



ITC LIMITED

Replacement of Inefficient Vacuum Fans with more Efficient and Higher Capacity Vacuum Fans at Former Machines

SUMMARY OF THE OPTION

M/s ITC Limited–Paperboards and Specialty Paper Division (ITC–PSPD), Bhadrachalam unit commenced its commercial production in October 1979. It is the largest and one of the best performing integrated pulp and paper plants in India with a design manufacturing capacity of 200,000 tons per annum (TPA) of paper and paper boards and was actually producing around 238,000 – 240,000 TPA. Notwithstanding, the unit, plans for an immediate expansion with the addition of another Paper Machine, thus taking the manufacturing capacity to 2, 85,000 TPA. The products range from Printing and writing paper of various grades, Poster paper, Uncoated paper board and Coated paper board. The annual electricity consumption is of the order of 242 Million kWh and the thermal energy consumption totals 914913 million kCals/year. The energy cost accounts for 5.12% of the manufacturing cost. The specific electricity consumption is 971 kWh/Ton and the specific thermal energy average is 3.87 Million kCal/Ton.

KEY WORDS

India, Pulp and Paper, Fans and blowers, Vacuum fans, Former machines

OBSERVATIONS

The ITC PSPD unit has five former machines for pulp concentration. Pulp with solids concentration of 3 per cent is made to pass over these former machines, where the pulp is made to pass over a mesh like structure. Three vacuum fans per former machine was placed beneath the mesh to evacuate the steam from the pulp sheet. These fans were found to be operating at a low efficiency of around 57 per cent. The fan design vacuum was around 600 mm of water column (14 X 3 m³/min), but during actual conditions the maximum usage vacuum was around 300 mm of water column which is maintained by 50 per cent throttling with subsequent energy and pressure loss.

OPTIONS

Based on the study, 15 energy inefficient vacuum fans was replaced with five vacuum fans (one fan per former machine), each of around 82 per cent fan efficiency and with a capacity of 42 m³/min.



RESULTS

The following results were obtained:

PARAMETER	BEFORE CPEE	AFTER CPEE
No. of Vacuum Fans	3 Nos.per machine X 5 Machines) =15	(1 No per machine. X 5 Machines) =5
Vacuum maintained	600 mm Hg	400 mm Hg
Fan efficiency	57 per cent	82 per cent
Power Consumption	(10.97 kW per machine X 5) = 54.85	(4.11 kW per machine X 5) = 20.55

Financial benefits

- Investment: US\$ 8,957
- Annual cost savings : Rs. 458,248 or US\$ 10,657 (= 274400 kWh X Rs.1.67/kWh) (@ 43 Rs./US\$)
- Payback period: 10 months

Environmental benefits

- Annual electricity savings: 2,74,400 kWh (= 34.3 kW reduction per hour X 8000 hrs/yr)
- Annual GHG emission reduction: 245 tons CO₂ (= 2,74,700 kWh X 0.000893 tons of CO₂/kWh) [1]

[1] – Sourced from UNEP GHG Calculator – Specific to India

FOR MORE INFORMATION

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