

Presenter's Notes

The slide features a background image of a building fire at night with firefighters on a ladder. The text is overlaid on this image. At the top left, it says 'Staying safe while protecting others'. At the top right is the Rhode Island Energy logo, a stylized blue wave, with the text 'Rhode Island Energy' and 'a PPL company' below it. A dark blue horizontal bar across the middle contains the title 'First Responder Beware®' on the left and 'Electrical Safety for First Responders' on the right. At the bottom left is a lightning bolt icon in a circle, followed by the text 'To report emergencies, call 911 and Rhode Island Energy immediately.' and 'Electrical emergencies: 1-855-RIE-1102 (743-1102)'. At the bottom right, it says 'Click on each slide to advance.'

Before darkening the room, offer a welcome and an overview.

Begin by introducing the program:

- Welcome to *First Responder Beware: Staying Safe While Protecting Others, Electrical Safety for First Responders*. Today's session will cover strategies for working safely around electric power lines and for handling certain emergencies involving electricity. By following the procedures we'll cover here today, you can keep yourself, your fellow first responders and the public safe. Now I know that some of you will have heard this information before, and so for you, this program will be a refresher. For others, this may be the first time you're hearing about this topic, but I hope everyone will find the program valuable.

Darken the room and begin the presentation.

Electrical safety for first responders



- Firefighters, police and EMTs are typically first on the scene in an emergency and face the greatest risk from electrical infrastructure contacts.
- Understanding the potential dangers and dealing with them correctly makes everyone safer.
- This program is designed to supplement, not replace, your department's standard operating procedures (SOPs).



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- Firefighters, police and EMTs are typically first on the scene in an emergency and face the greatest risk from electrical infrastructure contacts.
- Understanding the potential dangers and dealing with them correctly makes everyone safer.
- This program is designed to supplement, not replace, your department's standard operating procedures (SOPs).

This is a good time to reiterate the importance of this information: that it can protect first responders, incident victims and bystanders from electricity-related injury or death.

Please note: Each local department will have its own SOPs for electrical safety. Emphasize to participants that this program is not designed to replace these procedures, only to supplement them.

Electrical safety basics





- Respect the power of electricity
- Hands off electrical systems
- Protect yourself and others from shock
- Always observe the 10-foot rule
- Be aware of overhead power lines
- Use extra caution near downed power lines
- Manage substation and transformer fires



This presentation will cover key practices you need to know to keep yourself safe around electric power lines and on the scene of emergencies involving electricity. The topics we are going to focus on are:

- Respecting the power of electricity
- Hands off electrical systems
- Protecting yourself and others from shock
- Observing the 10-foot rule
- Being aware of overhead power lines
- Using extra caution near downed power lines
- Managing substation and transformer fires

Respect the power of electricity



- **Electricity always seeks the easiest, most direct path to the ground through conductors like:**
 - Your body
 - Trees
 - Water
 - Metal objects and structures
 - Long or tall equipment
- **Even low-voltage electrical shock can be fatal.**
- **Standard-issue protective gear DOES NOT insulate you against electrical shock.**
- **Electrical shock and burn injuries may include internal tissue damage that is not immediately apparent. Make sure victims receive thorough medical attention.**

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First of all, we need to know a few basic things about electricity.

- Electricity always seeks the easiest, most direct path to the ground through conductors like:
 - your body
 - trees
 - water
 - metal objects and structures, including fences and even gutters
 - and long or tall equipment, such as ladders
- Even low-voltage electrical shock can be fatal. Protecting yourself means always remembering that there are no minor risks when dealing with electricity.
- Standard-issue protective gear DOES NOT insulate you against electrical shock.
- Electrical shock and burn injuries may include internal tissue damage that is not immediately apparent. Make sure victims receive thorough medical attention. Shock victims often show no visible injuries or only minor burns on the skin, but the internal organs can be critically damaged. Treat these injuries as serious regardless of their appearance.

Hands off electrical systems

Never attempt to disconnect electric services:

- **Never cut service wires.**
- **Never attempt to remove electric meters.** This is extremely dangerous and can cause serious injury or death.
- **Never attempt to open or enter a manhole or vault.**
- **Never touch or attempt to move power lines.**



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Rhode Island Energy
an EPL company

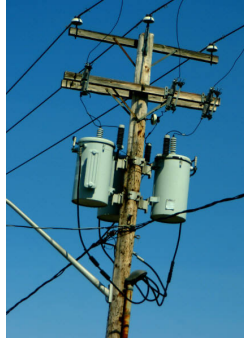
Remember that even low-voltage electrical shock is potentially fatal. To avoid this risk, keep away from electrical equipment and systems.

- Never attempt to disconnect electric services. This can be an extremely dangerous, even deadly, mistake.
 - Never cut service wires or power lines.
 - Never attempt to remove electric meters. This is extremely dangerous and can cause serious injury or death.
 - Never attempt to open or enter a manhole or vault.
 - Never touch or attempt to move power lines. Remember, your protective gear DOES NOT insulate you against electrical shock. In dealing with electrical systems, employ a hands-off policy and call Rhode Island Energy.
 - Although some wires may appear insulated, they are not. Their weatherproof coating will not protect you from electrical shock.

Protect yourself and others from shock



- **Always identify power lines and electrical equipment upon arrival at an incident scene.**
- **Assume all lines are energized**, as well as all objects in contact with power lines.
- **If power lines or electrical equipment are involved in an incident**, have your dispatcher contact Rhode Island Energy.
- **Provide the best possible directions** to the location.
- **Secure the area.**




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Adhering to some simple best practices can minimize the risk of electrical shock.


- Always identify power lines and electrical equipment upon arrival at an incident scene. The first thing to do is to survey the area for overhead power lines, downed lines, solar photovoltaic (PV) systems, batteries and other equipment such as transformers. Especially during or after a storm, look for lines down in trees or on fences. Proper electrical safety procedures should figure into any operational planning.
- Assume all lines are energized, as well as all objects in contact with power lines. Additionally, areas around power lines and electrical equipment or objects in contact with them (such as trees, fences or vehicles) should also be treated as energized. This includes the ground. Approach with caution.
- If power lines or electrical equipment are involved in an incident, have your dispatcher contact Rhode Island Energy. Calling is always the right thing to do, whether you identify electrical infrastructure or are just unsure. They want you and the public to be safe and will respond quickly. Their personnel will switch off the power and tell you when the area is safe and de-energized.
- As simple as it sounds, provide the best possible directions to the location. Intersections, landmarks and specific buildings will help.
- Secure the area. When dealing with electricity, your priority is to protect yourself and the public. Utility personnel will tell you when it is safe to approach.

Always observe the 10-foot rule



- **ALWAYS keep yourself and your equipment at least 10 feet away from overhead power lines.** Drones must be kept **at least 200 feet away.**
- Higher voltages require greater clearances.
- **There is no uniform system for identifying power line voltage.** When in doubt, contact Rhode Island Energy for clearance information.
- **Have a spotter monitor the placement of ladders and aerial equipment** to ensure they remain a safe distance away from power lines.

Electrical safety distances given are minimums. Always use the maximum possible distance.



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For your safety, always observe the 10-foot rule.

- ALWAYS keep yourself and your equipment *at least* 10 feet away from overhead power lines. Maintain a minimum 10-foot clearance for power lines of 50 kV or less. (Drones are an exception to this 10-foot away rule. Keep them at least 200 feet away from power lines and other electrical equipment, and follow department SOPs for drone operation.)
- Higher voltages require greater clearances.
- There is no uniform system for identifying power line voltage. When in doubt, contact Rhode Island Energy for clearance information. Their line workers get a lot of specialized training that teaches them to recognize the voltages they're dealing with at any given site. Don't make the mistake of thinking you can know the appropriate voltage and clearance by looking at a line.
- Have a spotter monitor the placement of ladders and aerial equipment to ensure they remain a safe distance away from power lines.

Electrical safety distances given are minimums. Always use the maximum possible distance. Your best practice is always to stay as far away as possible from power lines and electrical infrastructure.

Be aware of overhead power lines



- Park emergency vehicles as far away as possible from overhead power lines.
- Keep aerial equipment **at least 10 feet away** from overhead lines. Assign a spotter to help judge the distance.
- Never use a solid water stream to fight fires near overhead power lines.



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When overhead lines are present at an incident scene, remember a few simple safety rules:

- Park emergency vehicles as far away as possible from overhead power lines. You don't want to be surprised by a falling power line.
- Keep all aerial equipment *at least* 10 feet away from all overhead lines. Remember the 10-foot rule and that metal ladders are conductors. Be aware that wind can move aerial equipment, and assign a spotter to monitor your equipment's proximity to power lines. Remember that higher voltages require greater clearances, and always use the maximum possible distance. (A good rule of thumb is to maintain a safety clearance that is greater than the length of the equipment when extended.)
- Never use a solid water stream to fight fires near overhead power lines. A solid stream can create a clear path for electrical current. When overhead lines are in the vicinity of a fire, you can, with extreme care, use a 30-degree fog pattern with nozzle pressure at 100 psi. But remember that ALL water is a conductor and always be extremely cautious when using water around overhead lines.

Be aware of overhead power lines



If your equipment contacts a power line:

- **The equipment should be considered energized.**
- **Call Rhode Island Energy.**
- If you can do so safely, **move the equipment away from the line.**
- **Stay put, and warn others** to stay away until utility personnel give the all clear.



Remember that anything touching a power line may be energized.

- If your equipment contacts a power line, the most important thing to do is remain calm and stay put.
 - The equipment should be considered energized as should the power line.
 - Call Rhode Island Energy immediately.
 - If you can do so safely, move the equipment away from the power line.
 - Stay put and warn others to stay away until utility personnel give the all clear. All personnel on the equipment should remain there. This is your safest course of action. Utility personnel will respond quickly, switch off the power and tell you when it is safe to get off. Wait for their instructions.

Be aware of overhead power lines



If fire or other imminent danger forces you off the equipment:

- **Jump clear**, landing far enough away from the equipment so that you don't touch the equipment and the ground at the same time.
- **Land with your feet together and shuffle away with small movements**, keeping your feet close together and on the ground at all times.
- **DO NOT run or take large steps.** When equipment contacts a line, electricity spreads out in the ground like ripples in a pond, and the voltage decreases with distance from the point of contact. If your legs bridge two areas of different voltage, you could be killed.



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In some cases, other hazards such as fire make it impossible to stay on the energized equipment until utility personnel give the all clear.

- If fire or other imminent danger forces you off the equipment:
 - Jump clear, landing far enough away from the equipment so that you don't touch the equipment and the ground at the same time. If you do, you will become electricity's path to the ground, and you will be seriously—or fatally—shocked. Make every attempt to land on both feet at the same time.
 - Land with your feet together and shuffle away with small movements, keeping your feet close together and on the ground at all times.
 - **DO NOT** run or take long steps. When equipment contacts a line, electricity spreads out in the ground like ripples in a pond, and the voltage decreases with distance from the point of contact. If your legs bridge two areas of different voltage, you could be killed.

Always assume PV systems are energized



In incidents involving PV systems, be alert for electrical, structural, and chemical hazards.

- **Consider all PV equipment**, junction boxes, batteries, and wiring to be energized at all times. Do not touch or cut into PV modules, conduit, or equipment.
- **Prepare for fires** near a rooftop array to grow unexpectedly, in some cases causing rapid structural failure.
- **Always wear full protective clothing and SCBA.** Batteries that ignite or overheat may release hazardous materials and highly toxic and explosive gases.



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Always assume PV systems are energized, whether or not the sun is shining.

- In incidents involving PV systems, be alert for electrical, structural and chemical hazards.
 - Consider all PV equipment, junction boxes, batteries and wiring to be energized at all times, and keep yourself and all tools away from them. Do not touch or cut into PV modules, conduit or equipment.
 - Prepare for fires near a rooftop array to grow unexpectedly, in some cases causing rapid structural failure.
 - Always wear full protective clothing and SCBA. Batteries that ignite or overheat may release hazardous materials and highly toxic and explosive gases.

Use extra caution near downed power lines



- Park emergency vehicles away from fallen lines.
- Secure the area:
 - Keep yourself and the public *at least 30 feet away* from fallen power lines.
- Transmission lines from large towers require a distance of **100 feet**.
- **Never touch or attempt to move fallen lines** or objects contacting them.
- **Never use a solid water stream to fight fires near downed lines.**



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Dealing with downed lines requires additional measures to protect life and property.

- Park emergency vehicles away from fallen lines. The ground and objects in the vicinity of a fallen power line may be energized. Wait for utility personnel to give the all clear.
- Secure the area:
 - Keep yourself and the public *at least 30 feet* away from fallen power lines. Always remember that objects and even the ground near downed lines may also be energized.
- Transmission lines from large towers require a distance of 100 feet. In any incident involving downed lines, recall that wind, as well as electrical charge, can cause lines to whip and move. Observing these expanded clearances can help protect everyone from the unexpected.
- Never touch or attempt to move fallen lines or objects contacting them. Doing so endangers you and incident victims. Contact Rhode Island Energy immediately so that they can de-energize the scene.
- Never use a solid water stream to fight fires near downed lines. If you must use water to extinguish a fire near downed lines, use only a fog or spray, and be extremely cautious.

Use extra caution near downed power lines



- **DO NOT** enter, contact or even approach areas or vehicles that may be energized.
- Call Rhode Island Energy.
- Instruct vehicle occupants to drive the vehicle away from the line if this can be done safely.
- If the vehicle cannot be moved, instruct the occupants to stay put until utility personnel give the all clear. Staying in the vehicle is their **BEST** protection against electrical shock.



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When incident victims are in or around the energized area, particularly in vehicles that have contacted power lines, remember that both you and they are safest staying put.

- **DO NOT** enter, contact or even approach areas or vehicles that may be energized. Resist the temptation to attempt to extract passengers. You risk both your own and the victims' safety when you enter the energized area. Instead, stay away. You chose this work to save lives, and that instinct is strong. However, in this case, if you enter the energized area, you have a very high risk of electrical shock. Becoming a victim yourself puts everyone in greater danger.
- Call Rhode Island Energy immediately. They will respond quickly and de-energize the scene.
- Instruct vehicle occupants to drive the vehicle away from the line if this can be done safely. Keeping your distance, find a position where passengers can see you without exiting or moving around inside the vehicle, and attempt to reassure them.
- If the vehicle cannot be moved, instruct the occupants to stay put until utility personnel give the all clear. Staying in the vehicle is their **BEST** protection against electrical shock. Tell them utility personnel are on the way to turn off the electricity, and tell them to stay put and to try to relax. If passengers are injured or panicked, talk with them, keep them calm and alert, and use the wait time to prepare medical assistance.

Use extra caution near downed power lines



If occupants in an energized vehicle are in imminent danger from fire or other hazards:

- Instruct them to **jump clear**, landing far enough away from the equipment that they don't touch the equipment and the ground at the same time.
- Tell them to **land with their feet together and shuffle away with small movements**, keeping their feet close together and on the ground at all times.
- **Demonstrate the proper procedure** from a distance.
- **If occupants are injured, disabled or otherwise unable to safely exit the vehicle on their own**, your incident commander will assess the situation and tell you how to proceed.



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In some cases, fire or other hazards make it impossible for victims to remain in the vehicle.

- If occupants in an energized vehicle are in imminent danger from fire or other hazards, you must resist the temptation to approach the vehicle. Contacting an energized vehicle is a sure way to become a shock victim yourself! Follow this procedure to get everyone out alive:
 - Instruct them to jump clear, landing far enough away from the equipment so that they don't touch the equipment and the ground at the same time. Find a vantage point where victims in the vehicle can see and hear you, but keep your distance.
 - Tell them to land with their feet together and shuffle away with small movements, keeping their feet close together and on the ground at all times. Emphasize that they must not run or take long steps.
 - Demonstrate the proper procedure from a distance. Show occupants how to perform the jump-and-shuffle procedure from a visible distance before they attempt their escape.
 - If occupants are injured, disabled or otherwise unable to safely exit the vehicle on their own, your incident commander will tell you how to proceed. Wait for instructions before taking action or you could become another victim.

Substation and BESS fires



- **Burning electrical equipment is already ruined and will be replaced. The safest course of action is to LET IT BURN.**
- Contact Rhode Island Energy, and wait for their personnel to arrive. **Never attempt to enter a substation without utility personnel present.**
- **Isolate the area at least 300 feet in all directions.** Keep unauthorized persons away.
- **Be alert for explosions, toxic smoke and oil releases.** Stay upwind.
- **Protect area exposures** to prevent fire from spreading.
- **If an equipment fire must be suppressed,** utility personnel and the incident commander will tell you how to proceed.



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Substations and battery energy storage system (BESS) present specific risks.

- Burning electrical equipment is already ruined and will be replaced. The safest course of action is to let it burn.
- Contact Rhode Island Energy, and wait for their personnel to arrive. Never attempt to enter a substation without utility personnel present.
- Isolate the area *at least* 300 feet in all directions. Keep unauthorized persons away. Your most important responsibility in these types of emergencies is to protect the public.
- Be alert for explosions, toxic smoke and oil releases and stay upwind. A BESS can present an explosion hazard, even without signs of fire.
- Protect area exposures to prevent the fire from spreading. Once the area is evacuated, focus on defending nearby property and green space.
- Do not direct water into the substation. If an equipment fire must be suppressed, utility personnel and the incident commander will tell you how to proceed.

Transformer fires



- **DO NOT open or enter switch cabinets or pad-mounted transformers.**
- **Never cut locks or pry cabinets open.**
 - The equipment contains live electrical components, and if you contact them, you could be killed.
- **Call Rhode Island Energy, evacuate the public and protect area exposures.**
- **Let transformers burn until otherwise instructed by utility personnel.**



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Burning transformers call for similar procedures as substation fires.

- **DO NOT open or enter switch cabinets or pad-mounted transformers. This is very dangerous and unnecessary.**
 - Never cut locks or pry cabinets open. The equipment contains live electrical components, and if you contact them, you could be killed. Once a fire has begun, the equipment is unsalvageable and will be replaced. Don't risk your life to save ruined equipment.
- Call Rhode Island Energy, evacuate the public and protect area exposures. Whether it's a transformer on the ground or on a pole, be alert for explosions and toxic smoke, and once the area is secure, do what you can to keep the fire from spreading.
- Let transformers burn until otherwise instructed by utility personnel. They will determine when it is safe to extinguish an equipment fire and will advise your incident commander regarding the safest procedures.

Electrical safety review




- **Identify all overhead power lines and electrical equipment upon arrival at an incident scene.**
- Whenever you suspect electrical infrastructure is involved or when in doubt, **call Rhode Island Energy.**
- **Never attempt to cut service wires or remove electric meters.**
- **Never touch power lines.**
- **Assume all power lines are energized, and keep yourself and your equipment at least 10 feet away.**
- **Even low-voltage electrical shock can be fatal**, and your gear does not insulate you against electrical shock.
- **When responding to a substation or transformer fire, let it burn**, evacuate the area and protect exposures.

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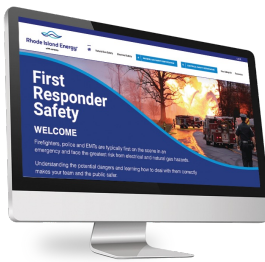
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So let's review the key points of this presentation.

- Identify all overhead power lines and electrical equipment upon arrival at an incident scene. Do this as part of your initial situation survey, and include electrical infrastructure in your operational planning.
- Whenever you suspect electrical infrastructure is involved or when in doubt, call Rhode Island Energy. They want to help you keep yourself, fellow responders and the public safe.
- Never attempt to cut service wires or remove electric meters. This is extremely dangerous!
- Never touch power lines. Utility personnel will switch off the electricity to de-energize a scene and will inform you when the area is safe.
- Assume all power lines are energized, and keep yourself and your equipment *at least* 10 feet away. Drones are the exception to this rule: Keep them at least 200 feet away from power lines and other electrical equipment.
- Even low-voltage electrical shock can be fatal, and remember, your gear does NOT insulate you against electrical shock.
- When responding to a substation or transformer fire, let it burn, evacuate the area and protect exposures. Your focus should be on safeguarding life and property.



Thank you for your attention.



Visit Rhode Island Energy's website at rienergy.e-smartresponders.com for additional information and to earn a Certificate of Completion in our electrical safety course.


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Thank you for your attention. Rhode Island Energy thanks you for helping to keep yourself, your community and your fellow first responders safe.


Visit Rhode Island Energy's website at rienergy.e-smartresponders.com for additional information and to earn a Certificate of Completion in their electrical safety course.

Presenter's Notes


First Responder Beware®
Electrical Safety for First Responders



To report emergencies, call 911 and
Rhode Island Energy immediately.
Electrical emergencies: 1-855-RIE-1102 (743-1102)



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Take questions and begin discussion. Discuss how this information conflicts with what your audience believed about electricity and how they may have put themselves or others at risk in the past. Ask what they would have done differently had they had this instruction before.

The instructor's guide includes more detail about the electricity distribution system and incident response procedures. It also includes an electrical safety quiz, suggested discussion topics and simulations for group use.

Rhode Island Energy thanks you for helping to keep first responders safe.