

Successful Implementation – Energy Conservation Measure

Measure
Reduction in Power Cost by Installation of Variable Frequency Drive in ID (Induced Draft) Fan of ESP
Equipment
ID Fan of ESP (Electro Static Precipitator)
Industry / Sector
Glass Industry
Year of Implementation
2001
Cost Benefit Analysis
<input type="checkbox"/> Type of Measure : Medium Term Investment
<input type="checkbox"/> Annual Energy Saving : 5,25,600 kWh
<input type="checkbox"/> Actual Cost Saving : Rs.24.18 lacs/ year
<input type="checkbox"/> Actual Investment : Rs.6.0 lacs
<input type="checkbox"/> Payback : 3 months
Implementation Highlights
<ul style="list-style-type: none"> ▪ It is a simple system in installation and is maintenance free. ▪ Due to reduced speed of the motor & fan, wear & tear of parts has reduced drastically. ▪ This success has made us to initiate the complete study of other fan systems also to find out the further scope of energy conservation in other areas. ▪ After successful completion of this project, we installed VFD's in other fans of Melting Furnace and Presses.

Summary

By providing the VFD in ID fan, we not only saved on the power consumption thereby reducing our monthly power bill but also achieved a finer control with respect to the pull in the Glass Melting Furnace. Now with the VFD, we don't have to manage the dampers in the system, which is not a leak proof system and also needs manual interventions.

Background

ESP has been installed to maintain the pollutants in the discharge gases from the Glass Melting Tank stack within the Pollution control limits.

The ID fan draws suction from the exhaust of Tank through ESP fields and maintains the slight positive pressure inside the tank. The tank pressure is maintained through controlling the inlet damper to ID fan and the ID fans used to run at its rated speed. The damper opening was about 20% only. That meant under utilisation of fan capacity at higher power consumption. Therefore it was felt to find out some system to reduce the power consumption without affecting the tank performance. VFD was found to be a suitable option. After doing the detailed calculations, VSD of suitable rating and feature was installed. After installation, there was substantial saving in the power.

Motor Details (ID Fan)	Unit	Details
Motor Rated Power	KW	110
Power Drawn	KW	68

Principle

VFD adjusts the electrical frequency of the power supplied to a motor to change the motor's rotational speed. The reduced frequency allows the output to be reduced accordingly.

Details of techno-economics:

Particulars	Actual energy savings
Earlier Power Consumption by pump	68 KW
Presently Power Consumption	8 KW
Power Saving	60 KW
Annual Power Saving @ 8760 hrs	5,25,600 KWH
Annual Energy Saving @ Rs.4.60/kwh	Rs.24.18 lacs
Investment	Rs.6.0 lacs
Payback Period	3 months

Implementation issues

- Initially the production persons who operate the ESP and ID fan were reluctant to have a new type of Electronic control system. However after trial demonstration of the energy saving potential of the VFD on another standby equipment, they got convinced and became part of the project to implement it.
- A huge saving potential in fans and blowers exists in the plant but it needs a detailed systematic study for identifying the opportunities. A right projection of savings vs. investment is a must for justifying the need.