

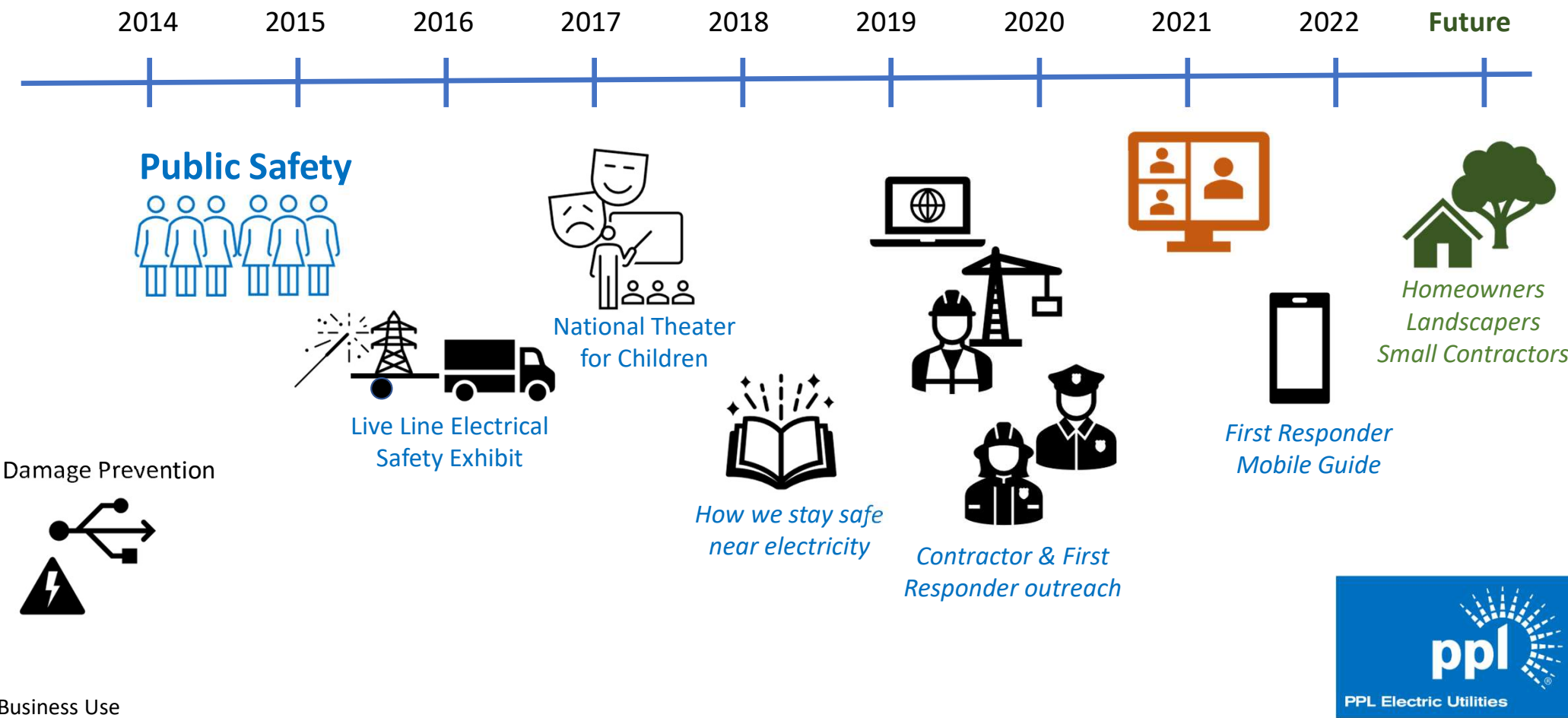
WELCOME



PPL Electric Utilities

Paul Ward
Senior Director - Business Services

Evolution of Public Safety





PPL Electric Utilities

**Doug Haupt
Supervisor – Public Safety**



PPL Electric Utilities

ADAPT

IMPROVISE

OVERCOME



"If you want to go fast, go alone; ...

...but if you want to go far, go together."

**None of us
are as SMART as**

**ALL of
US!**





Direct Mail Flyers

Online Web Sites

First Responder Training

'Tips of Trade' Messages

Culver Company: Experts in Strategic Planning for Utility Public Safety Outreach

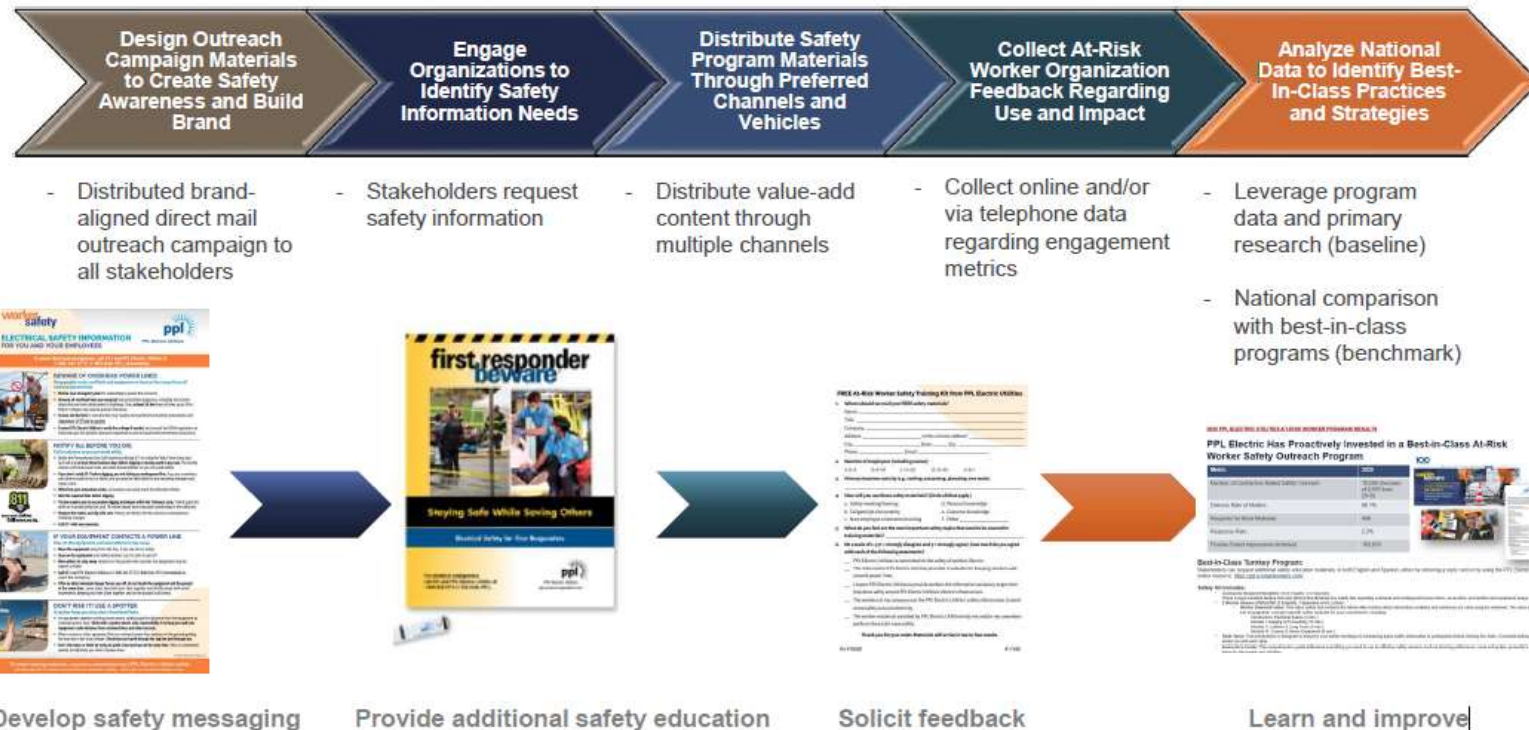
Services

- **Utility public safety awareness program design, implementation, evaluation, and refinement**
- **Litigation and regulatory support**
- **Public safety risk assessment and tactical solutions to fill gaps**
- **Risk management reporting**
- **Primary research on program effectiveness (national benchmarks and company baseline)**



METHODOLOGY

Culver Company's Best-in-Class Program Methodology Utilized by PPL Electric Utilities





[Order FREE Materials](#)

[Safe Practices](#) ▾

[Videos](#) ▾

[Tips of the Trade](#)

[Safety Quiz](#)

[Case Studies](#)

[FOR INSTRUCTORS >](#)

worker beware®

WELCOME

PPL Electric Utilities invites you to become an e-SMART worker. Check out our training tips, videos and case studies. Each of these is designed to help you and your team work safely around electric lines.

WORKER SAFETY

Electrical Safety

[Electrical Safety Online Certification Course](#)

[Free Safety Kit](#)

[Resources](#)

[Home](#)

first responder beware®

WELCOME

Firefighters, police and EMTs are typically first on the scene in an emergency and face the greatest risk from electrical hazards.

Understanding the potential dangers and learning how to deal with them correctly makes your crew and the public safer.

FIRST RESPONDER SAFETY



Electrical Safety

This section provides safety tips for responding to some common electrical emergencies.



Electrical Safety Online Certification Course

Earn a certificate that demonstrates your knowledge of electrical safety with this FREE online course.

OVERVIEW OF PPL/CULVER COMPANY PARTNERSHIP

PPL Electric Utilities Accomplishments with Culver Company—A Decade Standing Relationship

At-Risk Worker

- Best-in-class program (website, mailer, and safety kits)
- Tips of the Trade (skipped 2021 due to budget)



First Responder

- Best-in-class program (website, mailer, and safety kits)
- Tips of the Trade (skipped 2021 due to budget)
- Brand-aligned certificate-based e-learning website for first responders to complete self-paced electrical safety modules
- Created a 12-member First Responder Advisory Panel



School

- Brand-aligned Website



Advising

- Strategic roadmap with 3-year plan and recommendations



2021 PPL ELECTRIC UTILITIES AT-RISK WORKER PROGRAM RESULTS

Program Overview: Targets At-Risk Excavators/Contractors with Direct Mail Outreach and Digital Resources

- April 6, 2021: Culver Company distributed PPL Electric Utilities brand-aligned electrical safety education to approximately **22,477 at-risk worker organizations**.
 - Three segmented mailers: tree workers, roofers, and general contractors
- The outreach included an electrical safety poster that was designed to be hung at the workplace or kept in their vehicles for reference.
- Stakeholders were encouraged to request additional safety education materials by either returning a postage-paid business reply card or using the PPL Electric Utilities at-risk worker website: <https://ppl.e-smartworkers.com/>.
- This website provides a single interactive location that
 - Shows at-risk workers how to work safely around electric utilities through educational modules, streaming videos, case studies, and a safety quiz.
 - Provides safety instructors with tools and resources they can use to conduct effective utility safety meetings, including downloadable slide shows, presenter's notes, and instructor's guides.
 - Allows customers to request safety materials.



**Program Includes:
Outreach
Mailers, Safety
Kit, and Website**



2021 PPL ELECTRIC UTILITIES AT-RISK WORKER PROGRAM RESULTS

PPL Electric Has Proactively Invested in a Best-in-Class At-Risk Worker Safety Outreach Program

Metric	2021
Number of Contractors Mailed Safety Outreach	22,477 (increase of 2,921 from 2020)
Delivery Rate of Mailers	93%
Requests for More Materials	435
Response Rate	1.9%
Positive Brand Impressions Achieved	78,578



Best-In-Class Turnkey Program:

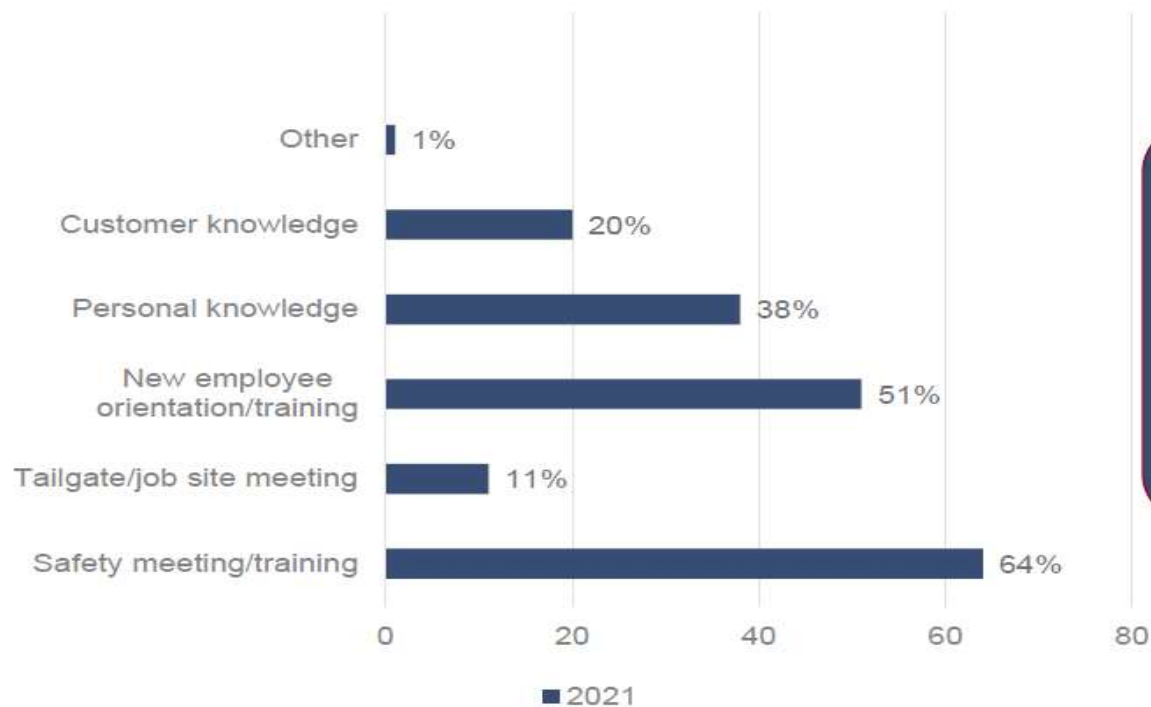
Stakeholders can request additional safety education materials, in both English and Spanish, either by returning a reply card or by using the PPL Electric Utilities online resource: <https://ppl.e-smartworkers.com/>

Safety Kit includes:

- Contractor Beware® Booklets (10 in English, 5 in Spanish)
These 8-page booklets feature full-color photos that illustrate key safety tips regarding overhead and underground power lines, excavation, and spotter and equipment usage.
- 2 Worker Beware DVDs/USB (1 English, 1 Spanish) with videos and a slide shows

At-Risk Workers Value the Information, Utilizing the Materials for On-the-Job Safety

How Are the Materials Used?



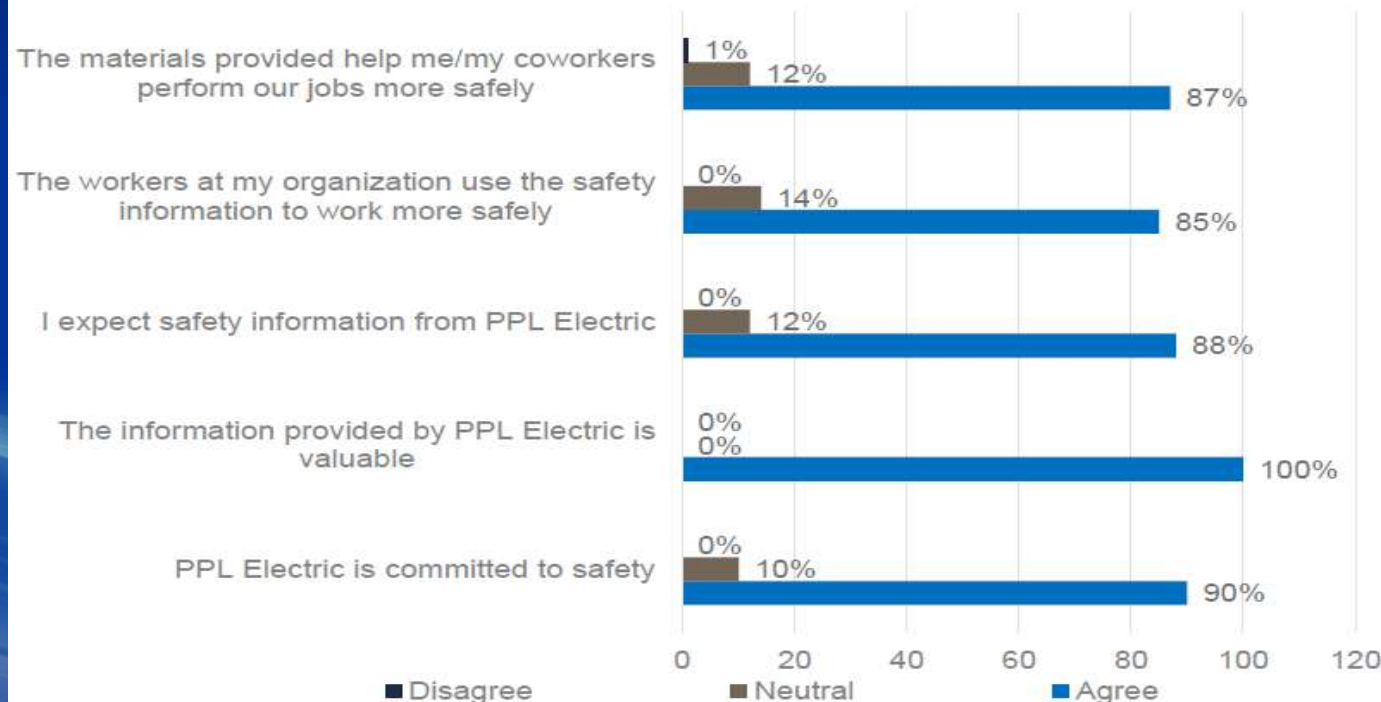
Stakeholders are using the materials more for personal knowledge and customer knowledge more than ever

Source: PPL Electric Utilities program data, program year 2021 n= 43

Note: Total may not equal 100% because some respondents provided more than one response.

2021 PPL ELECTRIC UTILITIES AT-RISK WORKER PROGRAM RESULTS

Strategic Safety Communication Programs Positively Impact At-Risk Worker Knowledge and Benefit Utilities' Image




2021 saw a higher number of neutral opinions, which could reflect the requests for the first time by stakeholders

Source: PPL Electric Utilities program data, program year 2021 n= 432




'Tips of the Trade' Messages



PPL Electric Utilities


March 2022

TIPS OF THE TRADE



Safely Exposing Buried Utilities

You've called 811, you've waited at least **three business days** and you're sure all buried utility lines on your job site have been located and marked. Now you can use your mechanized equipment to begin excavating, right? Not so fast.



Order our COMPLIMENTARY worker safety kit on the PPL Electric Utilities e-SMARTworkers website.

[ORDER KIT >](#)

Buried power lines and other facilities can be easily damaged and are dangerous to contact. Before you can safely work close to an underground utility line with mechanized digging equipment, you must see the line with your own eyes:

- First, use only hand tools, like shovels, or other nonintrusive methods to expose the line. You must hand expose within the "tolerance zone," a safety area that spans the width of a marked utility plus 18 inches from each indicated outside edge in Pennsylvania.
- Then, and only then, can you begin power digging. Be sure to work with a spotter whose only job is to keep mechanized digging equipment away from buried facilities.

Always contact www.pa1call.org before digging and for the most current requirements.

Hand Dig with Care

Take care to prevent damage by using a rounded or blunt-edged shovel—and be sure you use a fiberglass shovel when digging around buried electric lines. Never use sharp tools like pickaxes, mattocks, pry bars or pointed spades, which may gouge or puncture utilities.

Begin digging off to the side of the marked utility line. Use a gentle, prying motion to break away soil as you approach the line laterally. **Never pry against a utility line to remove soil, stab at the soil or stomp on the shovel with both feet.**


Report ALL Damage

Even a slight gouge, scrape or dent to a utility line or its coating may interrupt service or cause a hazard. Contact with a gas pipeline may not be immediately dangerous but may lead to leaks, fire or explosions later. Protect all exposed utility lines and check them regularly for damage. Before you backfill, check them again. If you contact a utility line, report it to us immediately so that our crews can inspect the line and make the necessary repairs. (If gas is leaking, the law requires that you call 911.)


Would You Like to Know More?

Additional utility safety tips, case studies, instructional videos and educational tools can all be found, at no charge to you, on PPL Electric Utilities' website.

For more contractor safety information, visit ppl.e-smartworkers.com.




For electrical emergencies, call 911 and PPL Electric Utilities at 1-800-342-5775 (1-800-DIAL-PPL).



PPL Electric Utilities

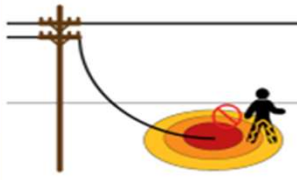
March 2022

TIPS OF THE TRADE



Downed power lines and step potential

Step potential is the voltage difference between the two feet of a person standing near an energized, grounded object. This invisible hazard can be deadly for anyone in the vicinity of a downed power line.



To order our COMPLIMENTARY first responder safety training kit, visit the PPL Electric Utilities e-SMARTresponders website.

[ORDER KIT >](#)


How step potential happens

When a power line contacts the earth, it carries electric current into the ground. If the voltage is strong enough, the current will spread out from the point of contact. Voltage will be highest at the point of contact and will diminish with distance from that point. (Voltage levels may vary with ground conditions and the conductivity of the soil.)

If you walk across this energized area, the voltage between your feet will differ. Electricity will use your legs as a path to travel from an area of higher voltage to an area of lesser voltage, resulting in electrocution or serious injury.

The shuffle technique is key

If you are in the vicinity of a downed power line, you must make small, shuffling movements with your feet close together and in contact with the ground at all times. Do NOT take large steps, and do NOT allow the heel of one foot to pass the toes of the other. These precautions ensure both feet remain in areas of similar voltage.



Continue shuffling until you are at a safe distance: **at least 100 feet** away from a downed power line. Always maintain the maximum distance possible from any downed line.

Distance is your best protection


Downed power lines can be energized even if they don't hum or spark, and even lines that appear dead could become re-energized at any moment. If you know or even suspect that a power line is down, contact PPL Electric Utilities immediately and take these precautions:

- Keep yourself and all vehicles and equipment **at least 100 feet** away from ALL downed power lines and any objects that may be energized.
- Do NOT rescue anyone in proximity to a downed power line until the PPL Electric Utilities representative confirms the line has been de-energized.
- Maintain a safety perimeter to keep the public far away from the area until PPL Electric Utilities personnel give the all clear.

Would you like to know more?

Additional utility safety tips, case studies, instructional videos and safety education tools can all be found, at no charge to you, on PPL Electric Utilities' e-SMARTresponders website.

For more first responder safety information, visit ppl.e-smartresponders.com.



In an electrical emergency, call PPL Electric Utilities at 1-800-342-5775 (1-800-DIAL-PPL).

2021 PPL ELECTRIC UTILITIES FIRST RESPONDER PROGRAM RESULTS

Emergency Officials Were Provided with Resources About Safety and the Opportunity to Complete Online Safety Education

- April 6, 2021: Culver Company distributed PPL Electric Utilities brand-aligned electrical safety education to approximately **2,810 first responder organizations**.
- Stakeholders were encouraged to request additional safety education materials by either returning a postage-paid business reply card or using the PPL Electric Utilities first responder website: <https://ppl.e-smartresponders.com/>
- In addition, the first responder website provides an interactive e-learning resource where participants can complete a robust, certificate-based education course



first responder beware

PROTECT YOURSELF, YOUR CREW AND THE PUBLIC.
Require your employees to follow the enclosed safety practices when they work around electric lines.

ppl
PPL Electric Utilities

Free safety poster inside!

Order Your First Responder Safety Kit

Kit includes:

- 15 Booklets – This booklet features bold photos and clear text to help teach firefighters, EMTs, police and other emergency professionals about safety near utility lines. Information includes vehicle rescues, substation fires and what to do if equipment contacts a utility line.
- 1 DVD – The DVD contains the First Responders & Electrical Hazards video. It covers everything first responders must know to respond effectively in emergencies that involve electricity. It includes substation emergencies, downed wires, fire apparatus and overhead wires, car/pole accidents, pole fires and structure fires. The DVD also contains a training slide show with presenter's notes and trainer's guide—everything you need to run an effective safety training session.

Orders are filled on a first-come, first-served basis and supplies are limited, so order today. Materials will arrive in two to four weeks.

Detach the poster above this section, and hang in a prominent place.

e-SMART First Responder Website

To order training materials, request a presentation by a PPL Electric Utilities safety professional or learn more about first responder safety, visit ppl.e-smartresponders.com.



ppl.e-smartresponders.com

First Responder Beware® website includes:

- Overhead line safety
- Car/pole accidents
- Downed power lines
- Substation fires

Training Tools

- **Safety trainer's guide:** Step-by-step instructions for an easy, effective safety training session.
- **Slide show with presenter's notes:** A 15-minute presentation of critical safety tips, along with talking points to support the slide show.

ppl
PPL Electric Utilities

2021 PPL ELECTRIC UTILITIES FIRST RESPONDER PROGRAM RESULTS

PPL Electric Utilities Has Proactively Invested in a Best-in-Class First Responder Safety Outreach Program

Metric	2021
Number of First Responders Mailed Safety Outreach	2,810
Delivery Rate of Mailers	98%
Requests for More Materials	301
Response Rate	10.8% (increase of 1.7% from 2020)
Positive Brand Impressions Achieved	45,909



Best-In-Class Turnkey Program:

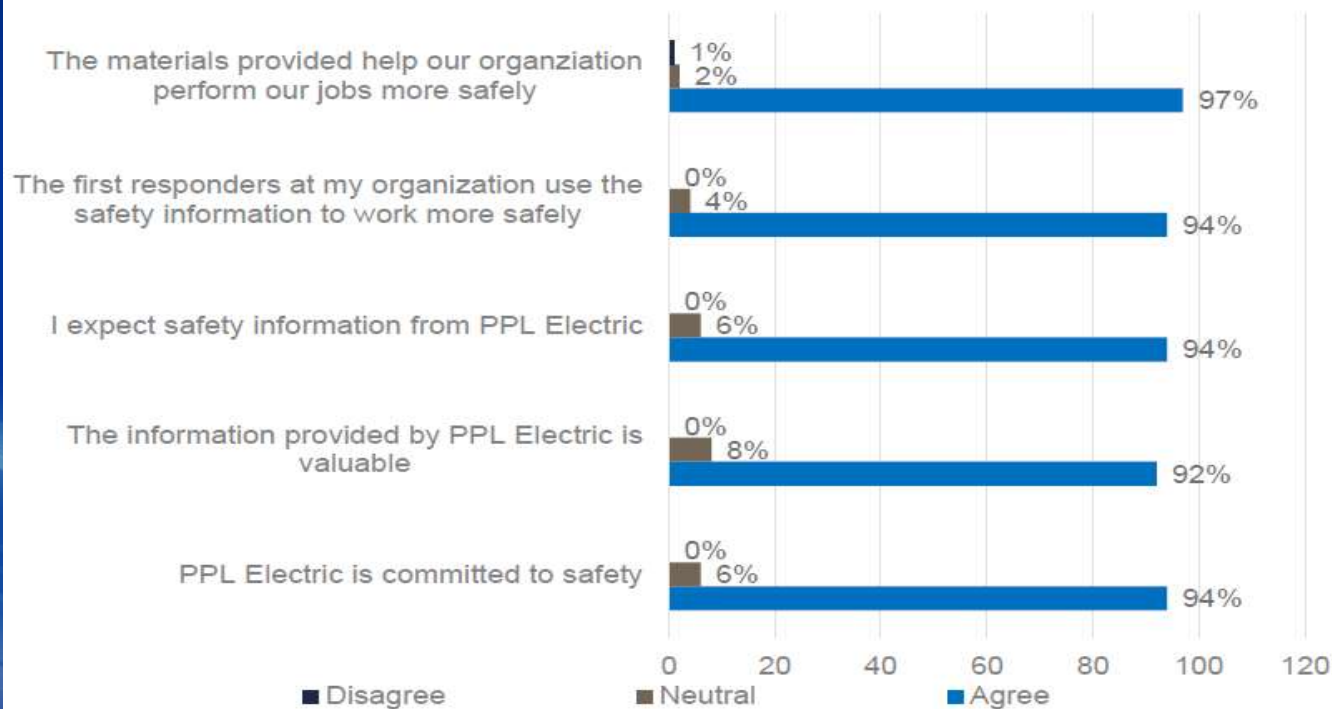
Stakeholders can request additional safety education materials either by returning a reply card or by using the PPL Electric Utilities online resource:
<https://ppl.e-smartresponders.com/>

Safety Kit includes:

- *First Responder Beware Booklet*
- *1 First Responder DVD/USB*

2021 PPL ELECTRIC UTILITIES FIRST RESPONDER PROGRAM RESULTS

Strategic Safety Communication Programs Positively Impact At-Risk Worker Knowledge and Benefit Utilities' Image



Source: PPL Electric Utilities program data, program year 2021 n= 67



Electrical Safety

ELECTRICAL SAFETY CERTIFICATION

Free Safety Kit

Resources

[Home](#)

Electrical safety certification

PPL Electric Utilities

Electrical safety certification

This self-directed safety education program helps emergency responders learn to safely identify and respond to electrical hazards. The program consists of four modules, which you can complete at your own pace, followed by online interactive quizzes that test your knowledge. To receive certification, you must complete all four modules with a score of 80% on the quizzes, and you will earn a personalized certificate of completion. This program is required by your department.

This program is not intended as a substitute for formal safety training. It is intended to help you and your department stay up-to-date on the latest safety information.

Electrical safety course

This self-directed safety education program helps emergency responders learn electrical safety concepts through interactive educational modules that you can complete at your own pace, follow your own schedule, and receive immediate feedback on your progress.

Successfully complete all four modules with a score of 80% on the quizzes, and you will receive a certificate of completion. If you do not pass, you may satisfy additional safety education hours required by your department.

Utilities may provide electricity in your department's response area. If PPL Electric Utilities is in your area, you may request a demonstration of the local electric utility.

This course is designed to meet industry best practices but is not intended as a substitute for training. It is not to be taken in place of, and be sure to follow your department's policies and procedures. Complete when you have finished the course. Let off.

Module 1. A module is considered complete when you have

Please note: This safety education reflects industry best practices but is not intended to replace formal training. To ensure all appropriate formal training has taken place, and be sure to follow your local utility's safety requirements. **Module 1. A module is considered complete when you have completed the program at any time and return to resume where you left off.**



Electrical Safety Online Certification Course

Earn a certificate that demonstrates your knowledge of electrical safety with this **FREE** online course.

2021 PPL ELECTRIC UTILITIES FIRST RESPONDER PROGRAM RESULTS

Many Organizations Were Engaged with the Emergency Official Safety Resources Available

365 individuals from the PPL Electric Utilities service area have completed the e-learning First Responder Certification

- Both fire and law enforcement are represented as participants



How they heard about the PPL Electric Utilities e-learning First Responder Certification	Number of Responses
Course Catalog	40
Email	149
Magazine	15
Direct Mail Outreach	8
Online Advertising	19
Referral (colleague/friend)	39
Presentation	6
Social Media	15

SAFETY CULTURE

A Culture of Public Safety Drives Measurable Improvements Enterprise-Wide



Everything
Connects with



- ✓ **7 years**
- ✓ **125,000+ students in grades K-5**
- ✓ **Over 330 schools**



PPL Electric Utilities



Everything
Connects with



PPL Electric Utilities

What teachers are saying:

“It was great that the students were able to send their questions about electricity and get live answers! The turbine visual for how electricity is made was great...!”

“My kindergartners thoroughly enjoyed the livestream and the activity book.”

Everything
Connects with



**“My students and I absolutely loved
this program! They were extremely
engaged!”**





Pennsylvania 811

A Privately funded non-profit Pennsylvania Corporation

811 Day 2020 - Electric Safety



Via CiscoWebex



PM

K

CS

811Day

Slide 26

LPWO

I would suggest switching out this photo to something clearer. Let me know if you want me to get one.

Lester, Patrick W, 2022-05-12T16:54:53.087



Pennsylvania 811
A Privately funded non-profit Pennsylvania Corporation

Electrical Safety and 811 Presentations

**2020 – 37 Zoom presentations
1,684 Contractors and First Responders**

**2021 – 26 Zoom presentations (6 months)
1,251 Contractors and First Responders**

Public Safety Social Media 2021



MARK SANTAYANA
PPL ELECTRIC UTILITIES

Call 8-1-1



STEVE KRAUSE
PPL ELECTRIC UTILITIES

Downed Wires



DOUG HAUPT
PPL ELECTRIC UTILITIES

Look-Up & LIVE



Pennsylvania 811
A Privately funded non-profit Pennsylvania Corporation

E-Smart Safety Site for Kids

ppl
PPL Electric Utilities

e-SMARTkids

[Home](#) [Get SMART!](#) [Activity Pages](#) [Ask an Expert](#) [Games](#) [Home Inspections](#) [Call Before You Dig](#)

WELCOME! PPL ELECTRIC UTILITIES INVITES YOU TO BECOME AN E-SMARTKID. BECOMING E-SMART MEANS LEARNING ABOUT ELECTRICITY SAFETY AND ENERGY SCIENCE. CHECK OUT OUR GAMES, VIDEOS, AND ACTIVITIES, AND YOU'LL BE ON YOUR WAY TO BEING E-SMART SAFE!

Electrical Safety-SMART!

GET SMART!

LEARN HOW TO STAY SAFE AROUND ELECTRICITY

E-Smart Safety Site for Kids



PPL Electric Utilities



Get SMART!

Activity Pages

Ask an Expert

Games

Home Inspections

Call Before You Dig

ASK THE SUPEREXPERT ABOUT ELECTRICITY & ENERGY EFFICIENCY

Have you ever wondered why shoes hanging on a power line don't get fried? Or whether cars could someday run on cow manure? Now you can get answers to these and all your energy-related questions. Just Ask the Superexpert!

The Superexpert answers new questions regularly, so check back to see if YOUR question is up!

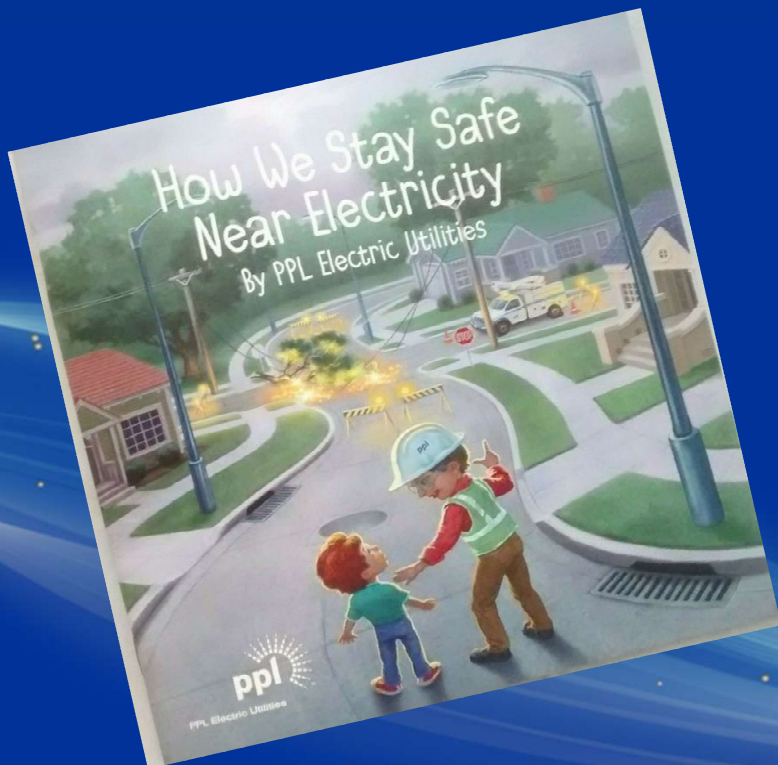
- + I once saw a pair of shoes hanging from a power line. Why didn't the shoes get burned up by the electricity in the line? —Will
- + Is it true that cars could someday run on cow manure? —Tyler
- + I have heard that landfills can be a source of energy. How does that work? —Alya
- + How much energy is in a bolt of lightning? —Sophie
- + What kind of a difference does it really make to replace a regular light bulb with an energy-saving one? —Anna
- + Why didn't Ben Franklin get killed when he tied a metal key to a kite string and flew the kite in a thunderstorm? —Zachary



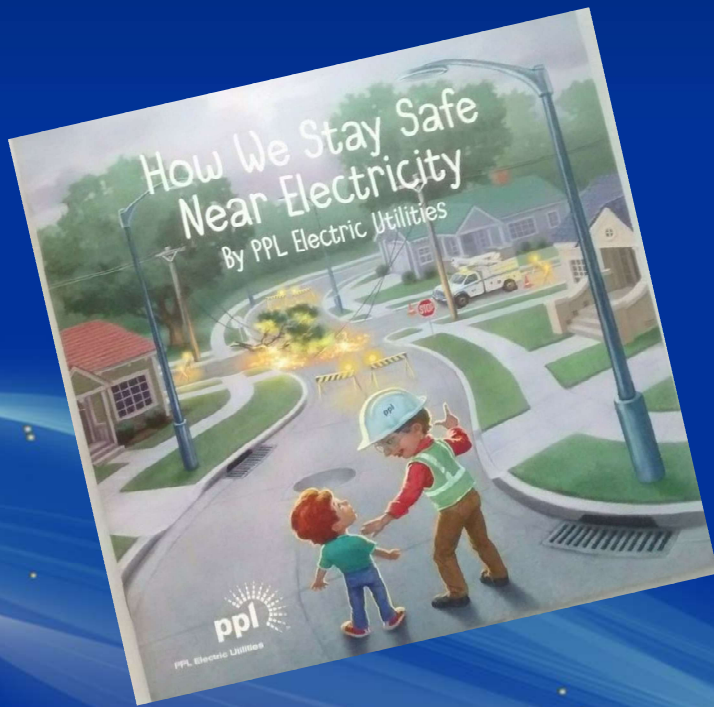
Electrical Safety Book for Children



PPL Electric Utilities



Electric Safety Book For Children



Available at no cost for fourth-grade students at schools in PPL's service territory.

A PDF version is also available for anyone to download at pplelectric.com.

Since 2019 we have distributed 42,689 books to 4th grade students.

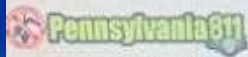
Industry Roundtable Talks

Wrap-up



Eric Moore LO, PE
Paul McCarty

EMoore@entecheng.com
PMcCarty@entecheng.com



Norm Parrish

NLParrish@pa1call.org



Doug Haupt

DLHaupt@pplweb.com



Matt Shapansky, PE

Matthew.Shapansky@allanmyers.com



Neil Derstine

NeilDerstine@hotmail.com

For PDH certificate or Operator CEH:

Christine Gunsaulus CGunsaulus@entecheng.com



Christine Gunsaulus



Doug Haupt



Norm Parrish



Matt Shapansky



Neil Derstine



Paul McCarty



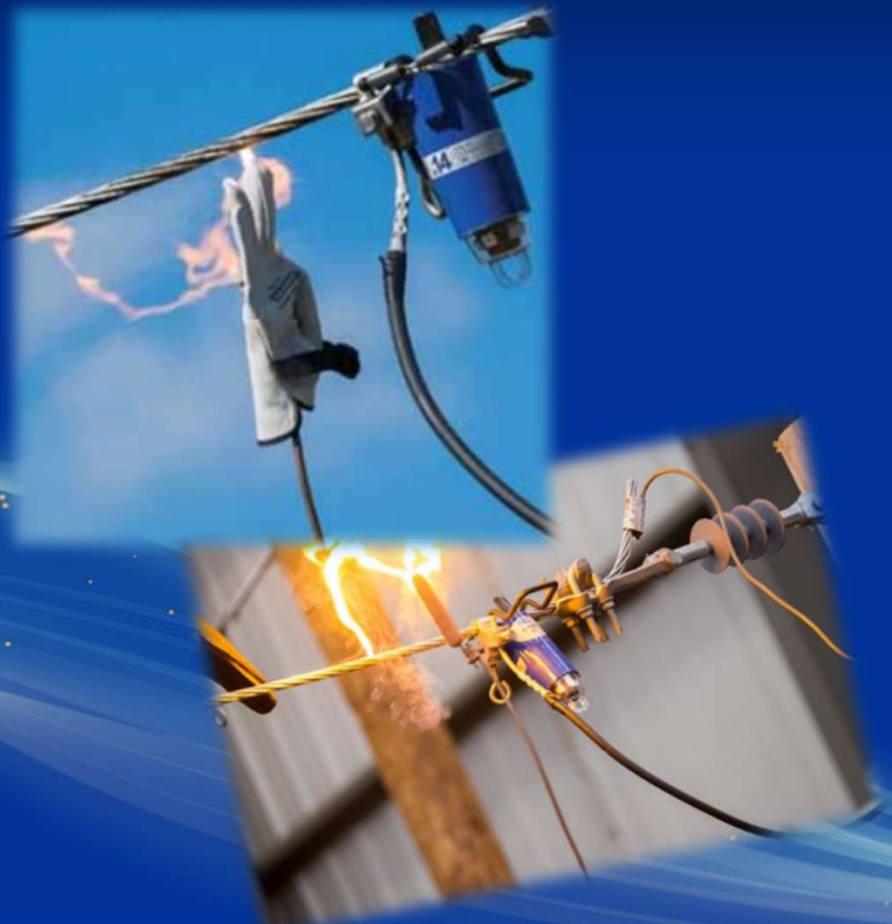
Eric Moore



pennsylvania
STATE POLICE

- **We're keeping the public safe around our power lines.**
- **That includes state police officers.**
- **Since 2014, PPL has been a part of every graduating cadet class at the PA State Police Academy.**
- **We have provided electrical safety presentations to 23 graduating classes and 2,700+ cadets.**

LIVE LINE Electrical Safety Exhibit



PPL Electric Utilities

May 23, 2021 · 🌐

Our Live Line Electrical Safety Exhibit is back in action! Request a demonstration for your organization today! <http://ow.ly/4J6o50EQjOQ>



STORIES.PPLELECTRIC.COM

Our Live Line Exhibit is back on tour – PPL Stories

Safety Our Live Line Exhibit is back on tour May 19, 2021 We're po...

Live Line Electrical Safety Exhibit

Nearly 50,000 reached with 458 Presentations

2015 – 3,558

2016 – 5,450

2017 – 7,885

2018 – 10,025

2019 – 18,584

2020 – 45

2021 – 4,250

PPL ELECTRIC UTILITIES **LIVE LINE ELECTRICAL SAFETY EXHIBIT**




County 911 Center Zoom Presentations

PPL Stories

ABOUT US

f t in



KEEPING FIRST RESPONDERS SAFE

MAY 24, 2021

When it comes to responding to emergencies and keeping the public safe, police, firefighters, and ambulance personnel are critical.

And we want to make sure they're safe while protecting the public, particularly when they are working around overhead and underground power lines and other electrical equipment.

We're hoping a new program will do just that. We recently introduced our new electrical safety presentation designed specifically for 911 centers and emergency management agencies.

The response was impressive. Representatives from 23 of the 29 counties we serve joined the free, one-hour Zoom presentation we offered in early May. In all, 86 people were on the call to learn valuable safety lessons.

"It's always beneficial for our 911 dispatch staff to be involved in this type of training," said Daniel S. Bellesfield, Lehigh County's 911 Operations Coordinator. "While we are not physically on scene, being trained and familiar with equipment and terminology will help to expedite responses to emergencies."

OUR BLOG

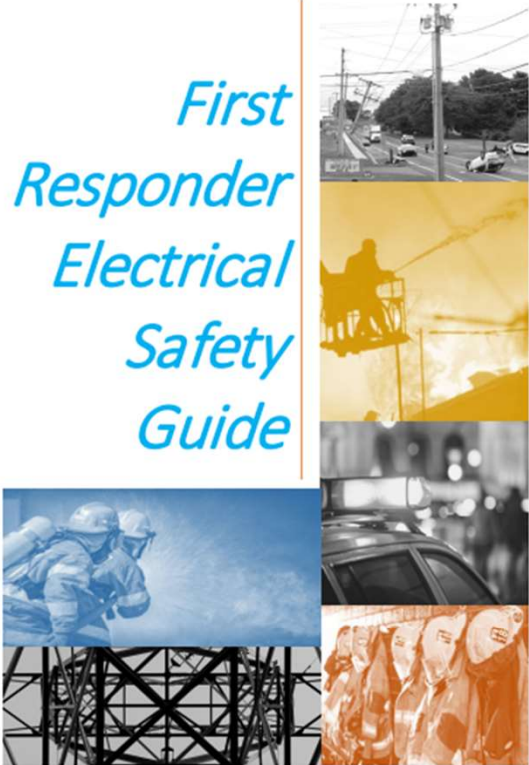
For outages or power problems, please visit www.pplelectric.com or call 1-800-342-5775. In case of an emergency, please dial 911.

Welcome to **PPL Stories**. We're PPL Electric Utilities, and we look forward to sharing stories, pictures and video about our work in the community - both to provide reliable electric service and to support the places where we live and work. Visit pplelectric.com for more about us.

Mobile-Friendly Guide

ppl
PPL Electric Utilities

First Responder Electrical Safety Guide



ppl
PPL Electric Utilities

Business Use

First Responder Electrical Safety Guide

➤ Provides first responders information that they can have right at their fingertips.

➤ Can download PDF to their phones.

➤ Hard copies distributed at our Live Line presentations.

➤ To date, we've distributed over 2,000 books.

➤ Emailed the PDF to 2,600+ First responder organizations

First Responder Electrical Safety Guide	
ppl	
<i>Table of Contents</i>	
Electric Utility General Information	
Electrical System Overview	4
Electrical Distribution Components	6
Electric Utility Pole Equipment	7
Electric Utility Underground Equipment	8
Electric Meters	10
Grid Numbering System	11
Substation Equipment	12
Personal Protective Equipment (PPE)	13
Step Potential	14
Touch Potential	15

First Responder Electrical Safety Guide	
ppl	
Electric Emergency Response Guide	
Assessment: First On Scene Barrier Placement	16
Car vs. Pole Accidents	18
Downed Wire Emergencies	19
Equipment vs. Wire Contacts	21
Pole Fires	22
Structure Fires	23
Substation Fires and Spills	24
Tree on Wire Emergencies	25
Underground Manhole Fires	9
Underground Pad-Mounted Equipment	8
PPL Electric Utilities Contact Info	
Contact Information	26

Battery Energy Storage System (BESS)



Battery Energy Storage System (BESS)

First Responder Presentation

- **If the energy storage system (battery) is burning, immediately contact PPL EU, and wait for their personnel to arrive.**
- **Isolate the area at least 150 feet in all directions. Keep unauthorized persons away.**
- **Protect exposures outside of the immediate hazard area, such as trees and buildings, to prevent fire from spreading.**
- **Wait for PPL personnel to give the go-ahead to begin firefighting.**

Battery Energy Storage System (BESS)

First Responder Presentation

- **Use a firefighting method appropriate for the specific chemistry of battery.**
- **For example, lithium-ion batteries should be doused with “copious amount of water” to prevent re-ignition during thermal runaway.**
- **Explore the safety training resources on energy storage and other distributed energy resources offered by the National Fire Protection: <https://www.nfpa.org/News-and-Research/Resources/Emergency-Responders/High-risk-hazards/Energy-Storage-Systems>**

Battery Energy Storage System (BESS)

BATTERY ENERGY STORAGE SYSTEMS (BESS) EMERGENCIES

QUICK REFERENCE GUIDE

Initial Response Actions:

Conduct an Initial Scene Assessment as well as:

1. **IDENTIFY** the location and type of system
2. **SHUTDOWN** the BESS if necessary
3. **WATCHOUT** for high voltage & other hazard

IDENTIFY	SHUTDOWN	WATCH OUT
<p>LABELS:</p> <p>Battery Disconnect Emergency Stop (ESTOP) Battery Room</p> <p>COMPONENTS:</p> <p>Battery racks or cabinets Gas detection equipment SDS's</p>	<p>If system is on fire or other life safety/property hazard exists</p>  <p>Locate emergency stop, disconnect or circuit breaker Shutdown the BESS</p>	<p>Stay away from open bus bars (shock hazards) Monitor for re-ignition with thermal imaging camera (TIC)</p>  <p>Look for electrolyte spills Monitor air for toxic/flammable gases Ventilate as required</p>

Battery Energy Storage System (BESS)

BATTERY ENERGY STORAGE SYSTEMS (BESS) EMERGENCIES

QUICK REFERENCE GUIDE

General Warning and Cautions

In the event of damage or fire involving battery energy storage systems (BESS):

- Always assume the batteries and associated components are energized and fully charged.
- Safety Data Sheets (SDS) can provide important information regarding battery chemistry
- Exposed electrical components, wires, and batteries present potential shock hazards.
- **During incidents involving a BESS, responders should follow the steps: IDENTIFY, SHUTDOWN, WATCH OUT**
- Wear all PPE and look away when operating disconnects to protect against arc flash injuries.
- Locate building personnel responsible for the system and/or locate emergency contact numbers.
- Be prepared to control HVAC systems to prevent spread of smoke and toxic/flammable gases

ALARM ACTIVATIONS		FIRES	
Overheated Batteries/Gas Sensor Activation	Electrolyte Spill	Small Fires	Large Fires
<ul style="list-style-type: none">• Shutdown of system may not be required, especially if critical systems will be disabled• Monitor battery for potential ignition with thermal imaging camera (TIC)• Check for deformities or bulging of batteries• Check for electrolyte spills• Monitor for toxic/flammable gas release, ventilate the area as necessary• Turn over incident to a qualified, responsible party for additional	<ul style="list-style-type: none">• Spill may not be visible if batteries are mounted inside a cabinet• Ventilate battery room as necessary• Check safety data sheet for specific hazards and mitigation information• Wearing PPE with SCBA, contain the spill (ensure compatibility with spilled product)• Neutralize & absorb corrosive liquids (only by qualified personnel)• Decontaminate PPE• Turn over incident to a qualified,	<ul style="list-style-type: none">• SHUTDOWN/STOP entire system• Control ventilation of smoke and toxic gases• If applicable, use a dry chemical extinguisher to extinguish the fire• Do not overhaul electrical components• Check for electrolyte spills• Monitor battery for re-ignition• Turn over incident to a qualified, responsible party for additional monitoring	<ul style="list-style-type: none">• SHUTDOWN/STOP entire system• Control ventilation of smoke and toxic gases• Secure an adequate water supply• Extinguish the fire using a fog pattern from a sufficiently sized hose line (Except Sodium Sulfur BESS)• Do not overhaul electrical components• Check for electrolyte spills• Monitor battery for re-ignition• Turn over incident to a qualified, responsible party



PPL Electric Utilities Wins 2021 S.E.E. Chairman's Award for Safety

**PPL Electric Utilities earns S.E.E. Chairman's
Award for innovative downed wire technology
and focus on safety**

Automatic De-energization of Downed Conductors (ADDC) technology

Automatic De-energization Of Downed Conductors (ADDC)

- **The innovative technology, implemented in 2019, is a collaboration of PPL, EPRI and SEL.**
- **It has successfully prevented six instances of potential hazards due to downed conductors.**
- **The ADDC technology is now patented.**
- **It's PPL's second patent related to safety technology in the past two years. It is a testament to our commitment to safety for employees, customers and the public.**
- **Now active on all PPL reclosers (approximately 4,300).**

KEY FEATURES

ARC SENSE TUNE



- Requires 0.5 SA to detect current (60A in 751, 50A in 651R-2)
- Must observe current for 24 hours to become “tuned” to the line harmonics

ARC SENSE COUNT



- There are two algorithms that “count” the arcs
- Counts are deviations from the tuned average

ARC SENSE ALARM



- When either algorithm has enough counts (3 or 30) it registers an alarm
- PPL built filters on the alarms to stop specious counts

DOWNED CONDUCTOR TRIP



- PPL has created custom logic to trip when a known downed conductor occurs
- PPL patented this functionality

Automatic De-energization of downed conductors (ADDC)

ARC Sense Operations (so far...)


- **4,300 devices (approximately)**
- **29 correctly detected**
- **7 false trips**
- **5 failed equipment trips (considered correct)**

New Pole Inspection Process

Program is finalist for EEl Edison Award



- **New program eliminates interpretation of both pole strength and decay level.**
- **Ensures accurate and repeatable way to do inspections.**
- **Has improved detection of pole failures, decay, and reduced inspection cost and duration.**
- **The improved drill needle resulted in the reduction in the degree of measurement inaccuracy to below 1%.**
- **What used to take a five-person crew a week to complete (150 pole inspections) can now be accomplished in just two days with a two-person crew.**



2020: **THE YEAR OF THE PANDEMIC AND A NEW ERA OF VIRTUAL WORKING**

[illegible]



**GOING
FAR
TOGETHER**



PPL Electric Utilities

QUESTIONS

THANK YOU