, Hohai University
- 14PESGM1575, Cost-Benefit Study of Dispersed Battery Storage to Increase Penetration of Photovoltaic Systems on Distribution Feeders
  Y. YANG, Florida State University
  N. YANG, Lawton Chiles High School
  H. LI, Florida State University
- 14PESGM1587, Harmonic Suppression Technology for PV Inverter Under Non-Ideal Grid Voltage Condition
  X. YUAN, Hohai University
  X. MA, Hohai University
- 14PESGM1602, An Active Power Control Application in a Utility Wind Farm Cluster
  L. LI, North China Electric Power University
  L. DAN, North China Electric Power University
  Z. CHENCHEN, North China Electric Power University
  Z. SHUANG, North China Electric Power University
- 14PESGM1803, Evaluation of German 3-Phase Solar PV Inverter
  R. BRAVO, Southern California Edison
  S. ROBLES, Southern California Edison
  R. SALAS, Southern California Edison
- 14PESGM1993, Interleaving Modulation Inverters for High Efficiency Photovoltaic Systems
  C. ATTAIANESE, University of Cassino and Southern Lazio
  M. D'ARPINO, University of Cassino and Southern Lazio
  M. DI MONACO, University of Cassino and Southern Lazio
  G. TOMASSO, University of Cassino and Southern Lazio
- 14PESGM2001, Examining the Viability of Energy-Only Markets with High Renewable Penetrations
  J. RIESZ, University of New South Wales
  I. MACGILL, University of New South Wales
  J. GILMORE, ROAM Consulting
- 14PESGM2011, Solar commercial Virtual Power Plant Day Ahead Trading
  B. ZWAENEPOEL, Ghent University
  T. VANDOORN, Ghent University
  J. LAVEYNE, Ghent University
  G. VAN EETVELDE, Ghent University
  L. VANDEVELDE, Ghent University
- 14PESGM2062, Application of Change-Point Analysis to Abnormal Wind Power Data Detection
  M. XU, Tsinghua University
  Z. LU, Tsinghua University
  Y. QIAO, Tsinghua University
  N. WANG, Gansu Electric Power Corporation
  S. ZHOU, Gansu Electric Power Corporation
- 14PESGM2077, Node Identification for Placing EVs and PAs in a Distribution Network
  V. KASI, Indian Institute of Technology Guwahati
  K. THIRUGNANAM, Indian Institute of Technology Guwahati
  P. KUMAR, Indian Institute of Technology Guwahati
  S. MAJHI, Indian Institute of Technology Guwahati
- 14PESGM2082, Design and Implementation of Single Voltage Source Converter Based Standalone Microgrid
  B. SINGH, IIT Delhi
  K. KANT, IIT Delhi
  A. CHANDRA, École de Technologie Supérieure
  K. AL-HADDAD, École de Technologie Supérieure
- 14PESGM2100, Efficacy of Wind Power in Mitigation of CO_2 Emission from the Irish Electrical Grid
  P. BROGAN, Queens University Belfast
  J. MORROW, Queens University Belfast
  R. BEST, Queens University Belfast
  D. LAVERTY, Queens University Belfast
- 14PESGM2123, Solar Resource Model for Rural Microgrids in India
  J. HURTT, Johns Hopkins University
  D. JHIRAD, Johns Hopkins University
  J. LEWIS, Johns Hopkins University
- 14PESGM2128, An Optimal Speed Wind Turbine Test Bench System for PMSG Machines with MPP control
  S. JANAKIRAMAN, University of Houston
  W. SHIREEN, University of Houston

- 14PESGM2173, Using Industrial Load Flexibility to Increase Hydroelectric Generation Efficiency
  M. FEKRI MOGHADAM, University of British Columbia
  W. DUNFORD, University of British Columbia
  E. VAAHEDI, BC Hydro
  M. METCALFE, Enbala Power Networks
- 14PESGM2201, Maximum Power Point Tracking of a Variable Speed PMSG Wind Power System with DC Link Reduction Technique
  R. KOTTI, Univeristy of Houston
  W. SHIREEN, Univeristy of Houston
- 14PESGM1446, Recommended Practices for Wind Integration Studies
  H. HOLTTINEN, VTT
  M. O'MALLEY, UCD
  D. FLYNN, UCD
  M. MILLIGAN, NREL
  J. SMITH, UVIG
- 14PESGM1580, Market Design for High Levels of Variable Generation
  M. MILLIGAN, National Renewable Energy Laboratory
  H. HOLTTINEN, VTT Technical Research Centre of Finland
  J. KIVILUOMA, VTT Technical Research Centre of Finland
  A. ORTHS, Energinet.dk
  M. LYNCH, University College Dublin
  L. SODER, KTH
- 14PESGM1799, Impact of Wind Power Curtailments on the Spanish Power System Operation
  S. MARTIN-MARTINEZ, Universidad de Castilla-La Mancha
  E. GOMEZ-LAZARO, Universidad de Castilla-La Mancha
  A. MOLINA-GARCIA, Universidad Politecnica de Cartagena
  A. HONRUBIA-ESCRIBANO, Universidad de Castilla-La Mancha

Insulated Conductors Committee Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Insulated Conductors*

PAPERS AND AUTHORS:

- 14PESGM0659, Modeling and Analysis of the Power Transmission with an 110kV/3kA HTS Cable in a Meshed Grid
  J. ZHU, China Electric Power Research Institute
  M. QIU, China Electric Power Research Institute
  X. LAI, China Electric Power Research Institute
  X. CHEN, Beijing Jiao-tong University
  W. YUAN, University of Bath

IGCC Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Intelligent Grid Coordinating*

PAPERS AND AUTHORS:

- 14PESGM0049, Economic Analysis of Plug-in Electric Vehicle Parking Deck with Dynamic Pricing
  Y. GUO, University of Michigan-Dearborn
  X. LIU, University of Michigan-Dearborn
  Y. YAN, University of Michigan-Dearborn
  N. ZHANG, University of Michigan-Dearborn
  W. SU, University of Michigan-Dearborn
- 14PESGM0086, Networked-Based Distributed Energy Management of Micro-Grid Systems
  A. KAHROBAEIAN, University of Alberta
  Y. MOHAMED, University of Alberta
- 14PESGM0240, A New Trading Framework for Demand Response Aggregators
  N. MAHMOUDI, University of Queensland
  T. KUMAR SAHA, University of Queensland
  M. EGHBAL, University of Queensland
- 14PESGM0278, A Game Theoretical Approach to Modeling Energy Consumption with Consumer Preference
  L. BAI, University of Louisville
  G. XU, University of Louisville
  Q. ZHENG, University of Central Florida

- 14PESGM0303, Modeling Smart Grid Adoption via a Social Network Model
  A. CASSIDY, Washington University in St. Louis
  A. NEHORAI, Washington University in St. Louis
- 14PESGM0390, Power Utility-Owned Microgrids: A Process for Selecting Scenarios for Their Implementation
  E. MCKINNEY, Idaho Power Company
  D. ARJONA, Idaho Power Company
- 14PESGM0529, Distributed Load Demand Scheduling in Smart Grid to Minimize Electricity Generation Cost
  S. YUE, University of Southern California
  D. ZHU, University of Southern California
  Y. WANG, University of Southern California
  M. PEDRAM, University of Southern California
- 14PESGM0623, Performance Analysis of a Real-Time Decentralized Algorithm for Coordinated PEV Charging at Home and Workplace with PV Solar Panel Integration
  I. HARRABI, INRS
  M. MAIER, INRS
- 14PESGM0757, Design and Implementation of an Autonomous Grid Simulator Based on Multi-Agent System
  G. LIU, CEPRI
  T. PU, CEPRI
  K. LIU, CEPRI
  Y. LI, CEPRI
- 14PESGM0801, Inventory Management of DSCC System via Improved (s, S) Model
  Y. NIE, Hong Kong Polytechnic University
  C. CHUNG, Hong Kong Polytechnic University
  L. CHEN, Hong Kong Polytechnic University
  X. WANG
  R. YU, ABB Corporate Research Center
  M. QIN
- 14PESGM0943, Distributed Demand Response Algorithms against Semi-Honest Adversaries
  M. ZHU, Pennsylvania State University
- 14PESGM0944, Distributed Access Control of Volatile Renewable Energy Resources
  M. ZHU, Pennsylvania State University
  N. LI, Massachusetts Institute of Technology
  W. SHI, University of California, Los Angeles
  R. GADH, University of California, Los Angeles
- 14PESGM0955, Energy Networks: A Modelling Framework for European Optimal Cross-Border Trades
  C. SPATARU, University College London
  J. BIALEK, Durham University
- 14PESGM0963, State-of-Health Aware Optimal Control of Plug-in Electric Vehicles
  Y. WANG, University of Southern California
  S. YUE, University of Southern California
  M. PEDRAM, University of Southern California
- 14PESGM0980, Design Considerations for Inertia Emulating Controllers Used in Variable Speed Wind Turbines
  A. WICKRAMASINGHE, University of Wollongong
  L. MEEGAHAPOLA, University of Wollongong
  A. AGALGAONKAR, University of Wollongong
  S. PERERA, University of Wollongong
- 14PESGM1080, An Active Power Synchronization Control Loop for Grid-Connected Converters
  D. REMON, Abengoa
  A. CANTARELLAS, Abengoa
  E. RAKHSHANI, Abengoa
  I. CANDELA, Technical University of Catalonia
  P. RODRIGUEZ, Abengoa
- 14PESGM1108, An Electricity Trade Model for Multiple Power Distribution Networks in Smart Energy Systems
  T. CUI, University of Southern California
  Y. WANG, University of Southern California
  S. NAZARIAN, University of Southern California
  M. PEDRAM, University of Southern California
- 14PESGM1175, Coordinated Parameters Design of SEDC and GTSDC for SSR Mitigation
  X. DONG, Tsinghua University
  X. XIE, Tsinghua University
  Y. HAN, Tsinghua University

L. WANG, Tsinghua University
D. SUN, Tsinghua University

- 14PESGM1195, Distributed Coordination Scheduling Algorithm for Electric Vehicle Charging with ADMM
  M. QIN, Hong Kong Polytechnic University
  C. CHUNG, Hong Kong Polytechnic University
  K. CHAN, Hong Kong Polytechnic University
  J. YI, Chongqing University
- 14PESGM1275, Dynamic Behaviour of a Population of Controlled-by-Price Demand Side Resources
  F. SOSSAN, DTU Elektro
  X. HAN, DTU Elektro
  H. BINDNER, DTU Elektro
- 14PESGM1285, An ANFIS Based Assessment of Demand Response Driven Load Pattern Elasticity
  O. ERDINC, University Beira Interior
  N. PATERAKIS, University Beira Interior
  J. CATALAO, University Beira Interior
  A. BAKIRTZIS, Aristotle University of Thessaloniki
- 14PESGM1293, Cost and Emission Savings from the Deployment of Variable Electricity Tariffs and Advanced Domestic Energy Hub Storage Management
  S. LE BLOND, University of Bath
  R. LI, University of Bath
  F. LI, University of Bath
  Z. WANG, University of Bath
- 14PESGM1413, Voltage Sensorless Predictive Direct Power Control of Three-Phase PWM Converters With Accurate Virtual Flux Estimation
  Y. TAO, South China University of Technology
  L. WANG, South China University of Technology
  Q. WU, South China University of Technology
  W. TANG, South China University of Technology
- 14PESGM1550, Risk-Limiting Dispatch with Operation Constraints
  C. PENG, University of Hong Kong
  Y. HOU, University of Hong Kong
- 14PESGM1589, Overload Prevention in an Autonomous Microgrid Using Battery Storage Units
  M. GOYAL, Queensland University of Technology
  A. GHOSH, Curtin University
  F. SHAHNIA, Curtin University
- 14PESGM1656, Cyber Attacks on AC State Estimation: Unobservability and Physical Consequences
  J. LIANG, ASU
  O. KOSUT, ASU
  L. SANKAR, ASU
- 14PESGM1764, Consensus-Based *-f/Q-Vdot* Droop Control in Autonomous Micro-Grids with Wind Generators and Energy Storage Systems
  L. LU, National Tsing Hua University
  C. CHU, National Tsing Hua University
- 14PESGM1775, Combined Operation of a VSC Based Grid Interfaced Solar Photovoltaic Power Generation System with Night Time Application
  A. VERMA, Indian Institute of Technology, Delhi
  B. SINGH, Indian Institute of Technology, Delhi
  D. SHAHANI, Indian Institute of Technology, Delhi
  A. CHANDRA, École de Technologie Supérieure
  K. AL-HADDAD, École de Technologie Supérieure
- 14PESGM1809, Multi-Objective Optimization for Environomic Scheduling in Microgrids
  C. DECKMYN, Ghent University
  T. VANDOORN, Ghent University
  M. MORADZADEH, Ghent University
  L. VANDEVELDE, Ghent University
- 14PESGM1881, Market-Oriented Energy Management of a Hybrid Power System via Model Predictive Control with Constraints Optimizer
  H. HASSAN
  Y. MOHAMED
- 14PESGM1945, Event Detection Methods for Nonintrusive Load Monitoring
  H. AZZINI, University of Campinas
  R. TORQUATO, University of Campinas
  L. SILVA, University of Campinas

- 14PESGM1949, Development of a Laboratory Platform for Distributed Grid Management Applications
  N. HONETH, KTH – Royal Institute of Technology
  L. NORDSTRÖM, KTH – Royal Institute of Technology
  S. IACOVELLA, KU Leuven
  P. VINGERHOETS, KU Leuven
  G. DECONINCK, KU Leuven
- 14PESGM1960, Distribution Transformer Load Management System
  T. ALQUTHAMI, Georgia Institute of Technology
  A. MELIOPOULOS, Georgia Institute of Technology
- 14PESGM2027, LV-Grid Automation System – A Technology Review
  C. OERTER, Wuppertal University
  N. NEUSEL-LANGE, Wuppertal University
- 14PESGM2064, Increasing Distribution System Model Accuracy with Extensive Deployment of Smart Meters
  J. PEPPANEN, Georgia Institute of Technology
  J. GRIMALDO, Georgia Institute of Technology
  M. RENO, Georgia Institute of Technology
  S. GRIJALVA, Georgia Institute of Technology
  R. HARLEY, Georgia Institute of Technology
- 14PESGM2091, Practical Limitations of Sliding-Mode Switching Attacks on Smart Grid Systems
  A. FARRAJ, University of Toronto
  E. HAMMAD, University of Toronto
  D. KUNDUR, University of Toronto
  K. BUTLER-PURRY, Texas A&M University

Marine Systems Coordinating Committee Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Marine Systems Coordinating*

PAPERS AND AUTHORS:

- 14PESGM0217, Integrated Converter Modeling for Medium Voltage DC Shipboard Distribution System Simulation
  L. QI, ABB Inc.
  J. PAN, Corporate Research Center, ABB Inc
  J. DANIEL, PS Grid System, ABB Inc
  O. APELDOORN, DM Power Conversion, ABB Ltd
  J. LI, DM Power Conversion, ABB Ltd
  Z. WANG, DM Power Conversion, ABB Ltd
- 14PESGM0522, Research and Ocean Testing Solutions to Advance the Wave Energy Industry
  A. VON JOUANNE, Oregon State University
  T. BREKKEN, Oregon State University
  T. LETTENMAIER, Consultant
  E. AMON, Oregon State University
  S. MORAN, Oregon State University
  A. YOKOCHI, Oregon State University
- 14PESGM1358, Prospects of Wave Power Grid Integration
  P. PRADAN, Lehigh University
  K. HATALIS, Lehigh University
  S. KISHORE, Lehigh University
  R. BLUM, Lehigh University
  A. LAMADRID, Lehigh University
- 14PESGM1365, Multi-step Forecasting of Wave Power Using a Nonlinear Recurrent Neural Network
  K. HATALIS, Lehigh University
  P. PRADAN, Lehigh University
  S. KISHORE, Lehigh University
  R. BLUM, Lehigh University
  A. LAMADRID, Lehigh University
- 14PESGM2013, Distributed Flywheel Energy Storage Systems for Mitigating the Effects of Pulsed Loads
  A. ELSAYED, Florida International University
  O. MOHAMMED, Florida International University

Power & Energy Education Poster *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Power & Energy Education*

PAPERS AND AUTHORS:

- 14PESGM0823, Burns & McDonnell – K-State Smart Grid Laboratory: Protection, Communication & Power Metering
  E. PIESCIOROVSKY, Kansas State University
  N. SCHULZ, Kansas State University

Power System Communications Poster *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Power System Communications*

PAPERS AND AUTHORS:

- 14PESGM0194, An ISO/IEC 15118 Conformance Testing System Architecture
  K. HÄNSCH, Fraunhofer Institute for Factory Operation and Automation IFF
  A. PELZER, Fraunhofer Institute for Factory Operation and Automation IFF
  P. KOMARNICKI, Fraunhofer Institute for Factory Operation and Automation IFF
  S. GRÖNING, TU Dortmund University
  J. SCHMUTZLER, TU Dortmund University
  C. WIETFELD, TU Dortmund University
  J. HEUER, Siemens AG
  R. MÜLLER, Siemens AG
- 14PESGM0477, Secure Integration of the Home Energy Management System to the Battaery Management System in Customer Domain of the Smart Grid
  P. JAFARY, Tampere University of Technology
  S. REPO, Tampere University of Technology
  H. KOIVISTO, Tampere University of Technology
- 14PESGM0926, Wide Area Synchronized HVDC Measurement Using IEC 61850 Communication
  C. WENGE, Fraunhofer IFF
  A. PELZER, Fraunhofer IFF
  A. NAUMANN, Fraunhofer IFF
  P. KOMARNICKI, Fraunhofer IFF
  S. RABE, Otto-von-Guericke University
  M. RICHTER, Otto-von-Guericke University
- 14PESGM1300, Adaptive Auto-Reclosing Based on DER Connectivity Data with IEC 61850
  D. ISHCHENKO, ABB Inc.
  A. OUDALOV, ABB
  J. STOUPIS, ABB Inc.
  S. MOHAGHEGHI, Colorado School of Mines
- 14PESGM1370, Power System Adequacy Assessment with Probabilistic Cyber Attacks Against Breakers
  Y. XIANG, University of Toledo
  L. WANG, University of Toledo
  Y. ZHANG, University of Toledo
- 14PESGM1427, Reliability Analysis of Power Grids with Cyber Vulnerability in SCADA System
  Y. ZHANG, University of Toledo
  Y. XIANG, University of Toledo
  L. WANG, University of Toledo
- 14PESGM1833, A Key Management-Based Two-Level Encryption Method for AMI
  I. PARVEZ, FIU
  A. ISLAM, FIU
  F. KALEEM, FIU
- 14PESGM1862, Analysis of Communication Schemes for Advanced Metering Infrastructure (AMI)
  D. BIAN, Virginia Tech
  M. KUZLU, Virginia Tech
  M. PIPATTANASOMPORN, Virginia Tech
  S. RAHMAN, Virginia Tech
- 14PESGM0190, A New Secure Method for the Transmission of Protection Information between Substations based on Compressed Sensing
  J. HE, Beijing Jiaotong University (BJTU)
  B. LI, Beijing Jiaotong University (BJTU)
  T. YIP, Beijing Jiaotong University (BJTU)
  J. LI, Huazhong University of Science and Technology School of Optical Electronic Information

- 14PESGM0255, Towards an Improved Phasor Measurement Unit Data Communications Framework
  J. HASTINGS, Queens University Belfast
  D. LAVERTY, Queens University Belfast
  D. MORROW, Queens University Belfast

PSDP Committee Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Power System Dynamic Performance*
Chair: *L. Fan, University of South Florida*
Co-Chair: R *O. Ramos, University of Sao Paulo*

PAPERS AND AUTHORS:

- 13GM0024, Analysis of Wind Farm Dynamics using Multiple Doubly Fed Induction Generators *(This paper was accepted for the 2013 PES GM, the author could not present at that meeting and is presenting at the 2014 GM) the paper will be available on Xplore post conference)*
  T. RUNOLFSSON, University of Oklahoma
  R. NAZIM, ATC Drivetrain
- 14PESGM0004, Transient Interaction Study for VSC-HVDC Connected Offshore Wind Park Considering Original Controls
  S. TEEUWSEN, Siemens AG
  R. ZUROWSKI, Siemens AG
  L. CAI, REpower Systems SE
  S. JENSEN, REpower Systems SE
  A. OSMANBASIC, REpower Systems SE
  F. GAFARO, REpower Systems SE
- 14PESGM0267, Application of Pseudo-Transient Continuation Method in Dynamic Stability Analysis
  X. WANG, Cornell University
  H. CHIANG, Cornell University
- 14PESGM0269, Design of Wide-Area Damping Control Robust to Transmission Delay Using μ-Synthesis Approach
  S. ZHANG, Arizona State University
  V. VITTAL, Arizona State University
- 14PESGM0415, Network Delay Caused by Cyber Attacks on SVC and Its Impact on Transient Stability of Smart Grids
  B. CHEN, Texas A&M University
  K. BUTLER-PURRY, Texas A&M University
  S. NUTHALAPATI, University of Texas at Austin
  D. KUNDUR, University of Toronto
- 14PESGM0463, Impacts of Wind Turbine Inertia on Power Transmission Systems
  E. LIAO, University of Queensland
  R. YAN, University of Queensland
  T. SAHA, University of Queensland
- 14PESGM0504, Methods for Utilization of MMC-VSC-HVDC for Power Oscillation Damping
  N. TRINH, EAN
  I. ERLICH, EAN
  S. TEEUWSEN, PTI Germany
- 14PESGM0574, The Influence of MTDC Control on DC Power Flow and AC System Dynamic Responses
  L. SHEN, University of Manchester
  W. WANG, University of Manchester
  M. BARNES, University of Manchester
- 14PESGM0600, Distribution Side Mitigation Strategy for Fault Induced Delayed Voltage Recovery
  Y. LIU, Arizona State University
  V. VITTAL, Arizona State University
- 14PESGM0605, Evaluating System Strength for Large-Scale Wind Plant Integration
  Y. ZHANG, ERCOT
  F. HUANG, ERCOT
  J. SCHMALL, ERCOT
  J. CONTO, ERCOT
  J. BILLO, ERCOT
  E. REHMAN, ERCOT

- 14PESGM0634, Digital PID Based Load Frequency Control through Open Communication Networks
  Y. ZHANG, Huazhong University of Science and Technology
  D. YUE, Huazhong University of Science and Technology
  S. HU, Nanjing University of Posts and Telecommunications
- 14PESGM0753, Early Prediction of Transient Voltage Sags Caused by Rotor Swings
  T. WECKESSER, Technical University of Denmark
  H. JOHANNSSON, Technical University of Denmark
  T. VAN CUTSEM, Fund for Scientific Research
- 14PESGM0768, Characterization and Assessment of Voltage and Power Constraints of DFIG WT Connected to a Weak Network
  E. ABULANWAR, Aalborg University
  W. HU, Aalborg University
  F. IOV, Aalborg University
  Z. CHEN, Aalborg University
- 14PESGM0840, Low Voltage Ride through Capability Enhancement of Wind Farms' Generators: DVR Versus STATCOM
  A. AWAD, University of Waterloo
  R. EL SHATSHAT, University of Waterloo
  M. SALAMA, University of Waterloo
  T. EL-FOULY, Natural Resources Canada
- 14PESGM0853, Reactive Power and Voltage Emergency Control Strategy of Large-Scale Grid-Connected Wind Farm
  Q. WANG, Southeast University
  Y. TANG, Southeast University
  J. LUO, NARI Group Corporation
- 14PESGM0870, Applying Power-Synchronization Control in a Multi-Terminal DC System
  R. ROGERSTEN, Royal Institute of Technology
  L. ZHANG, ABB Corporate Research
  P. MITRA, ABB Power Systems
- 14PESGM0924, Analysis of Dual-Infeed HVDC with LCC Inverter and VSC Rectifier
  C. GUO, North China Electric Power University,Beijing
  C. ZHAO, North China Electric Power University,Beijing
  X. CHEN, University of Manitoba
- 14PESGM0964, Power Coordinated Control of Wind Turbines with Permanent Magnet Synchronous Generator for Low Voltage Ride Through
  Z. LIU, North China Electric Power University
  C. LIU, North China Electric Power University
  G. LI, North China Electric Power University
- 14PESGM0972, Dynamic Ramp Rate Control for Voltage Regulation in Distribution Systems with High Penetration Photovoltaic Power Generations
  M. CHAMANA, UNC Charlotte
  F. JAHANBAKHSH, Quanta Technology
  B. CHOWDHURY, UNC Charlotte
  B. PARKHIDEH, UNC Charlotte
- 14PESGM0973, A One-Step Model Predictive Control for Modular Multilevel Converters
  Y. MA, University of South Florida
  Z. MIAO, University of South Florida
  V. DISFANI, University of South Florida
  L. FAN, University of South Florida
- 14PESGM1001, A Novel VSC HVDC Active Power Control Strategy to Improve AC System Stability
  M. MOHAMMADI, Brunel Univeristy
  C. SAUNDERS, Brunel Univeristy
  G. TAYLOR, Brunel Univeristy
- 14PESGM1004, A Novel Online Adaptive Sensorless Identification and Control of Doubly Fed Induction Generator
  R. MAHARJAN, University of North Carolina at Charlotte
  S. KAMALASADAN, University of North Carolina at Charlotte
- 14PESGM1024, Supplemental Control for Enhancing Primary Frequency Response of DFIG-Based Wind Farm Considering Security of Wind Turbines
  R. CHEN, Tsinghua University
  W. WU, Tsinghua University
  H. SUN, Tsinghua University
  Y. HU, Tsinghua University
  B. ZHANG, Tsinghua University

- 14PESGM1043, Distributed APPM for On-Line Voltage Stability Assessment of the Large-Scale Power Grid
  J. LIU, National Tsing Hua University
  X. GUO, National Tsing Hua University
  C. CHU, National Tsing Hua University
- 14PESGM1049, Equivalent Modeling of Wind Farm in Frequency Domain
  Y. JIN, Hohai University
  P. JU, Hohai University
  F. WU, Hohai University
  X. PAN, Hohai University
  Q. CHEN, Hohai University
  S. LIXIA, Hohai University
  C. QIN, Hohai University
  C. CAI, Hohai University
- 14PESGM1052, Parameter Identifiability Analysis of Power System Transient Models Based on Profile Likelihood
  R. CHEN, Tsinghua University
  H. SUN, Tsinghua University
  W. WU, Tsinghua University
  Y. HU, Tsinghua University
  B. ZHANG, Tsinghua University
- 14PESGM1097, Improved Frequency Regulation in Mini-Grids with High Wind Contribution Using Online Genetic Algorithm for PID Tuning
  R. WIES, University of Alaska Fairbanks
  E. CHUKKAPALLI, University of Alaska Fairbanks
  M. MUELLER-STOFFELS, University of Alaska Fairbanks
- 14PESGM1111, Investigating Early Warning Signs of Oscillatory Instability in Simulated Phasor Measurements
  G. GHANAVATI, University of Vermont
  P. HINES, University of Vermont
  T. LAKOBA, University of Vermont
- 14PESGM1224, Implementing a Pressurized Water Reactor Nuclear Power Plant Model into Grid Simulations
  S. ARDA, ASU
  K. HOLBERT, ASU
- 14PESGM1246, Impact of DFIG with Phase Lock Loop Dynamics on Power System Small Signal Stability
  Z. WANG, Tsinghua University
  C. SHEN, Tsinghua University
  F. LIU, Tsinghua University
- 14PESGM1257, Load Frequency Control with Dynamic Demand Control for Deregulated Power System
  Q. ZHU, University of Liverpool
  W. YAO, University of Liverpool
  L. JIANG, University of Liverpool
  C. LUO, Midwest Independent Transmission System Operator Inc. (MISO)
  Q. WU, University of Liverpool
- 14PESGM1319, Stability Analysis of Microgrids with Multiple DER Units and Variable Loads based on MPT
  Y. LI, University of Denver
  W. GAO, University of Denver
  J. JIANG, Beijing Jiaotong University
- 14PESGM1323, Power Smooth Control for DFIG under Extreme Operating Gust
  X. LIU, Hong Kong Polytechnic University
  Z. XU, Hong Kong Polytechnic University
  K. WONG, University of Western Australia
  L. L. LAI, State Grid Energy Research Institute
- 14PESGM1337, Real-Time Digital Simulation Modeling of Single-Phase PV in RT-LAB
  J. KHAZAEI, University of South Florida
  L. PIYASINGHE, University of South Florida
  Z. MIAO, University of South Florida
  L. FAN, University of South Florida
- 14PESGM1373, Design of a Nonlinear Excitation Controller Using Inverse Filtering for Transient Stability Enhancement
  R. GOLDOOST SOLOOT, Queensland University of Technology
  Y. MISHRA, Queensland University of Technology
  G. LEDWICH, Queensland University of Technology

- 14PESGM1507, Grid-Adaptive Equivalencing of Power System for Generator Tripping
  D. MIN, Yonsei University
  K. HUR, Yonsei University
  S. KIM, Korea Electrotechnology Research Institute
- 14PESGM1508, Assessment of Voltage Stability Risks under Intermittent Renewable Generation
  T. ALPCAN, University of Melbourne
  S. SAHA, University of Melbourne
  M. ALDEEN, University of Melbourne
- 14PESGM1558, Small Signal Stability Analysis with High Penetration of Grid-Connected Wind Farm of PMSG Type Considering the Wake Effect
  R. WANG, Tsinghua University
  L. SHI, Tsinghua Univ.
  L. YAO, China Electric Power Research Institute
  Y. NI, Tsinghua University
- 14PESGM1585, Providing Inertial Support from Wind Turbines by Adjusting Phase-Locked Loop Response
  W. HE, Huazhong University of Sci. and Tech.
  X. YUAN, Huazhong University of Sci. and Tech.
  J. HU, Huazhong University of Sci. and Tech.
  X. XIONG, Huazhong University of Sci. and Tech.
  N. CHEN, China Electric Power Research Institute
  L. ZHU, China Electric Power Research Institute
- 14PESGM1634, Impact of Distribution-Connected Large-Scale Wind Turbines on Transmission System Stability during Large Disturbances
  Y. ZHANG, National Renewable Energy Laboratory
  A. ALLEN, National Renewable Energy Laboratory
  B. HODGE, National Renewable Energy Laboratory
- 14PESGM1639, Developing Dynamic Models for the 2030 Eastern Interconnection Grid
  G. KOU, University of Tennessee, Knoxville
  Y. LIU, University of Tennessee, Knoxville
  S. HADLEY, Oak Ridge National Laboratory
  T. KING, Oak Ridge National Laboratory
- 14PESGM1662, A Study on Wind Frequency Control under High Wind Penetration on an NPCC System Model
  Y. LEI, University of Tennessee
  Y. LIU, University of Tennessee
  G. KOU, University of Tennessee
  B. WANG, University of Tennessee
  C. LI, University of Tennessee
  K. SUN, University of Tennessee
  Y. LIU, University of Tennessee
  K. TOMSOVIC, University of Tennessee
  J. CHOW, Rensselaer Polytechnic Institute
- 14PESGM1818, Design of Self-Compensating Power-Flow Controller for Energy Storage System to Enhance Frequency Stability in Islanded Power Systems
  Y. ZHANG, South Dakota School of Mines and Technology
  R. FU, South Dakota School of Mines and Technology
  P. DEVAKOTA, South Dakota School of Mines and Technology
- 14PESGM1970, Frequency Response of the Eastern Interconnection due to Increased Wind Generation
  M. TILL, University of Tennessee
  Y. LIU, University of Tennessee
  Y. LIU, University of Tennessee
  M. PATEL, PJM Interconnection L.L.C.
  T. KING, JR., Oak Ridge National Lab
- 14PESGM1974, Electromechanical Speed Map Development Using FNET/GridEye Frequency Measurements
  P. MARKHAM, Electric Power Research Institute
  Y. LIU, University of Tennessee
- 14PESGM1979, Methods to Establish Input-Output Relationship for System Identification-Based Models
  F. BAI, University of Tennessee at Knoxville
  Y. LIU, University of Tennessee at Knoxville
  Y. LIU, University of Tennessee at Knoxville
  K. SUN, University of Tennessee at Knoxville
  X. WANG, Southwest Jiaotong University
  N. BHATT, Electric Power Research Institute

A. DEL ROSSO, Electric Power Research Institute
E. FARANTATOS, Electric Power Research Institute

- 14PESGM2061, Modeling and Evaluation of the Protection of Distributed Synchronous Generators Connected to Unbalanced Systems
  F. MOURINHO, Universidade Estadual do Oeste do Parana
  J. PESENTE, Universidade Estadual do Oeste do Parana
  R. OTTO, Fundacao Parque Tecnologico Itaipu
  R. RAMOS, Escola de Engenharia de Sao Carlos/USP
- 14PESGM2104, Storage Devices for Automated Frequency Regulation and Stabilization
  N. POPLI, Carnegie Mellon University
  M. ILIC, Carnegie Mellon University
- 14PESGM2119, Dynamic Response of Large Wind Power Plant Affected by Diverse Conditions at Individual Turbines
  M. ELIZONDO, Pacific Northwest National Laboratory
  S. LU, Pacific Northwest National Laboratory
  G. LIN, Pacific Northwest National Laboratory
  S. WANG, Pacific Northwest National Laboratory
- 14PESGM2124, Optimal Locations for Energy Storage Damping Systems in the Western North American Interconnect
  R. BYRNE, Sandia National Laboratories
  D. TRUDNOWKSI, Montana Tech University
  J. NEELY, Sandia National Laboratories
  R. ELLIOTT, Sandia National Laboratories
  D. SCHOENWALD, Sandia National Laboratories
  M. DONNELLY, Montana Tech University
- 14PESGM2210, Intelligent Balancing Authorities (iBAs) for Transient Stabilization of Large Power Systems
  S. BAROS, Carnegie Mellon University
  M. ILIC, Carnegie Mellon University
- 14PESGM2228, Transient Stability Constrained Optimal Power Flow for Cascading Outages
  L. TANG, Iowa State University
  J. MCCALLEY, Iowa State University
- 14PESGM2267, Moving-Horizon Dynamic Power System State Estimation Using Semidefinite Relaxation
  G. WANG, Beijing Institute of Technology
  S. KIM, University of Minnesota
  G. GIANNAKIS, University of Minnesota
- 14PESGM2341, Simulations and Evaluation of FIDVR Using PMU Data
  N. ABED, Southern California Edison
  A. SALAZAR, Southern California Edison
- 14PESGM1755, Transient Stability Analysis of Power System Using Polynomial Lyapunov Function based Approach
  S. MAZUMDER, University of Illinois, Chicago
  E. PILO DE LA FUENTE, University of Illinois, Chicago
- 14PESGM2161, Impact of Increased Photovoltaic Generation on Inter-Area Oscillations in the Western North American Power System
  R. ELLIOTT, Sandia National Laboratories
  R. BYRNE, Sandia National Laboratories
  A. ELLIS, Sandia National Laboratories
  L. GRANT, Missouri University of Science and Technology
- 14PESGM0142, Inclusion of Classic HVDC Links in a PMU-Based State Estimator
  W. LI, KTH Royal Institute of Technology
  L. VANFRETTI, KTH Royal Institute of Technology

PSIM Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Power System Instrumentation and Measurements*
Chair: *F. Rahmatian, Quanta Technology*
Co-Chair: *J. McBride, JMX Services, Inc.*

PAPERS AND AUTHORS:

- 14PESGM0121, A WT Based High Resolution Approach to Quantify Single-Phase Power Components Defined in IEEE STD 1459-2010
  G. MOHAMED, Alexandria University
  N. ABBASY, Alexandria University

- 14PESGM0123, A WT Based High Resolution Approach to Quantify Three-Phase Power Components Defined in IEEE STD 1459-2010
  G. MOHAMED, Alexandria University
  N. ABBASY, Alexandria University
- 14PESGM0246, Uncertainty of Measurement Error in Intelligent Electronic Devices
  P. CHEN, Texas A&M University
  Y. DONG, Electrocon International Inc
  V. MALBASA, Texas A&M University
  M. KEZUNOVIC, Texas A&M University
- 14PESGM0291, Electrical Field Based Wireless Devices for Contactless Power Gird Phasor Measurement
  Y. ZHANG, National Renewable Energy Laboratory
  W. YAO, University of Tennessee
  J. CULLISS, University of Tennessee at Knoxville
  G. ZHANG, Quanta Technology
  Z. TENG, Hunan University
  Y. LIU, University of Tennessee at Knoxville
- 14PESGM0295, Improved WLS-TF Algorithm for Dynamic Synchronized Angle and Frequency Estimation
  L. ZHAN, University of Tennessee, Knoxville
  Y. LIU, University of Tennessee, Knoxville
- 14PESGM0308, Stochastic Noise Removal on Partial Discharge Measurement for Transformer Insulation Diagnosis
  J. CHAN, University of Queensland
  H. MA, University of Queensland
  T. SAHA, University of Queensland
  C. EKANAYAKE, University of Queensland
- 14PESGM0668, Automated Data Acquisition System for Operational Energy Analysis
  E. MILLER, United States Military Academy
  A. ST. LEGER, United States Military Academy
  S. HART, United States Military Academy
- 14PESGM1025, A Verification Experiment for Comparing Digital and Analog Measurements of Time-Varying Harmonics
  T. CARVALHO, CEFET-MG
  V. CUK, Eindhoven University of Technology
  C. DUQUE, UFJF
  P. SILVEIRA, Itajubá Federal University
  M. SEVERO MENDES, UFMG
  P. RIBEIRO, Itajubá Federal University
- 14PESGM1057, Applying Process Immunity Time to Assess Annual Industrial Process Trips
  J. CEBRIAN, University of Sao Paulo
  N. KAGAN, University of Sao Paulo
  J. MILANOVIC, University of Manchester
- 14PESGM1119, Integration of Phase-Locked Loop Based Real-Time Oscillation Tracking in Grid Synchronized Systems
  B. TRENTO, University of Tennessee
  B. WANG, University of Tennessee
  K. SUN, University of Tennessee
  L. TOLBERT, University of Tennessee
- 14PESGM1408, A Comparative Study of Optimal PMU Placement Algorithms for Cost Minimization
  A. DEESE, College of New Jersey
  T. NUGENT, College of New Jersey
  S. COPPI, College of New Jersey
- 14PESGM1654, Identification Algorithm for Siting of Phasor Measurement Units
  P. THOMAS, University of Texas at Austin
  S. RAJAGOLAPAN, Electric Reliability Council of Texas
  B. BLEVINS, Electric Reliability Council of Texas
  S. SANTOSO, University of Texas at Austin
- 14PESGM1999, Synchrophasor Estimation Algorithm Using Legendre Polynomials
  C. QIAN, North China Electric Power University
  T. BI, North China Electric Power University
  J. LI, China EPRI
  H. LIU, North China Electric Power University
  Z. LIU, Shandong Huaguan Smart Card Co., Ltd.

- 14PESGM2014, Implementation and Applications of a Wide Area Frequency Measurement System Synchronized Using Network Time Protocol
  K. SALUNKHE, Indian Institute of Technology, Bombay
  G. GAJJAR, Indian Institute of Technology, Bombay
  S. SOMAN, Indian Institute of Technology, Bombay
  A. KULKARNI, Indian Institute of Technology, Bombay

Power System Operations Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Power System Operations*
Chair: *H. Chen, PJM*

PAPERS AND AUTHORS:

- 14PESGM0041, Integration of Renewable Generation for Frequency Support of HVDC/AC Interconnected Systems under Power Market Scenario
  E. RAKHSHANI, Abengoa
  D. REMON, Abengoa
  A. CANTARELLAS, Abengoa
  K. ROUZBEHI, Technical University of Catalonia (UPC)
  P. RODRIGUEZ, Abengoa
- 14PESGM0057, Redesign of the Automatic Generation Control Scheme in the Swiss Power System
  I. AVRAMIOTIS FALIREAS, Swissgrid Ltd.
  T. HARING, ETH Zurich
  G. ANDERSSON, ETH Zurich
  M. ZIMA, Swissgrid Ltd.
- 14PESGM0104, Dispatch Strategy of Large-Scale Wind Farm Automatic Generation Control System
  X. ZHANG, North China Electric Power University
  Z. XU, North China Electric Power University
  M. IQBA, North China Electric Power University
  Q. YANG, North China Electric Power University
- 14PESGM0264, System Losses Optimization Using HVDC Links in Alberta
  M. HAJIAN, AltaLink
  J. SCHWARTZ, AltaLink
  R. CUI, AltaLink
  N. KSHATRIYA, Alberta Electric System Operator
- 14PESGM0309, Low-Order Robust Damping Controller Design for Large-Scale PV Power Plants
  R. SHAH, University of Queensland, Australia
  N. MITHULANANTHAN, University of Queensland, Australia
  K. LEE, Baylor University
- 14PESGM0344, A Wind Forecast Error Cost Included OPF Model and Its Fast Algorithm
  Y. SUN, North China Electric Power University
  Y. GUO, North China Electric Power University
  R. MAO, North China Electric Power University
  S. MALIK, North China Electric Power University
- 14PESGM0373, Identification of Parallel Flows in Congestion Management with Multiple Electricity Markets
  C. LUO, Midcontinent Independent System Operator, Inc. (MISO)
  Y. HOU, University of Hong Kong
  J. WEN, Huazhong University of Science and Technology
  H. SUN, Huazhong University of Science and Technology
- 14PESGM0375, Energy Storage Control for Peak Shaving in a Single Building
  R. TULL DE SALIS, University of Michigan
  A. CLARKE, University of Michigan
  Z. WANG, University of Michigan
  J. MOYNE, University of Michigan
  D. TILBURY, University of Michigan
- 14PESGM0380, Error Analysis and Believable Bound Selection of Line Loss Comparison in the Distribution Grid
  H. LI, SMEPC
  B. XIE, SMEPC
  Z. YOU, SMEPC
  S. ZHANG, SMEPC

- 14PESGM0508, A System of Systems Engineering Approach for Unit Commitment in Multi-Area Power Markets
  A. KARGARIAN, Mississippi State University
  Y. FU, Mississippi State University
  P. LIU, Mississippi State University
  C. WANG, Mississippi State University
- 14PESGM0510, A Comparative Study of VSC-OPF Techniques for Voltage Security Improvement and Losses Reduction
  T. ZABAIOU, École de Technologie Supérieure (ÉTS)
  L. DESSAINT, École de Technologie Supérieure (ÉTS)
  I. KAMWA, Hydro-Quebec Research Institute (IREQ)
- 14PESGM0558, Influence of Transformer Tap-Changer Control Mode Upon HVDC Valve Power Loss
  Z. ZHAO, NR Electric Co., Ltd.
  W. BIN, NR Electric USA LCC
- 14PESGM0566, Fault Distance Localization Method for Heterogeneous Distribution Networks
  R. MARGUET, University Grenoble Alpes
  B. RAISON, University Grenoble Alpes
- 14PESGM0667, PMU Signal Prioritization for Effective Control Coordination of Load Despatch Centres
  R. PANDEY, Indian Institute of Technology (Banaras Hindu University), Varanasi
  S. ARCHANA, Indian Institute of Technology (BHU)
  K. NAYYAR, Indian Institute of Technology (BHU)
  P. PENTAYYA, Power System Operation Corporation of India (POSOCO)
  C. KUMAR, Power System Operation Corporation of India (POSOCO)
- 14PESGM0684, Water Cost in Electricity Generation: Short Term Operation Planning
  R. NAVARRO, Instituto de Investigaciones Electricas
- 14PESGM0741, Bi-level Linear Programming based Interval Optimization for SCED in the Presence of Wind Power Uncertainty
  T. DING, Tsinghua University
  H. SUN, Tsinghua University
  F. HARLEY, University of Tennessee, Knoxville
  F. LI, University of Tennessee, Knoxville
  R. BO, Midwest Independent Transmission System Operator (Midwest ISO)
- 14PESGM0767, Cluster based Wind-Hyrdo-Thermal Unit Commitment Using GSA Algorithm
  A. SHUKLA, Indian Institute of Technology-Kanpur
  S. SINGH, Indian Institute of Technology-Kanpur
- 14PESGM0796, An Improved Electricity Market Model on Demand Response Considering Distribution Loss Sensitivities
  M. HONG, Case Western Reserve University
  K. LOPARO, Case Western Reserve University
- 14PESGM0799, Inter-Area Power Exchange Preserving Multi-Area Economic Dispatch
  X. LAI, Tsinghua University
  Q. XIA, Tsinghua University
  L. XIE, Texas A&M University
- 14PESGM0818, Online Coordination of Plug-In Electric Vehicle Charging in Smart Grid with Distributed Wind Power Generation Systems
  A. MASOUM, Curtin University
  S. DEILAMI, Curtin University
  M. MASOUM, Curtin University
  A. ABU-SIADA, Curtin University
  S. ISLAM, Curtin University
- 14PESGM0833, Online Estimation of Power System Actual Frequency Response Characteristic
  D. APOSTOLOPOULOU, University of Illinois at Urbana-Champaign
  A. DOMINGUEZ-GARCIA, University of Illinois at Urbana-Champaign
  P. SAUER, University of Illinois at Urbana-Champaign
- 14PESGM0901, Optimal Design of an Isolated Photovoltaic-Diesel-Battery Hybrid System by Using an Iterative Algorithm
  N. LUU, Grenoble University; CEA Ines
  Q. TRAN, CEA Ines
  S. BACHA, Grenoble University
  B. NGUYEN, DANAVTC
- 14PESGM0906, Sensitivity-Based Dispatch of DG for Voltage Control
  S. ABBOTT, Queen's University of Belfast
  B. FOX, Queen's University of Belfast
  D. MORROW, Queen's University of Belfast

- 14PESGM0907, Intra-Plant Reactive Power–Voltage Control: Practices, Drawbacks and Challenges
  J. DRAGOSAVAC, Electrical Engineering Institute Nikola Tesla
  Ž. JANDA, Electrical Engineering Institute Nikola Tesla
  D. ARNAUTOVIC, Electrical Engineering Institute Nikola Tesla
  S. AWADALLAH, University of Manchester
  J. MILANOVIC, University of Manchester
- 14PESGM0914, A Decentralized Optimization Method to Track Electric Vehicle Aggregator's Optimal Charging Plan
  Z. LI, Tsinghua University
  Q. GUO, Tsinghua University
  H. SUN, Tsinghua University
  S. XIN, Tsinghua University
- 14PESGM0942, Optimal Location of Series FACTS to Improve the Performance of Power System with Wind Penetration
  A. ABDELAZIZ, Ain Shams University
  M. EL-SHARKAWY, Ain Shams University
  M. ATTIA, Ain Shams University
  E. EL-SAADANY, University of Waterloo
- 14PESGM0965, Short-Circuit Current Limiting for Ring Distributed Power System Integrated with Multiple Sources
  X. LIU, Wuhan University
  H. CHEN, Wuhan University
  Y. TAO, Wuhan University
  C. CHEN, Wuhan University
  Q. HU, Wuhan University
- 14PESGM0985, On the Value of Storage at Consumer Locations
  Y. XU, Singapore University of Technology and Design
  L. TONG, Cornell University
- 14PESGM1138, Operating Reserves with Flexible Loading in Electricity Market
  Y. TAO, Ventyx, an ABB Company
- 14PESGM1150, Application of a Novel Stability Control System for Coordination of Power Flow Control Devices in the Future GB Transmission System
  S. KHALEGHI KERAHROUDI, Brunel University / National Grid
  P. TAYLOR, Brunel Institute of Power Systems (BIPS)
  D. LI, National Grid
  D. BRADLEY, National Grid
- 14PESGM1185, Determining Maximum Photovoltaic Penetration in a Distribution Grid Considering Grid Operation Limits
  R. AHMADI KORDKHEILI, Aalborg University
  B. BAK-JENSEN, Aalborg University
  J. R.PILLAI, Aalborg University
  P. MAHAT, Aalborg University
- 14PESGM1215, Modeling, Operation and Control of Wind Turbine with Direct Drive PMSG Connected to Power Grid
  R. ABEDI, Baylor University
  K. LEE, Baylor University
- 14PESGM1264, Power System Dispatch with Wind Power Integrated Using Mean-Variance Model and Group Search Optimizer
  Y. LI, South China University of Technology
  M. LI, South China University of Technology
  B. WEN, China Southern Power Grid
  Q. WU, South China University of Technology
- 14PESGM1309, An On-line Generation Dispatching Algorithm to Improve Small Signal Stability
  Z. YU, China Electric Power Research Institute
  F. LI, China Electric Power Research Institute
  L. SUN, China Electric Power Research Institute
  X. ZHOU, China Electric Power Research Institute
  P. ZENG, China Electric Power Research Institute
  B. LI, China Electric Power Research Institute
- 14PESGM1310, Impact of Super-Cyclone Phailin on Power System Operation – Defense Mechanism and Lesson Learned
  S. MUKHOPADHYAY, GTBIT, GGSIP University
  S. SOONEE, POSOCO, POWERGRID
  V. AGRAWAL, POSOCO, POWERGRID
  S. NARASIMHAN, POSOCO, POWERGRID
  S. SAXENA, POSOCO, POWERGRID

- 14PESGM1317, Optimal Regulation Provision by Aluminum Smelters
  X. ZHANG, Carnegie Mellon University
  G. HUG, Carnegie Mellon University
- 14PESGM1332, Solution Quality Analysis on Predictive Economic Dispatch with Time
  D. CHEN, Siemens
  L. WANG, Siemens
  S. KUMAR, Siemens
- 14PESGM1364, Piecewise Affine Dispatch Policies for the Economic Dispatch Problem Under Uncertainty
  D. MUNOZ-ALVAREZ, Cornell University
  E. BITAR, Cornell University
  L. TONG, Cornell University
  J. WANG, Argonne National Laboratory
- 14PESGM1366, Performance-Based Regulation Model in PJM Wholesale Markets
  Y. XIAO, Alstom Grid
  Q. SU, Alstom Grid Inc.
  F. BRESLER, PJM Interconnection, L.L.C.
  R. CARROLL, PJM Interconnection, L.L.C
  J. SCHMITT, PJM Interconnection, L.L.C.
  M. OLALEYE, PJM Interconnection, L.L.C.
- 14PESGM1371, Valuation and Allocation of Spinning Reserve Considering Power Network Constraints
  K. WANG, Shandong University
  X. CHU, Shandong University
  W. ZHANG, Shandong University
- 14PESGM1458, Wide Area Synchrophasor Measurements based Transient Stability Assessment and Emergency Control
  S. SIDDIQUI, Malaviya National Institute of Technology
  K. VERMA, Malaviya National Institute of Technology
  K. NIAZI, Malaviya National Institute of Technology
  M. FOZDAR, Malaviya National Institute of Technology
- 14PESGM1471, Dynamic Modeling of Electric Vehicle Movable Loads based on Driving Pattern Analysis
  D. TANG, Nanyang Technological University
  P. WANG, Nanyang Technological University
- 14PESGM1485, Posicast Control – A Novel Approach to Mitigate Multi-Machine Power System Oscillations in Presence of Wind Farm
  H. GHORBANI, UPC. Universitat Politècnica de Catalunya, Barcelona Tech.
  J. CANDELA, UPC. Universitat Politècnica de Catalunya, Barcelona Tech.
  A. LUNA, UPC. Universitat Politècnica de Catalunya, Barcelona Tech.
  P. RODRIGUEZ, UPC. Universitat Politècnica de Catalunya, Barcelona Tech.
- 14PESGM1535, Constructing Breaker Sequence based System Restoration Strategy with Graph Theory
  C. PENG, University of Hong Kong
  Y. HOU, University of Hong Kong
  C. WANG, University of Hong Kong
  Z. QIN, University of Hong Kong
- 14PESGM1542, A Multi-Time Scale Reactive Power Coordinated Control Strategy Based on Continuous and Discrete VAR Sources
  P. GUO, North China Electric Power University
  W. LIU, North China Electric Power University
  W. ZHENG, Gansu Electric Power Research Institute
  C. LIANG, Gansu Electric Power Research Institute
  J. ZHENG, Gansu Electric Power Research Institute
- 14PESGM1567, A Localized Synchrophasor Measurement System
  P. ZHAO, ONCOR
  C. WELDY, ONCOR
  D. BOGEN, ONCOR
- 14PESGM1574, Optimal Spinning Reserve Capacity in Power System with Wind Uncertainties
  Y. YANG, Training Center of Hunan Electric Power Corp.
  Z. WEN, Training Center of Hunan Electric Power Corp.
  S. XU, Changsha Power Bureau of Hunan Electric Power Corp.
  X. TANG, Training Center of Hunan Electric Power Corp.
  M. YANG, Training Center of Hunan Electric Power Corp.
  K. SUN, Training Center of Hunan Electric Power Corp.
- 14PESGM1579, STATCOM Control for Integration of Wind Farm to the Weak Grid
  C. XIA, University of Hong Kong
  H. YUNHE, University of Hong Kong

- 14PESGM1596, A Systematic Comparison of Operating Reserve Methodologies
  E. IBANEZ, National Renewable Energy Laboratory
  I. KRAD, National Renewable Energy Laboratory
  E. ELA, National Renewable Energy Laboratory
- 14PESGM1610, A Disturbance Diagnosis System for Real Time Response
  F. DA SILVA ANTUNES, Cemig Generation and Transmission
  P. DA SILVEIRA, UNIFEI – Federal University of Itajubá
  P. RIBEIRO, UNIFEI – Federal University of Itajubá
- 14PESGM1612, The Impact of Synchronized Human Activities on Power System Frequency
  Y. LEI, University of Tennessee
  Y. ZHANG, University of Tennessee
  J. GUO, University of Tennessee
  D. ZHOU, University of Tennessee
  J. CULLISS, University of Tennessee
  P. IRMINGER, University of Tennessee
  Y. LIU, University of Tennessee
- 14PESGM1640, Data Sensitivities for Variable Renewable Energy Curtailment Estimation
  J. DILLON, University College Dublin
  M. O'MALLEY, University College Dublin
- 14PESGM1641, On Battery Storage System for Load Pickup in Power System Restoration
  N. KADEL, South Dakota State University
  W. SUN, South Dakota State University
  Q. ZHOU, Independent Consultant
- 14PESGM1648, Multi-Scene Security Constrained Economic Dispatch with Rational Wind Power Curtailment in Micro-Grid
  X. SHEN, Tsinghua University
  J. ZHENG, Tsinghua University
  S. ZHU, Tsinghua University
  X. WANG, Carleton University
- 14PESGM1689, Frequency-Based Real-Time Line Trip Detection and Alarm Trigger Development
  D. ZHOU, University of Tennessee, Knoxville
  Y. LIU, University of Tennessee, Knoxville
  J. DONG, National Grid
- 14PESGM1690, Detection of Vulnerable Relays and Senstive Controllers under Cascading Events Based on Performance Indices
  Z. LIU, Aalborg University
  Z. CHEN, Aalborg University
  Y. HU, Glyndwr University

* 14PESGM1692, Day-Ahead Corrective Transmission Topology Control
  M. ABDI KHORSAND, Arizona State University
  K. HEDMAN, Arizona State University

- 14PESGM1706, Ramp Requirement Design for Reliable and Efficient Integration of Renewable Energy
  C. WANG, University of Connecticut
  P. LUH, University of Connecticut
  N. NAVID, MISO
- 14PESGM1725, Distributed Storage Operation in Distribution Network with Stochastic Renewable Generation
  T. CHU, Stanford University
  J. QIN, Stanford University
  J. WEI, Stanford University
- 14PESGM1726, Research on Voltage Stability Region Tangent Plane of Power System with Doubly-Fed Induction Generator Wind Farm
  Z. QIN, Changsha University of Science and Technology
  R. MA, Changsha University of Science and Technology
- 14PESGM1829, Implementation of ROSE for On-line Voltage Stability Analysis at ISO New England
  S. MASLENNIKOV, ISO New England
  E. LITVINOV, ISO New England
  M. VAIMAN, V&R Energy
  M. VAIMAN, V&R Energy
- 14PESGM1832, LVRT Capability Assessment of FSIG-based Wind Turbine Utilizing UPQC and SFCL
  A. MOGHADASI, FIU
  A. ISLAM, FIU
  M. AMINI, FIU

- 14PESGM1880, A Distributed Control Scheme for Voltage Regulation in DC Distribution Systems
  A. HAMAD, University of Waterloo
  H. FARAG, York University
  E. EL SAADANY, University of Waterloo
- 14PESGM1888, Thyristor-Controlled Switch Capacitor Placement in Large-Scale Power Systems via Mixed Integer Linear Programming and Taylor Series Expansion
  O. ZIAEE, University of Nebraska Lincoln
  F. CHOOBINEH, University of Nebraska Lincoln
- 14PESGM1922, An LFB-based Algorithm for Fast Recovery of a Power System from Contingencies
  Y. TOHIDI, KTH Royal Institute of Technology
  A. SAFDARIAN, Sharif University of Technology
  M. HESAMZADEH, KTH Royal Institute of Technology
- 14PESGM1923, Influence of Distribution Line Asymmetry on Power Flow Results
  I. DZAFIC, Siemens AG
  E. HALILOVIC, SSST
  R. JABR, American University of Beirut
  B. PAL, Imperial College
  D. ABLAKOVIC, Siemens AG
- 14PESGM1924, A Stochastic SOCP Optimal Power Flow with Wind Power Uncertainties
  M. BARADAR, KTH Royal Institute of Technology
  M. HESAMZADEH, KTH Royal Institute of Technology
- 14PESGM1966, Novel Load Frequency Control Approach based on Virtual Area Error in a Microgrid Including PV and Battery
  F. DOOST MOHAMMADI, West Virginia University
  M. GHORBANI, West Virginia University
  A. FELIACHI, West Virginia University
  M. CHOUDHRY, West Virginia University
- 14PESGM1987, Impact of Employing State Estimation of Distribution Networks on State Estimation of Transmission Networks
  A. ALIMARDANI, University of British Columbia
  S. ZADKHAST, University of British Columbia
  F. THERRIEN, University of British Columbia
  J. JATSKEVICH, University of British Columbia
  E. VAAHEDI, BC Hydro
- 14PESGM1994, Security Constrained Day-Ahead Microgrid Island Scheduling with Battery Storage Control
  M. JIN, Alstom Grid Inc.
  X. WANG, Alstom Grid Inc.
  X. YU, Alstom Grid Inc.
- 14PESGM2003, Experience in Distribution State Estimation Preparation and Operation in Complex Radial Distribution Networks
  D. ABLAKOVIC, Siemens AG
  I. DZAFIC, Siemens AG
  R. JABR, American University of Beirut
  B. PAL, Imperial College
- 14PESGM2031, Provision of Flexibility at High Wind Penetration Levels Using Modern Storage Heater Load
  H. QAZI, University College Dublin
  D. FLYNN, University College Dublin
- 14PESGM2105, A Distributed Power System State Estimator Incorporating Linear and Nonlinear Areas
  Y. GUO, Tsinghua University
  W. WU, Tsinghua University
  Z. WANG, Harbin Institute of Technology
  B. ZHANG, Tsinghua University
  H. SUN, Tsinghua University
- 14PESGM2130, Modeling MW-Dependent Ramp Rate in the Electricity Market
  H. SONG, ISO New England
  T. ZHENG, ISO New England
  H. LIU, ALSTOM Grid Inc.
  H. ZHANG, ALSTOM Grid Inc.
- 14PESGM2186, Optimal Economic Power Dispatch in the Presence of Intermittent Renewable Energy Sources
  S. ELSAIAH, MSU
  M. BENIDRIS, Michigan State University
  J. MITRA, Michigan State University
  N. CAI, Michigan State University

- 14PESGM2279, Construction of Multiband Uncertainty Set for Building Energy Management with Uncertain Loads and Solar Power
  P. LIU, Mississippi State University
  Y. FU, Mississippi State University
- 14PESGM2286, An Operating Reserve Risk Map for Quantifiable Reliability Performances in Renewable Power Systems
  M. MODARRESI, Texas A&M University
  L. XIE, Texas A&M University
- 14PESGM0704, A Novel Approach for Reconfiguring Distribution System and Its Sensitivity Analysis
  F. DING, Case Western Reserve University
  K. LOPARO, Case Western Reserve University

Planning and Implementation Posters *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

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

PAPERS AND AUTHORS:

- 14PESGM0211, Electrical Load Profile Analysis and Peak Load Assessment Using Clustering Technique
  D. SHARMA, IIT Kanpur
  S. SINGH, IIT Kanpur
- 14PESGM0282, A Model for the Effect of Aggregation on Short Term Load Forecasting
  R. SEVLIAN, Stanford University
  R. RAJAGOPAL, Stanford University
- 14PESGM0405, Impact of Electric Vehicles on LV Feeder Voltages
  Y. LI, University of Manchester
  P. CORSSLEY, University of Manchester
- 14PESGM0641, Mixed-Integer Convex Model for VAr Expansion PLanning
  J. LÓPEZ, Sao Paulo State University – UNESP
  J. MANTOVANI, Sao Paulo State University – UNESP
  J. CONTRERAS, Universidad de Castilla – La Mancha
- 14PESGM0650, Analysis of Upstream Gas Network Constraints for Power Generation in Queensland
  R. ZENG, University of Queensland
  D. CHATTOPADHYAY, University of Queensland
  T. SAHA, University of Queensland
- 14PESGM0673, Offshore Wind Delivery System Technology Assessments and Performance Evaluation
  S. LIU, ABB, Inc.
  J. DANIEL, ABB, Inc.
  J. PAN, ABB, Inc.
- 14PESGM0884, Performance of Mixed Integer Non-Linear Programming and Improved Harmony Search for Optimal Placement of DG Units
  S. KAUR, Indian Institute of Technology
  G. KUMBHAR, Indian Institute of Technology
  J. SHARMA, Indian Institute of Technology
- 14PESGM0892, A Method for Forecasting the Spatial and Temporal Distribution of PEV Charging Load
  H. ZHANG, Tsinghua University
  W. TANG, State Grid
  Z. HU, Tsinghua University
  Y. SONG, Tsinghua University
  Z. XU, Tsinghua University
  L. WANG, State Grid
- 14PESGM1081, The Sensitivity of Vehicle-to-Grid Revenues to Plug-In Electric Vehicle Battery Size and EVSE Power Rating
  C. HARRIS, University of Texas at Austin
  M. WEBBER, University of Texas at Austin
- 14PESGM1166, A Bi-Level Programming Method for Transmission Planning with Large-Scale Intermittent Generations Considering Stochastic Optimal Power Flow
  L. GAN, North China Electric Power University
  G. LI, North China Electric Power University

M. ZHOU, North China Electric Power University
H. LI, State Power Economic Research Institute
Z. WANG, State Power Economic Research Institute

- 14PESGM1260, EV Charging Analysis Based on the National Travel Surveys of the Nordic Area
  Z. LIU, Technical University of Denmark
  Q. WU, Technical University of Denmark
- 14PESGM1307, Development of Time-of-Use Price by Clustering Techniques
  R. LI, University of Bath
  Z. WANG, University of Bath
  S. LE BLOND, University of Bath
  F. LI, University of Bath
- 14PESGM1335, Autonomous Electric Vehicle Charging Management over Real Time Digital Simulator
  G. ASIM AKHTAR, King Fahd University of Petroleum & Minerals
  A. AL-AWAMI, King Fahd University of Petroleum & Minerals
  E. SORTOMME, Alstom Grid
  M. ABIDO, King Fahd University of Petroleum & Minerals
  M. WAQAR AHMED, King Fahd University of Petroleum & Minerals
- 14PESGM1336, On the Solution Variability Reduction of Stochastic Dual Dynamic Programming Applied to Energy Planning
  M. SOARES, PUC-Rio
  A. STREET, PUC-Rio
  D. VALADÃO, PUC-Rio
- 14PESGM1350, Prioritization of Underground Transmission Cable Renewal Projects in Power Electric Utility Companies
  K. WONG, Hydro One Networks Inc.
- 14PESGM1362, Generation Capacity Expansion Planning Under Demand Uncertainty Using Stochastic Mixed-Integer Programming
  W. GANDULFO, UTFSM
  E. GIL, UTFSM
  I. ARAVENA, UTFSM
- 14PESGM1382, Assessing the Influence of Climatic Variables on Electricity Demand
  D. VU, University of Wollongong
  K. MUTTAQI, University of Wollongong
  A. AGALGAONKAR, University of Wollongong
- 14PESGM1426, Grid-Connected Wind Power Capacity Optimization Based on the Principle of Maximum Entropy
  Q. BIAN, Zhejiang University
  Q. XU, Zhejiang Power Economic Research Institute of State Grid
  L. SUN, Zhejiang Power Economic Research Institute of State Grid
  L. ZHANG, Zhejiang University
  H. WU, Zhejiang University
  H. XIN, Zhejiang University
- 14PESGM1487, Reducing Grid Losses and Voltage Unbalance with PV Inverters
  S. WECKX, KULeuven/Vito
  C. GONZALEZ, KULeuven
  J. DRIESEN, KULeuven
- 14PESGM1505, A Novel Method for Optimal Life Cycle Management Scheme with Markov Model
  C. WANG, University of Hong Kong
  Y. HOU, University of Hong Kong
- 14PESGM1687, Optimal Planning of Parking Lots and DLC Programs of Demand Response for Enhancing Distribution Networks Reliability
  S. PAZOUKI, Islamic Azad University
  A. MOHSENZADEH, Tarbiat Modares University of Tehran
  M. HAGHIFAM, Tarbiat Modares University
- 14PESGM1735, Anti-Disaster Transmission Expansion Planning Considering Wind Power Integration Using Ordinal Optimization
  Q. XU, Tsinghua University
  C. KANG, Tsinghua University
  Q. XIA, Tsinghua University
  D. HE, Georgia Institute of Technology
  R. HARLEY, Georgia Institute of Technology
  J. BAI, State Grid Corporation of China
  Z. WANG, State Grid Corporation of China
  H. LI, State Grid Corporation of China
  X. TIAN, State Grid Corporation of China

- 14PESGM1763, Uncertainty Reduction in Power Generation Forecast Using Coupled Wavelet-ARIMA
  Z. HOU, Pacific Northwest National Laboratory
  P. ETINGOV, Pacific Northwest National Laboratory
  Y. MAKAROV, Pacific Northwest National Laboratory
  N. SAMAAN, Pacific Northwest National Laboratory
- 14PESGM1877, Impact of PEV Penetration on Distribution System Planning Considering Time-of-Use Electricity Prices
  A. BIN HUMAYD, University of Waterloo
  K. BHATTACHARYA, University of Waterloo
- 14PESGM1902, Reactive Power Planning with Uncertainties in Load/Generation Specifications
  P. BIJWE, Indian Institute of Technology
  A. VERMA, Indian Institute of Technology
  Y. PRAKASH, Power Grid Corporation Limited
- 14PESGM1965, Time Series Outlier Detection and Imputation
  H. AKOUEMO, Marquette University
  R. POVINELLI, Marquette University
- 14PESGM1985, An Efficient Forward-Backward Algorithm to MSDEPP Including Batteries and Voltage Control Devices
  A. ABEYGUNAWARDANA, Queensland University of Technology
  A. AREFI, Queensland University of Technology
  G. LEDWICH, Queensland University of Technology
- 14PESGM2181, The Investment Allocation of the Distribution System Optimization Based on an Improved PSO
  C. WANG, Shanghai Jiaotong University
- 14PESGM2261, An Economic-Based Cyber-Security Framework for Identifying Critical Assets
  J. YAN, MISO
  R. BO, Midwest ISO
  M. NI, State Grid Electric Power Research Institute of China
- 14PESGM2266, Optimal Generation Planning to Improve Storage Cost and System Conditions
  H. ABURUB, Wichita State University
  W. JEWELL, Wichita State University
- 14PESGM2274, Impacts of Classified Electric Vehicle Charging Derived from Driving Patterns to the LV Distribution Network
  F. YI, University of Bath, UK
  Z. PINGLIANG, China Electric Power Research Institute
  S. YU, China Electric Power Research Institute
  C. GU, China Electric Power Research Institute
  J. LI, China Electric Power Research Institute
  C. YUAN, China Electric Power Research Institute
  F. LI, University of Bath, UK
- 14PESGM2275, Wind Power Scenario Generation for Stochastic Wind Power Generation and Transmission Expansion Planning
  D. LEE, University of Texas at Austin
  J. LEE, Korea Naval Academy
  R. BALDICK, University of Texas at Austin
- 14PESGM2335, Available Transfer Capability of Photovoltaic Generation Incorporated System
  X. FANG, University of Tennessee
  F. LI, University of Tennessee
  N. GAO, SMEPC
  Q. GUO, China EPRI

PSR Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Power System Relaying*
Chair: *M. McDonald, Ameren Services*

PAPERS AND AUTHORS:

- 14PESGM0378, Performance Analysis of Flux-Lock Type SFCL Influenced by Characteristics of Two Coils
  Y. ZHAO, University of Queensland
  O. KRAUSE, University of Queensland
  T. SAHA, University of Queensland
  Y. LI, Hunan University

- 14PESGM0445, A TDQ-Based Fault Detector for Digital Power System Relaying
  F. LOPES, Federal University of Campina Grande
  W. NEVES, Federal University of Campina Grande
  D. FERNANDES JR., Federal University of Campina Grande
- 14PESGM0614, Study on a Mal-Operation Case of Differential Protection due to the Interaction between Magnetizing Inrush and Sympathetic Inrush
  H. SHEN, North China Electric Power University
  T. ZHENG, North China Electric Power University
  S. HUANG, North China Electric Power University
  O. LI, North China Electric Power University
- 14PESGM0632, Modelling and Simulation of a Protection Scheme for a Synchronous Generator Wind Power Plant
  M. MOHAPI, University of Cape Town, Cape Town
  C. BUQUE, University of Cape Town, Cape Town
  S. CHOWDHURY, University of Cape Town, Cape Town
- 14PESGM0987, Improved Superimposed Current Phase Selector of Wind Farm with Crowbar System
  T. HUANG, Southeast University
  Y. LU, Southeast University
- 14PESGM1064, Power Differential Protection of a DC-AC Converter Using Tellegen's Theorem
  K. YASO, Kyoto University
  T. HISAKADO, Kyoto University
  O. WADA, Kyoto University
  S. TANAKA, Toshiba Corporation
  A. FUKU, Toshiba Corporation
  W. FUJITA, Toshiba Corporation
- 14PESGM1122, Methodology for Modeling Overcurrent Relays with Non-Standard Curves by Using Logarithmic-Linear Correction
  D. NEGRAO, University of Sao Paulo
  J. VIEIRA, University of Sao Paulo
  S. APARECIDO DE SOUZA, Companhia de Transmissão de Energia Elétrica Paulista
- 14PESGM1313, Sensitivity and Stability Analysis of Loss of Main Protection in Active Distribution Networks
  M. HAIRI, University of Manchester
  H. LI, University of Manchester
- 14PESGM1484, Traveling Waves Based Fault Forecast for Feeders in Power Distribution System
  S. SHI, State Key Lab. of Power System
  X. DONG, State Key Lab. of Power System
- 14PESGM1537, Wavelet Transform Based Discrimination Between Inrush and Internal Fault of Indirect Symmetrical Phase Shift Transformer
  S. BHASKER, IIT, Roorkee
  M. TRIPATHY, IIT, Roorkee
  V. SAXENA, IIT, Roorkee
- 14PESGM1565, Studies on Fault Analysis and Protection Configuration Schemes in an Isolated Micro-Grid
  X. WANG, Inner Mongolia Power (Group) Co., Ltd.
  J. QI, Inner Mongolia Power (Group) Co., Ltd.
  Y. HOU, Inner Mongolia Power (Group) Co., Ltd.
  Y. WANG, Xi'an Jiaotong University
  W. XU, Xi'an Jiaotong University
  D. WANG, Xi'an Jiaotong University
  Z. JIAO, Xi'an Jiaotong University
- 14PESGM1669, Fault Application System Design for a 25kV Distribution Test Feeder
  H. CHEEMA, McGill University
  C. ABBEY, Hydro Quebec
  Y. BRISSETTE, Hydro Quebec
  G. JOOS, McGill University
- 14PESGM1819, A New Method for Mitigation of Power Oscillations with Fast Reclosing of Transmission Lines based on SIME
  B. KEYVANI, University of Tehran
  M. KARBALAYE ZADEH, NTNU
  H. LESANI, University of Tehran
- 14PESGM1944, Benefits of CCVT Secondary Voltage Compensation on Traveling Wave-Based Fault Locators
  R. BAINY, UNIOESTE
  F. LOPES, UFCG
  W. NEVES, UFCG

- 14PESGM2059, Differential Protection of Power Transformers Using the Wavelet Transform
  R. MEDEIROS, Federal University of Rio Grande do Norte
  F. COSTA, Federal University of Rio Grande do Norte
  J. FERNANDES, Federal University of Rio Grande do Norte
- 14PESGM2298, Simulation and Detection of Open Phase for Generating Station Auxiliary Three Phase Transformers
  N. ABED, Southern California Edison
  F. ASHRAFI, Southern California Edison
  K. CHANG, Southern California Edison

PSACE Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *PSACE*
Chair: *K. Schneider, Pacific Northwest National Laboratory*

PAPERS AND AUTHORS:

- 14PESGM0036, A SIPSS-Lasso-BPNN Scheme for Online Voltage Stability Assessment
  S. LIU, Zhejiang University
  Z. XU, Zhejiang University
  G. TANG, Zhejiang University
  Z. ZHANG, Zhejiang University
  F. XU, Zhejiang University
  C. WU, Yunnan Power Grid Corporation
  L. LI, Yunnan Power Grid Corporation
  B. ZHAO, Yunnan Power Grid Corporation
- 14PESGM0038, Life Cycle Assessment of Energy Consumption and CO_2 Emission for Transmission System
  Y. SUN, Tsinghua University
  C. KANG, Tsinghua University
  X. DONG, Tsinghua University
  X. NIU, State Grid Shandong Power Economic Research Institute
  X. TIAN, State Grid Shandong Power Economic Research Institute
  H. YAN, China Electric Power Research Institute
- 14PESGM0126, Capacity Credit Evaluation of Solar Power Plants
  S. SAMADI, Texas A&M University
  C. SINGH, Texas A&M University
- 14PESGM0131, A Knowledge-Based Fault Diagnosis Platform in Smart Grid: A Conceptual Design
  Z. WANG, IBM Research – China
  F. GAO, IBM Research – China
  X. LV, IBM Research – China
  W. YIN, IBM Research – China
  J. DONG, IBM Research – China
- 14PESGM0136, Power System State Forecasting Using Fuzzy-Viterbi Algorithm
  H. LIVANI, Virginia Tech
  S. JAFARZADEH, California State University, Bakerfield
  M. FADALI, University of Nevada, Reno
  C. EVRENOSOGLU, Virginia Tech
- 14PESGM0148, Usage of Artificial Neural Networks for Pseudo Measurement Modeling in Low Voltage Distribution Systems
  A. ABDEL-MAJEED, University of Stuttgart
  C. KATTMANN, University of Stuttgart
  S. TENOHLEN, University of Stuttgart
  R. SAUR, Technical University Delft
- 14PESGM0232, Performance Metrics for Assessment of Distribution System Protection Schemes
  U. SINGH, North Carolina State University
  M. BARAN, North Carolina State University
  D. LUBKEMAN, North Carolina State University
- 14PESGM0237, Waste Heat Recovery: A Risk Management Strategy for Wind Farms and Compressed Energy Storage Plants
  G. DOLUWEERA, University of Calgary
  H. SAFAEI, Harvard University
- 14PESGM0274, A Framework for Transmission-Related Applications of Energy Storage Systems for Wind Power Integration
  M. GHOFRANI, University of Washington, Bothell
  A. ARABALI, University of Nevada, Reno
  M. GHAYEKHLOO

- 14PESGM0299, Analysis of Linear Loss Models – A New Zealand Perspective
  B. CHAKRABARTI, Transpower NZ Limited
  D. GOODWIN, Transpower NZ Limited
  R. RAYUDU, Victoria University of Wellington
- 14PESGM0321, Optimal Intra-Day Coordination of Wind Farm and Pumped-Hydro-Storage Plant
  H. DING, Tsinghua University
  Z. HU, Tsinghua University
  Y. SONG, Tsinghua University
- 14PESGM0359, Using Twitter to Detect and Characterize Electrical Power Disturbances
  R. D'AMORE, MITRE Corporation
  E. CASE, MITRE Corporation
  N. DONNANGELO, MITRE Corporation
  M. FULK, MITRE Corporation
  T. KILEY, MITRE Corporation
  C. HAGER, MITRE Corporation
  J. BALLO, MITRE Corporation
  M. COHEN, MITRE Corporation
- 14PESGM0366, An Optimal Approach for Smart Grid Economic Dispatch
  J. ZHU, Alstom Grid Inc.
- 14PESGM0383, A Dynamic Economic Dispatch Method Considering with the Uncertainty and Correlation of Wind Power
  D. LIU, China Electric Power Research Institute
  J. GUO, China Electric Power Research Institute
  W. WANG, China Electric Power Research Institute
  C. LIU, China Electric Power Research Institute
  Y. HUANG, China Electric Power Research Institute
  M. O'MALLEY, University College Dublin
- 14PESGM0385, Remuneration Structure Definition for Distributed Generation Units and Demand Response Participants Aggregation
  P. FARIA, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
- 14PESGM0402, Heuristic Dynamic Programming for Neural Network Vector Control of a Grid-Connected Converter
  X. FU, University of Alabama
  S. LI, University of Alabama
- 14PESGM0423, Effects of Dependent and Common Mode Outages on the Reliability of Bulk Electric System – Part I: Basic Concepts
  M. PAPIC, Idaho Power
  S. AGARWAL, General Reliability
  J. BIAN, NERC
  R. BILLINTON, University of Saskatchewan
  C. DENT, Durham University
  I. DOBSON, Iowa State University
  P. JIRUTITIJAROEN, National University of Singapore
  W. LI, BC Hydro
  T. MENTEN, Consultant
  J. MITRA, Michigan State University
  A. SCHNEIDER, Quanta Technology
  C. SINGH, Texas A & M University
  V. VADLAMUDI, NTNU
- 14PESGM0424, Effects of Dependent and Common Mode Outages on the Reliability of Bulk Electric System – Part II: Outage Data Analysis
  M. PAPIC, Idaho Power
  S. AGARWAL, General Reliability
  J. BIAN, NERC
  R. BILLINTON, University of Saskatchewan
  C. DENT, Durham University
  I. DOBSON, Iowa State University
  P. JIRUTITIJAROEN, National University of Singapore
  W. LI, BC Hydro
  T. MENTEN, Consultant
  J. MITRA, Michigan State University
  A. SCHNEIDER, Quanta Technology
  C. SINGH, Texas A & M University
  V. VADLAMUDI, NTNU

- 14PESGM0530, Distributed Power Flow Analysis for Hybrid AC/HVDC Grids by Network Decomposition
  J. LIU, ABB Inc.
  X. FENG, ABB Inc.
  B. BERGGREN, ABB Inc.
  I. SEGERQVIST, ABB Inc.
  M. CALLAVIK, ABB Inc.
- 14PESGM0551, Voltage and Power Management in a Microgrid System with Diesel Generator and Energy Storage
  M. NEGNEVITSKY, University of Tasmania
  O. HARUNI, University of Tasmania
  P. MILBOURNE, Aurora Energy
  J. O'FLAHERTY, Aurora Energy
  D. CAPECE, Aurora Energy
  T. NGUYEN, Aurora Energy
- 14PESGM0577, PV Interconnection Risk Analysis through Distribution System Impact Signatures and Feeder Zones
  M. RENO, Georgia Institute of Technology
  K. COOGAN, Georgia Institute of Technology
  S. GRIJALVA, Georgia Institute of Technology
  R. BRODERICK, Sandia National Laboratories
  J. QUIROZ, Sandia National Laboratories
- 14PESGM0589, Estimating the Rate of Battery Degradation Under a Stationary Markov Operating Policy
  J. DONADEE, Carnegie Mellon University
  M. ILIC, Carnegie Mellon University
- 14PESGM0707, Realistic Traffic Scenarios Using a Census Methodology: Vila Real Case Study
  J. SOARES, Polytechnic of Porto
  C. LOBO, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
  P. OLIVEIRA, UTAD University
- 14PESGM0739, Prediction and Prevention of Cascading Outages in Idaho Power Network
  M. PAPIC, Idaho Power
  O. CINIGLIO, Idaho Power
- 14PESGM0819, Impact Analysis of Entergy-MISO Integration on Power System Economics
  J. LIN, PJM Interconnection
- 14PESGM0835, A New Point Estimate Method for Probabilistic Load Flow With Correlated Variables Including Wind Farms
  C. CHEN, Tsinghua University
  W. WU, Tsinghua University
  B. ZHANG, Tsinghua University
  C. SINGH, Texas A&M University
- 14PESGM0850, A Method for Fast Mining Abnormal State Information of Power Equipment Base On Time Series Analysis
  Y. YAN, Shanghai Jiaotong University
  G. SHENG, Shanghai Jiaotong University
  Y. LIU, Shanghai Jiaotong University
  X. JIANG, Shanghai Jiaotong University
  X. SUN, Liaocheng Power Supply Company
  Y. SUN, Shandong Electric Power Company
- 14PESGM0866, Reliability Evaluation of Wind Farms Considering Generation and Transmission Systems
  M. MOSADEGHY, University of Queensland
  T. SAHA, University of Queensland
  R. YAN, University of Queensland
  S. BARTLETT, University of Queensland
- 14PESGM0895, Optimized Monitoring of Voltage Sags in Distribution Systems Caused by Balanced and Unbalanced Short-Circuits
  T. KEMPNER, University of São Paulo
  A. SANTOS, University of São Paulo
  M. OLESKOVICZ, University of São Paulo
- 14PESGM0896, Reliability Worth Assessment of an Advanced Cable Health Monitoring Scheme
  S. KAZEMI, Razi University
  R. MILLAR, Aalto University
  E. SAARIJÄRVI, Aalto University
  M. LEHTONEN, Aalto University

- 14PESGM0958, Evaluation Model and Algorithm for Wind Farm Capacity Credit Considering Effect of Storage Systems Using the Bisection Method
  B. HU, Chongqing University
  K. XIE, Chongqing University
  H. YANG, Chongqing University
  Z. JIANG, China Southern Power Grid
- 14PESGM0961, Database-Assisted Load Flow Simulation for Low Voltage Grids Using a Model Reduction Approach
  C. KATTMANN, University of Stuttgart
  A. ABDEL-MAJEED, University of Stuttgart
  S. TENBOHLEN, University of Stuttgart
- 14PESGM1006, An Approach for Real-Time Tuning of Cost Functions in Optimal System-Centric Wide Area Controller Based on Adaptive Critic Design
  R. YOUSEFIAN, University of North Carolina at Charlotte
  S. KAMALASADAN, University of North Carolina at Charlotte
- 14PESGM1012, Reliability Study of Onshore and Offshore Wind Generation and Impact of Location
  S. ZHAO, Texas A&M University
  C. SINGH, Texas A&M University
- 14PESGM1107, Fast Contingency Screening and Ranking for Small Signal Stability Assessment
  C. BAONE, GE Global Research
  N. ACHARYA, GE Global Research
  S. VEDA, GE Global Research
  C. NILANJAN, GE Global Research
- 14PESGM1128, Islanding Detection Based on Probabilistic PCA with Missing Values in PMU Data
  X. LIU, Queen's University Belfast
  D. LAVERTY, Queen's University Belfast
  R. BEST, Queen's University Belfast
- 14PESGM1177, Matrix Exponential Based Electromagnetic Transients Simulation Algorithm with Krylov Subspace Approximation and Accurate Dense Output
  C. WANG, Tianjin University
  X. FU, Tianjin University
  P. LI, Tianjin University
  H. YU, Tianjin University
  C. DING, Tianjin University
  G. SONG, Tianjin University
  F. PENG, Guangdong Power Grid Corporation
- 14PESGM1203, A Novel Point Estimate Method for Probabilistic Power Flow Considering Correlated Nodal Power
  L. ZHANG, Shanghai Jiao Tong University
  H. CHENG, Shanghai Jiao Tong University
  S. ZHANG, Shanghai Jiao Tong University
  P. ZENG, China Electric Power Research Institute
  L. YAO, China Electric Power Research Institute
  M. BAZARGAN, ALSTOM Grid Research & Technology
- 14PESGM1228, IGDT Based Genco's Trading Decision Making in Multimarket Environment
  P. MATHURIA, Malaviya National Institute of Technology Jaipur
  R. BHAKAR, Malaviya National Institute of Technology Jaipur
- 14PESGM1243, A Novel Load Profiling Method for Detecting Abnormalities of Electricity Customer
  G. ZHOU, IBM Research – China
  W. ZHAO, IBM Research – China
  X. LV, IBM Research – China
  F. JIN, IBM Research – China
  W. YIN, IBM Research – China
- 14PESGM1258, Sense, Model and Identify the Load Signatures of HVAC Systems in Metro Stations
  Y. WANG, IIIS, Tsinghua University
  H. FENG, National Engineering Research Center of Software Engineering
  X. XI, Department of Automation, Tsinghua University
- 14PESGM1279, Phase Variable Transformer Models for Unbalanced Distribution System Power Flow
  K. GADIRAJU, GE
  P. BIJWE, Indian Institute of Technology Delhi
- 14PESGM1287, A Fine-Grained Parallel EMTP Algorithm Compatible to Graphic Processing Units
  Y. SONG, Tsinghua University
  Y. CHEN, Tsinghua University
  Z. YU, Tsinghua University
  S. HUANG, Tsinghua University
  L. CHEN, Tsinghua University

- 14PESGM1305, Assessment on Baseline and Higher Order Grid Security Criteria: Prospects for Insular Grid Applications
  A. BIZUAYEHU, University Beira Interior
  E. RODRIGUES, University Beira Interior
  S. SANTOS, University Beira Interior
  J. CATALAO, University Beira Interior
  J. CONTRERAS, University Castilla–La Mancha
- 14PESGM1334, Long-Run Incremental Pricing based Transmission Charging Method Distinguishing Demand and Generation Technologies
  J. LI, University of Bath
  Z. ZHANG, University of Bath
  C. GU, University of Bath
  F. LI, University of Bath
- 14PESGM1419, Estimating Cascading Failure Risk: Comparing Monte Carlo Sampling and Random Chemistry
  P. REZAEI, University of Vermont
  P. HINES, University of Vermont
  M. EPPSTEIN, University of Vermont
- 14PESGM1425, Real-Time Coordinated Management of PHEVs at Residential Level via MDPs and Game Theory
  J. TAN, University of Toledo
  L. WANG, University of Toledo
- 14PESGM1443, An Efficient Algorithm for Optimal Real-Time Pricing Strategy in Smart Grid
  W. ZHANG, University of Sydney
  G. CHEN, University of Sydney
  Z. DONG, University of Sydney
  J. LI, University of Ballarat
  Z. WU, University of Ballarat
- 14PESGM1483, A Game-Theoretic Analysis of Demand Response in Electricity Markets
  E. NEKOUEI, University of Melbourne
  T. ALPCAN, University of Melbourne
  D. CHATTOPADHYAY, University of Melbourne
- 14PESGM1486, Economic Valuation of Reserves on Cross Broder Interconnections: A Danish Case Study
  M. F. ASTANEH, Aalborg University
  Z. RATHER, Aalborg University
  W. HU, Aalborg University
  Z. CHEN, Aalborg University
- 14PESGM1519, Metering System Planning for State Estimation via Evolutionary Algorithm and $H\Delta^{T}$ Matrix considering SCADA and PMU Measurements
  A. BOZZ, University of São Paulo
  M. VIGLIASSI, University of São Paulo
  J. LONDON JR., University of São Paulo
- 14PESGM1599, Feeder Monitoring for Volt/VAR Control in Distribution Systems
  V. ZAMANI, NC State University
  M. BARAN, NC State University
- 14PESGM1609, Cascadings in Large Power Systems: Benchmarking Static vs. Time Domain Simulation
  E. CIAPESSONI, Ricerca sul Sistema Energetico RSE S.p.A.
  D. CIRIO, Ricerca sul Sistema Energetico RSE S.p.A.
  A. PITTO, Ricerca sul Sistema Energetico RSE S.p.A.
- 14PESGM1618, A Novel Evaluation Method for Power Grid Evolution with Economy and Security Contraints
  J. GUO, Tsinghua University
  X. ZHANG, Tsinghua University
  S. HUANG, Tsinghua University
  S. MEI, Tsinghua University
  W. LONG, State Grid of Corporation of China
  D. PENG, State Grid of Corporation of China
- 14PESGM1638, A Model-Free Method for Wind Power Plant Control with Variable Wind
  C. KIM, Hanyang University
  Y. GUI, Hanyang University
  C. CHUNG, Hanyang University
  Y. KANG, Chonbuk National University

- 14PESGM1653, Control and Size Energy Storage for Managing Energy Balance of Variable Generation Resources
  X. KE, North Carolina State University
  N. LU, North Carolina State University
  C. JIN, Pacific Northwest National Laboratory
- 14PESGM1668, Day-Ahead Dispatch of PEV Loads in a Residential Distribution System
  N. MEHBOOB, University of Waterloo
  C. CANIZARES, University of Waterloo
  C. ROSENBERG, University of Waterloo
- 14PESGM1678, Stochastic Voltage/Var Control with Load Variation
  J. MOMOH, Howard University
  S. SALKUTI, Howard University
  Y. BAXI, Howard University
- 14PESGM1709, Optimal Location of FACTS for ATC Enhancement
  J. MOMOH, Howard University
  S. SALKUTI, Howard University
- 14PESGM1711, Loss Allocation Control in Power Distribution System Reconfiguration in the Presence of Distributed Generators
  M. HEIDARI-KAPOURCHALI, WichitaState University
  V. ARAVINTHAN, WichitaState University
- 14PESGM1733, A Novel Strategy for Failure-Tolerant Communication in Smart Grids
  C. NGUYEN, New York Independent System Operator
  A. FLUECK, Illinois Institute of Technology
- 14PESGM1861, Forecast of Wind Power Ramps through Weather Circulation Patterns
  A. COUTO, LNEG – Portuguese National Laboratory of Energy and Geology
  P. COSTA, LNEG – Portuguese National Laboratory of Energy and Geology
  L. RODRIGUES, LNEG – Portuguese National Laboratory of Energy and Geology
  V. LOPES, LNEG – Portuguese National Laboratory of Energy and Geology
  A. ESTANQUEIRO, LNEG – Portuguese National Laboratory of Energy and Geology
- 14PESGM1879, National Grid Microgrid Feasibility Evaluation: Case Study of a Rural Distribution Feeder
  H. LI, EPRI
  V. SINGHVI, EPRI
  A. MAITRA, EPRI
  S. RAJAGOPALAN, EPRI
  B. ENAYATI, National Grid
  S. SANTOSO, University of Texas at Austin
  R. PATTERSON, Patterson Power Engineers LLC
- 14PESGM1882, Performance of AC and DC Based Transmission Switching Heuristics on a Large-Scale Polish System
  M. SAHRAEI-ARDAKANI, Arizona State University
  A. KORAD, Arizona State University
  K. HEDMAN, Arizona State University
  P. LIPKA, University of California, Berkeley
  S. OREN, University of California, Berkeley
- 14PESGM1903, Tacit Collusion with Imperfect Information: Ex-Ante Detection
  E. MOISEEVA, KTH Royal Institute of Tecnology
  M. HESAMZADEH, KTH Royal Institute of Tecnology
  I. DIMOULKAS, KTH Royal Institute of Tecnology
- 14PESGM1911, A Novel Current Controlled SVPWM Technique for Grid Connected Solar PV System
  L. ARUNAGIRI, IIT Mandi
  B. RAJPOURHIT, IIT Mandi
  A. JAIN, CPRI
- 14PESGM1933, Aggregation for Load Servicing
  S. PATEL, Stanford University
  R. SEVLIAN, Stanford University
  B. ZHANG, Stanford University
  R. RAJAGOPAL, Stanford University
- 14PESGM1942, Economic Dispatch with Deliverable Ramping Capability Constraint for High Wind Penetration
  N. BROWN, Iowa State University
  V. AJJARAPU, Iowa State University
  N. NAVID, Midcontinent Independent System Operator, Inc.
- 14PESGM2016, Swarm Intelligence Based Multi-Phase OPF for Peak Power Loss Reduction in a Smart Grid
  A. ANWAR, University of New South Wales, Canberra
  A. MAHMOOD, University of New South Wales, Canberra

- 14PESGM2058, A Novel Controller for a Grid Connected Single Phase PV System and Its Real Time Implementation
  S. MISHRA, IIT Delhi
  B. ACHARY, IIT Delhi
- 14PESGM2126, Correcting Optimal Transmission Switching for AC Power Flows
  C. BARROWS, National Renewable Energy Laboratory
  S. BLUMSACK, Penn State University
  P. HINES, University of Vermont
- 14PESGM2153, Potential Revenue from Electricity Energy Storage in the Electricity Reliability Council of Texas (ERCOT)
  R. BYRNE, Sandia National Laboratories
  C. SILVA-MONROY, Sandia National Laboratories
- 14PESGM2170, Adaptive Frequency Control Application for a Real Autonomous Islanded Grid
  Y. TOFIS, University of Cyprus
  Y. YIASEMI, University of Cyprus
  E. KYRIAKIDES, University of Cyprus
  K. KANSALA, VTT Technical Research Centre of Finland
- 14PESGM2179, Real-Time Pricing Algorithm Considering Load Identification for Smart Grid
  L. SUN, Georgia Institute of Technology
- 14PESGM2180, An Analytical Method for Constructing a Probabilistic Model of a Wind Farm
  S. SULAEMAN, Michigan State University
  S. TANNEERU, Xcel Energy
  M. BENIDRIS, Michigan State University
  J. MITRA, Michigan State University
- 14PESGM2182, Distribution System Restoration Considering Critical Infrastructures Interdependencies
  H. AHMADI, University of British Columbia
  A. ALSUBAIE, University of British Columbia
  J. MARTI, University of British Columbia
- 14PESGM2189, Cascading Failure Model of AC-DC System and Blackout Mechanism Analysis
  Z. YUXIN, Tsinghua University
  Z. XUEMIN, Tsinghua University
  H. SHAOWEI, Tsinghua University
  M. SHENGWEI, Tsinghua University
  Y. XIAOPENG, Henan Power Grid Company
  Z. ZHENAN, Henan Power Grid Company
  Z. QUANSHENG, Henan Power Grid Company
- 14PESGM2214, Neighborhood Electric Vehicle Charging Scheduling Using Particle Swarm Optimization
  J. PEPPANEN, Georgia Institute of Technology
  S. GRIJALVA, Georgia Institute of Technology
- 14PESGM2217, A Study on Electrical Operation Principles of the Residential Loads for Building Monitoring
  D. HE, Georgia Tech
  J. MEI, Georgia Tech
  R. HARLEY, Georgia Tech
  T. HABETLER, Georgia Tech

Stationary Battery Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Stationary Battery*

PAPERS AND AUTHORS:

- 14PESGM0185, Design of Hybrid Energy Storage System Using Dual Batteries for Renewable Applications
  K. TAKEDA, Hitachi Research Laboratory
  C. TAKAHASHI, Hitachi Research Laboratory
  H. ARITA, Hitachi Research Laboratory
  N. KUSUMI, Hitachi Research Laboratory
  M. AMANO, Shin-Kobe Electric Machinery Co., Ltd.
  A. EMORI, Shin-Kobe Electric Machinery Co., Ltd.
- 14PESGM0936, A New Battery Modelling Method based on Simulation Error Minimization
  C. ZHANG, Queen's University Belfast
  K. LI, Queen's University Belfast
  Z. YANG, Queen's University Belfast
  P. LEI, Harbin Institute of Technology
  C. ZHU, Harbin Institute of Technology

- 14PESGM0997, Temperature Dependence of Capacity Decay Due to Ion Diffusion in Vanadium Redox Flow Battery
  R. BADRINARAYANAN, Nanyang Technological University
  J. ZHAO, Nanyang Technological University
  S. NARAYANAN, Nanyang Technological University
  K. TSENG, Nanyang Technological University
- 14PESGM1299, Grounding Faults of Cascade Battery Energy Storage System
  Z. LING, Shanghai Jiaotong University
  C. YANG, Shanghai Jiao Tong University
  M. QIN-DONG, Shanghai Jiao Tong University
  C. MAN, China Southern Power Grid Co. Ltd
  G. HAI-FENG, China Southern Power Grid Co. Ltd.
  L. YONG-QI, China Southern Power Grid Co. Ltd.

Substations Committee Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*
Sponsored by: *Substations*

PAPERS AND AUTHORS:

- 14PESGM0268, Eliminating Hurricane-Induced Storm Surge Damage to Electric Utilities via In-Place Elevation of Substation Structures and Equipment
  J. BAKER, DIS-TRAN Packaged Substations
- 14PESGM0484, Application Benefits of Line- or Self-Commutated Static Var Compensator
  D. LANGNER, Siemens AG
  G. PILZ, Siemens AG
  M. GURBIEL, Siemens AG
- 14PESGM0883, Resilient Core Networks for Energy Distribution
  N. KUNTZE, Fraunhofer SIT
  C. RUDOLPH, Fraunhofer SIT
  S. LEIVESLEY, Newrisk Limited
  D. MANZ, PNNL
  B. ENDICOTT-POPOVSKY, University of Washington
- 14PESGM0951, Lightning Overvoltage Studies of Siahbishe 400 kV Gas Insulated Substation
  S. SHAHABI, University of Manitoba
  B. KORDI, University of Manitoba
- 14PESGM0989, Stateful Intrusion Detection for IEC 60870-5-104 SCADA Security
  Y. YANG, Jiangsu Electric Power Company Research Institute
  K. MCLAUGHLIN, Queen's University Belfast
  S. SEZER, Queen's University Belfast
  Y. YUAN, Jiangsu Electric Power Company Research Institute
  W. HUANG, Jiangsu Electric Power Company Research Institute
- 14PESGM1129, Performance Evaluation of Data Transmission in a Single and Double Bus Network within the Utility Substation based on IEC 61850
  S. KUMAR, Curtin University
  N. DAS, Curtin University
  J. MUIGAI, Curtin University
  S. ISLAM, Curtin University
- 14PESGM1206, Cyber Vulnerabilities on Agent-based Smart Grid Protection System
  M. RAHMAN, UNSW Canberra
  H. POTA, University of New South Wales
  M. HOSSAIN, Griffith University
- 14PESGM1321, DC-Line Current Ripple Reduction of a Parallel Hybrid Modular Multilevel HVDC Converter
  J. QIN, Purdue University
  M. SAEEDIFARD, Georgia Institute of Technology
- 14PESGM1368, Optimal Design of Grounding Systems for High Voltage Substations
  A. GHODS, University of Ulsan
  H. LEE, University of Ulsan
  A. ETEMADI, George Washington University
- 14PESGM1555, Fault Information and Diagnosis Modeling of On-Line Communication Monitoring System for Digital Substation
  Z. WANG, Hangzhou Dianzi University
  N. JIN, Shaoxing Electric Power Company
  J. ZHANG, Hangzhou Dianzi University
  Q. ZHANG, Hangzhou Dianzi University
  J. ZHANG, Hangzhou Dianzi University

- 14PESGM1564, Modular Multilevel Converter Model Implemented in FPGA for HIL Test of Industrial Controllers
  W. LI, OPAL-RT Technologies
  L. GREGOIRE, OPAL-RT Technologies
  P. ROBERT, OPAL-RT Technologies
  S. SOUVANLASY, OPAL-RT Technologies
  J. BELANGER, OPAL-RT Technologies
- 14PESGM1591, Stability of DC-Link Voltage as Affected by Phase Locked Loop in VSC when Attached to Weak Grid
  P. ZHOU, Huazhong University of Sci. and Tech.
  X. YUAN, Huazhong University of Sci. and Tech.
  J. HU, Huazhong University of Sci. and Tech.
  Y. HUANG, Huazhong University of Sci. and Tech.
- 14PESGM1896, Risk Evaluation for Hypothesized Multiple Busbar Outages
  R. BULBUL, Michigan Technological University
  C. TEN, Michigan Technological University
  A. GINTER, Waterfall Security Solutions Ltd.

Application and Analysis of Surge Protective Devices *(poster)*

Monday, 28 July, 5:00 PM–7:00 PM *Chesapeake J*

Sponsored by: *Surge Protective Devices*
Chair: *R. Hotchkiss, Surge Suppression Incorporated*

PAPERS AND AUTHORS:

- 14PESGM2165, NEMA 5VS Survey Results on Surge Protective Devices for the Protection of Safety Equipment
  R. HOTCHKISS, Surge Suppression Incorporated
- 14PESGM2168, Surge Protection of Low Voltage AC Drives – Application Note
  R. HOTCHKISS, Surge Suppression Incorporated

Switchgear Committee Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: Switchgear

PAPERS AND AUTHORS:

- 14PESGM0082, Investigation of Grid Loss Reduction under Closed-Ring Operation of MV Distribution Grids
  R. DE GROOT, Eindhoven University of Technology
  J. MORREN, Eindhoven University of Technology
  J. SLOOTWEG, Eindhoven University of Technology

Transformers Committee Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Transformers*

PAPERS AND AUTHORS:

- 14PESGM0192, An Economic Evaluation Model of Transformers Considering Outage Consequence
  L. WANG, Zhejiang University
  Y. WANG, Zhejiang University
  J. TANG, Zhejiang University
  C. GUO, Zhejiang University
  X. LUO, Yunnan Power Grid Corporation
  M. CAO, Yunnan Power Grid Corporation
- 14PESGM0245, A Diffusion-Driven Model for Investigating Moisture Effects on Dielectric Response Measurement of Transformer Insulation
  Y. CUI, University of Queensland
  H. MA, University of Queensland
  T. SAHA, University of Queensland
  C. EKANAYAKE, University of Queensland

- 14PESGM0272, Differential Partial Discharge Extraction Technique for Online Power Transformer Insulation Assessment
  J. SEO, University of Queensland
  H. MA, University of Queensland
  T. SAHA, University of Queensland
- 14PESGM0372, Investigating the Sensitivity of Frequency Response Analysis on Transformer Winding Structure
  M. MOHD YOUSOF, University of Queensland
  T. SAHA, University of Queensland
  C. EKANAYAKE, University of Queensland
- 14PESGM0631, Analysis on the Effects of Energization Mode for Magnetically Controlled Shunt Reactor
  T. ZHENG, North China Electric Power University
  Y. ZHAO, North China Electric Power University
- 14PESGM0782, Detection of Minor Axial Winding Movement within Power Transformers Using Finite Element Modeling
  Z. ZHANG, University of Liverpool
  W. TANG, South China University of Technology
  Q. WU, South China University of Technology
  J. YAN, University of Liverpool
- 14PESGM0871, Application of FRA Polar Plot Technique to Diagnose Internal Faults in Power Transformers
  O. ALJOHANI, Curtin University
  A. ABU-SIADA, Curtin University
- 14PESGM1039, Application of Multifractal Spectrum to the Vibration Analyses of Power Transformer under DC Bias
  P. GAO, Shanghai Jiaotong University
  F. WANG, Shanghai Jiaotong University
  L. SU, Electric Power Research Institute
- 14PESGM1539, Performance Evaluation of On-Line Transformer Winding Short Circuit Fault Detection Based on Instantaneous Voltage and Current Measurements
  A. MASOUM, Curtin University
  N. HASHEMNIA, Curtin University
  A. ABU SIADA, Curtin University
  M. MASOUM, Curtin University
  S. ISLAM, Curtin University
- 14PESGM1597, Research on Chaotic Dynamic Characteristics of On-Load Tap Changers
  X. ZHOU, Shanghai Jiaotong University
  F. WANG, Shanghai Jiaotong University

Transmission and Distribution Poster Session *(poster)*

Monday, 28 July, 5:00 PM–8:00 PM *Prince George's Exhibit Hall DE*

Sponsored by: *Transmission and Distribution Committee*
Chair: *G. Chang, National Chung Cheng University*

PAPERS AND AUTHORS:

- 14PESGM0030, 3-Phase 4-Wire Shunt APF under Non-Ideal PCC Voltage Using Adaptive Notch Filter
  T. NGUYEN, Shibaura Institute of Technology
  G. FUJITA, Shibaura Institute of Technology
  M. BIN MUHTAZARUDDIN, Shibaura Institute of Technology
- 14PESGM0124, Hardware Design for Distributed MAS-Based Fault Location in Distribution Systems
  M. GHORBANI, West Virginia University
  F. MOHAMMADI, West Virginia University
  M. CHOUDHRY, West Virginia University
  A. FELIACHI, West Virginia University
- 14PESGM0128, Survey on Assessment of Power Quality Cost in Shanghai China
  Z. QING, South China University of Technology
  H. WEI, International Copper Association
  T. SHUN, North China Electric Power University
  X. XIANGNING, North China Electric Power University
- 14PESGM0323, Modeling Induction Machines and Core-Form Transformers in Unbalanced Distribution Circuits
  L. AMBER, Clarkson University
  T. ORTMEYER, Clarkson University
  P. MCGRATH, Clarkson University

- 14PESGM0347, Real-Time Simulation on UHVDC Coordinated Control for Transmitting Large Scale Wind Power
  Z. YIYING, China Electric Power Research Institute
  D. PENG, China Electric Power Research Institute
  X. GUOPING, China Electric Power Research Institute
  W. ZIPING, China Electric Power Research Institute
- 14PESGM0421, Recloser and Sectionalizer Placement for Reliability Improvement Using Discrete Event Simulation
  Q. QIN, Binghamton University
  N. WU, Binghamton University
- 14PESGM0486, Comparison of Fault Currents in Multiterminal HVDC Grids with Different Grounding Schemes
  M. BUCHER, ETH Zurich
  C. FRANCK, ETH Zurich
- 14PESGM0625, Dual-Functional DSTATCOM with Flexible Mode Transfer for Power Quality Improvement
  C. KUMAR, Indian Institute of Technology Madras
  M. MISHRA, Indian Institute of Technology Madras
- 14PESGM0630, Utilizing Reactive Capability of PV Inverters and Battery Systems to Improve Voltage Profile of a Residential Distribution Feeder
  M. KABIR, QUT
  Y. MISHRA, QUT
- 14PESGM0645, HVDC Cable Modelling for VSC-HVDC Applications
  A. BEDDARD, University of Manchester
  M. BARNES, University of Manchester
- 14PESGM0653, Distributed Distribution Automation System Based on the Identification of Tie-Switch
  K. FAN, Shandong University
  M. GAO, Shandong University
  B. XU, Shandong University of Technology
  X. ZHANG, Shandong University of Technology
- 14PESGM0660, A Practical Case of Determining the Maximum Allowed PV Plant Connection Power using Different Reactive Power Control Concepts
  M. MAKSIC, Elektroinstitut Milan Vidmar
  D. MATVOZ, Elektroinstitut Milan Vidmar
- 14PESGM0779, Impact Assessment of the Two-Way Operation of Plug-In Electric Vehicles on Distribution Networks
  R. TORQUATO, University of Campinas
  L. SILVA, University of Campinas
  W. FREITAS, University of Campinas
  B. KURTH, Clausthal University of Technology
  V. ARIOLI, Center for Research and Development (CPqD)
- 14PESGM0814, Carson Grounding System and Its Impact on Reduction Grounding Impedance
  H. FORERO, ENDESA-CODENSA
  D. CALDERON, Universidad de los Andes
  G. RAMOS, Universidad de los Andes
  M. GARZÓN, ENDESA-CODENSA
  F. PEREZ, ENDESA-CODENSA
  C. QUINTERO, ENDESA-CODENSA
- 14PESGM0847, Disturbance Detection Using Hit-or-Miss Wavelet Singular Entropy for Power Quality Monitoring
  T. JI, South China University of Technology
  M. LI, South China University of Technology
  Q. WU, South China University of Technology
- 14PESGM0859, Application of DSTATCOM for Surplus Power Circulation in MV and LV Distribution Networks with Single-Phase Distributed Energy Resources
  F. SHAHNIA, Curtin University
  R. CHANDRASENA, Curtin University
  A. GHOSH, Curtin University
  S. RAJAKARUNA, Curtin University
- 14PESGM0873, Reliability Modeling and Evaluation of VSC-HVDC Transmission Systems
  J. GUO, Xi'an Jiaotong University
  X. WANG, Xi'an Jiaotong University
  Z. BIE, Xi'an Jiaotong University
  Y. HOU, Xi'an Jiaotong University
- 14PESGM1089, Frequency Domain Techniques for Modeling Discrete Switching Events: EMT Analysis
  A. RAMIREZ, Cinvestav-Guadalajara

- 14PESGM1292, High-Power High-Frequency Converter Modelling Using Dommel's and Runge-Kutta Methods in ABC and DQ frame
  W. LIN, University of Aberdeen
  D. JOVCIC, University of Aberdeen
- 14PESGM1369, Complex Power Optimization of Photovoltaic Systems
  M. ZARGHAMI, California State University, Sacramento
  B. KAVIANI, California State University, Sacramento
  F. TAVATLI, California State University, Sacramento
  M. VAZIRI, California State University, Sacramento
- 14PESGM1510, Developing Regional, Radial DC Grids and Their Interconnection into Large DC Grids
  D. JOVCIC, University of Aberdeen
  M. TAHERBANEH, University of Aberdeen
  J. TAISNE, RTE, France
  S. NGUEFEU, RTE, France
- 14PESGM1523, Combinatorial Weighting Method for Lightning Transformation Effect Evaluation of 500kV Transmission Lines
  R. DUAN, Shanghai Jiaotong University
  F. WANG, Shanghai Jiaotong University
  Y. LIU, Shanghai Jiaotong University
  H. HUANG, Shanghai Power Grid Co. Ltd.
- 14PESGM1611, Grid-Connected PV Inverter Test System for Solar Photovoltaic Power System Certification
  Y. LIU, Taiwan Electric Research and Testing Center
  P. LAN, Taiwan Electric Research and Testing Center
  H. LIN, Taiwan Electric Research and Testing Center
- 14PESGM1660, Modeling and Analysis of an ePFC (enhanced Power Flow Controller) with Conduction Angle Control
  A. VADDIRAJ, University of North Carolina – Charlotte
  M. MANJREKAR, University of North Carolina – Charlotte
- 14PESGM1738, Impact of Grounded Shield Wire Assumption on Impedance-based Fault Location Algorithms
  J. TRAPHONER, University of Texas at Austin
  S. DAS, University of Texas at Austin
  S. SANTOSO, University of Texas at Austin
  A. GAIKWAD, Electric Power Research Institute
- 14PESGM1807, A Novel Reduced Switching-Frequency Voltage-Balancing Strategy for Modular Multilevel Converters
  C. ZHAO, North China Electric Power University
  M. PENG, North China Electric Power University
  Y. LU, State Grid Corporation
  X. HUANG, State Grid Corporation
  P. QIU, State Grid Corporation
- 14PESGM1834, Improved PD-PWM for Minimizing Harmonics of Multilevel Converter Using Gradient Optimization
  G. SON, LSIS Co. Ltd.
  Y. CHUNG, LSIS Co. Ltd.
  S. BAEK, LSIS Co. Ltd.
  H. KIM, Yonsei University
  T. NAM, Yonsei University
  K. HUR, Yonsei University
  J. PARK, Yonsei University
- 14PESGM1859, A Monte Carlo Method for Optimum Placement of Photovoltaic Generation Using a Multicore Computing Environment
  G. GUERRA, Universitat Politecnica de Catalunya
  J. MARTINEZ, Universitat Politecnica de Catalunya
- 14PESGM1860, Three-Phase Transformer Model Validation for Ferroresonance Analysis
  J. COREA ARAUJO, Universitat Rovira i Virgili
  F. GONZALEZ-MOLINA, Universitat Rovira i Virgili
  J. MARTINEZ, Universitat Politecnica de Catalunya
  F. CASTRO-ARANDA, Universidad del Valle
  C. MANRIQUE-LEMOS, Universidad del Valle
  J. BARRADO-RODRIGO, Universitat Rovira i Virgili
  L. GUASCH-PESQUER, Universitat Rovira i Virgili
- 14PESGM2088, Best Phase Connection for DGs Using Individual Smart Meter Data
  A. MERCIER, Grenoble INP G2Elab
  C. BENOIT, G2Elab – Grenoble Institute of Technology
  Y. BESANGER, G2Elab – Grenoble Institute of Technology

- 14PESGM2110, Single to Three-Phase Conversion by High-Leg Phase Derivation
  M. JENSEN, University of Nevada, Reno
  M. ETEZADI-AMOLI, University of Nevada, Reno
- 14PESGM2262, A System Level Study Employing Improved Solid State Transformer Average Models with Renewable Energy Integration
  V. RAMACHANDRAN, North Carolina State University
  A. KUVAR, North Carolina State University
  U. SINGH, North Carolina State University
  S. BHATTACHARYA, North Carolina State University
  M. BARAN, North Carolina State University

Tuesday Morning

Student Poster Session and Attendee Breakfast *(breakfast)*

Tuesday, 29 July, 7:00 AM–9:30 AM *Prince George's Exhibit Hall E*

Presenter Breakfast *(breakfast)*

Tuesday, 29 July, 6:30 AM–8:30 AM *National Harbor 2 and 3*

Companion Hospitality Lounge *(other)*

Tuesday, 29 July, 7:00 AM–5:00 PM *Eastern Shore 1*

Registration Tuesday *(meeting preparations)*

Tuesday, 29 July, 7:00 AM–8:00 PM *Convention Center Prefunction*

EMC Motor Sub Committee Meeting Combo Session *(combo)*

Tuesday, 29 July, 8:00 AM–12:00 PM *Chesapeake 8*

Sponsored by: *Electric Machinery*
Chair: *A. Chiba, Tokyo Institute of Technology*

EMC Motor subcommittee meeting, working group status presentations.

A lecture titled "Design, analysis and control of fault tolerant multiphase electric machines – Oil and Gas Industries", by a new IEEE Nikola Tesla Field Award Recipient (Hamid A. Toliyat).

Advanced Control of Wind and Solar Power Plants *(panel)*

Tuesday, 29 July, 8:00 AM–12:00 PM *Camellia 1*

Sponsored by: *Electric Machinery Committee and Energy Development and Power Generation Committee*
Chair: *E. Muljadi, NREL*

This panel may cover diverse topics in Advanced Control of Wind and Solar Power generation including spinning reserve, frequency regulation, governor control, inertial response, other control strategies, and, power plant planning, operation, testing, and grid integration.

PRESENTATIONS AND PANELISTS:

- 14PESGM2584, Advanced Controls for Wind Plant Frequency Response
  R. NELSON, Siemens
- 14PESGM2586, Advanced Wind Power Plant Solutions
  S. SAYLORS, VESTAS
- 14PESGM2585, Recent North American Experience on Use of Advanced Wind Plant Controls to Meet Grid Obligations
  N. MILLER, General Electric
- 14PESGM2587, Advanded Wind Turbine Testing
  V. GEVORGIAN, NREL

- 14PESGM2588, Synchronous Power Control, An Effective Solution for Grid-Friendly Distributed Power Plants
  P. RODRIGUEZ, Abengoa
- 14PESGM2663, Balancing and Reserve Power by PV Plants
  K. CHRISTENSEN, SMA America
- 14PESGM2590, Advanced Controls of PV for Microgrid Applications
  V. BHAVARAJU, Eaton Corp.

Energy Storage Technologies *(panel)*

Tuesday, 29 July, 8:00 AM–12:00 PM *National Harbor 6*

Sponsored by: *Emerging Technologies Coordinating*
Chair: *N. Hadjsaid, Grenoble-INP*
Co-Chair: *N. Rostamkolai, Rose-Hulman Institute of Technology*

Energy storage is currently gaining more importance in the context of energy transition paradigm. Indeed, it is expected to play a key role as an enabling technology in the process of lowering the carbon foot print of the electrical system, particularly with renewable energies on the rise and the event of the plug-in Hybrid and Electric Vehicles (PHEV). Storage has always been used in the power industry but at a limited scale as it is considered to be non-competitive for most grid applications. However, the new emphasis put on energy storage in the context of this new energy paradigm has triggered new efforts in research and development on storage technologies. Most of research roadmaps have pointed out that the energy storage will play a major role in the future with breakthrough capabilities. Hence, several new technologies have emerged in recent years. In addition, large in situ pilot projects for demonstration purposes have recently been launched to demonstrate on real scale the effectiveness of these new technologies in terms of performances as well as in terms of system benefits, business models and best practices.

The panel will be dedicated to the emerging energy technology storage. The presentations will cover technology, economy, system integration and feedback experience on some real scale pilot projects for grid applications.

PRESENTATIONS AND PANELISTS:

- 14PESGM2722, BC Hydro Case Study: Battery Energy Storage in Field
  H. WHITTAKER, BC Hydro, Canada
- 14PESGM2723, Energy Storage Technologies Integration into Electrical Networks
  S. LECHAT SANJUAN, Schneider Electric, France
- 14PESGM2721, New Scheduling Tools for Emerging Storage Technologies: Experience from Shetland Islands
  I. KOCKAR, University of Strathclyde
- 14PESGM2724, Storage for Massive Grid Integration of Renewables: Technology Selection and Feedback from the Field
  M. PERRIN, Institute National de l'Energie Solaire (INES/CEA)
- 14PESGM2725, Overview of the New Energy Technology Storage Challenges from Technical, Regulation and Business Models View Points
  B. DELPECH, EDF R&D
- 14PESGM2753, Battery Energy Storage Systems for Stationary and Mobile Microgrids
  S. HENDRIX, ENERDEL Inc.

Extreme Events and Disaster Management – Global Perspective *(panel)*

Tuesday, 29 July, 8:00 AM–12:00 PM *Camellia 2*

Sponsored by: *Energy Development and Power Generation*
Chair: *J. McConnach, IEEE*
Co-Chair: *S. Mukhopadhyay, GTBIT, GGSIP University*

Natural Disaster Preparedness, Planning and Response is one of the Key Topics for GM2014. Preparing for, responding to, coping with and managing the aftermath of Disasters due to the Extreme Events of Climate Change and other causes is receiving much attention. This is particularly important for less developed countries where the resources and infra-structure for dealing with such events are limited. This session will focus on experiences, developments and lessons learned from Extreme Events in various parts of the world, thus hopefully contributing to improvements to Disaster Mitigation and Management Measures and Practices (DMMMP), to minimize destruction and disruption impacts and fatalities. This will include such measures as Storm Proofing, System Hardening and Safe Posture measures, Emergency Preparedness Plans, Post Event System Response, Repair and Restoration Management Practices, Customer Communication Innovations, and Lessons Learned from Recent Extreme Events.

PRESENTATIONS AND PANELISTS:

- 14PESGM2685, Introduction to Panel Session on Extreme Events and Disaster Management – Global Perspective
  S. MUKHOPADHYAY, GTBIT, GGSIP University
- 14PESGM2682, Typhoon Disaster Management in the Philippines
  B. WOJSZCZYK, Meralco
- 14PESGM2683, Design of Reliability Index for Extreme Weather Used in the Control Center
  J. ZHONG, University of Hong Kong
- 14PESGM2684, Impact of Cyclone Phailin on Odisha State Power System
  S. MUKHOPADHYAY, GTBIT, GGSIP University
- 14PESGM2686, Lessons Learned from 2012 Super Storm Sandy
  D. BRATCHER, DGV GL Energy

Transactions Paper Session #1 *(transactions paper)*

Tuesday, 29 July, 8:00 AM–11:30 AM *Chesapeake 2*

Sponsored by: *Power System Dynamic Performance*
Chair: *Z. Miao, University of South Florida*

PAPERS AND AUTHORS:

- 14PESGM0903, Offshore Wind Integration to a Weak Grid by VSC-HVDC Links Using Power-Synchronization Control: A Case Study *[Transaction Number: 10.1109/TPWRD.2013.2273979]*
  L. ZHANG, ABB Corporate Research
  L. HARNEFORS, ABB Corporate Research
  P. MITRA, ABB Power Systems
- 14PESGM1325, Impedance Model Based Resonance Analysis in a VSC-HVDC System *[Transaction Number: TPWRD-00888-2012.R2]*
  L. XU, PEP Power Systems Studies
  L. FAN, University of South Florida
- 14PESGM0033, Electromechanical Transient Modeling of Modular Multilevel Converter Based Multi-Terminal HVDC Systems *[Transaction Number: TPWRS-01035-2012]*
  S. LIU, Zhejiang University
  Z. XU, Zhejiang University
  W. HUA, Zhejiang Electric Power Corporation Research Institute
  G. TANG, Zhejiang University
  Y. XUE, Zhejiang University
- 14PESGM2151, Considerations Toward Coordinated Control of DFIG-Based Wind Farms *[Transaction Number: TPWRD-0067-2010]*
  B. CHAUDHURI, Imperial College London
  N. RAY CHAUDHURI, Imperial College London
- 14PESGM0974, Impact of Unbalance on Electrical and Torsional Resonances in Power Electronic Interfaced Wind Energy Systems *[Transaction Number: TPWRS-00789-2012.R1]*
  Z. MIAO, University of South Florida
- 14PESGM1520, Two-Level Dynamic Stochastic Optimal Power Flow Control for Power Systems with Intermittent Renewable Generation *[Transaction Number: TPWRS.2013.2237793]*
  J. LIANG, ABB
  G. VENAYAGAMOORTHY, Clemson University
  R. HARLEY, Georgia Institute of Technology
- 14PESGM1411, Design and Testing of Custom FPAA Hardware with Improved Scalability for Emulation of Smart Grids *[Transaction Number: TSG-00298-2013]*
  A. DEESE, College of New Jersey
  C. NWANKPA, Drexel University

Industry Experience with Wide-Area Coordinated Voltage Control *(panel)*

Tuesday, 29 July, 8:00 AM–12:00 PM *Azalea 3*

Sponsored by: *Power System Dynamic Performance*
Chair: *J. Chow, Rensselaer Polytechnic Institute*
Co-Chair: *L. Wang, Powertech Labs Inc.*

The objectives of this panel session are to provide a platform for system operators to share knowledge and experience about AVC technologies and for the audience to assess the feasibility of implementing AVC technologies. This session will review various available potential AVC technologies, based on a variety of system needs across multiple existing implementations, and to understand the practical considerations and issues when deploying the technologies in actual systems.

PRESENTATIONS AND PANELISTS:

- 14PESGM2556, Optimal Voltage Var Dispatch in Real-Time at BC Hydro
  D. ATANACKOVIC, British Columbia Hydro and Power Authority
- 14PESGM2557, Optimization Approach of Coordinated Voltage Control for PJM System
  J. TONG, PJM Interconnection
- 14PESGM2558, History of Advanced Voltage Control
  S. LIU, EPRI
- 14PESGM2559, Voltage Control Challenges and Experiences in China
  Q. GUO, Tsinghua University
- 14PESGM2560, Korean Experience with Advanced Voltage Control
  B. CHANG, Korea Electric Power Research Institute (KEPRI)
- 14PESGM2561, Advanced Voltage Control in Jiangsu Power Grid
  H. LI, Jiangsu Power Co.
- 14PESGM2562, Three Decades of Secondary Voltage Control in the French Transmission Grid
  A. PARISOT, RTE, France

Wind Power Related Operation Topics *(transactions paper)*

Tuesday, 29 July, 8:00 AM–12:00 PM *Chesapeake A*

Sponsored by: *Power System Operations*
Chair: *F. Milano, University College Dublin*

PAPERS AND AUTHORS:

- 14PESGM0034, A Robust Optimization Approach for the Interdependency Analysis of Integrated Energy Systems Considering Wind Power Uncertainty *[Transaction Number: TPWRS.2013.2263256]*
  C. FUERTE-ESQUIVEL, University of Michoacan
  A. MARTINEZ-MARES, University of Michoacan
- 14PESGM0286, Modeling of Wind Farm Participation in AGC *[Transaction Number: TPWRS-00442-2013]*
  L. CHANG-CHIEN, National Cheng Kung University
  C. SUN, National Cheng Kung University
  Y. YEH, National Cheng Kung University
- 14PESGM0293, Risk-Constrained Multi-Stage Wind Power Investment *[Transaction Number: TPWRS-01067-2011]*
  L. BARINGO, ETH Zürich
  A. CONEJO, Ohio State University
- 14PESGM0803, Probabilistic Optimal Power Flow in Correlated Hybrid Wind-Photo Voltaic Power Systems *[Transaction Number: TSG-00660-2012]*
  M. AIEN, Graduate University of Advanced Technology
  M. FOTUHI FIRUZABAD, Sharif University of Technology
  M. RASHIDINEJAD, Graduate University of Advanced Technology
- 14PESGM1084, Multi-Area Unit Scheduling and Reserve Allocation under Wind Power Uncertainty *[Transaction Number: TPWRS-00590-2013.R2]*
  A. AHMADI-KHATIR, EPFL
  A. CONEJO, Ohio State University
  R. CHERKAOUI, EPFL
- 14PESGM1894, Dynamic Scheduling of Operating Reserves in Co-Optimized Electricity Markets with Wind Power *[Transaction Number: TPWRS-01260-2012]*
  Z. ZHOU, Argonne National Laboratory
  A. BOTTERUD, Argonne National Laboratory
- 14PESGM2127, Trading Wind Power in a Competitive Electricity Market Using Stochastic Programing and Game Theory *[Transaction Number: TSTE-00071-2012]*
  T. DAI, University of Nebraska-Lincoln
  W. QIAO, University of Nebraska-Lincoln

Planning Transmission for Co-Optimization with Resource Expansion *(panel)*

Tuesday, 29 July, 8:00 AM–12:00 PM *Chesapeake 7*

Sponsored by: *Power System Planning and Implementation*
Chair: *M. Henderson, ISO New England*

The need for transmission expansion and development of proper plans is driven by resource development, which is often determined by policy makers and independent market participants. This panel will discuss the reasons behind transmission expansion and how optimal plans are developed. The session will provide an update on Order 1000 as a backdrop and then discuss planning techniques that measure

the true value of transmission. New applications of HVDC and FACTS are next discussed as a means of providing flexible expansion of the network. Finally, the role of storage and demand resources as ways of providing ancillary services and securing the network for N-1-1 contingencies will be discussed.

PRESENTATIONS AND PANELISTS:

- 14PESGM2397, Application of FACTS and HVDC for System Expansion — The Atlantic Wind Connection
  D. WOODFORD, Electranix Corp
- 14PESGM2398, Large Scale Storage and Demand Resources – Enabler of Transmission Delivery?
  S. VENKATARAMAN, GE
- 14PESGM2399, Probabilistic Planning
  D. BROOKS, EPRI
- 14PESGM2400, Planning Transmission for Value Rather than Cost
  M. ILIC, Carnegie Mellon University
- 14PESGM2401, FERC Order 1000: Planning for the Right of First Refusal and Planning for Policy
  H. CHAO, NYISO
- 14PESGM2402, HVDC for System Expansion – East and West
  D. OSBORN, MISO Energy
- 14PESGM2403, Operational Economics of D-FACTS as Compared with Conventional Power Flow Control
  F. KREIKEBAUM, Smart Wire Grid
- 14PESGM2404, Modeling Advanced Large Scale Storage as a Means of Providing Regulation, Ramping, Voltage Support, N-1-1 Security, and Providing Additional System Inertia
  P. DONALEK, MWH Global
- 14PESGM2405, TBD
  S. MEYN, University of Florida

IEEE Transaction Paper Presentations *(transactions paper)*

Tuesday, 29 July, 8:00 AM–12:00 PM *Potomac 1*

Sponsored by: *Power System Relaying Committee*
Chair: *S. Ward, Quanta-Technology. LLC*

PAPERS AND AUTHORS:

- 14PESGM1874, Adaptive Protection and Microgrid Control Design for Hailuoto Island *[Transaction Number: TSG-00362-2013.R1]*
  H. LAAKSONEN, ABB Oy
  D. ISHCHENKO, ABB Inc.
  A. OUDALOV, ABB
- 14PESGM0921, An Accurate Offline Phasor Estimation for Fault Location in Series Compensated Lines *[Transaction Number: TPWRD- 00455-2013]*
  M. DADASH ZADEH, Western University
  R. RUBEENA, Western University
  T. BAINS, Western University
- 14PESGM0700, Out-of-Step Protection Using State Plane Trajectories Analysis *[Transaction Number: TPWRD-00683-2012.R1]*
  B. SHRESTHA, University of Saskatchewan
  R. GOKARAJU, University of Saskatchewan
  M. SACHDEV, University of Saskatchewan
- 14PESGM0181, Low-Latency Distance Protective Relay on FPGA *[Transaction Number: TSG-00049-2013]*
  Y. WANG, University of Alberta
  V. DINAVAHI, University of Alberta
- 14PESGM0661, An Efficient Method Based on the Electromagnetic Time Reversal to Locate Faults in Power Networks *[Transaction Number: TPWRD-00932-2012]*
  R. RAZZAGHI, École Polytechnique Fédérale de Lausanne EPFL
  G. LUGRIN, École Polytechnique Fédérale de Lausanne EPFL
  H. MAHMOUDIMANESH, École Polytechnique Fédérale de Lausanne EPFL
  C. ROMERO, École Polytechnique Fédérale de Lausanne EPFL
  M. PAOLONE, École Polytechnique Fédérale de Lausanne EPFL
  F. RACHIDI, École Polytechnique Fédérale de Lausanne EPFL
- 14PESGM1559, A New DFT-Based Current Phasor Estimation for Numerical Protective Relaying *[Transaction Number: TPWRD-00776-2012]*
  M. DADASH ZADEH, Western University
  Z. ZHANG, GE Digital Energy

- 14PESGM1075, Directional Relaying in the Presence of a Thyristor-Controlled Series Capacitor *[Transaction Number: 06478858]*
  A. PRADHAN, IIT Kharagpur
  P. JENA, IIT Roorkee
- 14PESGM1823, A New Method of Current Transformer Saturation Detection in the Presence of Noise *[Transaction Number: TPWRD-00573-2013.R1]*
  B. SCHETTINO, UFJF
  C. DUQUE, UFJF
  P. SILVEIRA, UNIFEI
  P. RIBEIRO, Technical University of Eindhoven
  A. CERQUEIRA, UFJF

The Dynamic Security Assessment of the Next Generation Electrical Grid Theory and Practice *(panel)*

Tuesday, 29 July, 8:00 AM–10:00 AM *National Harbor 7*

Sponsored by: *(PSACE) Computer Analytical Methods*
Chair: *E. Haq, California ISO*

The next generation electrical utilities will face additional challenges for reliable operation of electrical grid due to the high penetration of renewable generation resources. The variability associated with the renewable resources and the reduced online inertia will require more efficient monitoring tools, situational awareness tools, advanced control tools and advanced fast dynamic security assessment tools for the safe and reliable operation of the electrical grid. The speakers of this panel will address the theory and practice of dynamic security assessment tools for the next generation electrical grid.

PRESENTATIONS AND PANELISTS:

- 14PESGM2452, Dynamic Security of a Synchronous System with High Wind Penetration
  I. DUDURYCH, Eir Grid
- 14PESGM2457, Dynamic Security Assessment in the Future Gird
  V. VITTAL, Arizona State University
- 14PESGM2453, Toward On-Line Transient Stability Assessments of Large-Scale Power Systems with Renewable Energies
  H. CHIANG, Cornell University
- 14PESGM2458, Toward On-Line Transient Stability Assessments of Large-Scale Power Systems with Renewable Energies
  H. LI, Bigwood Systems
- 14PESGM2456, Toward On-Line Transient Stability Assessments of Large-Scale Power Systems with Renewable Energies
  J. TONG, PJM Interconnection
- 14PESGM2455, BPA Experiences with Voltage Control realted to Large Scale Wind Generation Integration
  D. KOSTEREV, BPA
- 14PESGM2454, Experience of Online Dynamic Security Assessment at California ISO
  E. HAQ, California ISO
- 14PESGM2459, Experience of Online Dynamic Security Assessment at California ISO
  D. SUBAKTI, CAISO
- 14PESGM2460, Experience of Online Dynamic Security Assessment at California ISO
  K. ABDUL-RAHMAN, CAISO
- 14PESGM2461, Experience of Online Dynamic Security Assessment at California ISO
  J. WU, CAISO
- 14PESGM2462, BPA Experiences with Voltage Control realted to Large Scale Wind Generation Integration
  E. HEREDIA, BPA

Forecasting and Intelligent Control of Microgrids *(panel)*

Tuesday, 29 July, 8:00 AM–10:00 AM *Azalea 2*

Sponsored by: *(PSACE) Intelligent Systems*
Chair: *G. Kumar Venayagamoorthy, Clemson University*
Co-Chair: *J. Solanki, West Virginia University*

Microgrids, also known as µGrids, are formed based on localized groupings of generation sources including renewables, energy storage and loads that are normally connected to an utility grid for operation. A microgrid is electrically viewed as a single controlled entity by the macrogrids it is connected to, and

can be function autonomously. Intelligent real-time operation of microgrids to meet its variable demand from fixed and variable generation sources requires short-to-medium-to-long term foresight of generation outputs and load demands. This panel focuses on intelligent control technologies that use or are capable of integrating forecasting into dynamic power and energy management systems of microgrids.

PRESENTATIONS AND PANELISTS:

- 14PESGM2148, Dynamic Energy Management System for Smart Micro-Grids
  G. VENAYAGAMOORTHY, Clemson University
- 14PESGM2147, Robust Control and Energy Management Algorithms for Microgrid
  A. SRIVASTAVA, Washington State University
- 14PESGM2150, Development and Evaluation of Advanced Controls for Microgrids at NREL
  B. KROPOSKI, National Renewable Energy Laboratory
- 14PESGM2146, Distributed Energy Resources Scheduling Considering Real-Time Resources Forecast
  M. SILVA, Polytechnic of Porto
  T. SOUSA, Polytechnic of Porto
  S. RAMOS, Polytechnic of Porto
  H. MORAIS, Technical University of Denmark (DTU)
  Z. VALE, Polytechnic of Porto
- 14PESGM2149, Power Management of Microgrids with Distributed Agents
  H. NEHRIR, Montana State University-Bozeman
- 14PESGM2781, Power Management of Microgrids with Distributed Agents
  C. COLSON, Western Area Power Administration
- 14PESGM2236, Sentinel Assets for Predictive Microgrid Power Quality Control
  S. CHERIAN, Spirae

PSACE 1 *(transactions paper)*

Tuesday, 29 July, 8:00 AM–12:00 PM *Baltimore 1*

Sponsored by: *PSACE*
Chair: *N. Zhou, Binghamton University*

PAPERS AND AUTHORS:

- 14PESGM0426, Generation System Reliability Evaluation Incorporating Correlations of Wind Speeds with Different Distributions *[Transaction Number: TPWRS-00243-2012]*
  W. LI, Chongqing University
  Z. QIN, Chongqing University
- 14PESGM0459, Early Detection and Optimal Corrective Measures of Power System Insecurity in Enhanced Look-ahead Dispatch *[Transaction Number: model predictive control]*
  Y. GU, Texas A&M University
  L. XIE, Texas A&M Univeristy
- 14PESGM0776, Day-Ahead Resource Scheduling Including Demand Response for Electric Vehicles *[Transaction Number: TSG-00465-2011]*
  J. SOARES, Polytechnic of Porto
  H. MORAIS, Technical University of Denmark (DTU)
  T. SOUSA, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
  P. FARIA, Polytechnic of Porto
- 14PESGM1149, Transmission Network Investment with Probabilistic Security and Corrective Control *[Transaction Number: TPWRS.2013.2257885]*
  R. MORENO, Universidad de Chile / Imperial College London
  D. PUDJIANTO, Imperial College London
  G. STRBAC, Imperial College London
- 14PESGM1230, The Fokker-Planck Equation for Power System Stability Probability Density Function Evolution *[Transaction Number: TPWRS-00725-2012]*
  K. WANG, Shanghai Jiaotong University
  M. CROW, Missouri University of Science and Technology
- 14PESGM1291, Penalty-Based Nonlinear Solver for Optimal Reactive Power Dispatch with Discrete Controls *[Transaction Number: TPWRS.2013.2252207]*
  E. SOLER, Universidade Estadual Paulista
  E. ASADA, University of Sao Paulo
  G. DA COSTA, University of Sao Paulo
- 14PESGM0751, A Novel Method for Evaluating Future Power Distribution System Reliability *[Transaction Number: 0885-8950]*
  M. ALMUHAINI, King Fahd University of Petroleum and Minerals
  G. HEYDT, Arizona State University

- 14PESGM0755, Evaluating Future Power Distribution System Reliability including Distributed Generation *[Transaction Number: 0885-8977]*
  M. ALMUHAINI, King Fahd University of Petroleum and Minerals
  G. HEYDT, Arizona State University

Wind and Solar Plant System Impacts and Interconnection Requirements *(panel)*

Tuesday, 29 July, 8:00 AM–10:00 AM *National Harbor 4*

Sponsored by: *Transmission and Distribution Committee*
Chair: *T. McDermott, University of Pittsburgh*

This panel will offer updates and a discussion forum addressing hot topics in wind and solar plant interconnections. Both transmission and distribution impacts and interconnections will be addressed. Topics include effective grounding and overvoltages on distribution systems, technology-specific vs. technology-neutral ride-through requirements on transmission systems, the impact of new IEEE and NERC guidelines, and a review of the reactive power requirements for interconnections.

PRESENTATIONS AND PANELISTS:

- 14PESGM2489, Evaluating Wind and Solar Plants Harmonics Compliance
  D. MUELLER, Enernex
- 14PESGM2492, European Grid Code Experiences and Research
  J. VON APPEN, Fraunhofer IWES
- 14PESGM2751, Technology-Specific vs. Technology-Neutral Fault Ride through Requirements
  M. FISCHER, ENERCON Canada
- 14PESGM2491, DER Smart Inverter Functionalities
  A. HUQUE, EPRI
- 14PESGM2488, Issues Affecting Anti-Islanding Detection in Power Systems with High Wind Penetration and Low Inertia
  R. BEST, Queen's University Belfast

PQ – Power Quality Interest Group *(combo)*

Tuesday, 29 July, 8:00 AM–9:00 AM *Potomac 2*

Sponsored by: *Transmission and Distribution*
Chair: *T. Laughner, TVA*

PRESENTATIONS AND PANELISTS:

- 14PESGM0948, Current and Future Practice for Selection of Power Quality Monitoring Locations
  F. ZAVODA, IREQ
  A. DABIN, ELIA
  J. MEYER, Technische Universitaet Dresden
  L. KOO, Parsons Brinckerhoff

Late Breaking News: Energy Policy *(super session – panel)*

Tuesday, 29 July, 8:00 AM–12:00 PM *Potomac C*

Sponsored by: *PES Technical Council*
Chair: *J. Nelson, TVA*

Energy policy decisions can have significant impacts on the planning, design, operation and maintenance of the power system. Aspects of energy policy may include legislation, regulatory requirements, international treaties, investment incentives, taxation or other public policy techniques. All of these can have economic, reliability, social and/or environmental implications. This session will provide various perspectives on energy policies, and the requirements and impacts they have on the power industry. Attendees will have ample opportunity to pose questions to the panel of speakers at the end of the session.

The following individuals are confirmed for the session, but please reference the program addendum for the final slate of speakers.

– W. HEDERMAN, Senior Advisor and Deputy Director, U.S. Department of Energy

– V. RABL, Chair of IEEE USA Energy Policy Committee

– G. VAN WELLIE, CEO, ISO New England (USA)

– R. A. L. CANDELA, Senior Executive, XM (Columbia, South America)

Smart Substations – Protection, Control, Communications, Wide Area Measurements, and Enterprise Applications *(tutorial)*

Tuesday, 29 July, 8:00 AM–5:00 PM *Chesapeake G*

Sponsored by: *IEEE PES*

What substation and system-wide protection, control, and communications designs lead to reliability, efficiency, sustainability, and effective management information for the enterprise? Modern protective relays, switchyard data acquisition units, and intelligent electronic devices (IEDs) are the essential eyes and ears for smart substations. They collect information, control apparatus, monitor equipment condition, and protect power apparatus. The substation IEDs aggregate data for Smart Grid functions; serial or Ethernet communications networks exchange data with the utility enterprise. Modern IEDs can also stream synchrophasors for wide area monitoring (visualization), protection, automation, and control (WAMPAC). These measurements and communications are only a platform for Smart Grid functions – the utility must plan how to use this platform effectively.

This tutorial explains sea changes in measurement technology, intelligent relays and IEDs, data communications, substation integration design, and wide area measurement and control in the context of Smart Grid trends. Attendees get an extensive overview of rapidly advancing technology, specific functions and implementations, plus practical guidance on how to select designs and take advantage of the potential benefits.

Power System Basics – Understanding the Electric Utility Operation Inside and Out *(tutorial)*

Tuesday, 29 July, 8:00 AM–5:00 PM *Chesapeake J*

Sponsored by: *IEEE PES*

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. Anyone who is involved in some way with the electric utility industry can benefit from attendance at this course.

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 over- view of generation, substations, transmission, distribution, and utilization is provided. Protection, reliable operation, and safety are among the topics covered.

Using Smart Grid Data to Improve Planning, Analytics, and Operation of the US Capital region T&D Systems *(panel)*

Tuesday, 29 July, 8:00 AM–12:00 PM *National Harbor 5*

Sponsored by: *Local Organizing Committee*
Chair: *S. Griffith, NEMA*
Co-Chair: *J. LoPorto, PHI*

Smart Grid investments promise access to vast amounts of data regarding the operation and condition of the transmission and distribution assets and systems in the US Capital region and elsewhere. This panel will address the challenges around “big data”; the role of AMI data, current experience and future vision; the role of data from smart devices in the substation and in the field; and the role of synchrophasor data, both at the transmission and distribution levels, focusing on the data handling and analytics at the distribution level.

PRESENTATIONS AND PANELISTS:

- 14PESGM2509, Utility Perspective, Using Smart Grid Data to Improve Planning, Analytics, and Operation of the US Capital Region T&D Systems
  K. LEFKOWITZ, PHI
- 14PESGM2570, Utilizing Distribution Synchrophasor for Smart Islanding
  M. SWEEZER-FISCHER, Florida Power & Light
- 14PESGM2528, Lockheed Martin-Big Data Capabilities that Enhance Intelligence Fusion, Data Mining, Real-Time Situational Awareness, and in the Development and Deployment of New Technologies for Optimizing Operations at Leading Utilities
  S. PANCHOLI, Lockheed Martin
- 14PESGM2535, Big Data and Advanced Analytics Technologies for the Smart Grid
  A. DE CASTRO, SAS

- 14PESGM2750, Manufacturing Perspective-Using Smart Grid Data to Improve Planning, Analytics, and Operation of the US Capital Region T&D Systems
  D. JONES, Alstom Grid, Inc.

Frameworks and Roadmaps for Designing Smart Grids *(panel)*

Tuesday, 29 July, 9:00 AM–12:00 PM *Magnolia 3*

Sponsored by: *Energy Development and Power Generation*
Chair: *P. Ribeiro, Federal University of Itajubá*

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. Therefore, it is of paramount importance the establishment of consistent frameworks and roadmaps in order to guarantee sustainable developments. This panel will discuss and critically evaluate different frameworks and roadmaps with the intention of bringing a normative understanding of the design of the next generation of the electrical infrastructure and emphasizing the interactions between technical and non-technical dimensions of interoperability, domains of sub-systems, zones of operations and values of all interested parties and stakeholders. It is expected that the presentations and debates will assist engineers, researchers and developers to better understand and design smart grid systems.

PRESENTATIONS AND PANELISTS:

- 14PESGM2365, Roadmap Strategies
  S. PULLINS, Horizon Energy Group
- 14PESGM2366, Developing Energy Infrastructure: The Case for Economics and Public Policy as an Engineering Problem
  D. CARTES, Florida State University
- 14PESGM2367, Frameworks and Roadmaps
  P. RIBEIRO, Federal University of Itajubá
- 14PESGM2368, Roadmap and Challenges of Infrastructure Development and Coordination at PJM
  L. JIANWEI(JAY) LIU, PJM

Advances in Power System Operation *(panel)*

Tuesday, 29 July, 9:00 AM–12:00 PM *National Harbor 8*

Sponsored by: *Power System Operations*
Chair: *K. Morrison, BC Hydro*
Co-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 advancing 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:

- 14PESGM2387, Harvesting AMI Data to Support Grid Operations
  F. ALBUYEH, Open Access Technology International, Inc. (OATI)
- 14PESGM2389, Defining a New Architecture and Functions to Allow the System Operator to Manage Distributed Energy
  M. VADARI, Modern Grid Solutions
- 14PESGM2386, Advanced Solutions for Western Interconnection Operation
  H. ZHANG, WECC
- 14PESGM2388, Integrating Data for Heightened Awareness
  R. PRADHAN, Siemens
- 14PESGM2390, Deployment of DSA Tools to Restore Ontario's Power System
  A. MARIA, IESO

Grid Resilience: Modernization Strategies and Advanced Power System Operations *(panel)*

Tuesday, 29 July, 9:00 AM–12:00 PM *Chesapeake 4*

Sponsored by: *Power System Operations*
Chair: *D. Ton, U.S. Department of Energy*
Co-Chair: *J. Wang, Argonne National Laboratory*

Severe weather and climate events have wreaked widespread outages in recent years, causing significant damage to the economy and society. Grid resilience encompasses the ability to prepare for, withstand, and recover from disruptions to electricity delivery. Achieving grid resiliency requires development of resiliency metrics and new or enhanced electric system designs, planning, operations, and control, as well as adoption of microgrids for protecting critical loads and for serving as a grid resource for fast restoration and recovery. This panel session will feature presentations by leading researchers in reliability and resiliency of electric power systems from NERC, DOE national laboratories, and universities. The session will begin with an overview of transmission and distribution system resiliency, followed by presentations on project activities focusing on addressing resiliency of distribution grid, where a great majority of outages from climate events takes place. Further, the planning process and progress for a new DOE program initiative on resilient electric distribution R&D will be introduced.

PRESENTATIONS AND PANELISTS:

- 14PESGM2592, Distributed Control and Microgrids for Enhancing the Power System Resilience
  M. SHAHIDEHPOUR, IIT
- 14PESGM2596, Power Grid Vulnerability and Resilience
  G. CONZELMANN, Argonne National Laboratory
- 14PESGM2593, Boosting Grid Resilience Using Micro Grid Concepts
  R. GUTTROMSON, Sandia National Laboratories
- 14PESGM2594, Reliability-Focused Information Sharing during Major Grid Disturbances
  S. CHANOSKI, NERC
- 14PESGM2591, Integrating Microgrids into the Distribution System Restoration Strategy
  C. LIU, Washington State University
- 14PESGM2595, Grid Resilience: Design and Restoration Optimization
  R. BENT, Los Alamos National Lab

Transactions Paper Session *(transactions paper)*

Tuesday, 29 July, 9:00 AM–12:00 PM *Potomac 6*

Sponsored by: *Substations*
Chair: *M. Etter, ABB Inc.*

PAPERS AND AUTHORS:

- 14PESGM0340, A Novel Whole-View Test Approach for Onsite Commissioning in Smart Substation *[Transaction Number: TPWRD-01006-2012]*
  S. JING, UESTC
  Q. HUANG, UESTC
  J. WU, Sichuan Electric Power Test & Research Institute
  W. ZHEN, Sichuan Electric Power Test & Research Institute
- 14PESGM0810, Design Requirements of Wide-Area Damping Systems – Using Empirical Data from a Utility IP Network *[Transaction Number: TSG-00251-2013]*
  K. ZHU, Ventyx, an ABB company
  M. CHENINE, KTH-the Royal Institute of Technology
  L. NORDSTRÖM, KTH-the Royal Institute of Technology
  S. HOLMSTRÖM, Svenska Kraftnät
  G. ERICSSON, Svenska Kraftnät
- 14PESGM0863, Initial Parameter Estimates and Constraints to Support Gray Box Modeling of Power Transformers *[Transaction Number: TPWRD.2013.2259266]*
  S. MITCHELL, University of Newcastle
  J. WELSH, University of Newcastle
- 14PESGM1835, Reduced Switching-Frequency Voltage-Balancing Strategies for Modular Multilevel HVDC Converters *[Transaction Number: 14PESGM1835]*
  J. QIN, Purdue University
  M. SAEEDIFARD, Georgia Institute of Technology
- 14PESGM1890, Integrated Anomaly Detection for Cyber Security of the Substations *[Transaction Number: TSG-00384-2013]*
  J. HONG, Washington State University
  C. LIU, Washington State University
  M. GOVINDARASU, Iowa State University

State Estimation, Smart Grid and FACTS *(paper forum)*

Tuesday, 29 July, 9:00 AM–12:00 PM *Magnolia 2*

Sponsored by: *IEEE PES*
Chair: *M. Elizondo, Pacific Northwest National Laboratory*

- 14PESGM0005, POD Utilization Methods for STATCOMs
  S. TEEUWSEN, Siemens AG
- 14PESGM0353, Distributed State Estimation of Hybrid AC/HVDC Grids by Network Decomposition
  V. DONDE, ABB Inc
  X. FENG, ABB Inc
  I. SEGERQVIST, ABB Inc
  M. CALLAVIK, ABB Inc
- 14PESGM0358, An Improved Modular Multilevel Converter with DC Fault Blocking Capability
  R. ZENG, Energy and Environment
  L. XU, Energy and Environment
  L. YAO, China Electric Power Research Institute
- 14PESGM0453, Speed up of Data-Driven State Estimation Using Low-Complexity Indexing Method
  Y. WENG, Carnegie Mellon University
  C. FALOUTSOS, Carnegie Mellon University
  M. ILIC, Carnegie Mellon University
  R. NEGI, Carnegie Mellon University
- 14PESGM0724, SCADA-Rate Parallel State Estimation Assessed with Utility Data
  Y. CHEN, Pacific Northwest National Laboratory
  M. RICE, Pacific Northwest National Laboratory
  Z. HUANG, Pacific Northwest National Laboratory
- 14PESGM0912, A Novel Station Online Re-Commssioning Strategy for MMC-MTDC Systems
  Y. WANG, Tsinghua University
  Z. YUAN, Tsinghua University
  J. FU, Tsinghua University
  X. ZHAO, China Southern Power Grid
  Y. LI, China Southern Power Grid
  Y. HUANG, China Southern Power Grid
- 14PESGM0933, Model Validation for Improving State Estimation
  Y. GUO, Hydro One
  J. PENRICE, Hydro One
  V. CHEUK, Hydro One
- 14PESGM0976, Nonlinear Coordinated Control for Synchronous Generator Excitation and STATCOM
  L. HUI, Jiangsu University
  S. ZHI-HUANG, Jiangsu University
  W. NI, Jiangsu University
- 14PESGM1030, Impact of DC Voltage Control Parameters on AC/DC System Dynamics Under Faulted Conditions
  M. NDREKO, TU Delft
  A. VAN DER MEER, TU Delft
  M. GIBESCU, TU Delft
  M. A. M. M. VAN DER MEIJDEN, TenneT TSO B.V.
- 14PESGM1353, Tracking the Machine States Using a Linear Phasor Estimator Assisted Dynamic State Estimator
  A. ROUHANI, Northeastern University
  A. ABUR, Northeastern University
- 14PESGM1528, Networking Technology of Fault Indication System Based on ZigBee
  Z. YANG, Shandong University of Technology
  W. WEI, Shandong University of Technology
  S. XIANG, Shandong University of Technology
  F. KAIJUN, Shandong University
  X. BINGYIN, Shandong University of Technology
- 14PESGM1756, Operational Experience with Static Var Compensators in Ontario, Canada
  H. BAROT, Hydro One
  L. SINGH, Hydro One
  R. VARMA, University of Western Ontario
- 14PESGM2308, Energy Hub Optimal Sizing in the Smart Grid; Machine Learning Approach
  A. SHEIKHI, Sharif University of Technology
  M. RAYATI, Sharif University of Technology

A. RANJBAR, Sharif University of Technology
M. ADAMI, Sharif University of Technology
S. BAHRAMI, Sharif University of Technology

- 14PESGM1964, Using Smart Meters in State Estimation of Distribution Networks
  A. ALIMARDANI, University of British Columbia
  S. ZADKHAST, University of British Columbia
  J. JATSKEVICH, University of British Columbia
  E. VAAHEDI, BC Hydro
- 14PESGM2288, Estimating Power System Dynamic States Using Extended Kalman Filter
  Z. HUANG, Battelle – Pacific Northwest National Laboratory
  K. SCHNEIDER, Battelle – Pacific Northwest National Laboratory
  J. NIEPLOCHA, Battelle – Pacific Northwest National Laboratory
  N. ZHOU, Binghamton University
- 14PESGM1357, A Time-Variant Load Model Based on Smart Meter Data Mining
  X. ZHANG, Georgia Institute of Technology
  S. GRIJALVA, Georgia Institute of Technology
  M. RENO, Georgia Institute of Technology
- 14PESGM2234, Roadmap for Smart Metering Deployment for Indian Smart Grid
  M. KHAN, Cantral Power Research Institute
  A. JAIN, Central Power Research Institute
  V. ARUNACHALAM, Central Power Research Institute
  A. PAVENTHAN, Central Power Research Institute

Protection, Control and PMUs *(paper forum)*

Tuesday, 29 July, 9:00 AM–12:00 PM *Magnolia 1*

Sponsored by: *IEEE PES*
Chair: *Chengzong Pang, Wichita State University*

- 14PESGM0134, Synchrophasor Network, Laboratory and Software Applications Developed in the STRONg^{2}rid Project
  M. ALMAS, KTH Royal Institute of Technology
  M. BAUDETTE, KTH Royal Institute of Technology
  L. VANFRETTI, KTH Royal Institute of Technology
  S. LØVLUND, Statnett SF
  J. GJERDE, Statnett SF
- 14PESGM0141, Open Source SCADA Implementation and PMU Integration for Power System Monitoring and Control Applications
  M. ALMAS, KTH Royal Institute of Technology
  L. VANFRETTI, KTH Royal Institute of Technology
  S. LØVLUND, Statnett SF
  J. GJERDE, Statnett SF
- 14PESGM0418, Improved Differential Protection Scheme for Long Distance UHVDC Transmission Line
  X. ZHENG, Virginia Tech
  N. TAI, Shanghai Jiaotong University
  J. THORP, Virginia Tech
  X. YANG, ALSTOM Grid Technology Centre
- 14PESGM0441, Monitoring Voltage Collapse Margin by Measuring the Area Voltage Across Several Transmission Lines with Synchrophasors
  L. RAMIREZ, Iowa State University
  I. DOBSON, Iowa State University
- 14PESGM0452, Faulty Line Identification by Distance Relay in Series-Compensated Parallel Transmission Lines
  V. C, Indian Institute of Technology Madras
  S. SWARUP, Indian Institute of Technology Madras
- 14PESGM0580, Open Conductor Analysis and Detection
  F. VELEZ, Dominion Virginia Power
- 14PESGM0909, An Adaptive Three-Bus Power System Equivalent for Estimating Voltage Stability Margin from Synchronized Phasor Measurements
  F. HU, University of Tennessee
  K. SUN, University of Tennessee
  A. DEL ROSSO, EPRI
  E. FARANTATOS, EPRI
  N. BHATT, EPRI

- 14PESGM1116, Adaptive Out-of-Step Protection Schemes Based on Synchrophasors
  D. FAN, NYISO
  V. CENTENO, Virginia Tech
- 14PESGM1442, Fault Factor Analysis with Phasor Measurement Units
  Y. ZHANG, North China Electric Power University
  Z. WANG, North China Electric Power University
- 14PESGM1525, The Use of a PMU-Based State Estimator for Tracking Power System Dynamics
  M. ASPROU, University of Cyprus
  E. KYRIAKIDES, University of Cyprus
  S. CHAKRABARTI, Indian Institute of Technology, Kanpur
- 14PESGM1661, Protection System Misoperation Analysis
  J. BIAN, North American Electric Reliability Corp. (NERC)
  A. SLONE, North American Electric Reliability Corp. (NERC)
  P. TATRO, North American Electric Reliability Corp. (NERC)
- 14PESGM1827, Effects of Distributed Generators on Impedance-Based Fault Location Algorithms
  S. DAS, University of Texas at Austin
  S. SANTOSO, University of Texas at Austin
  A. MAITRA, Electric Power Research Institute
- 14PESGM2026, Hybrid Optimization Algorithm for Directional Overcurrent Relay Coordination
  F. BOTTURA, University of Sao Paulo – EESC/USP
  M. OLESKOVICZ, University of Sao Paulo – EESC/USP
  D. COURY, University of Sao Paulo – EESC/USP
  S. DE SOUZA, Companhia de Transmissão de Energia Elétrica Paulista, ISA-CTEEP
  M. RAMOS, Companhia de Transmissão de Energia Elétrica Paulista, ISA-CTEEP
- 14PESGM2040, Methodology for Evaluation of Relay Digital Filters during a Fault
  J. CAMPOS, UFCG
  W. NEVES, UFCG
  D. FERNANDES, UFCG
  F. COSTA, UFRN
- 14PESGM2041, A Real-Time Distributed Storage System for Multi-Resolution Virtual Synchrophasor
  T. QIAN, NC State University
  A. CHAKRABORTTY, NC State University
  F. MUELLER, NC State University
  Y. XIN, Renaissance Computing Institute
- 14PESGM2202, Challenges and Recommendations for Fault Location in Series Compensated Transmission Lines
  T. BAINS, Western University
  M. DADASH ZADEH, Western University
- 14PESGM1728, Power System Network Partitioning for SVD Based Information Retrieval Using PMU data
  J. LIM, University of Wisconsin – Madison
  C. DEMARCO, University of Wisconsin – Madison

Cyber Security Testbeds for the Smart Grid — Present and Future *(panel)*

Tuesday, 29 July, 10:00 AM–12:00 PM *Chesapeake 11*

Sponsored by: *(PSACE) Computer Analytical Methods*
Chair: *M. Govindarasu, Iowa State University*

Electric power grid is a complex cyber physical system (CPS) that forms the lifeline of modern society, and its reliable and secure operation is of paramount importance to national security and economic well-being. Recent findings, documented in government reports and literature, indicate the growing threat of cyber-based attacks in numbers and sophistication on power grid infrastructure. Moreover, increasing adoption of smart grid technologies could potentially increase the cyber exposure to attacks. The goal of this panel session is to advance the state-of-the-art R&D in cyber security and resiliency of the smart grid. In particular, the panel's topics include: opportunities and challenges that cyber security testbeds present; the state of cyber security testbeds and their applications; design and deployment experiences; cyber attack-defense evaluations; and novel CPS security testbed architectures and enabling applications. Panelists are experts from academia, national laboratories, and industries.

PRESENTATIONS AND PANELISTS:

- 14PESGM2553, A Cyber-Physical Power System Test Bed for Intrusion Detection Systems
  T. MORRIS, Mississippi State University
- 14PESGM2550, Cyber-Physical System Security Analysis with SCADA Models
  C. LIU, Washington State University

- 14PESGM2551, Cyber Security and Resilience of Smart Grids and Interdependent Infrastructures: Data, Metrics, Testbeds and Validations
  M. AMIN, University of Minnesota
- 14PESGM2552, Federated CPS Security Testbed for Scalable Smart Grid Experimentations
  A. HAHN, MITRE
- 14PESGM2554, PNNL and Cyber Security Testbeds for Energy Delivery Systems
  P. SKARE, Pacific Northwest National Laboratory
- 14PESGM2571, NIST Smart Grid Cyber Security Testbed
  V. PILLITTERI, NIST
- 14PESGM2574, TCIPG Testbeds: Enabling, Transitioning, and Commercializing Technology
  T. YARDLEY, University of Illinois, Urbana Champaign

Coordination of Regional Electricity Markets *(panel)*

Tuesday, 29 July, 10:00 AM–12:00 PM *Baltimore 2*

Sponsored by: *(PSACE) Economic Systems*
Chair: *E. Litvinov, ISO-New England*

Market coordination and regional congestion management, also known as “Seams issues”, are becoming one of the most important problems in the electricity markets, both in the USA and in Europe. Although the optimal power flow decomposition has been a subject of research for a long time, very little has been implemented in real systems. Because of this, the interties are underutilized and sometimes uneconomically scheduled, affecting overall market efficiency. ISO’s/RTO’s in the USA are actively working on the designing market coordination algorithms, however there is no well established methodology on how to solve the problem, especially in LMP-based markets. The panel will discuss current state of the market coordination and possible directions for the future.

PRESENTATIONS AND PANELISTS:

- 14PESGM0676, Implementation Methods for the European Day-Ahead Electricity Market Integration
  A. BAKIRTZIS, Aristotle University
  P. BISKAS, Aristotle University
- 14PESGM0677, Market to Market Coordination
  R. BALDICK, IEEE TCPC
- 14PESGM0679, A Possible Approach to Win-Win Long-Term Seams *[Transaction Number: XXX]*
  M. ILIC, Carnegie Mellon University
- 14PESGM0678, PJM’s Experience and Vision Ahead for Managing Seams Issues
  A. OTT, PJM
- 14PESGM0680, A Marginal Equivalent Decomposition Method for Multi-Area Optimal Power Flow Problems
  F. ZHAO, ISO New England
  E. LITVINOV, ISO New England

Challenges and Solutions of Big Data for Power System Operations *(panel)*

Tuesday, 29 July, 10:00 AM–12:00 PM *Azalea 2*

Sponsored by: *(PSACE) Intelligent Systems*
Chair: *L. Xie, Texas A&M University*
Co-Chair: *G. Kumar Venayagamoorthy, Clemson University*

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:

- 14PESGM2254, Dimensionality Reduction of Big PMU Data for Early Event Detection
  L. XIE, Texas A&M University
- 14PESGM2255, Big Data Analytics for the Control Room
  M. PARASHAR, Alstom Grid
- 14PESGM2256, Computational Approaches for Handling Big Data in Power Systems
  G. VENAYAGAMOORTHY, Clemson University
- 14PESGM2257, Big Data Analytics with High Performance Computing
  L. MIN, Lawrence Livermore National Laboratory

- 14PESGM2258, Rethinking Data-Driven Software for Sustainable Electric Energy Services: From Data Gathering, through Learning and Decision Making
  M. ILIC, Carnegie Mellon University
- 14PESGM2259, Big Data Analytics for Improved Outage Management
  M. KEZUNOVIC, Texas A&M University
- 14PESGM2260, Role of Knowledge Discovery and Data Analytics in Intelligent Control of Microgrids
  R. SHARMA, NEC LABS America
- 14PESGM2263, Big Data Analytics from Industry Perspective
  C. WELLS, University of California at San Diego

Technologies for Advanced Volt/Var Control Implementation *(panel)*

Tuesday, 29 July, 10:00 AM–12:00 PM *National Harbor 7*

Sponsored by: *Transmission and Distribution Committee*
Chair: *A. Maitra, EPRI*

Advanced approaches for VVC are being implemented to achieve benefits of energy savings, peak load reduction, and reduced losses on distribution systems. These approaches can be based on centralized control approaches, distributed controls, or a combination. Other new approaches are also being proposed that can provide more accurate voltage control across the entire feeder and also respond fast enough to deal with fluctuations associated with high PV penetration, load switching, fast electric vehicle charging, etc. The first panel session will provide updates on these technologies and application of the technologies.

PRESENTATIONS AND PANELISTS:

- 14PESGM2525, Volt/Var Control Schemes and Prioritization
  T. WEAVER, AEP
- 14PESGM2524, Integration of Advanced Metering Data for Volt/Var Control Implementation
  P. POWELL, Dominion Power
- 14PESGM2526, Advanced Volt/Var Control with Edge of the Network Control – A Field Trial
  D. LEWIS, Southern Company
- 14PESGM2527, Secondary-Side Volt/Var Technologies for Renewable Integration and VVO
  R. MCFETRIDGE, GridCo Systems

Transformation and Innovation in Power Systems *(panel)*

Tuesday, 29 July, 10:00 AM–12:00 PM *National Harbor 4*

Sponsored by: *IEEE PES*
Chair: *S. Eftekharnejad, Women in Power*
Co-Chair: *S. Bahramirad, ComEd*

This session is sponsored by the Women in Power Committee

SPEAKERS:

S. Bahramirad: Manager-Smart Grid and Technology at ComEd
J. Matevosyan: Senior Planning Engineer at ERCOT
W. Reder: Vice President – Power Systems Services at S&C Electric Company
C. Warren: Vice President – Asset Management & Innovation Officer at National Grid

Power systems have continuously evolved since the advent of electricity. With the penetration of renewable resources such as wind and solar, power systems are now evolving at an unprecedented rate. More diverse energy resources, along with low emission distributed generation resources have paved the way for realization of the microgrids. With new technologies in place, consumers are introducing new load profiles and can impact grid operations by participating in demand response programs. This panel session is dedicated to the new wave of innovative technologies in power transmission and distribution systems. The panel also discusses the challenges traditional power industry and its workforce faces while adopting these new technologies.

Tuesday Afternoon

New Wind Turbine Concepts *(panel)*

Tuesday, 29 July, 1:00 PM–3:00 PM *Azalea 2*

Sponsored by: *Electric Machinery*
Chair: *I. Erlich, University of Duisburg-Essen*

The panel will address new approaches and latest advances in the wind turbine technology.

PRESENTATIONS AND PANELISTS:

- 14PESGM2737, Changing the Game Once More – from 6 MW Direct Drive to 10 MW
  R. NELSON, Siemens
- 14PESGM2726, Harnessing More Wind Power with Less Material
  M. RICHWINE, GE
- 14PESGM1795, Cluster Wind Turbine Concept
  F. RICHERT, SkyWind GmbH
- 14PESGM1796, Variable Speed Wind Turbines based on Electro-Mechanical Differential Systems *[Transaction Number:]*
  M. WALDNER, SET Sustainable Energy Technology GmbH, Austria
- 14PESGM1797, Type 5 Wind Turbines: Directly Coupled Synchronous Generator with Hydrodynamic Gearbox – Grid Integration Aspects
  M. PÖLLER, Moeller & Poeller Engineering GmbH

Advanced Motors and Drives for Transportation *(panel)*

Tuesday, 29 July, 1:00 PM–5:00 PM *Chesapeake 11*

Sponsored by: *Electric Machinery*
Chair: *T. Wu, Universtity of Central Florida*
Co-Chair: *I. Husain, NC State University*

There are active research and development in electric motors for HEV and EV applications. Some panelists will present the latest research and developments of some unique machine structures, switched reluctance motors, DC biased machines, and some status reviews. The session also includes aircraft motor applications.

PRESENTATIONS AND PANELISTS:

- 14PESGM2610, Overview of High-Performance Torque Control of Switched Reluctance Motor Drive System
  S. PANDA, National University of Singapore
- 14PESGM2611, Development of a Switched Reluctance Generator for Hybrid Electric Vehicle
  A. CHIBA, Tokyo Institute of Technology
- 14PESGM2612, HEV/BEV NVH Issues Caused by Electric Machine Drive Components and Mitigation Using Advanced Motor Control
  J. ZHANG, Oregon State University
- 14PESGM2613, Double Stator Switched Reluctance Motor Drives
  B. FAHIMI, University of Texas at Dallas
- 14PESGM2614, DC Biasing for Extended Speed Operation of AC Machines
  Y. SOZER, University of Akron
- 14PESGM2615, Advanced Electric Machines and Drive for Electric Vehicles
  R. QU, Huazhong University of Science & technology
- 14PESGM2616, A New and More Accurate Nonlinear Dynamical Model of PM Motor for More Electric Aircraft
  D. WOODBURN, General Electric Aviation

Transaction Presentations on Electric Machines, Energy Development and Power Generation *(transactions paper)*

Tuesday, 29 July, 1:00 PM–5:00 PM *National Harbor 6*

Sponsored by: *Electric Machinery Committee and Energy Development and Power Generation Committee*
Chair: *O. Mohammed, Florida International University*

PAPERS AND AUTHORS:

- 14PESGM1312, Explicit Formulations for Constant-Parameter Voltage-Behind-Reactance Interfacing of Synchronous Machine Models *[Transaction Number: TEC-00275-2013]*
  M. CHAPARIHA, University of British Columbia
  F. THERRIEN, University of British Columbia
  J. JATSKEVICH, University of British Columbia
  H. DOMMEL, University of British Columbia
- 14PESGM1315, Efficient Explicit Representation of AC Machines Main Flux Saturation in State-Variable-Based Transient Simulation Packages *[Transaction Number: TEC-00422-2012]*
  F. THERRIEN, University of British Columbia
  L. WANG, ABB Sweden Corporate Research
  J. JATSKEVICH, University of British Columbia
  O. WASYNCZUK, Purdue University
- 14PESGM1873, Fault Diagnosis of the Asynchronous Machines Through Magnetic Signature Analysis Using Finite-Element Method and Neural Networks *[Transaction Number: TEC-00297-2013]*
  M. BARZEGARAN, Florida International University
  A. MAZLOOMZADA, Florida International University
  O. MOHAMMED, Florida International University
- 14PESGM0006, Impact of Wakes on Wind Farm Inertial Response *[Transaction Number: 10.1109/TSTE.2013.2280664]*
  S. KUENZEL, Imperial College London
  L. KUNJUMUHAMMED, Imperial College London
  B. PAL, Imperial College London
  I. ERLICH, University of Duisburg-Essen
- 14PESGM1509, A Battery Energy Storage System Dual-Layer Control Strategy for Mitigating Wind Farm Fluctuations *[Transaction Number: 10.1109/TPWRS.2013.2244925]*
  Q. JIANG, Zhejiang University
  Y. GONG, Zhejiang University
  H. WANG, Zhejiang University
- 14PESGM0117, A Novel Fault Tolerant DFIG based Wind Energy Conversion System for Seamless Operation during Grid Faults *[Transaction Number: TPWRS-00651-2013.R1]*
  P. KANJIYA, Masdar Institute of Science & Technology
  B. AMBATI, Masdar Institute of Science & Technology
  V. KHADKIKAR, Masdar Institute of Science & Technology
- 14PESGM0904, Semi-Definite Programming (SDP) for Power Output Control in Wind Energy Conversion System *[Transaction Number: TSTE-00221-2013]*
  Z. JIN, University of Tennessee
  F. LI, University of Tennessee
  X. MA, University of Tennessee
  S. DJOUADI, University of Tennessee
- 14PESGM0683, Optimal Feature and Decision Tree Based Classification of Power Quality Disturbances in Distributed Generation Systems *[Transaction Number: TSTE-00080-2013.R1]*
  P. RAY, International Institute of Information Technology
  S. MOHANTY, Motilal Nehru National Institute of Technology
  N. KISHOR, Motilal Nehru National Institute of Technology
  J. CATALAO, Univ. Beira Interior
- 14PESGM0416, Integrating Hybrid Power Source into an Islanded MV Microgrid Using CHB Multilevel Inverter under Unbalanced and Nonlinear Load Conditions *[Transaction Number: TEC-00578-2012]*
  M. HAMZEH, Shahid Beheshti University
  A. GHAZANFARI, University of Alberta
  H. MOKHTARI, Sharif University of Technology
  H. KARIMI, Polytechnique de Montreal

Network Development in Europe – The DC Grid Option *(panel)*

Tuesday, 29 July, 1:00 PM–5:00 PM *Azalea 3*

Sponsored by: *Energy Development and Power Generation*
Chair: *D. Westermann, Ilmenau University of Technology*
Co-Chair: *A. Orths, Energinet.dk*

The energy revolution places new requirements on the transmission system in Europe. Within the next assets for long distance bulk power transmission need to be built. Root causes are wind power integration in the north of Europe and solar power production in south. In the last consequence a new network layer will be built which is referred to as an overlay grid. With respect to the transmission requirements

the DC grid option is supposed to be the most economic solution. 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:

- 14PESGM2666, DC Grid Code Requirements
  D. VAN HERTEM, K.U.Leuven
- 14PESGM2667, DC Compact Systems
  H. KOCH, Siemens AG
- 14PESGM2668, Impact of DC Voltage Control Parameters on AC/DC System Dynamics Under Faulted Conditions
  M. NDREKO, TU Delft
- 14PESGM2669, Influencing Factors for Oscillations within Meshed HVDC Grids and Consequences for DC Voltage Control
  A. MARTEN, Technische Universität Ilmenau
- 14PESGM2670, Multiterminal HVDC grids
  C. BARKER, ALSTOM Grid
- 14PESGM2671, The Gridtech Perspective
  A. ANDREA MANSOLDO, Eirgrid

Cyber Physical Systems Challenges for the Power Grid of the Future *(panel)*

Tuesday, 29 July, 1:00 PM–5:00 PM *National Harbor 7*

Sponsored by: *Power & Energy Education Committee*
Chair: *A. Pahwa, Kansas State University*
Co-Chair: *R. Baheti, National Science Foundation*

Conventional power systems are undergoing major changes due to integration of advanced communication, computing, and power electronics to change the power system from a static infrastructure to a dynamic infrastructure with proactive delivery management. Migrating to smart grid serves an important role in facilitating energy efficiency programs and the integration of renewable and distributed generation (DG). Integration of Cyber Physical Systems (CPS) concepts with power systems is currently one of the most active and dynamic topic in the emerging field of power and energy systems for their migration to smart grid. New systems and tools are needed for the next generation power and energy systems, which are expected to have large penetration of renewal resources both at the bulk and distributed level, and high penetration of electric vehicles. The presentations will discuss the challenges and opportunities to prepare a roadmap for integration of CPS research into power systems.

PRESENTATIONS AND PANELISTS:

- 14PESGM2437, Cyber-Physical Systems Program at NSF
  R. BAHETI, National Science Foundation
- 14PESGM2439, TBD
  S. VENKATA, Alstom
- 14PESGM2440, Cyber-Physical Security within KCP&L's Comprehensive SmartGrid Demonstration
  B. MENGE, Kansas City Power & Light
- 14PESGM2436, Potential Developments in Distribution Engineering
  G. HEYDT, ASU
- 14PESGM2441, Modeling Distributed Control and Communications for the Power System
  K. TOMSOVIC, University of Tennessee
- 14PESGM2438, Markets 3.0 – Integrating Distributed Resources and the Demand Side into the Markets
  R. MASIELLO, DNV GL

Energy Saving Devices – Combo Session with ESD Working Group *(panel)*

Tuesday, 29 July, 1:00 PM–5:00 PM *Camellia 1*

Sponsored by: *Power System Instrumentation and Measurements*
Chair: *E. So, National Research Council of Canada*
Co-Chair: *F. Rahmatian, Quanta Technology*

Energy Saving Devices – The story of energy storage devices; the utility's role in handling "black boxes" being sold to its customers; understanding the test or measurement data; steps to take to assess an unknown device; managing grid losses with proactive measures; and relationship between electric energy eavings, power factors, and carbon footprint.

PRESENTATIONS AND PANELISTS:

- 14PESGM2620, The Story of False Energy Storage Devices
  A. EMANUEL, WPI
- 14PESGM2619, The Utility's Role in Handling "Black Boxes" Being Sold to its Customers
  D. HANSEN, PacifiCorp
- 14PESGM2621, Understanding How RESD Vendors Twist Test or Measurement Data to Support Savings Claims
  B. HOWE, EPRI
- 14PESGM2623, Steps to Take to Assess an Unknown Device
  T. UNRUH, DOE
- 14PESGM2624, Steps to Take to Assess an Unknown Device
  R. BINGHAM, Dranetz
- 14PESGM2618, Managing Network Losses with Proactive Measures
  W. LUAN, China EPRI
- 14PESGM2622, Regarding Electric Energy Savings, Power Factors, and Carbon Footprint
  G. FITZPATRICK, National Institute of Standards and Technology
- 14PESGM2625, Regarding Electric Energy Savings, Power Factors, and Carbon Footprint
  T. NELSON, National Institute of Standards and Technology

Complexity versus Simplification in Electricity Markets *(panel)*

Tuesday, 29 July, 1:00 PM–5:00 PM *National Harbor 5*

Sponsored by: *Power System Operations*
Chair: *B. Hobbs, Johns Hopkins University*
Co-Chair: *S. Oren, UC Berkeley*

As US RTO markets have evolved over the last decade, they have become increasingly complex in their representations of network and security constraints, the numbers and types of ancillary services, the internal constraints of generation and demand bidders, and the array of financial products, such as financial transmission rights. Meanwhile, most European markets have opted to retain simple structures, such as one-part bids, zonal or copper-plate pricing, and separate (or non-existent) markets for ancillary services. Does greater fidelity to physical constraints increase or decrease market transparency, efficiency, and access? Do they multiply or reduce gaming opportunities, as in the recent JP Morgan case? Does adding more products, such as short-run flexiramp or long-run flexible capacity markets, with finer geographic texture serve the goals of reducing costs to consumers and enhancing reliability? When do incremental market enhancements cumulate to the point that the design should be evaluated and rethought from top to bottom? The panel is in part inspired by the lively controversy over the recent blog by Prof. James Bushnell on the topic; the blog and the many responses can be found at http://energyathaas.wordpress.com/2013/08/12/jp-morgan-and-market-complexity/

PRESENTATIONS AND PANELISTS:

- 14PESGM2497, None
  J. BUSHNELL, UC Davis
- 14PESGM2746, None
  E. WOLFE, Resero, Inc.
- 14PESGM2715, None
  C. BATLLE, Universidad Pontificia Comillas
- 14PESGM2718, None
  A. CLAXTON, APX
- 14PESGM2499, None
  J. ELLIS, Independent Consultant
- 14PESGM2717, Efficiency First
  R. O'NEILL, FERC
- 14PESGM2716, None
  A. PAPALEXOPOULOS, ECCO
- 14PESGM2500, None
  H. SINGH, Goldman-Sachs
- 14PESGM2498, None
  M. WHITE, ISO-New England

System Control Realated Topics *(transactions paper)*

Tuesday, 29 July, 1:00 PM–5:00 PM *Chesapeake 4*

Sponsored by: *Power System Operations*
Chair: *K. Hedman, ASU*

PAPERS AND AUTHORS:

- 14PESGM0016, Calculating Individual Resources Variability and Uncertainty Factors Based on Their Contributions to the Overall System Balancing Needs *[Transaction Number: TSTE-00146-2013]*
  P. DU, ERCOT
- 14PESGM0582, A New and Fast Method for Preventive Control Selection in Voltage Stability Analysis *[Transaction Number: TPWRS-01341-2012]*
  M. MANSOUR, University of Sao Paulo
  E. LUIS GERALDI JUNIOR, University of Sao Paulo
  L. FERNANDO COSTA ALBERTO, University of Sao Paulo
  R. ANDRADE RAMOS, University of Sao Paulo
- 14PESGM0949, Robustness of Commissioned Coordinated Q–V Controller for Multi-machine Power Plant *[Transaction Number: TPWRS-00327-2012]*
  J. DRAGOSAVAC, Electrical Engineering Institute Nikola Tesla
  Ž. JANDA, Electrical Engineering Institute Nikola Tesla
  J. MILANOVIC, Univerisity of Manchester
  D. ARNAUTOVIC, Electrical Engineering Institute Nikola Tesla
- 14PESGM0954, Real-Time Monitoring of Short-Term Voltage Stability Using PMU Data *[Transaction Number: TPWRS-00608-2012.R3]*
  S. DASGUPTA, Iowa State University
  M. PARAMASIVAM, Iowa State University
  U. VAIDYA, Iowa State University
  V. AJJARAPU, Iowa State University
- 14PESGM1493, On-line Voltage Control in Distribution Systems with Multiple Voltage Regulating Devices *[Transaction Number: IEEE TRANSACTIONS ON SUSTAINABLE ENERGY/1949-3029 © 2013 IEEE/]*
  D. RANAMUKA, University of Wollongong
  A. AGALGAONKAR, University of Wollongong
  K. MUTTAQI, University of Wollongong
- 14PESGM2057, Analysis of Conservation Voltage Reduction Effects Based on Multistage SVR and Stochastic Process *[Transaction Number: TSG-00416-2013]*
  Z. WANG, Georgia Institute of Technology
  M. BEGOVIC, Georgia Institute of Technology
  J. WANG, Argonne National Laboratory
- 14PESGM2071, A Multi-Objective PMU Placement Method Considering Measurement Redundancy and Observability Value under Contingencies *[Transaction Number: TPWRS-00907-2011]*
  S. MAZHARI, Amirkabir University of Technology
  H. MONSEF, University of Tehran
  H. LESANI, University of Tehran
  A. FEREIDUNIAN, K. N. Toosi University of Technology

Asset Management *(panel)*

Tuesday, 29 July, 1:00 PM–5:00 PM *Chesapeake 2*

Sponsored by: *Power System Planning and Implementation*
Chair: *A. McGrail, National Grid USA*

PRESENTATIONS AND PANELISTS:

- 14PESGM2369, Investment Planning: “Managing the Money”
  S. VARADAN, UISOL
- 14PESGM2370, Risk – Definitions, Applications, Links to Standards such as ISO 55000
  A. MCGRAIL, National Grid USA
- 14PESGM2371, Spares & Contingency Planning – Demonstrating Value
  J. ROACH, Hartford Steam Boiler
- 14PESGM2372, Spares & Contingency Planning – Demonstrating Value from Critical Spares Holdings
  G. HAMOUD, Hydro One Inc.
- 14PESGM2373, Data Management
  K. ELKINSON, Doble Engineering Co.
- 14PESGM2374, Asset Specification & Standardization: Link to Efficiency and Value
  A. SINGH, UWI
- 14PESGM2375, Investment Planning: “Managing the Money”
  C. PUNT, Xcel Energy
- 14PESGM2376, Identifying Critical Components on the System
  K. BUTZ, Magna

- 14PESGM2377, Maintenance Justification & Planning
  G. DOORMAN, NTNU
- 14PESGM2378, Condition & Performance Monitoring – Remnant Life Estimation
  N. FANTANA, ABB
- 14PESGM2379, System Renewal, Obsolescence
  J. BRASHER, Ovante LLC
- 14PESGM2380, Cyber & Physical Security
  G. BENNETT, Xcel Energy
- 14PESGM2381, Condition & Performance Monitoring – Remnant Life ...
  B. SPARLING, Dynamic ratings
- 14PESGM2382, Maintenance Justification & Planning
  H. BASHUALDO, Siemens Industry
- 14PESGM2383, Identifying Critical Components on the System
  G. SHEBLE, EPMT Inc.
- 14PESGM2384, Cyber Security
  K. CORCORAN, Tollgrade

Data Mining for Power Market Regulatory Issues *(panel)*

Tuesday, 29 July, 1:00 PM–3:00 PM *Magnolia 3*

Sponsored by: *(PSACE) Intelligent Systems*
Chair: *Z. Vale, Polytechnic of Porto*

The operation of electricity markets around the world is producing a huge volume of data, of diverse nature. A significant part of this date is in the public domain and can be used by the players operating in these markets. However, knowledge discovery techniques are not being adequately used so that relevant information and knowledge is made available. The envisaged information and knowledge should be especially important to address regulatory issues and analyze the impact of regulatory schemes on market players.

PRESENTATIONS AND PANELISTS:

- 14PESGM1867, Global Data Clustering for Power Market Data
  H. MORI, Meiji University
- 14PESGM1869, Towards a Unified European Electricity Market: The Contribution of Data-Mining to Support Realistic Simulation Studies
  T. PINTO, Polytechnic of Porto
  G. SANTOS, Polytechnic of Porto
  I. F. PEREIRA, Polytechnic of Porto
  R. FERNANDES, Polytechnic of Porto
  T. M. SOUSA, Polytechnic of Porto
  I. PRAÇA, Polytechnic of Porto
  Z. VALE, Polytechnic of Porto
  H. MORAIS, Technical University of Denmark (DTU)
- 14PESGM1969, Mining Power Market Data: Challenges and Opportunities
  Z. FAN, PJM
- 14PESGM2171, Application of High Performance Computing for Analysis of Demand Side Response Data
  I. KOCKAR, University of Strathclyde
  M. PLECAS, University of Strathclyde

Detection of Incipient Faults Using Waveform Analytics *(panel)*

Tuesday, 29 July, 1:00 PM–3:00 PM *National Harbor 8*

Sponsored by: *Transmission and Distribution Committee*
Chair: *D. Russell, Texas A&M University*

Utility companies operate distribution feeders in a reactive mode, waiting for failures to occur and then reacting to make repairs and restore service. This has been necessary largely because utility companies historically have lacked means to provide “visibility” regarding feeder health and operation. Electrical waveforms contain substantial important information regarding feeder faults, incipient equipment failures, and other events, but that “important” information must be extracted from the underlying, mundane data. Extracting appropriate information provides visibility of system health and operation, thereby enabling condition-based maintenance, improvements in reliability, and better operational efficiency. This panel will discuss methods and share actual experiences on incipient fault detection using waveform analytics. Improved visibility of feeder health and operation is an important feature of the future smart grid.

PRESENTATIONS AND PANELISTS:

- 14PESGM2512, Analysis of Low Magnitude Failure Signatures Using DFA Analytics
  J. WISCHKAEMPER, Texas A&M University
- 14PESGM2513, Incipient Fault Detection Using IEDs and Real-Time Substation Analytics
  M. MOUSAVI, ABB, Inc.
- 14PESGM2511, Using Power Quality Monitors and Digital Relays for Incipient Fault Detection and Notification
  D. SABIN, Electrotek Concepts
- 14PESGM2514, Operational Use of Incipient Fault Detection Data for Improved Distribution Operations
  J. BOWERS, Pickwick Electric Coop.
- 14PESGM2549, Determining the Location and Cause of Faults in Power Distribution System with an Arc Voltage Evaluation Method
  M. TREMBLAY, IREQ

Natural Disaster Preparedness, Planning and Response *(super session – panel)*

Tuesday, 29 July, 1:00 PM–5:00 PM *Potomac C*

Sponsored by: *PES Technical Council*
Chair: *H. Chen, PJM*

Natural disasters, such as hurricanes, storms, earthquakes, and Polar Vortex this winter, caused massive power outages across the countries and left millions people out of power for extended time. Looking back, it is important to summarize the experiences and challenges, and learn from them. How can we be better prepared in the future in terms of planning, response and recovery? How can new technologies come to help, so that in the future, the grid will be better prepared for the disasters, be less impacted, and recover fast? This supersession will gather the experts from RTO/ISO, utilities, vendor/consulting companies and academia, to discuss the experiences on natural disaster planning and restoration, infrastructure hardening and system resiliency through strategic asset management, micro-grids, as well as new decision support technologies.

PANELISTS:

1. PJM's Experiences on Natural Disaster Planning and Response, M. BRYSON, PJM
2. Energy Strong – PSE&G's Infrastructure Hardening and Resiliency Program in Response to Super Storm Sandy, J. L. CARDENAS, PSEG
3. Managing Asset to Achieve System Resiliency, B. SNYDER and D. NOVOSEL, Quanta Technology
4. Response and Recovery of the Distribution Grid During Extreme Events, C.-C. LIU, Washington State University
5 . Resiliency Contributions from Microgrids, S. W. PULLINS, Green Energy Corp.
6. Storm Hardening Initiatives of Consolidated Edison Company of New York, Inc., G. REILLY, Consolidated Edison Company of New York, Inc.

Strategies for Integrating Distributed Renewables with Grid Operation in the US Capital Region *(panel)*

Tuesday, 29 July, 1:00 PM–5:00 PM *Potomac 1*

Sponsored by: *Local Organizing Committee*
Chair: *J. LoPorto, PHI*

The onset of renewable energy resources distributed throughout the T&D system introduces some challenges to grid operation and maintaining safety and reliability. This panel will address current activities in the US Capital region including integration of photovoltaic resources and fuel cells, as well as overall grid issues and approaches and industry efforts to support flexibility and standards development.

PRESENTATIONS AND PANELISTS:

- 14PESGM2547, Addressing the Challenge of Higher Penetrations of Intermittent Resources
  S. STEFFEL, PHI
- 14PESGM2548, Resilient Microgrids and Back-Up Power by Pairing Solar with Storage Behind the Meter
  L. ORTIZ, Solar Grid Storage
- 14PESGM2546, DER Interconnection and Integration – Issues, Opportunities, and Future Trends
  T. KEY, EPRI
- 14PESGM2569, Evolution of PV Inverter Technologies for Addressing High Penetration Utility Issues
  S. HONG, Solectria Renewables

- 14PESGM2573, Changing Drivers for DER
  J. MURACH, BGE

Microgrid Control *(panel)*

Tuesday, 29 July, 2:00 PM–5:30 PM *Chesapeake 7*

Sponsored by: *Power System Dynamic Performance Committee*
Chair: *C. Canizares, University of Waterloo*
Co-Chair: *J. Reilly, Reilly Associates*

This session will start with the Meeting of the PSDP Task Force on Microgrid Control and will be followed by the proposed Panel Session. Both events must be scheduled for the same room. The Microgrid Control Panel Session will discuss the main results of the survey document on microgrid control prepared by the Microgrid Control Task Force sponsored by the Power System Dynamic Performance Committee. It will also discuss some more recent advances in microgrid control technologies and approaches, presented by experts on the subject from across the world.

PRESENTATIONS AND PANELISTS:

- 14PESGM1695, Update of Microgrid Control Trends
  A. MEHRIZI-SANI, Washington State University
- 14PESGM1697, Update of Microgrid EMS Trends
  D. OLIVARES, Pontificia Universidad Catolica de Chile
- 14PESGM1700, Microgrid Controllers – Requirements and Specifications
  Y. XU, Oak Ridge National Laboratory
- 14PESGM1698, Optimal Voltage and Power Balance Control for Microgrids
  M. MARMIROLI, Mitsubishi Electric Corporation
- 14PESGM1696, Synchrophasor Applications for Decoupled Control of Microgrids
  C. WELLS, University of California at San Diego
- 14PESGM1701, On the Explicit Control of Microgrids: A Composable Method
  M. PAOLONE, École Polytechnique Fédérale de Lausanne
- 14PESGM1699, Microgrid Modeling and Dispatch Controls for Participation in Wholesale and Retail Power Markets
  M. WEBSTER, ICETEC Energy Services

Modern Information Technologies in the Computerized Operation of Power Systems *(panel)*

Tuesday, 29 July, 2:00 PM–5:00 PM *Chesapeake A*

Sponsored by: *Power System Operations*
Chair: *S. Savulescu, Energy Consulting International, Inc*

The utility information systems of today, such as SCADA, SCADA/EMS, SCADA/DMS and SAS, are predicated on the same networking concepts and deploy the same types of servers and workstations as the information systems from any other industry. This induces us to ask whether the current IT paradigms such as server virtualization and cloud computing can be used in power system control center environments. If “yes”, the next question is to what extent such technologies have already been deployed in control centers and with what results and benefits. Accordingly, the objectives of the Modern Information Technologies in the Computerized Operation of Power Systems panel are to shade light on these topics and to identify other platform trends that might be worth pursuing. The invited panelists will address topics: implementation of virtualization technologies in SCADA/EMS/DMS systems; potential for using cloud computing techniques in a utility information system.

PRESENTATIONS AND PANELISTS:

- 14PESGM1586, Obsolescence in Utility Information Systems. What It Is and How the IT Paradigms of Today Can Prevent It
  S. SAVULESCU, Energy Consulting International, Inc
- 14PESGM1582, Early Experience with Cloud Computing at ISO New England
  E. LITVINOV, ISO-New England
- 14PESGM1583, Lessons Learnt from Deploying Virtualized Control Room Solutions and Migrating towards a Cloud Based Infrastructure
  A. JAYANTILAL, Alstom
- 14PESGM1584, Virtualization Technologies in SCADA/EMS/DMS/OMS
  N. SABELLI, Ventyx an ABB Company
- 14PESGM1631, Virtualization and Reliability of Information Technology Systems for Power Systems Control
  R. PRADHAM, Siemens

Electric Vehicles and Wind Power *(transactions paper)*

Tuesday, 29 July, 2:00 PM–5:00 PM *Camellia 2*

Sponsored by: *Power System Planning and Implementation*
Chair: *A. Li, Southern California Edison*

- 14PESGM0080, Aggregation Model-Based Optimization for Electric Vehicle Charging Strategy *[Transaction Number: TSG2242207]*
  J. ZHENG, Tsinghua University
  X. WANG, Carleton University
  K. MEN, China Southern Power Grid Corporation
  C. ZHU, Microsoft Corporation
  S. ZHU, Tsinghua University
- 14PESGM0394, Location-Based Forecasting of Vehicular Charging Load on the Distribution System *[Transaction Number: TSG-00212-2013]*
  N. GHIASNEZHAD, University of Manitoba
  S. FILIZADEH, University of Manitoba
- 14PESGM0524, Packetized Plug-in Electric Vehicle Charge Management *[Transaction Number: TSG-00872-2012.R3]*
  P. REZAEI, University of Vermont
  J. FROLIK, University of Vermont
  P. HINES, University of Vermont
- 14PESGM0613, A Comprehensive Study of the Impacts of PHEVs on Residential Distribution Networks *[Transaction Number: 10.1109/TSTE.2013.2284573]*
  M. ELNOZAHY, University of Waterloo
  M. SALAMA, University of Waterloo
- 14PESGM1533, Modeling Intelligent Energy Systems: Co-Simulation Platform for Validating Flexible-Demand EV Charging Management *[Transaction Number: TSG-00710-2012]*
  P. PALENSKY, AIT Austrian Institute of Technology
  E. WIDL, AIT Austrian Institute of Technology
  M. STIFTER, AIT Austrian Institute of Technology
  A. ELSHEIKH, AIT Austrian Institute of Technology
- 14PESGM0910, Planning Active Distribution Networks Considering Multi-DG Configurations *[Transaction Number: 10.1109/TPWRS.2013.2282343]*
  S. AL KAABI, Masdar Institute of Science and Technology
  H. ZEINELDIN, Masdar Institute of Science and Technology
  V. KHADKIKAR, Masdar Institute of Science and Technology

Impacts of Renewable Generation *(paper forum)*

Tuesday, 29 July, 2:00 PM–5:00 PM *Magnolia 1*

Sponsored by: *IEEE PES*
Chair: *D. Manjure, Miso Energy*

- 14PESGM0010, Analysis of Transient Overvoltage Phenomena due to Direct Lightning Strikes on Wind Turbine Blade
  N. MALCOLM, University of Bath
  R. AGGARWAL, University of Bath
- 14PESGM0044, Influence of the Increasing Non-Synchronous Generation on Small Signal Stability
  H. CHAMORRO, KTH Royal Institute of Technology
  M. GHANDHARI, KTH Royal Institute of Technology
  R. ERIKSSON, KTH Royal Institute of Technology
- 14PESGM0221, Characteristics of Sequence Impedances of DFIG Wind Farm and the Impacts on the Phase Selection Elements
  S. SHEN, Shanghai Jiao Tong University
  P. ZHANG, Shanghai Jiao Tong University
- 14PESGM0290, Wind Power Uncertainty Modeling Considering Spatial Dependence Based on Pair-Copula Theory
  Q. LU, Tsinghua University
  W. HU, Tsinghua University
  Y. MIN, Tsinghua University
  F. YUAN, NARI Technology Development Co., Ltd
  Z. GAO, NARI Technology Development Co., Ltd

- 14PESGM0316, Energy Yield Losses due to Emulated Inertial Response with Wind Turbines
  J. VAN DE VYVER, Ghent University
  T. VANDOORN, Ghent University
  J. DE KOONING, Ghent University
  B. MEERSMAN, Ghent University
  L. VANDEVELDE, Ghent University
- 14PESGM0354, Validation of Wind Turbine Generator Stability Models for Wind Generation Interconnection Studies
  M. BORODULIN, New York Independent System Operator (NYISO)
- 14PESGM0379, Frequency Response with Significant Wind Power Penetration: Case Study of a Realistic Power System
  N. MASOOD, University of Queensland
  R. YAN, University of Queensland
  T. SAHA, University of Queensland
- 14PESGM0443, Impact Analysis of Wind Power Injection on Time-Scale Separation of Power System Oscillations
  S. CHANDRA, North Carolina State University
  M. D. WEISS, North Carolina State University
  A. CHAKRABORTTY, North Carolina State University
  D. F. GAYME, Johns Hopkins University
- 14PESGM0655, Coordinated Voltage Control Strategy of Wind Farms Cluster Considering Wind Power Fluctuation
  Y. SHUO, China Electric Power Research Institute
  W. WEISHENG, China Electric Power Research Institute
  L. CHUN, China Electric Power Research Institute
  H. YUEHUI, China Electric Power Research Institute
- 14PESGM0745, Approximate Dynamic Programming based Supplementary Frequency Control of Thermal Generators in Power Systems with Large-Scale Renewable Generation Integration
  W. GUO, Tsinghua University
  F. LIU, Tsinghua University
  S. MEI, Tsinghua University
  J. SI, Arizona State University
  D. HE, Georgia Institute of Technology
  R. HARLEY, Georgia Institute of Technology
- 14PESGM0783, Effects of Wind Penetration in the Scheduling of a Hydro-Dominant Power System
  S. SILVA, UNIFEI
  A. QUEIROZ, UNIFEI
  L. LIMA, UNIFEI
  J. LIMA, UNIFEI
- 14PESGM0809, Sensorless Control for Wind Energy Conversion System (WECS) with Power Quality Improvement
  M. BENADJA, École de Technologie Supérieure
  A. CHANDRA, École de Technologie Supérieure
- 14PESGM1072, Offshore Wind Power Impact on Peak Load Regulation of Power Systems
  Q. CHEN, Queen's University Belfast
  T. LITTLER, Queen's University Belfast
  J. WENLING, North China University of Electric Power
  H. WANG, North China University of Electric Power
- 14PESGM1450, Economic Dispatch with Ramp Constraints Concerning Wind Power Uncertainty
  M. LI, South China University of Technology
  T. JI, South China University of Technology
  Q. WU, South China University of Technology
  P. WU, Shenzhen Institute of Advanced Technology
- 14PESGM1825, Oscillation Damping Contributions of Variable-Speed Wind Generators in the Eastern Interconnection (EI)
  Y. LIU, University of Tennessee, Knoxville
  Y. LIU, University of Tennessee, Knoxville
  J. GRACIA, Oak Ridge National Laboratory
  T. KING, Oak Ridge National Laboratory
- 14PESGM2176, Short-Term Voltage Instability Detections of Wind Generators Using Synchrophasors
  J. LIU, National Tsing Hua University
  C. CHU, National Tsing Hua University

- 14PESGM1908, Maximzing Renewable Energy Penetration through Distribution Network Reconfiguration Using Mixed-Integer Conic Programming
  Y. YANG, Systems Engineering Institute, MOE KLINNS Lab
  X. GUAN, Systems Engineering Institute, MOE KLINNS Lab
  Q. ZHAI, Systems Engineering Institute, MOE KLINNS Lab
  J. WU, Systems Engineering Institute, MOE KLINNS Lab
  X. LEI, Systems Engineering Institute, MOE KLINNS Lab
- 14PESGM2229, Condition Based Maintenance Optimization of Wind Turbine System Using Degradation Prediction
  E. PAZOUKI, University of Akron
  H. BAHRAMI, University of Akron
  S. CHOI, University of Akron
- 14PESGM0345, Control Strategy of System Coordination in Nanao Multi-Terminal VSC-HVDC Project for Wind Integration
  J. FU, Tsinghua University
  Z. YUAN, Tsinghua University
  Y. WANG, Tsinghua University
  S. XU, China Southern Power Grid
  W. WEI, China Southern Power Grid
  Y. LUO, China Southern Power Grid

Power System Operations *(paper forum)*

Tuesday, 29 July, 2:00 PM–5:00 PM *Magnolia 2*
Sponsored by: *IEEE PES*
Chair: *M. Ni, NARI Group Corporation*

- 14PESGM0018, Transmission Voltage Support Using Distributed Static Compensation
  X. XU, S&C Electric Company
  M. BISHOP, S&C Electric Company
  E. CAMM, S&C Electric Company
  M. EDMONDS, S&C Electric Company
- 14PESGM0052, Optimizing the Generator Start-Up Sequence after a Power System Blackout
  C. SHEN, Electrical Engineering
  P. KAUFMANN, Computer Engineering Group
  M. BRAUN, Electrical Engineering
- 14PESGM0097, Comparison of Design Concepts for AC Low Voltage Distribution Networks
  J. DICKERT, Technische Universität Dresden
  G. SETH, Indian Institute of Technology Roorkee
  P. SCHEGNER, Technische Universität Dresden
- 14PESGM0171, Robust SCUC with Load and Wind Uncertain Intervals
  B. HU, Clarkson University
  L. WU, Clarkson University
- 14PESGM0215, A Utility Perspective on Ferroresonant Overvoltages
  A. NASSIF, ATCO Electric
- 14PESGM0376, Optimal Transmission Switching Based on Auxiliary Induce Function
  Z. YANG, Tsinghua University
  H. ZHONG, Tsinghua University
  Q. XIA, Tsinghua University
- 14PESGM0432, Cooperative Control of Interconnected Power System Load-Frequency based on Differential Games
  H. CHEN, South China University of Technology
  X. JIN, China Southern Power Grid
  R. YE, South China University of Technology
- 14PESGM0462, Effective Management of Post Fault Conditions in Power Distribution Networks
  S. CHHAJTA, Abu Dhabi Distribution Co.
  D. AL UZRI, Abu Dhabi Distribution Co.
  P. KUMAR E.M., Abu Dhabi Distribution Co.
  N. SHENOY, Abu Dhabi Distribution Co.
- 14PESGM0547, A Model Based Fault Locating Method for Distribution Systems
  M. BARAN, North Carolina State University
  A. PADMANABHAN, North Carolina State University
  S. CHOUHAN, Leidos Inc.
  X. YUAN, North Carolina State University
  J. SMITH, North Carolina State University
  H. MAYFIELD, MonPower

- 14PESGM0603, Comparison of Scenario Reduction Techniques for the Stochastic Unit Commitment
  Y. DVORKIN, University of Washington
  Y. WANG, University of Washington
  H. PANDZIC, University of Washington
  D. KIRSCHEN, University of Washington
- 14PESGM0610, A Matrix Converter based Voltage Regulator for MV Rural Feeders
  M. ALI, CQU
  P. WOLFS, CQU
- 14PESGM0621, An Efficient Approach for Solving Large Stochastic Unit Commitment Problems Arising in a California ISO Planning Model
  T. PARRIANI, University of Bologna
  G. CONG, IBM TJ Watson Research Center
  C. MEYERS, Lawrence Livermore National Laboratory
  D. RAJAN, Lawrence Livermore National Laboratory
- 14PESGM0709, Design and Implementation of Real-Time Off-Grid Detection Tool Based on FNET/GridEye
  J. GUO, University of Tennessee
  Y. ZHANG, University of Tennessee
  Y. LIU, University of Tennessee
  M. YOUNG, Oak Ridge National Laboratory
  P. IRMINGER, Oak Ridge National Laboratory
  A. DIMITROVSKI, Oak Ridge National Laboratory
  P. WILLGING, U.S. Department of Energy
- 14PESGM0817, How Far is the GPU Technology from Practical Power System Applications?
  Z. LI, LY Grid Innovation
  J. ZHU, GridView, ABB Inc.
  F. YANG, UWP
- 14PESGM1472, Optimal Transmission Reconfiguration through Line Switching and Bus Splitting
  M. HEIDARIFAR, University of Tehran
  M. DOOSTIZADEH, University of Tehran
  H. GHASEMI, University of Tehran
- 14PESGM2022, Frequency Containment Reserves Dimensioning and Target Performance in the European Power System
  M. DE LA TORRE RODRÍGUEZ, Red Eléctrica de España
  M. SCHERER, Swissgrid Ltd.
  D. WHITLEY, Statnett SF
  F. REYER, Amprion GmbH
- 14PESGM2207, Stochastic Optimal Reactive Power Dispatch Method based on Point Estimation Considering Load Margin
  S. FANG, Shanghai Jiao Tong University
  H. CHENG, Shanghai Jiao Tong University
  Y. SONG, Shanghai Jiao Tong University
  P. ZENG, China Electric Power Research Institute
  L. YAO, China Electric Power Research Institute
  M. BAZARGAN, ALSTOM Grid Research & Technology
- 14PESGM0320, The Potential of Network State-Based Algorithm Selection to Improve Power Flow Management
  J. KING, Parsons Brinckerhoff
  S. JUPE, Parsons Brinckerhoff
  P. TAYLOR, Newcastle University
- 14PESGM0389, A Penalty Function for Reactive Power Optimization with Discrete Variables
  A. MAZZINI, University of Sao Paulo
  E. ASADA, University of Sao Paulo
- 14PESGM0824, Optimal Coordinated Volt/Var Control in Active Distribution Networks
  M. AZZOUZ, University of Waterloo
  E. EL-SAADANY, University of Waterloo

Modern Heuristic Optimization Test Bed on OPF *(panel)*

Tuesday, 29 July, 3:00 PM–5:00 PM *Azalea 2*

Sponsored by: *(PSACE) Intelligent Systems*
Chair: *I. Erlich, University of Duisburg-Essen*

This panel will present new solutions and discuss the opportunities and challenges ahead regarding the data analysis and mining techniques and tools that can be used to this purpose. Industrial and academic experiences will be put together, identifying common goals and pointing out short and medium term solutions.

PRESENTATIONS AND PANELISTS:

- 14PESGM1798, Competition on Application of Modern Heuristic Optimization Algorithms for Solving Optimal Power Flow Problems
  S. WILDENHUES, University of Duisburg-Essen
- 14PESGM2658, DEEPSO as a Successful Blend of Evolutionary and Swarm Search Strategies in the OPF Challenge
  V. MIRANDA, INESC TEC
  L. CARVALHO, INESC TEC
- 14PESGM2660, Heuristic MINLP for Solving Optimal Power Flow Problems
  C. COFFRIN, NICTA
- 14PESGM2664, Differential Evolution Algorithm with a Modified Archiving-based Adaptive Tradeoff Model for Optimal Power Flow
  Z. XU, Hong Kong Polytechnic University
- 14PESGM2665, A Modified Chu-Beasley's Genetic Algorithm to Solve the Optimal Power Flow Problem
  J. FRANCO, UNESP
- 14PESGM2659, Application of Mean Variance Mapping Optimization (MVMO) to Solve OPF Problems
  I. ERLICH, University of Duisburg-Essen

Case Studies of Experiences with Distributed Resource Interconnections on Distribution Systems *(panel)*

Tuesday, 29 July, 3:00 PM–5:00 PM *National Harbor 8*

Sponsored by: *Transmission and Distribution Committee*
Chair: *T. McDermott, University of Pittsburgh*

This panel will offer several case studies of experiences with distributed resource integration on electric power distribution systems from utilities, vendors and consultants. Included in this session will be lessons learned, experience and questions, as well as solutions for applying IEEE 1547.

PRESENTATIONS AND PANELISTS:

- 14PESGM2493, Lessons Learned from DG Interconnections
  R. ARRITT, EPRI
- 14PESGM2495, Integration of Utility-Scale Solar at PacifiCorp
  R. NAIR, PacifiCorp
- 14PESGM2494, Impact Studies of PV Integration in Distribution Systems
  L. XU, Quanta Technology
- 14PESGM2752, PV Hosting Capacity on Distribution Feeders
  J. SMITH, EPRI
- 14PESGM2496, A Mitigation Strategy to Address Voltage Flicker due to the Cloud Cover Effect
  S. HONG, Solectria Renewables

Tuesday Evening

Senior Member Information Session *(panel)*

Tuesday, 29 July, 5:00 PM–7:00 PM *National Harbor 5*

Sponsored by: *IEEE PES*
Chair: *H. Louie, Seattle University*

Pre Awards Dinner General Reception *(reception)*

Tuesday, 29 July, 6:00 PM–7:00 PM *Potomac A/C Lobby*

PES Awards Dinner *(dinner)*

Tuesday, 29 July, 7:00 PM–9:30 PM *Potomac AB*

Wednesday Morning

Attendee Breakfast *(breakfast)*

Wednesday, 30 July, 6:30 AM–8:30 AM *Potomac A/C Lobby*

Presenter Breakfast *(breakfast)*

Wednesday, 30 July, 6:30 AM–8:30 AM *National Harbor 2 and 3*

Companion Hospitality Lounge *(other)*

Wednesday, 30 July, 7:00 AM–5:00 PM *Eastern Shore 1*

Registration Wednesday *(meeting preparations)*

Wednesday, 30 July, 7:00 AM–8:00 PM *Convention Center Prefunction*

Experience with the Use of Energy Storage in Renewable Power Plants *(panel)*

Wednesday, 30 July, 8:00 AM–12:00 PM *Azalea 3*

Sponsored by: *Electric Machinery Committee and Energy Development and Power Generation Committee*

Chair: *R. Nelson, Siemens*

This panel will concentrate on experiences with energy storage in wind and solar plants, including resolution of control interactions, interface issues, equipment location issues, and best utilization practices.

PRESENTATIONS AND PANELISTS:

- 14PESGM0717, GE Experience with Turbine Integrated Battery Energy Storage
  N. MILLER, General Electric
- 14PESGM0718, Ancillary Services Provided from a Wind Power Plant Augmented with Energy Storage
  S. SAYLORS, VESTAS
- 14PESGM0719, Integrating Energy Storage and Wind Plants – A Developer's Perspective
  T. SIEGEL, FIRST WIND
- 14PESGM0720, Experience with Modular Design in Energy Storage Systems
  I. LOPES, Siemens
- 14PESGM0721, Coupling Energy Storage with Renewables: Analyzing Multiple Case Studies
  T. MILLER, S&C
- 14PESGM0722, Experiences with Wind Turbines, Energy Storage, and Regulatory Requirements
  R. FOSTER, A123 Systems
- 14PESGM0723, Enhancing Wind Energy Production while Maintaining Grid Stability Using Energy Storage: Case Study
  P. HAYES, ABB

System Security *(panel)*

Wednesday, 30 July, 8:00 AM–12:00 PM *Chesapeake 11*

Sponsored by: *Energy Development and Power Generation*

Chair: *R. Krebs, Siemens Infrastructure & Cities Sector*

Co-Chair: *Z. Styczynski, Technical University Magdeburg*

In Europe the amount of fluctuating renewable infeeds to transmission networks as bulk generation of large wind farms or as distributed generation in MV networks requires the enforcement of the transmission system by additional AC and controllable DC interconnectors. New operational strategies,based on dynamic security forecasts, PMU-based system control as well as adapted protection systems are required. The session is addressing European developments and activities for an intelligent improvement of the operation, the utilization and the protection of the future hybrid transmission systems.

PRESENTATIONS AND PANELISTS:

- 14PESGM2694, Vulnerability of Power Supply – A Real Story
  A. ORTHS, Energinet.dk
- 14PESGM2698, AFTER Project: From Security to Risk Assessment and Risk Control
  E. CIAPESSONI, Ricerca sul Sistema Energetico – RSE S.p.A.
- 14PESGM2707, Increasing the Situational Awareness of System Operators by Highly Aggregated Dynamic Security Results
  U. KERIN, Siemens AG
- 14PESGM2699, Modern Control Center Software Ensuring Power System Stability
  D. FRENCH, Siemens Industry Inc.
- 14PESGM2700, Identification of Suitable Network Nodes for Application of Countermeasures to Reduce Risk of System Instability
  I. HAUER, Otto-von-Guericke University
- 14PESGM2706, Computer-Based Optimization of Protection System Design and Coordination
  J. JÄGER, Friedrich-Alexander University
- 14PESGM2697, Modeling and Estimation of Active Distribution Networks
  K. SUSLOV, Irkutsk State Technical University
- 14PESGM2701, Analysis on Optimal Placement and Setting of Phase-Shifting Transformers to Control Cross-Border Power Flows in Interconnected Transmission Systems
  R. SIKORA, 50Hertz Transmission GmbH
  M. WOLTER, 50Hertz Transmission GmbH
  K. STRUNZ, TU Berlin
- 14PESGM2702, Protection System Reliability in the Presence of HVDC and AC Transmission Systems at the Same Support Structure
  C. ROMEIS, Friedrich-Alexander University

Existing and Proposed Power Systems Laboratories for the Undergraduate Curriculum *(panel)*

Wednesday, 30 July, 8:00 AM–10:00 AM *National Harbor 7*

Sponsored by: *Power & Energy Education Committee*
Chair: *B. Chowdhury, UNC Charlotte*

Most engineering undergraduate curricula either do not have laboratories or lack actual hardware-oriented experimental laboratories for power engineering education. One of the biggest, often insurmountable hurdles is cost. However, putting together pieces of equipment that provides an enriched laboratory learning experience for students at an affordable cost is an experience that could be shared for others to follow. This panel, consisting of speakers from academia, will discuss traditional topics, such as electric machines and drives as well as emerging topics, such as distributed generation, renewable energy integration and smart grid concepts. They will also share their experiences in the design and utilization of these labs in undergraduate education and graduate research.

PRESENTATIONS AND PANELISTS:

- 14PESGM1744, Laboratory Experiences at the University of Texas
  S. SANTOSO, University of Texas at Austin
  J. RAMOS, University of Texas Pan American
  E. MULJADI, National Renewable Energy Laboratory
- 14PESGM1743, UIUC Power Systems Lab
  P. SAUER, University of Illinois.at Urbana-Champaign
- 14PESGM1745, UNC-Charlotte's Power Systems Teaching Lab
  B. CHOWDHURY, UNC Charlotte
- 14PESGM1741, Electric Power Systems Laboratory at the University of Pittsburgh Swanson School of Engineering
  G. REED, University of Pittsburgh
- 14PESGM1742, The University of Seville Smart Grid Lab: A Multi-Platform Test Bed to Teach Active Distribution Systems
  J. MARIA-MAZA, Universidad de Sevilla

Future Trends and Directions in Dynamic Security Assessment *(panel)*

Wednesday, 30 July, 8:00 AM–12:00 PM *National Harbor 6*

Sponsored by: *Power System Dynamic Performance Committee*
Chair: *C. Vournas, NTUA*

This is a Combo Session with the DSA WG Meeting. Both events must be scheduled for the same room.

Panel Description: "This panel will focus on Dynamic Security Assessment, which is presently one of the main tools to maintain secure operation of electric power systems. In particular, on-line DSA is essential to give advance warning in real time of the proximity to insecure operating conditions. Challenges faced in on-line DSA include running of stability programs in real time, utilizing real-time phasor measurements locally, or in a wide area, and processing of big amounts of data to extract security information. The first presenters will address problems and solutions for simulation-based on-line DSA, including the challenges of parallel processing and new computational algorithms, as well as specific applications. The next ones will focus on measurement and data driven techniques for on-line DSA."

PRESENTATIONS AND PANELISTS:

- 14PESGM0162, Dynamic Security Assessment Challenges (An European TSO Perspective)
  P. PANCIATICI, RTE
  J. HEYBERGER, RTE
  G. BAREUX, RTE
- 14PESGM0161, Algorithmic and Computational Advances for Fast Power System Dynamic Simulations
  P. ARISTIDOU, University of Liege
  T. VAN CUTSEM, University of Liège
- 14PESGM0160, Predictive Dynamic Security Assessment through Advanced Computing
  Z. HUANG, Battelle – Pacific Northwest National Laboratory
  R. DIAO, Battelle – Pacific Northwest National Laboratory
  S. JIN, Battelle – Pacific Northwest National Laboratory
  Y. CHEN, Battelle – Pacific Northwest National Laboratory
- 14PESGM2270, Distributed Dynamic State Estimator Enables Seamless DSA
  S. MELIOPOULOS, Georgia Tech
- 14PESGM0157, On-Line Dynamic Security Assessment: Where Are We and Where Should We Go
  L. WANG, Powertech Labs Inc.
- 14PESGM0158, Data Driven Dynamic Security Assessment
  P. SAUER, University of Illinois.at Urbana-Champaign
  A. DOMINGUEZ-GARCIA, UIUC
- 14PESGM1154, Phase Angles as Predictors of Network Dynamic Security Limits and Further Implications
  I. KAMWA, Hydro-Quebec/IREQ
  L.-A. DESSAINT
  S. GUILLON
- 14PESGM0159, DSA Using Synchronized Phasor Measurements and Decision Trees
  V. VITTAL, Arizona State University
- 14PESGM0156, Integrating Solution Engines Under a Distributed Processing Environment: An Alternative Approach for Static and Dynamic Security Assessment of Large Scale Power Systems
  F. ALVES, CEPEL
  R. HENRIQUES, Federal University Juiz de Fora
  J. PASSOS, Federal University Juiz de Fora
  S. GOMES, CEPEL
  C. BORGES, COPPE/UFRJ
  D. FALCAO, COPPE/UFRJ
  A. AVELEDA, COPPE/UFRJ
  G. TARANTO, COPPE/UFRJ
  T. ASSIS, COPPE/UFRJ

Transactions Paper Session #3 *(transactions paper)*

Wednesday, 30 July, 8:00 AM–12:00 PM *Camellia 1*

Sponsored by: *Power System Dynamic Performance*
Chair: *F. Li, University of Tennessee*

PAPERS AND AUTHORS:

- 14PESGM1170, Design of Wide-area Power System Damping Controllers Resilient to Communication Failures *[Transaction Number: TPWRS.2013.2261828]*
  S. ZHANG, Arizona State University
  V. VITTAL, Arizona State University
- 14PESGM1263, Wide-Area Damping Controller of FACTS Devices for Inter-Area Oscillations Considering Communication Time Delays *[Transaction Number: TPWRS-00295-2013.R1]*
  W. YAO, Huazhong University of Science and Technology
  L. JIANG, University of Liverpool

- 14PESGM0705, Adaptive Control Using Constrained RLS and Dynamic Pole-shift Technique for TCSCs *[Transaction Number: TPWRD-01358-2012.R1]*
  D. RAI, University of Saskatchewan
  R. GOKARAJU, University of Saskatchewan
  S. FARIED, University of Saskatchewan
- 14PESGM0516, Adaptive PI Control of STATCOM for Voltage Regulation *[Transaction Number: TPWRD-00172-2012.R3]*
  Y. XU, University of Tennessee
  F. LI, University of Tennessee
- 14PESGM0527, A Gain-Scheduled Decoupling Control Strategy for Enhanced Transient Performance and Stability of an Islanded Active Distribution Network *[Transaction Number: TPWRD-00019-2013]*
  A. HADDADI, McGill University
  A. YAZDANI, Ryerson University
  G. JOOS, McGill University
  B. BOULET, McGill University
- 14PESGM0839, Autonomous and Adaptive Voltage Control Using Multiple Distributed Energy Resources *[Transaction Number: TPWRS-00848-2011]*
  H. LI, University of Tennessee
  F. LI, University of Tennessee
  Y. XU, Oak Ridge National Laboratory
  D. RIZY, Oak Ridge National Laboratory
  S. ADHIKARI, University of Tennessee
- 14PESGM1666, Distributed Hierarchical Control Architecture for Transient Dynamics Improvement in Power Systems *[Transaction Number: TPWRS-00767-2012]*
  L. MARINOVICI, Pacific Northwest National Laboratory
  J. LIAN, Pacific Northwest National Laboratory
  K. KALSI, Pacific Northwest National Laboratory
  P. DU, Pacific Northwest National Laboratory
  M. ELIZONDO, Pacific Northwest National Laboratory
- 14PESGM0138, Nonlinear Koopman Modes and Power System Stability Assessment without Models *[Transaction Number: 10.1109/TPWRS.2013.2287235]*
  Y. SUSUKI, Kyoto University
  I. MEZIC, University of California, Santa Barbara

Transactions Paper Session #2 *(transactions paper)*

Wednesday, 30 July, 8:00 AM–12:00 PM *Chesapeake 7*

Sponsored by: *Power System Dynamic Performance*
Chair: *R. Kavasseri, North Dakota State University*

PAPERS AND AUTHORS:

- 14PESGM0009, Decentralized Dynamic State Estimation in Power Systems Using Unscented Transformation *[Transaction Number: TPWRS-00342-2013]*
  A. SINGH, Imperial College London
  B. PAL, Imperial College London
- 14PESGM0015, Using Disturbance Data to Monitor Primary Frequency Response for Power System Interconnections *[Transaction Number: PESL-00072-2013]*
  P. DU, ERCOT
- 14PESGM0177, A Phase Locked Loop-Based Approach to Real-Time Modal Analysis on Synchrophasor Measurements *[Transaction Number: TSG-00416-2012]*
  K. SUN, University of Tennessee
  Q. ZHOU, Chrontel Inc.
  Y. LIU, University of Tennessee
- 14PESGM0335, Parameter Selection for a Centralized Thermostatically Controlled Appliances Load Controller Used for Intra-Hour Load Balancing *[Transaction Number: TSG-00632-2012]*
  Y. ZHANG, Pacific Northwest National Laboratory
  N. LU, North Carolina State University
- 14PESGM0436, International Industry Practice on Power System Load Modelling *[Transaction Number: 10.1109/TPWRS.2012.2231969]*
  J. MILANOVIC, University of Manchester
  K. YAMASHITA, Central Research Institute of Electric Power Industry
  S. MARTINEZ, Red Eléctrica de España
  S. DJOKIC, University of Edinburgh
  L. KORUNOVIC, University of Nis

- 14PESGM0843, Demand Side Frequency Control Scheme in an Isolated Wind Power System for Industrial Aluminum Smelting Production *[Transaction Number: TPWRS-00397-2013]*
  H. JIANG, Tsinghua University
  J. LIN, Tsinghua University
  Y. SONG, Tsinghua University
  W. GAO, University of Denver
  Y. XU, Shenyang Aluminum and Magnesium Research Institute Company
  B. SHU, Beijing Electric Power Company
  X. LI, China Power Investment Corporation
  J. DONG, China Power Investment Corporation
- 14PESGM1172, Transient Model of Air-Conditioner Compressor Single Phase Induction Motor *[Transaction Number: 10.1109/TPWRS.2013.2275256]*
  Y. LIU, Arizona State University
  V. VITTAL, Arizona State University
  J. UNDRILL, Arizona State University
  J. ETO, Lawrence Berkeley National Laboratory
- 14PESGM1686, Aggregated Modeling and Control of Air Conditioning Loads for Demand Response *[Transaction Number: TPWRS-00078-2013]*
  W. ZHANG, Ohio State University
  J. LIAN, Pacific Northwest National Laboratory
  C. CHANG, Ohio State University
  K. KALSI, Pacific Northwest National Laboratory

Multi-Stage Optimization and Its Impact on Electricity Market *(panel)*

Wednesday, 30 July, 8:00 AM–10:00 AM *Chesapeake 4*

Sponsored by: *Power System Operations*
Chair: *J. Price, California ISO*
Co-Chair: *A. Lamadrid, Lehigh University*

Integrating high levels of renewable energy in the electricity system is attracting interest in probabilistic optimization methods to deal with uncertainty in the balancing process. These advanced optimization techniques include stochastic and robust optimization, look-ahead economic dispatch, hybrid methods for ancillary services, and new techniques for security optimization. However, where and how we should implement such techniques as well as its impacts needs to be addressed. Implementing multi-stage optimization problem affects both market and system operations. From a market perspective, issues include how multi-stage optimization can be related to market clearing, pricing determination, and settlements for energy and ancillary services, to improve system robustness and flexibility as well as market efficiency and transparency. Questions such as 1) how to scale stochastic and robust optimization models from research models to full-sized operational models, 2) how to define the day-ahead market (DAM) price when stochastic programming is adopted in DAM, 3) what information needs to be communicated to the market participants to achieve incentive compatibility, and 4) how deviations from the DAM should be settled and at what price, deserve a thorough investigation. This panel will bring academic and industry experts together to focus on the following areas:

- Existing practice in the industry and approaches under development
- Recent advances in operation models and the underlying economics
- New market design concepts using multi-stage decision making
- Potential market impact

PRESENTATIONS AND PANELISTS:

- 14PESGM1100, Applying Robust Optimization to MISO Look-Ahead Commitment
  Y. CHEN, MISO
  Q. WANG, Alstom Grid
  X. WANG, Alstom Grid
  Y. GUAN, University of Florida
- 14PESGM1101, Applying Robust Optimization to MISO Look-Ahead Commitment
  X. WANG, Alstom
- 14PESGM1102, Testing Market Alternatives for Renewable Integration Using a Reduced Network Model
  J. PRICE, California ISO
- 14PESGM1103, A Practical Two-Stage Reliability Assessment Commitment Framework Under Uncertainty
  L. ZHANG, Midwest ISO
- 14PESGM1104, Pricing under Two-Stage Optimization
  T. ZHENG, ISO New England

- 14PESGM1105, Adaptive Robust Optimization for Multi-Period Dispatch with Dynamic Uncertainty Sets
  A. SUN, Georgia Tech
  A. LORCA, Georgia Tech
- 14PESGM2028, Advanced Scheduling Strategies to Meet the Needs of Increasing Variability and Uncertainty on Power Systems and Its Effects on Wholesale Market Design
  E. ELA, National Renewable Energy Laboratory
- 14PESGM2030, Secure Planning and Operations of Systems with Stochastic Sources, Energy Storage and Active Demand
  C. MURILLO, Universidad Autónoma de Manizales
- 14PESGM1106, Evaluating the Market Effects of Different Flexible Ramping Products on the Electricity Dispatch in a Power Grid
  A. LAMADRID, Lehigh University

New Power System Planning (NewPSP) Combo Session *(panel)*

Wednesday, 30 July, 8:00 AM–10:00 AM *Potomac 1*

Sponsored by: *Power System Planning and Implementation*
Chair: *ML Chan, ML Consulting Group*

Power System Planning is fast changing. Electric power and other energy forms need to be considered. Power delivery system planning blurs with energy supply planning. Spatial system demarcation boundary becomes less distinct. Renewable resources integration greatly enhances the flexibility that needs to be accommodated. Thus the planning paradigm is fast changing, and the panelists of this New Power System Planning (NewPSP) Session provide unique but practical insights into the current power and energy system planning. Then we plan to solicit full participation by all practitioners to leverage the discussions to develop programs and sessions for future IEEE GM sessions.

PRESENTATIONS AND PANELISTS:

- 14PESGM2412, State of the Art of Active Circuit Planning – Input Data and Planning Methodology
  L. OCHOA, University of Manchester
- 14PESGM2413, Value of Flexible Supply Resources in the ISO/RTO Markets
  J. YAN, Southern California Edison
- 14PESGM2414, New Practical Load and Resource Forecasting Needs
  T. HONG, University of North Carolina at Charlotte
- 14PESGM2415, Flexible and Competitive Transmission Planning Process under FERC Order 1000
  M. HENDERSON, ISO New England
- 14PESGM2416, Asset Management in the Intelligent Grid Environment
  A. MCGRAIL, National Grid USA
- 14PESGM2417, Near and Long Term Issues in Flexibility Assessment
  E. LANNOYE, EPRI
- 14PESGM2418, Integration of Distributed Energy Resources and Microgrids with AMI and DMS
  H. WELLER, Leidos
- 14PESGM2419, Control of DER for Renewable Integration with Fast DR
  H. ASANO, CRIEPI

NERC PRC 005 Requirements for Battery Systems in Electric Utilities *(panel)*

Wednesday, 30 July, 8:00 AM–10:00 AM *Chesapeake 2*

Sponsored by: *Stationary Battery*
Chair: *C. Searles, BAE Batteries USA*

This session will present and discuss:

1. NERC PRC 005-2/3 and Its Impact on Utility Battery System Maintenance
2. Battery Testing Methodologies
3. Battery Monitoring

PRESENTATIONS AND PANELISTS:

- 14PESGM1982, Battery Testing Methodologies
  W. CANTOR, TPI
- 14PESGM1983, New Regulatory Battery Maintenance Requirements as Mandated by NERC PRC-005-2/3
  C. SEARLES, BAE Batteries USA
  W. CANTOR, TPI Engineering
- 14PESGM1984, Battery Monitoring
  R. TRESSLER, Alber Corp.

Advances in State Estimation for Distribution Networks – Part 1 *(panel)*

Wednesday, 30 July, 8:00 AM–10:00 AM *Chesapeake A*

Sponsored by: *Transmission and Distribution Committee*
Chair: *G. Taylor, Brunel University*

This panel presents a selection of novel distribution network state estimation developments that aim to fully enable and support the required smart grid functionality associated with the integration of renewable energy sources, service restoration, distribution automation and demand side participation. A smart distribution network perspective will be addressed with regard to advances in state estimation for smart distribution networks. Specific details of US, Canada, China and European R&D projects will also be presented. In addition the importance of state estimation is addressed in this panel in order to provide secure, scalable and interoperable smart grid functionality both within and external to smart distribution networks.

PRESENTATIONS AND PANELISTS:

- 14PESGM0487, State Estimation Technology Evolution and Practical experiences – From Transmission to Distribution
  K. DEMAREE, Alstom Grid
- 14PESGM0488, Distribution State Estimation: A Necessary Requirement for the Smart Grid
  J. PREVOST, Hydro Quebec
- 14PESGM0489, Study on Three-Phase State Estimation for Distribution Networks
  S. WANG, China Electric Power Research Institute
  G. LIU, China Electric Power Research Institute
  Y. LANG, China Electric Power Research Institute
- 14PESGM0490, Transformer Tap Estimation Using Hybrid Particle Swarm Optimization
  S. NANCHIAN, Imperial College
  A. MAJUMDAR, Imperial College London
  B. PAL, Imperial College London
  D. MOBSBY, Scottish and Southern Energy UK
  D. MACLEMAN, Scottish and Southern Energy UK

Overview of 2017 National Electrical Safety Code (NESC) Proposed Changes *(panel)*

Wednesday, 30 July, 8:00 AM–12:00 PM *National Harbor 4*

Sponsored by: *Transmission and Distribution Committee*
Chair: *N. Bingel III, Osmose Utilities Services Inc.*

The 2017 Edition of the National Electrical Safety Code (NESC) will be published 1 August 2016, to be effective by 1 February 2017, succeeding the present 2012 edition of the Code. The NESC provides safety requirements for the installation, operation or maintenance of outdoor communication and electric power facilities. The NESC primarily focuses on helping ensure the safety of employees and the public, and is not intended to be a design specification or instruction manual. This review provides the industry the opportunity to preview the various change proposals being considered for the new edition. The detailed change proposals will be included in the formal Preprint to be issued 1 September 2014, and appropriate industry and public comments must be submitted by 1 May 2015.

PRESENTATIONS AND PANELISTS:

- 14PESGM2481, Introduction
  L. SLAVIN, Outside Plant Consulting Services
- 14PESGM2483, SC2 – Grounding Methods
  J. DAGENHART, Clapp Research
- 14PESGM2780, SC3 – Electric Supply Stations
  B. DIETZMAN, Oncor Electric Delivery Company
- 14PESGM2485, SC4 – Overhead Lines – Clearances
  E. ENGDAHL, American Electric Power
- 14PESGM2482, SC5 – Overhead Lines – Strength and Loading
  N. BINGEL III, Osmose Utilities Services Inc.
- 14PESGM2486, SC7 – Underground Lines
  L. GAUNT, Northeast Utilities
- 14PESGM2487, SC8 – Work Rules
  J. TOMASESKI, International Brotherhood of Electrical Workers

Assessment Strategies and Benefits of Advanced Volt/Var Control *(panel)*

Wednesday, 30 July, 8:00 AM–10:00 AM *Magnolia 3*

Sponsored by: *Transmission and Distribution Committee*
Chair: *J. Green, EPRI*

As a utility considers the VVC control scheme to implement and the technologies to deploy, the utility must develop a methodology to categorize its feeders in order to prioritize which circuits to install VVC equipment on first, determine how to design the feeders to optimize the VVC benefits with the newly installed equipment, implement a proven methodology to accurately quantify the impacts of VVC, and perform a cost benefit analysis to prove to the value of the VVC program as compared to other energy efficiency and demand response programs that could be implemented. The second panel session will provide updates on these measurement and verification and design strategies being used in the industry and will also offer cost-benefit analysis examples from subject matter experts in the utility industry.

PRESENTATIONS AND PANELISTS:

- 14PESGM2520, Prioritization of Feeders for CVR/VVO
  V. HOLSOMBACK, Georgia Power Company
- 14PESGM2521, Physical Design of Volt/Var Implementation
  B. FAZIO, Hydro Quebec
- 14PESGM2522, Detection Methodologies for Quantifying the Impacts of VVC
  T. SHORT, EPRI
- 14PESGM2790, Approach to Performing a Cost/Benefit Analysis
  P. POWELL, Dominion Power

HVDC & FACTS – Education and HVDC and FACTS Bibliography (WG 15.05.14 & WG 15.05.17) *(combo)*

Wednesday, 30 July, 8:00 AM–10:00 AM *Potomac 4*

Sponsored by: *Transmission and Distribution*
Chair: *B. Johnson, University of Idaho*

PRESENTATIONS AND PANELISTS:

- 14PESGM1753, Bibliography of FACTS Applications for Grid Integration of Wind and PV Solar Power Systems: 2010–2013 IEEE Working Group Report
  S. RAHMAN, Western University
  R. VARMA, Western University
  W. LITZENBERGER, Bonneville Power Administration
- 14PESGM1759, Bibliography of FACTS 2012–2013: IEEE Working Group Report
  S. RAHMAN, Western University
  M. AC, Western University
  R. VARMA, Western University
  W. LITZENBERGER, Bonneville Power Administration
- 14PESGM1760, Bibliography of HVDC Transmission 2012–13: IEEE Working Group Report
  S. GUPTA, University of Western Ontario
  R. VARMA, University of Western Ontario
  W. LITZENBERGER, BPA

Grid Operations: Practices and Challenges *(super session – panel)*

Wednesday, 30 July, 8:00 AM–12:00 PM *Potomac C*

Sponsored by: *PES Technical Council*
Chair: *M. Bryson, PJM*

This supersession will bring together several panelists to share past experiences and challenges as well as new approaches to grid operations from the perspective of both market and non-market operations. In addition to operators, the panel will feature vendor expertise in the area of energy management systems and power system analysis tools used in real time operations. The panel will also include presenters with a perspective from the international community as well as the academic viewpoint on operating reliable power grids. The real focus of the panel will be on the operations and control room side of running a power system, but will include some insight from various parts of the professional spectrum and will touch on many of the impacts that have both improved the operations of electric systems as well as challenged the way that system operators need to tackle grid operations going forward.

1 – M. E. BRYSON, PJM – Session Chair

2 – J. M. RODRIGUEZ, Red Electrica De Espana – Real-Time Diagnostics and Situational Awareness

3 – S. HOLEMAN, Duke Energy – Topic related to Grid Operations Outside Markets and RTOs

4 – D. SOUDER, PJM – Topic related to Grid Operations Outside Markets and RTOs
5 – N. HALLADAY (or PowerGem speaker) – Real-Time System Modeling, Simulation and Analysis
6 – L. ROSENBERG (or Siemens Speaker) – Topic TBD
7 – T. MCGRAIL, WPI Professor – Topic TBD

Implementation of Synchrophasor Systems *(tutorial)*

Wednesday, 30 July, 8:00 AM–5:00 PM *Chesapeake D*
Sponsored by: *Power System Relaying Committee*

The electric power industry has experienced significant investment in the deployment of phasor measurement units (PMUs) and the associated infrastructure for making synchrophasor measurements and data collection. From a system reliability standpoint, real-time measurements allow early identification of potential problems both locally and regionally. The distinction of PMU technology comes from its unique ability to provide synchronized power system phasor measurements from widely dispersed locations in an electric power grid. From a broader perspective, the synchrophasor technology offers means to solve a series of challenges, thus attracting the industry worldwide.

This tutorial is intended for the power system practitioners considering investment in synchrophasor technology and the associated business case considerations. In addition to the benefits enabled by technology, the topics covered include understanding phasors, synchronization mechanisms including standards for distributing accurate timing information, the computation processing and accuracy of measurement, performance requirements for phasor data concentrators (PDCs), PDC function descriptions and functional requirements, data aggregation and alignment, configuration set points, and balancing data latency and integrity. Relevant industry standards and guides, phasor data communication and archival, approaches and architectures to build wide-area measurement systems, and applications using synchrophasor data such as situational awareness, advanced warning systems, adaptive protection, state estimation, and voltage stability monitoring will be presented. The tutorial will also include a review of the IEEE guides for installation and testing of PMUs and PDCs, and the need for conformance to the standards and calibration of the entire measurement chain.

Distribution Overcurrent Protection and Coordination *(tutorial)*

Wednesday, 30 July, 8:00 AM–5:00 PM *Chesapeake G*
Sponsored by: *IEEE PES*

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 full 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

Overcurrent Protective Devices : Circuit Breakers and Relays, Fuses, Pulse Closers, Sectionalizers

Coordination of Overcurrent Protective Devices

Distribution System – Delivering Power to the Customer *(tutorial)*

Wednesday, 30 July, 8:00 AM–5:00 PM *Chesapeake J*
Sponsored by: *IEEE PES*

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 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.

Reliability and Resiliency in the US Capital Region / Hardening the Grid: One Year after Hurricane Sandy *(panel)*

Wednesday, 30 July, 8:00 AM–12:00 PM *National Harbor 8*

Sponsored by: *Local Organizing Committee*
Chair: *S. Griffith, NEMA*

Recent events, notably Hurricane Sandy, which devastated parts of the US East Coast in October 2012, has brought attention to the reliability and resiliency of the electric systems in the US Capital region and elsewhere. This panel will describe lessons learned about the reliability and resiliency of the electric systems, what has been done in the preceding year in the US Capital region to harden the grid to make it smarter and more robust against natural disasters, and what remains to be done.

PRESENTATIONS AND PANELISTS:

- 14PESGM2501, Manufacturers Perspective on Reliability and Resiliency in the US Capital Region / Hardening the Grid: One Year after Sandy
  G. RACKLIFFE, ABB
- 14PESGM2502, Utility Perspective on Reliability and Resiliency in the US Capital Region / Hardening the Grid: One Year after Hurricane Sandy
  W. GAUSMAN, PHI
- 14PESGM2563, DC PUC Perspective on Reliability and Resiliency in the US Capital Region / Hardening the Grid: One Year after Hurricane Sandy
  C. HINTON, DC Public Service Commission
- 14PESGM2564, NARUC Perspective Reliability and Resiliency in the US Capital Region / Hardening the Grid: One Year after Hurricane Sandy
  M. KEOGH, NARUC
- 14PESGM2543, PSE&G's Energy Strong Proposal
  J. CALORE, PSE&G

Advanced Topics in Electrical Machines *(panel)*

Wednesday, 30 July, 9:00 AM–12:00 PM *Camellia 2*

Sponsored by: *Electric Machinery*
Chair: *M. Ooshima, Tokyo University of Science, Suwa*

Electric machines have been advanced in several aspects. Bearingless motors are magnetically suspended motor. Optimization provides latest motor structures. Decrease of iron loss for efficiency improvements is necessary. Rotor leakage inductance evaluation in synchronous machine is also presented.

PRESENTATIONS AND PANELISTS:

- 14PESGM2604, Status Review of Advances in Hybrid Electric Vehicles
  M. RAHMAN, Memorial University of Newfoundland
- 14PESGM2605, Stabilization of Rotor Levitation and Compensation of Suspension Force in a Time-Divided Torque and Suspension Force Control Type Bearingless Motor
  M. OOSHIMA, Tokyo University of Science, Suwa
  N. AOYAGI, Tokyo University of Science, Suwa
- 14PESGM2606, Recent Developments in Electrical Machine Design Optimization
  Y. DUAN, FUC Technologies
- 14PESGM2607, A Study of Rotor Leakage Reactance in Synchronous Generator
  D. HIRAMATSU, Toshiba
- 14PESGM2608, Investigation of Loss Increase in Rotating Machines Caused by Shrink Fitting of Stator Housings
  K. YAMAZAKI, Chiba Institute of Technology
- 14PESGM2609, Novel Single-Drive Bearingless Motor with Wide Magnetic Gap and High Passive Stiffness
  H. SUGIMOTO, Tokyo Institute of Technology

Energy Efficiency and Smart Cities *(panel)*

Wednesday, 30 July, 9:00 AM–12:00 PM *National Harbor 5*

Sponsored by: *Energy Development and Power Generation*
Chair: *J. Myrzik, IEEE*
Co-Chair: *W. L. Kling, Eindhoven University of Technology*

The European energy policy of 20% efficiency in 2020 is only achievable by a consequent replacement of for example 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.

PRESENTATIONS AND PANELISTS:

- 14PESGM2680, Flexibility in Urban Smart Multi-Energy Systems
  P. MANCARELLA, University of Manchester
- 14PESGM2679, Using Residential Heating Systems for Load Management Applications in Smart Cities
  J. MYRZIK, IEEE
- 14PESGM2678, GREENLYS: A System View Pilot Project for Smart Grids – An Urban Full Scale Experiment in Lyon and Grenoble Cities
  N. HADJSAID, Grenoble-INP
- 14PESGM2681, Analysis of Control Techniques for PV Systems and Their Application in the Residential Environment
  B. ASARE-BEDIAKO, TU Eindhoven The Netherlands
- 14PESGM2677, Optimal Deployment of Distributed Storage in Smart City Grids
  J. DRIESEN, K.U.Leuven
- 14PESGM2748, Advanced ICT Solutions for Smart Cities
  A. MONTI, RWTH

Test Systems for Oscillation Damping and Voltage Stability Analysis *(panel)*

Wednesday, 30 July, 9:00 AM–12:00 PM *Potomac 6*

Sponsored by:	*Power System Dynamic Performance Committee*
Chair:	*L. Lima, Kestrel Power Engineering*
Co-Chair:	*T. Van Cutsem, University of Liège*

This must be a 4-hour combo session starting with the Meeting of the PSDP Power Systems Stability Controls Subcommittee, followed by the proposed Panel Session. Both events must be scheduled for the same room. The description of this Panel Session is as follows: "The objective of this panel is to present the results of the Task Forces on Test Systems for Voltage Stability and Security Assessment and on Benchmark Systems for Stability Controls. It will also discuss the plans for the future development and maintenance, by the Power System Dynamic Performance Committee, of the test systems proposed by these two Task Forces."

PRESENTATIONS AND PANELISTS:

- 14PESGM0106, Itaipu Equivalent System and Intra-Plant Mode Equivalent System for Electromechanical Oscillations
  N. MARTINS, CEPEL
- 14PESGM0109, 9-Bus and 4-Generator Test Systems for Electromechanical Oscillations
  R. RAMOS, Escola de Engenharia de Sao Carlos/USP
- 14PESGM0107, NE-NY (68-Bus) and New England (39-Bus) Test Systems for Electromechanical Oscillations
  B. PAL, Imperial College London, U. K.
- 14PESGM0105, The Australian Equivalent System for Electromechanical Oscillations
  D. VOWLES, University of Adelaide
- 14PESGM0108, The RVS Test System for Voltage Stability Assessment
  L. LIMA, Kestrel Power Engineering
- 14PESGM0110, The Nordic Test System for Voltage Stability Assessment
  T. VAN CUTSEM, University of Liège

Modeling and Model Validation of Renewable Energy Power Plants *(panel)*

Wednesday, 30 July, 9:00 AM–12:00 PM *Azalea 2*

Sponsored by:	*Power System Dynamic Performance Committee*
Chair:	*P. Pourbeik, EPRI*

This combo session starts with the Dynamic Performance of Wind Generation WG Meeting and be followed by the proposed panel session. Both events must be scheduled for the same room. The first hour will be dedicated to the WG meeting. Following the WG meeting a panel session will be held covering the latest results and experience with plant level model validation work using field measured data,

such as from phasor measurement units at the point of common coupling of the wind or photovoltaic plant, studies performed using the latest 2nd generation generic models for wind and photovoltaic technologies and experience with modeling and performance of plant level controls. This is an ideal forum for planners, system operators and researchers interested and working in the arena of renewable energy systems to come together and discuss the latest developments in the modeling and model validation of these technologies.

PRESENTATIONS AND PANELISTS:

- 14PESGM0535, Using PMU Data for Model Validation of Wind Power Plants
  P. POURBEIK, EPRI
- 14PESGM0540, Siemens Experience with Plant Level Control Modeling
  Y. KAZACHKOV, Siemens PTI
- 14PESGM0536, Siemens Experience with Validation of Different Types of Wind Turbine Models
  J. BECH, Siemens Wind Power
- 14PESGM0537, Validation of a Second Generation Type 3 Generic Wind Model
  M. RICHWINE, GE
  J. SANCHEZ-GASCA, General Electric
  N. MILLER, General Electric
- 14PESGM0533, Experience with Model Validation of the Generic PV Models
  A. ELLIS, Sandia National Laboratories
- 14PESGM0538, Experience with Plant Level Model Validation for Wind Power Plants in Australia
  B. BADARZADEH, AEMO

V14PESGM0539, Developing Models for Wave Energy Conversion Systems
T. BREKKEN, Oregon State University

- 14PESGM0534, Fault Characteristics of Inverter-Based Renewable Generators
  J. SCHOENE, Enernex

DC Applications and Electric Vehicles *(paper forum)*

Wednesday, 30 July, 9:00 AM–12:00 PM *Magnolia 1*
Sponsored by: *IEEE PES*
Chair: *E. Yu, Southern California Edison*

- 14PESGM0519, An MILP Model for the Plug-In Electric Vehicle Charging Coordination Problem in Electrical Distribution Systems
  J. FRANCO, UNESP
  M. RIDER, UNESP
  R. ROMERO, UNESP
- 14PESGM0790, Nanao Multi-Terminal VSC-HVDC Project for Integrating Large-Scale Wind Generation
  X. LI, China Southern Power Grid
  Z. YUAN, Tsinghua University
  J. FU, Tsinghua University
  Y. WANG, Tsinghua University
  T. LIU, China Southern Power Grid
  Z. ZHU, China Southern Power Grid
- 14PESGM0869, Management Strategy for Unbalanced LV Distribution Network with Electric Vehicles, Heat Pumps and Domestic Photovoltaic Penetration
  F. BACCINO, University of Genova
  S. MASSUCCO, University of Genova
  F. SILVESTRO, University of Genova
  S. GRILLO, Politecnico di Milano
- 14PESGM0889, Efficient Modeling of Modular Multilevel Converters in HVDC-Grids Under Fault Conditions
  N. AHMED, KTH Royal Institute of Technology
  L. ÄNGQUIST, KTH Royal Institute of Technology
  S. NORRGA, KTH Royal Institute of Technology
  H. NEE, KTH Royal Institute of Technology
- 14PESGM1196, Charge Sharing Model Using Inductive Power Transfer to Increase Feasibility of Electric Vehicle Taxi Fleets
  P. DUTTA, Columbia University
- 14PESGM1304, Comparison of Various Operational Statuses of PIEV Aggregators with Home-Charged EVs and Parking Lots
  N. NEYESTANI, University Beira Interior
  M. DAMAVANDI, University Beira Interior
  M. SHAFIE-KHAH, University Beira Interior
  J. CATALAO, University Beira Interior

- 14PESGM1328, Algebraic Model and Control of Embedded Multi-Terminal DC Network in Meshed AC Power System
  N. YOUSEFPOOR, North Carolina State University
  B. PARKHIDEH, University of North Carolina at Charlotte
  B. FARDANESH, New York Power Authority
  S. BHATTACHARYA, North Carolina State University
- 14PESGM1347, A Two-Layer Evolution Strategy Particle Swarm Optimization Algorithm for Plug-In Hybrid Electric Vehicles at Residential Distribution Grid
  J. TAN, University of Toledo
  L. WANG, University of Toledo
- 14PESGM1494, A New Approach to HVDC Grid Voltage Control Based on Generalized State Feedback
  J. BEERTEN, University of Leuven (KU Leuven)
  R. ERIKSSON, Royal Institute of Technology (KTH)
  D. VAN HERTEM, University of Leuven (KU Leuven)
- 14PESGM1536, Open-Loop PDCI Probing Tests for the Western North American Power System
  D. TRUDNOWSKI, Montana Tech
  D. KOSTEREV, Bonneville Power Administration
  J. WOLD, Montana Tech
- 14PESGM1603, Series VSC-LCC Converter with Self-Commutating and DC Fault Blocking Capabilities
  W. LIN, Huazhong University of Science and Technology
  J. WEN, Huazhong University of Science and Technology
  M. YAO, Alstom Grid China Technology Center
  S. WANG, Huazhong University of Science and Technology
  S. CHENG, Huazhong University of Science and Technology
  N. LI, Alstom Grid China Technology Center
- 14PESGM2222, Frequency Changes in AC Systems Connected to DC Grids: Impact of AC vs. DC Side Events
  I. MARTINEZ SANZ, Imperial College London
  B. CHAUDHURI, Imperial College London
  G. STRBAC, Imperial College London
- 14PESGM0675, Estimation of Short Circuit Currents in Mesh DC Networks
  X. FENG, ABB Inc.
  L. QI, ABB Inc.
  Z. WANG, ABB Inc.
- 14PESGM2116, Priority-Based Charging Coordination of Plug-In Electric Vehicles in Smart Parking Lots
  E. AKHAVAN, University of Waterloo
  M. SHAABAN, University of Waterloo
  E. ELSAADANY, University of Waterloo
  F. KARRAY, University of Waterloo

Power System Stability *(paper forum)*

Wednesday, 30 July, 9:00 AM–12:00 PM *Magnolia 2*

Sponsored by: *IEEE PES*
Chair: *B. Chaudhuri, Imperial College London*

- 14PESGM0143, A Small-Signal Stability Index for Power System Dynamic Impact Assessment Using Time-Domain Simulations
  F. SEGUNDO SEVILLA, KTH Royal Institute of Technology
  L. VANFRETTI, KTH Royal Institute of Technology
- 14PESGM0306, Long Term Voltage Stability Thevenin Index Using Voltage Locus Method
  A. RAMAPURAM MATAVALAM, Iowa State University
  V. AJJARAPU, Iowa State University
- 14PESGM0553, Stability Synthesis of Power Hardware-in-the-Loop (PHIL) Simulation
  M. DARGAHI, Queensland University of Technology
  A. GHOSH, Queensland University of Technology
  G. LEDWICH, Queensland University of Technology
- 14PESGM0554, A Stochastic Model for Power System Transient Stability with Wind Power
  W. WU, Shanghai Jiaotong University
  K. WANG, Shanghai Jiaotong University
  G. LI, Shanghai Jiaotong University
  Y. HU, Shanghai Jiaotong University

- 14PESGM0570, Investigation of Voltage Stability in Unbalanced Distribution Systems with DG using Three-Phase Current Injection Based CPF
  H. CHOU, Texas A&M
  K. BUTLER-PURRY, Texas A&M
- 14PESGM0731, Impact of Internal Impedances of Distributed Synchronous Generators on Voltage Stability Analysis
  Y. WANG, Wayne State University
  C. WANG, Wayne State University
  H. ZHAN, Xihua University
- 14PESGM0900, Identification and Wide-Area Visualization of the Centers of Oscillation for a Large-Scale Power System
  L. BERNAL, Georgia Tech
  F. HU, University of Tennessee
  K. SUN, University of Tennessee
  E. FARANTATOS, EPRI
- 14PESGM0947, Flexible Tool for Small Signal Stability Analysis
  C. BITENZIK, IITREE-FI-UNLP
  J. AGÜERO, IITREE-FI-UNLP
  M. BEROQUI, IITREE-FI-UNLP
- 14PESGM0982, Application of a Damping Torque Analysis Index for Coordinated Tuning of Stabilisers in a Large Power Grid
  H. CAI, State Grid Economic Research Institute
  T. LITTLER, Queen's University Belfast
  J. HUANG, State Grid Economic Research Institute
  Z. XIE, State Grid Economic Research Institute
- 14PESGM1033, Transient Stability Analysis Using Potential Energy Indices for Determining Critical Generator Sets
  C. SAUNDERS, Brunel University
  M. ALAMUTI, Brunel University
  G. TAYLOR, Brunel University
- 14PESGM1035, A PMU-Based Three-Step Controlled Separation with Transient Stability Considerations
  C. WANG, University of Hong Kong
  Y. HOU, University of Hong Kong
- 14PESGM1401, EMTP-Type Realization of Model Reduction Algorithms for Transient Simulation of Distribution Networks
  C. WANG, Tianjin University
  H. YU, Tianjin University
  P. LI, Tianjin University
  C. DING, Tianjin University
  G. SONG, Tianjin University
  X. FU, Tianjin University
  C. SUN, Tianjin University
  K. YUAN, Tianjin University
- 14PESGM1703, Networked Control System Based Wide-Area Power System Stabilizer Application in Guizhou Power Grid
  F. ZHANG, Tsinghua University
  Y. SUN, Tsinghua University
  L. CHENG, Tsinghua University
  X. LI, Wuhan University
- 14PESGM1778, Improved Rotor Angular Speed Measurement – A Key for Proper Power Grid Stabilization
  M. BAECHLE, ABB Switzerland Ltd.
  V. KNAZKINS, ABB Switzerland Ltd.
  M. LARSSON, ABB Switzerland Ltd.
  P. KORBA, Zurich University of Applied Sciences
- 14PESGM2029, Rotor Trajectory Index for Transient Security Assessment Using Radial Basis Function Neural Network
  K. VERMA, Malaviya National Institute of Technology
  K. NIAZI, Malaviya National Institute of Technology
- 14PESGM2109, Energy-Guided Time-Domain Simulation for Critical Clearing Time Reassessment in the TTS-CUEP/BCU Method
  E. ROZAS THEODORO, University of Sao Paulo (USP)
  L. COSTA ALBERTO, University of Sao Paulo (USP)
  H. CHIANG, Cornell University

- 14PESGM0334, Analytical Tool for Designing MMC Parameters to Improve Damping of Transients
  H. JIANG, McGill University
  G. JOOS, McGill University
  B. OOI, McGill University

Design and Implementation of Ancillary Service Markets that Enable a Reliable and Efficient Power System with Increasing Penetrations of Variable Energy Resources *(panel)*

Wednesday, 30 July, 10:00 AM–12:00 PM *Chesapeake 4*

Sponsored by: *Power System Operations*
Chair: *M. O'Malley, University College Dublin*
Co-Chair: *E. Ela, National Renewable Energy Laboratory*

Ancillary service markets were developed to incentivize resources and to ensure the system achieved sufficient supply. Increasing amounts of variable energy resources, like wind and photovoltaic are creating new needs or exacerbating the current needs of ancillary services. Enabling technologies that have very unique features may now be participating primarily or entirely in these ancillary service markets. Modeling of system requirements across multiple time horizons and accounting for cross correlations between products is becoming increasingly important. Changing operational strategies, like robust unit commitment, are able to provide forms of ancillary services inherently, but with different incentive and market structures. Greater contribution of ancillary service suppliers from the distribution system can also cause challenges. These topics will be explored in detail from the perspective of all stakeholders, including renewable generators, conventional generators, system operators and the customer who ultimately pays for these ancillary services.

PRESENTATIONS AND PANELISTS:

- 14PESGM2652, Who Pays for these Ancillary Services
  S. BEUNING, Xcel Energy
- 14PESGM2653, Ancillary Service Market Evolution
  E. ELA, National Renewable Energy Laboratory
- 14PESGM2654, Future Ancillary Services in ERCOT
  J. MATEVOSJANA, ERCOT
- 14PESGM2655, Renewables: Causer and Provider of Ancillary Servicesse Resources and a Potential Causer
  L. BEANE, Iberdrola
- 14PESGM2656, Conventional Merchant Generator Perspective
  S. JOHNSON, NRG
- 14PESGM2657, New and Evolving Ancillary Service Markets at the CAISO
  C. LOUTAN, California ISO

Development of New Distribution Test Feeders *(panel)*

Wednesday, 30 July, 10:00 AM–12:00 PM *National Harbor 7*

Sponsored by: *(PSACE) Distribution System Analysis*
Chair: *J. Fuller, Pacific Northwest National Laboratory*

The first set of radial distribution system test feeders was released in 1991, designed for comparison testing and benchmarking of software programs and unbalanced power flow solution algorithms. These feeders were made available for public use, and since then, hundreds of researchers have accessed and published algorithms and methodologies based on these feeders. As computational capabilities increase and the needs of users incorporate more advanced technologies, the requirements for state-of-the-art distribution analysis tools and the need for models to validate them increase. The IEEE PES DAS Test Feeder Working Group has expanded beyond its original scope to address the needs of ongoing research and development. This panel session will discuss current developments from the WG (including meshed networks, urban cores and time-series solutions) and the planned road map for future development.

PRESENTATIONS AND PANELISTS:

- 14PESGM1934, IEEE 342-Node Low Voltage Networked Test System
  K. SCHNEIDER, Pacific Northwest National Laboratory
  P. PHANIVONG, Pacific Northwest National Laboratory
  J. LACROIX, Pacific Northwest National Laboratory
- 14PESGM1938, Time-Series Test Case
  B. MATHER, NREL

- 14PESGM1936, Protection Tests
  T. MCDERMOTT, MelTran, Inc.
- 14PESGM1937, Low Voltage Test Case
  R. DUGAN, EPRI
- 14PESGM1935, Test Feeder Working Group Roadmap
  J. FULLER, Pacific Northwest National Laboratory

Battery Safety and DC Systems – Evolution of DC Arc Flash and Other Battery Safety Issues through Codes and Government Regulations *(panel)*

Wednesday, 30 July, 10:00 AM–12:00 PM *Chesapeake 2*

Sponsored by: *Stationary Battery*
Chair: *S. McCluer, Schneider Electric*

This session will present and discuss:

1. NFPA 70E Considerations for Batteries and DC Power Systems
2. Safety Hazards Associated with Installation and Maintenance of Battery and DC Power Systems

PRESENTATIONS AND PANELISTS:

- 14PESGM2754, Safety Hazards Associated with Batteries and DC Power Systems
  W. CANTOR, TPI
- 14PESGM2755, TBA
  R. TRESSLER, Alber Corp.
- 14PESGM2756, NFPA 70E Considerations for Batteries and DC Power Systems
  S. MCCLUER, Schneider Electric

Advances in State Estimation for Distribution Networks – Part 2 *(panel)*

Wednesday, 30 July, 10:00 AM–12:00 PM *Chesapeake A*

Sponsored by: *Transmission and Distribution Committee*
Chair: *G. Taylor, Brunel University*

This panel presents a selection of novel distribution network state estimation developments that aim to fully enable and support the required smart grid functionality associated with the integration of renewable energy sources, service restoration, distribution automation and demand side participation. A smart distribution network perspective will be addressed with regard to advances in state estimation for smart distribution networks. Specific details of US, Canada, China and European R&D projects will also be presented. In addition the importance of state estimation is addressed in this panel in order to provide secure, scalable and interoperable smart grid functionality both within and external to smart distribution networks.

PRESENTATIONS AND PANELISTS:

- 14PESGM0493, Generalized State Estimation for Distribution Networks with a CIM Interface
  K. CELIK, Nexant
- 14PESGM0494, Addressing the Challenges for Integrating Micro-Synchrophasor Data with Operational System Applications
  E. STEWART, Lawrence Berkeley National Laboratory
  S. KILICCOTE, Lawrence Berkeley National Laboratory
  C. SHAND, Open Grid Systems Ltd
  A. MCMORRAN, Open Grid Systems Ltd
  R. ARGHANDEH, California Institute for Energy and Environment
  A. VON MEIER, California Institute for Energy and Environment
- 14PESGM0495, State Estimation for Actively Managed Distribution Networks
  R. CURRIE, Smarter Grid Solutions
- 14PESGM0492, Choices of State Estimation Solution Process for Medium Voltage Distribution Systems
  N. NUSRAT, Brunel University
  M. IRVING, Brunel University
  G. TAYLOR, Brunel University

Student Faculty Industry Luncheon *(luncheon)*

Wednesday, 30 July, 11:45 AM–1:30 PM *Potomac A*

Wednesday Afternoon

Student Job Fair *(panel)*

Wednesday, 30 July, 1:30 PM–3:00 PM *Potomac A*

Publications Town Hall – *PETS-J* – PES Open Access Journal (panel)

Wednesday, 30 July, 12:00 PM–1:00 PM *Potomac C*

Sponsored by: *IEEE PES Publications*
Chair: *S. Sudhoff, Purdue University*

Scott Sudhoff, EIC for the *Power and Energy Technology Systems Journal*, PES' new open access journal, will explain the scope of the *Power and Energy Technology Systems Journal* as well as what an open access journal is and the submission process.

The Market, the Prices and the Subsidies: The Real Cost of Power *(panel)*

Wednesday, 30 July, 1:00 PM–5:00 PM *Azalea 3*

Sponsored by: *Energy Development and Power Generation*
Chair: *R. Moreno, Universidad de Chile & Imperial College London*
Co-Chair: *B. Bezerra, PSR*

Market design in most of the countries is based on the concept that prices should give correct incentives for adequate expansion of electricity infrastructure in the long-term and efficient asset operation and demand consumption in the short-term. These goals, however, can only be archived if prices are cost-reflective, which is debatable in markets with cross-subsidies and initiatives that aim to adapt market design for incentivizing investments in renewables such as tax exemptions (mixing taxpayers with electricity consumers). In this context, the objective is to show experiences with distortions that these initiatives can cause on efficient market and system operation, and effective and reliable investment. Panelists will present cases and studies where the presence of external subsidies, cross-subsidies and inefficient feed-in-like tariffs had damaged (or could damage) power system efficiency and reliability. This panel is also chaired by Prof. Hugh Rudnick, PUC-Chile.

PRESENTATIONS AND PANELISTS:

- 14PESGM1916, (with B. Bezerra and R. Ferreira) The Impact of Subsidies and Incentives on the Market Efficiency: The Brazilian Experience
  L. BARROSO, PSR
- 14PESGM1919, (with C. Vasilakos, R. Moreno and D. Pudjianto) Alternative Transmission Tariffs for Renewables and Their Impacts on System-Wide Investment
  G. STRBAC, Imperial College London
- 14PESGM1917, (with M. Perez de Arce) Comparison of some Incentive Policies for Renewable Energy
  E. SAUMA, Pontificia Universidad Catolica de Chile
- 14PESGM2345, (with A. Flores-Quiroz and G. Jimenez) Effects on Energy Prices, Capacity Payments, and Ancillary Services of Neglecting Operational Constraints in a System with High Penetration of Variable Renewable Energy
  R. PALMA-BEHNKE, University of Chile
- 14PESGM1920, (with J. Larrain, H. Rudnick and P. Miquel) The Impact of Renewable Portfolio Standards in Fast Growing Countries
  S. MOCARQUER, Systep, Chile
- 14PESGM1918, (with J.A. Diaz-Velasco, C. Torres and C. Gallego) Two-in-One: The Experience of the Colombian Electricity Sector to Encourage Renewable Energies
  H. SALAZAR, Technological University of Pereira

T2 – IGCC Transaction Paper Session *(transactions paper)*

Wednesday, 30 July, 1:00 PM–5:00 PM *Chesapeake 11*

Sponsored by: *Intelligent Grid Coordinating Committee and Emerging Technologies Coordinating Committee*

PAPERS AND AUTHORS:

- 14PESGM0113, An Empirical Investigation of V-I Trajectory based Load Signatures for Non-Intrusive Load Monitoring *[Transaction Number: TSG2271282]*
  T. HASAN, Virginia Tech
  F. JAVED, Lahore University of Management Sciences
  N. ARSHAD, Lahore University of Management Sciences
- 14PESGM0315, PHEV Utilization Model Considering Type-of-Trip and Recharging Flexibility *[Transaction Number: 6623210]*
  P. GRAHN, Royal Institute of Technology
  K. ALVEHAG, Royal Institute of Technology
  L. SÖDER, Royal Institute of Technology
- 14PESGM0330, Harmonic and Negative-Sequence Current Control in an Islanded Multi-Bus MV Microgrid *[Transaction Number: TSG-00775-2012]*
  M. HAMZEH, Shahid Beheshti University
  H. KARIMI, Polytechnique de Montreal
  H. MOKHTARI, Sharif University of Technology
- 14PESGM0528, Optimum Sizing of Distributed Generation and Storage Capacity in Smart Households *[Transaction Number: TSG2278783]*
  S. KAHROBAEE, UNL
  S. ASGARPOOR, UNL
  W. QIAO, UNL
- 14PESGM0856, A Demand Response and Battery Storage Coordination Algorithm for Providing Microgrid Tie-Line Smoothing Services *[Transaction Number: TSTE-00136-2013]*
  D. WANG, Tianjin University
  S. GE, Tianjin University
  H. JIA, Tianjin University
  Y. ZHOU, Tianjin University
  C. WANG, Tianjin University
  N. LU, North Carolina State University
  X. KONG, Tianjin University
- 14PESGM1327, Integrity Assessment Scheme for Situational Awareness in Utility Automation Systems *[Transaction Number: TSG-00106-2013]*
  S. MOHAGHEGHI, Colorado School of Mines

On-Site Diagnostic Measurements for Power Apparatus and Their Importance in the Era of Smart Grid – Combo Session with Smart Sensors WG *(panel)*

Wednesday, 30 July, 1:00 PM–5:00 PM *National Harbor 6*

Sponsored by: *Power System Instrumentation and Measurements*
Chair: *E. So, National Research Council of Canada*
Co-Chair: *F. Rahmatian, Quanta Technology*

The panel covers discussions on how on-site diagnostics enhances reliability of vertically integrated hydro utility; effectiveness and importance of smart diagnostics for power cables; and advances on the on-site diagnostic assessment of power equipment insulations in the era of smart grids.

PRESENTATIONS AND PANELISTS:

- 14PESGM2628, On-Site Diagnostics Enhances Reliability of Vertically Integrated Hydro Utility
  W. MCDERMID, Manitoba Hydro
- 14PESGM2630, Effectiveness and Importance of Smart Diagnostics for Power Cables
  P. VAN DER WIELEN, DNV KEMA
- 14PESGM2626, Use of Online Transient Monitoring Systems in Evaluation of Substation Transformers and Condition Assessment of Associated Devices
  J. MCBRIDE, JMX Services, Inc.
- 14PESGM2627, Advances on the On-Site Diagnostic Assessment of Power Equipment Insulations in the Era of Smart Grids
  M. ABOU-DAKKA, National Research Council of Canada
- 14PESGM2641, Application of an Advanced Warning System for Condition Monitoring of Transmission Cable Assets
  S. CHERUKUPHALLI, BC Hydro

The Use of CIM Standards in Managing BIG Utility Data *(panel)*

Wednesday, 30 July, 1:00 PM–3:00 PM *Chesapeake A*

Sponsored by: *(PSACE) Computer Analytical Methods*
Chair: *M. Goodrich, SISCO System*
Co-Chair: *E. Haq, California ISO*

Due to the implementation of Smart Grid Technologies, the Electric Utilities are now facing with new challenges of dealing with large volume of real time and near real time data from the transmission and distribution systems. These Big sets of data are vital in efficient asset management, outage management, meter data management, customer service management, fast and interactive real time control and operation of the transmission and distribution systems. This panel will explore the application of the well established IEC Common Information Model standards in managing the BIG Utility data.

PRESENTATIONS AND PANELISTS:

- 14PESGM2447, Why Data Modeling Using the CIM is Important to Big Data Analytics
  M. GOODRICH, SISCO System
- 14PESGM2450, CIM-Based Utility Data Model Solution for Enterprise Analytics
  T. TERRY SAXTON, Xtensible Solutions
- 14PESGM2449, CIM Based Integration as a Key to Big Data Utilization
  J. SIMMINS, Electric Power Research Institute
- 14PESGM2451, Aggregating Meter-Level Distributed Energy Resources into CIM for Real-Time Systems
  J. MOSELEY, ERCOT
- 14PESGM2448, Melding Big Data and CIM for Bold Power Systems Insights
  S. VARADAN, UISOL
- 14PESGM2463, CIM-based Utility Data Model Solution for Enterprise Analytics
  S. HU, Xtensible Solution

Transactive Energy Techniques for End-to-End Power System Operation *(panel)*

Wednesday, 30 July, 1:00 PM–5:00 PM *Potomac 1*

Sponsored by: *(PSACE) Economic Systems*
Chair: *F. Rahimi, OATI*
Co-Chair: *F. Bouffard, McGill University*

The Transactive Energy framework involves principles, techniques, technologies, and systems for active participation of electricity consumers, producers, and power system operators and energy market administrators in seamless end-to-end interactions for reliable, economically efficient, and environmentally friendly supply and utilization of electric energy. It is based on forward and spot transactions for supply, transport, and/or consumption of electricity between and among consumers, producers, energy service providers, aggregators, and system and market operators. Transaction quantities and/or prices may be fixed through bilateral arrangements, bid/ask matching, or a market clearing process at retail or wholesale level. This panel examines the possibilities and limitations, as well as reliability and economic opportunities and risks, of extending the wholesale transactive operations to retail markets with a view to and End-to-End Transactive Operation Framework.

PRESENTATIONS AND PANELISTS:

- 14PESGM1769, Transactive Energy Concepts and Framework
  A. IPAKCHI, OATI
- 14PESGM1770, Possibilities and Limitations of Extending the Wholesale/Bulk Power Transactive Techniques to Retail Markets and Distribution Operations
  R. MASIELLO, DNV GL
- 14PESGM1768, Enabling Technologies for End-to-End Transactive System Operation from Retail to Wholesale
  N. LU, North Carolina State University
- 14PESGM1773, Transactive Control and Coordination of Distributed Energy Resources, End Devices, and Systems
  R. MELTON, PNNL
- 14PESGM1771, Transactive Control for Grid Balancing and Frequency Management
  F. FLETCHER, BWP
- 14PESGM1774, Canadian Perspective on Transactive Control
  D. BEAUVAIS, CanmetENERGY
- 14PESGM1772, Transactive Product Pricing, Payment, and Cost Allocation
  P. DE MARTINI, Newport Consulting
- 14PESGM1767, Transactive Energy Cost-Benefit Analysis in Scheduling, Real time and After-the-Fact Domains
  F. RAHIMI, OATI

System Economic / Technical Benefits of Unconventional Transmission Provision: Transmission Switching, Embedded HVDC, and Others *(panel)*

Wednesday, 30 July, 1:00 PM–5:00 PM *National Harbor 5*

Sponsored by: *(PSACE) Economic Systems*
Chair: *L. Xie, Texas A&M University*

Transmission planning and operations in the U.S. and around the world are facing increasing level of challenges due to recent technical, economical, and regulatory changes. In the U.S., China, and many other regions of the world, there has been both academia research and industrial application of novel transmission provisions such as transmission switching and embedded HVDC. This panel brings together leaders in academia, vendors, transmission owners, and system operators, and will serve as a forum to discuss the value proposition of several transmission provision options.

PRESENTATIONS AND PANELISTS:

- 14PESGM2774, Non Conventional Transmission Technologies and Their System Benefits
  X. ZHANG, University of Birmingham
- 14PESGM2775, North American Electric Transmission Grid – A Future Grid Vision
  R. NUQUI, ABB
- 14PESGM2776, Transmission Switching and Its Economic Benefits
  K. HEDMAN, Arizona State Unviersity
- 14PESGM2777, Embedded HVDC from Transmission Owner's Perspective
  J. FLEEMAN, American Electric Power
- 14PESGM2778, HVDC and Its Systems Benefits
  N. KIRBY, Alstom Grid
- 14PESGM2779, Application and Challenges of HVDC Transmission Technologies in China Southern Power Grid
  X. JIN, China Southern Power Grid

PSACE 2 *(transactions paper)*

Wednesday, 30 July, 1:00 PM–5:00 PM *Magnolia 3*

Sponsored by: *PSACE*
Chair: *Y. Xu, Washington State University*

PAPERS AND AUTHORS:

- 14PESGM2396, A Three-Phase Optimal Power Flow Algorithm to Mitigate Voltage Unbalance *[Transaction Number: TPWRD-01320-2012.R1]*
  L. ARAUJO, Federal University of Juiz de Fora
  D. PENIDO, Federal University of Juiz de Fora
  S. CARNEIRO JR, Federal University of Rio de Janeiro
  J. PEREIRA, Federal University of Juiz de Fora
- 14PESGM0333, Multiphase Load-Flow Solution for Large-Scale Distribution Systems Using MANA *[Transaction Number: 10.1109/TPWRD.2013.2279218]*
  I. KOCAR, Ecole Polytechnique Montreal
  J. MAHSEREDJIAN, Ecole Polytechnique Montreal
  U. KARAAGAC, Ecole Polytechnique Montreal
  G. SOYKAN, Ecole Polytechnique Montreal
  O. SAAD, IREQ
- 14PESGM1061, Impact of Reward and Penalty Scheme on the Incentives for Distribution System Reliability *[Transaction Number: TPWRS2279859]*
  K. ALVEHAG, KTH-Royal Institute of Technology
  K. AWODELE, University of Cape Town
- 14PESGM1308, Unified Distribution System State Estimator Using the Concept of Augmented Matrices *[Transaction Number: TPWRS-01044-2012]*
  F. THERRIEN, University of British Columbia
  I. KOCAR, École Polytechnique de Montréal
  J. JATSKEVICH, University of British Columbia
- 14PESGM1346, Investigation on Voltage Sags Caused by DG Anti-Islanding Protection *[Transaction Number: TPWRD-00510-2012]*
  F. TRINDADE, University of Campinas
  J. VIEIRA, University of Sao Paulo
  K. NASCIMENTO, University of Sao Paulo
- 14PESGM1397, Distributed Volt/VAr Control by PV Inverters *[Transaction Number: TPWRS.2013.2256375]*
  P. JAHANGIRI, Iowa State University
  D. ALIPRANTIS, Purdue University

- 14PESGM1813, Multi-Layered Optimization Of Demand Resources Using Lagrange Dual Decomposition *[Transaction Number: TSG-00721-2012]*
  J. JOO, Carnegie Mellon University
  M. ILIC, Carnegie Mellon University
- 14PESGM1856, Biogeography Based Optimal State Feedback Controller for Frequency Regulation of a Smart Microgrid *[Transaction Number: TSG-00433-2011]*
  M. GADDAM, Indian Institute of Technlogy, Delhi
  M. S, Indian Institute of Technology,Delhi
  P. SEKHAR, Indian Institute of Technology, Delhi

Voltage Stability Impacts of Geomagnetically Induced Currents *(panel)*

Wednesday, 30 July, 1:00 PM–3:00 PM *Potomac 6*

Sponsored by: *Transmission and Distribution Committee*
Chair: *T. Overbye, University of Illinois at Urbana-Champaign*

Geomagnetic disturbances (GMDs) have the potential to impact the operation of the high voltage power grid by causing geomagnetically induced currents (GICs) to flow in the transmission lines and transformers. These GICs can cause half-cycle saturation in the transformers, resulting in increased transformer reactive power losses. In their 2012 report NERC noted that there are two major risk caused by GICs. The first is the potential for damage to transmission system assets, primarily the high voltage transformers. The second is the loss of reactive power support leading to the potential for a voltage collapse. This panel session focuses on the second risk, considering the modeling needed to provide an assessment of GIC related to small and larger disturbance voltage stability.

PRESENTATIONS AND PANELISTS:

- 14PESGM1953, Overview of Severe Geomagnetic Storms and Analysis of US Electric Grid Threat
  J. KAPPENMAN, Storm Analysis Consultants
- 14PESGM1954, GMD Impacts on Power System Static and Dynamic Voltage Stability
  K. SHETYE, University of Illinois
- 14PESGM1955, Improving GMD-Induced Power System Voltage Stability with Transformer Neutral Blocking and Operational Schemes
  S. DAHMAN, PowerWorld Corporation
- 14PESGM1956, Bonneville Power Administration GMD/GIC Activities
  R. XU, Bonneville Power Administration
- 14PESGM2385, Modelling Considerations in Steady-State GMD Simulations
  L. MARTI, Hydro One Networks Inc.

Transmission and Distribution Paper Session I *(transactions paper)*

Wednesday, 30 July, 1:00 PM–5:00 PM *Azalea 2*

Sponsored by: *Transmission and Distribution Committee*
Chair: *S. Santoso, University of Texas at Austin*
Co-Chair: *G. Chang, National Chung Cheng University*

PAPERS AND AUTHORS:

- 14PESGM0521, A Technique to Mitigate Zero-Sequence Harmonics in Power Distribution Systems *[Transaction Number: TPWRD-01355-2012]*
  W. XU, University of Alberta
  P. BAGHERI, University of Alberta
- 14PESGM0619, Voltage Unbalance Emission Assessment in Interconnected Power Systems *[Transaction Number: TPWRD.2013.2274659]*
  U. JAYATUNGA, University of Wollongong
  S. PERERA, University of Wollongong
  P. CIUFO, University of Wollongong
  A. AGALGAONKAR, University of Wollongong
- 14PESGM0995, Modeling and Analysis of HVDC Converter by Three-Phase Dynamic Phasor *[Transaction Number: TPWRD-00656-2011.R6]*
  C. LIU, North China Electrical Power University
  A. BOSE, Washington State University
  P. TIAN, North China Electrical Power University

- 14PESGM1094, Modular Multilevel Converter Models for Electromagnetic Transients *[Transaction Number: TPWRD-00396-2013]*
  H. SAAD, Polytechnique
  S. DENNETIÈRE, RTE-France
  J. MAHSEREDJIAN, Polytechnique
  P. DELARUE, École Centrale de Lille
  X. GUILLAUD, École Centrale de Lille
  J. PERALTA, Polytechnique
  S. NGUEFEU, RTE-France
- 14PESGM1278, Transformer Leakage Flux Models for Electromagnetic Transients: Critical Review and Validation of a New Model *[Transaction Number: TPWRD-00845-2013]*
  M. LAMBERT, Polytechnique
  M. MARTINEZ, EDF
  J. MAHSEREDJIAN, Polytechnique
  F. DE LEON, New York University
  F. SIROIS, Polytechnique
- 14PESGM1281, A Hybrid Wavelet Transform and Neural Network-Based Approach for Modelling Dynamic Voltage-Current Characteristics of Electric Arc Furnace *[Transaction Number: TPWRD_0366_2013.R1]*
  G. CHANG, National Chung Cheng University
  M. SHIH, National Chung Cheng University
  Y. CHEN, National Chung Cheng University
  Y. LIANG, National Chung Cheng University
- 14PESGM1318, Steady-State and Dynamic Performance of Front-End Diode Rectifier Loads as Predicted by Dynamic Average-Value Models *[Transaction Number: TPWRD-00621-2012]*
  S. CHINIFOROOSH, BC Hydro
  H. ATIGHECHI, BC Hydro
  A. DAVOUDI, University of Texas at Arlington
  J. JATSKEVICH, University of British Columbia
  J. MARTINEZ, Universitat Politecnica de Catalunya
  M. SAEEDIFARD, Purdue University
  D. ALIPRANTIS, Purdue University
  V. SOOD, University of Ontario Institute of Technology
- 14PESGM2114, Rational Modeling of Multi-Port Systems via a Symmetry and Passivity Preserving Mode-Revealing Transformation *[Transaction Number: TPWRD-01271-2012]*
  B. GUSTAVSEN, SINTEF Energy Research

Utility Current Practices and Challenges of Predictive Distribution Reliability *(panel)*

Wednesday, 30 July, 1:00 PM–3:00 PM *Chesapeake 4*

Sponsored by: *Transmission and Distribution Committee*
Chair: *L. Xu, Quanta Technology*

The Predictive Reliability Task Force of the IEEE Working Group on Distribution Reliability has conducted a comprehensive survey to gain better understanding about current practices among utilities in North America regarding predictive reliability modeling and analysis. Topics covered by the survey include how utilities are preparing to consider in these studies emerging technologies such as distributed energy resources and areas of concern like aging infrastructures. This panel session will present the main findings from the survey and provide a platform for participant utilities to share experiences and discuss analytically methodologies and technical requirements for conducting predictive reliability studies for distribution systems.

PRESENTATIONS AND PANELISTS:

- 14PESGM2741, Reliability Management Approach at SCE
  S. CHIEN, Southern California Edison
- 14PESGM2742, URD Cable Fault Prediction Model
  C. GUBALA, Commonwealth Edison
- 14PESGM2744, Pepco's Reliability Forecasting Model
  B. CLARK, Pepco Holdings, Inc
- 14PESGM2743, Predicative Reliability Analysis Tools Utilizing OMS Data
  I. HOOGENDAM, PacifiCorp

Implementation of Smart Grid Projects: Results and Lessons Learned
(super session – panel)

Wednesday, 30 July, 1:00 PM–5:00 PM *Potomac C*

Sponsored by: *PES Technical Council*
Chair: *D. Ortiz, Department of Energy*

This session will engage participants in a discussion of the results, lessons learned, and benefits of Smart Grid investments by industry and the U.S. Department of Energy, and what the future may bring. Session panelists include representatives from leading utilities, equipment providers, national laboratories, and the U.S. Department of Energy. The presentations and resulting discussion will set the stage for the future, laying out opportunities to drive further value and discovering key technical and policy needs.

Topics that will be covered include:

- Smart Grid investments in transmission and distribution made under the American Recovery and Reinvestment Act: program structure, results, and next steps.
- Utility experiences with Smart Grid technologies and systems including challenges, solutions, and lessons learned.
- Future needs for Smart Grid systems and integration, including architecture and consumer engagement.

The audience will be able to engage and provide input directly to the U.S. Department of Energy decision makers responsible for the past and future investment in the Smart Grid.

Introduction to the Smart Grid Super Session
D. S. ORTIZ, Ph.D., Deputy Assistant Secretary, Office of Electricity Delivery and Energy Reliability, U.S. Department of Energy, Chair

Overview and Results of the Smart Grid Investment Grant Program Under the American Recovery and Reinvestment Act
J. PALADINO, Advanced Grid Integration Program, U.S. Department of Energy

TBD
R. KEEL, Chattanooga Electric Power Board

TBD
TBD, Utility partner

Large Scale Synchrophasor Deployment at PG&E
V. MADANI, Pacific Gas and Electric; Jay Giri, Alstom Grid

Interoperability of the Smart Grid and Needs for Distribution System Architecture
E. GUNTHER, Enernex

Consumer Behavior and the Smart Grid: Results of Real-Time Pricing Experiments
P. CAPPERS, Lawrence Berkeley National Laboratory

Grid Modernization and Infrastructure Replacement in the US Capital Region under an Uncertain Regulatory, Economic, and Generation Mix Environment
(panel)

Wednesday, 30 July, 1:00 PM–5:00 PM *National Harbor 8*

Sponsored by: *Local Organizing Committee*
Chair: *J. Lin, PJM*

Grid modernization is a critical issue for US Capital region utilities, as well as for independent system operators like PJM and utilities on other areas. This panel will address the following questions, primarily with respect to the US Capital area utilities: How should we modernize the current grid under various uncertainties? What, if anything, can Intelligent Grid investments do to lessen the risk of service interruption or violent failure or both? How will regulators support the use of ratepayer funds to replace or repair assets that are often underground and invisible until they fail? Is this an "old city" problem, or does it have corollaries in suburban and rural areas?

PRESENTATIONS AND PANELISTS:

- 14PESGM2504, Transmission Planning for Grid Modernization
  P. MCGLYNN, PJM Interconnection
- 14PESGM2505, Grid Modernization in the District of Columbia
  D. CLEVERDON, Public Service Commission of the District of Columbia
- 14PESGM2544, Underground Transmission – Challenges and Solutions for Retrofit of Existing Infrastructure and New Construction in Dense Urban Environments
  D. LINDSAY, ABB High Voltage Cables

- 14PESGM2572, Vision 2050 – Standards/Strategies to Proactively Address Aged T and D Equipment
  J. CANTLER, PHI
- 14PESGM2534, Smart/Strong/Flexible GRID: Modernizing for an Uncertain Future Using New Flow Control and Sensing Technologies
  A. KAPADIA, Smart Wire Grid

Transactions Paper Session #4 *(transactions paper)*

Wednesday, 30 July, 2:00 PM–5:00 PM *Camellia 1*

Sponsored by: *Power System Dynamic Performance*
Chair: *L. Vanfretti, KTH Royal Institute of Technology*
Co-Chair: *R. Kuiava, Federal University of Parana*

PAPERS AND AUTHORS:

- 14PESGM0300, Power System Ambient Mode Estimation Considering Spectral Load Properties *[Transaction Number: TPWRS-00245-2013.R2]*
  V. PERIC, KTH Royal Institute of Technology
  L. VANFRETTI, KTH Royal Institute of Technology
- 14PESGM2106, Modal Analysis of Power Systems through Natural Excitation Technique *[Transaction Number: TPWRS-00477-2013]*
  J. SEPPÄNEN, Fingrid / Aalto university
  J. TURUNEN, Statnett
  M. KOIVISTO, Aalto University
  N. KISHOR, Aalto University
  L. HAARLA, Aalto University
- 14PESGM0017, Generator Dynamic Model Validation and Parameter Calibration Using Phasor Measurements at the Point of Connection *[Transaction Number: TPWRS-01025-2011]*
  P. DU, ERCOT
- 14PESGM0497, Wide-Area Assessment of Aperiodic Small Signal Rotor Angle Stability in Real-Time *[Transaction Number: TPWRS-01416-2012.R1]*
  H. JÓHANNSSON, Technical University of Denmark
  A. NIELSEN, Technical University of Denmark
  J. ØSTERGAARD, Technical University of Denmark
- 14PESGM0520, Identification of Critical Components for Voltage Stability Assessment Using Channel Components Transform *[Transaction Number: TSG-00047-2012]*
  W. XU, University of Alberta
  I. PORDANJANI, University of Alberta
  Y. WANG, University of Alberta
- 14PESGM0174, A Systematic Approach for Dynamic Security Assessment and the Corresponding Preventive Control Scheme Based on Decision Trees *[Transaction Number: TPWRS-00169-2013]*
  C. LIU, Aalborg University
  K. SUN, University of Tennessee
  Z. RATHER, Aalborg University
  Z. CHEN, Aalborg University
  C. BAK, Aalborg University
  P. THØGERSEN, kk-electronic a/s
  P. LUND, Energinet.dk

Robust Optimization in Power Systems: Recent Advances and Potential Applications *(panel)*

Wednesday, 30 July, 2:00 PM–5:00 PM *Chesapeake 2*

Sponsored by: *Power System Operations*
Chair: *A. Sun, Georgia Tech*
Co-Chair: *T. Zheng, ISO New England*

Robust optimization (RO) has recently gained much attention in the power industry as a tool to assist decision making under various uncertainties caused by the integration of variable generation. The core concept of RO is to optimize the system performance in a controlled manner against the worst case scenarios. Such a philosophy is indeed consistent with the current operating practice. Much progress has been made in applying RO to power systems operation, e.g. unit commitment, contingency modeling, transmission switching, etc. We believe RO can be applied to even broader ranges of problems in power systems. This panel aims to bring practitioners and academics together to review the most recent advances of RO in power systems, and to stimulate discussions on identifying broader ranges of applications of robust optimization in power systems.

Potential topics:

Recent advances of RO in power systems

Potential applications in power system planning, investment, and markets

PRESENTATIONS AND PANELISTS:

- 14PESGM2050, Stochastic Optimization Formulations for Reliability Unit Commitment Runs
  K. PAN, University of Florida
  Y. LU, University of Florida
  Y. GUAN, University of Florida
  J. WATSON, Sandia National Laboratories
- 14PESGM2048, Parallelization of Robust Optimization for N-k Contingency Analysis
  J. ZHAO, ISO New England
- 14PESGM2049, Efficient Direct Test for Dynamics Following a Cleared Fault
  D. BIENSTOCK, Columbia University
- 14PESGM2047, Multistage Robust Optimization for Unit Commitment with Approximate Affine Policy and Improved Constraint Generation
  A. SUN, Georgia Tech
- 14PESGM2045, Robust Battery Scheduling in a Micro-Grid with PV Generation
  X. WANG, Alstom
- 14PESGM2046, Robust Optimization for Transmission Expansion Planning: Minimax Cost vs. Minimax Regret
  J. WANG, Argonne National Laboratory
- 14PESGM2044, Robust Transmission Expansion Planning
  A. CONEJO, Ohio State University

Value of Flexible Resources in the ISO/RTO Markets with the Penetration of Grid-Scale Intermittent Renewable Resources and Distributed Generations *(panel)*

Wednesday, 30 July, 2:00 PM–5:00 PM *Chesapeake 7*

Sponsored by: *Power System Planning and Implementation*
Chair: *J. Yan, Southern California Edison*

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, 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 incentivize appropriate grid-scale and distributed generation, energy storage, energy efficiency and demand response program investment that will lead to a flexible, sustainable, efficient and reliable power system?

C. How should the DA/RT bmarket be redesigned to send appropriate price signal to resources 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:

- 14PESGM2420, The Economic Assessment of the Explicit Representation of Ramping Requirements on Conventional Generators in Systems with Integrated Intermittent Resources
  G. GROSS, University of Illinois
- 14PESGM2421, A Resource Planning Perspective on the Value of Conventional Generation Resources in the ISO/RTO Markets with the Penetration of Intermittent RenewableResources
  G. STERN, SCE
- 14PESGM2422, Value of Conventional Resources in the CAISO Market with Penetration of Intermittent Renewable Resources
  M. ROTHLEDER, CAISO
- 14PESGM2423, Value of Conventional Generation Resources in the ISO/RTO Markets with the Penetration of Intermittent Renewable Resources
  L. ZHANG, MISO Energy
- 14PESGM2424, Value of Conventional Generation Resources in RTO Markets with Penetration of Intermittent Renewables: Market Design Conside
  P. SOTKIEWICZ, PJM

Distributed Energy Resources and Demand Response *(paper forum)*

Wednesday, 30 July, 2:00 PM–5:00 PM *Magnolia 1*

Sponsored by: *IEEE PES*
Chair: *L. Ochoa, University of Manchester*

- 14PESGM0129, A Single to Three Phase Power Converter with Integrated Storage and a PV Interface for Rural Power Applications
  P. WOLFS, CQU
  F. YANG, CQU
- 14PESGM0135, Probabilistic Quantification of Potentially Flexible Residential Demand
  K. KOUZELIS, Aalborg University
  I. DIAZ DE CERIO MENDAZA, Aalborg University
  B. BAK JENSEN, Aalborg University
- 14PESGM0239, An OPF Sensitivity Based Approach for Handling Discrete Variables
  A. MOHAPATRA, Indian Institute of Technology, Delhi
  P. BIJWE, Indian Institute of Technology, Delhi
  B. PANIGRAHI, Indian Institute of Technology, Delhi
- 14PESGM0250, Self-Balancing Robust Scheduling Model for Demand Response Considering Electricity Load Uncertainty in Enterprise Microgrid
  K. LIU, Xi'an Jiaotong University
  F. GAO, Xi'an Jiaotong University
  Z. WANG, Xi'an Jiaotong University
  X. GUAN, Xi'an Jiaotong University
  Q. ZHAI, Xi'an Jiaotong University
  J. WU, Xi'an Jiaotong University
- 14PESGM0762, Integration of In-Home Electricity Storage Systems in a Multi-Agent Active Distribution Network
  E. KLAASSEN, Eindhoven University of Technology
  M. REULINK, Eindhoven University of Technology
  A. HAYTEMA, Nedap
  J. FRUNT, DNV GL
  H. SLOOTWEG, Eindhoven University of Technology
- 14PESGM0905, A Methodology for Estimating the Capacity Value of Demand Response
  S. NOLAN, University College Dublin
  M. O'MALLEY, University College Dublin
  M. HUMMON, NREL
  S. KILICCOTE, Lawrence Berkeley National Laboratory
  O. MA, United States Department of Energy
- 14PESGM0986, Optimal Allocation of Distributed Generation in Distribution System Considering Time Sequence Data and Low-Carbon Economy
  K. LIU, China Electric Power Research Institute
  W. SHENG, China Electric Power Research Institute
  Y. LIU, China Electric Power Research Institute
- 14PESGM1011, An Approach for Control of Battery Energy Storage Management Systems Considering Multiple Functions
  S. ABDELRAZEK, University of North Carolina at Charlotte
  S. KAMALASADAN, University of North Carolina at Charlotte
  J. ENSLIN, University of North Carolina at Charlotte
- 14PESGM1210, Impact of Reconfiguration Period and Photovoltaic Penetration on Distribution Grid Reconfiguration
  P. CHITTUR RAMASWAMY, KU Leuven
  G. DECONINCK, KU Leuven
  J. RADHAKRISHNA PILLAI, Aalborg University
- 14PESGM1394, Optimal Scheduling with Dynamic Line Ratings and Intermittent Wind Power
  B. BANERJEE, Curtin University
  D. JAYAWEERA, Curtin University
  S. ISLAM, Curtin University
- 14PESGM1498, Phasor-Based Approach for Harmonic Assesment from Multiple Distributed Energy Resources
  R. ARGHANDEH, UC Berkeley
  A. VON MEIER, UC Berkeley
  R. BROADWATER, Virginia Tech
- 14PESGM1649, Operation Strategies for Energy Storage Systems in Distribution Networks
  M. CHEHREGHANI BOZCHALUI, NEC Laboratories America, Inc.
  R. SHARMA, NEC Laboratories America, Inc.

- 14PESGM1713, Active Power Reserve for Frequency Control Provided by Distributed Generators in Distribution Networks
  A. RUEDA-MEDINA, UNESP
  A. PADILHA-FELTRIN, UNESP
  J. S. MANTOVANI, UNESP
- 14PESGM1719, Control Strategy for Frequency Regulation in Islanded Distribution Systems with Synchronous Distributed Generators
  M. VOGT, CELESC Distribuição S.A.
  R. OLIVEIRA, Federal Technological University of Parana
  G. DRANKA, Federal Technological University of Parana
- 14PESGM1681, Commissioning Tests of 100kWh Battery Energy Storage System for a Distribution Test Line
  F. AWAN, McGill University
  C. ABBEY, Institut de recherche d'Hydro-Québec
  Y. BRISSETTE, Institut de recherche d'Hydro-Québec
  G. JOOS, McGill University
- 14PESGM0473, Ramp Rate Control of Photovoltaic Power Plant Output Using Energy Storage Devices
  V. SALEHI POUR, Power Analytics Corp.
  B. RADIBRATOVIC, Power Analytics Corp.
- 14PESGM1155, Fast Demand Response as an Enabling Technology for High Renewable Energy Penetration in Isolated Power Systems
  D. NIKOLIC, Hydro Tasmania
  M. NEGNEVITSKY, University of Tasmania
  M. DE GROOT, CSIRO
  S. GAMBLE, Hydro Tasmania
  J. FORBES, CSIRO
  M. ROSS, Hydro Tasmania
- 14PESGM1951, Multi-Agent Coordination of DG Inverters for Improving the Voltage Profile of the Distribution Grid
  E. POLYMENEAS, Georgia Institute of Technology
  M. BENOSMAN, Mitsubishi Electric Research Laboratory
- 14PESGM2084, Numerical Analysis of Voltage Regulation via Smart PV Inverters
  A. BARNES, Gridco Systems
  J. SIMONELLI, Gridco Systems

Power System Planning and System Reliability *(paper forum)*

Wednesday, 30 July, 2:00 PM–5:00 PM *Magnolia 2*

Sponsored by: *IEEE PES*
Chair: *J. Stamp, Sandia National Laboratories*

- 14PESGM0526, Very Short-Term Load Forecasting Based on NARX Recurrent Neural Networks
  L. ANDRADE, University of Sao Paulo
  M. OLESKOVICZ, University of Sao Paulo
  A. SANTOS, University of Sao Paulo
  D. COURY, University of Sao Paulo
  R. FERNANDES, CCET, Federal University of Sao Carlos
- 14PESGM0597, Top Risks to Transmission Outages
  J. BIAN, North American Electric Reliability Corp. (NERC)
  S. EKISHEVA, North American Electric Reliability Corp. (NERC)
  A. SLONE, North American Electric Reliability Corp. (NERC)
- 14PESGM0644, Data Attack on Strategic Buses in the Power Grid: Design and Protection
  D. DEKA, UT AUSTIN
  R. BALDICK, UT AUSTIN
  S. VISHWANATH, UT AUSTIN
- 14PESGM0670, Study on Power System Vulnerability Assessment Based on Cascading Failure Model
  H. QI, Tsinghua University
  L. SHI, Tsinghua University
  Y. NI, Tsinghua University
  L. YAO, China Electric Power Research Institute
  B. MASOUD, ALSTOM
- 14PESGM0686, Accelerated AC Contingency Calculation on Commodity Multi-core SIMD CPUs
  T. CUI, ABB
  R. YANG, Carnegie Mellon University
  G. HUG, Carnegie Mellon University
  F. FRANCHETTI, Carnegie Mellon University

- 14PESGM0690, Toward Implementation of the Reconfiguration for Providing Differentiated Reliability Options in Distribution Systems
  S. JUNLAKARN, Carnegie Mellon University
  M. ILIC, Carnegie Mellon University
- 14PESGM0774, Major Blackouts in the Development of Electricity Distribution Networks
  J. LASSILA, Lappeenranta University of Technology
  T. KAIPIA, Lappeenranta University of Technology
  J. HAAKANA, Lappeenranta University of Technology
  J. PARTANEN, Lappeenranta University of Technology
- 14PESGM1037, Benefits of Fast Cut Back Function of Thermal Generating Units in Constructing Self-Healing Grids
  N. WANG, China Southern Power Grid
  C. WANG, University of Hong Kong
  Y. HOU, University of Hong Kong
  E. LU, China Southern Power Grid
  Z. QIN, University of Hong Kong
- 14PESGM1163, Novel Congested Flowgate Grouping Methods In Economic Transmission Planning
  R. BO, MISO
  J. YAN, MISO
  C. WU, MISO
  L. HECKER, MISO
  M. TACKETT, MISO
  M. NI, State Grid Electric Power Research Institute of China
- 14PESGM1503, Constructing Restoration Strategies with Availability Risk Constraints
  Y. HOU, University of Hong Kong
  Z. QIN, University of Hong Kong
  J. YAN, MISO
- 14PESGM1540, Impact of Communication Failures on Power System Security and Stability Defense System
  W. YU, NARI Group Corporation
  J. LUO, NARI Group Corporation
  Y. XUE, NARI Group Corporation
  H. TONG, NARI Group Corporation
  R. BO, Mid-continent Independent Transmission System Operator
  M. NI, NARI Group Corporation
- 14PESGM2052, Adjustable Robust Long-Term Energy Planning Under Hydrological Uncertainty
  D. MEJIA-GIRALDO, Universidad de Antioquia
  J. VILLARREAL-MARIMON, XM, Compañía de Expertos en Mercados
  H. LOPEZ-MEJIA, XM, Compañía de Expertos en Mercados
- 14PESGM2090, Analysis of the Relationship between Load Profile and Weather Condition
  D. SHI, University of Bath
  R. LI, University of Bath
  R. SHI, University of Bath
  F. LI, University of Bath
- 14PESGM2211, Forecasting Real-Time Net Interchange of Electric Power
  X. SUN, University of Connecticut
  P. LUH, University of Connecticut
  K. CHEUNG, Alstom Grid Inc.
  W. GUAN, Alstom Grid Inc.
- 14PESGM1836, Risk Assessment of Power System with High Penetration of Wind Power Considering Negative Peak Shaving and Extreme Weather Conditions
  H. LI, Tsinghua University
  Z. LU, Tsinghua University
  Y. QIAO, Tsinghua University
  W. WANG, Gansu Power Grid
- 14PESGM1776, A Scalable Decomposition Algorithm for PMU Placement Under Multiple-Failure Contingencies
  R. CHEN, Sandia National Laboratories
  J. RUTHRUFF, Sandia National Laboratories
- 14PESGM1143, Identification of State Parameters for Stealthy Cyber-Events in the Power Grid Using PCA
  N. WALLACE, Louisiana Tech University
  S. SEMPLE, Louisiana Tech University
  T. ATKISON, Louisiana Tech University

- 14PESGM1384, Electric Load Forecasting for Large Office Building Based on Radial Basis Function Neural Network
  W. MAI, Hong Kong Polytechnic University
  C. CHUNG, Hong Kong Polytechnic University
  T. WU, Hong Kong Polytechnic University
  H. HUANG, Hong Kong Polytechnic University
- 14PESGM1581, Optimization of Community Energy Management System Operation Based on Short-Term Load Forecasting
  D. LI, Shanghai University of Electric Power
  X. LIU, Shanghai University of Electric Power
  S. LIN, Shanghai University of Electric Power
  Z. QIN, Shanghai University of Electric Power
  J. REN, Shanghai University of Electric Power

PQ Monitoring in the Era of the Smart Grid *(panel)*

Wednesday, 30 July, 3:00 PM–5:00 PM *Chesapeake 4*

Sponsored by: *Transmission and Distribution Committee*
Chair: *B. Howe, EPRI*
Co-Chair: *F. Zavoda, IREQ*

Virtually all Smart Grid deployment concepts hinge on significant increases in the both the number of data sources and the frequency and detail of data flowing from those sources. Power quality has long relied on dedicated monitoring for most data, but that is beginning to change. However, there is a lack of knowledge and agreement on a number of aspects of the monitoring process, particularly as non-PQ devices continue to emerge as data sources.

This Panel Session will address some application aspects of PQ monitoring including:

Overview of PQ monitoring,

Selection of monitoring locations,

Selection of monitoring parameters,

Presentation of PQ monitoring results,

These presentations will be coordinated with the following major objectives of the monitoring activity:

1. Compliance verification,
2. Benchmarking/Performance analysis,
3. Site characterisation,
4. Troubleshooting,
5. Advanced applications and studies,
6. Active PQ management.

PRESENTATIONS AND PANELISTS:

- 14PESGM2395, PQ Monitoring Overview
  B. HOWE, EPRI
- 14PESGM2392, Regulatory Framework for PQ Monitoring
  M. BOLLEN, Lulea University of Technology
- 14PESGM2391, Monitoring Locations in Smart Grids
  F. ZAVODA, IREQ
- 14PESGM2394, PQ Monitoring and Analysis Techniques
  G. CHANG, National Chung Cheng University
- 14PESGM2766, Case Studies in PQ Monitoring
  J. MEYER, Technische Universitaet Dresden

GIC Monitoring and Situational Awareness *(panel)*

Wednesday, 30 July, 3:00 PM–5:00 PM *Chesapeake A*

Sponsored by: *Transmission and Distribution Committee*
Chair: *J. Kappenman, Storm Analysis Consultants*

Geomagnetic storms can have planetary footprints and can create geomagnetically induced currents (GIC) via a variety of differing storm processes in electric power grids at high as well as low latitude locations. An overview will be provided on efforts that are underway to observe and understand the vulnerability of power grids around the world to this phenomenon.

PRESENTATIONS AND PANELISTS:

- 14PESGM2426, An Overview of Geomagnetic Storm Impacts and the Role of Monitoring and Situational Awareness
  J. KAPPENMAN, Storm Analysis Consultants
- 14PESGM2427, The Influence of Earth Conductivity Structure on the Electric Fields that Drive GIC in Power Systems
  D. BOTELER, Natural Resources Canada
- 14PESGM2428, Observation and Modeling Geomagnetically Induced Currents in Chinese High Voltage Power Grid
  C. LIU, North China Electric Power University
- 14PESGM2429, GIC Event Monitoring, Operating, and Planning at PJM Interconnection
  J. MULHERN, PJM Interconnection

Wednesday Evening

Networking Reception Hosted by PES and IEEE PES WIP *(reception)*

Wednesday, 30 July, 5:00 PM–6:30 PM *Atrium*
Sponsored by: *PES Women in Power*

PES Young Professionals Seminar and Networking Reception *(reception)*

Wednesday, 30 July, 6:00 PM–7:30 PM *Eastern Shore 2*
Sponsored by: *PES Young Professionals*

Thursday Morning

Attendee Breakfast *(breakfast)*

Thursday, 31 July, 6:30 AM–8:30 AM *Potomac 1-6 Foyer*

Presenter Breakfast *(breakfast)*

Thursday, 31 July, 6:30 AM–8:30 AM *National Harbor 2*

Companion Hospitality Lounge *(other)*

Thursday, 31 July, 7:00 AM–12:00 PM *Eastern Shore 1*

Registration Thursday *(meeting preparations)*

Thursday, 31 July, 7:00 AM–12:00 PM *Convention Center Prefunction*

Marine and Hydrokinetic (MHK) Generation *(panel)*

Thursday, 31 July, 8:00 AM–12:00 PM *Chesapeake K*
Sponsored by: *Electric Machinery Committee and Energy Development and Power Generation Committee*
Chair: *E. Muljadi, NREL*

This panel may cover diverse topics in Marine and Hydrokinetic (MHK) Generation (wave, tidal, and streAM–based technologies) including the prime mover design, electrical energy conversion, control strategies, power plant planning (resource assessment) and operation, testing, and grid integration.

PRESENTATIONS AND PANELISTS:

- 14PESGM2597, Overview of MHK Energy Generation
  J. WEBER, NREL

- 14PESGM2580, New Point Absorber Based on a Switched Reluctance Generator
  F. GARCIA LORENZO, Global Wedge LLC., Spain
- 14PESGM2582, Voltage Fluctuations and Flicker Emissions from Marine Energy Conversion Systems – A Proposed Framework for Standard Development
  J. KHAN, BC Hydro
- 14PESGM2583, Performance of a Magnetic Gear Using Ferrite Magnets for Low Speed Ocean Power Generation
  J. BIRD, University of North Carolina, Charlotte
- 14PESGM2578, Research and Ocean Testing Solutions to Advance the Wave Energy Industry
  T. BREKKEN, Oregon State University
- 14PESGM2577, Recent Research Results in Hydrokinetic technology at Dalhousie University
  M. EL-HAWARY, Dalhousie University

Implications of Large-Scale Wind Energy on Power Systems and Supporting Measures for Better Integration *(panel)*

Thursday, 31 July, 8:00 AM–12:00 PM *Potomac 6*

Sponsored by: *Energy Development and Power Generation*
Chair: *A. Orths, Energinet.dk*
Co-Chair: *K. Rudion, Otto-von-Guericke University*

The successful integration of large scale wind energy depends on various aspects and impacts the electricity system in various ways, as will be shown by examples from several European countries. The session will answer questions like: How to setup an integration study for my system? – Guidance is given based on international experience; What is the impact on dynamic stability? Which requirements are posed on offshore wind farm control systems? – To be answered for one of the world's most challenging systems: The Irish Island system and a unique Danish-German combined offshore project: How is system operation influenced by wind power curtailment? Spanish answer will be provided; What is a suitable market design answering challenges ranging from flexibility needs to capacity shortages. Are support schemes the answer or part of the problem? Can wind power provide flexibility and which operational strategies are to be applied offshore?

PRESENTATIONS AND PANELISTS:

- 14PESGM1446, Recommended Practices for Wind Integration Studies
  H. HOLTTINEN, VTT
  M. O'MALLEY, UCD
  D. FLYNN, UCD
  M. MILLIGAN, NREL
  J. SMITH, UVIG
- 14PESGM2538, Large Scale Wind Integration and Its Impact on Dynamic Stability
  D. FLYNN, University College Dublin
- 14PESGM1580, Market Design for High Levels of Variable Generation
  M. MILLIGAN, National Renewable Energy Laboratory
  H. HOLTTINEN, VTT Technical Research Centre of Finland
  J. KIVILUOMA, VTT Technical Research Centre of Finland
  A. ORTHS, Energinet.dk
  M. LYNCH, University College Dublin
  L. SODER, KTH
- 14PESGM0689, Impact of Wind Energy Support Schemes on the Development of an Offshore Grid in the North Sea
  S. SHARIAT TORBAGHAN, TU Delft
  H. MULLER, University of Groningen
  M. GIBESCU, TU Delft
  M. VAN DER MEIJDEN, TU Delft
  M. ROGGENKAMP, University of Groningen
- 14PESGM2070, Offshore Power System Operational Strategies for Improved Flexibility of Wind Energy Generation
  S. RABE, Otto-von-Guericke-University Magdeburg
- 14PESGM1799, Impact of Wind Power Curtailments on the Spanish Power System Operation
  S. MARTIN-MARTINEZ, Universidad de Castilla-La Mancha
  E. GOMEZ-LAZARO, Universidad de Castilla-La Mancha
  A. MOLINA-GARCIA, Universidad Politecnica de Cartagena
  A. HONRUBIA-ESCRIBANO, Universidad de Castilla-La Mancha

Impacts of Distributed Energy Resources on Transmission and Distribution System Planning *(panel)*

Thursday, 31 July, 8:00 AM–10:00 AM *Camellia 1*

Sponsored by: *Energy Development and Power Generation*
Chair: *N. Lu, North Carolina State University*
Co-Chair: *P. Du, ERCOT*

The panel will address issues raised by behind meter renewable generation resources and distributed energy resources (e.g. photovoltaic, electric vehicles, energy storage devices, demand response programs). The panelists are expected to discuss the following topics: design considerations for low-cost plug-and-play roof-top solar PVs; modeling and control of vehicle charging loads; AC/DC mixed microgrid for renewable integrations; demand response for micro-grid power and energy management; aggregated impact of distributed energy resources on grid operation and energy management software design.

PRESENTATIONS AND PANELISTS:

- 14PESGM2674, Energy Management System Design for DC and AC Mixed Microgrids
  N. LU, North Carolina State University
- 14PESGM2675, Low Cost Plug and Play Solar PVs for Residential Households
  D. LUBKEMAN, North Carolina State University
- 14PESGM2676, Static Voltage Stability Enhancement Considering Comfort-Constrained Demand Response
  D. WANG, Tianjin University
- 14PESGM2672, Modeling of Demand Response Resources in the Energy Management and Market Systems for Better Participation in MISO Wholesale Energy Market
  Y. CHEN, MISO
- 14PESGM2673, Ancillary Services Design Considering High Penetration of Renewables at ERCOT
  P. DU, ERCOT

Energizing Africa's Emerging Economies a Status of Renewable Energy Projects and Cross Border Interconnections *(panel)*

Thursday, 31 July, 8:00 AM–12:00 PM *Camellia 4*

Sponsored by: *Energy Development and Power Generation*
Chair: *B. Blyden, IEEE*
Co-Chair: *P. Naidoo, IEEE*

Renewable energy projects in Africa ... UPDATES AND LESSONS-LEARED

PRESENTATIONS AND PANELISTS:

- 14PESGM2768, Performance Characteristics of a Scalable Photovoltaic, Natural Gas Piston Engine and Utility Scale Battery Microgrid
  W. LEE, University of Texas – Arlington
- 14PESGM2769, Power Africa Initiative and the Knowledge Engine for Capacity Building
  B. BLYDEN, IEEE
- 14PESGM2770, Performance Characteristics of a Scalable Photovoltaic, Natural Gas Piston Engine and Utility Scale Battery Microgrid
  B. BLYDEN, IEEE
- 14PESGM2771, Water Treatment System Based on Non-Conventional Electrical Energy
  A. JITTU, Desert Power
- 14PESGM2772, Performance Characteristics of a Scalable Photovoltaic, Natural Gas Piston Engine and Utility Scale Battery Microgrid
  A. JITTU, Desert Power

Educational Tools for the Workforce Development for the Future Grid to Enable Sustainable Energy Systems *(panel)*

Thursday, 31 July, 8:00 AM–10:00 AM *National Harbor 4*

Sponsored by: *Power & Energy Education Committee*
Chair: *C. Singh, Texas A& M University*

This panel will focus on discussing the need for the tools to educate the work force for the future grid to enable sustainable energy systems. Then the tools developed under the Power System Engineering Research Center's initiative funded by the US Department of Energy (DOE) will be presented to stimulate

discussion for further developments. PSERC is a consortium of 13 universities and many industry partners. These tools represent the experience of a very diverse group.

PRESENTATIONS AND PANELISTS:

- 14PESGM1975, PSERC Academy
  R. AYYANAR, Arizona State Univerisity
- 14PESGM1875, Synchrophasor Education
  M. KEZUNOVIC, Texas A&M University
- 14PESGM1876, Development of Energy Processing for Smart Grid Course
  J. MOMOH, Howard University
- 14PESGM1788, Comprehensive Educational Tools for Reliability Modeling and Evaluation of the Emerging Smart Grid
  C. SINGH, Texas A& M University
- 14PESGM1787, A Cyber-Power Security Course at Washington State University for Smart Grid Workforce Development
  A. SRIVASTAVA, Washington State University

PSIM Transaction Paper Session *(transactions paper)*

Thursday, 31 July, 8:00 AM–11:00 AM *Chesapeake G*

Sponsored by: *Power System Instrumentation and Measurements Committee and Power System Relaying Committee*
Chair: *H. Kirkham, Pacific Northwest National Lab*
Co-Chair: *J. McBride, JMX Services, Inc.*

PAPERS AND AUTHORS:

- 14PESGM0844, Empirical Mode Decomposition with Hilbert Transform for Power Quality Assessment *[Transaction Number: 10880721]*
  S. SHUKLA, IIT Delhi
  S. MISHRA, IIT Delhi
  B. SINGH, IIT Delhi
- 14PESGM1159, Incorporating Non-Intrusive Load Monitoring into Building Level Demand Response *[Transaction Number: 8]*
  D. HE, Georgia Tech
  W. LIN, Cornell University
  N. LIU, Georgia Tech
  R. HARLEY, Georgia Tech
  T. HABETLER, Georgia Tech
- 14PESGM0518, An Event Window Based Load Monitoring Technique for Smart Meters *[Transaction Number: TSG-00189-2011]*
  W. XU, University of Alberta
  M. DONG, University of Alberta
  P. MEIRA, University of Campinas
  W. FREITAS, University of Campinas
- 14PESGM0509, A Novel Current Sensor for Home Energy Use Monitoring *[Transaction Number: TSG-00414-2013]*
  W. XU, University of Alberta
  P. GAO, University of Alberta
  S. LIN, Shanghai University of Electric Power
- 14PESGM1513, Noncontact Operation-State Monitoring Technology Based on Magnetic-Field Sensing for Overhead High-Voltage Transmission Lines *[Transaction Number: smart grid]*
  X. SUN, University of Hong Kong
  Q. HUANG, UESTC
  Y. HOU, University of Hong Kong
  L. JIANG, University of Hong Kong
  P. PONG, University of Hong Kong
- 14PESGM1047, Wide-Area Measurement-Based Voltage Stability Indicators by Modified Coupled Single-Port Models *[Transaction Number: TPWRS-00291-2013]*
  J. LIU, National Tsing Hua University
  C. CHU, National Tsing Hua University
- 14PESGM0219, An Overview of the IEEE Standard C37.118.2 — Synchrophasor Data Transfer for Power Systems *[Transaction Number: s1-ln1435796795844769-1939656818Hwf-799479673ldV481406061143579 67PDF_HI0001]*
  K. MARTIN, EPG
  G. BRUNELLO, GE

Operation Methods *(transactions paper)*

Thursday, 31 July, 8:00 AM–12:00 PM *National Harbor 7*

Sponsored by: *Power System Operations*
Chair: *J. Liu, PJM*

PAPERS AND AUTHORS:

- 14PESGM0070, Graphics Model for Power Systems Using Layouts and Relative Coordinates in CIM Framework *[Transaction Number: TPWRS-00963-2012]*
  G. RAVIKUMAR, Indian Institute of Technology Bombay
  P. YEMULA, Washington State University
  S. KHAPARDE, Indian Institute of Technology Bombay
- 14PESGM0365, Constrained Robust Estimation of Power System State Variables and Transformer Tap Positions Under Erroneous Zero-Injections *[Transaction Number: TPWRS-00298-2013]*
  R. PIRES, Federal University of Itajubá – UNIFEI
  L. MILI, Virginia Tech
  F. BECON LEMOS, Federal University of Rio Grande do Sul – UFRS
- 14PESGM0482, Tight and Compact MILP Formulation for the Thermal Unit Commitment Problem *[Transaction Number: TPWRS-00779-2012]*
  G. MORALES-ESPAÑA, Universidad Pontificia Comillas
  J. LATORRE, Universidad Pontificia Comillas
  A. RAMOS, Universidad Pontificia Comillas
- 14PESGM0485, An MIP Formulation for Joint Market-Clearing of Energy and Reserves Based on Ramp Scheduling *[Transaction Number: TPWRS-00510-2012]*
  G. MORALES-ESPAÑA, Universidad Pontificia Comillas
  A. RAMOS, Universidad Pontificia Comillas
  J. GARCÍA-GONZÁLEZ, Universidad Pontificia Comillas
- 14PESGM0596, Market Designs for the Primary Frequency Response Ancillary Service *[Transaction Number: TPWRS-00514]*
  E. ELA, National Renewable Energy Laboratory
  V. GEVORGIAN, National Renewable Energy Laboratory
  A. TUOHY, National Renewable Energy Laboratory
  B. KIRBY, Consultant
  M. MILLIGAN, National Renewable Energy Laboratoryl
  M. O'MALLEY, University College Dublin
- 14PESGM1415, Multi-Stage Robust Unit Commitment Considering Wind and Demand Response Uncertainties *[Transaction Number: 10]*
  C. ZHAO, University of Florida
  J. WANG, Argonne National Laboratory
  J. WATSON, Sandia National Laboratory
  Y. GUAN, University of Florida
- 14PESGM1855, Energy and Reserve Scheduling Under a Joint Generation and Transmission Security Criterion: An Adjustable Robust Optimization Approach *[Transaction Number: 10.1109/TPWRS.2013.2278700]*
  A. STREET, Pontifical Catholic University of Rio de Janeiro
  A. MOREIRA, Pontifical Catholic University of Rio de Janeiro
  J. ARROYO, Universidad Castilla-La Mancha

Planning for Near-Term Flexibility Challenges *(panel)*

Thursday, 31 July, 8:00 AM–12:00 PM *Potomac 3*

Sponsored by: *Power System Planning and Implementation*
Chair: *E. Lannoye, EPRI*
Co-Chair: *H. Johal, GE*

Bulk variable generation integration, conventional generation retirement and new generation and demand resources have raised new issues for power system planners. The need to understand the future need for flexibility from resources, as well as the development of the bulk transmission system to consider variable and uncertain flows is of critical importance to power system planning bodies. Variability and uncertainty of production and availability require new methods and practices to ensure system reliability is maintained into the future. A great deal of development has occurred in recent years to develop the means to plan systems successfully. As the implications of energy policy materialize, system planning has begun to adopt these methods to meet the new reality. This panel draws together experiences and insights from utilities, system operators and academia to present the current state of planning for flexibility.

PRESENTATIONS AND PANELISTS:

- 14PESGM2352, New England Photovoltaic Forecasts for Both Planning and Operations and Interconnection Issues
  M. HENDERSON, ISO New England
- 14PESGM2353, Transmission Planning for Power System Flexibility
  B. HOBBS, The Johns Hopkins University
- 14PESGM2354, Economic and Technical Analysis of the European Power System with a Large Share of Variable Renewable Generation
  V. SILVA, EDF
- 14PESGM2355, Utility Planning Considerations for Flexibility
  L. PLANO, PG&E

* 14PESGM2356, The German Experience of the Variability of Renewables
  S. SCHWENEN, DIW

* 14PESGM2357, Flexibility Assessment Methodologies in the North West
  B. KUJALA, NWCouncil

Distribution System Modeling for PV Integration Impacts *(panel)*

Thursday, 31 July, 8:00 AM–10:00 AM *Potomac 4*

Sponsored by: *(PSACE) Distribution System Analysis*
Chair: *B. Mather, NREL*

The continued increase in new photovoltaic (PV) systems requesting interconnection with the utility's distribution system, and the challenges presented by these requests, has accentuated the need for the development of new models, analysis and modeling tool packages to assess the impacts of PV integration. Modeling often used to determine PV impact on the distribution system includes quasi-static voltage profile and automatic voltage regulation equipment operation analysis, protection impact analysis, variability/flicker analysis and many others. This panel session will present and discuss recent work in the area of PV impact assessment for PV integration/interconnection studies.

PRESENTATIONS AND PANELISTS:

- 14PESGM2786, Accidental Islanding of Distribution Systems with Multiple Distributed Generation Units of Various Technologies
  F. KATIRAEI, Quanta Technology
- 14PESGM2787, Analysis of Salient Distribution System Operating Points as a Proxy for Complete PV Impact Evaluation
  B. MATHER, NREL
- 14PESGM2788, Tools and Methods to Understand the Impact and Interconnection Needs of High Penetration of Renewables in Arizona
  M. BAGGU, National Renewable Energy Laboratory
- 14PESGM2789, Emerging Insights, Open-Use Models, and Tools for Successful High-Penetration PV Deployment
  R. MEEKER, Center for Advanced Power Systems, Florida State Univeristy

Benefits and Challenges of Deploying Multi-Agent Systems *(panel)*

Thursday, 31 July, 8:00 AM–10:00 AM *Chesapeake L*

Sponsored by: *(PSACE) Intelligent Systems*
Chair: *S. Widergren, Pacific Northwest National Laboratory*

Much of the IEEE PES activities and committees are focused on increasing the autonomy, automation and distribution of intelligent decision making and control throughout electric power systems. Multi-agent systems offer a flexible and scalable approach to designing and implementing such systems. This panel session will detail deployed multi-agent systems that are delivering automation and autonomous applications, which lie at the heart of the smart grid vision. The benefits and value of such systems will be described, alongside deployment challenges such as testing, monitoring, and ensuring stable operations.

PRESENTATIONS AND PANELISTS:

- 14PESGM2566, Experiences from Agent-based Demand Participation Deployments
  K. KOK, TNO
- 14PESGM2567, Implementation of a Distributed Adaptive Demand Management Approach on a Building Cluster
  Y. LU, Siemens Corporate Research
- 14PESGM2568, Lessons Learned from a Deploying Agented-Based Restoration Coordination
  B. DIAL, S&C Electric Company

- 14PESGM2565, Living with Agents – Market-Based Demand Participation in the Field
  J. FULLER, Pacific Northwest National Laboratory
- 14PESGM2617, Adventures in Agent-Based HPC Test Bed Development for Electric Power Markets
  L. TESFATSION, Iowa State University

PSACE 3 *(transactions paper)*

Thursday, 31 July, 8:00 AM–12:00 PM *Camellia 2*

Sponsored by: *PSACE*
Chair: *C.-W. Ten, Michigan Technological University*

PAPERS AND AUTHORS:

- 14PESGM1406, Cumulus Cloud Shadow Model for Analysis of Power Systems with Photovoltaics *[Transaction Number: TPWRS.2013.2278685]*
  C. CAI, Iowa State University
  D. ALIPRANTIS, Purdue University
- 14PESGM1421, Impacts of Contingency Reserve on Nodal Price and Nodal Reliability Risk in Deregulated Power Systems *[Transaction Number: TPWRS-00379-2012]*
  P. WANG, Nanyang Technological University
- 14PESGM1739, Risk Analysis for Distribution Systems in the Northeast U.S. Under Wind Storms *[Transaction Number: TPWRS.2013.2286171]*
  P. ZHANG, University of Connecticut
  G. LI, Xi'an Jiaotong University; University of Connecticut
  P. LUH, University of Connecticut
  W. LI, BC Hydro
  Z. BIE, Xi'an Jiaotong University
  C. SERNA, Northeast Utilities
- 14PESGM2039, A Seamless Control Methodology for a Grid Connected and Isolated PV-Diesel Microgrid *[Transaction Number: TPWRS- 01296-2012]*
  S. MISHRA, IIT Delhi
  D. RAMASUBRAMANIAN, ASU
  P. SEKHAR, IIT Delhi
- 14PESGM2227, Reliability and Sensitivity Analysis of Composite Power Systems Under Emission Constraints *[Transaction Number: 10.1109/TPWRS.2013.2279343]*
  M. BENIDRIS, Michigan State University
  J. MITRA, Michigan State University
- 14PESGM0260, Use of Mobile Unit Substations in Redundant Customer Delivery Systems *[Transaction Number: TPWRS-00890-2013.R1]*
  G. HAMOUD, Hydro One Inc.
  C. YIU, Hydro One Inc.
- 14PESGM0327, Convergence Property of the Measurement Gross Error Correction in Power System State Estimation, Using Geometrical Background *[Transaction Number: 10.1109/TPWRS.2013.2260360]*
  N. BRETAS, University of São Paulo
  A. BRETAS, UFRGS
  A. MARTINS, UNESP-Bauru
- 14PESGM1720, Linear Power Flow Formulation Based on a Voltage-Dependent Load Model *[Transaction Number: 06507359]*
  J. MARTI, University of British Columbia
  H. AHMADI, University of British Columbia
  L. BASHUALDO, BC Hydro

Adequacy of Power Systems with Renewable Energy Sources *(panel)*

Thursday, 31 July, 8:00 AM–12:00 PM *National Harbor 8*

Sponsored by: *(PSACE) Reliability and Risk Analysis*
Chair: *W. Li, Chongqing University*

Power system adequacy relates to the existence of sufficient facilities within the system to satisfy consumer load demands and system operational constraints under a variety of uncertainties in all normal and contingency states. For decades, system adequacy issues have been extensively investigated from a viewpoint of probabilistic reliability. However, new challenges appear as renewable energy sources are integrated into systems. These are associated with risk based methods, computing tools, and information collection and processing for adequacy evaluation in operation and planning of power systems and

microgrids with randomly intermittent sources. The challenges are also associated with both theoretical and practical considerations such as geographical diversity, coordination between different intermittent sources, relationship between intermittent sources and storages, and other engineering problems. The purpose of this panel session is to bring some main contributors from different countries together to share their accomplishments in this area.

PRESENTATIONS AND PANELISTS:

- 14PESGM2312, Risk Based Methods for Short Term Wind Power Commitment
  R. KARKI, University of Saskatchewan
  R. BILLINTON, University of Saskatchewan
  S. THAPA, University of Saskatchewan
- 14PESGM2315, Geographical Diversity of Renewable Sources and Power System Adequacy
  C. SINGH, Texas A& M University
- 14PESGM2317, Chronological Power Flow for Planning Transmission Systems Considering Intermittent Sources
  A. LEITE DA SILVA, UNIFEI
- 14PESGM2313, Simulation Tools for Reliability Analysis of Power Systems with Renewable Sources
  P. JIRUTITIJAROEN, National University of Singapore
- 14PESGM2311, Web Based Online Adequacy Reliability Information System for Power Systems Including Intermittent Resource Generators
  J. CHOI, Gyeongsang National University
- 14PESGM2316, Microgrid Reliability Evaluation Including Storage and Control Strategy
  K. XIE, Chongqing University
- 14PESGM2314, Engineering of Storage for Mitigation of Variability
  J. MITRA, Michigan State University

Transmission and Distribution Paper Session II *(transactions paper)*

Thursday, 31 July, 8:00 AM–12:00 PM *Potomac 5*

Sponsored by: *Transmission and Distribution Committee*
Chair: *B. Uluski, Utility Integration Solutions*

PAPERS AND AUTHORS:

- 14PESGM0007, Unintentional Islanding of Distributed Generation—Operating Experiences from Naturally-Occurred Events *[Transaction Number: TPWRD-00354-2013]*
  C. LI, Hydro One Inc
- 14PESGM0020, Distribution Voltage Control Considering the Impact of PV Generation on Tap Changers and Autonomous Regulators *[Transaction Number: Digital Object Identifier 10.1109/TPWRS.2013.2279721]*
  M. AGALGAONKAR, Imperial College London
  P. PAL, Imperial College London
  D. JABR, American University of Beirut
- 14PESGM0075, Methodology for Droop Control Dynamic Analysis of Multiterminal VSC-HVDC Grids for Offshore Wind Farms *[Transaction Number: TPWRD-00807-2010]*
  E. PRIETO-ARAUJO, CITCEA-UPC
  F. BIANCHI, IREC
  A. JUNYENT-FERRE, Imperial College London
  O. GOMIS-BELLMUNT, CITCEA-UPC
- 14PESGM0152, Stand-Alone Doubly-Fed Induction Generators (DFIGs) with Autonomous Frequency Control *[Transaction Number: 10.1109/TPWRD.2013.2243170]*
  Y. ZHANG, McGill University
  B. OOI, McGill University
- 14PESGM0355, Interfacing Issues in Multiagent Simulation for Smart Grid Applications *[Transaction Number: 06516729 (TPWRD-00007-2013)]*
  X. WANG, Carleton University
  P. ZHANG, University of Connecticut
  Z. WANG, Shandong University
  D. VENKATA, University of Alberta
  G. CHANG, National Chung Cheng University
  J. MARTINEZ, Universitat Politecnica de Catalunya
  A. DAVOUDI, University of Texas, Arlington
  A. MEHRIZI-SANI, Washington State University
  S. ABHYANKAR, Argonne National Laboratory

- 14PESGM0590, Optimal Dispatch of Photovoltaic Inverters in Residential Distribution Systems *[Transaction Number: TSTE-00301-2013.R2]*
  E. DALL'ANESE, University of Minnesota
  S. DHOPLE, University of Minnesota
  G. GIANNAKIS, University of Minnesota
- 14PESGM1031, Local Voltage Control Strategies for PV Storage Systems in Distribution Grids *[Transaction Number: TSG-00211-2013.R2]*
  J. VON APPEN, Fraunhofer IWES
  T. STETZ, Fraunhofer IWES
  M. BRAUN, Fraunhofer IWES
  A. SCHMIEGEL, Bosch Power Tec GmbH
- 14PESGM1404, Low-Frequency AC Transmission for Offshore Wind Power *[Transaction Number: TPWRD.2013.2266921]*
  H. CHEN, The MathWorks
  M. JOHNSON, Purdue University
  D. ALIPRANTIS, Purdue University

Cyber and Physical Security *(super session – panel)*

Thursday, 31 July, 8:00 AM–12:00 PM *Potomac C*
Sponsored by: *PES Technical Council*
Chair: *D. Houseman, EnerNex*

This panel of industry leaders and practitioners will cover a wide range of topics related to Cyber and Physical security on the grid. The panelists cover the whole grid from meters and in-home devices to generation facilities. This includes critical infrastructure protection – both cyber and physical and the identification of critical assets. The panel will also cover cyber threats and attacks, as well as cyber risk assessment and mitigation. Standards, industry best practice, key organizations and industry activities will also be covered during this panel. With the recent discussions of physical security on the transmission grid and in substations, some additional focus will be put on that topic.

PANELISTS:

A. LEE, EPRI, NESCOR
A. BOCHMAN, Bochman Advisors
C. JASON, Cyber Security Capabilities & Risk Management US Department of Energy
G. W. CAULEY, North American Electric Reliability Corporation
J. BRENTON, ERCOT

Electric Vehicle Charging Integration in Distribution Grids *(tutorial)*

Thursday, 31 July, 8:00 AM–12:00 PM *Chesapeake F*
Sponsored by: *IEEE PES*

This tutorial starts with an overview of the main charging principles that are in use for powering up battery electric vehicles and plug-in electric vehicles. After a short introduction on e-mobility, the main standardized systems (AC, DC, different modes) and advanced principles such as wireless charging are discussed, referring to practical cases where vehicles have to be charged in different environments and different use cases or business models. The link with power system integration is made by addressing the impact of this new type of power consumption on the power flow and stability. "Smart" solutions are proposed, such as droop control and demand side management implementation. Modeling techniques and hardware implementations are briefly discussed. Examples from on-going research and living –lab trials are given. This tutorial intends to make a bridge between developments in smart grids, e-mobility and intelligent hard- and software solutions enabling the deployment of electric vehicles.

Smart Distribution Systems (tutorial)

Thursday, 31 July, 8:00 AM–5:00 PM *Chesapeake C*
Sponsored by: *Transmission & Distribution*

The concept of Smart Grid involves the complete chain of energy delivery from generation to the customers. Many of the smart grid applications will occur at the distribution level since this is where new communication infrastructure will enable new automation schemes, integration of distributed generation, and integration of customer systems with the operation of the power delivery system. This tutorial covers the most recent evolution of smart distribution applications and technologies involved in the smart distribution system. Important applications include traditional distribution automation functions along with

advancements in Volt and Var Control, System Monitoring, Distribution Management Systems and Distributed resource integration. Telecommunication and Standards on Smart Distribution systems will also be part of the tutorial. A summary of topics and a brief description of what is covered by each topic:

Smart Distribution Systems Fundamentals
Smart Distribution Systems
Smart Distribution Circuit Automation
Volt/VAR Control
Smart Distribution Monitoring
Integrated Distribution Management Systems
Distributed Energy Resource Integration
Smart Communications
Smart Distribution Applications Integration

Transmission System — The Interconnected Bulk Electric System *(tutorial)*

Thursday, 31 July, 8:00 AM–5:00 PM *Chesapeake J*
Sponsored by: *IEEE PES*

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.

Electric Transportation Integration in the US Capital Region *(panel)*

Thursday, 31 July, 8:00 AM–12:00 PM *Chesapeake H*
Sponsored by: *Local Organizing Committee*
Chair: *R. Stewart, Pepco*

Several US Capital region utilities have active projects related to integrating electric vehicles into the grid. This panel will describe the Pepco and BG&E projects, in addition to the perspectives of the local independent system operator, PJM, and an overall industry perspective from EPRI.

PRESENTATIONS AND PANELISTS:

- 14PESGM2575, TBA
  J. MURACH, BGE
- 14PESGM2576, TBA
  B. GONZALEZ, Pepco
- 14PESGM2642, TBA
  C. RICE, Maryland Energy Administration
- 14PESGM2643, TBA
  C. GORGUINPOUR, US Department of Defense

Discussions on IEEE Std.4-2013: High-Voltage Testing Techniques *(panel)*

Thursday, 31 July, 9:00 AM–12:00 PM *Potomac 2*
Sponsored by: *Power System Instrumentation and Measurements*
Chair: *G. Fitzpatrick, National Institute of Standards and Technology*
Co-Chair: *W. Larzelere, Evergreen High Voltage LLC*

The panel discusses the recently updated IEEE Std. 4, covering a brief history of Std. 4 and a summary of major changes in the last revision including: contributions to uncertainty of measurements, K factor / manual waveform calculation methods, record of performance requirements, and atmospheric corrections.

PRESENTATIONS AND PANELISTS:

- 14PESGM2636, Brief History of IEEE Std. 4
  J. BRITTON, Phenix Technologies
- 14PESGM2637, Summary of Major Changes in the Last Revision
  J. BRITTON, Phenix Technologies
- 14PESGM2633, Contributions to Uncertainty of Measurements
  J. MCBRIDE, JMX Services, Inc.
- 14PESGM2638, K Factor / Manual Waveform Calculation Methods
  A. MOLDON, AMEESCO Consulting
- 14PESGM2639, Recent Improvements in K Factor Models
  Y. ZHANG, NEETRAC – Georgia Tech
- 14PESGM2634, Record of Performance – What is Required
  W. LARZELERE, Evergreen High Voltage LLC
- 14PESGM2640, Atmospheric Corrections
  J. RICKMANN, Phenix Technologies
- 14PESGM2635, Proposed Future Work for Subcommittee
  W. LARZELERE, Evergreen High Voltage LLC

Evolving Distribution Operation *(panel)*

Thursday, 31 July, 9:00 AM–12:00 PM *National Harbor 5*

Sponsored by: *Power System Operations*
Chair: *E. Vaahedi, BC Hydro*
Co-Chair: *L. Wang, Powertech Labs Inc.*
Co-Chair: *A. Jayantilal, Alstom*

Distribution Operation has been evolving in the last decade. Technology advancements such as Distribution Management Systems (DMS) and Distribution Automation (DA) are changing the processes and functionality of distribution operation. This panel session explores technology advances and their impact on distribution operation.

PRESENTATIONS AND PANELISTS:

- 14PESGM2442, Technology Improves Distribution Control Center Operations
  G. CLARK, Alabama Power Company
- 14PESGM2443, Developing the Business Case for Advanced Distribution Management
  R. ULUSKI, UISOL
- 14PESGM2444, Challenges with Distribution Operation
  C. SIEW, BC Hydro
- 14PESGM2445, Grid Operations' Performance Measures for Distribution Automation
  N. SHAH, BC Hydro
- 14PESGM2446, Issues Associated the Integration of Distributed and Demand-Side Resources with Distribution Grid
  A. IPAKCHI, OATI

Power System Equipment *(paper forum)*

Thursday, 31 July, 9:00 AM–12:00 PM *Magnolia 1*

Sponsored by: *IEEE PES*
Chair: *I. Papic, University of Ljubljana*

- 14PESGM0087, The Role of Viewpoints in CIM Profile Projection
  G. RAVIKUMAR, IIT Bombay
  S. KHAPARDE, IIT Bombay
  J. RUSHIKESH K., IIT Bombay
- 14PESGM0971, Identification of Back Flash and Shielding Failure on Transmission Line Based on Time Domain Characteristics of Traveling Wave
  Y. LIU, Shanghai Jiao Tong University
  G. SHENG, Shanghai Jiao Tong University
  Y. HU, Shanghai Jiao Tong University
  X. JIANG, Shanghai Jiao Tong University
  Y. SUN, Liaocheng Electric Power Company
  S. WANG, Liaocheng Electric Power Company
- 14PESGM0983, Experimental Research of Vibration Characteristics of Shunt Reactor
  S. CHEN, Shanghai Jiao Tong University
  F. WANG, Shanghai Jiao Tong University
  L. SU, Electric Power Research Institute, Shanghai Electric Power Company

- 14PESGM1573, Overload Strategy of Transmission and Transformation Equipment for Safety Operation
  Y. HUANG, Zhejiang University
  C. GUO, Zhejiang University
  Y. WEN, Zhejiang University
  Y. WANG, Zhejiang University
  X. ZHANG, State Grid
  J. ZHANG, Zhejiang University of Science & Technology
- 14PESGM2066, Improved Design of Controlled Rectifier for Reduced Ripple Resulting from Integration of DC loads to AC Systems
  A. BERZOY, Florida International University
  A. ELSAYED, Florida International University
  T. YOUSSEF, Florida International University
  O. MOHAMMED, Florida International University
- 14PESGM2096, A Testing Platform for Validation of Overhead Conductor Aging Models and Understanding Thermal Limits
  P. IRMINGER, Oak Ridge National Laboratory
  M. STARKE, Oak Ridge National Laboratory
  A. DIMITROVSKI, Oak Ridge National Laboratory
  M. YOUNG, Oak Ridge National Laboratory
  T. RIZY, Oak Ridge National Laboratory
  J. STOVALL, Oak Ridge National Laboratory
  P. OVERHOLT, U.S. Department of Energy
- 14PESGM2159, 2^4 Factorial Design for Joint Effect of Ambient Temperature and Capacitor Price, Size and Phase kVAr on Line Loss
  S. PAUL, Wichita State University
  W. JEWELL, Wichita State University
- 14PESGM2166, Surge Protection of Automatic Transfer Switches – Application Note
  R. HOTCHKISS, Surge Suppression Incorporated
- 14PESGM0053, Robust Nonlinear Excitation Controller Design for Multimachine Power Systems
  M. MAHMUD, Swinburne University of Technology
  M. HOSSAIN, Griffith University
  H. POTA, University of New South Wales
  N. ROY, University of New South Wales
- 14PESGM0732, Mutually Coupled Switched Reluctance Machine (MCSRM) for Electric and Hybrid Vehicles
  M. KABIR, North Carolina State Univeristy
  I. HUSAIN, North Carolina State Univeristy
- 14PESGM0816, A Deadbeat Direct Power Control Applied to Doubly-Fed Induction Generator under Normal and Sag Voltages Conditions
  R. FRANCO, UFABC
  R. VANI JACOMINI, IFSP
  C. CAPOVILLA, UFABC
  A. SGUAREZI FILHO, UFABC
- 14PESGM1079, The Influence of Rotor Damping System of Turbine Generator on Small Disturbance Characteristic
  G. XU, North China Electric Power University
  X. LIU, North China Electric Power University
  Y. LUO, North China Electric Power University
  M. SONG, China Urban Construction Design &Research Institute
- 14PESGM1267, Variable Speed Wind Turbine Based on Electromagnetic Coupler and Its Experimental Measurement
  R. YOU, Tsinghua University
  J. CHAI, Tsinghua University
  X. SUN, Tsinghua University
  Y. LIN, Tsinghua University
- 14PESGM1424, Condition Monitoring System Based on Effects of Electrical Torque Pulsations of Wind Turbine Generators
  K. ABDUSAMAD, University of Denver
  D. WENZHONG GAO, University of Denver
  Y. LI., University of Denver
- 14PESGM2089, Power Conservation over Frequency Transformation in Doubly Fed Asynchronous Generator
  S. BRAHMA, New Mexico State University
  M. CHAUDHARY, New Mexico State University
  S. RANADE, New Mexico State University

Power System Analysis *(paper forum)*

Thursday, 31 July, 9:00 AM–12:00 PM *Magnolia 2*

Sponsored by: *IEEE PES*
Chair: *M. Ortega-Vazquez, University of Washington*

- 14PESGM0210, Fault Analysis on Distribution Feeders Employing Solid State Transformers
  H. HOOSHYAR, KTH Royal Institute of Technology
  M. BARAN, North Carolina State University
- 14PESGM0218, Advanced Grid Events Analysis at ISO New England Using PhasorPoint
  Q. ZHANG, ISO New England
  X. LUO, ISO New England
  E. LITVINOV, ISO New England
  N. DAHAL, Alstom Grid
  M. PARASHAR, Alstom Grid
  K. HAY, Psymetrix
  D. WILSON, Psymetrix
- 14PESGM0273, Disturbance Detection in the MV and the LV Distribution Networks Using Time-Domain Method
  A. UKIL, Nanyang Technological University
- 14PESGM0374, Load Profile Disaggregation by Blind-Source Separation: A Wavelets-Assisted Independent Component Analysis Approach
  Y. ZHU, Iowa state university
  S. LU, Iowa state university
- 14PESGM0545, Order Reduction of Linear Power System Models Using a Frequency-Domain POD Method
  R. BETANCOURT, Universidad de Colima
  C. RERGIS, Cinvestav IPN Unidad Gdl
  A. MESSINA, Cinvestav IPN Unidad Gdl
- 14PESGM0617, Evaluation of Damping of Windings in a Generator Using Oscillation Energy Dissipation
  L. CHEN, Tsinghua University
  F. XU, Tsinghua University
  Y. MIN, Tsinghua University
  F. LI, Tsinghua University
- 14PESGM0688, Evaluation of Under-Excitation Limiter Actuation Under Unbalanced Load Conditions
  A. BOHNEN PIARDI, University of Sao Paulo
  J. ROBERTO PESENTE, Itaipu Power Plant
  R. BUENO OTTO, Itaipu Technological Park Foundation
  R. ANDRADE RAMOS, University of Sao Paulo
- 14PESGM0763, A Black-Box Approach to Interfacing White-Box Transformer Models with Electromagnetic Transients Programs
  B. GUSTAVSEN, SINTEF Energy Resaerch
  A. PORTILLO, WEG Transformers
- 14PESGM0911, A Study on Fluctuations in Electromechanical Oscillation Frequencies of Power Systems
  B. WANG, University of Tennessee
  K. SUN, University of Tennessee
  A. DEL ROSSO, EPRI
  E. FARANTATOS, EPRI
  N. BHATT, EPRI
- 14PESGM0941, Analysis of Wavelet Transform Applied to the Segmentation of Disturbance Signals with Different Sampling Rates
  L. ANDRADE, University of Sao Paulo
  M. OLESKOVICZ, University of Sao Paulo
  R. FERNANDES, CCET, Federal University of Sao Carlos
- 14PESGM0960, Research on Branches Group Based Method for Adding Mutual Inductance Branches to Y-Matrix and Z-Matrix
  M. CHEN, Huazhong University of Science and Technology
  D. SHI, Huazhong University of Science and Technology
  Y. LI, Huazhong University of Science and Technology
  L. ZHU, Huazhong University of Science and Technology
  H. LIU, Central China Grid Company Limited

- 14PESGM1013, Actor Systems for Flexible, Scalable and Modular Simulation of Electrical Power Systems
  D. MONTENEGRO, University of los Andes
  G. RAMOS, Unviersity of Los Andes
  S. BACHA, Unviersity Joseph Fourier
- 14PESGM1205, Time-Domain Steady-State Method of a Closed-Loop Voltage Source Converter
  R. LIAN, NTUST
- 14PESGM1244, A Fast Algorithm of Critical Power Flow for Reactive Power Balance and and Its Application in UHV Grid
  X. QIN, China Electric Power System Research
- 14PESGM0288, Generating Fault Rate Surfaces Using Network Fault Statistics and Geographic Information
  E. SAARIJÄRVI, Aalto University
  M. KOIVISTO, Aalto University
  J. MILLAR, Aalto University
  M. LEHTONEN, Aalto University
  J. NISKANEN, E.ON Kainuun Sähköverkot

Energy Systems Integration, Research Challenges and Opportunities *(panel)*

Thursday, 31 July, 10:00 AM–12:00 PM *Magnolia 3*

Sponsored by: *Energy Development and Power Generation*
Chair: *M. O'Malley, University College Dublin*

Electrification is the greatest engineering achievement of the 20th Century and at the start of the 21st century it continues to be at the forefront due to the need to integrate large amounts of variable renewable energy sources. There is a convergence with data, transport (e.g. E-cars), natural gas (e.g. gasturbines), heat (e.g. combined heat and power) and water (e.g.cooling) leading to the realisation that the electricity grid is at the centre of an EnergySystemIntegration (ESI) opportunity, for cost savings, emissions reductions and improvements in reliability. The diversity of ESI is such that there is a great variety of research questions and a great multitude of disciplinary knowledge and expertise is required to find effective solutions. This panel will bring together a cross disciplinary group (engineers, geophysics, social science and economics) drawn from NorthAmerica, Europe and beyond to explore the research challenges and opportunities.

PRESENTATIONS AND PANELISTS:

- 14PESGM2647, Co-Optimization of Wind, Transmission, and Natural Gas Infrastructure
  J. MCCALLEY, Iowa State University
- 14PESGM2648, Energy Systems Integration
  B. KROPOSKI, National Renewable Energy Laboratory
- 14PESGM2649, Achieving Efficient Gas & Electricity Market Interactions – Market Design and the Role of Regulation
  G. VANWELIE, NE ISO
- 14PESGM2650, Policy Drivers of the Water Energy Nexus
  C. ENSSLE, GE
- 14PESGM2651, ESI in Hawaii for Reducing Wind/Solar Curtailment
  D. CORBUS, NREL

The Future of OPF Algorithms *(panel)*

Thursday, 31 July, 10:00 AM–12:00 PM *Chesapeake L*

Sponsored by: *(PSACE) Computer Analytical Methods*
Chair: *C. Dent, Durham University*
Co-Chair: *J. Lavaei, Columbia University*

Optimal power flow (OPF) algorithms form a key part of modern energy management systems, and are an active area of research in industry and academia. This Panel will bring together researchers from both these communities to survey the state of the art in both industry practice and academic research, identify the industry's research and development needs and where new approaches developed by research organisations can find practical application, and identify how non-industry researchers can learn more about practical industrial methods and make their research more practically relevant. This last point is particularly significant, as while there is very considerable relevant expertise in academia, not all researchers have extensive knowledge of the solution methods and model formulations used in state of the art industrial OPF codes.

PRESENTATIONS AND PANELISTS:

- 14PESGM1219, Optimization Techniques for Mixed-Integer Nonlinear Power Optimization Problems
  J. LAVAEI, Columbia University
- 14PESGM1221, Distributed Control for Economic Dispatch through Transactive Energy Management
  D. PHAN, IBM TJ Watson Research Center
  S. GHOSH, IBM TJ Watson Research Center
- 14PESGM1218, Calculating Maximum Power Transfer and Voltage Stability Margins
  B. LESIEUTRE, University of Wisconsin-Madison
- 14PESGM1220, The Formulating, Solving and Settling Approximations to the N-1-1 Dynamically Stable Optimal AC Power Flow with Optimal Topology Control
  R. O'NEILL, FERC
- 14PESGM1222, Optimization in Power Systems – An Energy Market Perspective
  K. MOSLEHI, ABB
- 14PESGM1223, Challenges Presented by Practical OPF Problem Formulations
  O. ALSAC, Nexant

Transmission and Distribution Paper Session III *(transactions paper)*

Thursday, 31 July, 11:00 AM–3:00 PM *Potomac 4*

Sponsored by: *Transmission and Distribution Committee*
Chair: *V. Dinavahi, University of Alberta*

PAPERS AND AUTHORS:

- 14PESGM0067, An Approach for Controlled Reclosing of Shunt Compensated Transmission Lines *[Transaction Number: 10.1109/TPWRD.2013.2289394]*
  K. DANTAS, Federal University of Campina Grande
  W. NEVES, Federal University of Campina Grande
  D. FERNANDES JR., Federal University of Campina Grande
- 14PESGM0081, Fault Location in Distribution Systems Based on Smart Feeder Meters *[Transaction Number: TPWRD-00127-2013]*
  F. TRINDADE, University of Campinas
  W. FREITAS, University of Campinas
  J. DE MELO VIEIRA, University of São Paulo
- 14PESGM0523, Behavior of Single-Phase Transformers under Geomagnetically Induced Current Conditions *[Transaction Number: TPWRD-00516-2013]*
  A. REZAEI-ZARE, Hydro One Networks Inc.
- 14PESGM0592, System Impacts of Temperature-Dependent Transmission Line Models *[Transaction Number: TPWRD-01041-2012]*
  V. CECCHI, University of North Carolina, Charlotte
  M. KNUDSON, University of North Carolina, Charlotte
  K. MIU, Drexel University
- 14PESGM1290, Multiport High Power LCL DC Hub for Use in DC Transmission Grids *[Transaction Number: TPWRD-00267-2013]*
  D. JOVCIC, University of Aberdeen
  W. LIN, University of Aberdeen
- 14PESGM1995, Underground Ground Wires for Transmission Lines: Electrical Behavior and Feasibility *[Transaction Number: 0885-8977]*
  J. SEPPÄNEN, Fingrid / Aalto university
  P. TAMMI, Aalto University
  L. HAARLA, Aalto University
- 14PESGM2112, Avoiding Numerical Instabilities in the Universal Line Model by a Two-Segment Interpolation Scheme *[Transaction Number: TPWRD-00892-2012]*
  B. GUSTAVSEN, SINTEF Energy Research

Thursday Afternoon

Large Scale PV Generation on Transmission and Distribution Networks *(panel)*

Thursday, 31 July, 1:00 PM–4:00 PM *Potomac 5*

Sponsored by: *Energy Development and Power Generation*
Chair: *B. Chowdhury, UNC Charlotte*
Co-Chair: *C. Rahmann, Universidad de Chile*

Panelists will discuss the impact of large-scale solar PV generation on grid operations, specifically on system voltage and frequency stability. They will also discuss tools and solutions to overcome these problems.

PRESENTATIONS AND PANELISTS:

- 14PESGM1748, Impact of Large Scale PV Generation
  J. ROMERO AGUERO, Quanta Technology
- 14PESGM1749, Impact of Large Scale PV Generation
  V. VITTAL, Arizona State University
- 14PESGM1746, Large Scale PV Generation: Operational Challenges and Proposed Solutions at ERCOT
  P. DU, ERCOT
- 14PESGM1747, Stability Impact Analysis of Solar PV Generation in Ontario's Grid
  C. CANIZARES, University of Waterloo
- 14PESGM1750, Fast Frequency Response Capability on Photovoltaic Power Plants: Need of New Grid Requirements and Definitions
  C. RAHMANN, Universidad de Chile

Smart Grid Related Topics *(transactions paper)*

Thursday, 31 July, 1:00 PM–5:00 PM *Potomac C*

Sponsored by: *Power System Operations*

PAPERS AND AUTHORS:

- 14PESGM0153, Equal Incremental Rate Economic Dispatching and Optimal Power Flow for the Union System of Microgrid and External Grid *[Transaction Number: 1]*
  X. ZHANG, Xi'an Jiaotong University
  B. ZHANG, Xi'an Jiaotong University
- 14PESGM0262, Aiding Power System Support by Means of Voltage Control with Intelligent Distribution Substation *[Transaction Number: TSG-00428-2012.R2]*
  P. KADUREK, Eindhoven University of Technology
  J. COBBEN, Eindhoven University of Technology
  W. KLING, Eindhoven University of Technology
  P. RIBEIRO, Eindhoven University of Technology
- 14PESGM0513, Real-Time Demand Response through Aggregate Electric Water Heaters for Load Shifting and Balancing Wind Generation *[Transaction Number: TSG-00148-2013.R4]*
  S. POURMOUSAVI KANI, Montana State University
  S. PATRICK, Rocky Mountain Power
  H. NEHRIR, Montana State University
- 14PESGM1821, PEV Storage in Multi-Bus Scheduling Problems *[Transaction Number: TSG-00153-2013]*
  I. MOMBER, KTH, Royal Institute of Technology
  G. MORALES-ESPAÑA, KTH, Royal Institute of Technology
  A. RAMOS, IIT, Comillas University
  T. GÓMEZ, IIT, Comillas University
- 14PESGM2099, Solar Power Prediction Using Interval Type-2 TSK Modeling *[Transaction Number: TSTE-00078-2012]*
  S. JAFARZADEH, California State University Bakersfield
  S. FADALI, University of Nevada Reno
- 14PESGM2144, A Equal Incremental Rate Continuous Time-Varying Optimal Power Distribution Method for the Power System Containing Microgrids *[Transaction Number: 1]*
  X. ZHANG, Xi'an Jiaotong University
  B. ZHANG, Xi'an Jiaotong University

Advanced Modelling and Control of Future Low Voltage Networks *(panel)*

Thursday, 31 July, 1:00 PM–4:00 PM *Chesapeake K*

Sponsored by: *Power System Planning and Implementation*
Chair: *L. Ochoa, University of Manchester*
Co-Chair: *M. Stifter, AIT Austrian Institute of Technology*

The future widespread use of residential-scale low carbon technologies such as photovoltaic panels, electric vehicles or electric heat pumps is prompting distribution network operators to investigate their impacts and the potential solutions. In particular, low voltage networks, typically unobserved and uncontrolled, are believed to become one of major the bottlenecks. This panel session will present and discuss different views, approaches and trials on this topic. Given that most of the works to be presented is based on industry-funded projects, it will be possible to also understand the corresponding country-specific challenges.

PRESENTATIONS AND PANELISTS:

- 14PESGM2358, Techno-Economical Assessment of On-Load Tap Changers in UK LV Networks
  A. NAVARRO, University of Manchester
- 14PESGM2359, Innovative Solutions to Optimise Low Voltage Electricity Systems: Power Snap-Shot Analysis by Meters
  M. STIFTER, AIT Austrian Institute of Technology
- 14PESGM2360, Smart Control of Low Voltage Grids
  C. OERTER, Wuppertal University
- 14PESGM2361, Integration of Residential-Scale Photovoltaic Panels in Brazil
  W. FREITAS, UNICAMP
- 14PESGM2362, Household-Level Management of Electric Vehicles Considering Battery Degradation and Price Uncertainty
  M. ORTEGA-VAZQUEZ, University of Washington
- 14PESGM2363, The Customer Led Network Revolution Project
  P. LYONS, Newcastle University

Generation and Transmission Planning *(transactions paper)*

Thursday, 31 July, 1:00 PM–5:00 PM *Camellia 4*

Sponsored by: *Power System Planning and Implementation*
Chair: *R. Chu, PECO Energy/Exelon Corporation*

PAPERS AND AUTHORS:

- 14PESGM0085, An Improved Network Model for Transmission Expansion Planning Considering Reactive Power and Network Losses *[Transaction Number: TPWRS-01155-2012]*
  H. ZHANG, Arizona State University
  G. HEYDT, Arizona State University
  V. VITTAL, Arizona State University
  J. QUINTERO, Arizona State University
- 14PESGM0400, Multistage Transmission Expansion Planning Considering Fixed Series Compensation Allocation *[Transaction Number: TPWRS-00827-2012]*
  M. RAHMANI, Universidade Estadual Paulista (UNESP)
  G. VINASCO, Universidad de Antioquia (UdeA)
  M. RIDER, Universidade Estadual Paulista (UNESP)
  R. ROMERO, Universidade Estadual Paulista (UNESP)
  P. PARDALOS, University of Florida
- 14PESGM0687, Dynamic Optimization Based Reactive Power Planning to Mitigate Slow Voltage Recovery and Short Term Voltage Instability *[Transaction Number: TPWRS-00907-2012]*
  M. PARAMASIVAM, Iowa State University
  A. SALLOUM, Arizona State University
  V. AJJARAPU, Iowa State University
  V. VITTAL, Arizona State University
  N. BHATT, EPRI
  S. LIU, EPRI
- 14PESGM1479, Optimal Allocation of HTS-FCL for Power System Security and Stability Enhancement *[Transaction Number: 10.1109/TPWRS.2013.2273539]*
  S. ALARAIFI, MASDAR Institute of Science and Technology
  M. EL MOURSI, MASDAR Institute of Science and Technology
  H. ZEINELDIN, MASDAR Institute of Science and Technology
- 14PESGM2117, A Framework for the Prioritization of Underground Transmission Cable Renewal Projects In Power Electric Utility Companies *[Transaction Number: 14PESGM2117]*
  K. WONG, Hydro One Networks Inc.

- 14PESGM0511, Heterogeneous Unit Clustering for Efficient Operational Flexibility Modeling *[Transaction Number: TPWRS-00087-2013.R2]*
  B. PALMINTIER, MIT
  M. WEBSTER, MIT
- 14PESGM2107, A Holistic Approach for Planning Natural Gas and Electricity Distribution Networks *[Transaction Number: TPWRS.2013.2268859]*
  C. SALDARRIAGA, Technological University of Pereira (Colombia)
  R. HINCAPIÉ, Technological University of Pereira (Colombia)
  H. SALAZAR, Technological University of Pereira (Colombia)
- 14PESGM2135, Impact of Demand Response on Thermal Generation Investment with High Wind Penetration *[Transaction Number: TSG-00591-2012]*
  S. JIN, Liberty Mutual Insurance Group
  A. BOTTERUD, Argonne National Laboratory
  S. RYAN, Iowa State University

Faster than Real-time Dynamics Simulation *(panel)*

Thursday, 31 July, 1:00 PM–5:00 PM *Potomac 2*

Sponsored by: *(PSACE) Computer Analytical Methods*
Chair: *A. Flueck, Illinois Institute of Technology*

When will the next unforeseen disturbance occur in your power system? Could it cause a cascading outage? What will be the initial state of the power system when the next unanticipated disturbance occurs? Consider the real-time operations environment, which has become substantially more complex, dynamic, and uncertain, as new market rules, regulatory policies, and technologies have been adopted. Now, suppose we could predict 30 seconds of power system dynamic response, with a certain level of confidence, within 15 seconds of the initial unforeseen disturbance. Is it possible? Shifting operational data analytics from a traditionally offline environment to real-time situational awareness, eventually supporting measurement-based, wide-area, fast control, will require significant advancements in algorithms and computational approaches. This panel session will present ongoing research in mathematics, modeling and computational techniques for "faster than real-time" dynamics simulation of power systems.

PRESENTATIONS AND PANELISTS:

- 14PESGM2065, Advanced Modeling Grid Research: An Overview of DOE's Activities
  G. BINDEWALD, US Department of Energy
- 14PESGM0710, High Performance Computation Tools for Real-Time Security Assessment
  A. DEL ROSSO, EPRI
- 14PESGM0712, Real-Time Remedial Action Screening Using Direct Stability Analysis Methods
  J. MITRA, Michigan State University
- 14PESGM0711, High-Fidelity, Faster than Real-Time Dynamics Simulation
  A. FLUECK, Illinois Institute of Technology
- 14PESGM0716, Parallelization of Time Domain Dynamic Simulation: Existing Tools and New Techniques
  N. ACHARYA, GE Global Research
  B. LEONARDI, General Electric
  J. SANCHEZ-GAZSCA, General Electric
  Z. HUANG, Pacific Northwest National Laboratory
  R. DIAO, Pacific Northwest National Laboratory
- 14PESGM0713, Development of Custom FPAA Hardware for Faster than Real-Time Analysis of Power System Dynamics
  C. NWANKPA, Drexel University
  A. DEESE, Electrical and Computer Engineering
- 14PESGM0714, An Open-Source Approach to Accelerating Power System Dynamic Simulation
  Z. HUANG, Battelle – Pacific Northwest National Laboratory
  B. PALMER, Battelle – Pacific Northwest National Laboratory
  S. JIN, Battelle – Pacific Northwest National Laboratory
  G. BINDEWALD, US Department of Energy
- 14PESGM1561, iTESLA: Innovative Tools for Electrical System Security within Large Areas
  C. LEMAITRE, RTE
  P. PANCIATICI, RTE

PSACE 4 *(transactions paper)*

Thursday, 31 July, 1:00 PM–5:00 PM *Camellia 2*
Sponsored by: *PSACE*
Chair: *R. Singh, ABB Inc.*

PAPERS AND AUTHORS:

- 14PESGM0008, Incorporating Post Zonal Reserve Deployment Transmission Constraints into Energy and Ancillary Service Co-optimization *[Transaction Number: TPWRS-00778-2012]*
  Y. CHEN, MISO
  P. GRIBIK, PG&E
  J. GARDNER, MISO
- 14PESGM0059, Identification of Umbrella Constraints in DC-Based Security-Constrained Optimal Power Flow *[Transaction Number: TPWRS.2013.2271980]*
  A. JAHANBANI ARDAKANI, McGill University
  F. BOUFFARD, McGill University
- 14PESGM0071, Steady-State Simulation Methods of Closed-Loop Power Converter Systems–A Systematic Solution Procedure *[Transaction Number: TCAS-I 10835]*
  R. LIAN, NTUST
  P. LEHN, University of Toronto
- 14PESGM0092, Generalized & Fortescue Equivalent Admittance *[Transaction Number: TPWRS-01337-2012]*
  I. DZAFIC, Siemens AG
  B. PAL, Imperial College London
  M. GILLES, Siemens AG
  S. HENSELMEYER, Siemens AG
- 14PESGM0099, Network-Constrained Day-Ahead Auction for Consumer Payment Minimization *[Transaction Number: TPWRS-00698-2012]*
  R. FERNÁNDEZ-BLANCO, University de Castilla – La Mancha
  J. ARROYO, University de Castilla – La Mancha
  N. ALGUACIL, University de Castilla – La Mancha
- 14PESGM0125, Rolling Multi-Period Optimization to Control Electric Vehicle Charging in Distribution Networks *[Transaction Number: TPWRS-00391-2013]*
  A. O'CONNELL, University College Dublin
  A. KEANE, University College Dublin
  D. FLYNN, University College Dublin
- 14PESGM0137, Power System Reliability Impact of Energy Storage Integration with Intelligent Operation Strategy *[Transaction Number: TSG-00015-2013]*
  Y. XU, Alstom Grid
  C. SINGH, Texas A&M University
- 14PESGM0256, Assessment of Spare Breaker Requirements for High Voltage Transmission Stations *[Transaction Number: TPWRS-00267-2013.R2]*
  G. HAMOUD, Hydro One Inc.

Introduction to Smart Grid Data and Analytics *(tutorial)*

Thursday, 31 July, 1:00 PM–5:00 PM *Chesapeake F*
Sponsored by: *Intelligent Grid Coordinating Committee*

This is an introductory level course to look at smart grid data and analytics, the focus is on the distribution and customer domains of the NIST model. The course covers the following key topics:

What data is available from which devices, from the in home controller to meters to relays and substation automation.

What applications can be done with the data, with a heavy focus on AMI and line devices.

What is the value of each of the applications to the various stakeholders that are associated with the grid, using the Illinois Collaborative definitions of stakeholders.

The course will look at the process of collecting and verifying data, including all of the pitfalls that may occur and provide a 20 step process to go from no data to running analytics. The course is suitable for non-technical, as well as technical audiences, including regulatory, legislative, and utility staff members.

The course will also compare and contrast the two major privacy contenders and the impact each would have on the ability to perform the analytic applications based on the principles of each contender. Included in the course will be a summary of the ARRA analytics that have been highlighted by the EPRI and DOE reports.

Making Policy and Future Grid / How Federal Laws and Regulations are Impacting the Electric Grid *(panel)*

Thursday, 31 July, 1:00 PM–5:00 PM *Magnolia 3*

Sponsored by: *Local Organizing Committee*
Chair: *G. Godson, Pepco Holdings*

Policy makers and power engineers need to understand each other to make better decisions for the future. There are goals and constraints for each side and they are naturally different. How should we co-optimize the overall goal to reach a win-win situation?

PRESENTATIONS AND PANELISTS:

- 14PESGM2767, How Federal Laws, Regulations, and Policy are Impacting the Electric Grid
  G. GODSON, Pepco Holdings, Inc.
- 14PESGM2644, TBA
  M. HYLAND, American Public Power Association
- 14PESGM2645, TBA
  D. OWENS, Edison Electric Institute
- 14PESGM2646, TBA
  M. RALLS, National Rural Electric Cooperative Association

External Model and Internal Model Inaccuracies Impacting State Estimator Solution Quality for Reliability and Market Operations *(panel)*

Thursday, 31 July, 2:00 PM–5:00 PM *Potomac 6*

Sponsored by: *Power System Operations*
Chair: *V. Vinnakota, California ISO*

Following Black out of Sep 08, 2011 in Southern California, recommendations in joint report of FERC/ NERC for improved reliable system operation included a) Exchanging next day operations data and sharing real time data which could impact reliability of their systems b) Transmission operators need to review their real-time monitoring tools, such as State Estimator (SE) and Real Time Contingency Analysis (RTCA) for reliable system operation.

Sharing the data and using it provides opportunity to improve power grid reliability and also involves challenges with an added dimension of Optimized Market Operations and reliability of grid.

Objective of this panel is to provide a platform for Utilities / transmission operators to share experiences of deficiencies in models, both externally and internally, model update processes, solutions to circumvent model inadequacies due to limited data sharing in the pursuit of for a better quality of solution from the tools of SE/RTCA.

PRESENTATIONS AND PANELISTS:

- 14PESGM2710, West Wide System Model (WSM): Present Challenges, Continued Improvements & Solution Accuracy
  H. ZHANG, Peak Reliability
  S. KINCIC, Peak Reliability
- 14PESGM2712, Midwest ISO Experiences of Network Model Maintenance – State Estimator and Contingency Analysis Accuracy
  J. DONDETI, Midwest ISO
- 14PESGM2713, Experiences at California ISO in Supporting State Estimation Solution Accuracy due to External Model for Reliability and Market Operations
  A. MISHRA, CAISO
- 14PESGM2708, BC Hydro External Model Accuracy Requirements for Network Applications
  Z. YAO, BC Hydro
- 14PESGM2714, ISO New England Experiences with Internal and External Model Impacts on the State Estimator
  S. RAMESH, ISO New England
- 14PESGM2747, Handling Load Distribution Factors in State Estimation for Market Operations in ERCOT
  J. WU, ERCOT
  F. GARCIA, ERCOT
  V. BETANABHATLA, ERCOT
  S. NUTHALAPATI, ERCOT
  T. MORTENSEN, ERCOT

Power System Economics *(paper forum)*

Thursday, 31 July, 2:00 PM–5:00 PM *Magnolia 1*

Sponsored by: *IEEE PES*
Chair: *M. Vallem, PNNL*

- 14PESGM0296, An Investigation of the Impact of Dispatchable Power Routers on Electricity Markets and Market Participants
  J. THOMAS, Georgia Institute of Technology
  J. HERNANDEZ, Georgia Institute of Technology
  S. GRIJALVA, Georgia Institute of Technology
- 14PESGM0581, Markov-Based Stochastic Multi-Period Market Settlement with Wind Uncertainties
  Y. YU, University of Connecticut
  P. LUH, University of Connecticut
  E. LITVINOV, ISO New England
  T. ZHENG, ISO New England
  J. ZHAO, ISO New England
  F. ZHAO, ISO New England
- 14PESGM0765, Wind Power Bidding Strategy in a Day-Ahead Electricity Market
  B. KANNA, Indian Institute of Technology Kanpur
  S. SINGH, Indian Institute of Technology Kanpur
- 14PESGM0877, Evaluation of Emerging Metaheuristic Strategies on Opimal Transmission Pricing
  J. RUEDA, University Duisburg-Essen
  I. ERLICH, University Duisburg-Essen
- 14PESGM1207, Stochastic Cournot Model for Wind Power Trading in Electricity Markets
  K. SHARMA, Malaviya National Institute of Technology Jaipur
  R. BHAKAR, Malaviya National Institute of Technology Jaipur
  N. PADHY, Indian Institute of Technology Roorkee
- 14PESGM1208, Risk Constraint Profit Maximization in a Multi-Electricity Market
  D. PANDA, Indian Institute of Technology-Kanpur
  S. SINGH, Indian Institute of Technology-Kanpur
  V. KUMAR, Indian Institute of Technology-Kanpur
- 14PESGM1391, Distribution Use-of-System Pricing to Facilitate Retail Competition and Demand Management
  Z. ZHANG, University of Auckland
  N. NAIR, University of Auckland
- 14PESGM1637, Balancing Energy Market Integration in Northern Europe – Modeling and Case Study
  Y. GEBREKIROS, Norwegian University of Science and Technology (NTNU)
  G. DOORMAN, Norwegian University of Science and Technology (NTNU)
- 14PESGM1707, Combined Economic and Emission Dispatch Using Radial Basis Function
  J. MOMOH, Howard University
  S. SALKUTI, Howard University
- 14PESGM1766, Plug-In Electric Vehicle Charging Demand Estimation based on Queueing Network Analysis
  H. LIANG, University of Waterloo
  I. SHARMA, University of Waterloo
  W. ZHUANG, University of Waterloo
  K. BHATTACHARYA, University of Waterloo
- 14PESGM1864, Integrated Risk Management Model for Portfolio Selection in Multiple Markets
  P. MATHURIA, Malaviya National Institute of Technology Jaipur
  R. BHAKAR, Malaviya National Institute of Technology Jaipur
- 14PESGM1927, Comparison of Transmission Cost Allocation Methods in a Multi-area Framework
  D. LIMA, PUC-Rio
  J. VARGAS, PUC-Rio
- 14PESGM2069, Interface Definition and Pricing for Economic and Efficient Interchange Transactions
  X. ZHANG, MISO
  D. CHATTERJEE, MISO
  T. PENG, MISO
  R. SUTTON, MISO
- 14PESGM2097, Do Wind Power Producers have Market Power and Exercise It?
  Y. YU, Stanford University
  B. ZHANG, Stanford University
  R. RAJAGOPAL, Stanford University
- 14PESGM2185, Price Responsive Demand Modeling in PJM Capacity Market
  Y. XIAO, Alstom Grid
  Y. LEE, ALSTOM Grid Inc.

B. CHIU, ALSTOM Grid Inc.
F. BRESLER, PJM Interconnection, L.L.C.
J. BASTIAN, PJM Interconnection, L.L.C.
A. ENGLE, PJM Interconnection, L.L.C.
P. BRUNO, PJM Interconnection, L.L.C.

- 14PESGM2265, Evaluating Impact of Wind Power Hourly Variability On Day-Ahead Electricity Markets
  R. BO, MISO
  J. BAKKE, MISO
- 14PESGM0197, Fast Demand Forecast of Electric Vehicle Charging Stations for Cell Phone Application
  M. MAJIDPOUR, UCLA
  C. QIU, UCLA
  C. CHUNG, UCLA
  P. CHU, UCLA
  R. GADH, UCLA
  H. POTA, University of NSW
- 14PESGM0294, Hourly Price Forward Curve Calculation for Market Coupling
  A. ADAM, SwissGrid AG
  M. HILDMANN, ETH Zürich
  G. ANDERSSON, ETH Zürich
- 14PESGM1931, Learning Energy Demand Domain Knowledge via Feature Transformation
  S. SIDDIQUE, Marquette University
  R. POVINELLI, Marquette University
- 14PESGM0367, Multi-Objective Pricing Game Among Interconnected Smart Microgrids
  A. BELGANA, INRS
  B. RIMAL, INRS
  M. MAIER, INRS

Micro-Grids & Power System Dynamics *(paper forum)*

Thursday, 31 July, 2:00 PM–5:00 PM *Magnolia 2*

Sponsored by: *IEEE PES*
Chair: *S. Pullins, Horizon Energy Group*

- 14PESGM0090, Identification of Power System Dynamic Signature Using Hierarchical Clustering
  T. GUO, University of Manchester
  J. MILANOVIC, University of Manchester
- 14PESGM0304, Control for Microgrids with Inverter Connected Renewable Energy Resources
  H. POTA, University of New South Wales
  M. HOSSAIN, Griffith University
  M. MAHMUD, Swinburne University of Technology
  R. GADH, UCLA
- 14PESGM0328, Specification and Implementation of a Reference Grid for Distribution Network Dynamic Studies
  H. HOOSHYAR, KTH Royal Institute of Technology
  F. MAHMOOD, KTH Royal Institute of Technology
  L. VANFRETTI, KTH Royal Institute of Technology
- 14PESGM0559, Nonlinear Distributed Controller Design for Maintaining Power Balance in Islanded Microgrids
  M. MAHMUD, Swinburne University of Technology
  M. HOSSAIN, Griffith University
  H. POTA, University of New South Wales
  N. ROY, University of New South Wales
- 14PESGM0764, Dynamic Equivalents of Active Distribution Grids Based on Model Parameters Identification
  T. PREDA, Norwegian University of Science and Technology
  K. UHLEN, Norwegian University of Science and Technology
  N. HADJSAID, Grenoble Electrical Engineering Laboratory (G2ELAB)
- 14PESGM0832, Small Signal Security Region of Droop Coefficients in Autonomous Microgrids
  X. WU, Tsinghua University
  C. SHEN, Tsinghua University
  M. ZHAO, Tsinghua University
  Z. WANG, Tsinghua University
  X. HUANG, China Southern Grid

- 14PESGM1272, Modelling and Simulation for INER AC Microgrid Control
  G. CHANG, National Chung Cheng University
  G. ZENG, National Chung Cheng University
  H. SU, National Chung Cheng University
  L. HSU, National Chung Cheng University
  Y. CHANG, National Chung Cheng University
  Y. LEE, National Chung Cheng University
  C. LIN, National Chung Cheng University
- 14PESGM2073, Enhancement of Islanded Droop-Controlled Microgrid Performance via Power Filter Design
  I. NIKOLAKAKOS, Masdar Institute of Science and Technology
  I. AL-ZYOUD, Emirates Nuclear Energy Corporation
  H. ZEINELDIN, Masdar Institute of Science and Technology
  M. EL-MOURSI, Masdar Institute of Science and Technology
  A. AL-HINAI, Masdar Institute of Science and Technology
- 14PESGM0205, A Study of the Voltage Distribution for the Interconnection of Power Grids
  V. PERUMALLA, Ebiz Labs Inc
  Q. BIAN, Zhejiang University
  D. DI, University of Oklahoma
  D. JIANG, University of Oklahoma
- 14PESGM0694, Optimal Power Exchanges in an Interconnected Power Microgrids Based on Model Predictive Control
  H. DAGDOUGUI, ÉTS
  L. DESSAINT, ÉTS
  A. OUAMMI, CNRST
- 14PESGM0742, Electric Service Restoration Using Microgrids
  B. ANSARI, Colorado School of Mines
  S. MOHAGHEGHI, Colorado School of Mines
- 14PESGM0865, Real-Time Energy Management Strategies for Microgrids
  X. WU, Xi'an Jiaotong University
  X. WANG, Xi'an Jiaotong University
  Z. BIE, Xi'an Jiaotong University
  P. ZENG, China Electric Power Research Institute
- 14PESGM1729, A Hierarchical Energy Management Strategy for Grid-Connected Microgrid
  X. LI, Arizona State University
  G. GENG, Zhejiang University
  Q. JIANG, Zhejiang University
- 14PESGM2004, Experiment with an OPF Controller Based on HPSO-TVAC for a PV-Supplied Microgrid with BESS
  K. LE, Waseda University
  Y. HAYASHI, Waseda University

Smart Distribution Analytics to Integrate Distributed Energy Resources and Microgrids for Flexible Distribution Grid Operations *(panel)*

Thursday, 31 July, 3:00 PM–5:00 PM *Potomac 4*

Sponsored by: *Transmission and Distribution Committee*
Chair: *A. Jayantilal, Alstom Grid*

The deployment of Distributed Energy Resources (DER) shows progress globally and is moving the operating paradigm towards active distribution networks. Recent grid restoration experiences from natural disasters and storms show the promise of DER and Microgrids to reduce outage times, whilst providing critical emergency services. A new generation of Distribution Automation, Distribution Sensors and Solid State Electronic devices/controllers is being deployed to manage the complexity of DER/Microgrids providing benefits to utilities and customers. DER/Microgrids promise to revolutionize how consumers value electricity service and reliability. DER/Microgrids provide additional control variables for further optimization of the transmission grid and bulk generation dispatch. This panel will discuss Smart Distribution analytics and technologies to manage emerging DER/Microgrids including advanced state estimation, dynamic rating, fault-location-isolation and service-restoration, meter data analytics, control room situational awareness, Microgrid Controllers, and Distributed Energy Resource Management Systems (DERMS).

PRESENTATIONS AND PANELISTS:

- 14PESGM2516, Experiences and Lessons Learned from SPIDERS Microgrids Rollout and Demonstrations
  J. STAMP, Sandia National Laboratories

- 14PESGM2517, Hierachial Control of Economic and Reliable Operation of Microgrids
  M. SHAHIDEHPOUR, IIT
- 14PESGM2518, The Navy Yard Energy Master Plan for Value-Based Microgrid Implementation
  W. AGATE, Philadelphia Industrial Development Corporation
- 14PESGM2519, Networked Microgrids
  T. MOHN, GeneralMicroGrids
- 14PESGM2536, Operating Rural Communities in NY Within Grid-Tied Microgrid
  A. MAITRA, EPRI

Chair and Author Index

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National Harbor Conference Rooms

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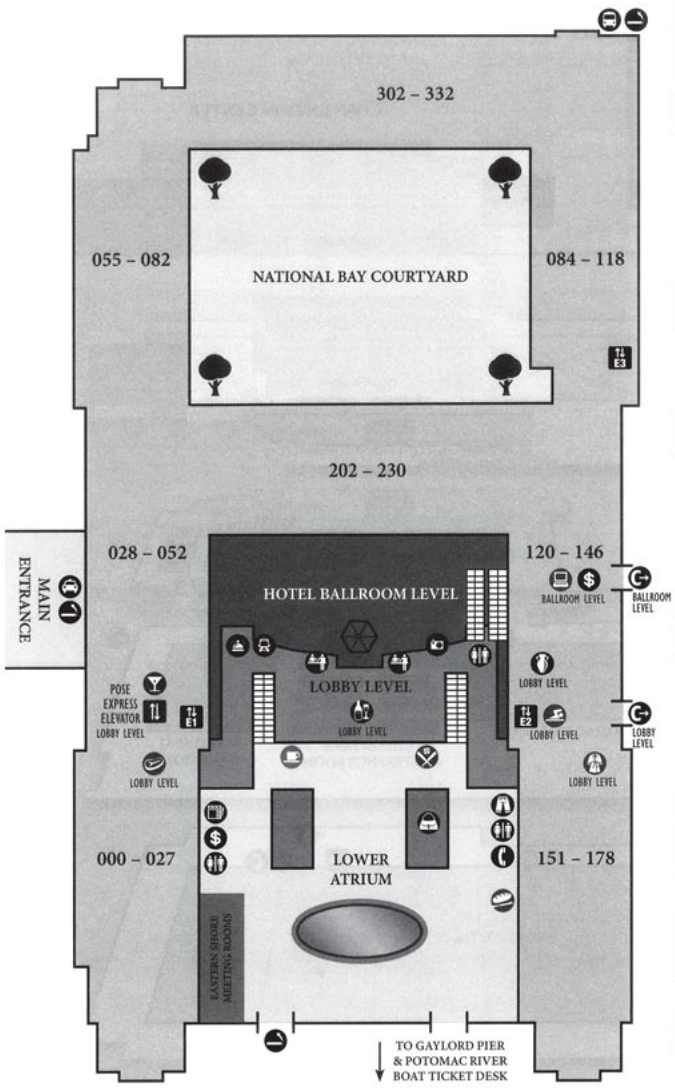


HOW TO FIND YOUR ROOM

ROOM NUMBER
FLOOR

★ DINING ★

- Old Hickory Steakhouse & Lounge (Lobby Level)
- National Pastime Bar & Grill (Lower Atrium)
- Pienza Restaurant (Lower Atrium)
- Java Coast Fine Coffees (Lower Atrium)

★ BARS / LOUNGES ★

- Belvedere Lobby Bar (Lobby Level)
- POSE Ultra Lounge (Roof Top)

★ RETAIL ★

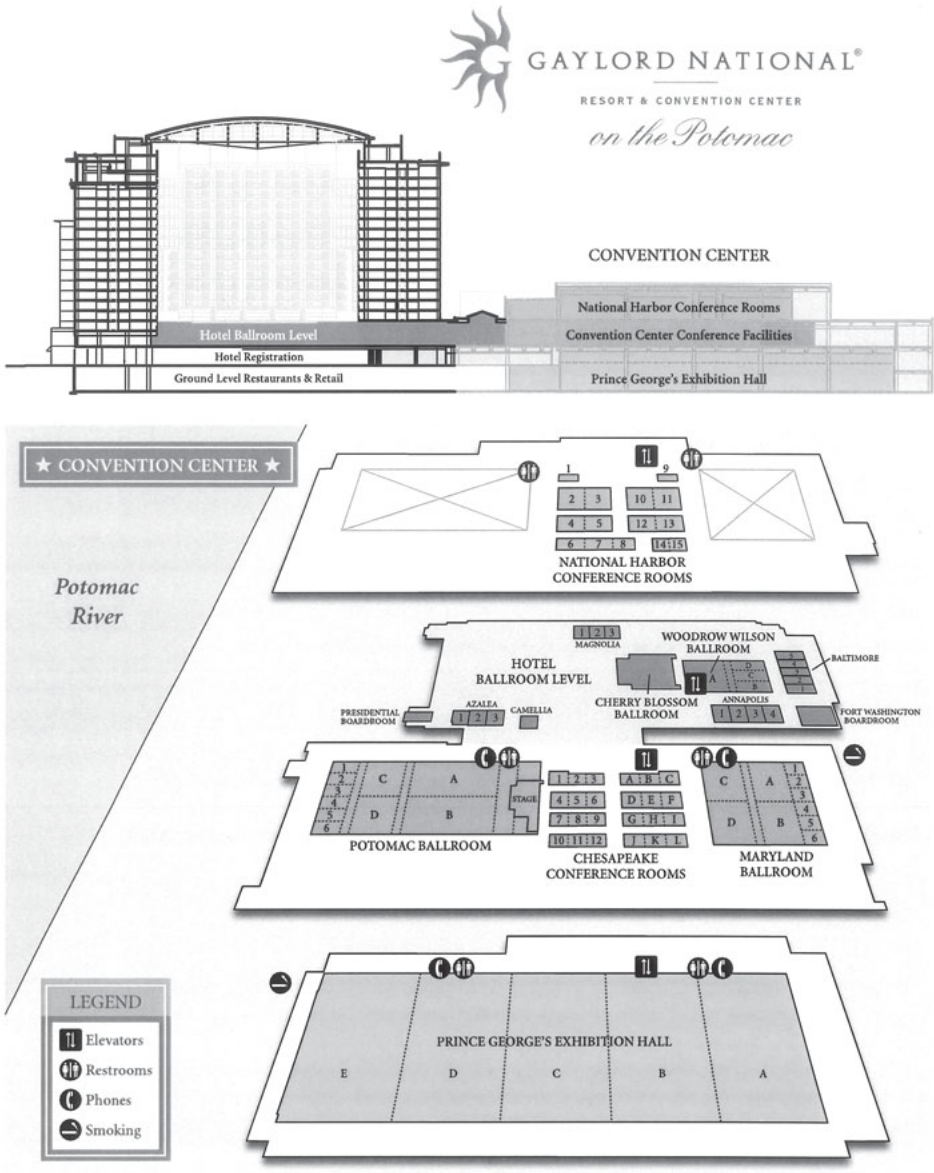
- Paisleys: Accessories & More (Lower Atrium)
- Amelia's Boutique (Lower Atrium)
- Strictly First Glass (Lobby Level)
- Key Provisions: News • Sundries • Gifts (Lower Atrium)

★ RECREATION ★

- Business Center (Ballroom Level)
- Relâche™ Spa & Salon (Lobby Level)
- Elevators to the Fitness Center, Pool & Bar, Potomac Playzone & Handicap Access to Pier (Take E2 elevator to level P1)

LEGEND

Elevators	Concierge
Restrooms	Tours
ATM	Bus Pickup
Phones	Taxi Pickup
Bell Services	Shuttle Desk
Convention Center	Smoking


GAYLORD NATIONAL®
RESORT & CONVENTION CENTER
on the Potomac
CONVENTION CENTER
National Harbor Conference Rooms
Convention Center Conference Facilities
Prince George's Exhibition Hall
Hotel Ballroom Level
Hotel Registration
Ground Level Restaurants & Retail
★ CONVENTION CENTER ★
Potomac River
NATIONAL HARBOR CONFERENCE ROOMS
HOTEL BALLROOM LEVEL
MAGNOLIA
WOODROW WILSON BALLROOM
BALTIMORE
CHERRY BLOSSOM BALLROOM
ANNAPOLIS
FORT WASHINGTON BOARDROOM
PRESIDENTIAL BOARDROOM
AZALEA
CAMELLIA
POTOMAC BALLROOM
STAGE
CHESAPEAKE CONFERENCE ROOMS
MARYLAND BALLROOM
PRINCE GEORGE'S EXHIBITION HALL
LEGEND
Elevators
Restrooms
Phones
Smoking

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National Harbor, MD, USA

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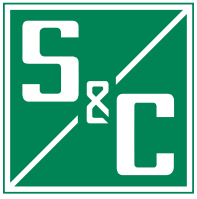

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