EPRI

EPRI T&D LAB:

LENOX

One of the best ways to understand how a line or substation asset performs is through specialized lab testing. The purpose-built test site at EPRI's laboratory in Lenox, Mass., gives transmission and distribution (T&D) engineers the ability to evaluate new and existing designs, approaches, and assets enabling utility engineers to improve the way that they design and manage the T&D system.

EPRI and its Lenox Lab have played a vital role in the energy industry by conducting experimental and technology application research in high-voltage T&D environments. The unique facilities, located in a rural setting, features outdoor test lines and substations impacted by all four seasons.

Researchers use the Lenox Lab to evaluate new technologies as well as perform forensic studies and tests on existing assets. The results of an EPRI lab or field test are designed to help you understand the performance of new and existing technologies, enabling you to make better decisions.

LAB OVERVIEW:

- Full Scale Indoor and Outdoor High Voltage Testing
- Accelerated Aging of T&D Assets and Monitoring Systems
- Full Scale Distribution Structure Resiliency Testing
- Distribution Automation Testing
- Manhole Explosion Events
- Unmanned Aerial System (UAS) Testing
- Mechanical Testing of T&D Components

STAFF CAPABILITIES:

The laboratory utilizes EPRI's world class subject matter experts together with skilled technicians.

Areas of expertise include:

- Line and Substation Insulation Coordination
- Insulation Contamination and Aging
- Distribution Automation
- Transformer Monitoring and Diagnostics
- SF6 & Alternatives
- Unmanned Aerial Systems and Robotics
- Distribution resilience
- Underground distribution

FAST FACTS:

Location:
Lenox,
Massachusetts, USA

Indoor Size:
24,000 sq feet

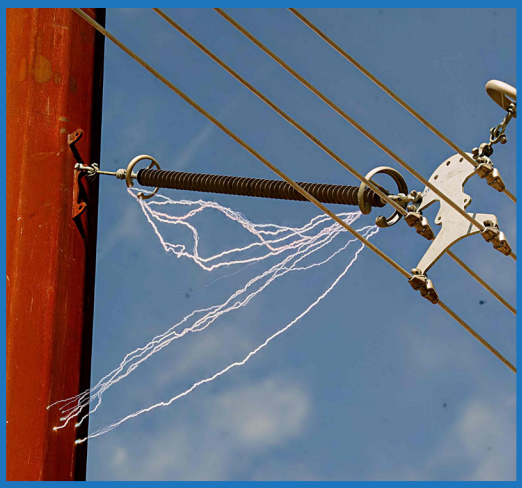
Outdoor Size:
35 acres

Staff:
3+ dozen researchers

60+ years in operation

DETAILED LAB CAPABILITIES:

- High Voltage Testing, including:
  1 and 3 phase AC up to 1200kV
  1500kV DC (± 750kV DC)
- Lightning and Switching Impulse Testing (multiple generators up to 5.6MV)
- Multiple Configurable Test Lines and Structures
- Corona Cage
- Bushing and Underground Termination Test Setup
- 138kV Research Substation
- T&D Component Aging
- Composite Structure Aging
- 230kV Accelerated Aging Chamber
- Saft Fog Aging Chamber
- Full Scale Distribution Testing
- Cross Arm Testing
- Distribution Automation Loop
- Pole Strength Testing
- Wildfire Resistant Design Testing
- MV Termination Cable Testing
- Stray and Content Voltage Detection
- Manhole Events
- Equipment Flammability
- Live Downed Conductor and High Impedance Fault Detection
- Arc Flash Test Site
- Unmanned Aerial System (UAS) Testing
- Impact of Electric and Magnetic Field Testing



RESEARCH IN ACTION:

Simulated tree strikes on full-scale distribution structures at the Lenox Lab, replicating what happens when destructive storms sweep through, helped utilities improve designs that could reduce repair time by as much as 80%.

EPRI's Overhead Distribution Structure Resiliency research informed modifications to construction standards and hardening efforts. This study examined more than 1,000 outages events for vegetation and construction information.

Through thorough and rigorous testing at the outdoor lab, the study identified multiple opportunities to increase resilience against storm and vegetation issues. The research application improved thirteen existing construction standards and created eight new construction standards designed to harden distribution systems against vegetation related damage.