



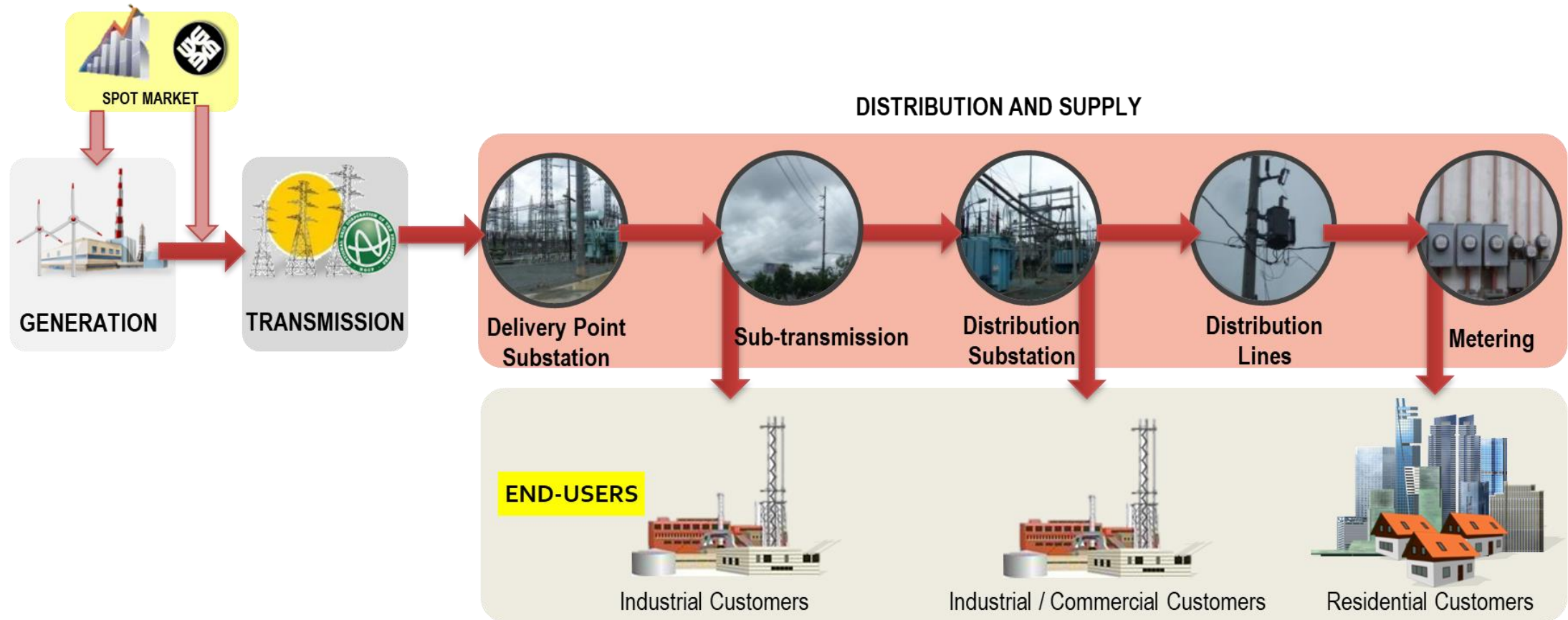
ELECTRICAL SAFETY 101

Outline

- I. Basics of Electricity
- II. Legal Basis of Electrical Safety
- III. Hazards and Risks of the Use of Electricity
- IV. Electrical Safety
- V. 10 Golden Rules of Electrical Safety

Basics of Electricity

The Electric Power Distribution System in the Philippines



MERALCO Franchise Statistics

“MERALCO serves as a mission critical Utility Service Provider”

Largest electric distribution utility in the Philippines



Franchise Area: **9,685 sq. km.**

3% of Philippine land area

36 cities and 75 municipalities

Covers **Bulacan, Cavite, Metro Manila, and Rizal** ...

... and certain cities, municipalities, and barangays in the provinces of **Batangas, Laguna, Pampanga, and Quezon**

Total Customers: **6.6 million**

-  Home to approximately **27% of Philippine population**
-  Franchise area generates around **50% of GDP**
-  Produces **60% of manufacturing output**
-  Energy sales account for **55% of the entire country²**

Commercial
500K (8%)

Residential
5.81M (92%)



Industrial

29%

Residential

31%

Commercial

40%



Count and Sales Breakdown

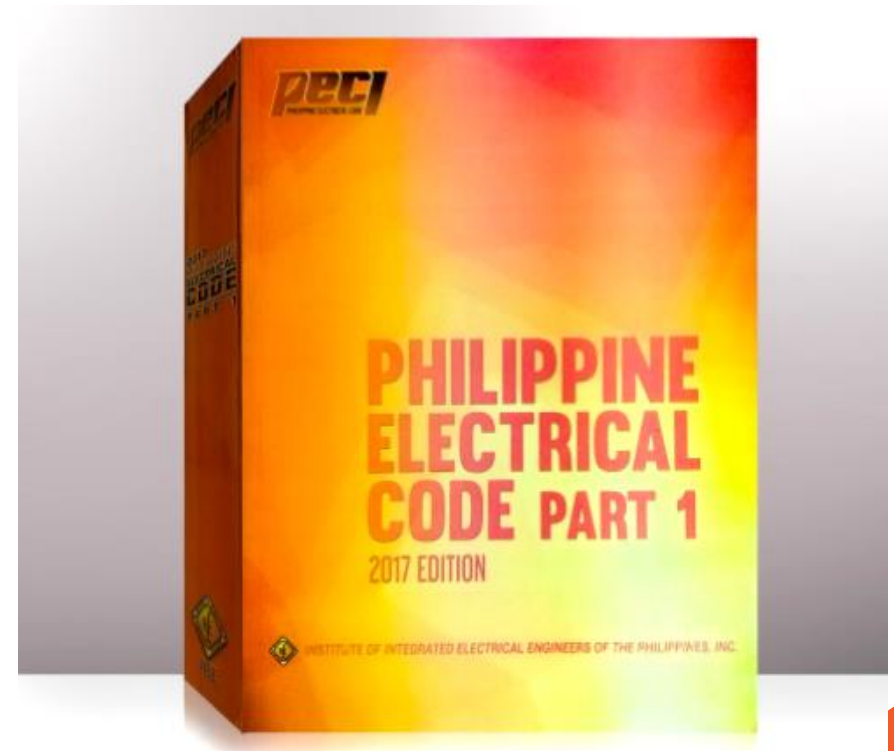
Demand: **7,399 MW (peak)**

Energy Sales: **44,313 GWh**

Legal Basis of Electrical Safety

**Compliance to Laws and National Codes & Standards help
ensure electrical safety**

Philippine Electrical Code (Part I & II)

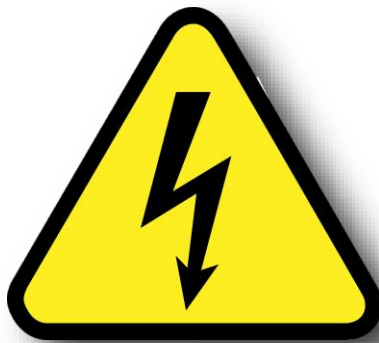


Hazards and Risks of the use of Electricity

Three types of Electrical Risks:

Electrical Shock:

Electricity travels in closed circuits, normally through a conductor. But sometimes a person's body — an efficient conductor of electricity — mistakenly becomes part of the electric circuit



Flashover:

also known as an Arc flash, is a continuous electric discharge of high current which flows through an air gap between conductors. This generates a very bright ultra-violet light as well as intensive heat. An arc flash is typically caused by a short circuit.



Electrical Fire:

occur when electric current ignites flammable materials. Electrical fires are extremely dangerous because putting them out with water may expose a person to a higher risk of electric shock.



EFFECTS OF ELECTRICAL CONTACT TO THE HUMAN BODY

WHY WORRY ABOUT ELECTRICITY?

Electrocutions rank **fourth** in causes of industrial fatalities (behind traffic, violence and construction).

Most of the accidents involve low voltage (600 volts or less).

Electricity flowing through the body can shock, cause involuntary muscle reaction, paralyze muscles, burn tissues and organs, or kills.

Source: IIEE. Electrical Safety at Home, School, Office and Workplace



EFFECTS OF ELECTRICAL SHOCK



Fall from heights



Major or Minor Injuries



Unconsciousness/Head Injury or Death



EFFECTS OF ELECTRICAL SHOCK

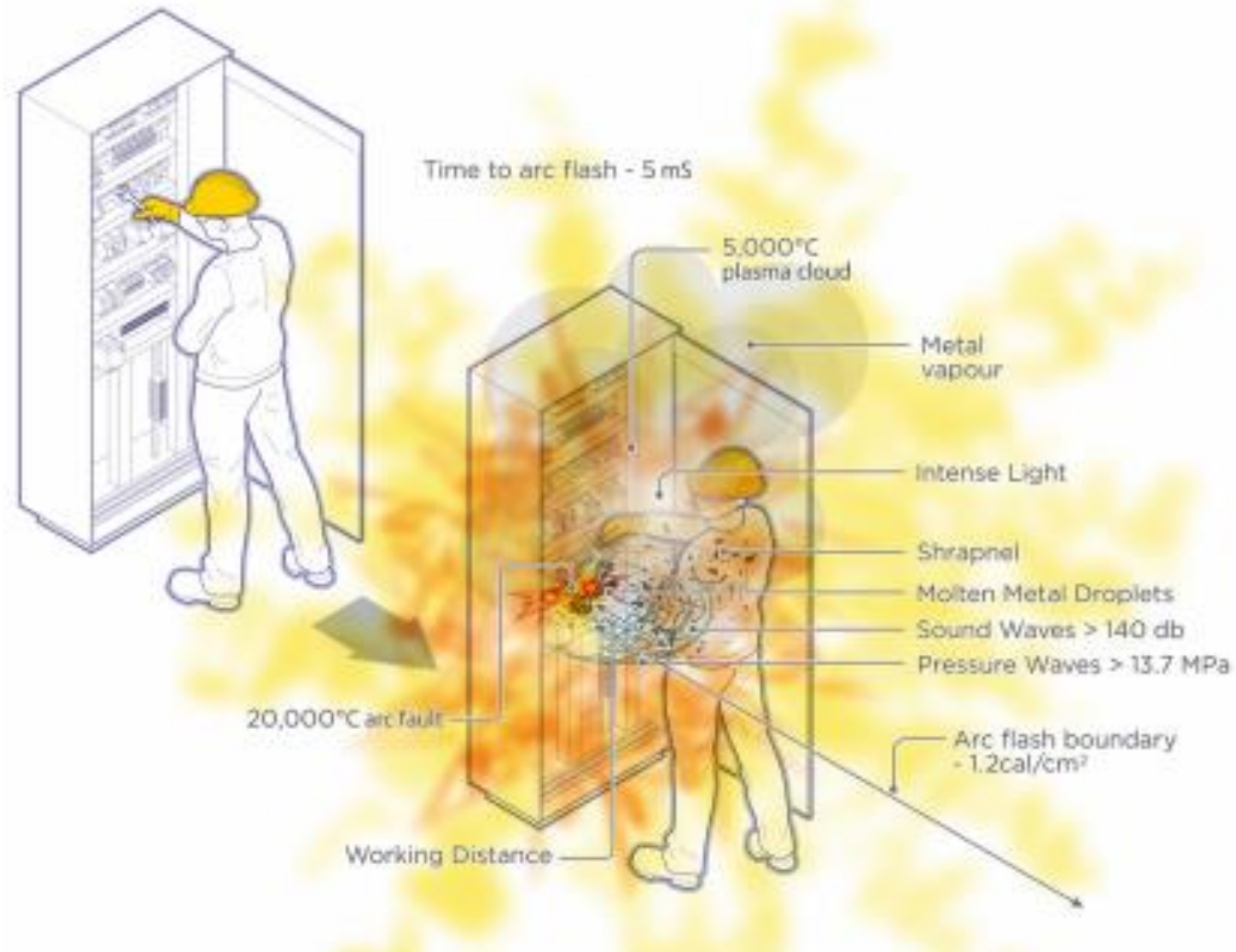
Electrical Burns



Fatal Electrocution



FLASHOVER EVENT



EFFECTS OF FLASHOVER

Multiple Degree Burns



Blindness



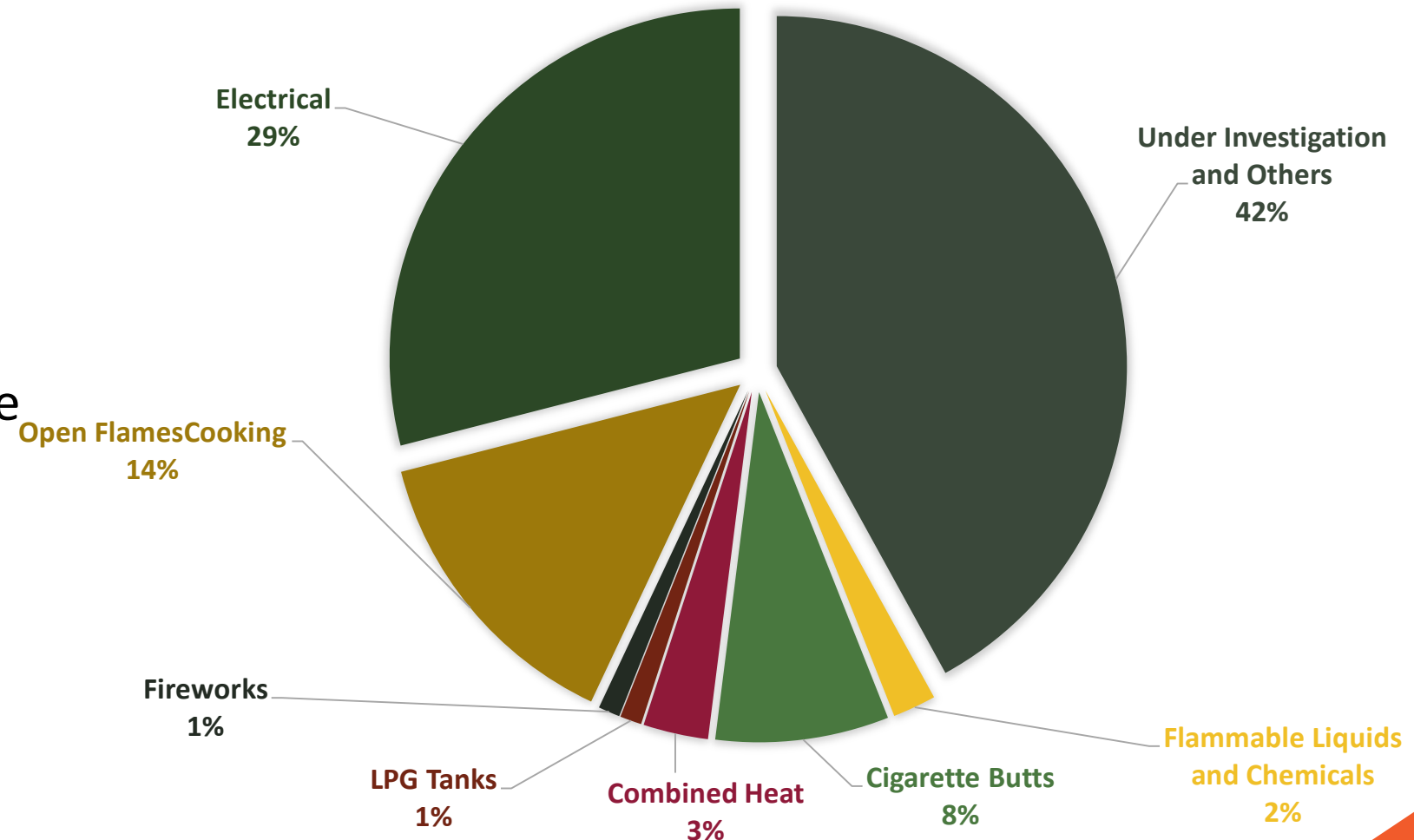
Fatality



Electrical Fire Statistics

Causes of fire accidents

- A total of 19,292 fire incidents occurred throughout the Philippines in 2016
- The two leading causes of fire are due to electrical and open flame/cooking

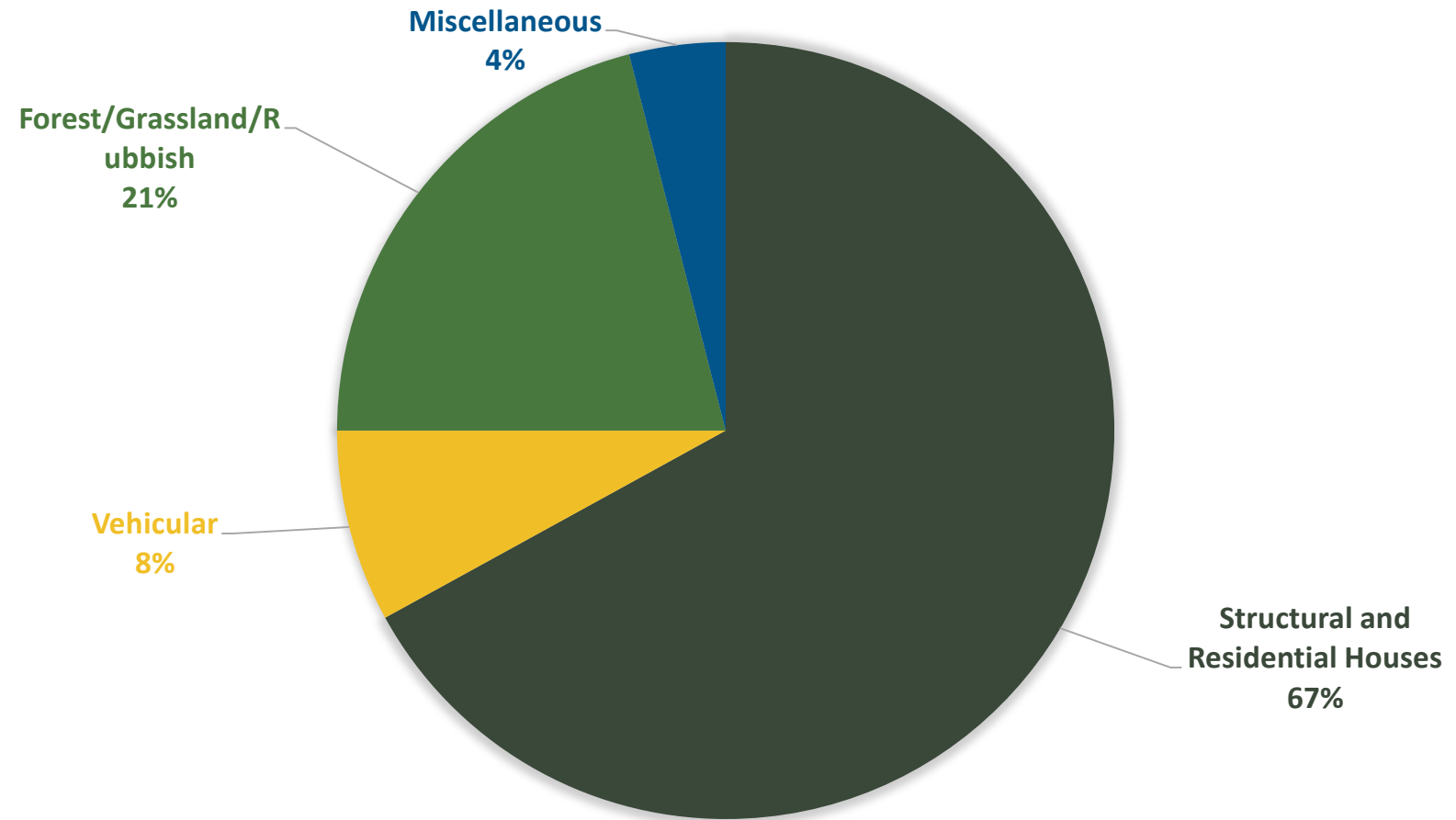


Note: Total of 285 Filipinos died and 987 are injured each year in fires.

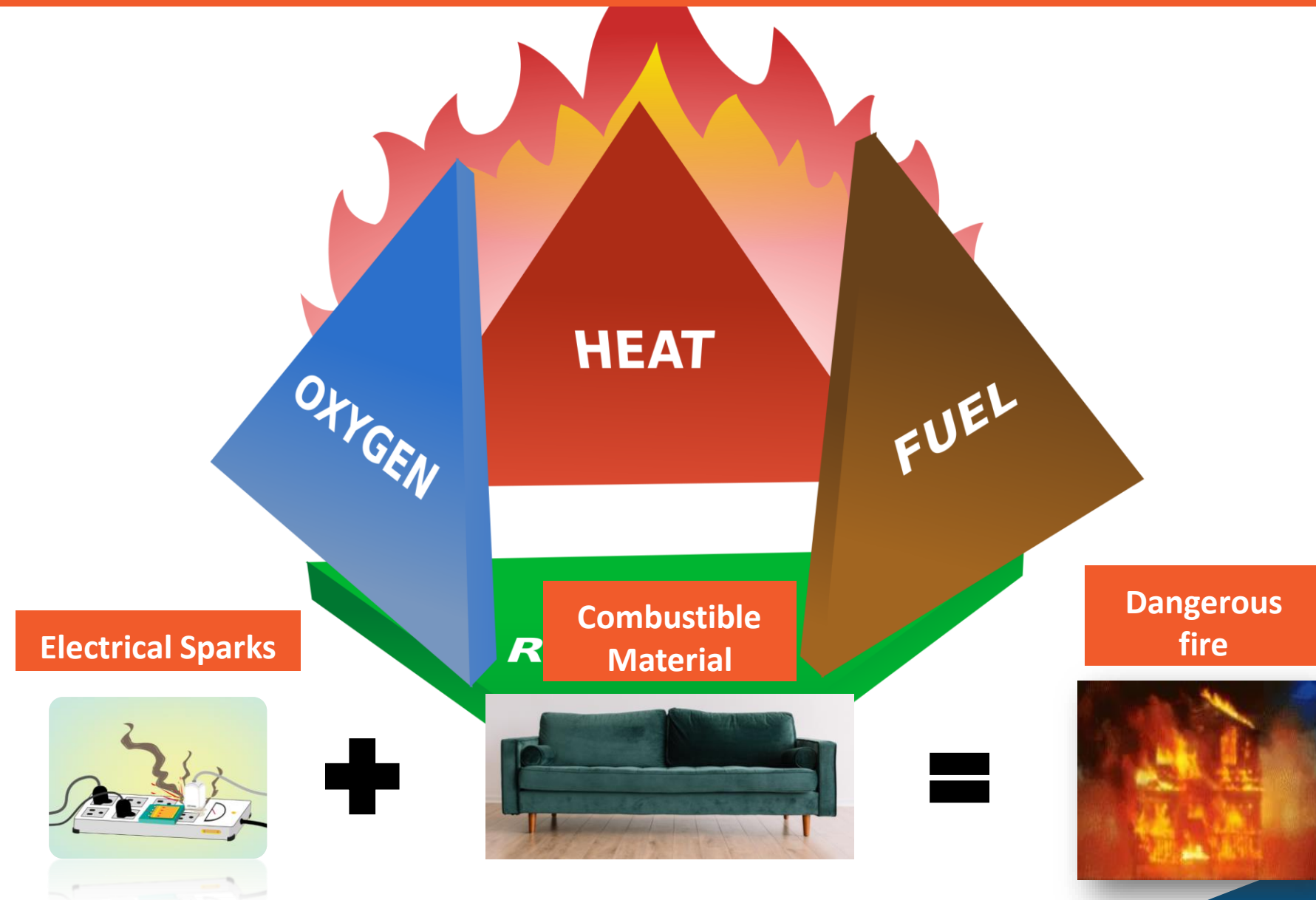
Electrical Fire Statistics

Locations of fire accidents

Most of these fire transpired in residential houses and structural buildings



EFFECTS OF ELECTRICAL FIRE



EFFECTS OF ELECTRICAL FIRE

Multiple Degree Burns



Suffocation



Fatality

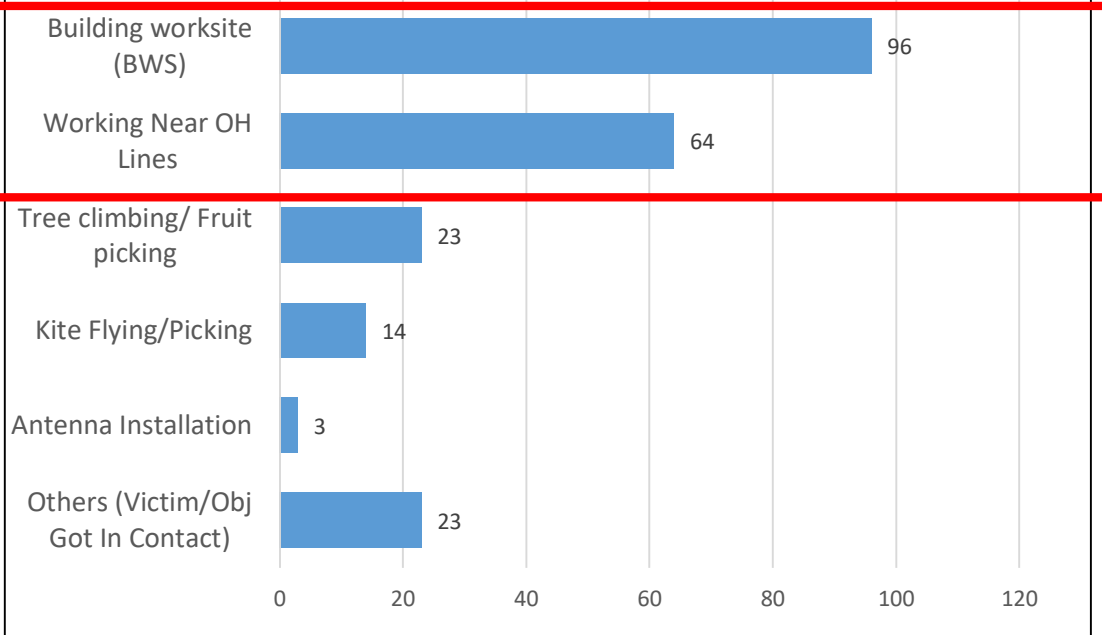


Electrical Safety (Line side)

PUBLIC SAFETY STATISTICS

Building Work Site incidents (BWS) is still the top contributor of 226 Public Incidents in 2020

2020 DUE TO PUBLIC ACTION INCIDENTS



CAUSES

- Lack of awareness of construction workers on power line safety
- Building work sites violate safe clearance distance from power lines

CONSEQUENCES

Injury or fatality to public from accidental contact to power lines



IDENTIFYING MERALCO LINES

IDENTIFYING MERALCO LINES

VOLTAGE INCREASES AS THE HEIGHT INCREASES



115, 000 Volts

27 meters above ground

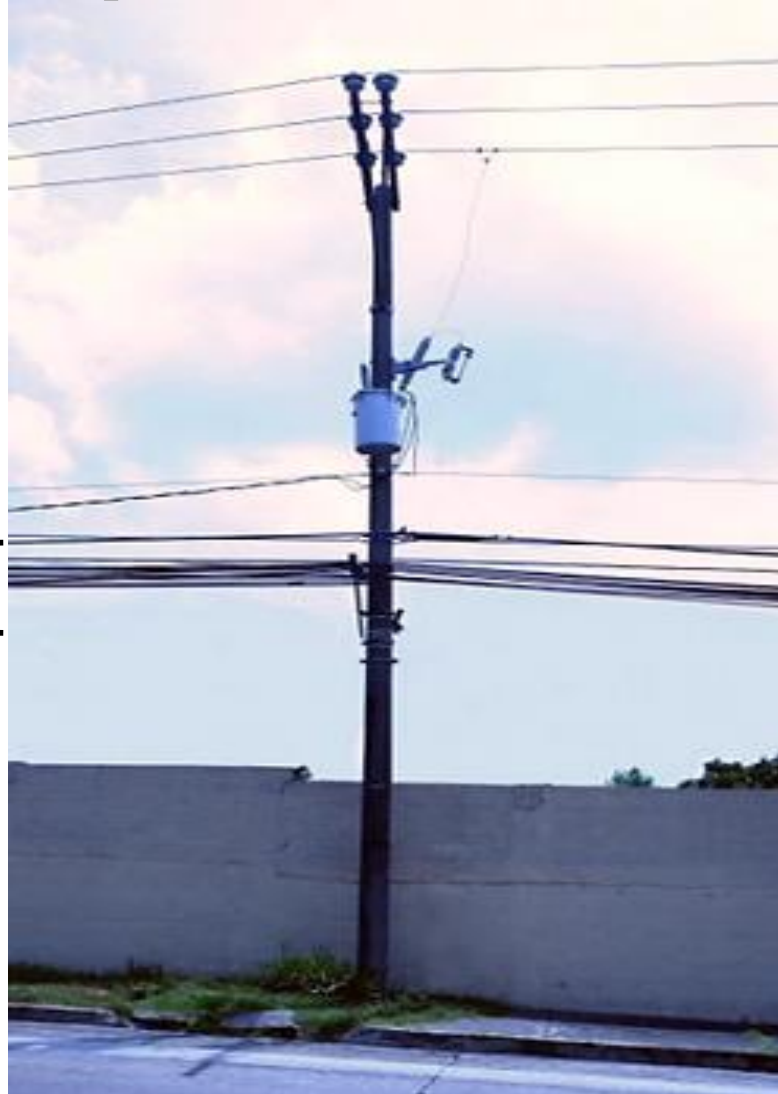
34, 500 Volts

13 meters above ground

IDENTIFYING MERALCO LINES

DISTRIBUTION LINES ARE EQUALLY DANGEROUS AS TRANSMISSION LINES

Telecom, Cable TV Wires {



} **34,500 Volts**
13 meters above ground

} **230 Volts**
7 meters above ground

AVOIDING POWER LINE CONTACTS

Common Incidents From Building Work Sites (BWS)

AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

**WORKING NEAR POWERLINES
MUST BE AVOIDED**



AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

IMPROPER HANDLING OF ITEMS ARE COMMON ACCIDENT CAUSES



AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

**BE MINDFUL OF LONG ITEMS THAT
MAY BRING CONTACT TO POWERLINES**



AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

**SPOTTERS ARE NECESSARY TO GUIDE
CRANE OPERATORS AVOID POWERLINE CONTACT**



AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

**CONCRETE PUMPS ARE EXPOSED
TO THE SAME HAZARDS AS CRANES**



AVOIDING POWER LINE CONTACTS

AVOIDING POWER LINE CONTACTS

ANTENNA INSTALLATION



AVOIDING POWER LINE CONTACTS

TREE CUTTING / PRUNING



AVOIDING POWER LINE CONTACTS

FRUIT PICKING



AVOIDING POWER LINE CONTACTS

KITE FLYING

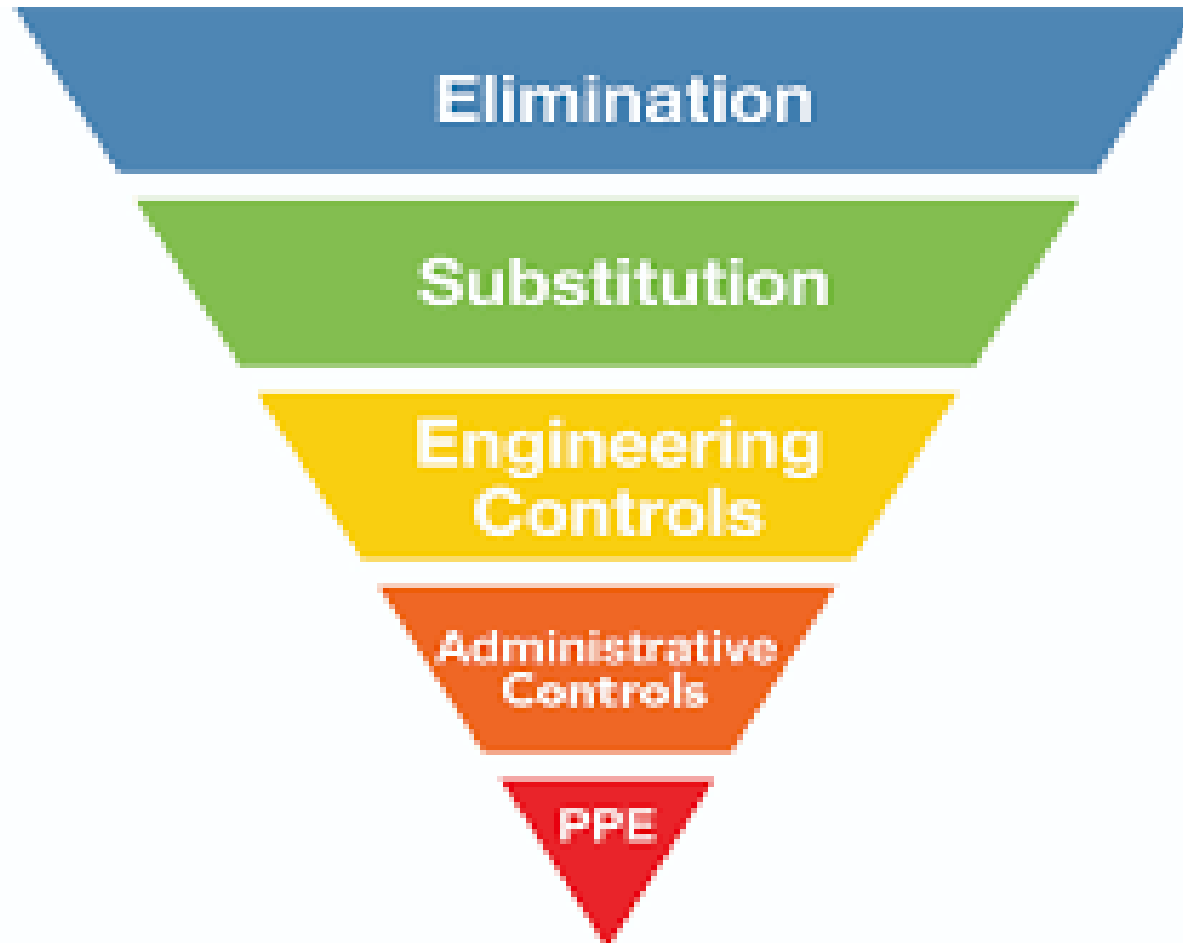


MEASURES TO AVOID CONTACT

AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

Hierarchy of Controls



AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

Compliance to P.D. 1096

THE NATIONAL BUILDING CODE OF THE PHILIPPINES

(Presidential Decree No. 1096 — R.A. 6541 Revision)



The 2004 Revised IMPLEMENTING RULES AND REGULATIONS (IRR) of P.D. 1096

(Department of Public Works and Highways)

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Bonifacio Ddye, Port Area, Manila

13 APR 2018

NBCDO MEMORANDUM)
CIRCULAR NO. 01)
Series of 2018)

SUBJECT: STRICT COMPLIANCE ON SETBACK
REQUIREMENTS UNDER RULE VIII,
REVISED IRR OF PD 1096

TO : ALL BUILDING OFFICIALS
CITY/MUNICIPAL ENGINEERS
DPWH DISTRICT ENGINEERS

It has been observed that setback requirements, particularly front setbacks, of buildings constructed along national and local roads are not properly observed nor complied with pursuant to the provisions of Rule VIII, Revised Implementing Rules and Regulations (IRR) of the National Building Code of the Philippines (PD 1096).

In this regard, all concerned Building Officials are hereby directed to conduct ocular inspections of all non-compliant buildings/structures in their respective areas of jurisdiction, and notify directly the concerned building owners, copy furnished the undersigned, through the National Building Code Development Office (NBCDO), to comply with the provisions of Rule VIII, Revised IRR of PD 1096, and for them to correct/remove such violation/s pursuant to Section 211, Item 1 (b), of said Rule which states that *"In addition to the imposed penalty, the owner shall correct/remove his violations of the provisions of the Code"*.

Likewise, all DPWH District Engineers are directed to conduct the same undertaking along national roads in your respective areas of jurisdiction, and submit to the undersigned, through the NBCDO, your inventory of such non-compliant buildings/structures using the attached form (see Annex "A").

Appropriate sanctions will be taken against those who fail to comply with this directive.

For strict and immediate compliance.

MARK A. VILLAR
Secretary

AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

**AVOID POWERLINE CONTACT,
MAINTAIN A SAFE DISTANCE OF 3 METERS**



AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

SAFE CLEARANCES REQUIRED BY LAW

Clearance Description	Primary Lines up to 34.5/20 kV		69 kV Open Supply Cond.	115 kV Open Supply Cond.
	Open Supply Cond.	Unguarded Rigid Parts		
A. Buildings				
1. Horizontal, H, to walls, projections, guarded and unguarded windows, balconies, and areas readily accessible to pedestrians	2 300	2 000	2 480	2 780
2. Vertical, V				
(a) Over or under roofs or projections not readily accessible to pedestrians	3 800	3 600	3 980	4 280
(b) Over or under balconies and roofs readily accessible to pedestrians	4 100	4 000	4 280	4 580
(c) Over roofs accessible to vehicles but not subject to truck traffic	4 100	4 000	4 280	4 580
(d) Over roofs accessible to truck traffic	5 600	5 500	5 780	6 080
B. Signs, Chimneys, Billboards, Radio and Television Antennas, Tanks, and Other Installations not Classified as Bldgs or Bridges				
1. Horizontal, H	2 300	2 000	2 480	2 780
2. Vertical, V				
(a) Over or under catwalks and other surfaces upon which personnel walk	4 100	4 000	4 280	4 580
(b) Over or under other portions of such installations	2 450	2 300	2 630	2 930

AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

Installation of barriers to avoid powerline contact



AVOIDING POWER LINE CONTACTS

CONSTRUCTION ACTIVITIES

Require construction workers to wear appropriate PPEs when working near powerlines



AVOIDING POWER LINE CONTACTS

MERALCO Initiatives

AVOIDING POWER LINE CONTACTS

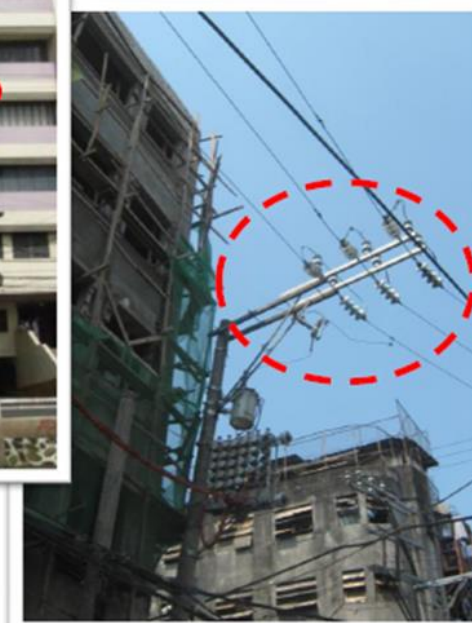
Reconstruction of Facilities/Engineering Methods



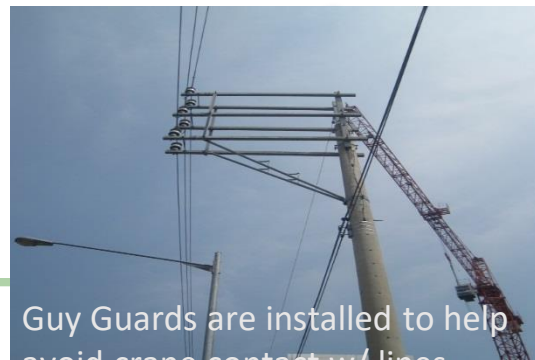
Installation of insulated wires to line facilities to avoid accidental contact.



Installation of conductor covers to provide barrier to construction workers.



Reconstruction of facilities to maintain safe clearance from building under construction.



Guy Guards are installed to help avoid crane contact w/ lines

AVOIDING POWER LINE CONTACTS

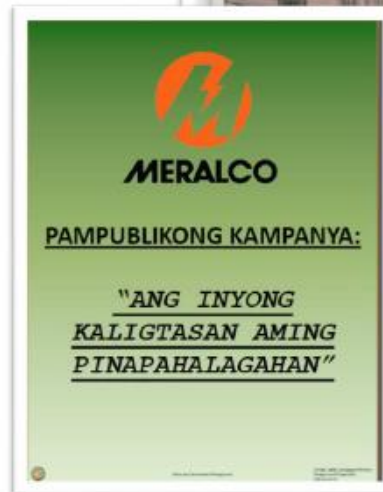
Ground Work Activities



Electrical safety lectures at Roxas High School, Quezon City



Council of Student Chapters Forum at Meralco Theater



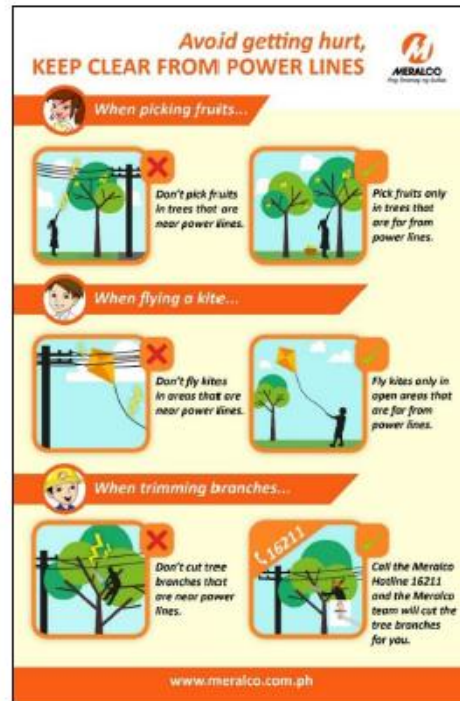
Building work site safety lectures were conducted using Flip Charts



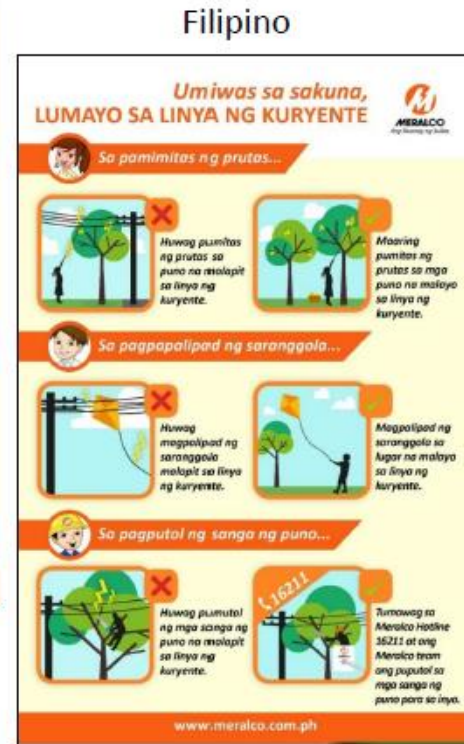
AVOIDING POWER LINE CONTACTS

Ground Work Activities

Leaflets distributed to customers



English



Filipino

Poster Type Collaterals for Kiosks and Building Work Sites



AVOIDING POWER LINE CONTACTS

Electrical Safety Education Campaign

Electrical Safety Information @ Meralco.com.ph

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 - Home Safety Tips**
 - Construction Safety Tips
 - Earthquake Safety Tips
 - Fire Safety Tips
 - Typhoon Safety Tips



Home Safety Tips

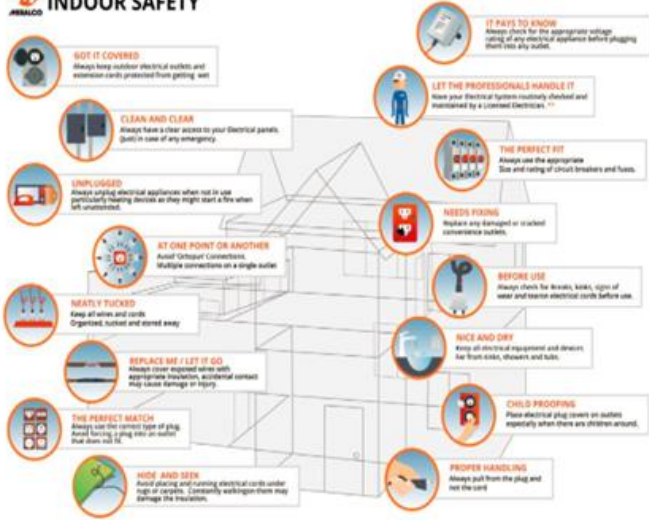
In preventing electrical accidents, a little care and vigilance goes a long way to help you avoid a good deal of damage, and ensure your family's safety. Here are a few reminders to keep in mind:

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1. Indoor Safety Tips

 **INDOOR SAFETY**



- IT PAYS TO KNOW**
Always check for the appropriate voltage rating of any electrical appliance before plugging them into any outlet.
- LET THE PROFESSIONALS HANDLE IT**
Have your electrical system routinely checked and maintained by a licensed electrician.
- THE PERFECT FIT**
Always use the appropriate size and rating of circuit breakers and fuses.
- NEEDS FILING**
Replace any damaged or cracked convenience outlets.
- BEFORE USE**
Always check for screws, bolts, signs of wear and tear on electrical cords before use.
- CHILD PROOFING**
Place electrical plug covers on outlets, especially when there are children around.
- PROPER HANDLING**
Always pull from the plug and not the cord.
- NOT IT COVERED**
Always keep outdoor electrical outlets and extension cords protected from getting wet.
- CLEAN AND CLEAR**
Always have a clear access to your electrical panels, built in case of any emergency.
- UNPLUGGED**
Always unplug electrical appliances when not in use (particularly charging devices as they might catch a fire when left unattended).
- AT ONE POINT OR ANOTHER**
Avoid "Daisy-Chain" Connections. Multiple connections on a single outlet.
- NEATLY TUCKED**
Keep all wires and cords organized, tucked and stored away.
- REPLACE ME / LET IT GO**
Always cover exposed wires with appropriate insulation, accidental contact may cause damage or injury.
- THE PERFECT MATCH**
Always use the correct type of plug. Avoid forcing a plug into an outlet. Pull down on the plug.
- HIDE AND SEEK**
Avoid placing and running electrical cords under rugs or carpets. Constantly walking on them may damage the insulation.

"A little care and vigilance goes a long way to help you avoid a good deal of damage, and ensure your family's safety."

AVOIDING POWER LINE CONTACTS

Electrical Safety Education Campaign



Public Safety Flash Animation
(link <https://www.youtube.com/watch?v=GhwHb8R7MGk>)

AVOIDING POWER LINE CONTACTS

Electrical Safety Education Campaign

Electrical Safety In Power Up Forum @ Facebook

B Bernice Gretchel Garcia to Pamilyang Meralco
October 17, 2017 · 🌐

Reinforcing our solid partnership with Ayala Land conglomerate. [Power Up Forum](#) led by CBG RM, Darryl Francisco with the support of CBG Marketing, TS & ES, Networks - NAP, Design team and Safety. — with Victor IV Risma and 13 others.



You, Daphne Doraja Syjuco, Amanda Fernandez and 18 others

Like Comment Share

J Janelle Paola Jacinto to Pamilyang Meralco
August 30, 2017 · 🌐

Happening Now: 3rd South Business Area [Power Up Forum](#) for LGU department heads and building officials.

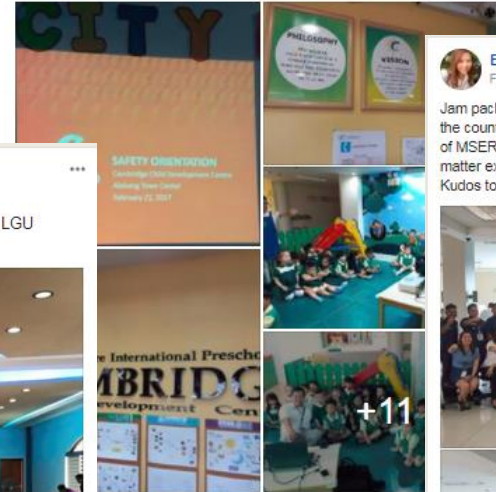


You, Daphne Doraja Syjuco, Amanda Fernandez and 21 others

Like Comment Share Send in Chat

Leslie Anne Degrano to Pamilyang Meralco
February 21, 2017 · Muntinlupa City · 🌐

Safety Awareness at Cambridge Child Development Center, Alabang Town Center Muntinlupa City 📍 #mduties #alabangbc #powerupforum — with Richard Macayan at Cambridge Child Development Centre - Alabang.



Bezie Mae Mina to We are One Meralco
February 12 at 8:23pm · 🌐 · Multi-Company Group

Jam packed Power Up Forum conducted for PNP with rank officers all over the country as attendees. Many many thanks to Allan Dilla of OSRO, Cholo of MSERV, Robert Marlon Perea of Spectrum & our very own CBG subject matter experts, Dean Arnold Sempio, Dennis Miranda & Jojo Santiago III. Kudos to everyone! 😊 — with Gerilyn Solidum and Georgina Magno.



You, Daphne Doraja Syjuco, Amanda Fernandez and 9 others

Love Comment

AVOIDING POWER LINE CONTACTS

Electrical Safety Education Campaign

Media Engagements on Electrical Safety

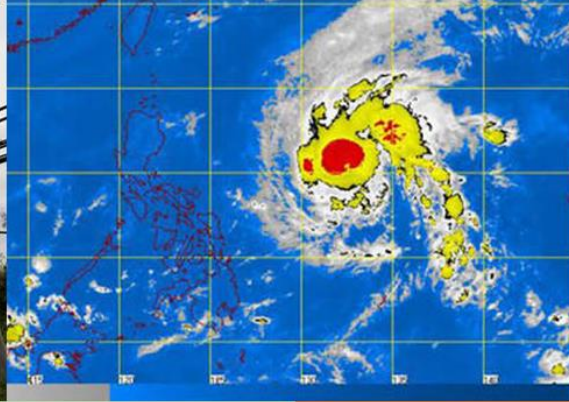


DISASTER ELECTRICAL SAFETY

TYPHOON & FLOOD SAFETY



Never touch, kick, pull, or attempt to pull a fallen wire. Even a telephone wire could be deadly if tangled with power lines some distance away.



Turn off main breaker / switch before flood water reaches the floor of your house.



Do not position electrical appliances near windows. Strong rains could get into your appliances and cause short circuit.

Stormy weather brings the possibility of downed power lines. All lines down should be treated "live and dangerous".



Electrical Safety (Load side)

AVOIDING ELECTRICAL ACCIDENTS AT HOME/OFFICE

Electrical Fire Prevention Practices



- Keep hallways and stairways clear for quick exits and always equip them with smoke detectors whenever possible.

Electrical Fire Prevention Practices



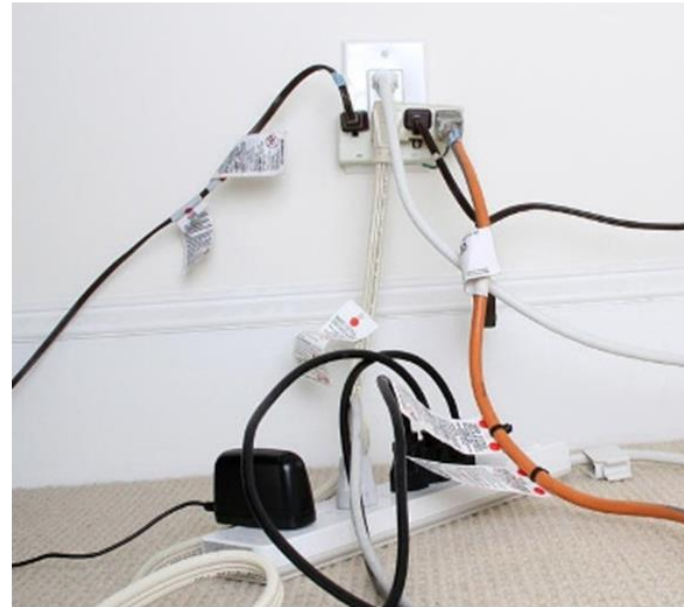
- Check for signs such as blown fuses, warm outlet plates, sparks from switches and outlets.
- Avoid plugging several electrical appliances to only 1 outlet. This may result in power overload and other electrical faults.

Electrical Fire Prevention Practices



- Never leave hot appliances plugged-in when you are not around.

Electrical Fire Prevention Practices



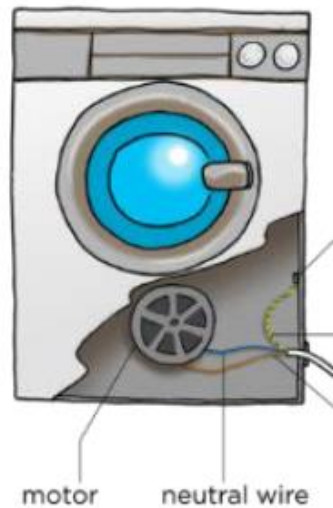
- Use extension cords only within their designated rating
- Never let multi-outlet assemblies or cube taps cause overloads.
- Never use frayed or deteriorated extension cords.
- Never tamper with fuses to change their current carrying capacity.

Electrical Fire Prevention Practices

- Never pour water to put out an electrical fire!
- An electrical fire originates from an energized electrical equipment, wiring, fuses and appliances. Its extinguishment calls for a non-conductive dry powder, carbon dioxide or vaporizing liquid. Never use water to avoid shock at fatal electrocution.



Safety Tips



Safety tips

- Mag-lagay ng safety caps sa mga outlets
- Tanggalin ang mga appliances sa outlet kung di ginagamit
- Ilayo sa tubig ang mga connection
- Ang mga pumps, heater, etc. ay may sariling circuit.
- Regular inspeksiyon ng lisensiyadong electrical engineer or electrician

10 GOLDEN RULES on Electrical Safety

10 GOLDEN RULES OF ELECTRICAL SAFETY



- 1 Treat all electrical systems as energized until proven otherwise. Disconnect from power source before performing any work or servicing.
- 2 Ensure that electrical systems are properly guarded and equipment appropriately grounded.
- 3 Install protective devices that are properly rated and coordinated to automatically isolate faulted parts of the system.



- 4 Comply with all applicable industry technical standards in the design and installation of electrical systems.
- 5 Consult and engage the services of PRC licensed electrical practitioners (PEE, REE, RME)
- 6 Ensure that electrical equipment are labelled, including diagrams/safety signages, and conductors are properly color coded.



- 7 Periodically monitor electrical loading within the rated capacity. Upgrade immediately if necessary.
- 8 Regularly inspect and maintain electrical system and equipment.
- 9 Wear appropriate PPE and use proper tools when conducting electrical works.
- 10 Provide a disconnecting means for local and manual isolation of electrical equipment during emergencies.



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ELECTRICAL SAFETY

101