MEBS6016 Energy Performance of Buildings

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Self-evaluation Exercise

(For self-evaluation, no need to submit. But if you have any problems, please contact the lecturers.)

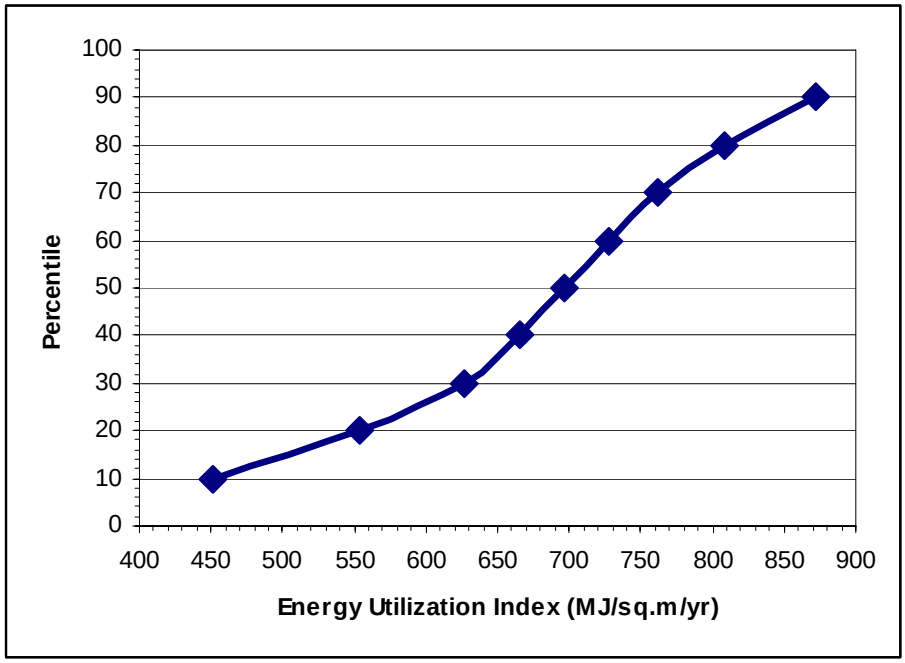
1. What is energy performance contracting (EPC)? What are the possible benefits of EPC to a building owner when he considers it for a building retrofit. Briefly discuss the potential and barriers of EPC development in Hong Kong.

2. An office building with a total gross floor area of 12,000 m^2 has used 1.8 x 10^6 kWh of electricity in one year. The annual cost of electricity is $2 millions and this includes both energy charge and demand charge. If the demand charge constitutes 20% of the annual electricity cost, determine the following indicators for energy performance. Assume the ratio of net floor area to gross floor area is 0.8.

   i) Energy utilization index (kWh/m^2/year), based on net floor area.

   ii) Energy cost index ($/$m^2$/year), based on net floor area.

   If this building is compared with a group of office buildings with an energy benchmark shown on the following graph, determine the percentile of this building and comment on the performance level.



3. For an energy efficiency project, the system will cost $50,000 installed and has a life time of 10 years. It will require $10,000 worth of maintenance each year and the energy costs will be $60,000 per year. If this system is not installed, the building will still require $5,000 worth of maintenance each year and the energy costs will be $100,000 per year.

   If the discount rate is assumed 10%, calculate the LCC and determine if the investment on this system is effective.