UTILITY TECHNOLOGY EDUCATION

Southeastern Distribution Apparatus School and Conference

August 18th - 21st, 2025

The Hotel at Auburn University
and Dixon Conference Center
Auburn, Alabama

Utility Technology Association is a 501c(6) non-profit organization dedicated to the delivery of high quality, practical and comprehensive training designed to meet the needs and challenges of today's electric utility industry.

Southeastern Distribution Apparatus School & Conference

Monday

	Module 100	Module 200	Module 300	Module 400	Module 500
10:00 - 4:00	Registration				
1:00 - 1:30	General Session - Auditorium				
1:30 - 2:30	The Universal Power System: An Evolution John Paserba - *Southern States*				
2:30 - 3:00	Networking Refreshment Break				
3:00- 4:30	Electrical Fundamentals	Protective Grounding	Creating Grid Intelligence with AMI	Preventing Reclosing for Underground Faults	
4:30 - 6:00	Exhibit Hall Opens / Hospitality				

Tuesday

8:30 - 10:00	Power Theory	Capacitor Installations & Operation	Power System SCADA and Smart Grids	Why Grid Reliability Demands New Approaches and Tools Utilizing Mobile Generation Assets for Resilient Operations	Utility Preventive Maintenance & Testing Program
10:00 - 10:30	Networking Refreshment Break in Exhibit Hall				
10:30 - 12:00	Distribution & Substation Equipment Overview	Application of Voltage Regulators	Power System SCADA and Smart Grids - Continued	Executing Large-Scale Distribution Programs Impact of Investment Projects on System Reliability Metrics	Regulator Maintenance & Testing
12:00 - 1:00	Lunch				
1:00 - 2:30	Distribution & Substation Equipment Overview Continued	Distribution Feeder Protection	Operating Through Cyber Compromise	DER Interconnection using STATCOMs Operation of Microgrid through Hurricane Helene	Testing Reclosers and Sectionalizers Battery Maintenance & Testing
2:30 - 3:00	Networking Refreshment Break in Exhibit Hall				
3:00 - 4:00	Fundamentals of Reclosers	Apparatus Equipment Maintenance & Testing	Outage Management - Prepare for Hurricane Season	Serving Data Centers: Opportunities and Challenges	Substation Transformer Testing
4:00 - 5:30	Exhibit Hall / Hospitality				

Knowledge is Power

Southeastern Distribution Apparatus School & Conference

Wednesday

	Module 100	Module 200	Module 300	Module 400	Module 500
8:30 - 10:00	Voltage Regulators	Applications of 600A Underground Connectors	Harnessing AI for Utility Innovation	Emerging Technology: Electrical Grid Smarter and Stronger Supply Chain & Asset Traceability	Transformer Offline Test Result Analysis & Case Studies
10:00 - 10:30	Networking Refreshment Break in Exhibit Hall				
10:30 - 12:00	Lightning Impact in Distribution Systems	Underground Switchgear	MACsec for "Last Foot" Security with Distribution Relaying	Lessons Learned and Tips for Electronic Recloser Utilization	Transformer Field Maintenance Dissolved Gas Analysis
12:00 - 1:00	Lunch				
1:00 - 2:00	Substation Breakers	System Protection: Theory & Applications Series	Smart Grid Relaying: Leveraging the IEC-61850 Protocol	Stray Voltage Investigations	Using Mobile DGA to Safeguard Equipment & Personnel
2:00 - 2:15	Networking Refreshment Break				
2:15 - 3:15	Distribution Transformer Connections	System Protection: Theory & Applications Series - Continued	Battery Energy Storage Systems (BESS) Applications		Maintenance & Testing of Substation Circuit Breakers
3:15 - 3:30	Networking Refreshment Break				
3:30 - 4:30	Infrared Inspections	System Protection: Theory & Applications Series- Continued	Digital and Virtual Substations, What are They?		Cable Rehabilitation Program
5:00 - 6:00	Annual Dinner - Grand Ballroom				
6:00 - 9:00	Casino Royale - Grand Ballroom				

Thursday

8:30 - 9:45	Case Studies on the Use of AI and Utility Data to Create Work Orders & Roll Trucks
9:45 - 10:00	Networking Refreshment Break
10:00 - 11:15	Modernizing Powerline Inspections with UAS & AI
11:15	Closing Session

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Opening Session

The Universal Power System: An Evolution
John Paserba, *Southern States*

The history of the electrical grid is a story of innovation and adaptation. The intricate network of power lines and substations that deliver electricity to our homes, industries, and cities is a marvel of modern engineering. This complex system, known as the electrical grid, has a long and fascinating history. The concept of an electrical grid can be traced back to the late 19th century. The electrical grid's expansion has been a tale of continuous breakthroughs at a varying pace of innovation. The future of the electrical grid lies in becoming smarter and more sustainable. This session will take us where we have been and where we are going.

Module 100: Fundamentals of Distribution System Apparatus

Electrical Fundamentals
Instructor: Mike Chirico, ***Covington Electric Cooperative***
Session on AC and DC circuit theory including ohms law and associated math, circuit components, and current and voltage laws. Included are discussion of the relationship between current, voltage, resistance, impedance, power and energy.

Power Theory
Instructor: Mike Chirico, ***Covington Electric Cooperative***
An expansion of the basic electricity review class – with an elaboration on volts, amps, power factor, etc. Definition and applications of KW, KVA, the power triangle, and calculating power factor.

Distribution & Substation Equipment Overview
Instructor: Keith Hardt, ***Pungo Engineering***
This session will cover generation, transmission, distribution and utilization of an electric grid. Topics include the equipment on the distribution system with discussion on design and function.

Substation Breakers
Instructor: Chad Cassity, ***Georgia Power***
Session will include common functions, types, how breakers work and why the equipment is used. Learn about protection schemes, protective relays and how to bypass breakers. Learn about the different interruption mediums such as oil, SF6 or vacuum. Discusses testing, inspection & sampling practices. Students will learn about the components of dissolved gas analysis testing.

Voltage Regulators
Instructor: Jimmy Smith, ***Howard Industries***
Session will center on how a regulator works and the internal components. Covers how they are used in distribution systems along with basic operation & functions. Covers safety issues such as by-passing & deenergizing regulators. Basic inspection procedures.

Lightning Impact in Distribution Systems
Instructor: Joe Hall, ***CREASTA***
Covers how arresters work and their use in the distribution system. It introduces the student to how lightning and other causes create overvoltage on the system. We also introduce the student to the concepts of BIL (Basic Insulation Level) ratings of equipment / hardware. We discuss the importance of properly grounding the system to make arresters operate properly.

Fundamentals of Reclosers
Instructor: Roger Munay, ***Eaton***
Reclosers are used throughout the power distribution system, from the substation to residential utility poles. They range from small reclosers for use on single-phase power lines, to larger three-phase reclosers used in substations. Learn about the function of these devices.

Distribution Transformer Connections
Instructor: Scott Sligh, ***GRESCO Utility Supply***
Discussion in this class will include components and internal workings of a transformer. Covers how a transformer works and how it is used on the distribution system. Learn the meaning of transformer polarity and how to easily hook up transformer banks using the Arrow System.

Infrared Inspections
Instructor: Chad Smith, ***Coweta-Fayette EMC***
Infrared inspection is a proactive approach to identifying issues in electrical systems before they cause a serious or costly outage. This session will cover the tools used and various findings from inspections.

Module 200: Principles & Applications of Distribution System Apparatus

Protective Grounding
Instructor: Keith Hardt, ***Pungo Engineering Services***
Session gives a comprehensive understanding of the theory and practice of safe electrical grounding principles as it relates to the individual. There will be discussion on the OSHA requirements, understanding ground potential rise, touch and step potential, and vehicle safety along with applications, principles and procedures related to grounding.

Capacitor Installation & Operations
Instructor: Kevin Corcoran, ***Hubbell Utility Automation Trinetics***
Discussion on why capacitors are used in the distribution system and how they work. Defines terms such as working power, non-working power and power factor.

Application of Voltage Regulators
Instructor: Roger Munay, ***Eaton***
Explanation of why voltage regulators are needed and how they work. Topics include the placement of regulators, settings, and effects on the distribution system. Class will cover safety considerations of voltage regulators.

Fundamentals of Distribution Feeder Protection
Instructor: Craig Wester, ***GE Vernova***
Session provides a basic understanding of the principles of relaying and protection of the electric distribution feeder. Topics included in this class are why relays are used, how relays protect the feeder, applications of various types of relays, and relay coordination.

Apparatus Equipment Maintenance & Testing
Instructor: Curtis Boyer, ***Sunbelt Solomon Services***
Keeping transformers and other electrical equipment running smoothly is essential to the success of every utility. This session will cover maintenance and repair procedures along with associated testing requirements.

Applications of 600A Underground Connectors: Junctions, Switchgear, and Transformer
Instructor: David Swafford, ***Southcon***
Learn about the design, installation, and application of 600A dead front separable connectors for UG distribution systems.

Underground Switchgear
Instructor: Robert Reepe, ***Georgia Power***
Pad mounted switchgear provides simplicity and complexity to distribution systems in today's environment. This switchgear discussion covers the design and application of load serving devices in the distribution system. Simple switching systems, simple protection with fuses to complex communication enabled switching and vacuum interruption will be covered as well as design considerations and applications for each category of device. The future of implementing advanced technologies will be included. We will limit the coverage to Medium Voltage Utility Grade outdoor switchgear.

System Protection: Theory & Applications Series
Instructors: Bill Baker, ***Georgia Power;*** **Brad Schafer,** ***GRESCO Utility Supply***
This series of classes will be built on system protection theory and applications. Covered in this series will be station protection, feeder protection and some distribution automation schemes.

The first session presents fundamentals in protection theory, protection practices and presents fundamentals in the Time Current Coordination relationships of devices. Also, the coordination between devices with isolation and restoration techniques.
The second session builds on the foundation on theory and demonstrates the integration of the theory and the devices performing the system protection. Covered in this session will be single and three phase reclosers. Also, will cover how reclosers operate, how they are applied on the distribution system, and how they interact with other devices such as station relays and fuses.

The third session demonstrates the coordination between devices with isolation and restoration techniques. Also, will cover the key differences between electronic reclosers and hydraulic reclosers, and the pros and cons of both options.

Module 300: SCADA & Operational Technology

Creating Grid Intelligence with AMI
Instructor: Bryan Seal, *Wasion*
What is Distributed Intelligence? Using Distributed Intelligence for maintenance, troubleshooting, detecting and monitoring renewable energy, EV, power quality, and to detect grid anomalies – all from the grid edge.

Power System SCADA and Smart Grids
Instructor: John McDonald, *JDM Associates*
Session begins with a brief history of electrical power utility SCADA as well as its use in other industries. All the basic system building blocks are then presented starting with intelligent electronic devices (IEDs), data concentrators, communication links, and master stations. The class includes considerations when building a SCADA system such as budgeting, cost justification, user expectations, staffing, test and commissioning, training, and maintainability. Diving deeper into the system, the fundamentals of SCADA communication will be discussed including protocols, channel types, and cloud services. System design aspects will be described including alarm management, HMI design, integration with our smart grid applications, and time synchronization. Finally, the class will touch on important security considerations. Throughout the talk, the presenter will interject industry best practices and examples from project implementations. Questions and sharing of past experiences are highly encouraged by all attendees.

Operating Through Cyber Compromise
Instructor: Sam Chanoski, *Idaho National Laboratory*
Sophisticated attacks targeting control systems often first appear as malfunctions, misoperations, maintenance problems, or abnormal use of built-in functionality. This session will provide a view of cybersecurity from the Control Center.

Outage Management - Prepare for Hurricane Season
Instructor: Tony Holstein, *Gainesville Regional Utilities*
Learn about how this Florida based utility is working to improve outage management operations to better prepare for hurricane season while providing for a safe and reliable system.

Harnessing AI for Utility Innovation
Instructor: Venkat Banunarayanan, *NRECA*
This session will explore the integration of Artificial Intelligence (AI) into utility operations. Discussion on the potential cybersecurity challenges of AI advancements.

Introduction to MACsec for "Last Foot" Security with Distribution Relaying
Instructor: Michael Albritton, *SEL*
Ensuring end-to-end security through a network includes protecting communications between devices within distribution recloser cabinets. Commonly referred to as edge or last foot security, implementing MACsec locally within routers and relays provides a cryptographic solution that guards networks with vulnerable accessibility. This session provides a basic review of network topology in distribution automation, an introduction to MACsec concepts, and a summary of how to implement solutions to secure end devices. Common problems and hardware solutions will be explored.

Smart Grid Relaying: Leveraging the IEC-61850 Protocol
Instructor: Greg Hataway, *Gridco*
This session will discuss the topic of IEC-61850 in a relatively informal and easy to understand way. The technology promises a lot of things to the industry but is it right for your utility? The session will cover what it is, how it's implemented and how utilities can use it from full implementation to solving a specific issue. It will wind up with some pros and cons and then the opportunity to discuss it in a casual format.

Module 400: Smart Grid, Engineering & Emerging Technology

Preventing Reclosing for Underground Faults
Instructor: Michael Albritton, *SEL*
Protection of overhead and underground distribution lines continues to evolve as feeder configurations continue to become more interconnected. This session will review common approaches to reclosing for both overhead and underground circuits, identify the challenges associated with reclosing sections with underground cables, and offer solutions to detecting faults and improving decisions on reclosing for underground conductors.

Why Grid Reliability Demands New Approaches and Tools
Instructor: James Hobbs, *Safegrid*
Advanced fault monitoring systems are playing a pivotal role in improving grid performance by detecting, predicting, and preventing faults before they lead to outages. Discover three use cases of these systems with multiple utility case studies: Fault Prediction, Fault Detection, and Fault Location.

Utilizing Mobile Generation Assets for Resilient Operations
Instructor: Josh Pepple, *NRTC*
Understand the critical importance of selecting primary and secondary locations for mobile generation deployment, ensuring readiness and reliability in the face of unforeseen events. This presentation will cover the importance of comprehensive planning and documentation to outline the steps for deploying mobile generation assets, emphasizing the need for proactive measures during optimal conditions rather than reactive responses during emergencies.

Executing Large-Scale Distribution Programs: Strategies for Efficiency & Innovation
Instructors: Freddie Wright, *Georgia Power,* Nathan Khan, *Burns & McDonnell*
Learn how Georgia Power executed a large-scale distribution program that focused on their Grid Investment Program and is impact on reliability and service improvements. Discussion on the creation, customer benefits and insights gained from transitioning from a Time & Material Model to a Fixed Price Model for a large-scale investment.

Tracking the Impact of Investment Projects & Programs on System Reliability Metrics
Instructors: Charlie Vance, *1898 & Co.,* Gerald Ramsey, *Georgia Power Company*
Learn about tools created to track the impact of various projects on system reliability performance. GPC is tracking multiple investment programs including: worst performing feeder enhancements, circuit sectionalizing, OH to UG conversions, lateral fuse to recloser changeouts, FLISR schemes, circuit coordination, and cycle or spot vegetation trims. Additional benefits of the tools will also be discussed.

Accelerating Distribution DER Interconnection using STATCOMs
Instructor: Keith Harbison, *AMSC*
Utilities must now enhance their network's capabilities to accommodate DERs, while maintaining efficiency and superior power quality for their customers. See how AMSC's STATCOM equips utilities to address interconnection voltage related issues allowing more DER interconnections without having to build new express feeders or upgrade and reconductor the existing distribution circuit.

Operation of the Hot Springs Microgrid through Hurricane Helene
Instructor: Jason Handley, *Duke Energy*
Walk through the events that led up to and through grid restoration for the town of Hot Springs, North Carolina after Hurricane Helene washed away the town's substation requiring the microgrid to serve the town with only solar and batteries for seven days straight.

Serving Data Centers: Opportunities and Challenges
Instructor: Seth Mitchell, *Greystone Power*
This session will look at how large data centers are contributing to the utilities electric load growth. Discussion on the impact of data centers on the electric grid and the challenges they pose to grid stability and planning.

Transforming the Grid: How Emerging Technology is Making the Electrical Grid Smarter and Stronger
Instructor: Scott Lindsay, *Gridware*
Emerging technologies like real-time monitoring, data analytics, automation, and artificial intelligence are transforming the grid, enhancing efficiency and reliability. Join Scott as he shares real-world use cases where advanced **sensors** and smart-pole technology is driving grid modernization.

SCATE - Supply Chain & Asset Traceability for Energy - IEEE SA -P3476
Instructor: Alicia Farag, *Locusview*
The need for high quality asset data has always been important, but advanced technologies such as ADMS and AI will certainly require more accurate data. Construction is the best time to capture high fidelity asset data, but manually scribing asset serial numbers and ratings is not the solution.

A new IEEE Industry Connections program titled Supply Chain and Asset Traceability for Electric (SCATE) is attempting to solve these problems. The goal of SCATE is to develop industry standards for Unique IDs and Smart Tags for electric grid equipment and materials. Program participants include EPRI, utility companies, manufacturers, and technology companies.

Lessons Learned and Tips for Electronic Recloser Utilization
Instructors: David Nahay, Chris Boos, *Alabama Power*
Drawing from Alabama Power's experience, this presentation outlines key lessons learned and practical tips for the utilization of both three-phase and single-phase electronic reclosers on the distribution system. It reviews general best practices and common challenges, offering potential solutions to effectively address and overcome these issues.

Stray Voltage Investigations
Instructor: Michael Ivey, *Hi-Line Engineering*
Stray voltage complaints to electric utilities often occur at bodies of water, including boat docks and swimming pools. The concept of stray voltages will be discussed, followed by methods of investigation used to search for the root cause. This will include discussion of the tools typically employed and how to interpret the information gathered. Common problems will be presented along with possible solutions.

Battery Energy Storage Systems (BESS) Applications
Instructor: Manish Murudkar, *Cobb EMC*
This session will discuss BESS systems, how and why these systems are being deployed by utilities, and limitations of the technology. Learn about active projects at Cobb EMC.

Digital and Virtual Substations, What are They?
Instructor: Alexandre Piatniczka, *Schneider Electric*
Explore the concepts of digital and virtual substations, their significance in modern power systems, and their alignment with the IEC 61850 standard. Consider how utilities can benefit from these technologies to achieve enhanced measurement accuracy, reduced operational and capital expenses, improved system availability, and increased safety.

Module 500: Equipment Maintenance & Testing

Utility Preventive Maintenance & Testing Program
Instructor: Will Sowell, *Aubrey Silvey Enterprises*
Apparatus equipment maintenance and testing are crucial for ensuring safe and reliable performance of an electric distribution system. Regular maintenance and testing can prevent equipment failures, improve efficiency, and reduce liability in emergency situations. Proper maintenance extends the working lifespan of the equipment. These sessions focus on what to do, when to do it and how to interpret the results along with safety considerations.

Regulator Maintenance & Testing
Instructor: Curtis Boyer, *Sunbelt Solomon Services*
This class will cover how to properly test a Voltage Regulator. Discussion on the types of tests that can and cannot be performed on a regulator. Review of the maintenance performed on the parts with comparisons of worn vs new parts using a working cut away of a voltage regulator.

Testing Reclosers and Sectionalizers
Instructor: Mark Pustejovsky, *Megger*
Self-Powered reclosers like the S&C Tripsaver, ABB Eagle, Hubbell Versatech II, etc... have many settings and once programed these devices should be tested to ensure proper settings were installed and the recloser is operating. The class will go through different testing techniques on how to test these devices as well as perform a demo of this type of testing. The class will also cover testing of single phase sectionalizers.

Battery Testing and Maintenance Through Ohmic and Discharge Testing
Instructors: Swapnil Marathe, Vinayak Sharma, *Megger*
Stationary battery systems serve as the backbone of substation control and protection schemes, ensuring uninterrupted operation during power loss. To maintain operational readiness, utilities must employ reliable diagnostic methods that assess both the internal condition and performance capacity of battery systems. Two complementary techniques—ohmic testing and discharge testing—provide a comprehensive view of battery health.

Substation Transformer Testing
Instructor: Clive Buttrey, *Middle Tennessee Electric*
This session will discuss the various types of tests done on substation power transformers. Initial commissioning and baseline tests, periodic maintenance tests, and post-event tests used to troubleshoot problems will be covered.

Tests listed below will be discussed along with when it is appropriate to conduct each of these tests.

-Core ground resistance
-Insulation Power Factor
-Excitation Current
-Leakage Reactance
-Sweep Frequency Response Analysis
-Winding Resistance
-Transformer Turns Ratio
-Dissolved Gas Analysis

Transformer Offline Test Result Analysis & Case Studies
Instructor: John Foschia, *Doble Engineering*
When testing transformers, there are several off-line electrical tests available for the purposes of diagnostic analysis. While each test provides valuable information about the apparatus, no one test will tell us everything we need to know in order to make a full assessment. In that respect, all tests are an equally important part of a comprehensive test program. This session will cover the purpose and theory of off-line electrical transformer diagnostics, common failure mechanisms, and the analysis of test results.

Transformer Field Maintenance & Repair
Instructor: Greg Taylor, *Southern Transformer Services*
While the three phase padmount and large transformer lead times are still longer than normal for both new purchases and in-shop repairs - now is a time when maintenance and repairs in the field can help to create savings of time and money. This session will cover annual testing for prevention of failure, field repairs such as leaks, bushing replacement, paint, and gaskets. Also review of oil filtration for moisture and gas removal.

Is Dissolved Gas Analysis an Art or a Science?
Instructor: Kayla Whitesel, *Delta-X Research*
Dissolved Gas Analysis (DGA) is widely used as a screening tool for transformer health, often forming the basis for condition assessments and maintenance decisions. However, while DGA provides valuable information, it primarily measures symptoms of underlying issues rather than directly assessing transformer condition. IEEE has even classified DGA interpretation as "more of an art than a science."
Conventional DGA methods rely on percentile-based thresholds, assuming that higher gas concentrations always indicate a worsening condition. However, real-world failure data suggests that this approach is not always reliable – some transformers fail before reaching conventional gas thresholds, while others with high gas levels continue operating for years.
Attendees will gain insight into how a reliability-driven approach can provide a clearer picture of asset health, reduce uncertainty in failure predictions, and optimize maintenance planning.

Using Mobile DGA to Safeguard Equipment & Personnel
Instructor: Lee Doyle, *Vaisala*
This session will describe how Duke Energy utilized a Mobile DGA system to gather real-time data while reducing the risk to personnel who were sent to sites to gather samples from concerning transformers. The system was used at two different substations. The first was to monitor a single-phase transformer who's siblings had already failed and been replaced. The second transformer was a critical distribution transformer that was showing elevated acetylene levels and was on a weekly sampling schedule. During the study of this transformer several through faults were observed in real-time and the transformer was moved up in its replacement schedule. Session take-aways will be

- How to better ensure grid resiliency with a better understanding of transformer health and condition through real time DGA.

- Value of DGA sampling versus online DGA monitoring, and when/where to use them.

- Learn innovative ways to manage maintenance operations more efficiently and effectively.

Maintenance & Testing of Substation Breakers
Instructor: Logan Merrill, *OMICRON Electronics*
This session will explore the critical aspects of maintaining circuit breakers in substations to ensure optimal performance and reliability.
Topics included are utilizing specific test for circuit breakers such as Minimum PU, Timing Test, Contact Resistance and Travel Analysis.

Cable Rehabilitation Program
Instructor: Kris Rubino, *Southwire*
This session will discuss methods and technologies available for the assessment of the condition of the insulated cable systems and tasks generally employed in preventive maintenance programs. Learn about cable rejuvenation and replacement options.

Closing Session

Case Studies on the Use of AI and Utility Data to Create Work Orders & Roll Trucks
Instructor: Tom Lawton, *TESCO*
This presentation will examine how utilities have begun to integrate AI into day to day operations to leverage AMI and other operational data to create work orders and roll trucks. These work orders can ensure that the crews have the proper training and the trucks have the proper equipment to do the job. These work orders can also be prioritized based on safety and operational parameters.

Modernizing Powerline Inspections with UAS & AI
Instructors: Jason Guy, *Buzz Solutions,* Solomon Brackett, *City of Troy Utilities*
New technologies provide significant opportunities for utilities to modernize their inspection processes. Drones and other unmanned aerial vehicles provide dramatic improvements in image capture. Once drone programs ramp up utilities have to address potential resource impacts of analyzing larger quantities of images. Then the challenge becomes integrating the inspection results smoothly into work processes.

This presentation summarizes the learnings from utility projects related to data management, analysis, reporting and integration, including:
* Creating a central repository for storing all inspection images
* Determining what images to capture
* Use of metadata with images
* Knowing when you are ready for AI-automated analysis of images
* Evaluating software and AI technologies
* How to scale inspections programs successfully
* How to measure ROI for modernizing inspections.

Inspections are a common first step in many grid modernization strategies - increasing reliability, improving asset management, reducing O&M costs.