

MARRIOTT HOTEL, BANGALORE



The Situation

Design Considerations

Hot water for 326 guest rooms, laundry and kitchen at 60°C temperature. -
Optimisation of hot water generation

The Solution

Proposed System

Two 240 KW Heat pumps which will also deliver 48 TR of cooling at full load.

Requisite pumps, 2 nos PHEs of 240 KW capacity and interconnecting piping

Hot Water Generation Cost Comparison between Conventional Diesel Boiler and Heat Pump

| Hot Water Generation Using BOILER | | | Hot Water Generation Using HEAT PUMP | | |
|--|------------|----------|---|-----------|------------------|
| | | UNIT | Heat Pump Capacity | | UNIT |
| | | | Heating KW – 480. Cooling TR- 96 | | |
| ΔT | 35 | Deg C | ΔT | 35 | Deg C |
| Heating Capacity of Diesel Boiler | 480 | KW | Heating Capacity of Heat Pump | 480 | KW |
| Total Hot Water Generated /Hr | 11,794 | Litres | Total Hot Water Generated /Hr | 11,794 | Litres |
| Operating Hours | 12 | | Operating Hours | 12 | |
| Total Hot Water Generated /Day | 1,41,531 | Litres | Total Hot Water Generated /Day | 1,41,531 | Litres |
| No of days operation | 365 | | No of days operation | 365 | |
| NCV Diesel | 10,100 | Kcal/Kg | Input power to heat pump | 144 | KW |
| Boiler Efficiency | 0.85 | | Power Consumption | 0.3 | KW/KW of Heating |
| Diesel Required / Hr | 57 | Ltrs | | | |
| | | | Units Consumed /day | 1728 | KW |
| Actual Diesel consumed/day | 679 | Ltrs | Yearly Consumption KWH | 6,30,720 | Rs. |
| Yearly Diesel Requirement | 2,47,773 | Ltrs | Power tariff | 6 | Rs./KWH |
| Rate of Diesel | 46 | Rs./Ltr. | | | |
| Annual Diesel Cost | 11,39,7574 | Rs. | Total Cost | 37,84,320 | Rs. |
| | | | 96 Tons Cooling will be available in the process. Cost to produce this by other Chiller | 18.9 | Lacs |
| | | | Net Cost of Hot Water Generation | | |
| | | | by Heat Pump | 18.9 | Lacs |
| Annual Savings Generated Using Total Heating Recovery Solution | | | | 95.1 | Lacs |

The Results

Project Summary

Total Project Cost – Rs. 40.00 Lakhs

Expected savings per annum at 100% load – Rs. 95.1 Lakhs

Payback period – Less than 1 year

Other advantages

Heat Pump falls under Energy Saving Devices and Depreciation @ 80 % can be claimed in First Year
Condition of compulsory use of Solar heating under ECBC Code waived off with use of Heat Pumps