

Effective Energy Saving of a Large Building through Multiple Approaches

Authors : Choo Hong Ang

Abstract : The most popular approach to save energy for large commercial buildings in Malaysia is to replace the existing chiller plant of high kW/ton to one of lower kW/ton. This approach, however, entails large capital outlay with a long payment period of up to 7 years. This paper shows that by using multiple approaches, other than replacing the existing chiller plant, an energy saving of up to 20 %, is possible. The main methodology adopted was to identify and then plugged all heat ingress paths into a building, including putting up glass structures to prevent mixing of internal air-conditioned air with the ambient environment, and replacing air curtains with glass doors. This methodology could save up to 10 % energy bill. Another methodology was to change fixed speed motors of air handling units (AHU) to variable speed drive (VSD) and changing escalators to motion-sensor type. Other methodologies included reducing heat load by blocking air supply to non-occupied parcels, rescheduling chiller plant operation, changing of fluorescent lights to LED lights, and conversion from tariff B to C1. A case example of Komtar, the tallest building in Penang, is given here. The total energy bill for Komtar was USD2,303,341 in 2016 but was reduced to USD 1,842,927.39 in 2018, a significant saving of USD460,413.86 or 20 %. In terms of kWh, there was a reduction from 18, 302,204.00 kWh in 2016 to 14,877,105.00 kWh in 2018, a reduction of 3,425,099.00 kWh or 18.71 %. These methodologies used were relatively low cost and the payback period was merely 24 months. With this achievement, the Komtar building was awarded champion of the Malaysian National Energy Award 2019 and second runner up of the Asean Energy Award. This experience shows that a strong commitment to energy saving is the key to effective energy saving.

Keywords : chiller plant, energy saving measures, heat ingress, large building

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