REA Briefing 2025

Buildings Energy Efficiency Ordinance (Cap. 610) and BEC & EAC 2024

2 & 15 May 2025

香港邁向碳中和 Carbon Neutral@HK

機電工程署 EMSD

Hong Kong's Climate Action Plan 2050

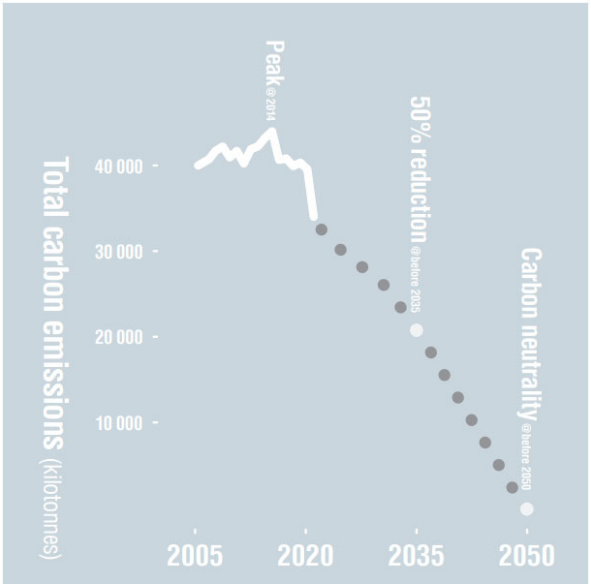
Hong Kong's Roadmap To Carbon Neutrality

Before 2035 — Total carbon emissions ↓50% Compared with 2005 level

Before 2050 — 香港邁向 碳中和 Carbon Neutral@HK

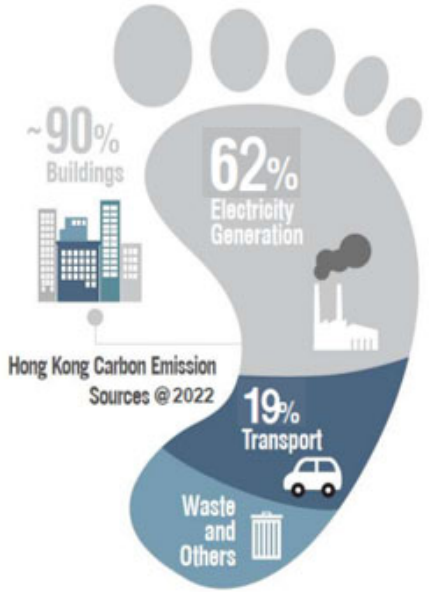
2035 — Electricity consumption (Compared with 2015)

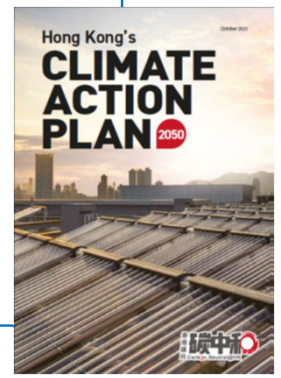
- COMMERCIAL BUILDINGS 15-20% (Reduce by 30-40% subsequently)
- RESIDENTIAL BUILDINGS 10-15% (Reduce by 20-30% subsequently)



Four decarbonisation strategies

- Net-zero Electricity Generation
- Energy Saving and Green Buildings
- Green Transport
- Waste Reduction





Source: Hong Kong Climate Action Plan 2050, (Oct 2021)

Buildings Energy Efficiency Ordinance (Cap. 610)

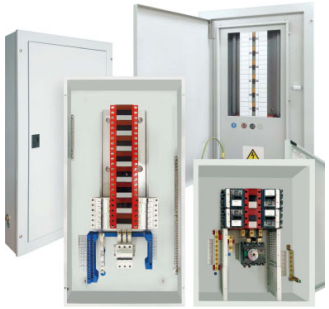
✓ **Full Implementation on 21 September 2012**

http://www.emsd.gov.hk/beeo

4 Types of Major Building Services Installation (BSI)

Air-conditioning

Lighting



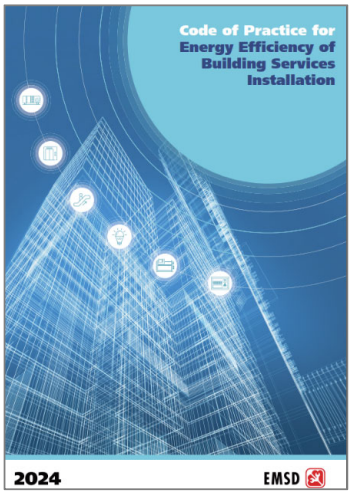
Electrical

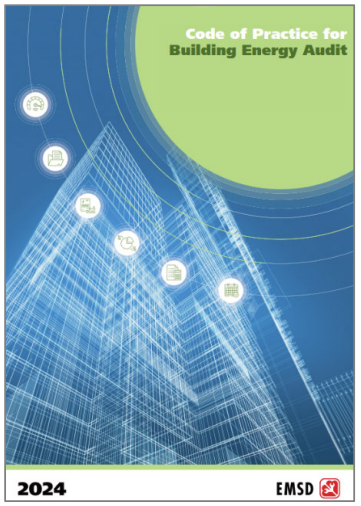
Lift and Escalator

Buildings Energy Efficiency Ordinance (Cap. 610)

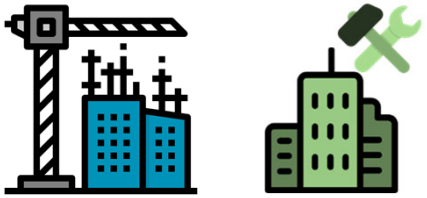
Buildings Energy Efficiency Ordinance (Cap.610)

- **Buildings Energy Efficiency (Fees) Regulation (Cap. 610A)**
- **Buildings Energy Efficiency (Registered Energy Assessors) Regulation (Cap.610B)**
- **Building Energy Code (BEC)**
- **Energy Audit Code (EAC)**





Regulatory Scope



The building services installations (BSI)* of New Constructed Building or Existing Building undergoing Major Retrofitting Works shall comply with the Building Energy Code

** Building services installations include: Air-conditioning, electrical, lift & escalator and lighting installation*

13 types of buildings

Listed in Schedule 1 of BEEO

1. Commercial building
2. Composite building – portion not for residential or industrial use
3. Hotel or guesthouse
4. Residential building – common area
5. Composite building – common area of portion for residential or industrial use
6. Industrial building – common area
7. Educational building
8. Community building
9. Municipal building
10. Medical and health care building
11. Government function building
12. Passenger terminal building of airport
13. Railway station

Existing Building shall conduct energy audit for central BSI at intervals no longer than 10 years

2 types pf buildings

Listed in Schedule 4 of BEEO

1. Commercial building
2. Composite building - portion for commercial use

Regulatory Scope

	Responsible party	Applicability	Code Compliance	Legal Obligation
(1) Newly Constructed Buildings 	Developer 	4 key types of BSIs	Building Energy Code (BEC)	Apply for **COCR Stage 1 & Stage 2 (EE1 & EE2)**
(2) Existing Buildings 	Responsible person; (Owner of BSI, Tenant) 	Major Retrofitting Works (MRW)	BEC (Table 10.1)	Obtain **FOC (EE4)** from **REA**
(3) Commercial Buildings / Commercial Portion of Composite Buildings 	Building owner 	Energy Audit	Energy Audit Code (EAC)	Obtain **EA Form (EE5)** and **EA Report** from **REA**

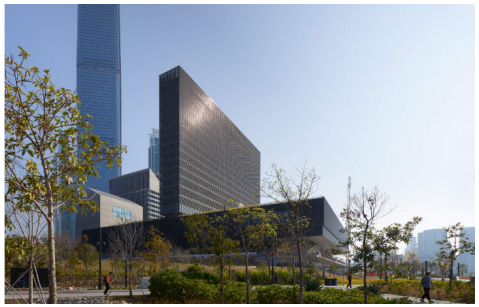
COCR for Newly Constructed Buildings

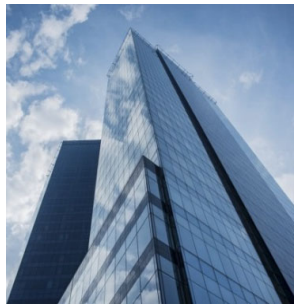
Stage One Declaration

- Developer engage Registered Energy Assessor (REA) to submit declaration **within 2 months after** obtaining Consent to commencement of building works (建築工程展開同意書)
- Declare the design of building services installations to comply with the BEC

Stage Two Declaration

- Developer engage REA to submits declaration **within 4 months after** the Occupation Permit (佔用許可證) is issued
- Confirm **designed**, **installed** and **completed** BSIs complying with BEC + REA inspect BSIs **within 30 days** of declaration
- Full fit-out works under developer's scope





Major Retrofitting Works in Existing Buildings

Works Area

Addition/replacement of a BS installation:

Works area ≥ 500 m² in a unit or a common area

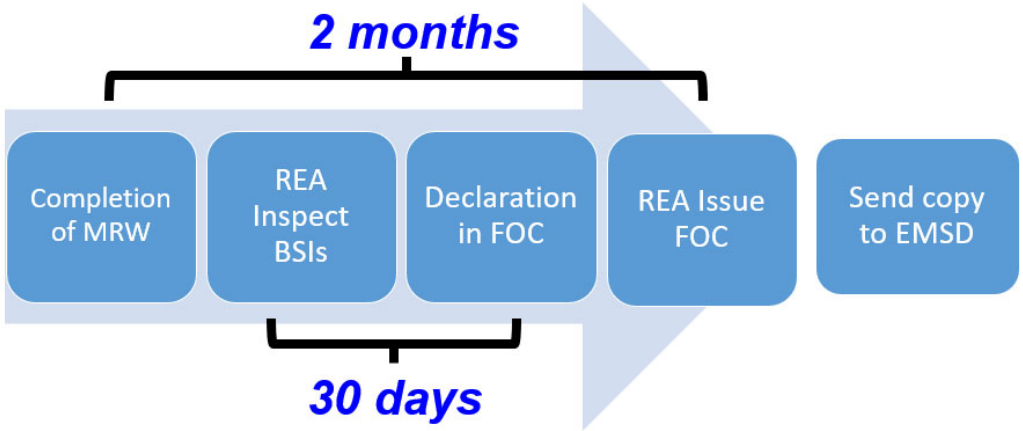
Central BS installation (CBSI)

Addition/replacement of main component:

electrical circuit ≥ 400A

A/C installation ≥ 350kW

motor drive + mechanical drive



Energy Audit in Existing Buildings

Building Type

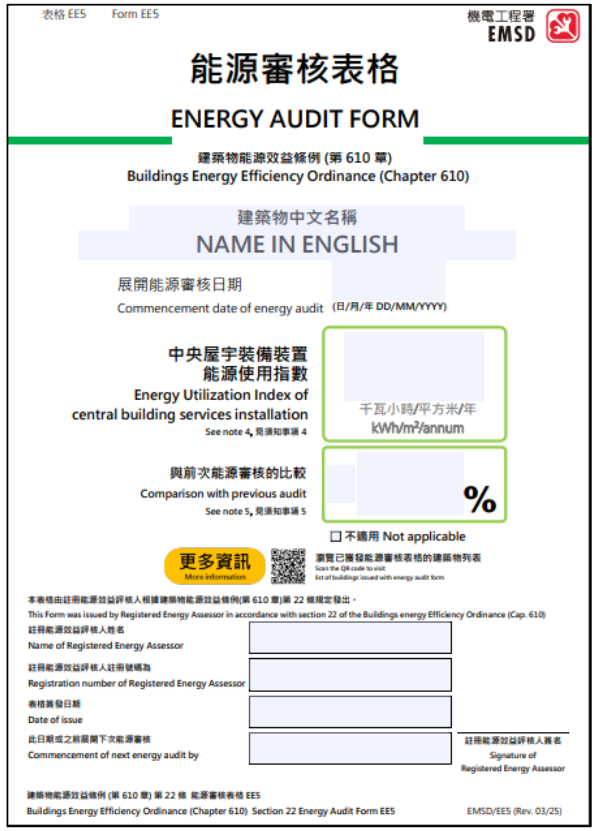
1. Commercial Buildings
2. Commercial Portion of Composite Buildings

Energy Audit Interval

- No longer than 10 year
- Within 10 year of buildings first issued with COCR for the above building type

EMSD Submission

- REA issued the Energy Audit Form and Energy Audit Report to building owner
- Send copy to EMSD within 30 days



表格 EE5 Form EE5

機電工程署 EMSD

能源審核表格

ENERGY AUDIT FORM

建築物能源效益條例 (第 610 章)
Buildings Energy Efficiency Ordinance (Chapter 610)

建築物中文名稱
NAME IN ENGLISH

展開能源審核日期
Commencement date of energy audit (日/月/年 DD/MM/YYYY)

中央屋宇裝備裝置能源使用指數
Energy Utilization Index of central building services installation
See note 4, 見須知事項 4

千瓦小時/平方米/年
kWh/m²/annum

與前次能源審核的比較
Comparison with previous audit
See note 5, 見須知事項 5

%

☐ 不適用 Not applicable

更多資訊 More information

瀏覽已獲發能源審核表格的建築物列表
Scan the QR code to visit list of buildings issued with energy audit form

本表格由註冊能源效益評核人根據建築物能源效益條例(第 610 章)第 22 條規定發出。
This Form was issued by Registered Energy Assessor in accordance with section 22 of the Buildings energy Efficiency Ordinance (Cap. 610)

註冊能源效益評核人姓名
Name of Registered Energy Assessor

註冊能源效益評核人註冊號碼為
Registration number of Registered Energy Assessor

表格簽發日期
Date of issue

此日期或之前展開下次能源審核
Commencement of next energy audit by

註冊能源效益評核人簽名
Signature of Registered Energy Assessor

建築物能源效益條例 (第 610 章) 第 22 條 能源審核表格 EE5
Buildings Energy Efficiency Ordinance (Chapter 610) Section 22 Energy Audit Form EE5

EMSD/EE5 (Rev. 03/25)

Building Owner must exhibit a copy of Energy Audit Form in a conspicuous position at main entrance of the building after energy audit

BEC and EAC
2024 Edition

BEC & EAC Review

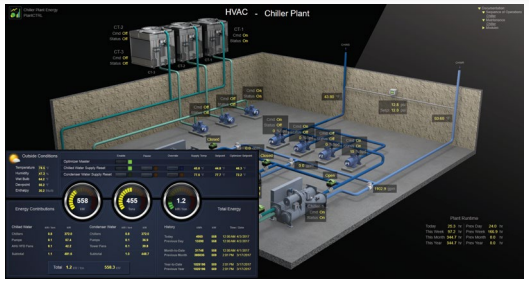
Considerations on Review:

a) Maturity of latest technology development;
b) Recognized international standards from other countries
c) Data analysis from BEEO submission
d) Aspiration from the public and stakeholders

+ **Streamline BEEO Submission**

1) **Uplifting** on Energy Efficiency Standard
(e.g. Tighten the COP, LPD, motor efficiency)

2) **Addition** of new requirements
(e.g. Strengthen control strategy and energy data management)



Technical Taskforce and Working Groups for BEC & EAC Review

Cap 610 - Buildings Energy Efficiency Ordinance (BEEO)

Building Energy Code (BEC) | **Energy Audit Code (EAC)**

Technical Taskforce and **6** Working Groups : **38** representative organizations

- ✓ *Professional Institutions*
- ✓ *Trade, consultant/contractor*
- ✓ *University Academia*
- ✓ *Government departments*
- ✓ *Utility Companies*

- Air-conditioning
- Lighting
- Electrical
- Lift/Escalator
- Energy Audit
- Performance Based

BEC & EAC Review

2012

Enacted Buildings Energy Efficiency Ordinance

BEC & EAC 2012

2015

BEC & EAC 2015

2018

BEC & EAC 2018

2021

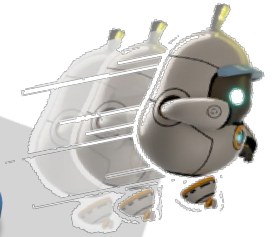
BEC & EAC 2021

2024

BEC&EAC 2024

- - > 2050

香港邁向 碳中和 Carbon Neutral@HK



~10% improvement

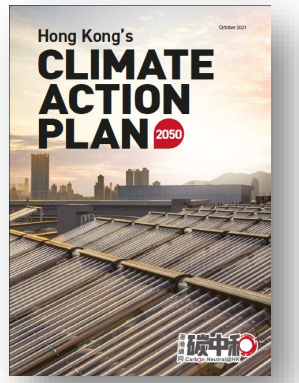
~18% improvement

~15% improvement

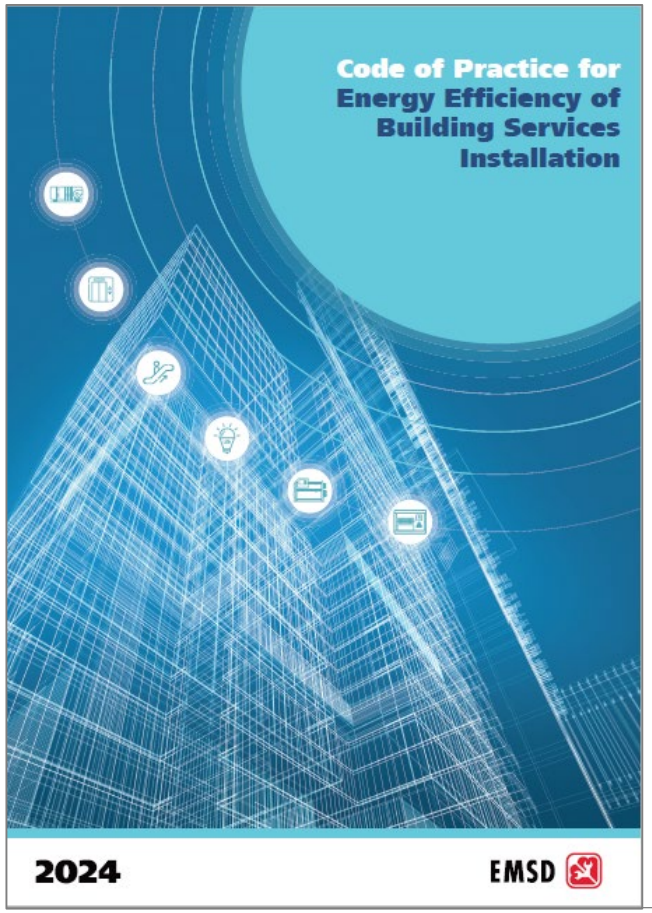
~20% improvement

Compare to BEC 2012

Compare to BEC 2015



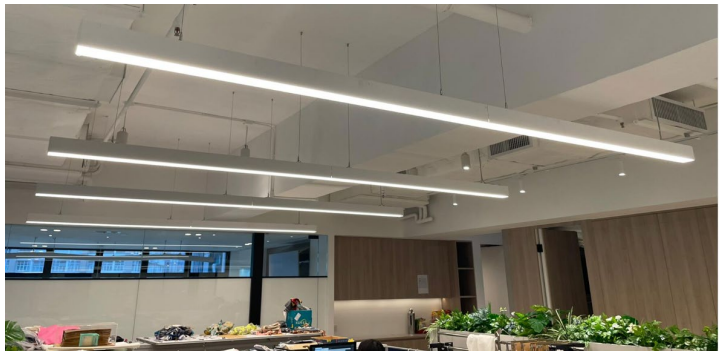
Major Changes for BEC 2024



Lighting Installation (Section 5)

Highlights of Major Changes

- Tightening of LPD and ALC requirements
- Tightening on the Control Area of Lighting Control Point & Automatic Lighting (i.e. higher spatial sensitivity)
- Simplified Trade-off Scheme of LPD *(New Clause)*



Automatic Time Scheduling

Occupancy Sensor

Lighting Installation (Section 5)

- Tightening LPD requirement at different lighting space (Table 5.4)

Type of space	BEC 2021 LPD (W/m2)	BEC 2024 LPD (W/m2)	% of changes
Bar / Lounge	13.0	10.0	-23.1%
Banquet Room / Function Room / Ball Room	17.0	12.7	-25.3%
Car Park	4.0	3.0	-25.0%
Changing Room/ Locker Room	10.0	8.1	-19.0%
Clinic	15.0	12.4	-17.3%
Conference / Seminar Room	12.8	10.6	-17.2%
Corridor	7.0	6.0	-14.3%
Dormitory	6.2	6.1	-1.6%
Entrance Lobby	11.5	10.0	-13.0%
Exhibition Hall / Gallery	15.0	12.0	-20.0%
Fast Food / Food Court	14.0	12.0	-14.3%

Space with Tighten LPD: **34 / 66 spaces**
Average LPD reduction : **14%**

Lighting Installation (Section 5)

- Tightening LPD requirement at different lighting space (Table 5.4)

Type of space	BEC 2021 LPD (W/m2)	BEC 2024 LPD (W/m2)	% of changes
Guest room in Hotel or Guesthouse	11.5	9.9	-13.9%
Laboratory	13.5	10.4	-23.0%
Library - Reading Area or Audio Visual Centre	12.0	10.2	-15.0%
Library - Stack Area	15.0	12.7	-15.3%
Lift Lobby *	9.2	7.5	-18.5%
Long Stay Ward for Elderly	15.0	12.9	-14.0%
Medical Examination Room	15.0	12.3	-18.0%
Office, enclosed (with internal floor area at or below $15m^2$)	9.5	9.0	-5.3%
Office, with internal floor area above $15m^2$ and of or below $200m^2$	8.9	8.5	-4.5%
Office, with internal floor area above $200m^2$	7.8	7.2	-7.7%
Pantry	10.2	8.5	-16.7%
Patient Ward / Day Care	13.0	11.2	-13.8%
Plant Room / Machine Room / Switch Room (with internal floor area above $15m^2$)	8.8	8.4	-4.5%

Remark * Space allowed for LPD trade-off

Space with Tighten LPD: **34 / 66 spaces**
Average LPD reduction : **14%**

Lighting Installation (Section 5)

- Tightening LPD requirement at different lighting space (Table 5.4)

Type of space	BEC 2021 LPD (W/m2)	BEC 2024 LPD (W/m2)	% of changes
Public Circulation Area	11.5	9.9	-13.9%
Restaurant	13.6	12.0	-11.8%
Retail	13.4	11.1	-17.2%
Server Room / Hub Room	8.9	8.2	-7.9%
Sports Arena, Indoor, for recreational purpose (with internal floor area at or below 1,000m2) ^	17.0	16.0	-5.9%
Sports Arena, Indoor, for recreational purpose (with internal floor area above 1,000 m2) ^		17.0	No change
Staircase	6.0	5.6	-6.7%
Storeroom / Cleaner (with internal floor area at or below 15m2)	7.9	7.4	-6.3%
Storeroom / Cleaner (with internal floor area above 15m2)		6.3	-20.3%
Toilet / Washroom / Shower Room *	9.7	9.0	-7.2%
Workshop	11.5	9.4	-18.3%

Breakdown down according to space area in BEC 2024

Breakdown down according to space area in BEC 2024

Remark * Space allowed for LPD trade-off

^ With ALC requirement from BEC2024

Space with Tighten LPD: **34 / 66 spaces**

Average LPD reduction : **14%**

Lighting Installation (Section 5)

- Tightening Lighting Control Point requirement

  Clause 5.5.1

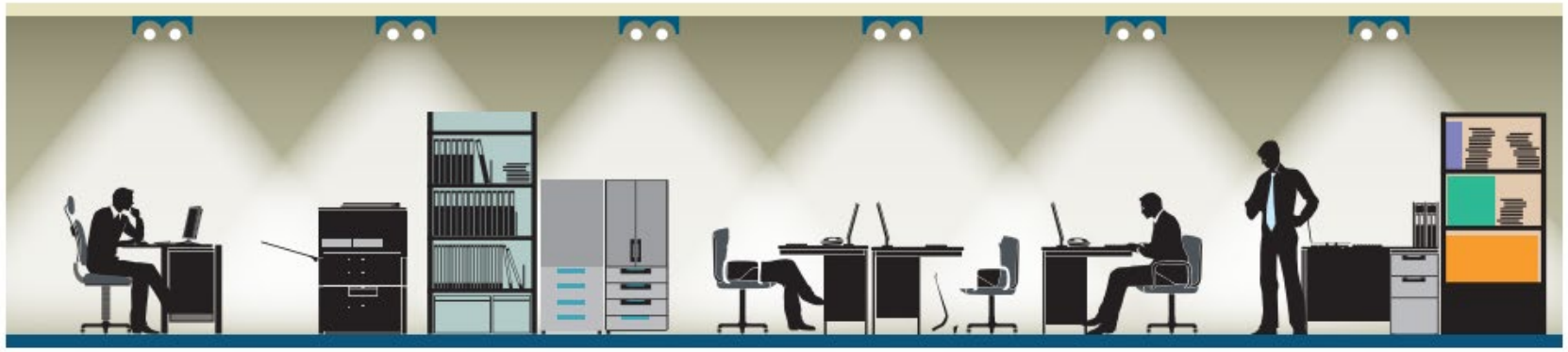
  A single lighting control point in any of the spaces that is not classified as an office should control no more than ~~500~~ 250 m^2.

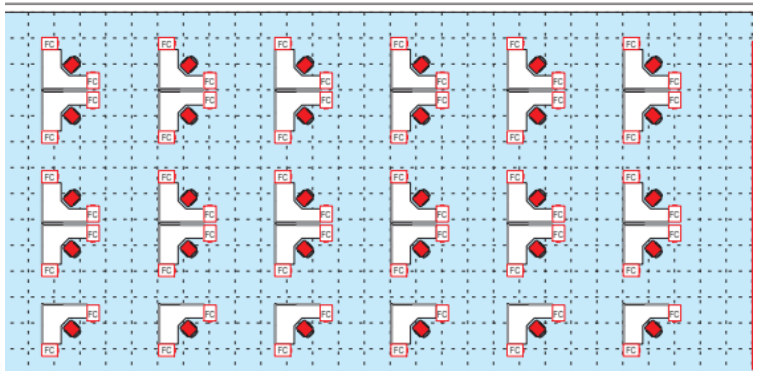
- Tightening Automatic Lighting Control requirement

  Clause 5.6.1.3

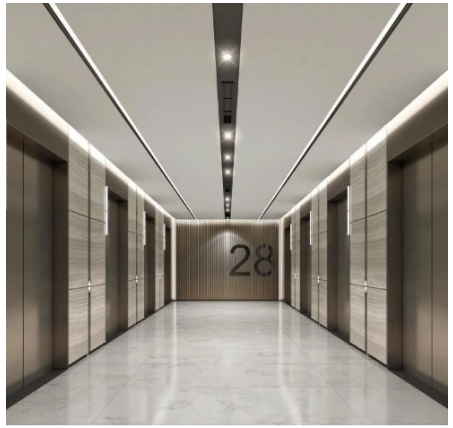
  The control devices or system should provide independent control which –

  (a) control the lighting for an area of no more than ~~2000~~ 250 m^2.





Lighting Installation (Section 5)



- Simplified Trade-off Scheme of LPD *(New Clause)*

Clause 5.7.1

The Trade-off Scheme of LPD are for the purposes of –

(a) reducing energy consumption in the designed building through the focus on its total lighting power in same designated types of spaces; and

(b) providing an alternative approach for compliance with the energy efficiency requirement given in Table 5.4
[ONLY "Lift Lobby" and "Toilet / Washroom / Shower Room"]

Pre-requisite Requirements	Terms of Trade-off
• 2 nos. of lighting spaces are allowed - Lift Lobby ↔ Lift Lobby - Toilet ↔ Toilet	• Not greater than 25% of the LPD requirements
• Comparable Operation Schedule & AC conditions • Under same ownership	• Capped at 50% of the achieved lighting power reduction

Lighting Installation (Section 5)

- Simplified Trade-off Scheme of LPD *(New Clause)*

Clause 5.7.2

The requirement of adopting the Trade-off Scheme for showing compliance:

(a) Only adopted in the specified type of spaces as highlighted in Table 5.4;
[ONLY "Lift Lobby" and "Toilet / Washroom / Shower Room"]

(b) Only applicable to same type of space with same operation schedule as well as the same thermal conditions;

(c) Limited to a maximum 50% of the surplus lighting power compared to the total achieved reduction in lighting power for the specific type of space;

(d) The LPD for the designed lighting space should not exceed 25% of the maximum allowable LPD in Table 5.4;

(e) The lighting space and lighting installations involved in the trade-off should be under the same ownership.

Lighting Installation (Section 5)

- Simplified Trade-off Scheme of LPD *(New Clause)*

Technical Data of Lighting Installation for Building Energy Code (BEC) 2024

(Please refer to Section 5, Code of Practice for Energy Efficiency of Building Services Installation 2024 Edition)

Part 6 – Simplified Trade-off Scheme Worksheet*1

(Complete this part if LPD Trade-off are applied in this submission)

Page ___ of ___

Name of space / Space Ref. No.*2*3	Type of Space*4	a Internal floor area (m^2)	b Installed LPD (W/m^2)	c Maximum allowable LPD in BEC Table 5.4 (W/m^2)*5	d ≤ 1.25*c Compliance in BEC Clause 5.7.2 (d)? (i.e. Installed LPD ≤ 1.25*Maximum allowable LPD)	e = a x b Installed lighting power in lighting space (W)	f = a x c Baseline lighting power as per BEC Table 5.4 (W)	g = f - e Achieved reduction in lighting power compared with BEC Table 5.4 (W)	h = 0.5*g Achieved reduction in lighting power for trade-off
(Please insert additional row if necessary)									
GF Lift Lobby	Lift Lobby	50.0	9.3	7.5	OK	465.0	375.0	-90.0	Trade-off
1F Lift Lobby	Lift Lobby	20.0	6.0	7.5	OK	120.0	150.0	30.0	15.0
2F Lift Lobby	Lift Lobby	20.0	6.0	7.5	OK	120.0	150.0	30.0	15.0
3F Lift Lobby	Lift Lobby	20.0	6.0	7.5	OK	120.0	150.0	30.0	15.0
4F Lift Lobby	Lift Lobby	20.0	6.0	7.5	OK	120.0	150.0	30.0	15.0
5F Lift Lobby	Lift Lobby	20.0	6.0	7.5	OK	120.0	150.0	30.0	15.0
6F Lift Lobby	Lift Lobby	20.0	6.0	7.5	OK	120.0	150.0	30.0	15.0
Total lighting power in lighting space cannot meet BEC Table 5.4 (W)								-90	
Total lighting power available for trade-off (W)								90	
Full compliance in BEC Clause 5.7.2								OK	

Remarks (applicable to Part 6) :-

*1 The Owner of the building / Responsible Person of the unit should properly maintain this table with layout plan and use for justification on maintaining the LPD to a standard as per the Trade-off Scheme

*2 Please indicate the space Ref No. / name of space on the relevant drawing. Spaces each having total electrical power consumed by the complete fixed lighting installation not exceeding 70W may be excluded.

*3 Layout plan showing the lighting spaces under LPF Trade-off Scheme should be attached with this table.

*4 Only specified types of space (indicated with * in Table 5.4, i.e. "Lift Lobby" or "Toilet / Washroom / Shower Room") are applicable to simplified trade-off scheme.

*5 If there are further major retrofitting works (MRW) on lighting installation in any of the lighting spaces under the Trade-off Scheme, the maximum allowable LPD of corresponding lighting spaces for MRW should be updated with latest edition of BEC.

- New Table in Technical Form for Trade-off calculation
- Build-in function for compliance check

Reminder

- ***Record of trade-off to be properly maintained***

Air-conditioning Installation (Section 6)

- Tightening AC equipment efficiency
  - UAC
  - VRF
  - Air-cooled Chiller
  - Water-cooled Chiller

- Trade-off for Low GWP Refrigerant in Major Retrofitting Works *(New Clause)*
- Tightening Carpark Ventilation System requirement
- Revision of Thermal Insulation Thickness
- Addition of Control, Monitoring and Optimisation requirement *(New Clause)*

Air-conditioning Installation (Section 6)

- Tightening AC equipment efficiency

Min. COP of Unitary Air-conditioner (UAC)				
AC Equipment			**BEC 2021**	**BEC 2024**
Air-cooled	7.5 kW or below	Cooling mode	2.7 (split type) 2.5 (non-split type)	2.8 (split type) 2.8 (non-split type)
		Heating mode	2.8	3.1

Average COP for UAC improvement : **~8%**

Air-conditioning Installation (Section 6)

- Tightening AC equipment efficiency

Min. COP of Variable Refrigerant Flow System (VRF)				
AC Equipment			BEC 2021	BEC 2024
Air-cooled – Modular unit with top-discharge fans	Above 20 kW & below 40 kW	Cooling mode	3.9	4.0
		Heating mode	4.1	4.2
	Above 200 kW	Cooling mode	3.4	3.5
		Heating mode	3.7	3.8

Average COP for VRF improvement : ~3%

Air-conditioning Installation (Section 6)

- Tightening AC equipment efficiency

Min. COP of Chiller				
AC Equipment			BEC 2021	BEC 2024
Air-cooled – Screw	Below 500 kW	Full Load	3.1	3.2
	500 kW & above	Full Load	3.1	3.2
Air-cooled – VSD Screw	Below 500 kW	75% of the full load	3.9	4.0
	500 kW & above	75% of the full load	4.0	4.1
Air-cooled – VSD Centrifugal	All Ratings	Full Load	3.2	3.3

Average COP for Chillers (air-cooled & water-cooled) improvement : ~4%

Air-conditioning Installation (Section 6)

- Tightening AC equipment efficiency

Min. COP of Chiller				
AC Equipment			BEC 2021	BEC 2024
Water-cooled – Screw	Below 500 kW	Full Load	4.8	5.1
	500 kW & above	Full Load	5.0	5.3
Water-cooled – VSD Screw	500 kW & 1000 kW	Full Load	5.0	5.2
		75% of the full load	6.8	7.0
	Above 1000 kW	75% of the full load	7.2	7.5
Water-cooled – VSD Centrifugal	Below 1000 kW	Full Load	5.4	5.5
		75% of the full load	7.2	7.3
	1000 kW to 3000 kW	Full Load	5.7	5.8
		75% of the full load	7.7	7.9
	Above 3000 kW	75% of the full load	7.8	8

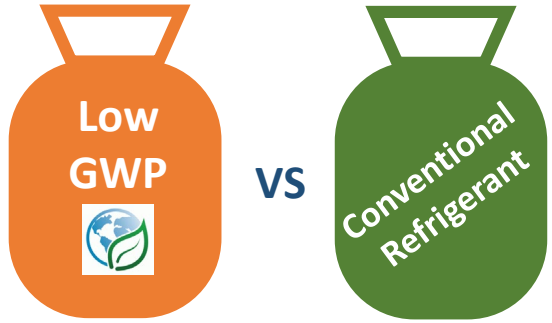
Average COP for Chillers (air-cooled & water-cooled) improvement : **~4%**

Air-conditioning Installation (MRW at Section 10)

➢ Trade-off for Low GWP Refrigerant in MRW *(New Clause)*

Facilitation for Use of Low GWP Refrigerant

- **Kigali Amendment – Phase down HFCs**
  - Transition to low GWP refrigerant
- **Trade opines – difficulties in chiller replacement project**
  - Larger chiller component for low GWP refrigerant to achieve same cooling capacity / COP
  - Footprint of low GWP refrigerant chiller is relatively larger
  - Practical constraint in complying tightened COP requirement for chiller replacement project



Air-conditioning Installation (MRW at Section 10)

➢ Trade-off for Low GWP Refrigerant in MRW *(New Clause)*

Works involving addition or replacement of a building services installation that covers total floor area of not less than 500 m^2 with Chiller Replacement

Table 10.1
Major Retrofitting Works and Energy Efficiency Requirements

Category of Major Retrofitting Work	Condition for Applicability of BEC Requirement		Applicable BEC Requirement	BEC Clause No.
(ii) addition or replacement of air handling unit(s), unitary air-conditioner(s) VRF system(s)	total cooling/heating capacity of the additional or replacement air handling unit(s), unitary air-conditioner(s),	involving addition or replacement of unitary air-conditioner, VRF system, heat pump, cooling tower and/or chiller	air- conditioning equipment efficiency(5)	6.12
		the additional or replacement air handling unit(s) forming a complete	separate air distribution system for process	6.5

Addition or replacement of a main component of a central building services installation
(i.e. Chillers >350KW)

Table 10.1
Major Retrofitting Works and Energy Efficiency Requirements

Category of Major Retrofitting Work	Condition for Applicability of BEC Requirement	Applicable BEC Requirement	BEC Clause No.
(ii) addition or replacement of a unitary air-conditioner or a chiller of a cooling	applicable in any conditions; the work involving addition or replacement of cooling tower(s)	air- conditioning equipment efficiency(5)	6.12
	the addition or replacement of air-conditioning equipment involving addition or complete replacement of the corresponding	frictional loss of water piping system	6.9
		energy metering	6.13

To resolved the space constraint In plantroom

In Remark (5) A 4% trade-off for minimum COP of chiller at Table 6.12(b) is allowable for chiller adopting refrigerant with global warming potential (GWP) value lower than 750. Supporting information should be provided as part of the documents appended in the Form of Compliance.

4% trade-off

Air-conditioning Installation (Section 6)

➢ Tightening Carpark Ventilation System requirement

Clause 6.10.7.1

A carpark ventilation system should be designed to operate with staging or modulation of fans, based on the detected contaminant level, to provide down to ~~50%~~ 35% or less of the design capacity. For carpark on basement floor, additional control in response to temperature is permissible.

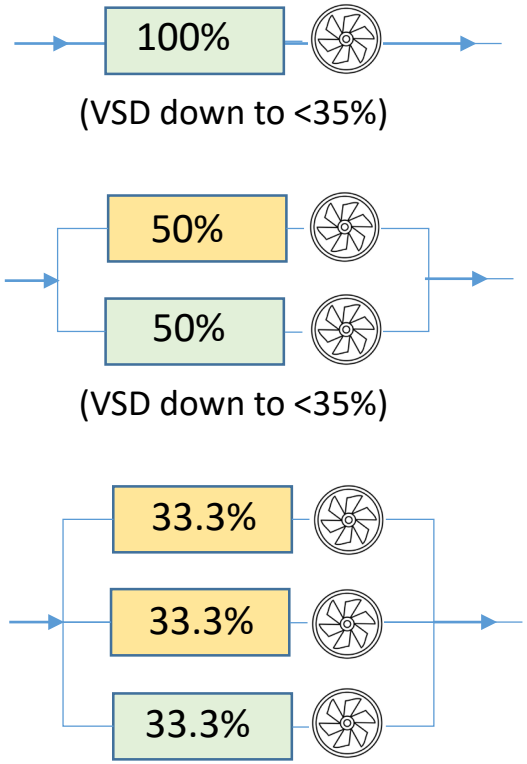
Clause 6.10.7.2

The requirement in clause 6.10.7.1 should be applicable to

(a) the exhaust air fans and the fresh air fans in respect of staging or modulation of fans, where jet fans, if any, should be exempted from the fan staging or modulation; and

(b) the carpark ventilation system with the total fan motors' nameplate power, including the fresh air fans, exhaust air fans and jet fans, of ~~11kW~~ 3.7 kW or above.

Examples

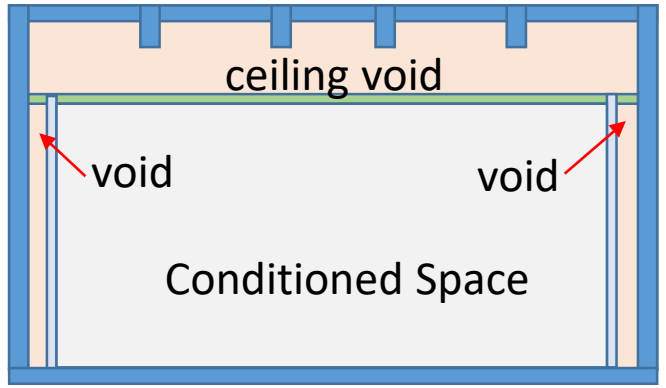


Air-conditioning Installation (Section 6)

➢ Supplement of Ambient Condition of Thermal Insulation

Table 6.11a : Minimum Insulation Thickness for Chilled Water Pipework @1

Ambient Condition	Outdoor @2				Unconditioned Space @2				Ceiling Void / Void of Conditioned Space@5				Conditioned Space @2	
Thermal conductivity λ (W/m-°C) @3	0.024		0.038		0.024		0.038		0.024		0.038		0.024	0.038
Surface coefficient h (W/m²-°C) @4	9	13.5	9	13.5	5.7	10	5.7	10	5.7	10	5.7	10	any value	
Pipe outer diameter d_o @1	Insulation thickness (mm) @1													
21.3 mm	20	15	29	21	29	19	41	27	20	13	28	18	13	13
26.9 mm	21	15	30	22	31	20	43	28	21	13	30	19	13	13
33.7 mm	22	16	32	23	32	21	45	29	22	14	31	20	13	13
42.4 mm	23	17	33	24	34	21	48	31	22	14	33	21	13	25
48.3 mm	24	17	34	25	35	22	49	31	23	14	33	21	13	25
60.3 mm	25	18	36	26	36	23	52	34	24	15	35	22	13	25
76.1 mm	26	18	37	27	38	24	54	34	25	15	36	23	14	25
88.9 mm	26	19	38	27	39	24	56	35	25	16	37	23	14	25
114.3 mm	27	19	40	28	41	25	58	38	26	16	39	24	14	25
139.7 mm	28	20	41	29	42	26	61	38	27	16	40	25	14	25
168.3 mm	29	20	42	30	43	26	63	39	28	16	41	25	14	25
219.1 mm	29	20	44	31	44	27	65	40	28	17	43	26	15	25
273 mm	30	21	45	31	45	27	67	42	29	17	44	26	15	25
323.9 mm	30	21	46	32	46	28	69	42	29	17	44	26	15	25
355.6 mm	31	21	46	32	47	28	69	42	29	17	45	27	15	25
406.4 mm	31	21	47	32	47	28	70	42	30	17	45	27	15	25



@5 Ceiling Void / Void adjacent to conditioned space:
- The design conditions for the void adjacent to the conditioned space should be declared by REA to suit the design consideration.
- As a reference, the minimum insulation thickness based on the declared assumption of 26oC dew point at 85% coincident relative humidity (app. coincident 28.8oC dry bulb) is calculated for compliance.
- If the void adjacent to conditioned space has different design conditions, the designer should calculate the minimum insulation thickness accordingly or otherwise, refer to unconditioned space for extreme conditions

Air-conditioning Installation (Section 6)

➢ Revision of Thermal Insulation Thickness

Table 6.11b : Minimum Insulation Thickness for Refrigerant Pipework (suction) @1

Ambient Condition	Outdoor @2				Unconditioned Space @2				Ceiling Void / Void of Conditioned Space @5				Conditioned Space @2	
Thermal conductivity λ (W/m-°C) @3	0.024		0.038		0.024		0.038		0.024		0.038		0.02	0.038
Surface coefficient h (W/m²-°C) @4	9	13.5	9	13.5	5.7	10	5.7	10	5.7	10	5.7	10	any value	
Pipe outer diameter d_o @1	Insulation thickness (mm) @1													
Line temperature θl	0°C													
6 mm	18	13	25	18	25	17	36	23	17	13	25	16	13	13
8 mm	19	14	27	20	27	18	38	25	19	13	26	17	13	13
10 mm	20	15	28	21	29	19	40	26	20	13	28	18	13	13
12 mm	21	15	30	22	30	19	42	27	20	13	29	19	13	13
15 mm	22	16	31	23	31	20	44	29	21	14	31	20	13	13
22 mm	24	18	34	25	34	22	48	31	23	15	33	22	13	13
28 mm	25	18	36	26	36	23	51	33	25	16	35	25	13	25
35 mm	27	19	38	27	38	24	54	35	26	16	37	25	13	25
42 mm	28	20	39	28	40	25	56	36	27	17	38	25	13	25
54 mm	29	21	41	30	42	27	59	38	28	18	41	26	13	25
76.1 mm	31	22	44	32	45	28	64	41	30	18	43	27	14	25
Line temperature θl	-10°C													
6 mm	23	17	32	24	33	21	46	30	22	14	32	21	13	13
8 mm	24	18	34	25	35	23	49	32	24	15	34	22	13	13
10 mm	26	19	36	26	37	24	52	33	25	16	36	23	13	13
12 mm	27	20	38	28	38	25	54	35	26	17	37	24	13	13
15 mm	28	21	40	29	40	26	56	37	28	18	39	25	13	13
22 mm	31	22	43	32	44	28	62	40	30	19	43	28	13	13
28 mm	32	24	46	33	46	30	65	42	32	20	45	29	13	25
35 mm	34	25	48	35	49	31	69	44	33	21	48	31	13	25
42 mm	35	26	50	36	51	33	71	46	35	22	50	32	13	25
54 mm	37	27	53	38	54	34	76	49	36	23	52	34	13	25
76.1 mm	40	28	57	41	57	36	82	52	39	24	56	36	14	25

Table 6.11c : Minimum Insulation Thickness for Ductwork and AHU Casing

Ambient Condition	Outdoor @2				Unconditioned Space @2				Ceiling Void / Void of Conditioned Space @5				Conditioned Space @2	
Thermal conductivity λ (W/m-°C) @3	0.024		0.038		0.024		0.038		0.024		0.038		0.024	0.038
Surface coefficient h (W/m²-°C) @4	9	13.5	9	13.5	5.7	10	5.7	10	5.7	10	5.7	10	any value	
Temperature difference between air inside duct/ casing and surrounding of duct/casing	Insulation thickness (mm)													
15 °C	20	13	31	21	31	18	49	28	19	15	30	25	15	25
20 °C	27	18	43	29	43	25	68	39	26	15	41	25	15	25

Air-conditioning Installation (Section 6)

- Revision of Clause 6.14 & 6.15

Clause 6.14 Control, Monitoring and Optimization

6.14.1 Direct Digital Control (DDC)

6.14.1.1 DDC should be provided for –

(a) A chilled/heated water plant and all the coils and terminal units served by the plant when the plant is of 350 kW or above cooling/heating capacity serving more than three zones; and

(b) an air distribution system for a conditioned space with system fan motor power of 7.45 kW or above.

6.14.1.2 The DDC should be capable of –

(a) monitoring zone and system demand for fan pressure, pump pressure, heating and cooling;

(b) transferring the zone and system demand to air distribution system controllers and from air distribution systems to plant controllers; and

(c) trending and graphically displaying input and output points.

Existing Clause 6.14

Air-conditioning Installation (Section 6)

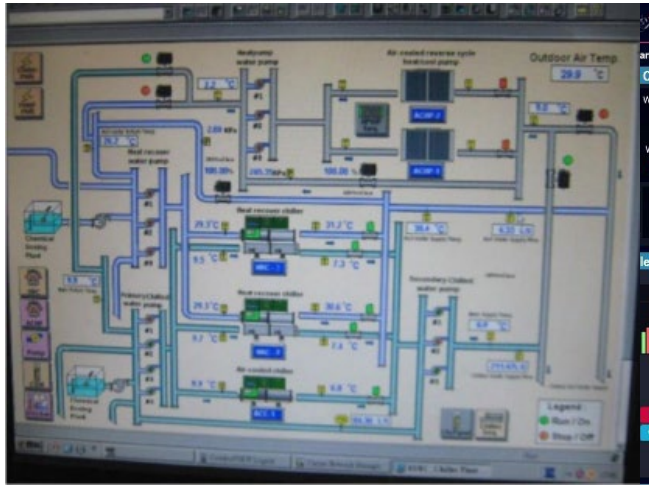
➢ Revision of Clause 6.14 & 6.15

Clause 6.14 Control, Monitoring and Optimization

6.14.2 Chilled Water Plant Control System *(New Clause)*

6.14.2.1 A chilled water plant with cooling capacity of 350kW or above should be equipped with chilled water plant control and monitoring provisions capable for **processing the data of DDC to digitally control, monitor, and manage the plant equipment.** The system should be able to **monitor and record the plant coefficient of performance** for energy management purpose.

(For Example: Building Management System(BMS), Central Control Monitoring System(CCMS), etc …)



Air-conditioning Installation (Section 6)

- Revision of Clause 6.14 & 6.15

Clause 6.14 Control, Monitoring and Optimization

6.14.3 Chilled Water Temperature Reset

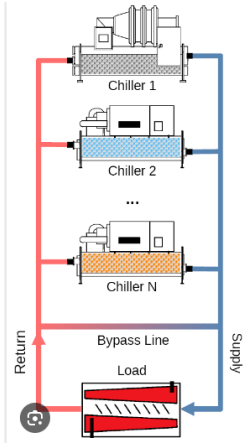
6.14.3.1 A chilled water plant with cooling capacity of 350 kW or above supplying chilled water should be equipped with controls that atomically reset the supply water temperatures according to representative building loads or outdoor ambient conditions.

Existing Clause 6.15

6.14.4 Chilled Water Plant Optimization Control *(New Clause)*

6.14.4.1 A chilled water plant **with 3 or more chillers**, which the cooling capacity of **each chiller is 350kW or above** should be equipped with provision of chilled water plant energy **optimization control** on top of the provision specified in clause 6.14.3.

New Clause



Optimization control strategy for chiller plant shall base on the characteristics of equipment, Plant COP, cooling load demand and ambient air /condensing water temperature condition. The strategies could be:

- Chiller Sequencing Control
- Cooling Tower Fan Control
- Condensing Water Flow Rate Reset
- Other Optimization Control Strategies

Supplement the examples of Chiller Plant Optimization in Technical Guidelines

Electrical Installation (Section 7)

- Tightening Minimum Nominal Full-Load Motor Efficiency to IE4 (75kW to 200kW)

Table 7.5.1 : Minimum Nominal Full-Load Motor Efficiency for Single-Speed Three-phase Totally Enclosed Motor

Motor Rated Output (P, in kW)	Minimum Rated Efficiency (%)	
	2-pole	4-pole
0.75 kW ≤ P < 1.1 kW	80.7%	82.5%
1.1 kW ≤ P < 1.5 kW	82.7%	84.1%
1.5 kW ≤ P < 2.2 kW	84.2%	85.3%
2.2 kW ≤ P < 3 kW	85.9%	86.7%
3 kW ≤ P < 4 kW	87.1%	87.7%
4 kW ≤ P < 5.5 kW	88.1%	88.6%
5.5 kW ≤ P < 7.5 kW	89.2%	89.6%
7.5 kW ≤ P < 11 kW	90.1%	90.4%
11 kW ≤ P < 15 kW	91.2%	91.4%
15 kW ≤ P < 18.5 kW	91.9%	92.1%
18.5 kW ≤ P < 22 kW	92.4%	92.6%
22 kW ≤ P < 30 kW	92.7%	93%
30 kW ≤ P < 37 kW	93.3%	93.6%
37 kW ≤ P < 45 kW	93.7%	93.9%
45 kW ≤ P < 55 kW	94%	94.2%
55 kW ≤ P < 75 kW	94.3%	94.6%
75 kW ≤ P < 90 kW	95.6%	96%
90 kW ≤ P < 110 kW	95.8%	96.1%
110 kW ≤ P < 132 kW	96%	96.3%
132 kW ≤ P < 160 kW	96.2%	96.4%
160 kW ≤ P < 200 kW	96.3%	96.6%
P = 200 kW	96.5%	96.7%
P > 200 kW	95.8%	96%

Remarks:

- Compliance to above should be based on testing to relevant international standards such as IEEE 112:2017, or IEC 60034-2-1 : 2014.
- Clause 7.5.1 is applicable to single-speed three-phase totally enclosed motor equipped with variable speed drive

IE3 ↑

IE4 ↓

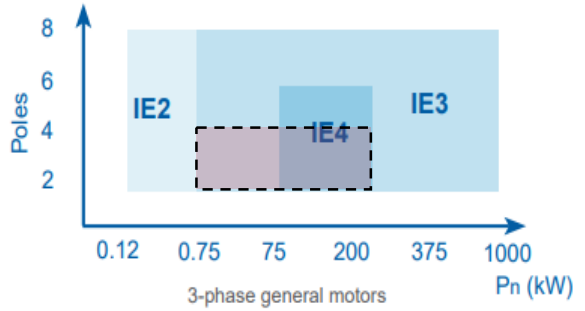
Updated to align with EU Regulation

IE4 ↑

IE3 ↓

Table 7.5.1 : Minimum Nominal Full-Load Motor Efficiency for Single-Speed Three-phase Totally Enclosed Motor

Motor Rated Output (P, in kW)	Minimum Rated Efficiency (%)	
	2-pole	4-pole
75 kW ≤ P < 90 kW	95.6%	96%
90 kW ≤ P < 110 kW	95.8%	96.1%
110 kW ≤ P < 132 kW	96%	96.3%
132 kW ≤ P < 160 kW	96.2%	96.4%
160 kW ≤ P < 200 kW	96.3%	96.6%
P = 200 kW	96.5%	96.7%
P > 200 kW	95.8%	96%



Lift & Escalator Installation (Section 8)

- Tightening ventilation fan efficacy

Clause 8.5.4.3

Power consumption of lift car ventilation fan at design air flow condition should not exceed ~~0.7~~ 0.53 W per litre per second (L/s).

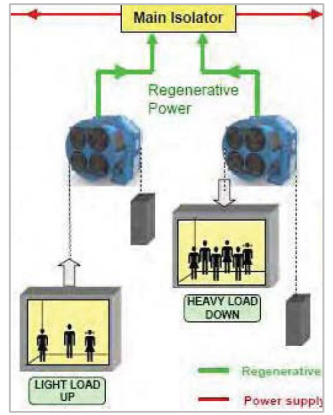
- Tightening lift regenerative brake

Clause 8.5.5

Regenerative braking should be provided for each of a lift

~~(a)~~ with rated speed of 2.0 m/s or above

~~(b) rated load at 900 kg or above~~



- Mandate escalator stand-by mode speed (i.e. to 0.25 ms^{-1})

Clause 8.5.7

Switching provision should be made for each escalator to operate under automatic speed reduction mode when the traffic demand is low. The crawling speed of escalator at reduction mode should not be less than 0.05 m/s or over 0.25 m/s. Further consideration in respect of safety, operation and riding quality should be conducted when deploying automatic stop at low traffic demand period.

Lift & Escalator Installation (Section 8)

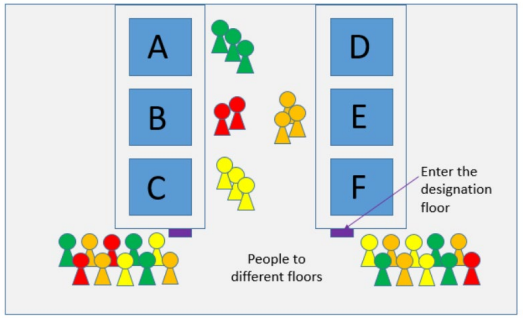
➢ Addition of Performance Monitoring Facilities for Measurement of Lift *(New Clause)*

Clause 8.7.4

For lift installation adopted lift destination group control system, sensing devices and metering should be provided for each lift to monitor the following parameters of **each brake-to-brake journey** started from origin floor and stopped at destination floor:

(a) distance travelled; and

(b) car load



Clause 8.7.5

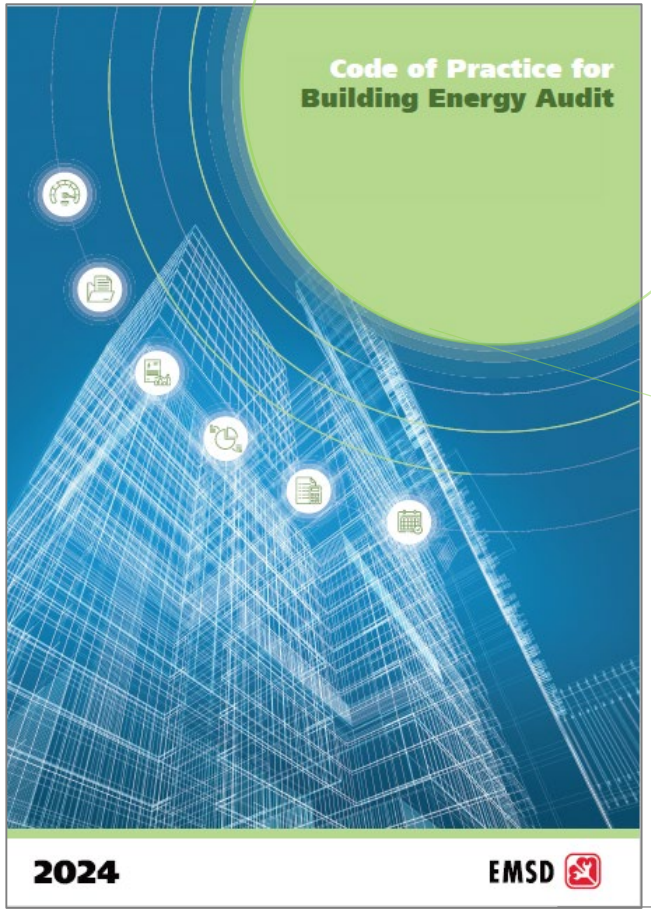
The measurement parameters as stated in 8.7.4 should be trended by each journey **at the origin floor** and **at the destination floor**. The data should be **logged with date and time** with a precision to record the start and the stop of journey. All these data should be exported and stored to monitoring facilities which should be capable of **maintaining the data collected for a minimum of one week** for energy management purpose.

Review Lift Performance by means of J/kg-m

$$J/kg\text{-}m = \frac{E_T}{\sum_{i=1}^{n} W_i D_i}$$

E: total energy consume
n: nos. of journey
W: car load
D: distance travel

Major Changes for EAC 2024



Highlights of EAC 2024

- Launch of Energy Audit Report Template
  (i.e. merging energy audit report and executive summary)

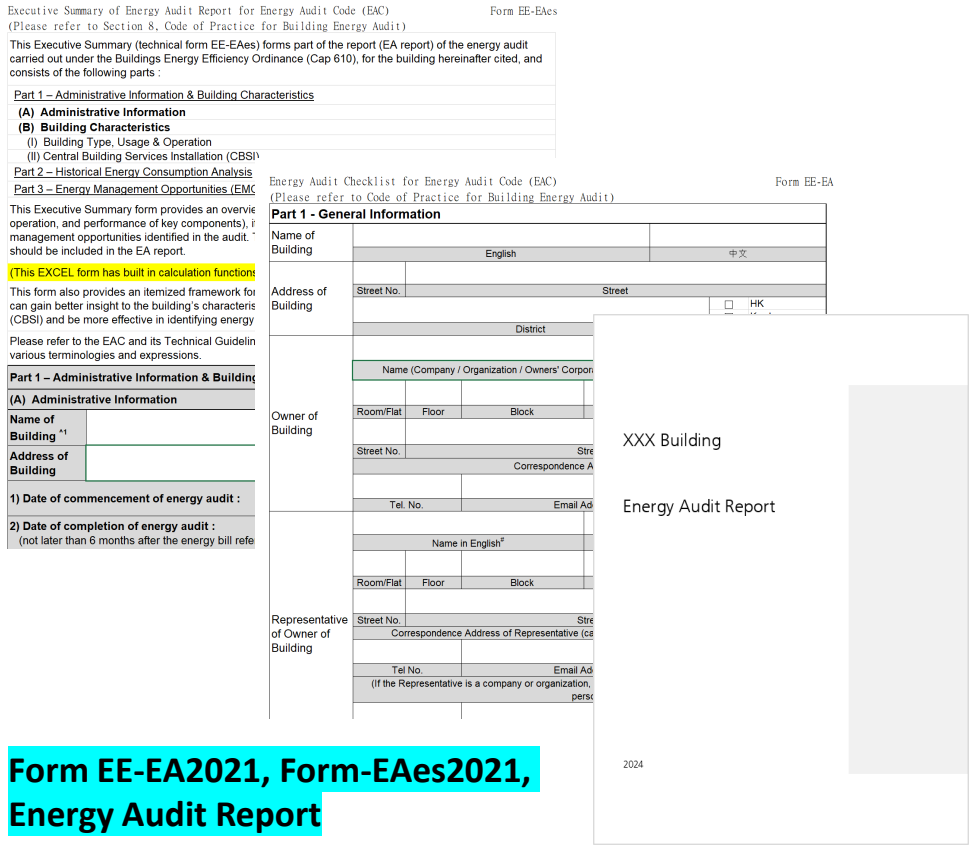
- Streamline of Energy Audit Code Requirement

- Revision of Energy Audit Form

Updates on Energy Audit Code

- Launch of Energy Audit Report Template

Form EE-EA2021, EE-EAes2021 & Energy Audit Report will be combined into **ONE** single **Energy Audit Report Template**


Executive Summary of Energy Audit Report for Energy Audit Code (EAC) Form EE-EAes

(Please refer to Section 8, Code of Practice for Building Energy Audit)

This Executive Summary (technical form EE-EAes) forms part of the report (EA report) of the energy audit carried out under the Buildings Energy Efficiency Ordinance (Cap 610), for the building hereinafter cited, and consists of the following parts :

Part 1 – Administrative Information & Building Characteristics
(A) Administrative Information
(B) Building Characteristics
(I) Building Type, Usage & Operation
(II) Central Building Services Installation (CBSI)
Part 2 – Historical Energy Consumption Analysis
Part 3 – Energy Management Opportunities (EMO

This Executive Summary form provides an overvie operation, and performance of key components), management opportunities identified in the audit. should be included in the EA report.

(This EXCEL form has built in calculation function

This form also provides an itemized framework fo can gain better insight to the building's characteris (CBSI) and be more effective in identifying energy

Please refer to the EAC and its Technical Guidelin various terminologies and expressions.

Part 1 – Administrative Information & Building
(A) Administrative Information
Name of Building [*1]
Address of Building
1) Date of commencement of energy audit :
2) Date of completion of energy audit : (not later than 6 months after the energy bill refe

Energy Audit Checklist for Energy Audit Code (EAC) Form EE-EA

(Please refer to Code of Practice for Building Energy Audit)

Part 1 - General Information

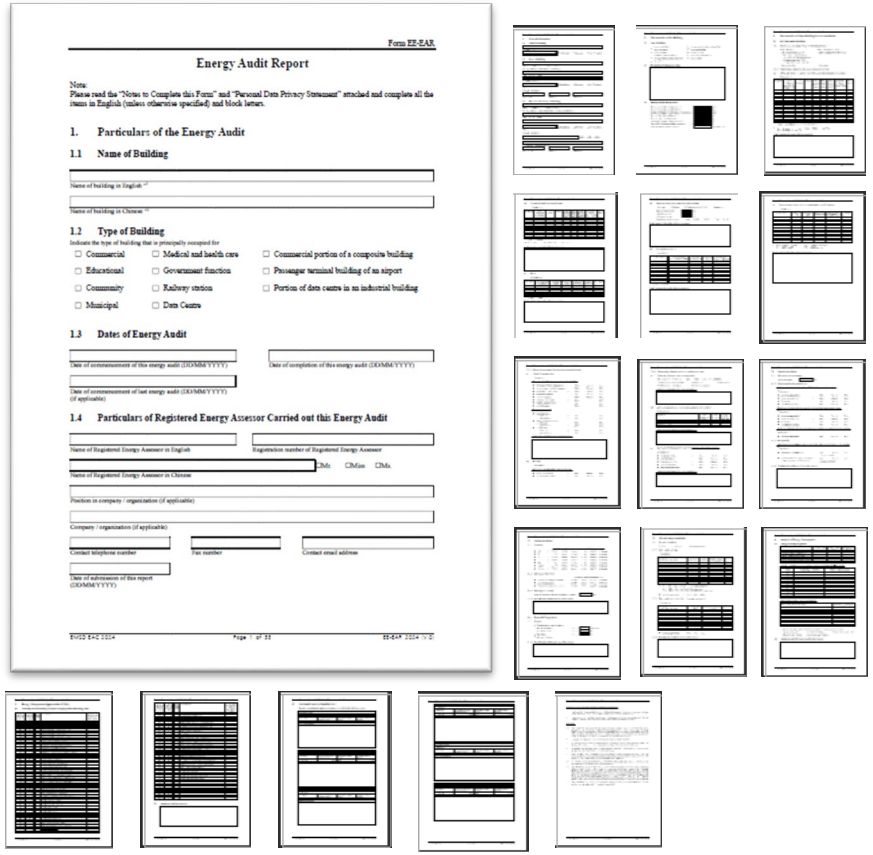
Name of Building		English	中文
Address of Building	Street No.	Street	
		District	HK
Owner of Building		Name (Company / Organization / Owners' Corpor	
	Room/Flat	Floor	Block
	Street No.	Stre	
		Correspondence A	
	Tel. No.	Email Ad	
Representative of Owner of Building		Name in English#	
	Room/Flat	Floor	Block
	Street No.	Stre	
		Correspondence Address of Representative (ca	
	Tel No.	Email Ad	
	(If the Representative is a company or organization, perso		

XXX Building

Energy Audit Report

2024

Form EE-EA2021, Form-EAes2021, Energy Audit Report


Form EE-EAR

Energy Audit Report

Note:
Please read the "Notes to Complete this Form" and "Personal Data Privacy Statement" attached and complete all the items in English (unless otherwise specified) and block letter.

1. Particulars of the Energy Audit

1.1 Name of Building

1.2 Type of Building

1.3 Dates of Energy Audit

1.4 Particulars of Registered Energy Assessor Carried out this Energy Audit

Energy Audit Report Template

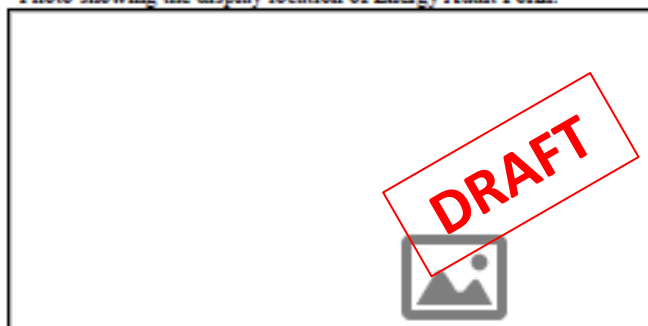
Updates on Energy Audit Code

- Highlights of the Energy Audit Report Template

1.5 Photos

Photo of the building:
(for portion of data centre in an industrial building, photo of the data centre entrance)

Photo showing the display location of Energy Audit Form:



1. Photo showing the display location of Energy Audit Form (EE-5)

3. Characteristics of the Building

3.1 Building design and operation

Date of issue of occupation approval [^2]	:		(DD/MM/YYYY)
Total gross floor area (GFA) of the building [^3]	:		m^2
		Total GFA	
			m^2
		Commercial portion of composite building (if applicable)	
Number of block of the building entity [^4]	:		nos.
Number of floor of the building entity [^5]	:		nos.
Total internal floor area of the building entity [^6]	:		m^2
Portion of the building entity being common area [^7]	:		%
Nominal operating hour per day (Weekday)	:		hours
Nominal operating hour per day (Saturday)	:		hours
Nominal operating hour per day (Sunday/Public Holiday)	:		hours

3.2 Description of building operation[^8]

2. Elaboration on the implication of EUI due to building operation (i.e. 24-hr)

Updates on Energy Audit Code

- Highlights of the Energy Audit Report Template

4.1.1 Major type(s) of air-conditioning cooling equipment for the building entity ^9

☐ Chiller (air-cooled)
☐ Chiller (water-cooled)
☐ Chilled water from external (e.g. district cooling system)
☐ Other (please specify):
☐ Variable refrigerant flow system
☐ Unitary air-conditioner
☐ Chilled water export to external

4.1.2 Characteristics of water-side equipment

(a) Chiller /heat pump for air-conditioning use (prime function for cooling)

☐ N/A

Type (C: chiller; HRC: heat recovery chiller; HP: heat pump)	Heat rejection#	Refri-gerant	Rated cooling capacity (kW)	Rated power input^10 (kW)	Rated COP for cooling (kW/kW)	Cooling output capacity control (CS: constant speed; VS: variable speed)	Digital meter for cooling output (Yes/No)	Digital meter for power input (Yes/No)	Year of service ^11

^11 Indicate the number of years after the first operation of the equipment. If the major component of the equipment (i.e. drive system) such as motor /compressor of chiller, motor of pump or lift drive had been replaced /upgraded, indicate the number of years after the replacement /upgrade of the major component of the equipment. If the year of operation cannot be identified, provide estimated figure.

3. Year of services for major CBSI equipment added. Provide approximate figure if unknown

Updates on Energy Audit Code

- Highlights of the Energy Audit Report Template

6. Energy Management Opportunities (EMO)

6.1 EMO Implemented Within the Past 5 years

EMO Category (I/II/III)	EMO description

Supplementary information / observations:

6.2 EMO Proposed in this Energy Audit

Proposed EMO

Category :

Title :

Description :

Estimated annual saving : kWh

HK$/kWh

HK$

Estimated capital cost : HK$ ☐ N/A

Simple payback period : year(s) ☐ N/A

Detailed description and cost benefit analysis :

4. Proposal of EMOs.

5. Cost Benefits Analysis streamline to table format

Updates on Energy Audit Code

- Simplified the required supporting documents

Step 2 - Analysis of Energy Consumption

Clause 7.3.1

Study the information collected and conduct site inspections /measurement for an appreciation of the applicable energy consuming equipment and systems of the central building services installations….

(a) total annual energy consumption of the central building services installations with at least ~~36~~ 12 consecutive months data;

5.1.2 Data of the Past 2nd 12-month (optional)

Period of data from _____ to _____

Net energy consumption

Annual energy consumption :

EUI :

% annual energy supplied to non-CBSI :

DRAFT

5.1.3 Data of the Past 3rd 12-month (optional)

Period of data from _____ to _____

Net energy consumption

Annual energy consumption : evaluation follow 5.1.1 _____ kWh

EUI : _____ kWh/m²/annum

% annual energy supplied to non-CBSI : approximate _____ %

Updates on Energy Audit Code

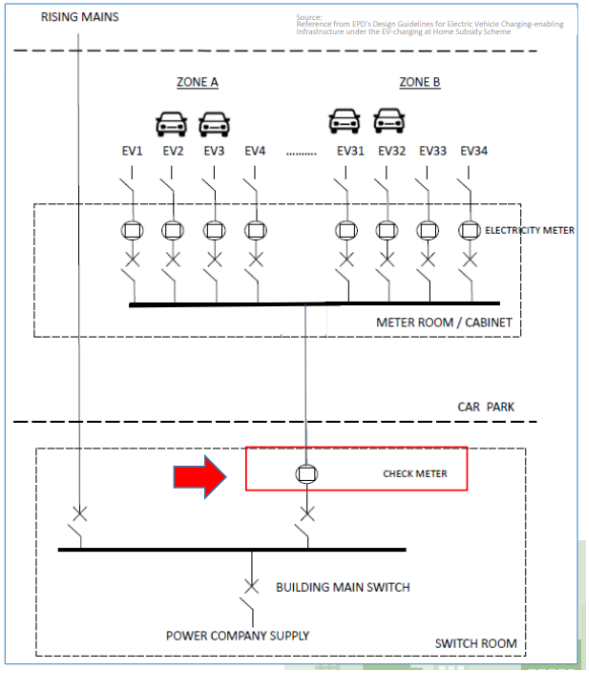
- Separate the Energy Consumption by Charging Facilities of EV

Clause 7.3.2

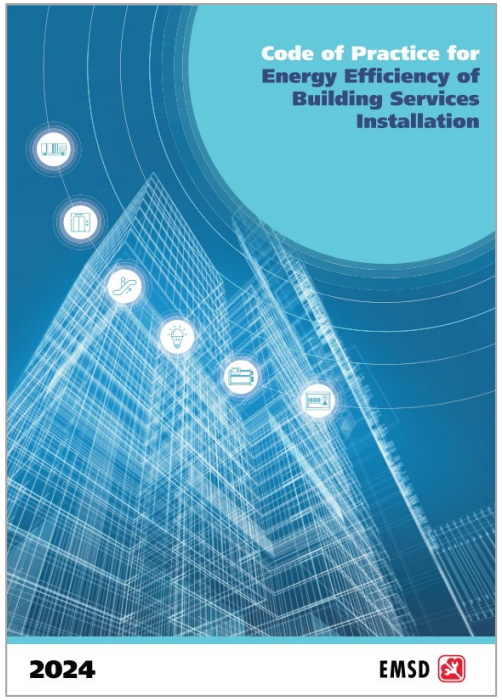
The net energy consumption by charging facility of electric vehicles can be deducted in compiling the total annual energy consumption if separate metering facility is provided for the charging facility.

Re-cap BEC 2021

Separate metering for charging facilities for EV



Gazette Date and Grace Period



Type of BEEO Submission	Grace Period	Effective Date for complying BEC & EAC 2024
COCR Stage One for **New Building**	9 months	23 Aug 2025
FOC for MRW in **Existing Building**	9 months	23 Aug 2025
Energy Audit in **Existing Building**	9 months	23 Aug 2025

Gazette Date: 22 November 2024

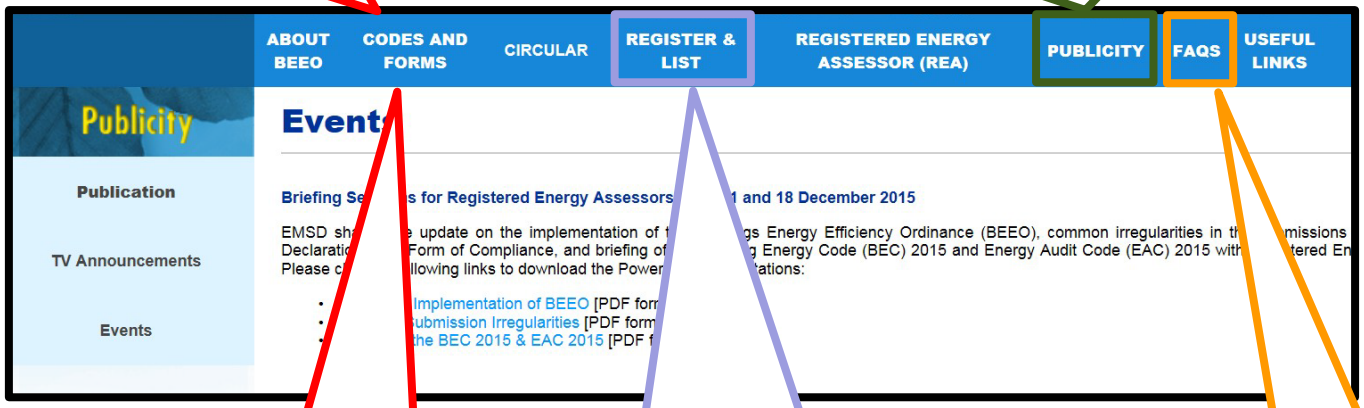
Technical Circular Ref.: 1/2024

After 9 months of Grace Period:

Fully implemented on

23 August 2025

Further Information



- Specified Forms
- Technical Forms
- Technical Guidelines

- Register of REA and COCR
- List of Stage One Declaration, FOC, EA Form and IN

Frequently Asked Questions

Thank You

香港邁向碳中和 Carbon Neutral@HK

機電工程署 EMSD