SUMMARY

The use of detailed simulation program (DSP) to analyze the energy performance of existing buildings can lead the designer to achieve high energy saving retrofit programs. It can also contribute to the operational energy saving strategies as well as to the energy conscious design stage.

This dissertation makes use of the DOE2.1E simulation program to study the energy performance of an existing building as well as to explore the energy conservation strategies.

This study has mainly three parts. These are the study of validation of simulation tool; the study of energy performance and calculation of chiller sizing and finally, study the energy conservation strategies in operational, design and retrofit stage. In the study of retrofit strategies, Life Cycle Costing method is used to make the decision for best option of energy conservation strategies.

The results of this study showed that the difference between simulated and actual annual energy consumption is only 0.1%. The results indicated a possible energy saving of up to 33.5% from building HVAC system operational and design, retrofit strategies. The results also indicated that possible energy saving of up to 10% from operational no cost, low cost strategies alone in this building.

All the studies are done based on annual energy consumption MWH. Although the study may not be the full answer to energy conservation strategies, it will provide some useful information for designers, building owners, maintenance managers, energy managers, etc to apply in the energy conservation for the design and operation of the buildings.