Buildings Energy Efficiency Bill

The Administration's response to Action Items at the Bills Committee meeting on 11 March 2010

Definition of "industrial building"

The definition of "industrial building" under the Buildings Energy Efficiency Bill (the Bill), which reads –

> "industrial building" means –
> (a) a building in which –
> (i) articles are manufactured, altered, cleaned, repaired, ornamented, finished, adapted for sale, broken up or demolished; or
> (ii) materials are transformed; or
>
> (b) a godown,

is modeled on the definition of "industrial building" adopted in the Building (Refuse Storage and Material Recovery Chambers and Refuse Chutes) Regulations (Cap. 123H). Members of the Bills Committee enquired the reason for not adopting the definition used in the Land (Compulsory Sale for Redevelopment) (Specification of Lower Percentage) Notice, which reads –

> "industrial building" means a building the whole or any part of which is approved by the Building Authority for any of the following uses under a plan approved under the Buildings Ordinance (Cap. 123) –
>
> (a) godown;
>
> (b) any industry in which articles are manufactured, altered, cleaned, repaired, ornamented, finished, adapted for sale, broken up or demolished, or in which materials are transformed.

2. As explained in LC Paper CB(1) 1378/09-10(01), the policy intention under the said Notice is not only to cover industrial buildings aged 30 years or above within a non-industrial zone that are still in use, but also to cover such industrial buildings which are under-utilised or have been left to disuse. As such, the definition of "industrial building"

in the Notice was tied to its building plan approved under the Buildings Ordinance. The definition of "industrial building" in the said Notice has taken account of the policy intention in that particular circumstances.

3. We propose that for industrial buildings, only their common areas are covered under the Bill. Such arrangement is proposed as industrial processes may have specific requirements on energy usage and are difficult to impose generalized energy efficiency standards for different industrial processes. In order to maximize the environmental benefits, those buildings in active industrial use would be classified as "industrial building". Therefore, we consider the current proposed definition to be appropriate in reflecting our policy intention.

Definition of "common area"

4. "Common area", in relation to a prescribed building, is defined under the Bill as follow –

(a) means any area of the building other than the parts that have been specified in an instrument registered in the Land Registry as being for the exclusive use, occupation or enjoyment of an owner; and

(b) without limiting paragraph (a), includes car parks, entrance lobbies, lift lobbies, corridors, staircases, common toilets, common store rooms, plant rooms, switch rooms, pipe ducts, cable ducts, refuse rooms, material recovery chambers, covered podia, covered playgrounds, occupants' clubhouses and building management offices.

5. Paragraph (a) of the definition sets out our policy intention to cover all areas of a prescribed building other than the parts that have been specified in an instrument registered in the Land Registry as being for the exclusive use, occupation or enjoyment of an owner. Paragraph (b) of the definition lists out examples of the "common area" that are commonly found in buildings to provide easy reference. The Department of Justice advises that the use of the phrase "without limiting paragraph (a), includes" makes it clear that paragraph (b) is to be read subject to paragraph (a) and serves to elaborate the main provision by setting out examples. If paragraph (b) is to be read alone, it would have the effect of limiting the scope of paragraph (a). An area within the examples set out in paragraph (b) would not be treated as "common area" of the

prescribed building if that area has been specified in an instrument registered in the Land Registry as being for the exclusive use, occupation or enjoyment of an owner.

6. The proposed definition is modeled on the definition of "common parts" adopted in the Building Management Ordinance (Cap. 344).

Scope and application of clauses 8 to 13

7. Duties set out in clauses 8 to 13 of the Bill are applicable to prescribed buildings in respect of which their consent to the commencement of building works for superstructure construction is given after the commencement of Part 2 of the Bill. A schematic presentation on the scope and application of clauses 8 to 13 is at **Annex A**.

Responsibilities under clause 12 of the Bill

8. Clause 12 of the Bill requires an owner of a building and a responsible person of a unit of a building to ensure that the central building services installations and other building services installations are maintained to a certain standard. The policy intent is to prevent the building services installations from being altered or replaced with less energy efficient components subsequently, and that the installations can be properly maintained to prevent undue decline in energy efficiency.

9. The specified standards set out in Building Energy Codes are standards and requirements on design parameters, rather than those on daily operational performance. In general, normal wear and tear of the installations should not have great impact on their energy efficiency performance when they are properly maintained. Owners and responsible persons may refer to equipment catalogue or in doubt, seek advice from qualified personnel in selecting proper replacement for the equipment and in conducting proper maintenance. The Electrical and Mechanical Services Department will prepare concise guidelines to facilitate compliance by owners and responsible persons.

10. Clause 12 of the Bill also requires the owner of a building must ensure that a Certificate of Compliance Registration (COCR) is in force in respect of the building. As stated in clause 10(4) that COCR is valid for 10 years, the policy intent of clause 12(1) is to ensure that COCR is

renewed in time. In light of the comments of the Bills Committee, we will revise clause 12(1) to set out clearly that only owners of buildings which have obtained COCR will have such responsibility.

Periodic inspection, testing and certification of fixed electrical installations

11. Under Regulation 20 of the Electricity (Wiring) Regulations (Cap. 406E), an owner of a low voltage fixed electrical installation shall have the installation inspected, tested and certified at least once every five years. A similar requirement is imposed under the Bill for renewal of COCR (clause 13 of the Bill), which aims at certifying that the central building services installations in a prescribed building are maintained to a certain standard. Taking account of the service life of building services installations and the compliance burden on owners, we are of the view that the proposed 10-year renewal for COCR is appropriate.

Samples of technical forms

12. Samples of technical forms (in English only) to be submitted as supplementary information for submissions of stage two declarations and Form of Compliance, as well as applications for renewal of COCR are at **Annexes B to F** respectively. We will prepare the Chinese version of the technical forms in due course.

Environment Bureau
Electrical and Mechanical Services Department
March 2010

Annex A

Scope and application of clauses 8 to 13
(Applicable to post-enactment buildings[1])

Clause 8

Declaration at design stage (stage one declaration)
- developers' responsibility (clause 8(1))
- to declare that all building services installations (including central building services installations and other building services installations) to be provided by developers at or before the time when a stage two declaration is made are designed, and will be installed and completed, in accordance with the specified standards and requirements (clause 8(2)(a))

Stage one and stage two declarations to be certified by registered energy assessors (clauses 8(2)(d) and 9(2)(d))

Clause 9

Declaration at occupation approval stage (stage two declaration)
- developers' responsibility (clause 9(1))
- to declare that all building services installations (including central building services installations and other building services installations) provided by developers at or before the time when the declaration is made have been designed, installed and completed in accordance with the specified standards and requirements (clause 9(2)(a))

Clauses 10 and 11

Issue of Certificate of Compliance Registration (COCR)
- Director of Electrical and Mechanical Services (DEMS) to issue COCR to developers after the submission of stage two declarations (clause 10(1))
- COCR is valid for 10 years (clause 10(4))
- DEMS to keep a register of buildings issued with COCR (clause 11(1))

Clause 12

Duties after the building obtains COCR

(a) central building services installations
- owners' responsibility (clause 12(2))
- to ensure that the central building services installations are maintained to a standard not lower than that applied in the first COCR issued in respect of the building (clause 12(2)(a))

(b) other building services installations serving an individual unit
- responsible persons' responsibility (clause 12(3))
- to ensure that the building services installations meet and are maintained to a standard not lower than that applied in the first COCR issued in respect of the building (clause 12(3)(a))

(c) COCR
- owners' responsibility (clause 12(1))
- ensure that a COCR is in force at all times (clause 12(1))

If major retrofitting works have been carried out in respect of a central building services installation,
- to ensure that central building services installation is maintained to a standard not lower than that applied in the latest Form of Compliance (FOC) issued in respect of the installation that has undergone major retrofitting works (clause 12(2)(b))

If major retrofitting works have been carried out in respect of other building services installation serving the unit,
- to ensure that building services installation is maintained to a standard not lower than that applied in the latest FOC issued in respect of the installation that has undergone major retrofitting works (clause 12(3)(b))

Clause 13

Renewal of COCR
- owners' responsibility (clause 12(1))
- to be certified by registered energy assessors to the effect that –
  - (a) the central building services installations are maintained to a standard not lower than that applied in the first COCR issued in respect of the building (clause 13(2)(c)(i)); and
  - (b) if major retrofitting works have been carried out, to maintain the central building services installation to a standard not lower than that applied in the latest FOC issued in respect of the installation that has undergone major retrofitting works (clause 13(2)(c)(ii))

[1] Post-enactment buildings mean buildings that obtain consents to the commencement of building works for superstructure construction from the Building Authority after the new legislation comes into operation.

Lighting Installations Summary — Part 1

Name of Building : _____

Registered Energy Assessor :

Name: _____ Registration No: _____

Submission Date: _____ Signature: _____

Lighting Load

Total area with fixed lighting installations (m^2) : _____

Total Installed lighting power (kW) : _____

Submitted Forms, Drawings, Catalogues etc. (tick where applicable)

Submittal	No. of Sheets
☐ Form EE-LG Part 1 (Lighting Installations Summary)	
☐ Form EE-LG Part 2 (Lighting Power Density Worksheet)	
☐ Drawings to show lighting layouts (for the luminaires contributing to the LPD in Part 2 of this form) in various lighting spaces ☐ A drawing summary list to indicate the drawing title and number.	
☐ Technical brochures / catalogues (for the luminaires contributing to the LPD in Part 2 of this form), substantiating the circuit wattage of each luminaire ☐ A brochures/catalogues summary list indicating their titles and corresponding luminaires	
☐ Others (to give details) _____	

Remarks:-

- Total Installed Lighting Power refers to the sum of circuit wattage (i.e. lamp wattage plus lamp control gear loss) of all luminaries included in the calculation of lighting power density. (Calculation details should be properly filed for ready retrieval for inspection)
- Lighting layouts should show :
  - for each space the positions of luminaires;
  - for each office space the no. of luminaires controlled by each lighting control point;
  - a summary of the different types of luminaires, with a brief description of each luminaire type, including
    - circuit wattage,
    - no. of lamps per luminaire, and
    - type of lamp including T5 tubular fluorescent, T8 tubular fluorescent, compact fluorescent, metal halide, light emitting diode, high pressure sodium, tungsten halogen etc.

Lighting Power Density							Part 2
Designation			Area (m^2)	Lighting Power Density (LPD) (W/m^2)			No. of control points *4 for office
Block	Floor	Name of Space		Type of Space *1	General lighting *2	Decorative lighting *3	

Remarks:-

*1 To insert the type of space per categorization in Table 5.4 of the BEC.

*2 Calculated LPD of general lighting that provides a substantially uniform level of illumination throughout and maintained type emergency lighting.

*3 Calculated LPD of general lighting included in the installations specified in clause 6(a) of Schedule 2 of the Ordinance (solely used for Decoration / Visual Production / Illumination of an Exhibit or Product on Display).

*4 Figure to be inserted only for a space classified as an office.

*2 *3 The LPD for General lighting has to comply with the corresponding requirement in Table 5.4 of this BEC. LPD for display lighting, decorative lighting and visual production lighting are to be provided to EMSD for information only.

Please insert more rows where applicable, for all the relevant spaces in the building.

AC Installations Summary	Part 1

Name of Building : _____

Registered Energy Assessor :

Name: _____ Registration No: _____

Submission Date: _____ Signature: _____

AC Load	Conditioned Area (m^2) _____
Calculated Block Cooling Load (kW)_____	Installed Total Plant Capacity (kW)_____

Calculation Method : ☐ ASHRAE ☐ CIBSE ☐ Others _____(Please specify)
(tick where applicable) Note : Calculation details should be properly filed for ready retrieval.

Submitted AC Forms, Drawings, Catalogues etc. (tick where applicable)

Submittal	No. of Sheets
☐ Form EE-AC Part 1 (AC Installation Summary)	
☐ Form EE-AC Part 2 (Design Parameters Worksheet)	
☐ Form EE-AC Part 3 (AC Systems and Controls Worksheet)	
☐ Form EE-AC Part 4 (Air Duct Leakage Test Worksheet)	
☐ Form EE-AC Part 5 (AC Equipment Efficiency Worksheet)	
☐ Form EE-AC Part 6 (Fan Motor Power Worksheet)	
☐ Drawings to show the water-side and air-side distribution schematics ☐ A drawings summary list to indicate the drawing titles and number.	
☐ Technical brochures / catalogues (for power rating and efficiency of the equipments submitted in the Form) ☐ A brochures / catalogues summary list to indicates the type of equipment.	
☐ Others (to give details) _____ _____	

Design Parameters Worksheet	Part 2

Part (A) : Outdoor Design Conditions

Summer		Winter	
Design d.b. Temp. ^{o}C	Design R.H. %	Design d.b. Temp. ^{o}C	Design R.H. %

Part (B) : Indoor Design Conditions

Applications/Zone Ref. (e.g. Offices, shops etc.)	Summer		Winter	
	Design d.b. Temp. ^{o}C	Design R.H. %	Design d.b. Temp. ^{o}C	Design R.H.%

Note : Design condition of each typical application/zone should be given. If different design conditions are adopted for the same type of application, these conditions should be given with different zone ref.

Design Parameters Worksheet	Part 2

Part (C) : Friction Loss

System Ref. No.		Piping System Description	Friction Loss (Pa/m)
Primary chilled water			
Secondary chilled water			
Condenser water			

Part (D) : Insulation

Technical Data of Air Conditioning Installation

Form EE-AC

For substantiation of compliance with Section 6 of COP in Energy Efficiency of BS Installations in Buildings (BEC)

Applications[i] a) Chilled Water b) Refrigerant c) Air	Pipe Size[ii] dia.(mm)	Operating Conditions		Surface Coefficient h W/(m^2 ^{o}C)	Thermal[iv] Conductivity λ W/(m ^{o}C)	Calculated Thickness (mm)	Thickness Applied (mm)
		In/Out[iii] d.b. ^{o}C	RH %				

[i] Fill in a, b or c.
[ii] Only applicable for pipes. Fill in the outer diameters.
[iii] "In" denotes indoor & "Out" denotes outdoor.
[iv] The thermal conductivity should be rated at 20^{o}C mean

AC Systems and Controls Worksheet	Part 3

Part (A) : Air Distribution System

(Separate Distribution System)
Any air distribution system supplying air to both zones having special process temperature/humidity requirements and zones having only comfort requirements?

☐ Yes Sys. Ref._____ ☐ No

Separate distribution system or supplementary control provided?
☐ Yes ☐ No

Exception : ☐ (a)
☐ (b)

(Air Leakage Limit On Ducts)
Operating static pressure > 750 pa?

☐ Yes Sys. Ref. _____ ☐ No
Leakage Class : ☐ I ☐ II ☐ III

Part (B) : Fan System

Any fan system with a total fan motor power ≥ 5 kW?

☐ Yes - including : ☐ CAV ☐ VAV ☐ No
☐ Others _____

Any individual VAV supply fan motor power ≥ 5 kW?

☐ Yes - Volume control method : ☐ No
☐ Variable speed drive ☐ Inlet guide vane
☐ Others_____

The fan motor power of the above VAV fan > 55% of design wattage at 50% of design air volume?

☐ Yes Sys. Ref. _____ ☐ No

Note : Form EE-AC Part 6 should be used for calculation of fan motor power of above fan systems.

Part (C) : Pumping System

Any variable flow system?

☐ Yes - capable of reducing system flow to 50% or less ☐ No
☐ Yes ☐ No

Exceptions : ☐ (a)
☐ (b)
☐ (c)

AC Systems and Controls Worksheet	Part 3

Part (D) : Temperature Control

Each AC system is provided with at least one automatic control device for regulation of temperature?

☐ Yes	☐ No

Thermostatic controls for comfort cooling are capable of adjusting the set point up to 29°C?

☐ Yes	☐ No

Thermostatic controls for comfort heating are capable of adjusting the set point down to 16°C?

☐ Yes	☐ No

Thermostatic controls for both comfort cooling and heating are capable of providing a temperature range or dead band of at least 2°C?

☐ Yes	☐ No Exceptions : Thermostats requiring manual changeover? ☐ Yes ☐ No	☐ Not Applicable

Part (E) : Humidity Control

Any humidifier or dehumidifier installed for maintaining specific humidity level?

☐ Yes Zone Ref. _____	☐ No	
Humidistat provided for the above purpose?		
☐ Yes	☐ No	
Humidistat capable of preventing the humidifier to increase RH above 30% ?		
☐ Yes	☐ No	
Humidistat capable of preventing the dehumidifier to decrease RH below 60% ?		
☐ Yes	☐ No	

AC Systems and Controls Worksheet	Part 3

Part (F) : Zone Control

Each AC zone controlled by individual thermostatic control?

☐ Yes	☐ No Zone Ref. _____ With exceptions ☐ Yes ☐ No

No zone control permit a) reheating, b) recooling or c) simultaneous heating and cooling to a zone ?

☐ Yes	☐ No Zone Ref. _____ Exceptions : ☐ (a) ☐ (b) ☐ (c) ☐ (d) ☐ (e)

Part (G) : Off Hours Control

Each AC system equipped with automatic controls capable of reducing energy use during non-use period of the zone?

☐ Yes Control method : _____ _____ _____	☐ No Sys. Ref. _____ Exceptions : System with cooling/heating capacity not more than 10kW and with manual off-hour control? ☐ Yes ☐ No

❑ For hotels, a single master switch provided at main entry door to each guest room or suite, or each room with a suite, that perform one of the following functions to reduce energy use during the period of non-use ?

☐ Yes ☐ No ☐ Not applicable.

☐ (a)
☐ (b)
☐ (c)

Air Duct Leakage Test Worksheet	Part 4

Test Section :_____ Drawing No. : _____

Total Surface Area of Tested Ducts

Width and depth or diameter (mm)	Periphery (mm)	Length (m)	Area (m^2)
		Total	

Design Data

Total duct surface area (m^2)	
Total surface area under test (m^2) [From above table]	
Duct operating static pressure - p (Pa)	
Air leakage class	
Air leakage limit (L/s per m^2)	
Maximum permitted leakage (L/s)	

Test Records Summary

Date of test	
Duct static pressure reading (Pa)	
Duration of test (min) [Not less than 10 minutes]	

Technical Data of Air Conditioning Installation

For substantiation of compliance with Section 6 of COP in Energy Efficiency of BS Installations in Buildings (BEC)

AC Equipment Efficiency Worksheet — Part 5

Equipment. Ref. No.	Unit Type	Quantity (No.)	Rated Capacity (kW)	Total Rated Capacity (kW)	Equipment Efficiency					Rating Standard of COP & PLV (to state standard (such as ARI), or other standards with details *)	Accredited Body (such as ARI)
					Rated COP at 100% load	Required COP (for office use)	Rated PLV (to be provided for equipment above 10kW)				
							75% load	50% load	25% load		
			Total		* details to include as appropriate: condenser water entering temperature, water flow rate & fouling factor, condenser entering air conditions, evaporator water leaving temperature, flow rate & fouling factor, refrigerant saturated discharge temperature & liquid temperature etc.						

Fan Motor Power Worksheet

Part 6

☐ Constant Air Volume System ☐ Variable Air Volume System

System Ref. No.	Supply Air (L/s)	Supply Fan			Return Fan			Pre-treated Air Fan				Exhaust Fan				Total fan motor power (kW)
		FSP_s (kW)	η_m	η_d	FSP_r (kW)	η_m	η_d	FSP_p (kW)	η_m	η_d	$\Re_p$	FSP_e (kW)	η_m	η_d	$\Re_e$	
Total Q														Total P_T		

Notes :

Q - Air flow rate (L/s)

FSP_x - Fan shaft power or fan brake power of respective motor in kW.

η_m - Motor efficiency of respective motor.

η_d - Drive/belt efficiency of respective fan drive.

$\Re_p$ - Ratio of pre-treated air quantity supplied to the fan system to the total air quantity handled by the pre-treated air fan.

$\Re_e$ - Ratio of exhausted air quantity extracted from the fan system to the total air quantity handled by the exhaust fan.

P_T = Total fan motor power in kW

= $FSP_s/(\eta_m \times \eta_d) + FSP_r/(\eta_m \times \eta_d) + (FSP_p \times \Re_p)/(\eta_m \times \eta_d) + (FSP_e \times \Re_e)/(\eta_m \times \eta_d)$.

P_f = Total fan motor power for air treatment/filtering in kW.

☐ - Tick where applicable.

Total fan motor power (P_T - P_f) ≥ 5 kW ? [P_f = ____ kW]

☐ If no,

☐ If yes, then

☐ CAV System (P_T - P_f) x 1000/Q = _____W per L/s ≤ **1.6 W per L/s**

☐ VAV System (P_T - P_f) x 1000/Q = _____W per L/s ≤ **2.1 W per L/s**

For exempted systems stipulated in this Code, fans and corresponding motor efficiencies have to be listed.

N.A. - Not Applicable.

Fan Motor Power Worksheet			Part 6
System Ref. No.:			
Supply Fan Filtering Sys.	Air Flow Rate	V (m^3/s)	
	Clean Air Pressure Drop	P_d (Pa)	
	Fan Efficiency	η_f	
	Motor Efficiency	η_m	
	Drive/Belt Efficiency	η_d	
	Additional Motor Power	P_f (kW)	
Return Fan Filtering Sys.	Air Flow Rate	V (m^3/s)	
	Clean Air Pressure Drop	P_d (Pa)	
	Fan Efficiency	η_f	
	Motor Efficiency	η_m	
	Drive/Belt Efficiency	η_d	
	Additional Motor Power	P_f (kW)	
Pre-treated Air Fan Filtering Sys.	Air Flow Rate	V (m^3/s)	
	Clean Air Pressure Drop	P_d (Pa)	
	Fan Efficiency	η_f	
	Motor Efficiency	η_m	
	Drive/Belt Efficiency	η_d	
	Ratio of pre-treated air quantity supplied to the system to the total air quantity handled by the pre-treated air fan	$\Re_p$	
	Additional Motor Power	P_f (kW)	
Exhaust Fan Filtering Sys.	Air Flow Rate	V (m^3/s)	
	Clean Air Pressure Drop	P_d (Pa)	
	Fan Efficiency	η_f	
	Motor Efficiency	η_m	
	Drive/Belt Efficiency	η_d	
	Ratio of exhausted air quantity from the system to the total air quantity handled by the exhaust fan	$\Re_e$	
	Additional Motor Power	P_f (kW)	
		Total P_f (kW)	

Notes:

$P_f = V \times (P_d - 250)/(\eta_f \times \eta_m \times \eta_d)$. For pre-treated air fan and exhaust fan filtering systems, multiply $\Re_p$ & $\Re_e$ respectively.

Total P_f = Sum of the additional motor power of all filtering systems.

Electrical Installations Summary	Part 1

Name of Building : _____

Registered Energy Assessor :

(Name): _____ (Registration No): _____

(Submission Date): _____ (Signature): _____

Electrical Load of Tenant : _____ kVA Electrical Load of Landlord : _____ kVA

Total Electrical Load : _____ kVA Usable Floor Area : _____ (m^2)

Total Load Density : _____ kVA / m^2 usable floor area

Submitted Forms, Drawings, Catalogues etc. (tick where applicable)

Submittal	No. of Sheets
☐ FORM EE-EL Part 1: Electrical Installations Summary	
☐ FORM EE-EL Part 2 : Electrical Power Distribution Worksheet	
☐ FORM EE-EL Part 3 : Electrical Power Utilisation Worksheet	
☐ FORM EE-EL Part 4 : Electrical Power Quality Worksheet	
☐ FORM EE-EL Part 5 : Electrical Metering & Monitoring Worksheet	
☐ Drawings to show the schematics for the Mains, Sub-main, Feeder and Final Circuits in Part 2 of this Form. ☐ A drawings summary list to indicate the drawing title and number.	
☐ Technical brochures / catalogues (for the conductor in Part 2 and motor in Part 3), substantiates the copper loss and the motor efficiency. ☐ A brochures / catalogues summary list to indicate their cable/busduct schedule and motor schedule.	
☐ Others (to give details) _____ _____	

Electrical Power Distribution Worksheet	Part 2

A. High Voltage Distribution

The building has more than 50 storeys or over 175m in height above ground ? ☐ Yes ☐ No

Voltage level :_____kV

System designed and installed by : ☐ Utility Company ☐ Private Consultants and Contractors

B. Minimum Transformer Efficiency

Any privately owned distribution transformers used in the building?

☐ Yes, Transformer Rated Capacity : _____kVA 1-phase/3-phase No. of Transformers : _____ Efficiency at Full Load : _____%	☐ No

C. Location of Distribution Transformers & Main LV Switchboards

The distribution transformers and main LV switchboards are at their load centres?

☐ Yes Locations : _____	☐ No Locations : _____

D. Main Circuits

The transformer rooms and main LV switchrooms are adjacent to each other?

☐ Yes	☐ No, maximum length of main circuits : _____m

If the main circuit(s) is/are not provided by the utility company, list the maximum power losses below:

Cable	Busbar/Busduct
Material : Copper/Aluminium* Design Current (I_b) : _____A Cable Type : _____ Conductors Size : _____mm^2 Cable Length : _____m Power Loss : _____kW Percentage Power Loss : _____%	Material : Copper/Aluminium* Design Current (I_b) : _____A Busduct Rating : _____A Busduct Length : _____m Power Loss : _____kW Percentage Power Loss : _____%

Electrical Power Distribution Worksheet — Part 2

E. Feeder and Sub-main Circuits

Designed operating temperature of feeder and sub-main circuit conductors : ________°C

Schedule of Copper Losses for Dedicated Feeder & Sub-main Distribution Circuits
(Note: circuits for Emergency Systems can be excluded):

Circuit Ref. (F = Feeder, S = Sub-main)	Cable Type	Conductor Size (mm^2)	Circuit Length (m)	Design Current I_b (A)	Design P.F.	Active Power (W)	Copper Loss (W)	Copper Loss (%)

Electrical Power Distribution Worksheet	Part 2

F. Final Circuits

Are there any final circuits having a rating over 32A (single-phase or three-phase)?

☐ No

☐ Yes (Schedule of copper losses of these final circuits is listed as follows)

Schedule of Copper Losses for Final Circuits
(Note: circuits for Emergency Systems can be excluded):

Circuit Ref.	Cable Type	Conductor Size (mm^2)	Circuit Length (m)	Design Current I_b (A)	Design P.F.	Active Power (W)	Copper Loss (W)	Copper Loss (%)

Electrical Power Utilisation Worksheet	Part 3

A. Lamps and Luminaires

Do the lighting installations comply with the Code of Practice for Energy Efficiency for Lighting Installations?

☐ Yes	☐ No, building / indoor space is for : ☐ Domestic, ☐ Medical, ☐ Industrial, ☐ Others _____

B. Air Conditioning Installations

Do the air conditioning installations comply with the Code of Practice for Energy Efficiency for Air Conditioning Installations?

☐ Yes	☐ No, building is for : ☐ Domestic ☐ Medical ☐ Industrial ☐ Others _____

C. Vertical Transportation

Do the vertical transportation systems comply with the Code of Practice for Energy Efficiency for Lift & Escalator Installations?

☐ Yes	☐ No

D. Power Factor Improvement

Anticipated total apparent power (S) for communal installations : _____kVA

Anticipated total active power (P) for communal installations : _____kW

Anticipated initial power factor before correction : _____

Design power factor after correction : _____

Type of power factor correction equipment used : _____

Rating of power factor correction equipment used : _____ kVAr

Location of power factor correction equipment : _____

Other provisions for future use : 1. _____

2. _____

3. _____

Electrical Power Utilisation Worksheet	Part 3

E. Motors and Drives

Are there any motors or driving systems having an output rating of 5kW or greater?

☐ No

☐ Yes, schedule of motors is listed as follows:

Motor Reference	Anticipated System Load (kW)	Motor Rating (kW)	Full Load Motor Efficiency (%)	Percentage Motor Rating to System Load (%)	VSD Type & Rating	Type of Power Transfer Devices	No. of Identical Motors

Electrical Power Quality Worksheet	Part 4

A. Maximum Total Harmonic Distortion (THD) of Current

Are there any non-linear electrical loads in the communal installations?

☐ No, (Other than fluorescent luminaires with conventional controlgear)

☐ Yes, schedule of non-linear loads is listed as follows:

Type of Non-linear Load	Circuit Ref.	Rating (kVA)	Load Current (A)	Anticipated THD Current (%)	Harmonic Reduction Devices (if any)	Final THD Current (%)

Electrical Power Quality Worksheet	Part 4

B. Balancing of Single-phase Loads

Are there any single-phase electrical loads (communal installations) connected in the three-phase four-wire power distribution system?

☐ No
☐ Yes, schedule of load currents in each phase is listed as follows:

Sub-main Circuit Ref. (with 1-phase loads)	Design Current in Red Phase I_R (A)	Design Current in Yellow Phase I_Y (A)	Design Current in Blue Phase I_B (A)	Average Current I_a (A)	Max. Deviation from Average I_d (A)	% Current Unbalance $Iu= (I_d \times 100) \div I_a$ (%)

Electrical Metering and Monitoring Worksheet	Part 5

A. Main Circuits

Does the rating of any main incoming circuit exceed 400A, three-phase?

☐ Yes

Ammeter to read:
- ☐ Red Phase Current (I_R)
- ☐ Yellow Phase Current (I_Y)
- ☐ Blue Phase Current (I_B)
- ☐ Neutral Current (I_N)

Voltmeter to read:
- ☐ Red to Yellow Line Voltage (V_{RY})
- ☐ Yellow to Blue Line Voltage (V_{YB})
- ☐ Blue to Red Line Voltage (V_{BR})
- ☐ Red Phase to Neutral Voltage (V_{RN})
- ☐ Yellow Phase to Neutral Voltage (V_{YN})
- ☐ Blue Phase to Neutral Voltage (V_{BN})

- ☐ Power Factor Meter
- ☐ kWh Energy Meter
- ☐ Maximum Demand Meter (kVA)
- ☐ Other metering provisions/facilities :

_____
_____
_____
_____

☐ No

B. Sub-main and Feeder Circuits

Does the rating of any sub-main/feeder circuit exceed 200A, three-phase?

☐ Yes

Ammeter to read :
- ☐ Red Phase Current (I_R)
- ☐ Yellow Phase Current (I_Y)
- ☐ Blue Phase Current (I_B)
- ☐ Neutral Current (I_N)

- ☐ kWh Energy Meter
- ☐ Other metering provisions/facilities :

_____
_____
_____
_____

☐ No

Summary of Information on Lifts, Escalators & Conveyors — Part 1

Name of Building : _____

Registered Energy Assessor :

(Name): _____ (Registration No): _____

(Submission Date): _____ (Signature): _____

Type(s) of Installation : ☐ Traction Lifts ☐ Hydraulic Lifts ☐ Escalators ☐ Passenger Conveyors (tick where applicable)

Submitted Forms, Drawings, Catalogues etc. (tick where applicable)

Submittal	No. of Sheets
☐ Form EE-LE Part 1 (Summary of Information on Lifts, Escalators & Passenger Conveyors)	
☐ Form EE-LE Part 2 (Electrical Power, Total Harmonic Distortion and Total Power Factor of Traction Lift)	
☐ Form EE-LE Part 3 (Electrical Power, Total Harmonic Distortion and Total Power Factor of Hydraulic Lift)	
☐ Form EE-LE Part 4 (Electrical Power, Total Harmonic Distortion and Total Power Factor of Escalator)	
☐ Form EE-LE Part 5 (Electrical Power, Total Harmonic Distortion and Total Power Factor of Passenger Conveyor)	
☐ Form EE-LE Part 6 (Energy Management of Lifts, Escalators & Passenger Conveyors)	
☐ Drawings / Schedules to show the technical data of Lifts / Escalators (for substantiate the information in Part 2 of this Form).	
☐ Others (to give details) _____ _____	

Electrical Power, Total Harmonic Distortion and Total Power Factor of Traction Lifts — Part 2

Lift Designation	Rated Load (kg)	Rated speed (m/s)	Circuit Current of Motor Drive (A)	Measured Running Active Power (kW)	Total Harmonic Distortion (%)	Total Power Factor	Decorative Load (kg)

All at rated load and at rated speed in the upward direction.

Electrical Power, Total Harmonic Distortion and Total Power Factor of Hydraulic Lifts	Part 3

Lift Designation	Rated Load (kg)	Rated speed (m/s)	Circuit Current of Motor Drive (A)	Measured Running Active Power (kW)	Total Harmonic Distortion (%)	Total Power Factor	Decorative Load (kg)

All at rated load and at rated speed in the upward direction.

Electrical Power, Total Harmonic Distortion and Total Power Factor of Escalators	Part 4

Escalator Designation	Rise of Escalator (m)	Step width (mm)	Rated Speed (m/s)	Motor Drive Circuit Current (A)		Measured Running Active Power (kW)		Total Harmonic Distortion (%) #	Supply from feeder circuit ? (yes or no)	Total Power Factor @
				#	@	#	@			
Non-public Service										
Public Service										

#: at no load and rated speed condition
@: at brake load condition

Electrical Power, Total Harmonic Distortion and Total Power Factor of Passenger Conveyors									Part 5
Conveyor Designation	Rise of Conveyor (m)	Step width (mm)	Rated Speed (m/s)	Motor Drive Circuit Current (A) #	Motor Drive Circuit Current (A) @	Measured Running Active Power (kW) #	Measured Running Active Power (kW) @	Total Harmonic Distortion (%) #	Supply from feeder circuit ? (yes or no)	Total Power Factor @
Non-public Service										
Public Service										
#: at no load and rated speed condition @: at brake load condition										

Energy Management of Lifts, Escalators & Passenger Conveyors — Part 6

LIFTS

(tick/delete as appropriate)

Zone Designation	Lift Bank with DC-MG motor drive	Energy Management	Provision of Metering Devices or provisions for connecting measuring devices for Lift Bank**
	Yes/No	☐ Standby mode ☐ Switch off Ventilation when idling more than 2 minutes	☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
	Yes/No	☐ Standby mode ☐ Switch off ventilation when idling more than 2 minutes	☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
	Yes/No	☐ Standby mode ☐ Switch off ventilation when idling more than 2 minutes	☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
	Yes/No	☐ Standby mode ☐ Switch off ventilation when idling more than 2 minutes	☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters

ESCALATORS / CONVEYORS

(tick/delete as appropriate)

Group Designation	Number of Escalators/Passenger Conveyors in Group	Provision of Metering Devices or provisions for connecting measuring devices for Group of Escalators/Passenger Conveyors
		☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
		☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
		☐ Voltmeter .. ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters

Compliance Summary	Part 1

A. Applicant Information

Name of organization:		
Address:		
Telephone no.:		
Fax no.:		
E-mail:		
Registered Energy Assessor (REA) responsible for the compliance:	Name: REA no.:	Telephone no.: Fax no.: E-mail:
Signature:		
Submission Date:		

B. Building Information

Name of Building :	
Address of Building :	
Primary building type:	
Other building usage(s):	
No. of storey:	
Building height (m):	
Gross floor area (m^2):	
Floor area (m^2):	
Air-conditioned floor area (m^2):	
Construction starting date:	
Expected completion date:	

The form shall be expanded to include all equipment under application. Additional sheets shall be used as appropriate.

C. Summary of Building Energy Performance

	Designed Building	Reference Building
Design energy consumption (kWh)		-----
Total energy budget (kWh)	-----	
Breakdown of energy usage (kWh): - Area lights - Miscellaneous equipment - Space cooling - Space heating - Ventilation fans - Pumps - Other energy uses (pls. specify)		
Energy use intensity (kWh/m^2/year) (based on gross floor area)		

D. Renewable or Recovered Energy

Have you considered "renewable energy" or "recovered energy" and excluded it in the design energy consumption? Yes / No * (* delete where applicable)

If yes, please provide detailed information and calculation for the "renewable energy" or "recovered energy". Use additional sheets if necessary.

The form shall be expanded to include all equipment under application. Additional sheets shall be used as appropriate.

Basic Requirements Checklist	Part 2

1. Building Envelope

Building (Energy Efficiency) Regulation Cap.123 Sub. Leg. M	
Shading coefficient of window glasses shall be not less than 0.25.	

2. Lighting

• Minimum allowable luminous efficacy • Maximum allowable lamp control gear loss • Interior lighting control	

3. HVAC

Air Side System • System load design • Separate distribution system • Air leakage limit on ductwork	
Water Side System • Pumping system variable flow • Friction loss	
Control • Temperature control • Humidity control • Zone control • Off hours control	
Insulation • Piping insulation • Ductwork and AHU casing insulation	

4. Electrical

Power Distribution in Buildings • High voltage distribution • Minimum transformer efficiency • Locations of distribution transformers and main LV switchboards • Main circuits • Feeder circuits • Sub-main circuits • Final circuits	
Efficient Utilization of Power • Motors and drives • Power factor improvement	
Power Quality • Maximum total harmonic distortion • Balancing of single-phase loads	
Metering and Monitoring Facilities • Main circuits • Sub-main and feeder circuits	

Basic Requirements Checklist	Part 2

5. Lift & Escalator

Lifts • Maximum allowable electrical power • Energy management of lift cars • Total harmonic distortion of motor drive systems • Total power factor of motor drive systems	
Escalators & Passenger Conveyors • Energy management of escalators & passenger conveyors • Maximum allowable electrical power of escalators & passenger conveyors • Total harmonic distortion of motor drive systems • Total power factor of motor drive systems	

[Support Documentation]

Description of document	*No. of pages*

The form shall be expanded to include all equipment under application. Additional sheets shall be used as appropriate.

Numerical Method for Building Energy Analysis	Part 3

1. General Information

Name of software/method:	
Software version number:	
Software release number (if any):	
Name of software license owner:	

2. Software Developer/Supplier

Organization that developed the software:	
Organization that supplied the software:	

3. Climatic Data

Climatic data used for the analysis:	
Format and nature of the climatic data:	

4. Systems or Equipment Not Yet Determined But Assumed

Items	*Description*

5. Other Modeling Assumptions

Items	*Description*

6. Limitations of the Software/Method

Items	*Description*

[Support Documentation]

Description of document	*No. of pages*
Input building description file (printed and electronic format)	
Output reports file (printed and electronic format)	

The form shall be expanded to include all equipment under application. Additional sheets shall be used as appropriate.

Key Building Data Summary		Part 4
	Designed Building	Reference Building
1. General Information		
Total gross floor area (m^2)		
Average occupant density (m^2/person)		
Minimum outdoor air (l/s per person)		
2. Building Envelope		
Gross wall area (m^2)		
Window-to-wall ratio		
Shading coefficient of windows		
Gross roof area (m^2)		
Skylight-to-roof ratio		
Shading coefficient of skylights		
OTTV of exterior walls (W/m^2)		
OTTV of roof (W/m^2)		
External shading device provided?		
3. Lighting		
Average lighting power density (W/m^2)		
Day lighting design provided? How?		
4. HVAC		
Number of Chillers		
Total cooling capacity (kW)		
Total heating capacity (kW)		
Type of air side system		
Total design supply air flow rate (m^3/s)		
Type of chiller plant		
Chiller coefficient of performance (kW/kW)		
5. Electrical		
Total installed equipment capacity (kW)		
Average equipment power density (W/m^2)		
6. Service Hot Water		
Service hot water provided? Fuel?		
Total heating capacity (kW)		

The form shall be expanded to include all equipment under application. Additional sheets shall be used as appropriate.

List of Energy-related Features for Trade-off	Part 5
Features	*Description*

[Support Documentation]

Description of document	*No. of pages*

The form shall be expanded to include all equipment under application. Additional sheets shall be used as appropriate.