# Part 1 - Performance-based Approach Summary

(* Please delete, if not applicable)

Page ___of ___

Name of Building / Unit / Common Area * _____

_____

Address of Building / Unit / Common Area * _____

_____

Date of Declaration by Registered Energy Assessor in Form EE2 / EE3 / EE4 * _____

| Documents submitted (Please tick where applicable) | No. of sheets |
|---|---|
| ☐ Form EE-PB Part 1: Performance-based Approach Summary | |
| ☐ Form EE-PB Part 2: Building Energy Consumption Worksheet | |
| ☐ Form EE-PB Part 3: Software Program Worksheet | |
| ☐ Demonstration of compliance with basic requirements (BEC Clause 9.4.1 & remarks item 5) in Part 1 of this Form) : Forms EE-LG, EE-AC, EE-EL & EE-LE and corresponding drawings/technical documents etc. (Please print "Compliance with basic requirements" on the Forms, corresponding technical documents and drawings.) | |
| ☐ Trade-off items counting towards the increase in design energy (BEC Clause 9.5.4) : Forms EE-LG, EE-AC, EE-EL & EE-LE applicable to the trade-off items, and corresponding drawings/technical documents etc. (Please print "Items counting towards increase in design energy" on the Forms, corresponding technical documents and drawings) | |
| ☐ Trade-off items counting towards the reduction in design energy (BEC Clause 9.5.4) : Forms EE-LG, EE-AC, EE-EL & EE-LE applicable to the trade-off items, and corresponding drawings/technical documents etc. (Please print the wording "Items counting towards reduction in design energy" on the Forms, corresponding technical documents and drawings) | |
| ☐ Summary of Building Energy Analysis covering the following topics:<br>- Input summary<br>● Building's model (the geometry)<br>● Façade input<br>● Load and system input<br>- Simulation software<br>- Energy consumption breakdown<br>- Trade-off items' performance towards the increase in design energy<br>- Trade-off items' performance towards the reduction in design energy<br>- Total energy consumption for the reference building and the designed building | |
| ☐ Input and output reports (BEC App A Clause A2.7) generated from the simulation program performing the building energy analysis, including –<br>▫ a breakdown of energy consumption for :<br>- lighting,<br>- space cooling and heat rejection equipment,<br>- space heating equipment (if provided),<br>- fans of AHUs and ventilation fans,<br>- pumps for air-conditioning, and<br>- service water heating equipment (if provided and included in the simulation),<br>- miscellaneous equipment/appliance loads (e.g. computer, photocopier, water dispenser etc.);<br>▫ monthly total building energy consumption profile;<br>▫ output report to show the amount of time any air-conditioning loads are not met by the air-conditioning system for both designed building and reference building; and<br>▫ explanation of any error messages noted in the output report | |
| ☐ Others (Please give details.) _____ | |

# Part 1 - Performance-based Approach Summary

(* Please delete, if not applicable)

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Remarks (applicable to Parts1 to 3) :-

1) Please submit in addition to Form EE-PB also Forms EE-LG, EE-AC, EE-EL & EE-LE for the trade-off items (BEC Clause 9.5.4) and for demonstration of compliance with the basic requirements (BEC Clause 9.4.1 & item 5) below).
2) All documents including this Form are for demonstration of compliance with the BEC for the building services installation, and should cover all the relevant items governed by the BEC in respect of the lighting, air-conditioning, electrical and lift & escalator installations.
3) Should space provided in this Form be inadequate, please provide details with clear cross-referencing on separate sheets and attach to this Form.
4) Descriptions and numbering of each installation, system, equipment, building block, floor, room, space etc. in each of Forms EE-LG, EE-AC, EE-EL, EE-LE & EE-PB, should such appear in more than one type of Form, should be identical.
5) The basic requirements consist of (a) the items **not** listed in BEC Table 9.4 and (b) items listed in BEC Table 9.4 but not involved as the trade-off.
6) **Any incomplete or erroneous information in this Form may render this Form being regarded invalid.**

## Part 2 – Building Energy Consumption Worksheet (BEC Clause 9.5) Page ___of ___

## (A) Design Energy and Energy Budget (BEC Clause 9.5.3)

| Design energy (kWh/year) | Energy budget (kWh/year) |
|---|---|
| | |

## (B) Compliance with Basic Requirements (BEC Clause 9.4)

All basic requirements complied (BEC Clause 9.4.1, 9.4.2, 9.4.3 & remarks item 5) in Part 1 of this Form) ?

☐ Yes (Please tick if yes)

(Please substantiate compliance with Forms EE-LG, EE-AC, EE-EL & EE-LE and corresponding technical documents and drawings)

## (C) Trade-off in Design Energy (BEC Clause 9.5.4)

| 1) Items counting towards increase in design energy (BEC Clause 9.5.4.1) | | | Applicable minimum standard *1 | | Energy *2 requiring off-set (kWh/yr) |
|---|---|---|---|---|---|
| Description of item (including type and Ref No. of installation/system, major equipment, capacity, location of installation, operating schedule and design assumption etc) | Drawing No. | Design performance | Applicable BEC Clause | BEC requirement | |
| ( Please insert additional row if necessary ) | | | | | |
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| | | | | | |
| Please provide in corresponding Forms EE-LG, EE-AC, EE-EL & EE-LE the detailed performance of the items above. | | | | Total : | |

## Part 2 – Building Energy Consumption Worksheet

(BEC Clause 9.5) Page ___of ___

| 2) Items with reduction in design energy as a result of (a) improvement over corresponding minimum allowable level of performance, and/or (b) energy efficient feature to improve the energy performance in building services installations, and/or (c) a better building OTTV @ (BEC Clause 9.5.4.1 (a), (b) and (c)) | | | Applicable minimum standard *1 | | Energy *2 available for off-set (kWh/yr) |
|---|---|---|---|---|---|
| Description of item (including type and Ref No. of installation/system, major equipment, location of installation, operating schedule and design assumption etc.) | Drawing No. | Design performance | Applicable BEC Clause | BEC requirement | |
| ( Please insert additional row if necessary ) | | | | | |
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| | | | | | |
| Please provide in corresponding Forms EE-LG, EE-AC, EE-EL & EE-LE the detailed performance of the items above. | | | | Total : | |

@ If a better building OTTV is used in the off-set (BEC Clause 9.5.4.1 (c) & Clause 9.5.4.2), please provide information below :

OTTV of designed building : Tower:_____, Podium:_____

OTTV of reference building : Tower:_____, Podium:_____

Please provide and attach to this Form a copy of the OTTV calculation submitted to the Building Authority.

## Part 2 – Building Energy Consumption Worksheet (BEC Clause 9.5) Page ___of ___

| 3) Recovered energy or renewable energy (BEC Clause 9.5.4.1 (d), & App A Clause A3.1.5) (Please also provide information required in (E) below, if method in (E) is adopted) | | Energy *2 available for off-set (kWh/yr) |
|---|---|---|
| Description of item (including type and Ref No. of installation/system, major equipment, capacity, location of installation, operating schedule and design assumption etc) | Drawing No. | |
| ( Please insert additional row if necessary ) | | |
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| | | |
| | | |
| | | |
| | | |
| Total : | | |

☐ The equipment or system of energy recovery captured or renewable energy generated on site is equipped with metering and monitoring facilities such that the performance of such equipment or system can be measured and verified (BEC Clause 9.5.4.6).

4) Ownership of items in trade-off process (BEC Clause 9.5.4.3)

| | |
|---|---|
| Owner of items in Part 2(C)1) : | |
| Owner of items in Part 2(C)2) : | |
| Owner of items in Part 2(C)3) : | |

## (D) Energy Consumption of Yet-to-be Designed/Installed Items

| Items not yet designed or installed (BEC App A Clauses A3.2.1, A3.2.2 & A3.2.3), with exclusion from building energy simulation not applicable | | Energy performance (Estimated energy consumption should be included in design energy in (A)) | | |
|---|---|---|---|---|
| Description of item (including type and Ref No. of installation/system, major equipment, capacity, location of installation, operating schedule and design assumption etc) | Drawing No. | Assumed design energy performance | Applicable BEC *1 requirement | Estimated energy consumption (kWh/yr) |
| ( Please insert additional row if necessary ) | | | | |
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| | | | | |
| Total : | | | | |

## Part 2 – Building Energy Consumption Worksheet (BEC Clause 9.5) Page ___of ___

## (E) Exceptional Calculation Method (BEC App A Clause A3.4)

| Items warranting exceptional calculation method (BEC App A Clause A3.4.1), with exclusion from building energy simulation not applicable | | Energy performance | | | |
|---|---|---|---|---|---|
| Description of item (including type and Ref No. of installation/system, major equipment, capacity, location of installation, operating schedule and design assumption etc), and description of exceptional calculation method | Drawing No. | Design energy performance | Applicable BEC *1 requirement | Contributing to trade-off in design energy ? | Estimated energy *2 requiring or available for off-set (kWh/yr) |
| ( Please insert additional row if necessary ) | | | | | |
| | | | | ☐ No ☐ Yes | |
| | | | | ☐ No ☐ Yes | |
| | | | | ☐ No ☐ Yes | |
| | | | | ☐ No ☐ Yes | |
| | | | | ☐ No ☐ Yes | |
| | | | | ☐ No ☐ Yes | |
| | | | | ☐ No ☐ Yes | |
| | | | | ☐ No ☐ Yes | |
| | | | | Total : | |

Remarks (applicable to Part 2) :-

1) *1 Applicable minimum standard refers to the minimum performance standard in the relevant clause of the BEC, example being for lighting power density the corresponding LPD value of a relevant space specified in BEC Table 5.4.
2) *2 Energy requiring off-set to be presented in positive value, and energy available for off-set to be presented in negative value.
3) If an item is not applicable, please insert underneath "Description of item" the wording "Not applicable".

## Part 3 – Software Program Worksheet

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## (A) Items Excluded in Building Energy Simulation

| 1) Due to exemption or exception given in the Ordinance or this BEC (BEC App A Clause A3.1.7) | | Relevant Clause No. in Ordinance / BEC | Rough estimate of energy consumption (kWh/yr) |
|---|---|---|---|
| Description of item (including type and Ref No. of installation/system, major equipment, capacity, location of installation, operating schedule and design assumption etc) | Drawing No. | | |
| ( Please insert additional row if necessary ) | | | |
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| | | | |
| | | | |
| | | | |
| Total of rough estimates of energy consumption (kWh/yr) excluded : | | | |

## Part 3 – Software Program Worksheet

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## (B) Items Warranting Special Simulation due to Software Limitation

| 1) Building components & systems, which have insignificant impact on trade-off and cannot be modeled by the software program, that are ignored in the simulation (BEC App A Clause A3.2.11 (a)) | | Contributing to trade-off in design energy ? | Rough estimate of energy consumption (kWh/yr) |
|---|---|---|---|
| Description of item (including type and Ref No. of installation/system, major equipment, capacity, location of installation, operating schedule and design assumption etc) | Drawing No. | | |
| ( Please insert additional row if necessary ) | | | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |

| 2) Items substituted with corresponding thermodynamically similar components or systems in the simulation, due to practical difficulty in the modeling (BEC App A Clause A3.2.11 (b)) | | Contributing to trade-off in design energy ? | Rough estimate of energy consumption (kWh/yr) |
|---|---|---|---|
| Description of item (including type and Ref No. of installation/system, major equipment, capacity, location of installation, operating schedule and design assumption etc) | Drawing No. | | |
| ( Please insert additional row if necessary ) | | | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |

| 3) Items modeled in the simulation using the same corresponding components or systems of the reference building, due to practical difficulty in the modeling (BEC App A Clause A3.2.11 (c)) | | Contributing to trade-off in design energy ? | Rough estimate of energy consumption (kWh/yr) |
|---|---|---|---|
| Description of item (including type and Ref No. of installation/system, major equipment, capacity, location of installation, operating schedule and design assumption etc) | Drawing No. | | |
| ( Please insert additional row if necessary ) | | | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |
| | | ☐ No ☐ Yes | |

| Total (sum of 1), 2) & 3)) of rough estimates of energy consumption (kWh/yr) of items warranting special simulation : | |
|---|---|

Remarks (applicable to Part 3 (A) & (B)) :–
If an item is not applicable, please insert underneath "Description of item" the wording "Not applicable".

# Part 3 – Software Program Worksheet

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## (C) Operation Parameters for Different Types of Space

1) Please list below the operation parameters for 3 most common types of space (BEC App A Clause A3.5.2 (a) & (b))

| Type of space (BEC App A Clause A3.5.2(a) ) | Building operation parameters | | | | | | |
|---|---|---|---|---|---|---|---|
| | Occupant density ($m^2$/person) | Minimum outdoor air (L/s /person) | Operating schedule No. | Lighting power density ($W/m^2$) | Equipment power density ($W/m^2$) | Service water heating power (W/person) | Others _____ (Please give details.) |
| | | | | | | | |
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2) Please list in the table for operating schedule (BEC App A Clause A3.5.2 (b) & (c)) below the operation densities of the operation parameters for one of the types of space in 1) above. (Table below only provides spacing for insertion of information for one type of space. Please add additional sheets for the other two types of space.)

Operating Schedule No._____ applicable to _____ (Please insert description for type of space in 1) above)

| Hour | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Occupants | | | | | | | | | | | | | | | | | | | | | | | | |
| Mon – Fri | | | | | | | | | | | | | | | | | | | | | | | | |
| Sat | | | | | | | | | | | | | | | | | | | | | | | | |
| Sun | | | | | | | | | | | | | | | | | | | | | | | | |
| Equipment | | | | | | | | | | | | | | | | | | | | | | | | |
| Mon – Fri | | | | | | | | | | | | | | | | | | | | | | | | |
| Sat | | | | | | | | | | | | | | | | | | | | | | | | |
| Sun | | | | | | | | | | | | | | | | | | | | | | | | |
| Lighting | | | | | | | | | | | | | | | | | | | | | | | | |
| Mon – Fri | | | | | | | | | | | | | | | | | | | | | | | | |
| Sat | | | | | | | | | | | | | | | | | | | | | | | | |
| Sun | | | | | | | | | | | | | | | | | | | | | | | | |
| AHU/Fan | | | | | | | | | | | | | | | | | | | | | | | | |
| Mon – Fri | | | | | | | | | | | | | | | | | | | | | | | | |
| Sat | | | | | | | | | | | | | | | | | | | | | | | | |
| Sun | | | | | | | | | | | | | | | | | | | | | | | | |
| Cooling | | | | | | | | | | | | | | | | | | | | | | | | |
| Mon – Fri | | | | | | | | | | | | | | | | | | | | | | | | |
| Sat | | | | | | | | | | | | | | | | | | | | | | | | |
| Sun | | | | | | | | | | | | | | | | | | | | | | | | |
| Heating | | | | | | | | | | | | | | | | | | | | | | | | |
| Mon – Fri | | | | | | | | | | | | | | | | | | | | | | | | |
| Sat | | | | | | | | | | | | | | | | | | | | | | | | |
| Sun | | | | | | | | | | | | | | | | | | | | | | | | |
| Hot Water | | | | | | | | | | | | | | | | | | | | | | | | |
| Mon – Fri | | | | | | | | | | | | | | | | | | | | | | | | |
| Sat | | | | | | | | | | | | | | | | | | | | | | | | |
| Sun | | | | | | | | | | | | | | | | | | | | | | | | |
| Others _____(Please give details.) | | | | | | | | | | | | | | | | | | | | | | | | |
| Mon – Fri | | | | | | | | | | | | | | | | | | | | | | | | |
| Sat | | | | | | | | | | | | | | | | | | | | | | | | |
| Sun | | | | | | | | | | | | | | | | | | | | | | | | |

## Part 3 – Software Program Worksheet

(Please tick where applicable) Page ___of ___

## (D) Simulation Software Program (BEC App A Clause A2)

| 1) General information | |
|---|---|
| Name of software : | |
| Software version no. and release no. : | |
| Developed by (organization) : | |

| 2) Software capability (BEC App A Clauses A2 & A3) | |
|---|---|
| Capable to perform full-year hour-by-hour, multiple thermal zone analysis (BEC App A Clause A2.2) | ☐ Yes |
| Maximum No. of thermal zones the program can handle: | |
| Capable to comprehensively model and simulate at all full load and part load conditions the thermal behaviour of the building, including the thermal interaction of the building envelope, building materials, no. of occupants, thermal mass effect, lighting installation, air-conditioning installation and relevant energy consuming equipment/systems serving the building, based on applicable building operating schedules including time-dependent variations of occupancy, fresh air intake, lighting loads, air-conditioning loads, thermostat settings, mechanical ventilation, process loads, and equipment/system loads ? (BEC App A Clause A2.1, A2.3 & A3.1.3) | ☐ Yes |
| Capable to simulate building operation schedules including hourly profiles for daily operation accounting for variations between weekdays, weekends, holidays and any seasonal operations ? (BEC App A Clause A3.1.3) | ☐ Yes |
| Capable to perform design load calculations to determine the air-conditioning equipment capacities, and the corresponding air and water flow rates ? (BEC App A Clause A2.5) | ☐ Yes |

| 3) Weather data (BEC App A Clause A3.1.2) | |
|---|---|
| Cover full calendar year of 8760-hour | ☐ Yes |
| Reflect coincident hourly condition of temperature, solar radiation, humidity and wind speed based on data from Hong Kong Observatory | ☐ Yes |
| Format (Test Reference Year / Typical Meteorological Year / Others) (Please specify, and if "others is selected please give details) | |

## Part 4 – Declaration

I, Registered Energy Assessor, hereby declare that all the information contained in this form and in the substantiation materials attached have been thoroughly examined and well prepared to demonstrate the compliance with the Building Energy Code.

I understand that any missing information, inconsistency and incorrectness on the submitted materials / information may result in jeopardizing the approval process and having the entire submission been rejected.

| | | | |
|---|---|---|---|
| Name of the REA: | | Registration No.: | |
| Signature of the REA | | Date: | DD / MM / YYYY |