

Electric Utilities 101

Recommended CEUs .6/PDHs 5.5/CPE 6.2 (total for both sessions)
Field of Study: Specialized Knowledge

Session 1: Tuesday, May 19

Noon - 3 pm Eastern

- **Introduction, Agenda Items, Learning Outcomes**
 - Course introduction and expectations
 - Icebreaker activity: What do you want to know about utilities?

- **Section 1: Electricity Basics Review**
 - What is electricity? (Volts, amps, watts, ohms—simple terms)
 - AC vs. DC Fundamentals
 - How the grid works (overview)
 - Power system reliability

- **Section 2: Power Generation 101**
 - Types of generation (fossil, nuclear, hydro, wind, solar, storage)
 - Renewable integration
 - The growing need for storage
 - How power plants work (basic mechanisms)
 - Baseload generation and peak generation
 - Power purchase agreements and independent power producers
 - Introduction to net metering and distributed generation

- **Section 3A: Transmission & Distribution (T&D)**
 - Transmission Systems
 - Grid Overview
 - Transmission system interconnections
 - System Inerties
 - Transmission overhead vs. underground
 - Right of way vs. easement

- **Wrap-up, Knowledge Check, Q&A**
- **Session 1 Adjourns**

Session 2: Thursday, May 21

Noon - 3 pm Eastern

- **Recap from Session 1; Agenda for Day 2**
- **Section 3B: Transmission & Distribution (T&D)**
 - Role of substations
 - Substation components
 - Types of distribution systems
 - How transformers work
 - Billing kilowatt-hours
 - Grid reliability, outages, and restoration
 - Types of reliability options
 - Causes of outages
 - Power restoration process
 - Smart grid and modernization
 - Advanced Distribution Management System (ADMS)
 - Supervisory Control and Data Acquisition (SCADA)
 - Distributed Energy Resources
 - Volt-Var Optimization for voltage control
- **Section 4: Clean Energy Basics**
 - Energy transition from fossil fuel to renewable
 - Renewable integration and challenges
 - Electrification of transportation and buildings
 - Storage and emerging technologies
- **Section 5: Customer Experience**
 - Real life examples of batteries, load profiles and rate implications:
 - AMI, time of use, max load calculations, load factor calculation
 - Utility scale batteries – cost analysis
 - Large power rate examples

- **Section 6: Challenges & Opportunities**
 - Grid resilience (cybersecurity, physical grid threats)
 - Supply chain and workforce challenges
 - Innovation and technology outlook
 - Future workforce and skills

- **Wrap up, Q&A, Course Evaluation**

- **Course Adjourns**