

A Message from the EnergyRight Solutions for Business and Industry (ERSB+I) Team

Greetings,

As technologies continue to advance for commercial and industrial products, TVA's EnergyRight Solutions for Business and Industry (ERSB+I) team is partnering with TVPPA and LPCs in research to find quality, innovative solutions that support customers' desires for technology solutions, productivity improvements, energy products and cost saving opportunities. We have been working to adapt our current offerings to address both you and your customer's needs in a changing energy market.

Many of the products TVA is talking to customers about provide strategic electrification options. For example, changing out a gas furnace for a dual-fuel option or adding electric forklifts to your fleet of gas vehicles will provide many benefits for all involved. These products bring value to the customer through lower energy costs, improved product quality, production efficiency, carbon emission reductions or savings in labor or materials.

Over this past summer, we asked our LPC partners how we could better serve the Valley and assist in positioning them as the Valley's Trusted Energy Advisors. Within this catalog, you will find some tools to do just that. We are offering these classes for both you and your end-use customer to take advantage of—at no additional cost to you!

In an environment where electric load is declining for TVA and many local power companies, it makes sense to research and support technologies that benefit our customers. This can help increase load and/or build in flexibility to help TVA manage the system in the most efficient way to keep rates low. We look forward to working with you during this exciting time of change. Please let us know if there are any specific courses you would like us to consider adding to this list and feel free to reach out with any questions, any time.

Thanks for letting us serve you,

ERSB+I Team



Logistics

These courses will be brought to you by TVA's ERSB+I team at no cost, but will require some assistance from the LPC.

LPCs will be responsible for:

- Securing a location for the training
- Providing food, if desired
- Marketing and outreach for the event.

TVA's ERSB+I Team will provide:

- Registration process
- Speakers
- Presentation
- Handouts/materials, as needed
- Marketing and outreach for the event

These logistics will be discussed in detail when scheduling the events. Please allow a lead time of four to eight weeks, depending on the scale of the event, in order to coordinate logistics and invite participants.

2018 Course Catalog

TECHNOLOGIES

Electrification Technologies: A La Carte

DURATION: Customized
CEUs: Varies
FORMAT: Seminar
DATE: On request, contact ERSB+I

Are you short on time but would still like an overview of some specific smart energy technologies? Training can be customized from the following list so you get the most information possible in the shortest window of time:

- Variable Refrigerant Flow
- Dual Fuel Heat Pumps
- Water Treatment
- Process Heating
- Kitchen Equipment
- Non-Road Electric Vehicles

We will provide a list of benefits and risks associated with each technology. Do you want information on something not already listed? Just let us know—we can look into adding it for you.

Food Service 101

DURATION: Customized
CEUs: Varies
FORMAT: Seminar
DATE: On request, contact ERSB+I

The ERSB+I standard incentive program has a focus on Electric Commercial Kitchen Equipment. This class will provide decision-makers from businesses—such as school cafeterias, restaurants, and grocery and convenient stores—with information on the incentive opportunities available. Topics include detail about the equipment types incentivized by the program, description of electrical equipment benefits beyond energy savings, and explanation of program participation guidelines for a successful project.

Electrification Technologies: A La Carte

DURATION: Customized
CEUs: Varies
FORMAT: Seminar
DATE: On request, contact ERSB+I

The Non-Road Electric Vehicle (NREV) course is designed to increase the awareness and adoption of electrified, non-road transportation assets by promoting electric fuel options over traditional fossil fuel options through education and incentives offered by ERSB+I. Non-fuel based benefits of switching to electric include reduced maintenance, safer and more efficient work atmosphere, less noise, and enhanced environmental profile. Technologies included in this offer are forklifts, Airport Ground Support Equipment (GSE), Heavy Duty Truck Stop Electrification (HD-TSE), Electric Truck Refrigeration Units (eTRUs), and golf carts.



Process Heating

DURATION: Customized
CEUs: Varies
FORMAT: Seminar
DATE: On request, contact ERSB+I

As TVA Industrial customers continue to investigate technologies and methodologies to remain competitive, a common focal point is process heating. Typically, process heat is relatively energy intensive, accounting for a significant percentage of total production cost. This course will cover the basic process heating applications and equipment, and outline opportunities for energy and performance improvements. It is not intended to be

a comprehensive technical text on improving process heating systems, but serves to raise awareness of potential performance improvement opportunities, provide practical guidelines, and offer suggestions on where to find additional help. Performance Improvement Opportunities for Electric-Based Systems may include:

- Arc Furnaces
- Electric Infrared Processing
- Electron-Beam Processing
- Induction Heating and Melting
- Laser Processing; Microwave Processing
- Plasma Processing
- Radio-Frequency Processing
- Resistance Heating and Melting

Water Treatment Electrification Possibilities

DURATION: Customized
 CEUs: Varies
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

Waste water is usually treated with chlorine to remove biological contaminants. Chlorine is potentially harmful to employees and can cause corrosion to equipment and storage facilities over time. These undesirable impacts, along with the cost of procurement, have led some wastewater treatment facilities to seek alternatives. Often the best option available for biological control is ultraviolet (UV) irradiation, provided by high intensity lighting. This is an example of a smart electro-technology that may result in lower operating costs, less wear and tear, and worker safety.

In this course, attendees will learn how the technology works, how to calculate the cost impacts, and review case studies where the

installation of UV irradiation has been installed.



BUILDING OPTIMIZATION

Building Envelope Leakage/Infiltration – Air, Moisture and the Problems They Cause

DURATION: 1 Hour
 CEUs: 0.7 IACET
 FORMAT: Webinar
 DATE: On request, contact ERSB+I

Building problems related to moisture and air leakage/infiltration often manifest themselves in occupant discomfort, indoor air complaints, and stained or cupped ceiling tile issues, adding to building operations staff workload. The integrity of the building envelope and the operation of the HVAC systems are critical to understanding how these moisture-related intrusions occur and the root cause of these types of problems. The building envelope and its interaction with the HVAC systems may be frequently overlooked by operators otherwise busy with day-to-day responsibility of building systems. This webinar will examine the role that the building envelope and its interaction with the HVAC systems play in ensuring both occupant comfort condition, improving energy efficiency, and lowering cost of operation.

Recorded Apr. 19, 2017.

Speakers: Ed Simpson, Building Commissioning Authority, TESTCOMM, and Jay Enck, CTO and Principal, CxBGS

Building Re-tuning without a Building Automation System

DURATION: 1 Hour
CEUs: 0.7 IACET
FORMAT: Webinar
DATE: On request, contact ERSB+I

Sometimes integration of building systems using a building automation system (BAS) is not viable, especially when dealing with older buildings and/or medium-sized buildings with modest complexity. This webinar will discuss methods for using low-cost data gathering methods and repeatable methodologies to identify opportunities for operational improvements.

Recorded Oct. 18, 2018. Speaker: Paul Reale, M.Sc., LEED AP, The City University of New York Building Performance Lab

Building Scoping for Operational Improvement

DURATION: 1 Hour
CEUs: 0.7 IACET
FORMAT: Webinar
DATE: On request, contact ERSB+I

Four individual lessons focus on creating a prioritized scope of work for finding opportunities for energy saving operational adjustments. Content includes presentations and group discussions as well as hands-on information gathering and analysis. Participants will be required to work through an e-learning module as well as collect and analyze data from their facility prior to attending the class.

Efficient Lighting Fundamentals

DURATION: 1 Hour
CEUs: 0.7 IACET
FORMAT: Webinar
DATE: On request, contact ERSB+I

Five individual lessons cover lighting fundamentals and principles of efficient lighting, including: evaluation of lighting levels; fixture and control technologies; retrofit and redesign options; and required maintenance to reduce energy use

associated with lighting while maintaining recommended lighting levels needed for productivity and safety.



New Technologies for Lighting Retrofits and Upgrades

DURATION: 1 Hour
CEUs: 0.7 IACET
FORMAT: Webinar
DATE: On request, contact ERSB+I

New technologies in commercial lighting come rapidly. Manufacturers are eager to offer lighting technologies that reduce energy use, offer superior lighting quality—or both. For building operators, the trick is to know when a new technology is ready to deliver on its promise and where it is most effectively used. This webinar will scan the horizon of new lighting technologies and offer insights on performance and application.

Recorded Feb. 15, 2017. Speaker: Eric Strandberg, Sr. Lighting Specialist, Lighting Design Lab

Operational Improvements using Building Automation Systems

DURATION: 1 Hour
CEUs: 0.7 IACET
FORMAT: Webinar
DATE: On request, contact ERSB+I

The building automation system (BAS) not only schedules and dynamically controls the operation of the building, it is also a repository of critical data on how the building has operated over time and its environmental and occupancy conditions. As such, the BAS can be a critical tool in troubleshooting building performance problems and identifying operational changes that can improve energy efficiency. This webinar will demonstrate how to

visualize and analyze BAS data to identify opportunities to improve occupant comfort and reduce energy use by focusing on the three basic S's of controls—Schedules, Setpoints, and Sequences.

Recorded Mar. 22, 2017. Speaker: Pete Segall, Energy Services Manager, ATS

Troubleshooting Common Air Handler Problems

DURATION: 1 Hour
 CEUs: 0.7 IACET
 FORMAT: Webinar
 DATE: On request, contact ERSB+I

Air handlers may be among the simplest pieces of equipment that HVAC technicians and operating engineers deal with—but nothing in the field is ever as simple as it seems. A malfunctioning air handler can cause huge comfort and energy efficiency problems for building owners and occupants. Understanding the most common problems with air handlers can be a good starting point for addressing the problem and making the repair. This webinar will review common problems encountered with air handlers, from dirty and clogged filters to broken belts, fan rotation, and motor failure, then introduce tools for verifying operation and approaches to correcting problems. Hear from two experienced industry professionals about strategies they use to make fast and efficient repairs.

Recorded May 17, 2017.
 Speakers: Kevin Fish, Sr. Associate, Strategic Energy Group, and Scott Lindquist, Operations Manager, University of New Hampshire



Benefits of PPN

DURATION: 1 Hour
 CEUs: None
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

The Preferred Partners Network (PPN) is an exclusive network of approved commercial and industrial trade allies. PPN members are experts in their field, provide sound advice on energy-saving investments, install energy saving equipment and guide participants through the process of applying for incentives throughout the Tennessee Valley Authority (TVA) service area. This course will provide an in-depth look at the benefits and new initiatives of the PPN program.



Introduction to Energy Audits

DURATION: 1 Hour
 CEUs: None
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

For over four decades, TVA has offered on-site energy assessments, commonly called “Energy Audits,” to help business and industry customers thrive in the Valley. Primarily offered in partnership with Local Power Companies, TVA’s Comprehensive Services Program (CSP) has employed engineers qualified to conduct these audits for TVA direct- and LPC-served customers. But what is an energy audit? How detailed are they and what good are they really doing? In this session, we will explore the components of a successful Energy Audit such as:

- Definition of an Energy Audit
- Billing History Analysis
- Energy Usage Profiles
- Low/No Cost Recommendations
- Analysis and Recommendations

- Financial Analysis (playback calculations)
- Audit Related Certifications
- Distinguishing the CSP offering

These sessions will be offered by an instructor who has performed energy audits for customers so live Q&A should be particularly valuable.

EPRI: Big Picture

DURATION: 1-2 Hours
 CEUs: None
 FORMAT: Seminar
 DATE: On request

Part of fulfilling TVA’s mission of delivering low-cost, reliable energy and furthering economic competitiveness in an environmentally respectful manner includes looking at innovative solutions to today’s complex problems. In times past, TVA was much larger and conducted research and development with internal staff. In our new, leaner position, TVA leverages research dollars with other utilities across the United States and around the globe. Since 1972, TVA has enjoyed an excellent partnership with the Electric Power Research Institute (EPRI). EPRI membership includes 90% of electric utility revenue generated in the U.S. and extends participation in over 35 countries. In this course, attendees will learn about the benefits from the EPRI partnership and our specific work in the Electrification space.

EPRI: Deep Dive into Electrification

DURATION: 1-2 Hours
 CEUs: None
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

In 2017, Electric Power Research Institute (EPRI) began a national effort toward the promotion of electro-technologies solving customer problems and minimizing environmental impacts of the ever-growing industrial world. In addition, TVA recently engaged with EPRI to prepare an ‘Electrification Potential Study’ for the TVA service territory. In this session, attendees will learn what EPRI discovered in their national effort regarding impactful electro technologies. We will share the potential impacts of 30 of these technologies specifically within the TVA

service territory. This is intended as an effort to identify and share specific technologies which will have the greatest impact for TVA/LPC end-use customers.

Fundamentals of Compressed Air Systems (Level 1)

DURATION: 8 Hours
 CEUs: 0.8 IACET
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

This one-day introductory course is designed to teach facility engineers, operators and maintenance staff how to achieve 15-25% cost savings through more effective production and use of compressed air. Participants will learn how to:

- Calculate the energy cost of compressed air in their facility;
- Improve compressed air system efficiency and reliability;
- Identify inappropriate uses of compressed air;
- Establish a baseline by which they can measure improvements in compressed air performance;
- Match system supply to actual production requirements for pressure and flow;
- Find and fix leaks;
- Establish a leak prevention program, and
- Better control compressed air to improve productivity and profitability.

Participants will receive materials to complete prior to the training, which will be used to calculate cost and performance in their own facilities.

Fundamentals of Compressed Air Systems (Level 2)

DURATION: 16 Hours
 CEUs: 1.6 IACET
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

This intensive two-day training provides in-depth technical information on troubleshooting and improving industrial compressed air systems. This training will help end users as well as industry solution providers learn how to:

- Collect and use data and tools to assess the efficiency and cost-effectiveness of a compressed air system;
- Develop and use a system profile;
- Implement a system maintenance program;
- Address air quality, highest pressure requirements and high-volume intermittent applications;
- Understand complex control system strategies;
- Align the supply side to demand side operation;
- Explain the value of heat recovery; and
- Successfully sell compressed air improvement projects to management.

Participants will receive material to complete prior to the training, which will be used to calculate cost and performance in their own facilities.



HVAC

DURATION: 1 Hour
 CEUs: 0.1 IACET
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

Commercial facilities have a variety of energy solutions for space conditioning. When determining the most effective system, it is useful to understand the utility's load shape objectives and requirements of the facility. This training provides an overview of HVAC processes and various technologies on the market, as well as technologies that best meet current load shaping objectives, such as Dual-Fuel Heat Pumps and Variable Refrigerant Flow.

How Electrification Can Help Meet Sustainability Goals

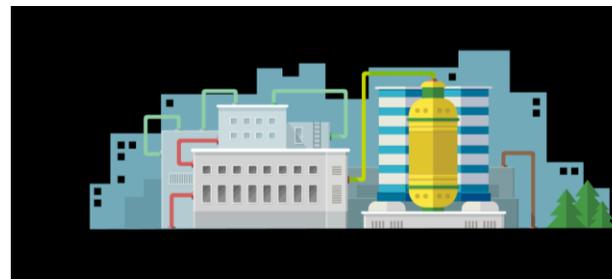
DURATION: 0.5 Hours
 CEUs: 0.1 IACET
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

Did you know that choosing electricity now or even fuel switching today can advance your company's sustainability goals for years to come? Experts agree electricity will play a central role in the low carbon economy, with many businesses and universities already setting goals for zero carbon emissions in the next 3-30 years. Smart electric technologies and energy efficiency work together to reduce fossil fuel consumption, which results in less carbon emissions. Installing electric infrastructure now rather than other fuel types will future-proof your company and provide sustainable long-term solutions for your energy needs.

Introduction to ISO 50001

DURATION: 1 Hour
 CEUs: 0.1 IACET
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

ISO 50001 is an Energy Management System based on the management system model of continuous improvement used for other well-known standards such as ISO 9001 and ISO 14001. This course provides an introduction to ISO 50001, including management responsibility, energy policy, energy planning, implementation and operation, checking, and management review. Activities cover scope, resource assessment, communication roles, and evaluating policy and legal requirements. Attendees will be introduced to key resources and online tools which aid in the implementation of ISO 50001, and will review real world case studies.



Load Shape Profiles

DURATION: 1 Hour
 CEUs: 0.1 IACET
 FORMAT: Seminar
 DATE: On request, contact ERSB+I

Now that TVA has significant reserve margin on our generation capacity, we are more interested in

impacting when customers consume our power. We build our generation fleet to meet the peak system demand, which only occurs for a very few hours per year. However, during the remainder of the year, consumption is far lower than peak. The costs associated with generation assets don't go away when generation assets aren't being utilized, so TVA hopes to increase consumption during off-peak hours. The annual usage of electricity during every hour of the year is called load shape; during this course, attendees will learn about the existing TVA load shape as well as the load shapes for various equipment. TVA will review what ERSB+I is doing in the program space to maximize positive impacts on our system-wide load shape.

Hospitals; Churches; Wastewater facilities and Manufacturers.

Managing Energy in Processes

DURATION: 2-3 Hours

CEUs: Varies

FORMAT: Seminar

DATE: On request, contact ERSB+I

Energy is managed as a controllable expense that is part of other continuous improvement efforts. Within this course, participants will be introduced to a system of organizational practices, policies and processes that create reliable, persistent energy savings by integrating energy management into the way a facility does business. This is distinguished from ad hoc energy management projects (e.g. attending training or installing high-efficiency systems) that are distinct in their own right from other organizational initiatives, but contribute to the overall performance of an industrial facility.

Sector-Specific Training

DURATION: Customized

CEUs: Varies

FORMAT: Seminar

DATE: On request, contact ERSB+I

Sector-specific trainings will be offered upon request for any of the following sectors who want to learn more about how smart energy technologies can specifically benefit them: Commercial; Real Estate; Food Service; K-12 Schools; Universities;

energyIQ VIDEOS



EnergyIQ for Everyone

<https://tva.mediaplatform.com/s/26/191>



EnergyIQ for B+I

<https://tva.mediaplatform.com/s/27/0>

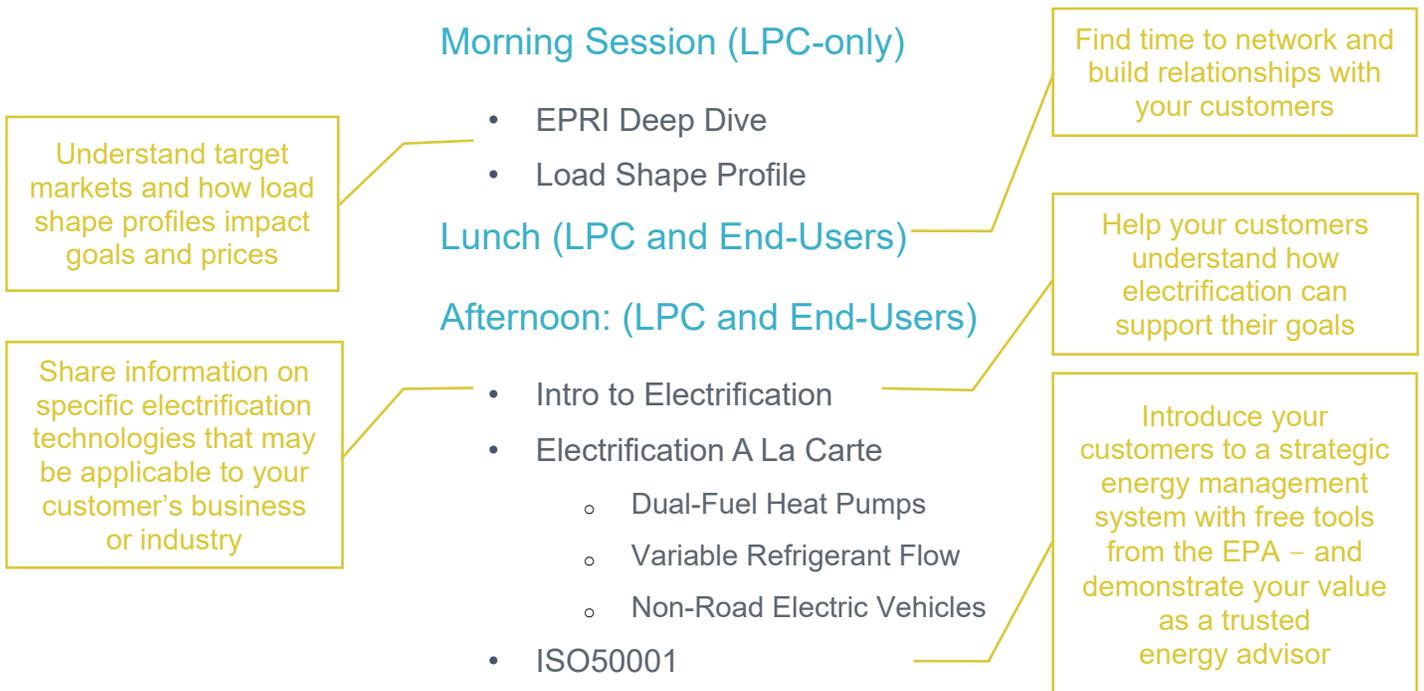


EnergyIQ for LPCs

<https://tva.mediaplatform.com/s/28/512>

Sample Agenda

These courses can be combined to deliver educational value to both you – the LPC – and your customers, while also providing an opportunity to cultivate relationships and demonstrate your value as a trusted energy advisor. Below is a sample of how five courses could be packaged together.



Registration

Schedule your courses today!

A limited number of trainings are available for each LPC.
Email ERSBI@TVA.gov to request trainings for your District.
The ERSB+I team is also happy to work with you to create additional offerings based on your training needs.

