

ASEAN  
Engineering Inspectors  
(AEI)



## Overview of AEI-EI & Electrical Installation Standards

### ***“Towards ASEANising Engineers”***

**Ir. Dr. Siow Chun Lim**

*Hon. Sec. of ASEAN Engineering Inspectors – Electrical Installation*

*ASEAN Engineering Register (AER),*

*ASEAN Federation of Engineering Organisations (AFEO)*





# CONTENTS

- Overview of AFEO & AEI
- Why AEI
- AEI – Electrical Installations
- Way Forward

# OVERVIEW OF AFEO & AEI





*Formed the ASEAN Engineering Register (AER) in 1998*

*ASEAN ENGINEERS*



*Initiated AEI (ASEAN Engineering Inspectorate) in 2008*

*AFEO*



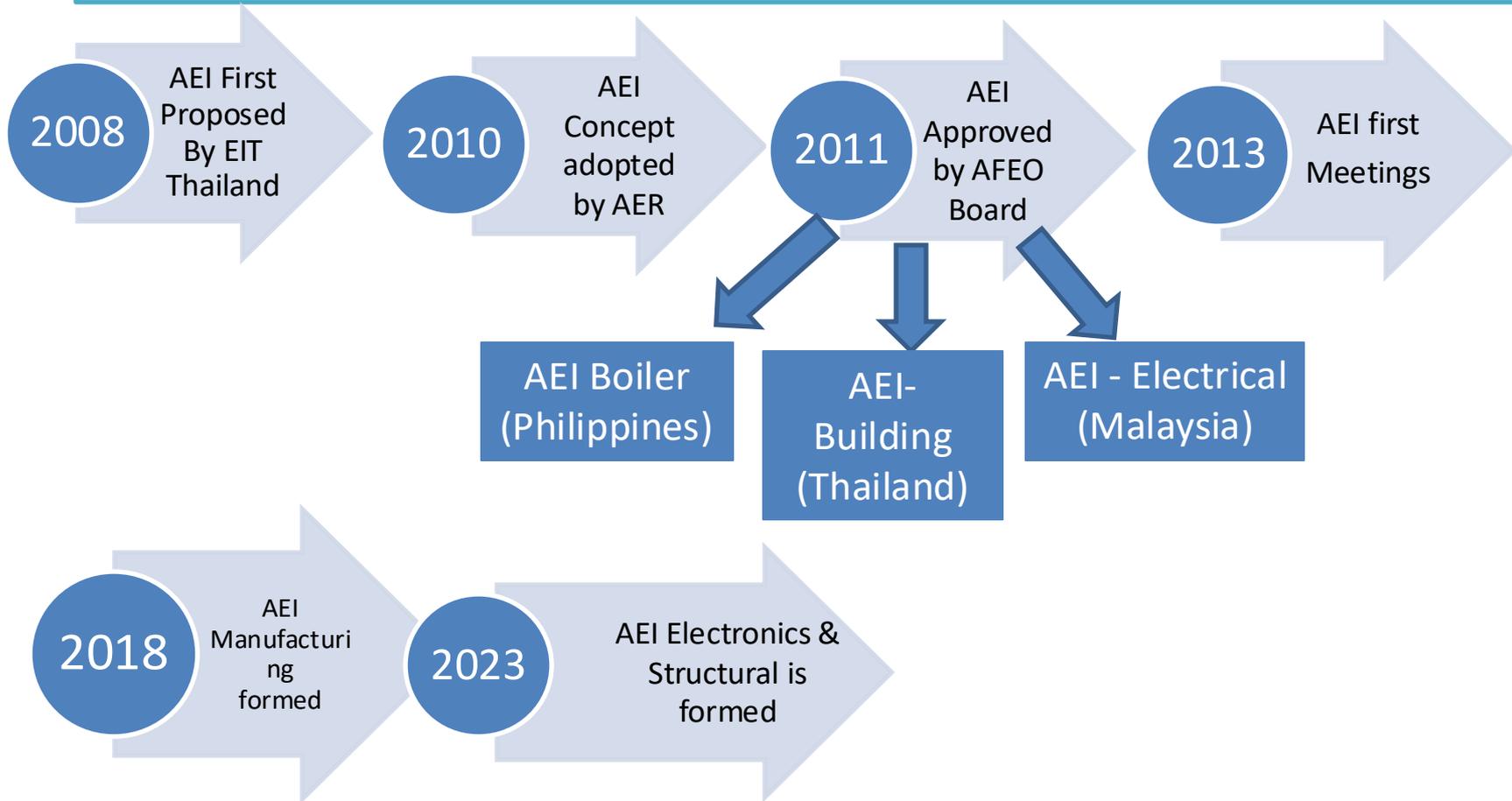
*AER*



*AEI*



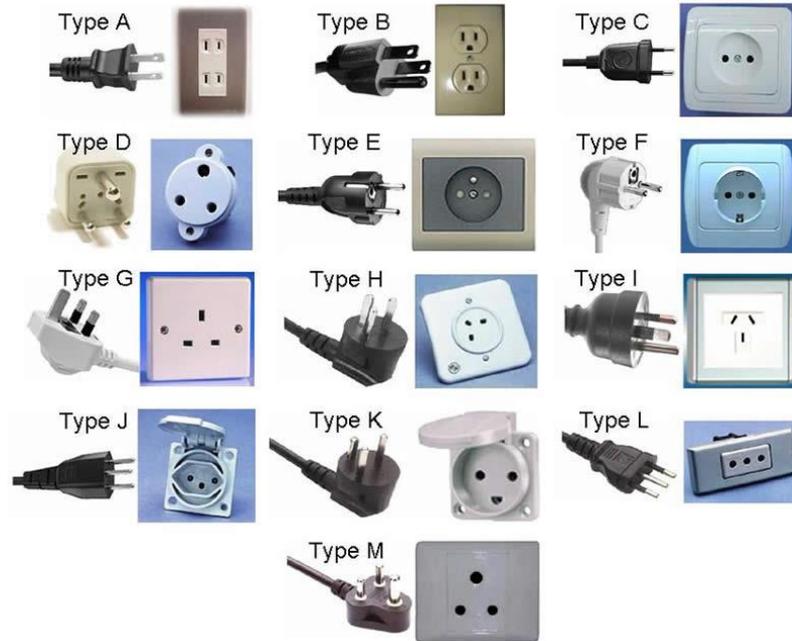
## *ASEAN Engineering Inspectors (AEI) initiative led by the industry*



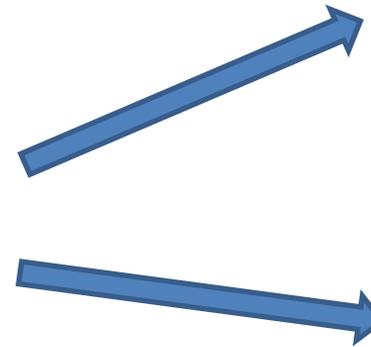
# OVERVIEW OF AEI



## ASEAN Socket Outlets



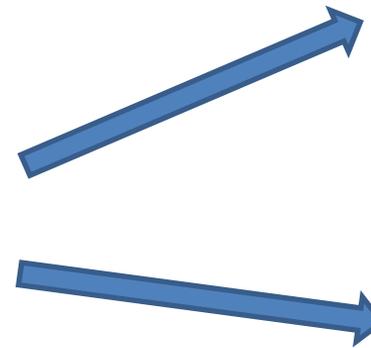
## Adaptors - Recognition



## ASEAN Handphone Brands



## Common Platform 5G/Wifi - Mutual Recognition



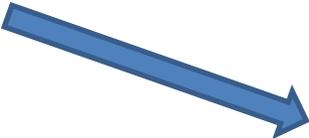
## ASEAN Standards



Mutual Recognition Of Standards



New ASEAN Engineering Guidelines





A world map with various countries highlighted in different colors (yellow, green, blue). The text "Development of ASEAN ENGINEERS ASEAN STANDARDS" is overlaid in large, bold, black letters across the center of the map.

# Development of ASEAN ENGINEERS ASEAN STANDARDS



# OVERVIEW



# ASEAN ENGINEERS

Design Engineers

Contractors

Service/T&C Engineers

**How Many Are Able To Work ABROAD & Outside The Country (ASEAN)?**

**Can we do so?**



## OVERVIEW





# ASEAN Regulations & Standards

**Are We The Same Across ASEAN?**



# OVERVIEW



# What is the basis of our AEI?



# **ASEAN & APEC Success Stories in Harmonization & Roadmap**



# ASEAN Charter



ASEAN Economic Community Framework

- Free flow of goods, investment, capital
- Free mobility of skilled labour

Harmonization of standards with reference to international standards

One Vision, One Identity, One Community

# ASEAN CHARTER





The AEC Blueprint 2025 will build on the AEC Blueprint 2015.

On November 22<sup>nd</sup> 2015, the ASEAN leaders have agreed on the “**Kuala Lumpur Declaration on ASEAN 2025: Forging Ahead Together**” during the 27th ASEAN Summit held in Kuala Lumpur, Malaysia.

**Amongst the highlights**

- Acceleration on the **harmonization of standards** and of E-Commerce regimes
- **Straightening of services** and financial integration

# ROADMAP TO AEC 2025



# ELECTRICAL



# CENELEC



CENELEC is the **European Committee for Electrotechnical Standardization** and is responsible for **standardization in the electrotechnical engineering** field. CENELEC prepares voluntary standards, which help facilitate trade between countries, create new markets, cut compliance costs and support the development of a Single European Market.

CENELEC creates market access at European level but also at international level, adopting international standards wherever possible, through its close collaboration with the International Electrotechnical Commission (IEC), under the [Frankfurt Agreement](#).



# IEC





The IEC is the leading global organization that develops international standards and manages conformity assessment systems for all electronic, electric and related matters.

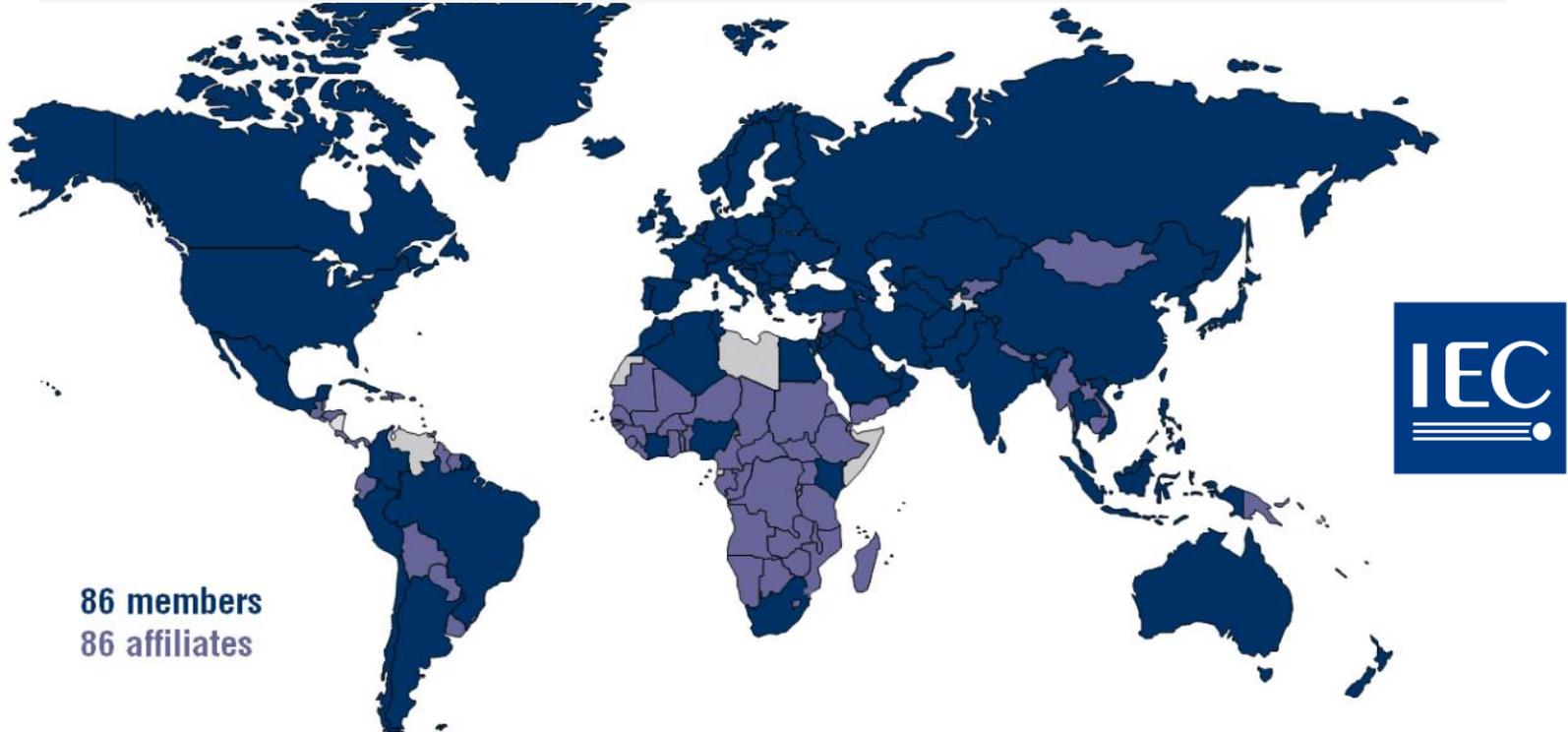


Source: IEC



A total of 172 countries are included in the IEC family, of which 86 are members and 86 are affiliates.

*Combining the national committees and the Affiliate Country Programme, the IEC family spreads across more than 99% of the world's population.*



Source: IEC





A total of 172 countries are included in the IEC family, of which 86 are **members** and 86 are **affiliates**.

## Vision

"IEC everywhere for a safer, more efficient world."

## Mission

"Our mission is to achieve worldwide use of IEC International Standards and Conformity Assessment Services that ensure the safety, efficiency, reliability and interoperability of electrical, electronic and information technologies, to enhance international trade, facilitate broad electricity access and enable a more sustainable world."



IEC Masterplan 473KB

## About us

The IEC brings nations and experts together to develop International Standards which facilitate world trade by removing technical barriers to trade, leading to new markets and economic growth.

Through its **members**, the Commission promotes international cooperation on all questions of standardization and related matters, such as the assessment of conformity to standards, in all electrical, electronic and related technologies – collectively known as "electrotechnology".

The IEC's vision, mission and strategy is outlined in the **Masterplan**. This document takes into account the needs of the whole IEC community and of developing markets to shape the Commission's long-term objectives and policies.



A global network of some 170 countries that covers 99% of world population and electricity generation



Offers an Affiliate Country Programme to encourage developing countries to use and participate in IEC work free of charge



Develops International Standards that represent a global consensus of state-of-the-art know-how and expertise.  
Administers Conformity Assessment Systems



Over 20 000 experts



100 years expertise.



# White Paper For Electrical Installation Standards & Regulations In Buildings Amongst ASEAN Countries



Feasibility Study –

White Paper On Electrical Installation Standards In Buildings  
Amongst ASEAN Countries



Prepared By:  
Electrical Engineering Technical Division (EETD)  
The Institution of Engineers, Malaysia (IEM)



Supported By:  
International Copper Association Southeast Asia Ltd.



**AEI-EI For Electrical Installation In Buildings**  
**White Paper For Electrical Installation Standards In Buildings Amongst ASEAN Countries**

**Report Outline**

**1 Chapter 1**

**ASEAN Electrical Installation Standards**  
**Executive Summary**

- 1.1 Objectives
- 1.2 Studies Methodology
- 1.3 Key finding & Recommendations
- 1.4 Reference Standards
- 1.5 Findings and Summary Table Of Studies



**Feasibility Study –**  
**White Paper On Electrical Installation Standards In Buildings Amongst ASEAN Countries**

Prepared By:  
Electrical Engineering Technical Division (EETD)  
The Institution of Engineers, Malaysia (IEM)

Supported By:  
International Copper Association Southeast Asia Ltd.



# OUTLINE OF REPORT



**AFEO Energy WG: AEI For Electrical Installation In Buildings**  
**Feasibility Studies – White Paper For Electrical Installation Standards In Buildings Amongst**  
**ASEAN Countries**

**2 Chapter 2**

**Development and Recent ASEAN Initiatives**

- 2.1 Development of ASEAN standards and roles of ASEAN
- 2.2 Global Landscape of Standard Development
- 2.3 ASEAN Electrical Standards Development – Role of ASEAN
- 2.4 ASEAN Electrical Installation Situation
- 2.5 Strength and Weaknesses of Electrical Installation In the ASEAN Region
- 2.6 The Electrical Installation Standards Cooperation

**3 Chapter 3**

**Detailed Studies and Outlook of Each ASEAN Country**

- 3.1 BRUNEI
- 3.2 CAMBODIA
- 3.3 INDONESIA
- 3.4 LAOS
- 3.5 MALAYSIA

**OUTLINE OF REPORT**



**AFEO Energy WG: AEI For Electrical Installation In Buildings**  
**Feasibility Studies – White Paper For Electrical Installation Standards In Buildings Amongst ASEAN**  
**Countries**

**Report Outline**

**Detailed Studies and Outlook of Each ASEAN Country**

- 3.6 MYANMAR
- 3.7 PHILIPPINES
- 3.8 SINGAPORE
- 3.9 THAILAND
- 3.10 VIETNAM

**4 Chapter 4**  
**Indicators & Way Forward**

- 4.1 Electrical Installation differences
- 4.2 Potential
- 4.3 Proposed Activities

**5 Chapter 5**  
**References & Bibliography**

# OUTLINE OF REPORT



## Detailed Studies Scope

- 1 Act & Regulation
- 2 Mandatory Standards
- 3 Government Agencies
- 4 Standards Development
- 5 Registration
- 6 Statistics On Electrical Safety
- 7 The Electricity Distribution Company
- 8 Power Quality Requirements
- 9 Voltage Level
- 10 Inspection
- 11 Constraints
- 12 Other Findings Relevant To Our Studies And General Institutional Finding

# OUTLINE OF REPORT



## **Act & Regulation**

### **Registration –**

- Electrical Professional Engineers**
- Contractor**
- Inspection**
- Products**

### **Additional Findings**

- Cable Colour Coding in ASEAN**
- Definition Of Electrical Competent Person in ASEAN**
- Electrical Inspection Methodology in ASEAN**
- Earthing Systems requirements**

# **KEY FINDINGS**



# Some Findings

Country	Status	Remarks
Brunei	Implemented since 2012	Based on IET Wiring Regulations Amendments
Cambodia	Both Accepted	Based on Cambodia's Electric Power Technical Standards of the Kingdom of Cambodia
Indonesia	Implemented since 2013	Peraturan Umum Industri Listrik tahun 2011 Amandemen 1 tahun 2013.
Laos	Not Mentioned	
Malaysia	In Process	UNITEN is appointed by Energy Commission To Carry Out on transition
Myanmar	No Plans To Convert Yet	
Philippines	Implemented 2009	Philippine Electrical Code
Singapore	Implemented since 1 <sup>st</sup> March 2011	
Thailand	Implemented in 2013	Thai Electrical Code 2013 (EIT)
Vietnam	No implementation yet	

# The Future Of Cable Color Code



Country	Status	Remarks
Brunei	Implemented since 2012	Based on IET Wiring Regulations Amendments
Cambodia	Both Accepted	Based on Cambodia's Electric Power Technical Standards of the Kingdom of Cambodia
Indonesia	Implemented since 2013	Peraturan Umum Industri Listrik tahun 2011 Amandemen 1 tahun 2013.
Laos	Not Mentioned	
Malaysia	In Process	UNITEN is appointed by Energy Commission To Carry Out on transition
Myanmar	No Plans To Convert Yet	
Philippines	Implemented 2009	Philippine Electrical Code
Singapore	Implemented since 1 <sup>st</sup> March 2011	
Thailand	Implemented in 2013	Thai Electrical Code 2013 (EIT)
Vietnam	No implementation yet	

# The Future Of Cable Color Code



Country	Definition Used	Remarks
Brunei	Registered Electrical Worker (REW)	Based on Electrical Installation Requirements 2011 — First Edition
Cambodia	Only Qualified Electrical Engineers is required	Based on Cambodia's Electric Power Technical Standards of the Kingdom of Cambodia
Indonesia	Kompetensi Instansi Pemanfaatan Tenaga Listrik	Peraturan Umum Industri Listrik tahun 2011 Amandemen 1 tahun 2013.
Laos	Not Mentioned	
Malaysia	Electrical Services Engineer, Competent Electrical Engineer, Electrical Supervisor, Chargeman & Cable Jointer, Wireman	Registered with Energy Commission
Myanmar	Professional Electrician Registration with the Ministry of Labour with 4 levels of trade skills	
Philippines	Master Electrician	Registered Under PCAB
Singapore	There are 3 classes of LEWs	
Thailand	No specific registration	
Vietnam	No definition as yet	

# The Definition Of Electrical Competent Person



Country	Methodology Of Inspection	Remarks
Brunei	DES authorised persons or DES Approved (Specialised) Contractor/Inspectors.	Based on Electrical Installation Requirements 2011 — First Edition
Cambodia	Only Qualified Electrical Engineers is required	Based on Cambodia's Electric Power Technical Standards of the Kingdom of Cambodia
Indonesia	Electrical Installation has to be verified and approved by KONSUIL (Komite Nasional Keselamatan untuk Instalasi Listrik) atau PPIILN (Perkumpulan Pemeriksa Instalasi Listrik Nasional),	Sertifikat Laik Operasi (SLO) will be issued upon approval.
Laos	Not Mentioned	
Malaysia	Electrical Contractor test and inspect before handover and register the installation.	Fill up forms
Myanmar	Inspection Only When Is Required	
Philippines	After completion of construction, government inspectorate will certify based on safety (fire) code. Government means city or municipal.	
Singapore	Certificate shall be issued by the electrical worker who carried out the inspection.	
Thailand	Visual inspection of buildings has to be done annually by certified building inspectors.	Building Inspectors falls under Public Works Department.
Vietnam	Only registration	

# Electrical Inspection



Country	Methodology Of Inspection	Frequency Of Inspection	Remarks
Brunei	DES authorised persons or DES Approved (Specialised) Contractor/Inspectors.	<ul style="list-style-type: none"> <li>⌚ 10 years interval for domestic installation (private houses, flats).</li> <li>⌚ 5 years interval for commercial properties (shops &amp; offices), educational establishments (schools colleges &amp; universities), hotels &amp; boarding houses.</li> <li>⌚ 3 years interval for factories, workshops and agricultural installation.</li> <li>⌚ 1 year interval for petrol filling stations, public entertainment areas (theatres &amp; cinemas), public laundrettes, places of worship.</li> <li>⌚ 6 months interval for construction sites and temporary installation.</li> <li>⌚ Change of occupancy or owner</li> </ul>	Based on Electrical Installation Requirements 2011 — First Edition

# Electrical Inspection



Country	Methodology Of Inspection	Frequency Of Inspection	Remarks
Cambodia	Only Qualified Electrical Engineers is required	No requirements and regulations	Based on Cambodia's Electric Power Technical Standards of the Kingdom of Cambodia
Indonesia	Electrical Installation has to be verified and approved by KONSUIL (Komite Nasional Keselamatan untuk Instalasi Listrik) atau PPILN (Perkumpulan Pemeriksa Instalasi Listrik Nasional),	1) Instalasi pembangkit tenaga listrik - 5 Tahun 2) Instalasi transmisi dan distribusi tenaga listrik - 10 Tahun 3) Instalasi pemanfaatan tenaga listrik TT dan TM 10 - 10 Tahun 4) Instalasi pemanfaatan tenaga listrik TR - 15 Tahun	Sertifikat Laik Operasi (SLO) will be issued upon approval.
Laos	Not Mentioned	No requirements and regulations	

# Electrical Inspection



Country	Methodology Of Inspection		Remarks
Malaysia	Electrical Contractor test and inspect before handover and register the installation.	<p>(3) An installation, other than a domestic installation, shall be checked and tested by a competent person at least once in every five years, or at any time as directed by the Commission.</p> <p>(4) Any protective relay and device of an installation shall be checked, tested and calibrated by a competent person at least once in every two years, or at any time as directed by the Commission.</p>	Borang G & H
Myanmar	For hotels, motels and factory buildings, inspection is done annually. For residential, government office and other commercial building, inspection upon request	Yearly	

# Electrical Inspection

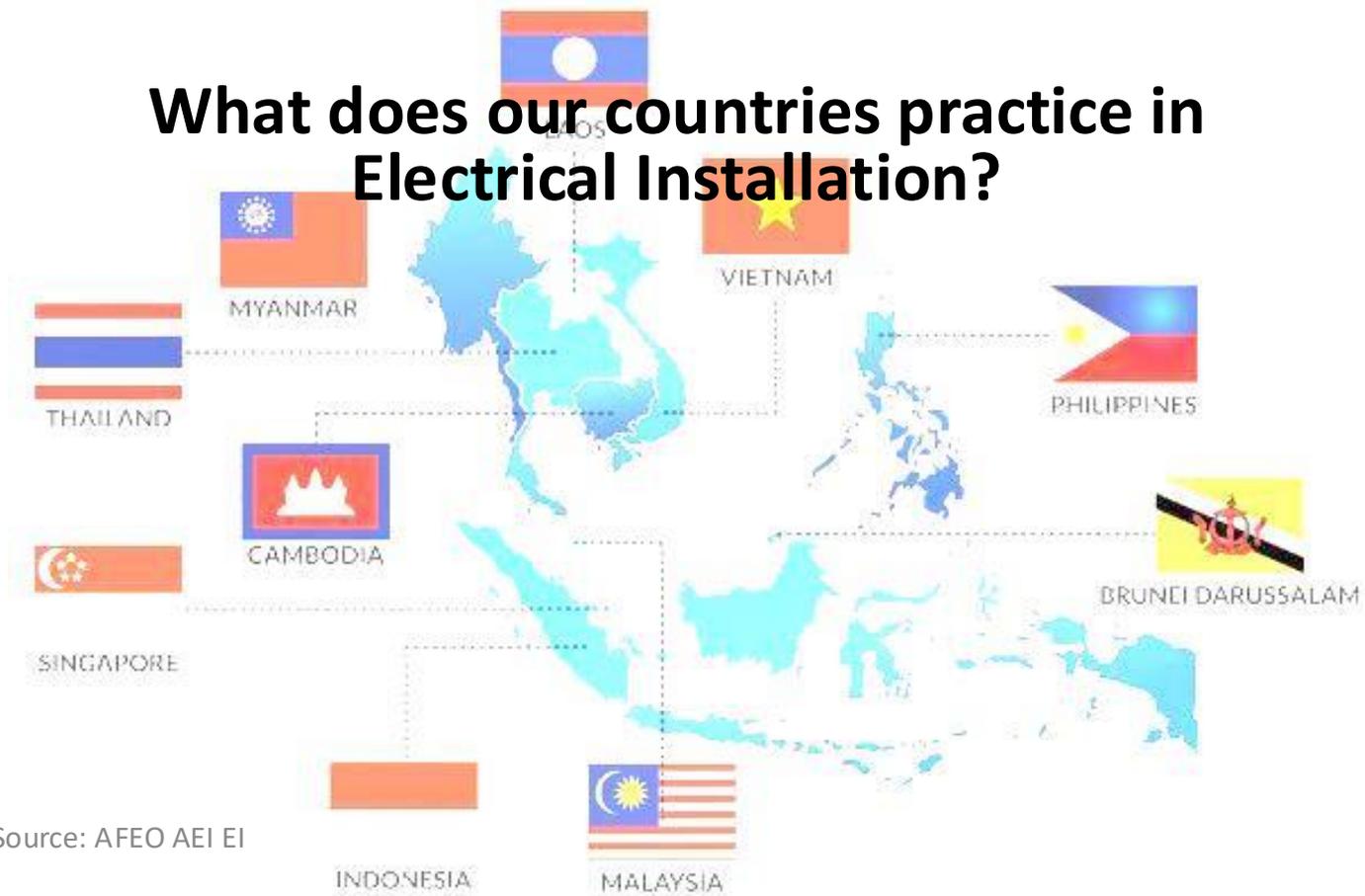


Country	Methodology Of Inspection	Frequency Of Inspection	Remarks
Philippines	After completion of construction, government inspectorate will certify based on safety (fire) code. Government means city or municipal (Office of the city electrician, fire department and department of labor and employment). This is for industrial, commercial & institutional buildings.	Yearly	
Singapore	Certificate shall be issued by the electrical worker who carried out the inspection.	Annually	Inspection carried out by LEW
Thailand	Visual inspection of buildings has to be done annually by certified building inspectors.	Annual Inspection	Building Inspectors falls under Public Works Department.
Vietnam	Only registration & maintenance servicing requirements.	No requirements	

# Electrical Inspection



# What do our countries practice in Electrical Installation?



Source: AFEO AEI EI

## OVERVIEW – ASEAN ELECTRICAL SCENARIO



Description	Malaysia	Malaysia (Sarawak)	Brunei	Laos	Myanmar	Cambodia	Singapore	Thailand	Indonesia	Vietnam	Philippines
Electricity Regulations & Electrical Safety Authority	Energy Commission (EC)	Electrical Inspectorate Unit (EIU), Ministry of Public Utilities Sarawak	Department of Electricity Services (Till 2018), Electricity Authority Brunei Darussalam	The Ministry of Energy and Mines	Electrical Inspection Department, Directorate of Supervision and Inspection, Ministry of Industry	General Department of Energy, Ministry of Mines & Energy	Energy Marketing Authority (EMA)	Energy Regulatory Committee (ERC)	Direktorat Jenderal Ketenagalistrikan (DGE)	Ministry of Industry and Commerce, Ministry of Science and Technology, Ministry of Construction and other relevant ministries.	Board of Electrical Engineering (BEE)
Standards Writing Authority	Department of Standards Malaysia (DSM)	Refer to Department of Standards Malaysia (DSM)	Department of Electricity Services	The Ministry of Energy and Mines	Technical Committee of Electrical & Electronic, Ministry of Education	Ministry of Mines & Energy For Electrical Installation Works & Institute of Standards, Cambodia (ISC)	Spring Singapore (Standards, Productivity and Innovation Board)	Engineering Institute of Thailand (EIT) – for engineering standards	Standards Nasional Indonesia (SNI)	Directorate for Standards, Metrology and Quality (STAMEQ)	Institute of Electrical Engineers (IIEE) Philippines
Registration of Electrical Products	Energy Commission (EC)	Electrical Inspectorate Unit (EIU), Ministry of Public Utilities Sarawak	Authority For Building Construction Industry (ABCI) – Consumer Product	The Ministry of Energy and Mines	Electrical Inspection Department, Directorate of Supervision and Inspection, Ministry of Industry	Institute of Standards, Cambodia (ISC)	Spring Singapore (Standards, Productivity and Innovation Board)	Thai Industrial Standards Institute (TISI)	Lembaga Sertifikasi Produk	Ministry of Science and Technology (MOST)	Bureau of Products Standards (BPS)
National standards on Electrical Installation and Electrical Safety	MS1979, MS1936 & MS IEC 60364	Refer to Malaysian Standards & International Standards	Electricity Installation Regulation 2011 (EIR)	Lao Electric Power Technical Standards	Electricity Law 2014, National Building Code 2016	The Electricity Law - promulgated by the Royal Decree no.NS/RKM/0201/03, dated February 02, 2001	CP 5 & CP 88	Thai Electricity Code 2013	Electrical Installation Regulation: Persyaratan Umum Instalasi Listrik (PUIL) 2011	National Technical Regulation on Electrical Installations of Dwelling and Public Building & National technical regulation on Electric safety	National Electrical Code (NEC)
General Reference Standards	IEC	IEC/BS	IEC/BS	IEC	IEC		IEC/BS	IEC	IEC	IEC	Mixture

Source: AFEO AEI EI

AEI-EI

40

# OVERVIEW – ASEAN ELECTRICAL



# Recent Developments: EV Charging Requirements





## GUIDE ON ELECTRIC VEHICLE CHARGING SYSTEM (EVCS)

### SSS 111025

Package/Series Number	SSS 111025
Package/Series Title	Electric vehicles charging system
Synopsis	Electric vehicles charging system
Last Updated Date	04 Jul 2022

This package/series comprises:

[TR 25-1:2022 Electric vehicles charging system - Part 1: Electrical safety and general requirements](#)

[TR 25-2:2022 Electric vehicles charging system – Part 2 : Low power charging](#)

[TR 25-3:2022 Electric vehicles charging system – Part 3: High power charging](#)

[TR 25-4:2022 Electric vehicles charging system – Part 4 : Battery swapping](#)

**1 Currently, the awareness of each other AMS standards is low and majority are unaware of the AMS regulatory requirements**

**2 There are differences in terminology and definition used in the standards**

**3 There are differences in the regulations' practice and implementation of standards**

**4 90% Of The ASEAN MEMBER STATES (AMS) adopts IEC Standards as based standards**



**5 Most of the AMS are willing to learn each other and share their knowledge counterparts**

Source: AFEO AEI EI

AEI-EI

## SUMMARY OF FINDINGS



43

# Part 6 Verification of Installations (revised)



## Initial verification : Inspection & Tests

- Method of protection against electric shocks (Chap 41)
- Protection against fire & thermal effects (Chap 42)
- Cross section of conductors (Chap 43)
- Protection against overvoltages (Chap 44)
- Identification of neutral and protective conductor (Chap 51)
- Selection of protective devices (Chap 53)

## Periodic verification : frequency

- **General case several years (e.g. 4 years)**
- **Dwelling 10 years recommended**



AEI-EI

44

## Latest in IEC Findings



# Installation Rules recommend the use of AFDD

## how to understand the standard ? (new)

1. IEC 60364-4-42 (2014) recommends the use of AFDD to protect against arc fault in final circuit
  - > in premises with sleeping accommodations : **e.g. bedrooms (in residential), hotels**
  - > in locations with risks of fire due to the nature of processed or stored materials: **e.g. barns, wood-working shops, stores of combustible materials**
  - > in locations with combustible constructional materials: **e.g. wooden buildings**
  - > in fire propagating structures: **e.g. high rise buildings**
  - > in locations with endangering of irreplaceable goods : **e.g. museums**
2. In a.c. circuits, the use of arc fault detection devices (AFDD) in compliance with IEC 62606 will satisfy above-mentioned recommendation : **to promote conformity marks**
3. The AFDD shall be installed at the origin of the final circuit to be protected : **in the switchboard**

AEI-EI

## Latest in IEC Findings



# IEC 60364-8-1: Energy Efficiency

## Main principles

Energy Efficiency in electrical installation  
is a system approach based on the 3 main following principles:

1. Minimize energy losses  
In the electrical  
installation

2. Use energy:  
at the right time  
when needed  
- at the lower cost

3. Maintain the  
performance

Note: safety shall be maintained when implementing energy efficiency measures

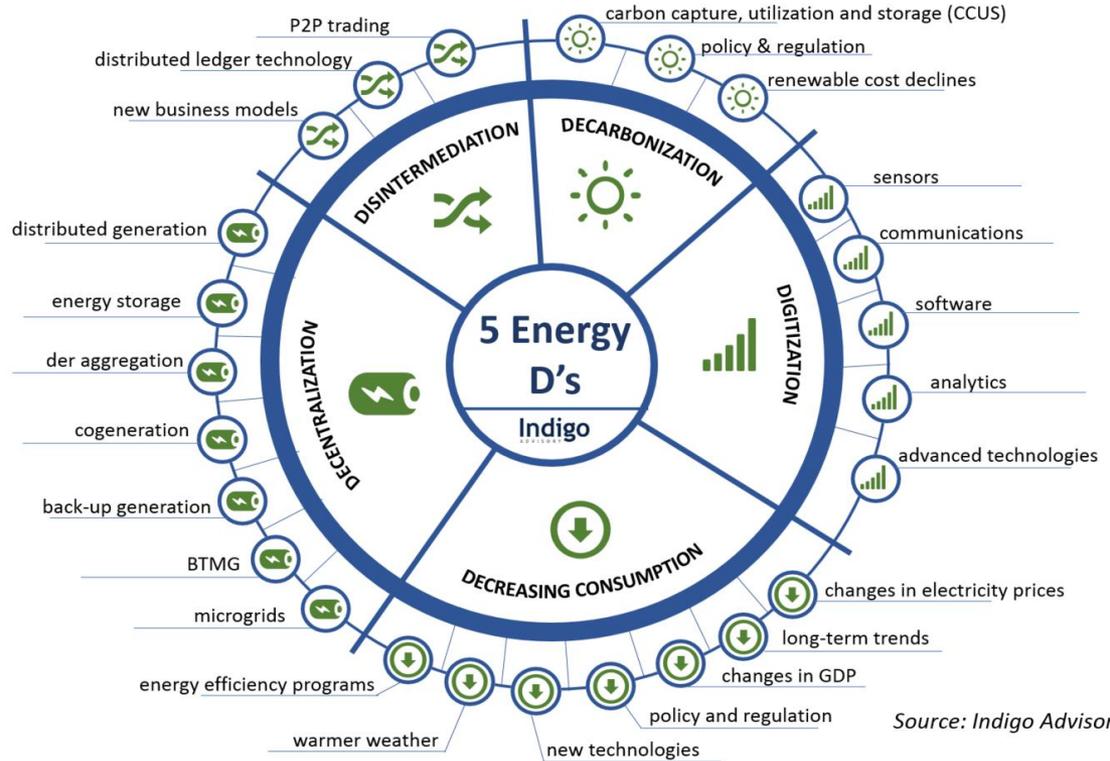
9

AEI-EI

## Latest in IEC Findings

# The Future

The 5D Energy Transition



AEI-EI

47

Latest in IEC Findings





IEC White Papers  
& Technology Reports

- Virtualising power systems
- Zero carbon power systems
- Power semiconductors for an energy-wise society
- HVDC: electricity for the 21st century
- Factory of the future
- Global energy interconnection
- IoT 2020: Smart and secure IoT platform
- Strategic asset management of power networks
- Orchestrating infrastructure for sustainable Smart Cities
- Internet of Things: Wireless Sensor Networks
- Microgrids for disaster preparedness and recovery - With electricity continuity plans and systems
- Nanotechnology in the sectors of solar energy and energy storage
- Grid integration of large-capacity Renewable Energy sources and use of large-capacity
- Electrical Energy Storage
- Electrical Safety

AEI-EI

48

**Latest in IEC White Paper**





# TOWARDS ONE ASEAN, ONE COMMUNITY & ONE STANDARDS



# PROMOTIONAL



# Upcoming Webinars

## Global Outreach Expert Series (GOES 2.0) - starting February 2025

Jointly Organised between Electrical Engineering Technical Division and ASEAN Engineering Inspectors - Electrical Installation (AEI-EI)

**Global Outreach Series (GOES) #9**

**WEBINAR TALK ON**  
**RECENT UPDATES ON LIGHTNING PROTECTION STANDARD IEC 62305-2 LIGHTNING RISK MANAGEMENT**

**ALAIN ROUSSEAU**

**29 FEB THURSDAY** **06.00 PM - 7.30 PM**

**REGISTER HERE**

Jointly Organised between Electrical Engineering Technical Division and ASEAN Engineering Inspectors - Electrical Installation (AEI-EI)

**Global Outreach Series (GOES) #9**

Jointly Organised between Electrical Engineering Technical Division and ASEAN Engineering Inspectors - Electrical Installation (AEI-EI) Global Outreach Series (GOES) #12

**WEBINAR**  
**Personal lightning Protection Shelters LPS**  
**30TH APRIL, 2024 AT 9.30AM - 11.30AM**  
**VIA ZOOM PLATFORM**

**Speaker:**  
**Francisco Roman**

**Synopsis**  
In Colombia there have been many lightning accidents due to its location in the tropics. In our EMC research group we are developing lightning protection shelters using conductive textiles and in this oral presentation we present the main lightning accidents we have in our country and the need to develop portable LPS. The main topic of our presentation is the testing of portable LPS against direct and indirect lightning strikes.

*Webinar Talk*  
**LATEST DEVELOPMENT IN SOCKET-OUTLETS AND SWITCHES STANDARDISATION**

Join Our Talk for Inspiration and Insights

24th May, 2024 Start at 3.00pm Zoom Platform

**Cristiano Masini**  
Secretary of Subcommittee 23B of IEC

**Secure Your Seat!**  
Register

