



# **86th Annual NC Electric Meter School and Grid Technology Conference**

Embassy Suites  
Kingston Plantation  
Myrtle Beach, South Carolina  
June 25-29, 2017

Offered by the Office of Professional Development  
North Carolina State University, Raleigh, North Carolina

# Our New Name, Logo and Focus



*To celebrate our 86th year, and our commitment to the future, we have updated our logo, our name, and we have added new topics and products related to electric metering and the electrical grid.*

*Electricity metering has been in existence for over 100 years. Metering has continued to evolve in functionality and complexity over this period. The NC Meter School has long served the purpose of providing a place where the metering discipline, skills, changes, products, and practices are learned and discussed. The industry has progressed with today's technology, and metering interfaces have become varied and often directly related to other grid technologies. The NC Electric Meter School and Grid Technology Conference will continue to be current and proactive.*

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# General Information

**The North Carolina Electric Meter School and Grid Technology Conference** has now expanded and includes topics and products related to electric metering and the electrical grid as follows:

## **Electricity Metering**

All aspects of metering to include installation, removal, testing, maintenance, and management practices. Examples may include any metering quantity measurement for revenue or other operational purposes.

## **Revenue**

Tariffs, rate practices, and other aspects associated with the accurate measurement of electricity. Examples may include any method or equipment to read, record, and/or verify accurate metering.

## **Communications**

Remote communications, including many forms and technology options, related to metering and/or other electrical equipment operations. Examples may include metering and other electrical grid hardware that requires communications between devices or from field to host. May also include modems, fiber, cellular, local, or other means of communications media or methods; tools or equipment.

## **IT/Computer/Programmable Devices**

Metering and other grid operational/support systems or equipment. Examples may include metering devices and associated equipment to upload/download programs/configurations; diagnostic equipment; and associated tools and methods.

## **Security**

Physical, cyber, and data protection options to safeguard the revenue and operational integrity of the electrical system. Examples may include pre- and post-energy tampering security methods and systems.

## **Renewable/Alternative Energy**

Metering interfaces to measure power at these different types of facilities. Examples may include solar, wind or other alternative means of generation.

## **Generation, Transmission, and Distribution**

Equipment and practices associated with any aspect of the electric grid, including but not limited to AMI (advanced metering infrastructure). Examples may include relay; substation; metered data from generation, transmission, and other distribution/grid management systems.

## **Customer Service**

Services or equipment to provide enhanced customer service options for the customer that may be from within the meter or associated metering data, or other services past the meter. Examples may include metering data or pre-pay.

## Reference Standard Calibration Check

An added benefit is being offered to you during the conference at no additional charge. After registering, and while attending the conference, please stop by the **Harrow** room reserved by Radian/WECO to have your reference standard(s) tested against a Radian NIST traceable 0.01% Reference Standard. You will receive a printed and/or electronic "Report of Calibration" which provides the accuracy of your standard at all common loading conditions.

## Room Assignments

General Session (Monday)	Kensington ABC
General Session (Thursday 11:15 a.m. - 12:00 p.m.)	Kensington ABC
Single Phase	Kensington C
Polyphase	Kensington A
Advanced Management	Kensington F (Monday-Wednesday)
Basic Substation & Distribution	Kensington B
Advanced Substation & Distribution	Windsor C
Advanced/Management Combined (Thursday, 8:00-11:00 a.m.)	Windsor A/B
Emerging Technologies (Tuesday/Wednesday)	Kensington B
Exhibitors	Somerset
Lunches	Kensington DEG
Banquet (Wednesday Social 6:00 p.m.)	Lakeside Pavilion (Tent behind Embassy), Monday-Wednesday
(Wednesday Buffet & Entertainment 7:00 p.m.)	Palmetto Pavilion Poolside
Calibration (Monday-Wednesday)	Kensington Ballroom
Manufacturers Programming Sessions (Tuesday & Wednesday)	Radian/WECO, Harrow Winchester, Oxford, Pembroke, and Eton

## Special Thanks to the Sponsors of our Networking Socials:

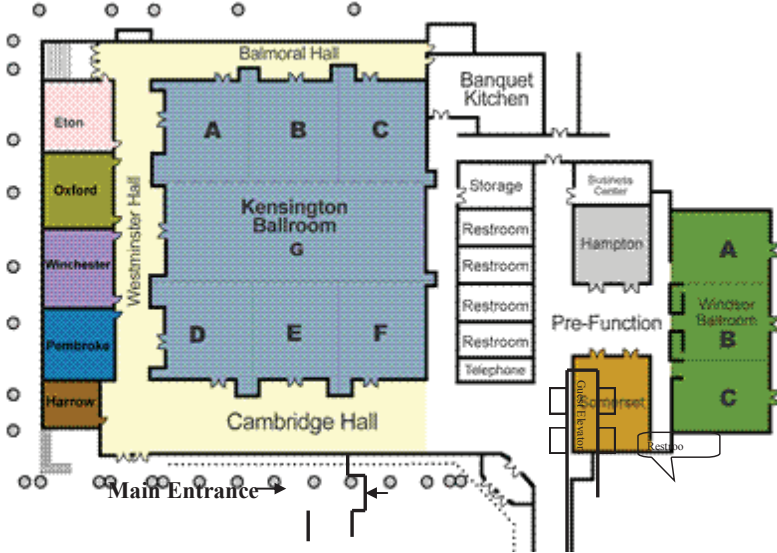
- HITT
- MEGGER
- NTS
- TESCO
- Powersolve

## Thanks to

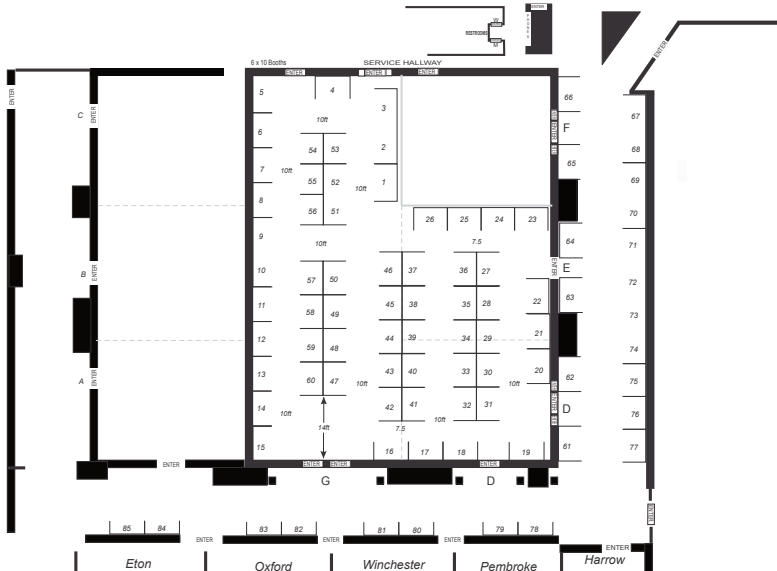
- POWERMETRIX for providing lanyards
- HARVEY PLEXICO INC for the notepads

# Floor Plans

## Embassy Suites Meeting Room Floor Plan



## Embassy Suites Exhibit Booths Floor Plan



# Exhibitor Information

<b>Exhibitor</b>	<b>Booth</b>	<b>Exhibitor</b>	<b>Booth</b>
ABB . . . . .	80	Power Line Sentry, LLC . . . . .	45
Aclara . . . . .	2	POWER SALES & SERVICE . . . . .	70
American Meter Program Services . . . . .	6	Powermetrix . . . . .	20, 21
Ametek Power Instruments . . . . .	40	PowerSolve . . . . .	5
Anixter Inc. . . . .	76	PowerTech . . . . .	19
ARTECHE . . . . .	77	PrimeStone Technologies, Inc. . . . .	11
AZZ Enclosure Systems . . . . .	35	Probewell Lab Inc. . . . .	43
Bellwether Management Solutions . . . . .	22	Radian Research . . . . .	71, 72
Brooks UPG . . . . .	54	Reliable Meter Service . . . . .	63
Burndy . . . . .	53	Ritz Instrument Transformers, Inc. . . . .	34
Chapman Co. . . . .	25	Safearth . . . . .	1
DC Technology Inc. . . . .	24	SAMSCO . . . . .	38
DeWalch . . . . .	49	SATEC . . . . .	42
Eaton Power Systems . . . . .	51	Schneider Electric . . . . .	9, 10
Electro Industries/GaugeTech . . . . .	57	Schweitzer Engineering Laboratories . . . . .	60
Ensales . . . . .	30	Sensus . . . . .	27
EUS . . . . .	41	Service Electric Co. . . . .	64
FLIR Systems . . . . .	37	Shealy Electrical- A Division of Border States . . . . .	4
GE Grid Automation . . . . .	61	Silver Spring Networks . . . . .	23
GE Grid Solutions . . . . .	59	SMC . . . . .	46
Harvey Plexico Inc. . . . .	50	Solid State Instruments/ Brayden Automation . . . . .	47
Highfield Manufacturing . . . . .	78	Southwest Electric Co. . . . .	18
Honeywell Elster . . . . .	12	Spinlab Utility Instrumentation Inc. . . . .	15
Hubbell/SWI . . . . .	7	SUSI Adapters . . . . .	73
ICMI, Member Reinhausen Group . . . . .	29	Synergy Systems, Inc. . . . .	17
IFD Corporation . . . . .	28	Terratal . . . . .	79
Inner-Tite Corp . . . . .	69	TESCO - The Eastern Specialty Company . . . . .	39
Irby Utilities . . . . .	58	Texas Meter + Device . . . . .	48
ITEC . . . . .	16	The Durham Company . . . . .	31
Itron . . . . .	62	TransData, Inc. . . . .	26
Jake Rudisill Associates, Inc. . . . .	52	Transformer Maintenance and Service, Inc. . . . .	14
KCI Associates . . . . .	55	TSTM . . . . .	66
Landis+Gyr . . . . .	33	Utility Lines . . . . .	82
Marwell . . . . .	44	Utility Solutions Inc. . . . .	36
Megger . . . . .	74	Vision Metering, LLC . . . . .	8
Milbank Manufacturing Co. . . . .	3	WESCO . . . . .	13
NaturChem, Inc. . . . .	75	WRDA, Inc. . . . .	67, 68
NTS . . . . .	32	Zepolla Innovations LLC / UtiliShelf . . . . .	56
Panasonic . . . . .	81		
Peak Demand Inc. . . . .	65		

# General Information

## Steering Committee Mission Statement

To represent the planning committee as a working group with a mission to guide the School, its programs, and its activities in a way deemed appropriate by the planning committee and in the best interest of the North Carolina Electric Meter School and Grid Technology Conference.

## Steering Committee

**Chairperson:** Mike Byrd  
**Vice Chairperson:** Rusty Mutschink  
**Secretary/Treasurer:** Connie McElroy-Bacon

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<b>COMMITTEES</b>	<b>CHAIRPERSON</b>	<b>VICE CHAIRPERSON(S)</b>
Single Phase	Clare Bargerstock	Mike Byrd
Polyphase	Chad Cooper	Jimmy Grubbs Jeff Plesur
Advanced	Rusty Mutschink	Tony Horton
Management	Kenneth McCraw	Jimmy Green
Substations (Basic)	Curtis Craig	Bob Wilcox
Substations (Advanced)	John Maclaga	Bob Wilcox
Emerging Technologies	Tony Horton	Garey Edwards Clare Bargerstock
Facilities	Tony Horton	Connie McElroy-Bacon Jimmy Green
Hall of Fame	Bob Kelly	Tony Horton
Mfrs./Hospitality	Craig Shoaf	Bob Kelly Randy Riley Jeff Lewis
Banquet/Entertainment	Connie McElroy-Bacon	James Williamson
Members at Large	Sean Dempsey Chuck Robertson Dean Williams	



# Conference Tracks

## SINGLE PHASE

The single phase track is designed for the entry-level person. Classes are designed to provide a basis for understanding metering principles, power and to complement the participant's metering skills gained on the job. Sessions offered cover overviews of a power system, basic math, AC and DC theory, meter testing safety and all areas related to single phase meters. The classes are designed to prepare participants for the next level of classes relating to polyphase meters.

## POLYPHASE

The polyphase track is designed for the purpose of providing participants with an overview of the basic information needed to understand polyphase metering. This session covers selection, installation, and maintaining polyphase meters. The session provides training on programming polyphase meters. Participants also will receive training in the selection, use, and maintenance of current and voltage transformers.

## ADVANCED

The advanced track includes topics on complex metering theory and concepts, high-end metering applications, power quality, remote metering communication methods and other advanced metering applications, tools and equipment. Individuals that have previous metering experience or education should attend this session.

## MANAGEMENT

The management track provides information about the newest technologies, current industry trends, day to day operational issues, as well as updates on new technology implementation projects. This track is ideal for professionals and managers who want to learn more about the metering industry, where it is headed and current challenges.

## BASIC SUBSTATION & DISTRIBUTION PRINCIPLES

This track is designed to provide entry-level knowledge of substations and distribution systems. It is ideal for substation personnel with less than two years' experience or meter technicians who work occasionally in substations. Classes cover the fundamentals of substation construction, proper grounding, electrical layout, and the purpose for typical equipment in a substation. Examples include safety, station power transformers, batteries, circuit breakers, capacitors, switches, voltage regulators, basic communications, metering, and other miscellaneous components found in most substations. Classes are also offered to cover distribution system operation and the various types of equipment used.

# Conference Tracks (continued)

## ADVANCED SUBSTATION & DISTRIBUTION CONCEPTS

This track is geared towards experienced substation and meter technicians as well as supervisors and managers who maintain, repair, and/or oversee the daily operation of substations. Classes cover advanced calibration, maintenance and repair of station equipment as well as troubleshooting techniques of station components. Included are classes on remote communication controls, SCADA, grounding, oil testing, welding, relays, voltage reduction, security protocols, lightning protection, IEEE and OSHA requirements, AMI equipment, infrared, and high frequency testing. Classes are also offered to cover various distribution system operation methods and techniques, and various types of equipment used.

## EMERGING TECHNOLOGIES

The Emerging Technologies Track provides an opportunity to explore how electric metering and the overall electric grid are working together in a variety of ways. New technologies, methods, tools, equipment, and challenges will be discussed. In addition to revenue metering as part of the overall electric grid this session will include a forum for Security, Renewables/Alternative Energy, Communications, IT/Computer/Programmable Devices, and Customer Service issues.

# Conference Schedule

## Sunday, June 25, 2017

- 2:00 p.m.            Begin Vendor Set-up – Embassy Suites, Kensington Ballroom
- 5:00–7:00 p.m.    Registration – Embassy Suites Lobby
- 6:00–7:00 p.m.    Welcome Reception – Kensington Ballroom

## Monday, June 26, 2017

### General Session – Kensington ABC

- Presiding:            Mike Byrd, ElectriCities of NC (Retired)
- 9:00 a.m.            **Welcome to the School**  
Mike Byrd, ElectriCities of NC (Retired)
- Presentation of Colors**  
Carolina Forest High School ROTC
- Opening Comments**  
Connie McElroy-Bacon, Conference Manager,  
NC State University
- 9:30 a.m.            **Welcome from NC State University Continuing Education**  
Alice Warren, Vice Provost for Continuing Education,  
NC State University
- 9:45 a.m.            **SCANA - Direction of the Grid**  
William “Bill” Turner, VP of Electric Operations, SCE&G
- 10:45 a.m.           **Break**
- 11:00 a.m.           **Vendor Perspective on Direction of the Grid**  
Tom Lawton, TESCO
- 12:00 a.m.           **Lunch, Lakeside Pavilion – Tent behind Embassy**
- Presiding:            Mike Byrd, ElectriCities of NC, (Retired)
- 1:00 p.m.            **You Might be Past AMI, So Where Is the Grid Going Now?**  
Thomas Kerestes, West Monroe Partners
- 2:30 p.m.            **Break**
- 2:45 p.m.            **Single Phase, Polyphase, Advanced, Basic Substation  
& Distribution, and Advanced Substation & Distribution  
Sessions Begin**
- 2:45 p.m.            **Management Session & Emerging Technologies Session  
Visit Vendors**
- 4:15 p.m.            **Networking Social in the Exhibit Area**

# Conference Schedule

## Monday (continued)

### Track Sessions Begin

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#### SINGLE PHASE—Kensington C

- Presiding: Clare Bargerstock, Northern Virginia Electric Cooperative
- 2:45 p.m. **Overview of an Electric System**  
Clare Bargerstock, Northern Virginia Electric Cooperative
- 4:15 p.m. **Networking Social in the Exhibit Area—Kensington DEG**

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#### POLYPHASE—Kensington A

- Presiding: Jimmy Grubbs, South Carolina Electric & Gas (Retired)
- 2:45 p.m. **History of Electric Metering**  
Tom Lawton, TESCO
- 4:15 p.m. **Networking Social in the Exhibit Area—Kensington DEG**

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#### ADVANCED—Kensington F

- Presiding: Rusty Mutschink, Central Electric Power Cooperative
- 2:45 p.m. **Meter Terminology**  
Jeff Lorow, Ametek Power Instruments
- 4:15 p.m. **Networking Social in the Exhibit Area—Kensington DEG**

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#### MANAGEMENT

- 2:45 p.m. **Visit Vendors**
- 4:15 p.m. **Networking Social in the Exhibit Area—Kensington DEG**

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#### SUBSTATION & DISTRIBUTION BASIC—Windsor C

- Presiding: Curtis Craig, Shenandoah Valley Electric Cooperative
- 2:45 p.m. **How to Make Accurate Temperature Measurements in a Substation Using an Infrared Camera**  
Ed Kochanek, FLIR
- 4:15 p.m. **Networking Social in the Exhibit Area—Kensington DEG**

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#### SUBSTATION & DISTRIBUTION ADVANCED—Windsor A/B

- Presiding: John Maclaga, City of Statesville
- 2:45 p.m. **Lightning Round**  
Multiple Topics; Multiple Speakers
- 4:15 p.m. **Networking Social in the Exhibit Area—Kensington DEG**

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#### EMERGING TECHNOLOGIES

- 2:45 p.m. **Visit Vendors**
- 4:15 p.m. **Networking Social in the Exhibit Area—Kensington DEG**

**Tuesday, June 27, 2017**

**SINGLE PHASE—Kensington C**

- Presiding: Dee Byrd, WR Daniel & Associates
- 8:00 a.m. **Basic Meter Math**  
Jack Pyburn, Honeywell
- 9:00 a.m. **Wathour Meter Configurations**  
Will Elliott, Aclara
- 10:00 a.m. **Break**
- 10:15 a.m. **DC Theory**  
Randy Riley, Landis + Gyr
- 12:00 p.m. **Lunch—Lakeside Pavilion**
- Presiding: Paul Keadle, NTS
- 1:00 p.m. **AC Circuit Theory**  
Bill Hardy, TESCO
- 2:00 p.m. **Wathour Meter Principles and Components**  
Tom Van Valkenburgh, Radian
- 3:00 p.m. **Break**
- 3:15 p.m. **History of Electric Metering**  
Tom Lawton, TESCO
- 4:15 p.m. **Adjourn/Networking Social in the Exhibit Area**

**POLYPHASE—Kensington A**

- Presiding: Jeff Plesur, Rappahannock Electric Cooperative
- 8:00 a.m. **Introduction to Polyphase Metering**  
Will Elliott, Aclara
- 9:00 a.m. **Principles and Applications of Polyphase Metering**  
Mike Corbin, Honeywell
- 10:00 a.m. **Break**
- 10:15 a.m. **Three Phase Theory**  
Bill Hardy, TESCO
- 11:00 a.m. **ANSI Meter Forms**  
Carl Chermak, Aclara
- 12:00 p.m. **Lunch—Lakeside Pavilion**
- Presiding: Eric Bush, NTS
- 1:00 p.m. **Visit Vendors**
- 2:15 p.m. **Safety in Field Metering Equipment**  
Steve Hudson, Powermetrix
- 3:30 p.m. **Break**
- 3:45 p.m. **Using the Meter's Self Diagnostics and Alternate Displays to Verify Installation Wiring, Phase Sequencing and Proper Operation of the Meter**  
Mike Osterhout, Landis + Gyr
- 4:15 p.m. **Adjourn/Networking Social in the Exhibit Area**

# Conference Schedule

## Tuesday (continued)

### ADVANCED—Kensington F

- Presiding: Terry Gaiser, Sensus
- 8:00 a.m. **Multi-Function Metering**  
Randy Riley, Landis + Gyr
- 8:45 a.m. **Troubleshooting with Phasors**  
Carl Chermak, Aclara
- 9:30 a.m. **Four Quadrant and Reactive Metering**  
Victor Love, Schweitzer Engineering Labs (SEL)
- 10:15 a.m. **Break**
- 10:30 a.m. **Measuring and Proving Test Accuracy**  
Tom Van Valkenburgh, Radian
- 11:15 a.m. **Harmonics in Metering**  
Steve Hudson, Powermetrix
- 12:00 p.m. **Lunch—Lakeside Pavilion**
- Presiding: Tyler Burns, Ensales
- 1:00 p.m. **Introduction to Smart Grids**  
Sean Dempsey, WESCO
- 1:45 p.m. **Basics of Power Quality and Compatibility**  
Chris Prince, Aclara
- 2:30 p.m. **Break**
- 2:45 p.m. **KYZ Pulse Metering, Ke Values, and Isolation Relays**  
Bill Brayden, Brayden Automation/Solid State Instruments
- 3:30 p.m. **Visit Vendors**
- 4:15 p.m. **Adjourn/Networking Social in the Exhibit Area**

### MANAGEMENT—Kensington B

- Presiding: Kenneth McCraw, Duke Energy
- 8:00 a.m. **New Challenges for the Meter Shop**  
Bill Hardy, TESCO
- 8:45 a.m. **Finding Metering Errors Remotely**  
Jeff Dargan and Van Vu, Duke Energy
- 9:30 a.m. **Managing the Meter Shop of the Future Through Better Tools & Information**  
Tom Lawton, TESCO
- 10:15 a.m. **Break**
- 10:30 a.m. **Monetizing Revenue Loss**  
Steve Hudson, Powermetrix
- 11:15 a.m. **Meter Asset Management 101**  
Eddie Hermann, Radian
- 12:00 p.m. **Lunch—Lakeside Pavilion**
- Presiding: Jeff Lewis, Powertech
- 1:00 p.m. **Why You Need a Service Requirements Book**  
Larry Medlin, Duke Energy
- 1:45 p.m. **Why Use Extended Range CTs**  
Claudio Morejon, GE Energy Connections
- 2:30 p.m. **Break**
- 2:45 p.m. **Seven Habits of Super Productive People**  
Joel Valley, Fayetteville PWC
- 3:30 p.m. **Change Managements**  
Sean Dempsey, WESCO
- 4:15 p.m. **Adjourn/Networking Social in the Exhibit Area**

## Tuesday (continued)

### **SUBSTATION & DISTRIBUTION BASIC—Windsor C**

Presiding: Jerry Aubin, Chapman Co.

8:00 a.m. **Basics of Transformer Protection**  
Brett Cockerham, Schweitzer Engineering Labs (SEL)

8:45 a.m. **Transformer Testing Basics**  
Will Knapek, Omicron

9:30 a.m. **Transformer Monitoring and Diagnostics**  
Mark Cheatham, GE Energy Connections

10:15 a.m. **Break**

10:30 a.m. **Basics of Bus Protection**  
John Town, Schweitzer Engineering Labs (SEL)

11:15 a.m. **Overcurrent Protection Basics**  
Roger Munay, Eaton Cooper Power Systems.

12:00 p.m. **Lunch—Lakeside Pavilion**

Presiding: Jack Pyburn, Honeywell

1:00 p.m. **Circuit Breaker Testing Basics**  
Will Knapek, Omicron

1:45 p.m. **Tools and Techniques to Troubleshoot Power Quality Events**  
Dinesh Chhajer, Megger

2:30 p.m. **Break**

2:45 p.m. **Transformer Condition Assessment**  
Mark Cheatham, GE Energy Connections

3:30 p.m. **Testing and Commissioning Microprocessor Feeder Relays**

John Town, Schweitzer Engineering Labs (SEL)

4:15 p.m. **Adjourn/Networking Social in the Exhibit Area**

### **SUBSTATION & DISTRIBUTION ADVANCED—Windsor A/B**

Presiding: Dave Carnegio, National Transformer Sales

8:00 a.m. **Relaying Zones of Protection**  
Paul Smith, GE Grid Automation

8:45 a.m. **New Feeder Protection Techniques Using Microprocessor Relays**  
John Town, Schweitzer Engineering Labs (SEL)

9:30 a.m. **Power Transformer Protection**  
Paul Smith, GE Grid Automation

10:15 a.m. **Break**

10:30 a.m. **Test the System Not the Element**  
Will Knapek, Omicron

11:15 a.m. **Visit Vendors**

12:00 p.m. **Lunch—Lakeside Pavilion**

Presiding: Scott Owens, GE Energy Connections

1:00 p.m. **Substation Bus Protection**  
Craig Wester, GE Grid Automation

# Conference Schedule

## Tuesday (continued)

### **SUBSTATION & DISTRIBUTION ADVANCED** (continued)

1:45 p.m. **A Simple Method for Determining Fault Location Along Distribution Lines**  
Brett Cockerham, Schweitzer Engineering Labs (SEL); Rick Anderson, Fayetteville PWC; Timothy Stankiewicz, Fayetteville PWC

2:30 p.m. **Break**

2:45 p.m. **How to Specify Slip-Over Bushing Current Transformers for Metering and Protection Applications**  
John Cochran, Instrument Transformer Equipment Corp.

3:30 p.m. **Testing Instrument Transformers**  
Will Knapek, Omicron

4:15 p.m. **Adjourn/Networking Social in the Exhibit Area**

### **EMERGING TECHNOLOGIES—Somerset**

Presiding: Tony Horton, Duke Energy (Retired)

8:00 a.m. **Utilizing AMI for Outage Efficiency**  
Angela Hare, Central EMC

8:45 a.m. **AMI Network Distribution Grid Management from Home to Substation**  
Kent Hedrick, Landis + Gyr

9:30 a.m. **Secondary Voltage Mitigation—The Missing Zone**  
Bob McFetridge, AMSC

10:15 a.m. **Break**

10:30 a.m. **The Active Grid**  
Bryan Seal, Itron

11:15 a.m. **Energy Storage and Self-Healing Systems**  
Brad Luyster, S&C Electric Company

12:00 p.m. **Lunch—Lakeside Pavilion**  
Presiding: Mike Corbin, Honeywell Solutions

1:00 p.m. **Update on Cyber Security Issues Utilities Are Currently Facing**  
Scott Mossbrooks, N-Dimensions

1:45 p.m. **Is Cellular Communications Secure Enough for Distribution Automation Applications?**  
Andre Smit, Siemens; John Kretzschmar, Spartan Utility Sales

2:30 p.m. **Break**

2:45 p.m. **Electric Vehicle Chargers**  
Bill Hardy, TESCO

3:30 p.m. **Panel-Experience in Metering Renewable Energy**  
Larry Medlin, Duke Energy Progress; Clare Bargerstock, Northern Virginia Electric Cooperative; Bruce Magruder, McGavran Engineering; Jimmy Green, Brunswick Electric; Brad Kusant, Itron; Kaitlyn Archer, Duke Energy

4:15 p.m. **Adjourn/Networking Social in the Exhibit Area**



## Wednesday, June 28, 2017

### SINGLE PHASE—Kensington C

- Presiding: Rick Wathern, WESCO
- 8:00 a.m. **Introduction to Instrument Transformers**  
Greg Tyre, GEC Durham Company
- 9:00 a.m. **Introduction to Meter Sockets**  
Mike King, Brooks UPG
- 10:00 a.m. **Break**
- 10:15 a.m. **Visit Vendors**
- 11:00 a.m. **Programming Workshop for Single Phase Meters**  
Scott Finley, Landis+Gyr
- 12:00 p.m. **Lunch—Lakeside Pavilion**
- Presiding: Brady Hidell, WESCO
- 1:00 p.m. **Programming Workshop for Single Phase Meters**  
(continued)  
TBA, Honeywell
- 2:00 p.m. **Break**
- 2:15 p.m. **Programming Workshop for Single Phase Meters**  
(continued)  
Steve Wright, Itron
- 3:15 p.m. **Programming Workshop for Single Phase Meters**  
(continued)  
Chris Prince, Aclara
- 4:15 p.m. **Adjourn**
- 6:00 p.m. **Networking Social—Palmetto Pavilion**
- 7:00 p.m. **Banquet—Kensington Ballroom**

### POLYPHASE—Kensington A

- Presiding: Allison Kane, WESCO
- 8:00 a.m. **Practical Use of Vectors in Metering**  
Carl Chermak, Aclara
- 9:00 a.m. **Introduction to Instrument Transformers**  
Bill Hardy, TESCO
- 9:45 a.m. **Break**
- 10:00 a.m. **Programming Polyphase Meters-Session 1 - Alternate Session available for T-rated Installation Wiring**  
Vendor Rooms — Itron, Aclara, Honeywell Elster, Landis+Gyr  
(see page 24 for room assignments)
- 11:00 a.m. **Programming Polyphase Meters-Session 2 - Alternate Session available for T-rated Installation Wiring**  
Vendor Rooms- Itron, Aclara, Honeywell Elster, Landis+Gyr
- 12:00 p.m. **Lunch—Lakeside Pavilion**
- Presiding: Trey Brown, Anixter
- 1:00 p.m. **Testing CTs and Meter in a 3 Phase Installation**  
Bob Whitmore, Radian
- 2:00 p.m. **Instrument Transformer Theory and Testing**  
Steve Hudson, Powermetrix
- 3:00 p.m. **Break**

# Conference Schedule

## Wednesday (continued)

### POLYPHASE (continued)

3:15 p.m. **Instrument Transformer Accuracy Class**

Frank Lopez, GE Energy Connections

4:15 p.m. **Adjourn**

6:00 p.m. **Networking Social—Palmetto Pavilion**

7:00 p.m. **Banquet—Kensington Ballroom**

### ADVANCED—Kensington F

Presiding: Perry Godwin, Chapman Co.

8:00 a.m. **Basics of Grounding**

Chris Prince, Aclara

8:45 a.m. **Sizing Instrument Transformer for the Most Accurate Metering Performance**

Scott Flowers, Ritz Instrument Transformers

9:30 a.m. **Metering Best Practices**

Kevin Hawk, Reliable Meter Service

10:15 a.m. **Break**

10:30 a.m. **Meter Communications**

Steve Wright, Itron

11:15 a.m. **Power Transformer and Line Losses**

Mike Bearden, Landis+Gyr

12:00 p.m. **Lunch—Lakeside Pavilion**

Presiding: Mike Gaston, WESCO

1:00 p.m. **Field Testing Challenges of Renewable Installations**

Steve Hudson, Powermetrix

1:45 p.m. **Advancements in Station and Large Industrial Metering**

Mike Bearden, Landis + Gyr

2:30 p.m. **Break**

2:45 p.m. **Beyond Smart Metering**

Scott Laster, Schneider Electric

3:30 p.m. **Improving Meter Shop Efficiency**

Pete Dack, Radian

4:15 p.m. **Adjourn**

6:00 p.m. **Networking Social—Palmetto Pavilion**

7:00 p.m. **Banquet—Kensington Ballroom**

### MANAGEMENT—Kensington B

Presiding: Ron Culp, Chapman Co

8:00 a.m. **Defining a Smart Meter**

Tina Pampanelli, Itron

8:45 a.m. **Meters, Smart Grid Readiness**

Discussion

9:30 a.m. **Managing Vendor Issues on AMI Design**

Tom Lawton, TESCO

10:15 a.m. **Break**

10:30 a.m. **Distribution Automation/AMI Convergence**

Drue Merkle, Honeywell

11:15 a.m. **Duke's AMI Deployment**

Adam Anderson, Duke Energy

12:00 p.m. **Lunch—Lakeside Pavilion**

Presiding: Anixter

## Wednesday (continued)

### MANAGEMENT (continued)

- 1:00 p.m. **Panel Discussion-Customer Impressions About Smart Meters**  
Tina Pampanelli, Itron;Clare Bargerstock, Northern Virginia Electric Cooperative; Jimmy Green, Brunswick Electric; Adam Anderson, Duke Energy, Oliver Price, Rappahannock Electric Cooperative
- 2:30 p.m. **Break**
- 2:45 p.m. **Meter Operations in a Post AMI World**  
Tom Lawton, TESCO
- 3:30 p.m. **Physical Security of Substations**  
Joel Valley, Fayetteville PWC
- 4:15 p.m. **Adjourn**
- 6:00 p.m. **Networking Social—Palmetto Pavilion**
- 7:00 p.m. **Banquet—Kensington Ballroom**

### SUBSTATION & DISTRIBUTION BASIC —Windsor C

- Presiding: Greg Holm, Burndy
- 8:00 a.m. **Variable Frequency Power Factor Testing for Advanced Insulation Diagnosis**  
Dinesh Chhajer, Megger
- 8:45 a.m. **Principles of Effective Grounding**  
Lee Herron Burndy
- 9:30 a.m. **Visit Vendors**

- 10:15 a.m. **Break**
- 10:30 a.m. **Capacitors and Capacitor Controls**  
Roger Munay, Eaton Cooper Power Systems
- 11:15 a.m. **Distribution Feeder Protection**  
Craig Wester, GE Grid Automation
- 12:00 p.m. **Lunch—Lakeside Pavilion**  
Presiding: Sean Dempsey, WESCO
- 1:00 p.m. **Basics of Feeder Overcurrent Relay Coordination**  
John Town, Schweitzer Engineering Labs (SEL)
- 1:45 p.m. **Reclosers and Fuses**  
Roger Munay, Eaton Cooper Power Systems
- 2:30 p.m. **Break**
- 2:45 p.m. **Voltage Regulators and Controls**  
Roger Munay, Eaton Cooper Power Systems
- 3:30 p.m. **DNP Mapping for Basic Substation Monitoring**  
Andy Gould, Schweitzer Engineering Labs (SEL)
- 4:15 p.m. **Adjourn**
- 6:00 p.m. **Networking Social—Palmetto Pavilion**
- 7:00 p.m. **Banquet—Kensington Ballroom**

# Conference Schedule

## Wednesday (continued)

### **SUBSTATION & DISTRIBUTION ADVANCED—Windsor A/B**

Presiding: Keith McAteer, GE Energy Connections

8:00 a.m. **High Speed Main-Tie-Main Pole Top Source Transfer Application With Precise Voltage Regulation**

Andre Smit, Siemens

8:45 a.m. **Non Communicating Loop Schemes and How They Improve Reliability Indices**

Don Wycklendt , G&W

9:30 a.m. **How We Designed and Installed A Non-Communicating Auto Transfer Scheme**

Bob Wilcox, Rappahannock Electric Cooperative

10:15 a.m. **Break**

10:30 a.m. **Advances in Distribution SCADA**

Guillermo Velarde, Schneider Electric

11:15 a.m. **Protective Relaying Over Packet Network-A Case Study**

Manny Duvelson, RFL/Hubbell Power Systems

12:00 p.m. **Lunch—Lakeside Pavilion**

Presiding: Ginny Kelm, Irbly

1:00 p.m. **Using Sensors and Instrument Transformers in Distribution Applications**

Scott Flowers, Ritz Instrument Transformers

1:45 p.m. **Automatic Subtransmission Fault Location System Using Power Quality Monitors**

Dan Sabin, Schneider Electric; Paul Golden, Electrotek Concepts

2:30 p.m. **Break**

2:45 p.m. **Is Cellular Communications Secure Enough for Distribution Automation Applications?**

Andre Smit , Siemens

3:30 p.m. **Beyond AMI-Supporting Distribution Automation Solutions on the Electric Distribution System**

Michael Logue, Sensus

4:15 p.m. **Adjourn**

6:00 p.m. **Networking Social—Palmetto Pavilion**

7:00 p.m. **Banquet—Kensington Ballroom**

### **EMERGING TECHNOLOGIES— Somerset**

Presiding: Andy Gould, SEL

8:00 a.m. **Revenue Protection Post AMI**

Mike King, Brooks UPG

8:45 a.m. **Adventures in Revenue Assurance**

Jason Parker, Duke Energy

9:30 a.m. **Getting More From Your AMI Data**

Angela Hare, Central EMC

10:15 a.m. **Break**

## Wednesday (continued)

10:30 a.m. **Physical Security Vulnerabilities at Stations**  
Deborah McLeod, Embedded Logix Inc.

11:15 a.m. **Big Data**  
John Kretschmar, Spartan Utility Sales

12:00 p.m. **Lunch—Lakeside Pavilion**

Presiding: Dean Williams, Duke Energy (Retired)

1:00 p.m. **Central EMC Advanced Grid Analytics (AGA) Project**  
David Chris, Landis+Gyr; TBA, Central EMC

1:45 p.m. **Using Meter Data for Distribution Grid Analytics**  
Kent Hedrick, Landis + Gyr

2:30 p.m. **Break**

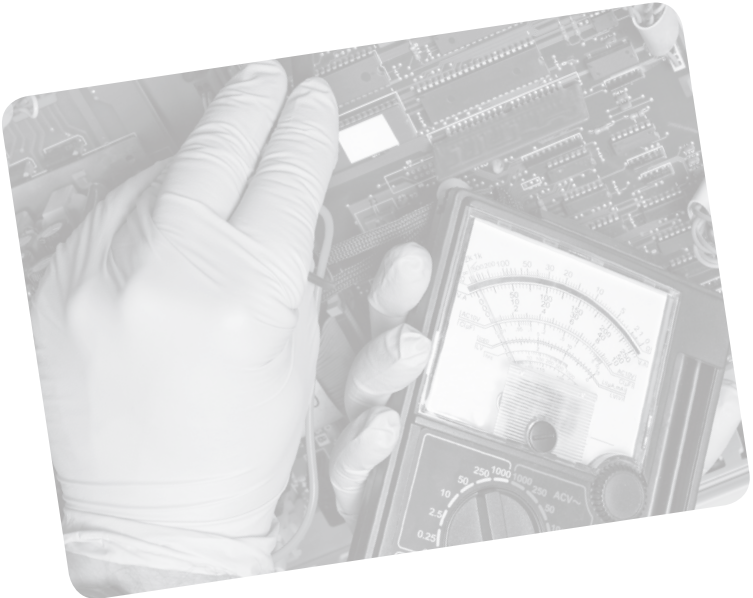
2:45 p.m. **One Year of Using Big Data and Cloud Computing for Improved Reliability**  
Mak Tarnoff, Aclara; TW Allen, Tideland EMC

3:30 p.m. **Substation Asset Monitoring**  
Deborah McLeod, Embedded Logix Inc.

4:15 p.m. **Adjourn/Networking Social in the Exhibit Area**

6:00 p.m. **Networking Social—Palmetto Pavilion**

7:00 p.m. **Banquet—Kensington Ballroom**



# Conference Schedule

Thursday, June 29, 2017

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## SINGLE PHASE—Kensington C

Presiding: Chad Geyer, Anixter

8:00 a.m. **Reference Standards and Traceability**  
Raeann Jackson, Radian

9:00 a.m. **Meter Testing 101**  
Tom Lawton, TESCO

10:00 a.m. **Time of Use and Load Profile**  
Steve Wright, Itron

10:45 a.m. **Break**

11:15 a.m. **All Sessions Combine into General Session**

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## POLYPHASE—Kensington A

Presiding: Bo Lewis, Powertech

8:00 a.m. **ANSI Standards Review**  
Bill Hardy, TESCO

9:00 a.m. **Demand and TOU Metering**  
Jack Pyburn, Honeywell

10:00 a.m. **Break**

10:15 a.m. **Site Verification – Protocols and Tools for AMI Installations**  
Tom Lawton, TESCO

11:15 a.m. **All Sessions Combine into General Session**

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## ADVANCED—Kensington B

Combined Session  
(See Advanced/Management/Emerging Technologies Sessions Agenda)

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## ADVANCED/MANAGEMENT/ EMERGING TECHNOLOGIES COMBINED SESSION—Kensington B

Presiding: Keith McAteer, GE Energy Connections

8:00 a.m. **Panel Discussion, Metering Where Are We Going From Here**  
Tina Pampanelli, Itron

9:00 a.m. **21st Century Power Measurements**  
Bill Hardy, TESCO

10:15 a.m. **Proactive Near Real-Time Phase Outage Monitoring**  
Jon Scott, Prime Stone; Ben Hancock, Georgia Power

11:00 a.m. **Break**

11:15 a.m. **All Sessions Combine into General Session**

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## SUBSTATION & DISTRIBUTION BASIC—Windsor C

Presiding: Dee Byrd, W.R. Daniel & Assoc.

8:00 a.m. **Evolution of Asset Health**  
Sean Dempsey, WESCO, Nand Singh, MinMax Technologies

8:45 a.m. **High Voltage Instrument Transformers**  
Scott Flowers, Ritz Instrument Transformers

9:30 a.m. **Meter Applications in Distribution Systems**  
Brett Cockerham, Schweitzer Engineering Labs (SEL)

## Thursday (continued)

### **SUBSTATION & DISTRIBUTION BASIC** (continued)

- 10:15 a.m. **Three Phase Primary Injection**  
John Musgrove, SMC
- 11:00 a.m. **Break**
- 11:15 a.m. **All Sessions Combine into General Session**

### **SUBSTATION & DISTRIBUTION ADVANCED—Windsor A/B**

- Presiding: Andy Gould, SEL
- 8:00 a.m. **Substation Ground Grid Integrity Testing**  
Steve Greenfield, Safearth
- 8:45 a.m. **Implementing Distribution Loop Schemes**  
John Town, Schweitzer Engineering Labs (SEL)

- 9:30 a.m. **Beyond Smart Metering**  
Scott Laster, Schneider Electric
- 10:15 a.m. **Communications Assisted Islanding Detection**  
Brian Dobb, RFL/Hubbell Power Systems
- 11:00 a.m. **Break**
- 11:15 a.m. **All Sessions Combine into General Session**

### **EMERGING TECHNOLOGIES— Kensington B**

Combined Session  
(See Advanced/Management/Emerging Technologies Sessions Agenda on page 22 after ADVANCED.)

## **General Session—Kensington ABC**

- Presiding: Mike Byrd, Electricities of NC (Retired)
- 11:15 a.m. **Traffic Safety**  
Corporal Sonny Collins,  
South Carolina Highway Patrol
- 12:00 p.m. **Participant Feedback on the School**
- Closing Comments**
- Adjourn**

# Conference Schedule

## Manufacturer Programming Session

### TUESDAY, JUNE 27

8:00 a.m.	_____	Eton
	_____	Oxford
	TESCO _____	Pembroke
	_____	Winchester
	Radian/WECO: Calibration Check _____	Harrow
10:00 a.m.	SATEC: Kyle Farmer _____	Eton
	SEL _____	Oxford
	TESCO _____	Pembroke
	Schneider: Paul Golden _____	Winchester
	Radian/WECO: Calibration Check _____	Harrow
12:00 p.m.	Lunch	
1:00 p.m.	Probewell: Kyle Farmer _____	Eton
	_____	Oxford
	TESCO _____	Pembroke
	_____	Winchester
	Radian/WECO: Calibration Check _____	Harrow
3:00 p.m.	SEL _____	Eton
	_____	Oxford
	TESCO _____	Pembroke
	_____	Winchester
	Radian/WECO: Calibration Check _____	Harrow
5:00 p.m.	Adjourn	

### WEDNESDAY, JUNE 28

8:00 a.m.	SEL: Brett Cockerham _____	Eton
	_____	Oxford
	TESCO _____	Pembroke
	_____	Winchester
	Radian/WECO: Calibration Check _____	Harrow
10:00 a.m.	Programming Session: Itron _____	Oxford
	Programming Session: Landis+Gyr _____	Kensington A
	Programming Session: Honeywell Elster _____	Eton
	Programming Session: Aclara _____	Winchester
	T-Rated Installation Wiring _____	Pembroke
	Radian/WECO: Calibration Check _____	Harrow
12:00 p.m.	Lunch	
1:00 p.m.	SEL _____	Eton
	SEL: Brett Cockerham _____	Oxford
	TESCO _____	Pembroke
	Aclara: Christopher Prince _____	Winchester
	Radian/WECO: Calibration Check _____	Harrow
3:00 p.m.	_____	Eton
	_____	Oxford
	TESCO _____	Pembroke
	_____	Winchester
	Radian/WECO: Calibration Check _____	Harrow
5:00 p.m.	Adjourn	









**Save the date!**

**87th Annual  
NC Electric Meter School and  
Grid Technology Conference**

**June 24-28, 2018**

**Embassy Suites Kingston Plantation  
Myrtle Beach, SC**