

Safe & Efficient Electricity System For Healthcare Facilities

7 April 2018

Mr LEE Chi-hang, Alfred

Senior Engineer / Health Sector/ Hong Kong East

Relationship between Healthcare and Electricity?

Healthcare Engineering Systems



醫療儀器
(Biomedical Equipment)



喉管式醫療氣體供應系統
(Medical Gas Pipeline System)



照明系統
(Lighting System)



電力系統
(Electrical System)



冷氣系統
(Air-Conditioning System)

What will the talk deliver?

Key facts for health practitioners

Agenda

I. Key Terminology

II. Design and Installation

- Electricity Ordinance (Cap.406)
- Energy Efficiency Ordinance (Cap.610)
- Back-up Power Supply Consideration
- Electrical Demand Loading & Protective Device Consideration

III. Operation and Maintenance

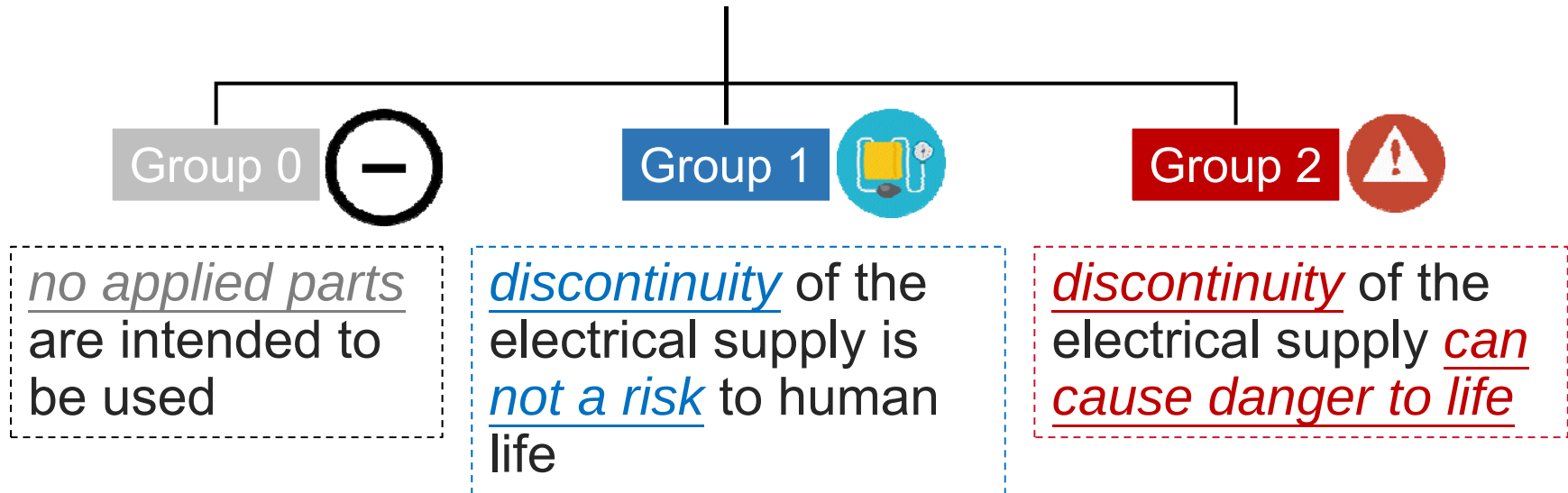
- Periodic Testing, Inspection and Certificate (WR2)
- Other Testing (e.g. On load test of emergency generator & discharge test on batteries)

I. Key Terminology (HTM 06-01)



Medical Location:

For the purpose of diagnosis treatment (including cosmetic) or monitoring a patient under medical supervision



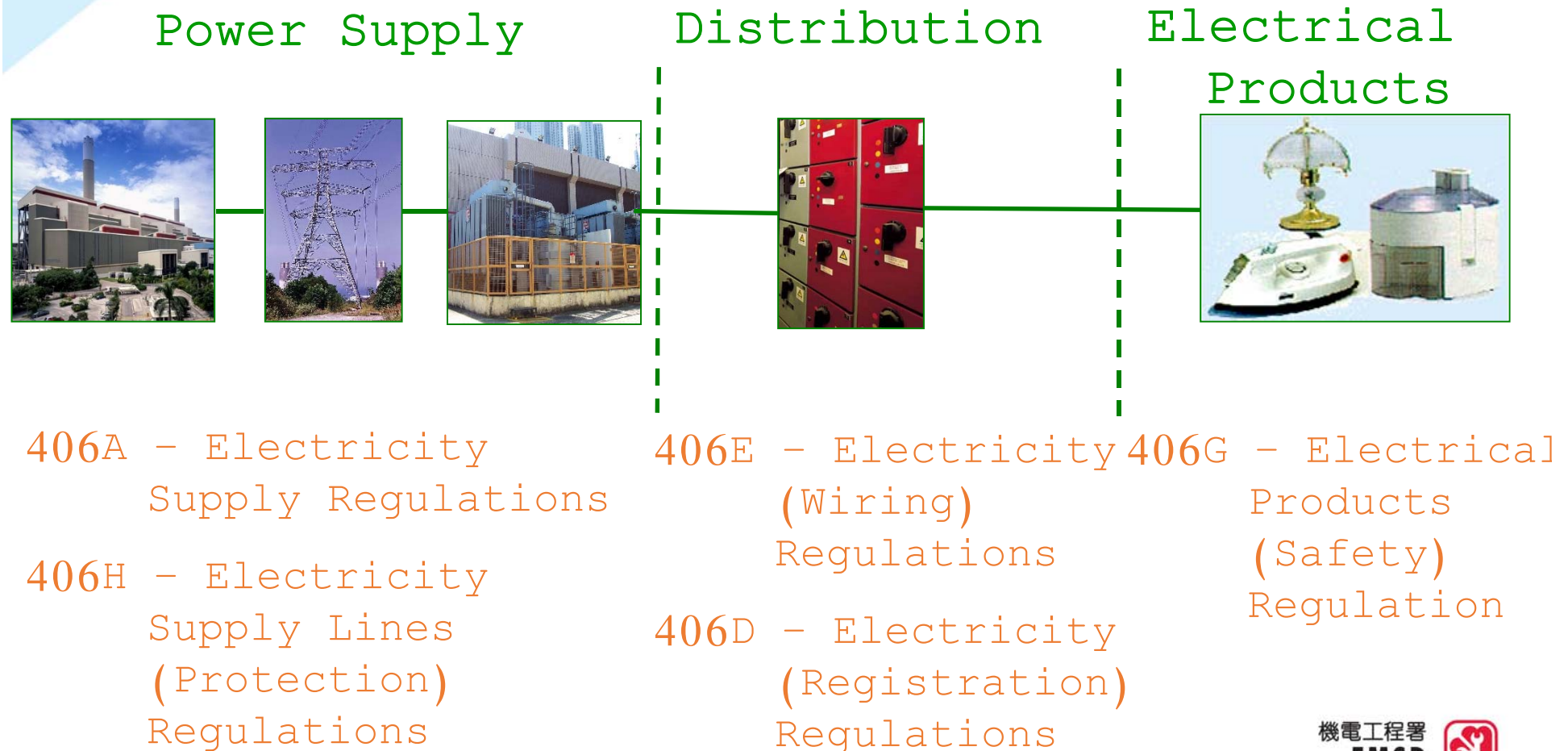
I. Key Terminology (HTM06-01)

Clinical Risk Grade	
E Support services and circulation	No immediate effect on the clinical treatment or safety of patients
D Ambulant Care	Disruption, inconvenience and a reduced environmental quality but would not directly compromise clinical treatment and safety.
C General Patient Care	Clinical treatment and patient safety will not be immediately compromised by an interruption of electrical power
B Complex treatment and diagnostics	Clinical treatment and patient safety may be compromised (but not endangered) by any minor interruption of electrical supply.
A Life support/ Complex Surgery	Disconnection of the supply represents a threat to life



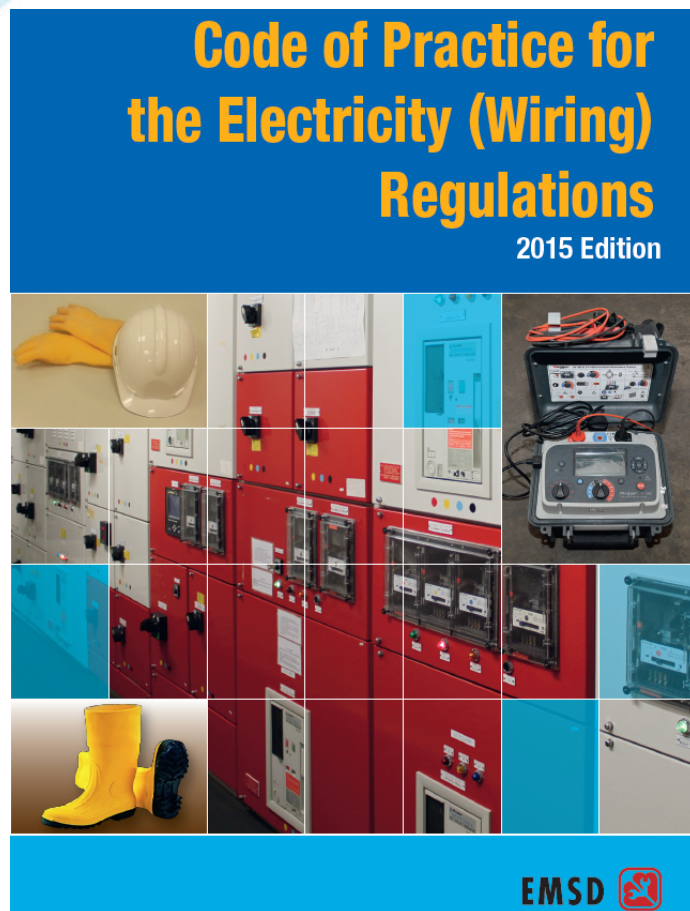
II. Design and Installation

Cap. 406 – Electricity Ordinance



II. Design and Installation

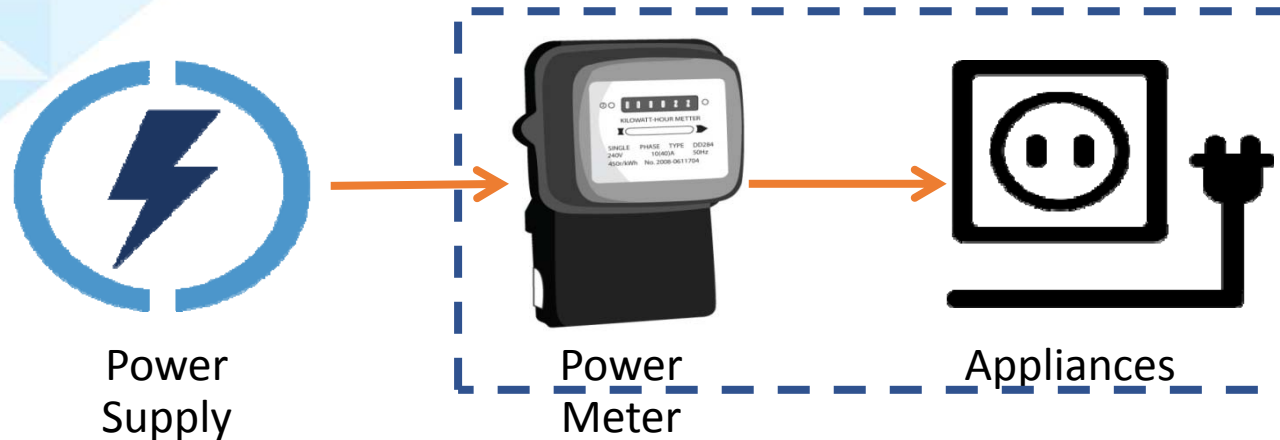
Cap. 406 – Electricity Ordinance Code of Practice for the Electricity (Wiring) Regulations



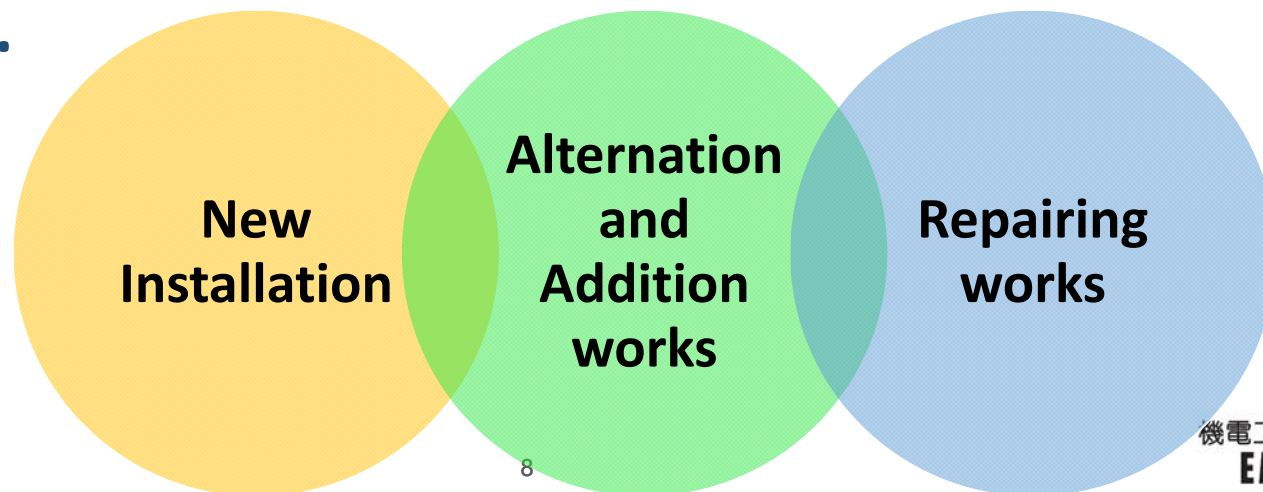
- General technical guidelines on the statutory requirements in accordance with international electrical safety standards and latest technical development

II. Design and Installation

What is WR1 – Work Completion Certificate?

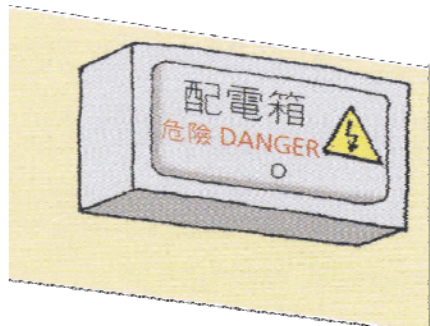


**For fixed electrical
installation ...**



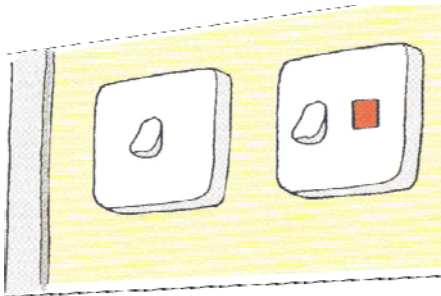
II. Design and Installation

Fixed Electrical Installation



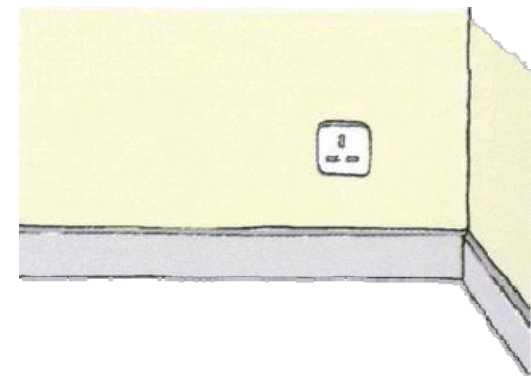
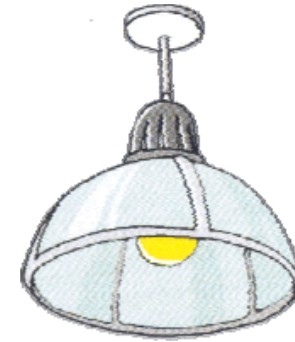
Distribution Board and
circuitry

Socket outlet



Switches and Lighting

Equipment direct
connected to electricity
system



What is the responsibility of owner in relation to installation?



- [illegible]

II. Design and Installation

Who can perform electrical work?



Registered Electrical Contractor	✓
Non-registered Electrical Contractor	✗
Employing Registered Electrical Contractor via Non-registered Electrical Contractor	✗
Sub-contracting to Registered Electrical Contractor via Registered Electrical Contractor	✓



II. Design and Installation

Cap. 610 – Buildings Energy Efficiency Ordinance (BEEO)

機電工程署
EMSD

ENG 繁體 简体

《建築物能源效益條例》
The Buildings Energy Efficiency Ordinance

空調裝置
Air-conditioning installation

電力裝置
Electrical installation

升降機及自動梯裝置
Lift & escalator installation

照明裝置
Lighting installation

Energy Audit Form
能源審核表格

Code of Practice for
Energy Efficiency of
Building Services
Installation

2015 EMSD

機電工程署
EMSD

II. Design and Installation

Scope of Buildings Energy Efficiency Ordinance (BEEO)

Prescribed Buildings	
• Hotel & guesthouse	• Commercial building
• Educational building	• Industrial building – common area
• Community building	
• Municipal services	• Residential building – common area
• Hospital & clinic	
• Government building	• Composite building – – commercial portion – common area of portion for residential or industrial use
• Airport passenger building	
• Railway station	

II. Design and Installation

Exemption on premises s4 BEO and Schedule 2 of BEO

1. Small building (3-storey each $\leq 65 \text{ m}^2$)
2. Building with approved electrical load ($\leq 100\text{A}$, 1-ph/3-ph)
3. Historical or Monument building
4. Building to be demolished in 12 months
5. BS installations, with specific operational & technical natures such as fire protection, life safety... etc.



II. Design and Installation

Exemption on installation

An installation that is solely used for—

- (a) surgical operation;
- (b) clinical treatment;
- (c) blood processing;
- (d) providing or maintaining appropriate environment settings for life protection; or
- (e) any combination of the purposes specified in paragraphs (a), (b), (c) and (d).

空調裝置
Air-conditioning installation

電力裝置
Electrical installation

升降機及自動梯裝置
Lift & escalator installation

Energy
Audit Form
能源審核表格

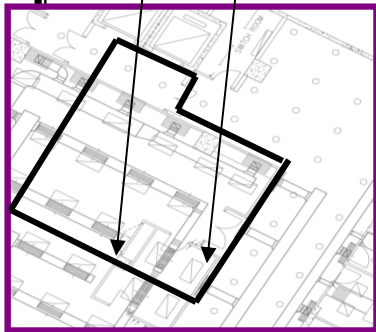
II. Design and Installation

What is Major Retrofitting Works?

Works Area

Addition/replacement of a BS installation specified in the BEC at the following conditions –

total floor area covered by the works (i.e. works area) $\geq 500 \text{ m}^2$ in a unit or a common area



If the works are conducted as a same series of works in phases or at different places in a unit or a common area, total floor area covered by these works (i.e. works area) $\geq 500 \text{ m}^2$ within 12 months aggregating

Central BS installation

Addition/replacement of a **main component** of a central BS installation, incl. –



a complete electrical circuit at rating $\geq 400\text{A}$;

or



a unitary air-conditioner or a chiller at rating $\geq 350\text{kW}$ (cooling or heating);

or

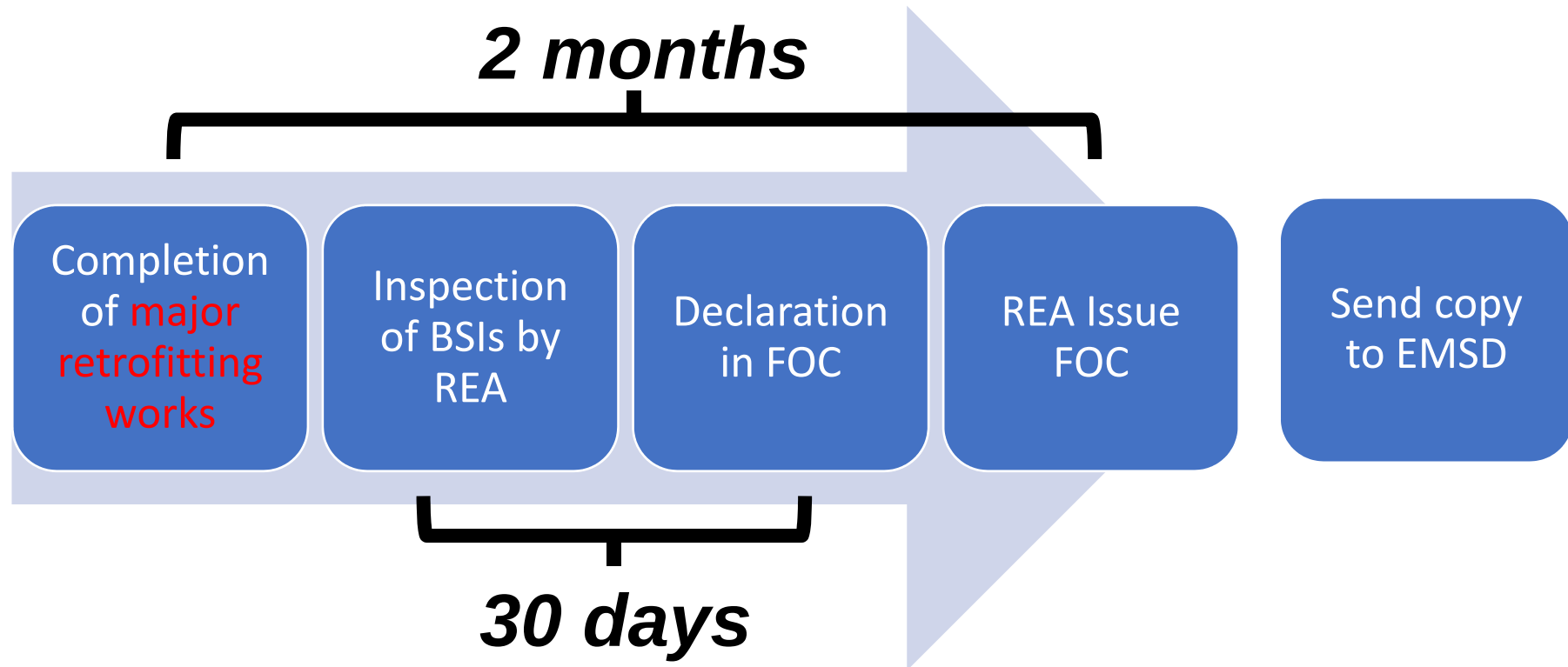


motor drive + mechanical drive of a lift, escalator or passenger conveyor

OR

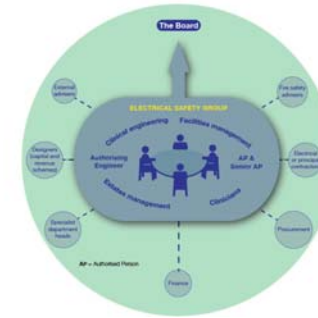
II. Design and Installation

What is the Form of Compliance (FOC) and when should it be submitted?



III. Back-up Power Supply Consideration

What are the consideration factors?



Department of Health

Health Technical Memorandum
06-01
Electrical services supply and distribution
2017 edition



Resilience



Risk
Mitigation



Sustainability

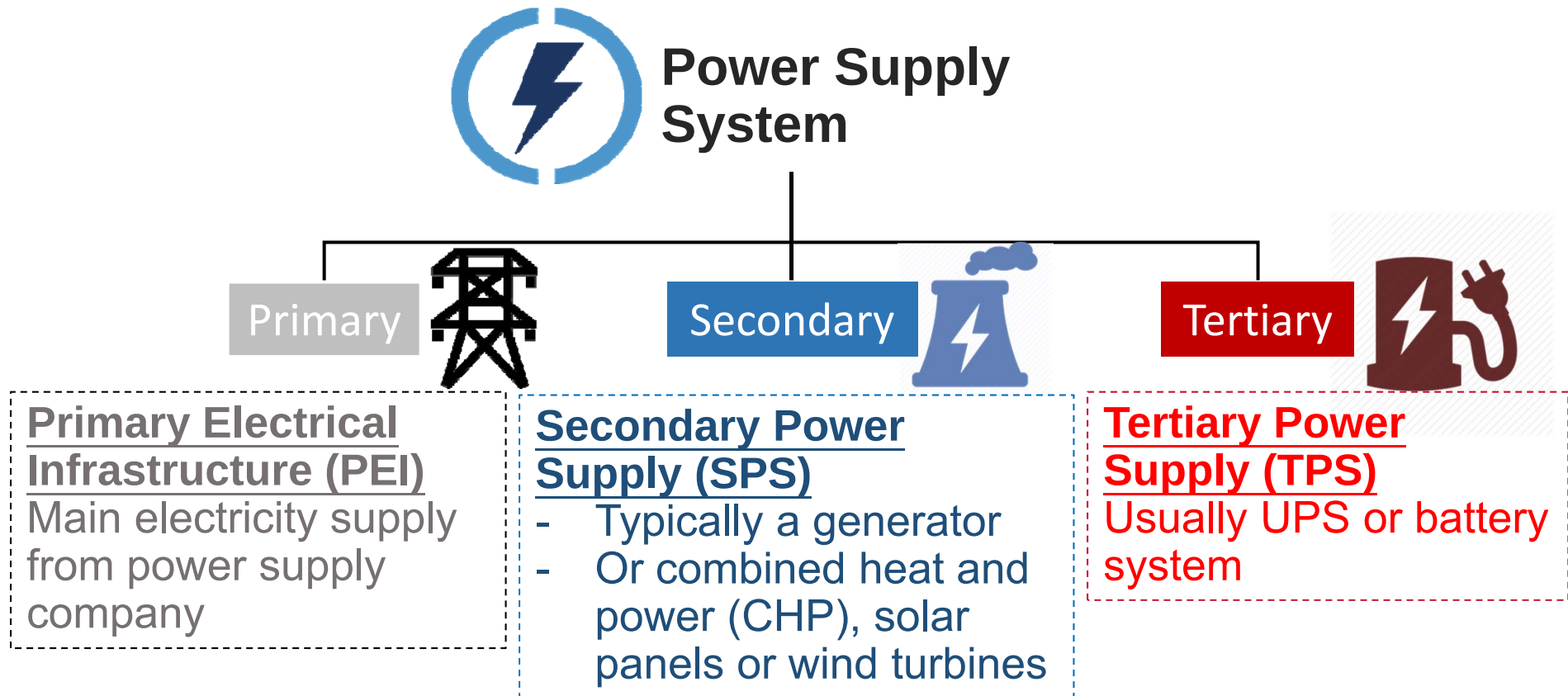


機電工程署
EMSD



III. Back-up Power Supply Consideration

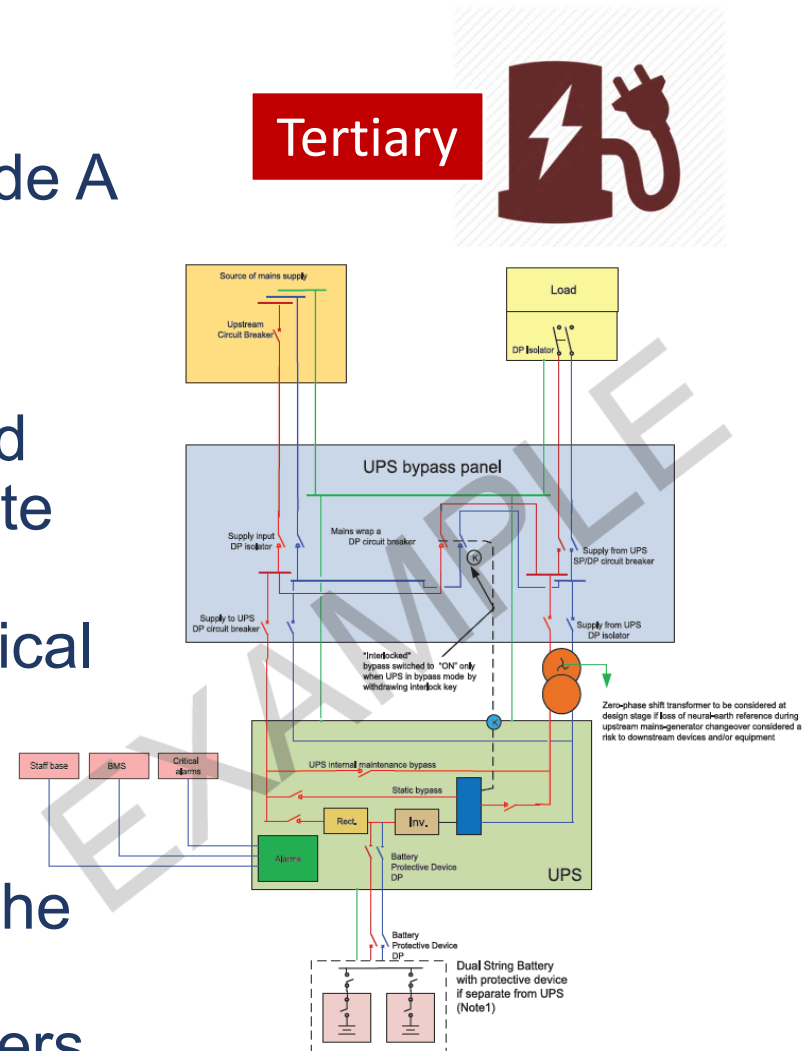
Definition in HTM06-01?



III. Back-up Power Supply Consideration

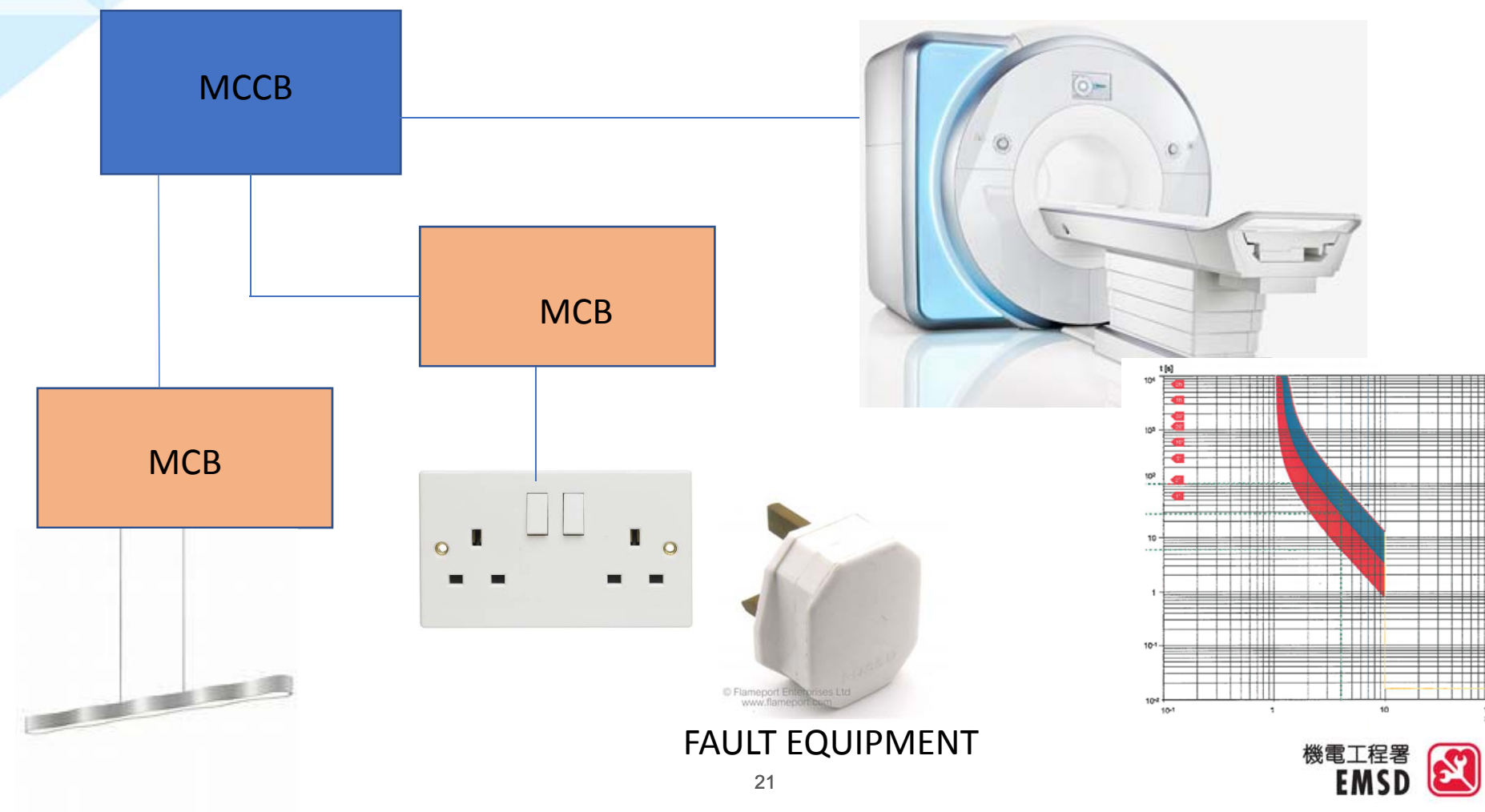
TPS: UPS Installation

- TPS supply for the clinical risk grade A or B areas (e.g. OT & ICU).
- E.g. In HTM06-01, it ...a dedicated TPS capable of sustaining adequate lighting levels for a minimum 1~3 hours following failure of the electrical supply.
- The battery autonomy in line with the procedures should be coordinated with Clinicians, equipment's suppliers and designers.



II. Design and Installation

Load Demand & Protection Device Consideration



III. Operation and Maintenance

What is the responsibility of owner in relation to installation?



- Inspected, tested and certified periodically in accordance with the Cap. 406
 - Periodic Inspection, Testing and Certification (PITC)
 - Owner's Approved Electricity Supply > 100A, 1Phase or 3 Phases
 - At least once every 5 years for premises covered in Cap. 165



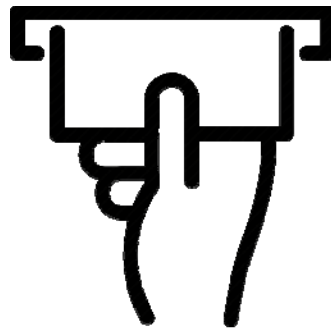
- Testing to ensure proper function upon loss of the normal power supply
 - On-load test of emergency generators;
 - Discharge tests of batteries.

III. Operation and Maintenance

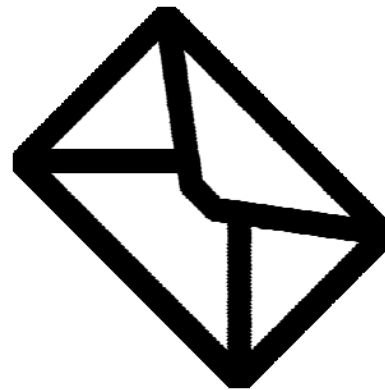
What is WR2 – Certification of PITC?



Report submission by REW:
within 1 month



Submission of WR2 form by owner or his/her representative:
within 2 weeks after the date of certification



Endorsement by DEMS, the Form WR2 will be returned



Record keeping by REC:
not less than 5 years

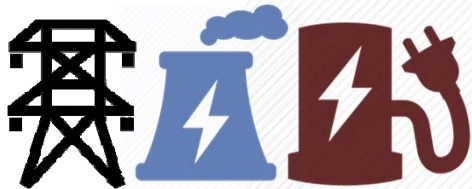
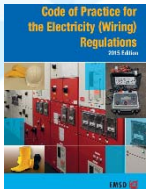
What has the talk delivered?

Overview of the
statutory
requirements on
“Electrical
Installation” regime

Highlight the
internationally
acceptable
healthcare
standard (HTM 06-
01 “Electrical Services
Supply and
Distribution”

Design &
Installation
Considerations of
Healthcare
Facilities from
“Electrical” point
of view

Operation &
Maintenance
Considerations of
Healthcare
Facilities from
“Electrical” point
of view





Thank You!