Successful Implementation – Energy Conservation Measure

Measure
Use of lighting voltage controller to reduce lighting energy consumption
Equipment
Lighting
Industry / Sector
Pulp & Paper
Year of Implementation
1999
Cost Benefit Analysis
◊ Type of Measure: Medium investment
◊ Annual Energy Savings: 2.45 lakh kWh
◊ Actual cost savings: Rs. 4.89 lakh
◊ Actual investment : Rs. 12.37 lakh
◊ Payback: 2 year 6 months
Implementation Highlights
⇨ Implementable in industries where lighting loads are high and voltages in lighting circuits are not controlled ⇨ Immediate, measurable results after implementation ⇨ Proven technology ⇨ Provides additional benefit of longer life of lamps and better power factor

Summary

The use of lighting voltage controller in lighting circuit lowers voltage levels slightly yielding energy savings without comprising on lighting levels. Very useful for continuous process industries with moderate to big lighting loads.

Background

A paper manufacturing plant has a connected lighting load of nearly 370 kW. This consists of fluorescent fittings, HPSV,HPMV & CFL lamps for plant, office and area lighting.

The lighting load is fed from 3.3 kV bus by 4 nos. of LT transformers. These transformers have lighting loads apart from other loads. Each transformer is connected to a Lighting circuit Distribution box. The total actual load varies between 300 to 350 kW during night. Meters are fitted at each DB to measure power consumption.

The voltage levels at lighting DBs vary between 225 & 240 V. Lighting loads consume less power at lower voltages. The plant lighting voltages were at a level, which could be brought down further.

The installation of lighting voltage controllers, of different kVA, on each DB brought down the lighting consumption by 20%. The output voltages were set at 210 V.

Principle

Slightly lowering (10-15%) the voltage levels of lighting feeders brings down the energy consumption proportionately. This however does not impair the ability of discharge lamps to strike, though an insignificant reduction in lumen output takes place.

Details of techno-econmics:

Particulars	Actual energy savings
No. of DB lighting circuits	**4**
Total Power consumption	**338 kW**
After installation	
Total Power consumption	**275 kW**
Annual Total energy savings, lakh kWh	**2.45**
Annual Cost savings, Rs. lakh	**4.89**
Cost of Implementation, Rs. lakh	**12.37**
Simple payback period, Year	**2 year 6 months**

Implementation issues

- This measure was possible because of dedicated lighting circuits in the plant
- Voltage levels have to be set at a level where the lighting levels are not visibly effected by lowering of voltages
- The power factor of the lighting circuit improves because of the lower voltage levels