aspiration energy
Leaders In Sustainable Heating Solutions

Aspiration Cleantech Ventures
Leaders In Energy Efficiency Solutions

COMBINED HEATING AND COOLING USING HEAT PUMPS

Application : Pre-Treatment
Fuel Replaced : LPG
Customer : A 3 Wheeler Manufacturer
Sector : Automotive

BACKGROUND

Painting is one of the most important processes in an automotive manufacturing plant. All the components that require painting are pre-treated by passing them through high temperature liquid tanks before the painting process begins. At our customer's manufacturing plant, the pretreatment tanks were maintained at a temperature of about 90°C and the required heat was generated by LPG Boilers. The annual fuel cost (LPG cost) was quite significant, and the customer was exploring ways to reduce energy costs.

SOLUTION

After conducting a thermal energy audit, Aspiration Energy proposed to install a 325 kW capacity water source Heat Pumps (65 kW(th)* 5no.s), which would be connected to the existing pretreatment process tanks of combined volume of 1,58,500 Litres and the Chiller of 40 tonnes of refrigeration capacity was completely turned off saving 600 - 800 kWh of electricity per day.

INSTALLATION

Design:
The existing LPG boiler and chiller was replaced by **325 kW** (65kW(th)* 5no.s) Heat Pumps.

Integration:
Two integrations were done - one was a centralized integration for both heating and cooling requirement, and the second one was a parallel connection of Heat Pump for proper load handling.

The cooling side was utilized using an Air Handling Unit.

The total project including the Design, Procurement, Installation & Commissioning was completed in record time and the Heat Pump started delivering energy savings better than the projected savings.

TYPE OF MACHINE : WATER SOURCE **MAX. OUTLET TEMPERATURE : 90 Deg C**
TYPE OF COMPRESSOR : SCROLL

DESCRIPTION	BEFORE	AFTER
HEATING SOLUTION	Boiler	Heat Pump
ENERGY SOURCE	LPG	Electricity
CAPACITY	2,325 kW	325 kW
FUEL COST	Rs.80/kg	Rs.8/kWh
OPERATIONAL COST	Rs.1.07 Cr/yr	Rs.59.4Lakhs/yr
FUEL CONSUMPTION /DAY	650 kg (For hot water boiler) + 700 kWh in chiller unit	2,320 kW
COOLING BENEFITS (SAVINGS)	NIL	Rs. 18.48 Lakhs/yr

PERFORMANCE COMPARISION

INSTALLATION PICTURE

BENEFITS

- Heating was used in existing process, The byproduct cooling from the Heat Pump was also utilized effectively.
- More than 50% energy savings, Payback period of less than 1 year.
- The Heat Pump system reduces CO2 emission by about 343 Tonnes of CO2/year

Annual savings of Rs. 76.81 Lakhs is achieved by eliminating both Boiler and Chiller unit consumption.