FEASIBILITY OF A COGENERATION SYSTEM IN A MEDIUM SIZE HOTEL IN SRI LANKA

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Dissertation submitted in partial fulfillment of the requirements for the degree of Master of Science in Building Services Engineering

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DECLARATION

"I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text".

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MHM Riyaaz

The above candidate has carried out research for the Masters Dissertation under my supervision.

Signature of the supervisor: Date:

Prof. R.A. Attalage

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ABSTRACT

By cogeneration, electricity and thermal energy can be produced by one prime energy source simultaneously. Using cogeneration systems to provide electricity, hot water and chilled water for hotels and hospital buildings seems to be a perfectly logical solution. The principle of cogeneration systems is simple and the technology is both well known and reliable. It helps to reduce energy costs, better fuel utilization, improve plant energy efficiency, reduce electricity consumption due to absorption chilling and as a whole reduce greenhouse gas emission.

In Sri Lanka, huge quantity of money is expended to import petroleum fuels for transportation, industrial, etc., and power generation purposes. Last year in Sri Lanka thermal power generation was recorded more than 60% of total power generations. However in thermal power generation, efficiency is normally less than 35%. Since cogeneration systems could produce electricity, hot water & chilled water, the overall efficiency could be more than 80%.

To implement a cogeneration system in three star class hotels in this study, information and data was collected from several hotels in relation to the monthly total power consumption, annual occupancy and number of guest rooms. All of these hotels operate alike and are similar to the three star class hotel operations. Based on the collected data and information three different scenarios for the proper analysis have been considered.

As a result of this cogeneration system, hotel saves 2,078 kWh electricity units per day and capital cost increased 25.7 million rupees, which can be recovered in less than the three years' time. Further to that annually it saves 10 to 11 million rupees from the operational and maintenance costs when considering the scenario 2.

In Sri Lanka 15% losses indicate for electricity transmission and distribution system. Subsequent to that, because of this system it is expected to saves 2,445 kWh per day and more than 800,000 kWh per year in this project. When considering the environmental aspect reduction of 400 tons per year of CO_2 to the atmosphere.

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