ENERGY OPTIMISATION OF HOTEL BUILDING PROJECTS: CASE STUDY

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In general, electrical power consumption in high-rise hotel buildings is comparatively larger than it is in other types of high-rise buildings. It is due to the extra lighting level requirement, air conditioners and hot water system requirements and also due to kitchen and laundry equipment. Due to this high electricity consumption, the monthly electricity bill will drastically increase. Therefore energy optimization plays an important role in the hotel sector. Thus several kinds of energy optimization including demand response (DR) activities and demand side management (DSM) activities can be applied to reduce electricity consumption and subsequently electricity bills can be reduced to save money.

This study proposed several optimization methods for an on-going hotel building project in Galle which has 12 floors and 100 guest rooms. DR activities, DSM activities, heat recovery from chiller condenser and the operation of kitchen boiler using bio-gas are proposed energy saving methods for this hotel building. Load calculation was also carried out after carefully analyzing the technical drawings of the hotel. The study emphasizes characterizing and describing DR control strategies for air-conditioning and ventilation systems. Under DSM lighting control strategies are also discussed and analyzed. This study discusses several DR and DSM activities which can be applied to hotel equipment to reduce energy consumption on the consumer side. This study also provides two other important energy saving opportunities such as heat recovery from condenser and the application of bio-gas plant for kitchen boiler operation. Using the above energy saving methods the monthly electricity bill was reduced by nearly LKR 700.000.00 and the total payback period was calculated at around 5 years if all four systems are implemented as discussed

Keywords: Demand Response, Demand Side Management, Energy consumption, Load calculation

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