



BUILDING ENERGY BENCHMARKING

The persistence increases in the average oil price are threatening economics worldwide. Based on the current scenario, the pressure is to further diversify resources, look for alternative resources as well as to conserve and use energy efficiently. In line with the above efforts will be undertaken to encourage buildings to adopt low energy office (LEO) concept. One of the early strategies for is building owner to gauge their building level of energy consumption efficiency via energy-use benchmarking technique.

In line with Pusat Tenaga Malaysia (PTM) role to promote energy efficiency to national end users, PTM would like to extend the invitation to your organisation to participate in this project. The project is developed to establish a comprehensive, reliable and accurate database for benchmarking energy consumption and efficiency in office buildings. As participant, your organisation will benefit in the increase understanding of your building energy consumption and related energy use operation compared to other office buildings in the category. We are planning to launch a web-based energy benchmarking system accessible by participants, which will benefit building owners and the nation in general.

The benefits of your participation will also include the following:

- € To assess its own buildings energy consumption effectiveness;
- € To obtain information to improve your building energy performance; and
- € To participate in further activities i.e. energy audit and energy efficiency campaign.

We will hand over a report showing your building performance and ranking.

If you are interested to participate, kindly fill this application form. This form consists of **4 pages** with **20 questions**. Terminology concepts and definitions is attached with this form to assist you in filling-up this form.

Kindly return complete form to us at:

Pusat Tenaga Malaysia
Level 8, Sapura @ MINES
No 7, Jln Tasik
The MINES Resort City
43300 Seri Kembangan
Selangor Darul Ehsan
(Attn: **Mr Haniff Ngadi**)

We very much look forward to collaborating with you and remain at your disposal for any further information you may require. For any enquiries, kindly contact: Mr Haniff Ngadi, at 03-8943 4300 ext 520, or email to: haniff@ptm.org.my.

This form is available for download at:

http://www.ptm.org.my/ee_building/benchmarking.html

BUILDING ENERGY BENCHMARKING DATA COLLECTION FORM**Introductions:**

1. Please complete the questionnaire by answering **ALL** the questions given. If the relevant parameter is not applicable, please indicate with **Nil**. If the relevant information is not available, please indicate with **NA**.
2. Where data is required, please furnish the latest accurate data. Verification on the accuracy of data given may be required.

-
1. Building ID _____ (for PTM use) Date of Audit _____
 2. City _____ Country _____ Postcode _____
 3. Building Name _____
Building Address _____
Building Owner Name _____
 4. Property Management Company Name _____
 5. Contact Person _____ Designation _____
Tel.: _____ Fax: _____ Email: _____
 6. Date of TCF (Temporary Certificate of Fitness*) _____ / _____ (Month/ Year)
 7. Date of Last Major Renovation on Envelope, Extension, Lighting, HVAC, and/or etc.:
_____ / _____ (Month/ Year), Specify (work scope) _____
-
8. Building Ownership
Office Building Sole Owner Occupied
 Landlord + Multi-Tenants _____ (# of Tenants)
 Multi-Tenants _____ (# of Tenants)
 Others, Specify: _____
 9. Building Type: Public Sector Private Sector
 10. Indicate Main Business/Services Type: General Office Office cum Retail
 Bank Branch Other Mixed Functional Use, Specify: _____
 11. Type of Main HVAC Central Air-Condition Stand-Alone System Split Unit
 Natural Ventilated Combined System, Specify: _____
-
12. No. of Storey (Above Ground) _____ No. of Basement Floor _____
 13. Operating Hours of Major Energy Consuming Systems

Table-1. Systems' Operating Hours

	Air-Con	Lighting	Office Equipment	Mechanical Ventilation	Lift & Escalator
Hours/ Week					

14. Environmental Setting Points: Temperature _____ °C, Relative Humidity (RH) _____ %
-

* Note: Refer attachment for Terminology – Concept and Definitions

15. Space Distribution

Table-2. Space Distribution in Building

	Function Type	Floor Area (m ²)	Floor Vacancy Rate * (%)	Operating Hour (Hours/ Week)	No. of Occupants* During Main Work Day (Person)	No. of PCs & Office Equipment (Piece)	Remark
a	Gross Office Area						
b	Tenanted Office Area						
c	Common Area *		NA				
d	Air Conditioned Area *		NA		NA	NA	
e	Retail Area						
f	Cafeteria/ F & B Area						
g	Data Centre Area *						
h	Indoor Parking Area (Above Ground)		NA		NA	NA	
i	Indoor Parking Area (Below Ground)		NA		NA	NA	
j	Open Parking Area		NA		NA	NA	
k	High Energy Use Tenants */ Area						
l	Others—Specify1						
m	Others—Specify2						
n	Others—Specify3						
o	Gross Lettable Area *						
p	Check: Gross Floor Area (Including Car Park)		NA	NA	NA	NA	The sum of all functional spaces in building (a+c+e+f+g+h+i+k+l+m+n)
q	Gross Floor Area (Including Car Park)		NA	NA	NA	NA	Gross floor area data provided by building owner
r	Gross Floor Area (Excluding Car Park)		NA	NA			(a+c+e+f+g+h+i+k+l+m+n)

* Note: Refer attachment for Terminology – Concept and Definitions 2

(b) Other Fuel Types:

Fuel Type	Bill Start Date	Bill End Date	Energy Consumption	Unit (recommended)	Remark
Diesel				Liter/ year	
Gas				m ³ / year	
Purchased Cooling				kWh/year*	
Renewable Energy				kWh/year	
Other				kWh/year	

*If other unit used specify in remark

17. If further investigation and site visit are needed, would you agree on that?

Yes No

18. Would you like to apply building energy performance* label for your building?

Yes No

19. Do you have Energy Management Team (EMT)* for your building?

Yes No

If yes for the above, how many team member? _____ persons .

20. Have you conduct Energy Audit (EA)* for your building?

Yes No

If yes, how many EA conducted? _____. When was the last energy audit? _____ (year).

I certify that the information given above is true and accurate at the time when the form is filled out.

Signature: _____ ***Company Stamp:***

Name: _____

Designation: _____

Tel: _____ ***Fax:*** _____ ***Email:*** _____

Date: _____

* Note: Refer attachment for Terminology – Concept and Definitions

BUILDING ENERGY BENCHMARKING DATA COLLECTION FORM

Terminology— Concepts and Definitions

1. [Air Conditioned Area \(ACA\)](#)
2. [Common Area \(CA\)](#)
3. [Data Centre Area \(DCA\)](#)
4. [Date of Temporary Certificate of Fitness for Occupation \(TCF\)](#)
5. [Energy Performance \(EP\)](#)
6. [Floor Vacancy Rate of Gross Lettable Area \(FLVCR\)](#)
7. [Gross Lettable Area \(GLA\)](#)
8. [Gross Floor Area \(GFA\)](#)
9. [High Energy Use Tenant/ Area \(HETA\)](#)
10. [Landlord Energy Consumption \(LEC\)](#)
11. [No. of Occupants \(NOC\)](#)
12. [Tenants Energy Consumption\(TEC\)](#)
13. [Total Building Energy Consumption \(TBEC\)](#)
14. [Energy Management Team \(EMT\)](#)
15. [Energy Audit \(EA\)](#)

1. Air Conditioned Area (ACA)

Air conditioned area in buildings refers to that area provided with cooling to maintain temperature between 22.5 °C to 25.5 °C, and max RH 70%. This would include the air conditioned areas for office, common services, retail, cafeteria, data centre, and etc.

2. Common Area (CA)

Common area should include all the non-lettable area used for common services that contribute to the gross floor area. Typically, these spaces would include corridors, lobbies, atriums, stairwells, mechanical rooms, public toilets, etc. Please do not include car park area which is recorded separately.

3. Data Centre Area (DCA)

Data centre refer to the centralized facilities housing large number of IT equipment (e.g. servers, data storage, network devices, monitors, etc) to perform various functions such as storage, management, processing and exchange of digital data and information. The typical operating hours of such facilities is 24 hours 7 days a week. Data centre area is defined as the floor area dedicated for central function of a data centre, which typically is also referred to the raised floor area. It consists of aisle, maintenance area, area designated for future expansion, and footprint areas of IT equipment, HVAC system, UPS, batteries and other supporting systems. Areas of central chiller plant, electric switch room, and mechanical room are not included. Please include data centre area in the gross office area, although this is recorded separately below.

4. Date of Temporary Certificate of Fitness for Occupation (TCF)

Temporary Certificate of Fitness for Occupation (TCF) may be issued under the direction of the authority having jurisdiction for a building or portion thereof in cases where only minor deviations from the approved building plans has been made pending full compliance with the requirements of local authority before the issue of

CF, CF or Certificate of Fitness for Occupation is basically referred to date that the authority accepted that a building has been built in accordance with By-laws or it is ready to be occupied by owner. If no TCF issued to this building before the issuance of CF please provide the CF date.

5. Energy Performance (EP)

Represents a comprehensive valuation of the energy use in buildings, which involves energy consumption pattern, power load, power quality and reliability, systems' operational efficiency and associated cost. To achieve energy conservation, load shading, power factor improvement, contingency planning, and cutting capital and running cost, as well as providing guidance for future designs are the major goals of carrying out energy performance analysis.

6. Floor Vacancy Rate of Gross Lettable Area (FLVCR)

This is the weighted floor vacancy rate of office, retail and other functional spaces of gross lettable area. The floor vacancy rate of gross lettable area is equal to the non-occupied lettable area divided by the gross lettable area, in terms of percentage.

7. Gross Lettable Area (GLA)

Refers to the total functional uses area for commercial purposes such as office, retail, cafeteria, restaurant, gym, club house, etc. inside the building excluding all common areas, car parking and service areas. However, in buildings occupied by both landlord and tenants, areas occupied by landlord from above categories should also be considered as part of the lettable area. The sum of gross lettable area and common area equals a building's gross floor area excluding car park.

8. Gross Floor Area (GFA)

Gross floor area is the all covered floor areas of a building, except otherwise exempted and uncovered areas for commercial uses are deemed the gross floor area of the building for purposes of plot ratio control and development charge. The gross floor area is the total area of the covered floor space measured between the centre line of party walls, including the thickness of external walls but excluding voids. Accessibility and usability are not criteria for exclusion from GFA. This should equal the sum of gross lettable area and common area, as well as the indoor parking area. However, in this study the EUI used for benchmarking purpose is calculated based on gross floor area excluding car park area.

Gross floor area excludes the following:

- 1) Where the floor areas are uncovered and do not generate activities that will intensify the development except for open areas that are used for commercial purposes such as gardens, eating areas, petrol kiosks, drive-ins and commercial establishments that have to be counted as part of gross floor area.
- 2) Where the floor areas are required by planning authority or to meet planning policies/objectives. Example; covered walkway.

3) Where the building design features or the use of modern construction techniques do not give rise to additional floor space and intensity of development. Example; curtain walling

4) Where the floor areas have a limited height clearance (1.5m or less) and are used for M&E services.

5) Covered floor space used for vehicular circulation and car parking. This includes the area for car park ticketing machine placed at the gantry of car park. This does not apply to car parks in excess of Land Transport Authority's requirements for commercial developments.

6) Covered main entrance canopy or main entrance for non-commercial purposes.

9. High Energy Use Tenant/ Area (HETA)

Similar to data centres, high energy use tenants/ area refer to the tenant or area characterized by high processing load, long operating hours, or other special requirement of power demand and energy use. For the accurate evaluation of building energy performance, detailed investigation of such tenants in building is needed. Please list such tenants if applicable.

10. Landlord Energy Consumption (LEC)

Refers to the energy utilized inside part of the building, comprising:

- Air-conditioner central plant system which supply air-conditioning inside the building
- Vertical transportation service i.e. escalator and lift
- Ventilation system such as exhaust fan and ventilator.
- Artificial lighting system in the common area i.e. corridor or public common service area i.e. toilet and lift.

11. No. of Occupants (NOC)

No. of occupants refers to the estimated peak number of occupants during main work day. Part timers should each count for 0.5 person, while full timers each counts for 1 person. To avoid double counting, occupants in gross office area include those undertaking office work, occupants in common area refer to those undertaking security, clearance, maintenance, reception and other works under common services, occupants in retail area refer to the retail staffs and customers, occupants in cafeteria area refer to the cafeteria staffs, occupants in data centre area refer to the data centre staffs.

12. Tenants Energy Consumption (TEC)

Refers to energy utilizes in the artificial lighting system, office equipment such as photocopy machine, computer, typewriter, fax machine etc. and miscellaneous electrical appliances i.e kettle, microwave, boiler, refrigerator and stand-alone air-conditioning equipment, etc. inside the lettable area of a building.

13. Total Building Energy Consumption (TBEC)

Consists of two energy utilization components in the building, that is, landlord building energy consumption and tenant building energy consumption.

14. Energy Management Team (EMT)

Energy Management Team is a multi disciplinary committee (where the leader is the energy manager) to include all of the relevant departments to manage energy consumption. The team can encourage communications and the sharing of ideas amongst various departments throughout the company, to obtain agreements on energy conservation projects which affect more than one department, and to provide a stronger voice to top management than a single manager normally could.

15. Energy Audit (EA)

Energy Audit is a study or survey to identify how energy is being used in a building or plant, and identifies energy savings opportunities. EA can be conducted by own staff or qualified consultant.

Summary for most office building

Gross Floor Area (Including Car Park)

