



## Service Priorities and Programmes Electronic Presentations

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**Submitting author:** Dr YUN YEE ENCON HUI

**Post title:** Hospital Manager, Kwong Wah Hospital

### **Energy Efficient Alternative of Hot Water Supply in Hospital**

*Hui Encon; Chan Eric*

*Kwong Wah Hospital*

#### **Keywords:**

Energy Efficiency

Energy Conservation Opportunity

Heat Pump

Green Management

Facility Management

#### **Introduction**

Energy efficiency is high on the agenda for green management. The energy consumption to produce hot water is significant in a hospital and may be secondary to that of central air conditioning system. The common energy sources to produce hot water are from town gas, electricity, fossil fuels, waste heat recovery, or heat pump. The coefficient of performance (COP) of water-water heat pump technology is high with a very short payback period. With the application of heat pump technology in both new and old hospital facilities, a high energy performance can be achieved in a way with considerable saving in energy cost.

#### **Objectives**

1. To review facility design of hot water supply in the hospital;
2. To evaluate energy efficiency of facility;
3. To identify energy conservation opportunity;
4. To propose energy efficient design of hot water supply.

#### **Methodology**

The study was based on case study of a hospital and literatures review. The hot water enhancement project of a hospital was studied.

The methodology of energy audit was reviewed. Conventional hot water supply may pose opportunity for energy conservation.

#### **Result**

The implementation of heat pump in conventional hot water supply is feasible on the condition that there is space in the plant room to accommodate the hot water tank and back-up system. The choice of heat source depends on factors such as availability and capacity of electricity and/or town gas.

The COP of heat pump is normally greater than 4-5 because the output heating

power is equal to the sum of all sources of input power plus the make-up heat. It is a more energy efficient alternative to heating solely by electricity or fuels where the COP can at best be close to 1.

By applying water to water heat pump technology to preheat water to over 50o C and further raising the temperature to slightly over 60o C by other back-up system, the system COP may achieve a value around 4.

In summary, heat pump technology is a feasible, economic and energy efficient alternative for hot water supply. It is a sensible choice to enhance conventional hot water supply by leveraging on heat pump technology.