

National Electrical Safety Month

“Be in the Know about the New”

May 2012

Campaign Introduction

Since the late nineteenth century, electricity has been constantly changing the way people live and work. Methods for generating and utilizing electricity have also evolved over the years. Technologies that were considered “emerging” just a few years ago, such as plug-in electric vehicles and solar power generation systems are now readily available for installation in homes and businesses. Despite these significant advancements, electricity remains uniquely unforgiving if not used safely. Each year, too many lives are disrupted by electrical fires and too many families mourn the loss of a loved one who is fatally injured by electricity.

The Electrical Safety Foundation (ESFI) is a non-profit organization dedicated exclusively to promoting electrical safety in the home, school, and workplace. ESFI sponsors National Electrical Safety Month each May to increase public awareness of electrical hazards in order to reduce the number of electrically-related fires, fatalities, injuries, and property loss.

The 2012 National Electrical Safety Month campaign provides consumers with an introduction to some of the latest advances in residential electrical technologies, including important safety considerations for existing home electrical systems. ESFI encourages consumers to consider the overall electrical safety of their homes when making decisions regarding the installation of new technologies. Campaign materials also highlight the tremendous safety benefits provided by arc fault circuit interrupters (AFCIs), ground fault circuit interrupters (GFCIs), and tamper resistant receptacles (TRRs). These technologies, while no longer “emerging,” provide advance protection against shocks, electrocution, and electrical fires.

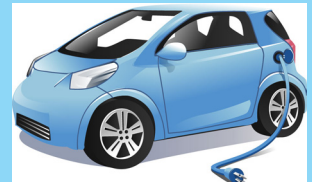
How to Use this Toolkit

In this toolkit, you will find a collection of new resources to help you facilitate an effective electrical safety awareness campaign for your community, organization, school, or family. Included are useful facts about emerging technologies and related safety tips, plus templates and tools you can use to promote electrical safety and National Electrical Safety Month. Working together, we can reduce the number of electrically-related deaths and injuries – one home, one school, and one workplace at a time.

Visit ESFI’s website at www.electrical-safety.org for additional print and multimedia resources.



What is an Electric Vehicle?



An electric vehicle (EV) is any vehicle that is powered entirely or partially by electricity.

EV's can be categorized into the following main types:

- **Hybrid (HEV)** – Hybrids have both a gasoline engine and an electric motor for increased fuel economy, but operates like a traditional car. The vehicle operates on the electric motor from idle to minimal speeds, generally up to 40 miles per hour, and runs on the internal combustion engine at higher speeds.
- **Plug-In Hybrid (PHEV)** – Like a traditional hybrid, PHEVs combine an electric motor with a traditional combustion engine. Unlike hybrids, PHEVs include powerful batteries that can be charged with a plug through a wall socket. PHEVs have a larger battery than traditional hybrids, which increases the amount of electricity that can be used to propel the vehicle.
- **Battery Electric (BEV)** – BEVs run on electrical power from battery packs, and do not contain an internal combustion engine. BEVs are 100% electric, and must be plugged in to charge.
- **Extended-Range Electric (ER-EV)** – ER-EVs are a cross between a plug-in hybrid and a battery electric vehicle. ER-EVs run on an electric motor to provide power to the drive train but also include a gasoline internal combustion engine serving as an internal generator to provide electricity and to charge the battery. In most cases, ER-EVs can also be plugged in to charge.
- **Neighborhood Electric (NEV)** – NEVs are Battery Operated Electric Vehicles with limited acceleration and a top speed between 20-25 miles per hour. They are legally limited to streets with speed limits less than 35 mph. NEVs are charged by plugging into a wall outlet.

Other forms of Electric Transportation

- **Electric Bicycles:** Electric bicycles use a motor for propulsion and can travel up to 15 to 20 miles per hour.
- **Electric Motorcycles and Motor-scooters:** These vehicles have two or three wheels and use electric motors to move. They are typically operated by batteries, but new developments in fuel cell technology have led to several prototypes. Petroleum hybrid motorcycles are also available. They generally reach speeds of 20 - 45 mph.
- **Electric Buses:** Battery electric buses and hybrid electric buses are in operation across the world and are gaining popularity.



Choosing Your Electric Vehicle



Choosing the Right Electric Vehicle

When deciding what kind of electric vehicle is right for you, the following should be considered:

- How long is your daily commute?
 - Neighborhood electric vehicles have a range of 20-40 miles, and are ideal for trips within the neighborhood or for short commutes.
 - Battery Electric Vehicles are ideal for commuting and city driving, but travel cannot exceed 120 miles without requiring a charge.
 - All other electric vehicles are equipped for longer commutes and city driving.
- Do you make long drives regularly?
 - Hybrids, Plug-In Hybrids and Extended-Range Electric Vehicles can all drive over 400 miles without requiring a charge.
- Do you want to eliminate all emissions, or are you just looking to be more fuel efficient?
 - Hybrid vehicles operate on both gas and battery power, reducing emissions, whereas battery-operated vehicles are zero emission.

Public Charging Stations

As EVs gain popularity, the power delivery infrastructure that enables vehicles to charge at home, at work, and in public spaces is simultaneously being rolled out. By 2017, Pike Research forecasts that more than 1.5 million locations to charge vehicles will be available in the United States, with a total of nearly 7.7 million locations worldwide.

Websites such as <http://www.mychargepoint.net/> can help consumers find charging stations in their area.

Electric Vehicle Conversion

As gas prices continue to rise, people who aren't in the market for a new vehicle may be considering converting their conventional vehicles to electric ones. While many conversion companies are beginning to emerge, there is also a growing market for do-it-yourself conversion kits. People who do not have practical experience with electricity should not attempt to convert their vehicle due to the danger of fire or electric shock.



Electric Vehicles - In the Home



Electric vehicle batteries can take anywhere from 4 to 20 hours to charge, making home charging necessary for many operators to achieve optimal performance from their vehicles. As consumers get ready to hit the road with their plug-in and battery electric vehicles, there are considerations that must be taken to ensure that their home is ready as well.

Home Evaluation

Before purchasing an electric vehicle (EV), consumers should have an electrical evaluation of their home performed by a licensed, qualified professional to determine that their home is adequate for EV charging. This evaluation should include examination of the following:

- **Electrical Service**-- This includes utility lines and the electric meter controlled by your local electric utility.
- **Electrical Panel**-- Every home has a service panel that distributes electricity to switches, outlets, and appliances. The service panel is usually found in the basement, garage, or utility area.
- **Home Wiring System**-- The wiring system delivers electricity from the panel to the circuits.

Installation Process

- A licensed electrician can determine if an electrical system upgrade or other improvements are needed to support an electric charging system.
- Your city or county may require permits and inspections, which can be facilitated by your electrician.
- Once your home has passed an evaluation by a licensed contractor or the local utility, the charging equipment can be installed.
- Installation should be performed by a licensed, qualified electrician in accordance with all applicable local and national codes.

Charging Requirements

EV charging can be performed at three levels.

- **Level 1:** Uses 120 volts and takes 8-12 hours to fully charge
- **Level 2:** Uses 240 volts and takes roughly 6-8 hours to fully charge
- **Level 3:** Converts 208 volts or 480 volts into direct current (DC). It can take as little as 30 minutes to fully charge. Level 3 technology is currently impractical for home-based charging units.



Electric Vehicles - In the Home



Components of Home Charging Equipment

If your EV has a smaller battery or you simply drive less, you can charge your electric car within a few hours using a standard household 120-volt outlet. If your electric car has a larger battery and you drive more, you may require a home charging station to enable faster charging. All charging equipment should bear the logo of an independent testing laboratory such as Underwriters Laboratories (UL), Intertek (ETL), or CSA International, signifying that it has been tested by a nationally recognized safety laboratory.

- **Power Supply Device (Charging Station):** For Level 2 charging, this piece of equipment can mount on your garage wall to safely supply 240 volts of electrical power.
- **Power Cord:** For Level 1 and Level 2 charging, this cord or cable conducts electricity from the power supply device to the charger or receiving unit onboard the vehicle.
- **Connector:** This is a plug on the power cord that connects the supply device to the onboard charger.

Charging Safety Tips

- Carefully read the Owner's Manual for your charging station upon installation.
- Never use an extension cord to charge the vehicle. Use of extension cords can increase risk of electric shock and other hazards.
- Inspect for damaged cords and plugs, which could result in shock and fire hazards.
- Charging equipment should not be installed in an area with heavy foot traffic, or near any materials that are flammable or explosive.
- Outdoor charging equipment is weatherproof, but should be protected from damage.

Investigating Battery Safety

In early 2012, the safety of electric vehicle batteries was called into question after three incidents of battery fires occurred during crash tests. This led to a voluntary recall by the manufacturer of the vehicle containing the battery, which offered free repairs to update the steel and cooling system that surround the battery. The National Highway Traffic Safety Administration (NHTSA) stated subsequently that it does not believe electric vehicles pose a greater risk of fire than gasoline-powered vehicles.



Electric Vehicles - On the Road



The National Fire Protection Association (NFPA) estimates that by 2015, there will be more than one million advanced electric vehicles (EVs) on the road, which is in line with the goal President Barack Obama stated during his 2011 State of the Union address. Here are some key characteristics of EV performance to help consumers better understand these vehicles, which are becoming more prevalent on our roadways.

Driving Range

The advertised driving range of an EV that relies solely on batteries varies from about 20 miles to 120 miles. The actual range depends heavily on driving habits and environmental conditions. For plug-in hybrid electric vehicles, the advertised range for different models varies from 13- 60 miles between charges, depending on battery size. If the vehicle is not plugged in, the expected driving range is about 300-400 miles. If the vehicle is plugged in daily, as recommended, it may be possible to drive the vehicle 1000-2000 miles or more between fill-ups.

Maintenance

EVs do not require the tune-ups or oil changes associated with conventional vehicles. In addition, EVs do not have timing belts, water pumps, radiators, fuel injectors, or tailpipes to replace. Before purchasing an EV, consumers should check with the dealer about battery life and warranties and consider the manufacturer's battery recycling policy. In some models, the batteries are designed to last for the expected lifetime of the vehicle.

Safety Requirements

Electric vehicles undergo the same rigorous safety testing as conventional vehicles sold in the United States and must meet the Federal Motor Vehicle Safety Standards. The exception is neighborhood electric vehicles, which are subject to less-stringent standards because they are typically limited to roadways specified by state and local regulations.

Did you know?

Electric vehicles have been around for over 180 years. Though the inventor of the first EV is uncertain, they have been traced back as early as 1828 when Hungarian Ányos Jedlik made a model car that was propelled by a small electric engine.



Electric Vehicles - On the Road



Safety Considerations

- EV operators should keep in mind the quietness of their vehicles and exercise extreme caution when driving through neighborhoods or streets where children could be present.
- Battery performance diminishes during cold temperatures, making EVs susceptible to a shorter battery life during the winter months. EV operators should take this into account when driving in cold climates.
- Be sure your vehicle is serviced by a professional who is experienced with working with EVs. Service professionals at the dealership where your vehicle was purchased are guaranteed to be equipped to service your vehicle.

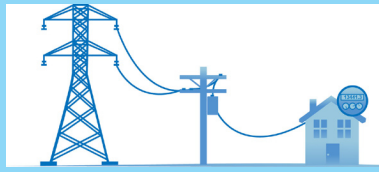
Danger After Crashes

The high-voltage electricity associated with EVs presents new hazards for fire fighters, first responders, and those involved in car accidents. The U.S. Fire Administration offers these tips when dealing with crashes involving EVs:

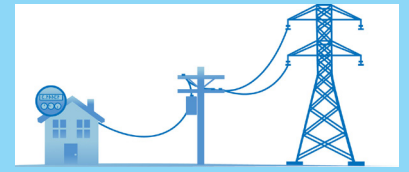
- Always assume the vehicle is powered-up despite no engine noises.
- Put vehicle in park, turn ignition off, and remove key to disable the high-voltage system.
- Consider the electrical system unsafe for a full five minutes after ignition shutdown
- Never touch, cut, or open any orange cable or components protected by orange shields.
- Remain a safe distance from vehicle if it is on fire.

Training for Emergency Responders

The National Fire Protection Association's (NFPA) Electric Vehicle Safety Training project provides firefighters and first responders with the information and materials necessary to respond to emergency situations involving electric vehicles. This training helps first responders identify electric vehicles and respond to common hazards. The project is being funded by a \$4.4 million grant from the U.S. Department of Energy.



Smart Grid & Smart Meters



Electricity is a critical part of modern lives, but it is often taken for granted. How does the electricity you need to watch your TV or wash your clothes get to your home? It travels through the electrical grid, an interconnected network of generating plants, transmission lines, and transformers.

What is Smart Grid?

Smart Grid refers to an improved electricity delivery system that includes monitoring, analysis, control, and communications capabilities. These “smart” technologies allow utilities to deliver electricity to homeowners and businesses as efficiently and economically as possible.

Why do we need a “smarter” grid?

In many areas of the United States, the existing electrical grid is getting old and worn out. In addition, population growth in some areas has caused the entire transmission system to be over used and fragile. Smart Grid technologies can improve the reliability, security, and efficiency of the electrical grid. A “smarter” grid will also allow for better integration of emerging technologies like solar power systems and electric vehicle charging stations.

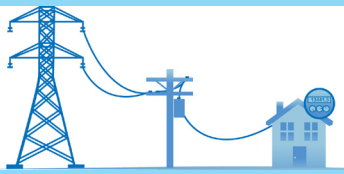
Residential Smart Meters

Smart grids provide a cost and energy efficient method for managing power on a large scale, but smart meters take that technology a step further, constantly monitoring and recording the amount of energy flowing to each specific customer. Unlike traditional meters that provide only one-way communication to the utility, smart meters allow for two way communication between the utility and the customer, providing valuable information to help customers better manage their energy use to save money and conserve energy.

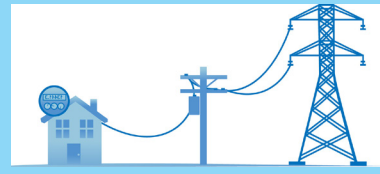
Smart meters are provided and installed by your local utility company in place of their traditional meter. Check with your utility regarding their plans for smart meter upgrades.

American Recovery and Reinvestment Act

On February 17, 2009, President Obama signed the American Recovery and Reinvestment Act of 2009. This economic recovery package included \$4.5 billion for activities to modernize the electric grid with smart grid technologies.



Smart Grid & Smart Meters



Identified Challenges

- Privacy– Instead of traditional one-way communication between the generation plant and the home or business, smart meters allow for two-way communication with the smart grid. Some are concerned that this type of communication, which involves the sharing of personal information including when you are home and what you are doing, is a violation of privacy.
- Encryption– As with other wireless technologies, smart devices are potentially vulnerable to hacking and other cyber-attacks. Utility companies are taking steps to ensure the security of smart meter data through encryption and other cyber security measures, adapting security protocols developed for the banking and defense sectors
- Radio Frequency (RF) Exposure– Household electronic devices, such as cell phones, wireless routers, and smart meters, produce RF emissions. Extremely high levels of RF exposure can be harmful to your health. In the U.S., the Federal Communications Commission (FCC) regulates the amount of RF energy that electronic devices, including smart meters, are allowed to emit in order to protect public health. Properly installed and maintained wireless smart meters result in much smaller levels of RF exposure than other common household devices, particularly cell phones and microwaves.
- Costs– Upgrading substations, lines, poles, meters, and communications systems, in addition to replacing aging equipment, is an expensive undertaking. Estimates for the deployment of Smart Grid technology in the U.S. range from \$338 billion to \$476 billion over the next 20 years. There is concern that these costs will ultimately be borne by the consumer.

Safety Considerations

- Whether you have a traditional mechanical meter or a smart meter, you should not attempt to alter, service/repair or remove the meter. Installation and service should only be performed by utility company personnel or their approved contractors.
- Keep the area around your meter and electrical panel clear for ease of access.

Did you know?

Within the next 4 years, approximately 65 million smart meters are expected to be installed across the country—that's more than half of all U.S. households.



Solar Power



For centuries, mankind has devised innovative ways to harness the power of the sun. From sun dials to solar powered gadgets, new technologies are being developed every day. Scientific advances during the last two and one half centuries have propelled solar technology into mainstream everyday applications.

What is solar power?

Quite literally, solar power is power or energy derived from sunlight. Sunlight can be directly utilized, converted in electrical energy, or converted into mechanical energy. Solar power is an important source of sustainable alternate energy.

Three common types of solar power are:

- **Passive Solar** – Passive solar technologies capture sunlight to heat and light buildings, allowing energy costs to remain low. Unlike active solar systems, passive solar design does not involve the use of mechanical or electrical devices, such as fans or pumps. A common structure that utilizes passive solar energy is a greenhouse. Just as with a greenhouse, schools, homes, and office buildings can take advantage of passive solar energy by including more windows in their design, using materials that help trap or pass heat, and constructing buildings at strategic angles so they will receive the most natural sunlight throughout the day.
- **Photovoltaic (“Solar Cells”)**–The Photovoltaic cell, also referred to as a PV device or “solar cell,” has the ability to directly convert solar energy into electrical energy. Once the electrical energy is generated, it has multiple commercial and residential uses. From wrist watches and small calculators to electric water pumps, photovoltaic cells can prove to be a useful power source.
- **Solar Thermal (Electric Power Plants)**–Unlike photovoltaic energy, solar thermal power is not generated directly from sunlight. Instead, the sun’s rays are concentrated and used to heat special fluids, which are then passed through pipes to heat water. The heated water produces steam which will provide mechanical energy through use of a turbine. That mechanical energy can then be converted into electrical energy by connecting the turbine to a generator. Various applications exist for power derived from solar thermal energy, including heating swimming pools, electric water heaters, and supplemental heating for homes.



Solar Power



Residential Considerations and Safety Precautions

Many homeowners find solar power advantageous for both its cost effectiveness and environmental friendliness. Before you decide to install a solar power system for your home, there are a number of important considerations:

- Do your homework. Research the various solar power systems and installation options before investing.
- Assess whether your property is a good site for solar. In general, you will need an open rooftop space or land that is free of shade for at least five hours per day. Wind speeds, heavy snow, and salt water can also affect your solar array.
- Investigate local building codes, zoning ordinances, covenants, and special regulations pertaining to solar power systems.
- Check with your local utility company to determine the requirements and costs or rebates for connecting your system to the grid.
- Before adding an active solar system to your home, have your home electrical system evaluated by a licensed, qualified professional to ensure it can support this new technology.
- Always hire a professional to install and repair solar panels at your home or workplace. Specific licensures and qualifications must be obtained before attempting to install solar equipment.
- Building, electrical, and plumbing codes also apply to solar power installations. Ensure your installer requests the appropriate permits and follows all applicable codes.
- Solar power systems present unique safety challenges for fire fighters. In the event of a fire, inform all officials of the use of solar panels as well as identify the type used. This will help them mitigate the risks.

Did you know?

If you generate your own electricity using a renewable energy source, like solar or wind energy, you may be able to sell your excess electricity to the utility company. Requirements vary by state and utility.

Wind Power



Like many other emerging technologies, wind power has become more mainstream in recent years. New technologies have decreased the cost of producing electricity from wind, and growth in wind power has been encouraged by the implementation of incentives for renewable energy products.

What is wind power?

The power of the wind is harnessed and transformed into electrical energy through the use of wind turbines. These turbines function very similarly to the childhood pinwheel toy: wind blows over the blades of the wheel creating lift and causing them to turn. The blades are connected to a shaft which is connected to and turns an electric generator, thus converting kinetic energy into electric energy.

Wind power can provide electricity in a variety of different situations. Large-scale operations are used to provide power for the utility electrical grid. Wind power systems can also provide a supplemental power source for grid-connected industrial, commercial, and residential locations. Stand-alone systems provide electricity for remote homes and businesses that are not serviced by the utility grid.

Residential Wind Power

Now that residential wind power systems are readily available, more homeowners are considering an investment in this technology. Many see it as a method of insulating themselves from fluctuating electricity costs and also reducing their home's carbon footprint. There are, however, a number of aspects to think about before deciding to install a wind power application for your home:

- Is there enough wind in your area? An average annual wind speed of at least 10 miles per hour is considered necessary to make a small wind system economical.
- Make sure your local building codes and zoning ordinances allow for wind turbine installations.
- Check with your utility company to determine the requirements and cost for connecting your system to the grid.
- Determine your household electricity needs and purchase a correctly-sized wind turbine.

Wind Farms

In large scale wind power operations, wind turbines are often grouped together into a single wind power plant, known as a wind farm, and generate bulk electrical power. Electricity from these turbines is fed into a utility grid and distributed to customers.



Wind Power



General Safety Considerations

- Break-down of materials - Turbines are only built to withstand certain strengths of wind. If subjected to winds in excess of those it was built for, the materials may begin to break down, resulting in portions of the blade flying great distances and posing the threat of harm.
- Fire – Lighting is one of the main causes behind turbine fires. Electrical malfunction, paired with the presence of combustible materials, such as insulation and lubricants, can also present serious fire hazards.
- Ice – Since large wind turbines operate at higher altitudes, the colder temperatures can cause ice to form on the blades when it rains. This ice can then be flung great distances as the blades spin, creating a safety hazard.
- Overhead power lines – People working in and around wind farms need to pay careful attention to overhead power lines. To prevent electrocution, all employees, tools and equipment should maintain a distance of at least ten feet from power lines, which carry extremely high voltage.
- Wildlife – Not only do wind farms take up habitat space for some species, they also can interfere with the migratory routes of birds and bats and pose physical danger to them if they fly into the turbines' paths.

The Intermittency Issue

For power grids that are dependent on wind, power outages will not occur in the event that the wind is not blowing. On a calm day, the turbines won't be able to produce power, but electricity will still be available from other power sources. Conversely, wind turbines typically don't produce electricity when wind speed exceeds a certain threshold, and have a device that prevents the blades from turning when the wind exceeds the limit of the turbine.

Did you know?

In 2010, wind turbines generated enough electricity to power about 8.7 million U.S. households for a year.

Home Safety Technology

For those who aren't early adapters of emerging technologies, there are other significant improvements that can be made to make your home more electrically safe. Installing arc fault circuit interrupters (AFCIs), ground fault circuit interrupters (GFCIs), and tamper resistant receptacles (TRRs) will help you minimize the risk of electrical fire, shocks, and electrocution without having to undertake major renovations.

Each year, home electrical fires in the United States are responsible for 450 deaths, more than 1,500 injuries, and \$1.5 billion in property damage. Fire is not the only danger, however. Thousands of children and adults are injured or killed by electricity annually.

AFCIs, TRRs, and GFCIs can prevent tragedy before it ever occurs. In fact, these devices have proven so effective that the National Electrical Code (NEC) requires them to be installed in all new homes. Existing homes with aging electrical systems can also benefit from these advanced technologies.

These devices should all be installed by a licensed, qualified electrician.

By the Numbers

- In the United States, arcing faults cause nearly 30,000 home fires each year, resulting in hundreds of deaths and injuries and more than \$750 million in property damage. The U.S. Consumer Product Safety Commission (CPSC) estimates that AFCIs could prevent more than 50 percent of the electrical fires that occur every year.
- Since the 1970s, ground fault circuit interrupters (GFCIs) have saved thousands of lives and have helped cut the number of home electrocutions in half.
- Each year, nearly 2,400 children are treated in hospitals for shocks and burns from tampering with electrical outlets. Most of these injuries are the result of small children placing ordinary household objects into the outlets with disastrous consequences. These incidents can be prevented with the installation of TRRs.

Q & A: Arc Fault Circuit Interrupters

Now more than ever, our homes are being dramatically transformed by in the introduction of new electrical devices. Unfortunately, the electrical systems of many existing homes are simply overwhelmed by these modern electrical demands, putting them at greater risk of arc faults and arc-induced fires.

What is an arc fault?

- An arc fault is a dangerous electrical problem caused by damaged, overheated, or stressed electrical wiring or devices.
- Arc faults can occur when older wires become frayed or cracked, when a nail or screw damages a wire behind a wall, or when outlets or circuits are overburdened.

Is this a common problem?

- More than 56% of the nearly 51,000 home electrical fires that occur in the U.S. each year involve arcing of home electrical equipment. These fires result in more than 1,000 deaths and injuries and more than \$700 million in property damage.

What are arc fault circuit interrupters, or AFCIs?

- AFCIs are devices that replace standard circuit breakers in your home's electrical service panel.
- AFCIs offer greater electrical fire protection than traditional breakers because they are equipped with advanced internal electronics that detect hazardous arcing conditions and shut down the electricity before a fire can start.

Are AFCIs effective?

- The U.S. Consumer Product Safety Commission (CPSC) estimates that AFCIs could prevent more than 50 percent of the electrical fires that occur every year.
- Beginning with the 2008 edition, the National Electrical Code (NEC) has expanded the requirements for AFCI installation beyond bedroom circuits to additional areas of the home, including dining rooms and family rooms.

How much do AFCIs cost?

- These devices can be purchased at any local electrical distributor, hardware store, and home improvement center across the country for approximately \$35 each. Depending on the size of a given home, the cost for installing additional AFCI protection is \$140 - \$350.

Can I install them myself?

- AFCIs should only be installed or replaced by a licensed, qualified electrician.

What does the TEST button do?

- AFCIs should be tested after installation and once each month to make sure they are working properly.
- Follow the device manufacturer's testing instructions.
- If the device does not trip when tested, it should be replaced.

What's the difference between an AFCI and a GFCI?

- The GFCI is designed to protect people from severe or fatal electric shocks while the AFCI protects against fires caused by arcing faults.

Q & A: Ground Fault Circuit Interrupters

Even today's modern electrical devices are subject to the basic principles of electricity. One of the most important being – water and electricity don't mix! Luckily, there is a technology available to help protect you from this shocking hazard. In fact, Ground Fault Circuit Interrupters have been providing this type of protection to consumers since the early 1970s.

What is a ground fault?

- A ground fault is an unintentional electrical path between a power source and a grounded surface.
- These leakage currents usually occur when an electrical appliance is damaged or the electrical parts are wet, causing electrical current to flow outside of the circuit conductors.
- If your body provides a path to the ground for this current, you could be burned, severely shocked, or electrocuted.

What are ground fault circuit interrupters, or GFCIs?

- GFCIs are electrical safety devices that are designed to protect people from electric shock and electrocution.
- Typically, GFCIs are installed in areas where water and electricity are in close proximity, such as the bathroom, kitchen, garage, basement, and outdoors.
- They are especially useful for cord-connected appliances and equipment used outdoors or near water.

How do GFCIs work?

- GFCIs prevent deadly shock by quickly shutting off power to the circuit if the electricity flowing into the circuit differs by even a slight amount from that returning, indicating a loss of current.

Are they effective?

- Since the 1970s, GFCIs have saved thousands of lives and have helped cut the number of home electrocutions in half.
- Since first including a home GFCI requirement in 1971, the National Electrical Code (NEC) has continually expanded the requirements to include additional locations. The NEC currently requires that GFCIs be used in all kitchens, bathrooms, garages, basements, crawlspaces, and outdoors.

Is it cost effective to switch to GFCIs?

- GFCI outlets are generally fairly inexpensive, starting under \$15.

Can I install them myself?

- GFCIs should only be installed by a licensed, qualified electrician.
- Portable GFCIs require no tools to install and provide flexibility in using receptacles that are not GFCI-protected. They are commonly used outdoors.

How to Test Your GFCIs

Be sure to test your GFCIs once a month to make sure they are working properly.

1. Push the “reset” button on the GFCI to prepare the outlet for testing.
2. Plug an ordinary nightlight into the GFCI and turn it ON. The light should now be on.
3. Push the “test” button of the GFCI. The nightlight should turn OFF.
4. Push the “reset” button again. The nightlight should now go ON again.

If the nightlight does not turn off when the “test” button is pushed, then the GFCI is not properly protecting you from shock or electrocution. It may have been improperly wired or damaged. Contact a licensed, qualified electrician to check the GFCI and correct the problem.

Q&A: Tamper Resistant Receptacles

Located in practically every room in every home, electrical outlets and receptacles represent a constant and real danger wherever young children are found. Tamper resistant receptacle (TRR) technology provides a simple, affordable, permanent solution to help prevent childhood shock and burn injuries caused by tampering with wall outlets.

What are tamper resistant receptacles, or TRRs?

- TRRs have a very similar appearance to standard wall outlets, but they are actually designed with spring-loaded receptacle cover plates that close off the receptacle openings, or slots.

Why do I need TRRs?

- Every year in the United States, more than 2,400 children under the age of 10 are treated in hospital emergency rooms for electrical shock or burns caused by tampering with a wall outlet around the home – that is seven children a day.
- Nearly one-third of these injuries occur when a small child attempts to insert household objects such as hairpins, keys, or paperclips into the receptacle.

How do TRRs work?

- When equal pressure is simultaneously applied to both sides, the receptacle cover plates open, allowing a standard plug to make contact with the receptacle contact points. Without this synchronized pressure, the cover plates remain closed, preventing the insertion of foreign objects.

Are TRRs effective?

- TRRs have proven to be so effective that the 2011 National Electrical Code (NEC) requires installation of TRRs in all new home construction.
- Although not widely used in homes until recently, tamper resistant receptacles have been required in hospital pediatric care facilities for more than 20 years.

How much do TRRs cost?

- The cost of installing a TRR in a newly constructed home is only about \$0.50 more than a traditional receptacle.
- Existing homes can be easily retrofitted with tamper resistant receptacles for as little as \$2.00 per outlet.

Can I install them myself?

- TRR's use the same installation guidelines that apply to standard receptacles and should only be installed by a licensed, qualified electrician.

Outreach Tools

Proclamation Request

Official government support for the National Electrical Safety Month campaign in your state, county, and/or city increases the impact of your electrical safety awareness efforts. An effective way to get your local government officials and agencies involved is to send them an Electrical Safety Month Proclamation request.

This sample letter highlights the mission of the National Electrical Safety Month campaign and emphasizes the need for electrical safety awareness. ESFI encourages you to customize this document with details specific to your community and submit it to your local government officials.

SAMPLE ELECTRICAL SAFETY MONTH PROCLAMATION REQUEST

Dear [Name]:

Since the late nineteenth century, electricity has been constantly changing the way people live and work. The methods for how electricity is generated and utilized have also evolved over the years. Electrical technologies that were considered “emerging” just a few years ago, such as plug-in electric vehicles and solar power generation systems, are now readily available throughout the country. Despite these significant advances, electricity remains uniquely unforgiving if not used safely. Each year, too many lives are disrupted by electrical fires and too many families mourn the loss of a loved one who is fatally injured by electricity.

The most recent statistical data from the National Fire Protection Association (NFPA) for 2005-2009 indicates an estimated annual average of more than 50,000 home fires involving some type of electrical failure or malfunction. These fires claimed 450 lives, injured nearly 1500 people, and resulted in \$1.5 billion in property damage each year. Electrical distribution and lighting systems were the fourth leading cause of home fires and the third leading cause of home fire deaths during this same period. Yet, electrical fires are not the only cause for concern. Statistics from the U.S. Consumer Product Safety Commission (CPSC) show that nearly 400 people are electrocuted each year in the United States. Analysis of workplace electrical injuries conducted by the Electrical Safety Foundation International (ESFI) reveals that workplace electrical hazards cause another 2,600 people per year to be injured so severely that they require time off from work to recover. These statistics are even more disturbing when you consider that most of these incidents and fires could have been prevented.

Outreach Tools

PROCLAMATION REQUEST CONTINUED

The Electrical Safety Foundation International (ESFI) sponsors National Electrical Safety Month each May to increase public awareness of the electrical hazards around us at home, school, and work. Campaign resources and outreach activities highlight the simple steps we can all take to avoid the personal tragedy behind the statistics. Electrical safety awareness and education among homeowners, families, employees, and communities will prevent electrical fires, injuries, and fatalities.

The primary focus of the 2012 National Electrical Safety Month (NESM) campaign is residential applications for emerging technologies and the safety considerations for existing home electrical systems. Like many other home components, electrical systems can wear out over time, increasing the potential for electrical hazards. ESFI's campaign materials encourage consumers to consider the overall electrical safety of their homes when making decisions regarding new technologies. NESM materials also highlight the tremendous safety benefits provided by arc fault circuit interrupters (AFCIs), ground fault circuit interrupters (GFCIs), and tamper resistant receptacles (TRRs). These technologies, while no longer "emerging," provide advanced protection against shocks, electrocution and electrical fires.

I urge you to join with us in this important initiative to increase electrical safety awareness in order to reduce the number of electrically-related fires, fatalities, injuries, and property loss. Your Electrical Safety Month Proclamation will serve as a powerful example of your commitment to the safety of the people of _____.

Respectfully,

Outreach Tools

Sample Proclamation

MAY IS ELECTRICAL SAFETY MONTH

Whereas, hundreds of people die and thousands are injured each year in the United States as a result of electrically-related incidents;

Whereas, there are, on average, 450 civilian deaths related to electrical home structure fires each year;

Whereas, property damage resulting from home fires caused by electrical failure or malfunction amounts to more than \$1.5 billion annually;

Whereas, more than seven people are electrocuted each week in the United States;

Whereas, following basic electrical safety precautions can help prevent thousands of people from being injured or killed each year;

Whereas, citizens are encouraged to inspect their homes and workplaces for possible electrical hazards;

Whereas, citizens are advised to protect their homes and families with the latest safety technology, such as ground fault circuit interrupters, arc fault circuit interrupters, and tamper resistant receptacles;

Whereas, citizens are urged to install, test, and properly maintain an adequate number of smoke alarms;

Whereas, the Electrical Safety Foundation International (ESFI) is dedicated exclusively to promoting electrical safety in the home, school, and workplace through education, awareness, and advocacy:

Now, therefore, I, _____, Governor of _____, do hereby proclaim May as Electrical Safety Month. This month observes the importance of establishing and practicing good electrical safety habits in the home, school, and workplace to reduce the number of electrically-related fires, injuries, and deaths.

I call upon the people of _____ to celebrate electrical safety during the month of May and to follow good electrical safety practices throughout the year.

In witness whereof, I have hereunto set my hand this _____ day of _____ 2012.

Gov.

Date

Outreach Tools

Customize this sample press release and submit to any local media contacts/outlets you think may be interested in learning about and promoting National Electrical Safety Month. Follow up with all media by contacting assignment desks to confirm receipt of the release and to provide any additional information.

[Insert Organization logo]

[Insert Organization/Company Name] to Celebrate National Electrical Safety Month

FOR IMMEDIATE RELEASE

[Insert Date]

Contact: [Insert contact name]

[Insert contact phone]

City, State—May is National Electrical Safety Month, and [Insert Company/Organization Name] is joining with the Electrical Safety Foundation International (ESFI) to raise awareness about potential home electrical hazards and the importance of electrical safety. This year’s campaign educates the public about emerging technologies and the electrical hazards associated with them. These technologies include electric vehicles, solar power, wind power, and smart meters.

In the United States, home electrical failures or malfunctions cause more than 50,000 fires each year, resulting in 450 deaths, nearly 1,500 injuries, and over \$1.5 billion in property damage, according to the National Fire Protection Association (NFPA). To help prevent electrical fires and incidents, it is vital that consumers know the ins and outs of their electrical system and understand the safety concerns associated with the latest residential technologies before bringing them into their homes.

“We are inundated with news about the increasing prevalence of electric vehicles, smart meters, and renewable energy sources, but there is not a lot of information readily available to educate consumers about the potential electrical safety hazards,” explains [Insert Company/Organization contact]. “Consumers need to be well educated about these new technologies and be sure to have an electrical system evaluation performed before adding new components to their home electrical system.”

ESFI is also reminding consumers that there are simple improvements that can be made to any home to increase electrical safety without undertaking a major renovation. This includes the installation of arc fault circuit interrupters that prevent fires by detecting hazardous arcing conditions, ground fault circuit interrupters that prevent shocks, and tamper resistant receptacles that replace standard wall outlets to protect children from shocks and burns.

Electrical safety awareness and education among consumers, families, employees, and communities will prevent electrical fires, injuries, and fatalities. Learn more about home electrical safety by visiting ESFI’s Virtual Home at <http://virtualhome.esfi.org>.

[Insert Organization boilerplate]

The Electrical Safety Foundation International (ESFI) sponsors National Electrical Safety Month each May to increase public awareness of the electrical hazards around us at home, work, school, and play. ESFI is a 501(c)(3) non-profit organization dedicated exclusively to promoting electrical safety. For more information about ESFI and electrical safety, visit www.electrical-safety.org.

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Outreach Tools

Customize this sample press release and submit to any local media contacts/outlets you think may be interested in learning about and promoting National Electrical Safety Month. Follow up with all media by contacting assignment desks to confirm receipt of the release and to provide any additional information.

[Insert Organization logo]

[Insert Organization/Company Name] Educates Consumers about Home Safety Technology as Part of National Electrical Safety Month

Minor improvements to the home provide major safety benefits

FOR IMMEDIATE RELEASE

[Insert Date]

Contact: [Insert contact name]

[Insert contact phone]

City, State—May is National Electrical Safety Month, and [Insert Company/Organization Name] is joining with the Electrical Safety Foundation International (ESFI) to raise awareness about potential home electrical hazards and the importance of electrical safety.

In addition to the overarching campaign theme of emerging technologies and the electrical hazards associated with them, ESFI is reminding consumers about the importance of home safety devices that provide safety enhancements without requiring major renovations. These devices include arc fault circuit interrupters (AFCIs), ground fault circuit interrupters (GFCIs), and tamper resistant receptacles (TRRs).

Arc Fault Circuit Interrupters (AFCIs)

- An arc fault is a dangerous electrical problem caused by damaged, overheated, or stressed electrical wiring or devices.
- Arcing faults are one of the major causes of the more than 50,000 home electrical fires that occur each year in the United States.
- AFCIs replace standard circuit breakers in the home's electrical service panel and provide a higher level of electrical fire protection by detecting hazardous arcing conditions and shutting down the electricity before a fire can start.
- While AFCIs were originally only required to protect bedroom circuits, the 2011 National Electrical Code (NEC) requires that this technology be installed in additional areas of the home, including dining rooms and living rooms.
- Although the new safety requirements apply to newly constructed homes, older homes with aging wiring systems can also benefit from the added protection provided by AFCIs.
- AFCIs should only be installed or replaced by a licensed, qualified electrician
- AFCIs must be tested monthly to ensure they are working properly.

Ground Fault Circuit Interrupters (GFCIs)

- A GFCI is a device designed to protect people from shock and electrocution.
- GFCIs constantly monitor electricity flowing in a circuit, and quickly switch off power if they sense any loss of current.
- GFCIs could prevent over two-thirds of home electrocutions that occur each year according to the Consumer Product Safety Commission (CPSC).

Outreach Tools

- GFCIs can be installed at the main service panel, in place of standard electrical outlets, or can be used as a portable device.
- Typically, GFCIs are installed in areas where water and electricity are in close proximity, such as the bathroom, garage, kitchen, and basement.
- GFCIs should be tested monthly, as they can be damaged as a result of voltage surges from lightning, utility switching or normal usage.
- While GFCIs should be installed by a licensed electrician, portable GFCIs require no tools to install.

Tamper Resistant Receptacles (TRRs)

- TRRs look just like ordinary outlets, but are designed with spring-loaded receptacle cover plates that close off the receptacle openings, or slots.
- When equal pressure is simultaneously applied to both sides, the receptacle cover plates open to allow the standard plug to make contact with the receptacle contact points.
- Without simultaneous pressure, the cover plates remain closed, preventing insertion of foreign objects and protecting your children from painful, traumatic electrical injuries.
- Every year in the United States, more than 2,400 children under ten years old are treated in hospital emergency rooms for electric shock or burns caused by tampering with a wall outlet, which could be prevented by installing TRRs in the home.
- Tamper resistant receptacles have proven to be so effective that the 2011 National Electrical Code (NEC) requires installation of TRRs in all new homes.
- TRRs should be installed by a licensed, qualified electrician.

[Insert Organization boilerplate]

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