

Intervening Technique	Installation of VFD on Cooling Blower Motor in figure Glass industry																				
Before CP	<p>Most electric motors are designed to run at 50% to 100% of rated load. Maximum efficiency is usually near 75% of rated load. Thus, a 10-horsepower (hp) motor has an acceptable load range of 5 to 10 hp; peak efficiency is at 7.5 hp. A motor's efficiency tends to decrease dramatically below about 50% load. However, the range of good efficiency varies with individual motors and tends to extend over a broader range for larger motors.</p>																				
	<p>A motor is considered under loaded when it is in the range where efficiency drops significantly with decreasing load. Power factor tends to drop off sooner, but less steeply than efficiency, as load decreases.</p>																				
	<p>Electrical load survey was conducted on major motors in the plant, the parameters measured are shown in following table:</p>																				
	<table border="1"> <thead> <tr> <th>Motor Name</th> <th>Voltage (V)</th> <th>Current (A)</th> <th>Power Factor</th> <th>Power (kW)</th> <th>Rated Power (kW)</th> <th>Loading (%)</th> </tr> </thead> <tbody> <tr> <td colspan="7" style="text-align: center;">100 TPD Furnace Area</td> </tr> <tr> <td>Glass Cooling</td> <td>412</td> <td>5.27</td> <td>0.64</td> <td>2.40</td> <td>5.5</td> <td>43</td> </tr> </tbody> </table>	Motor Name	Voltage (V)	Current (A)	Power Factor	Power (kW)	Rated Power (kW)	Loading (%)	100 TPD Furnace Area							Glass Cooling	412	5.27	0.64	2.40	5.5
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Lower Blower						
Throat Cooling Blower (with VFD)	411	9.02	0.78	5.02	11.2	45

- Loading on both the motors is less than 50 %, although throat cooling blower motor is driven through VFD still showing low power factor, indicating the opportunity to reduce the frequency of the VFD and optimize the power consumption.
- The Glass cooling lower blower motor is running at lower efficiency of around 75 %, thus it is recommended to replace motor with appropriate size on next failure, the motor need to be selected so that the loading on motor is more than 80 % to have more than 90 % efficiency.

Recommendation:

- It is recommended to reduce the frequency of the throat cooling blower motor frequency and replacement of the glass cooling lower blower motor with energy efficient motor will save approximately 5208 kWh per annum.

Environmental	<ul style="list-style-type: none"> • Per Day reduction in the Electricity consumption: 14.47 KWh • Per Year reduction in Electricity consumption: 5208 KWh • Per Day reduction in Greenhouse Gas (CO₂) emission: 0.01 MT of CO₂ • Per Year Reduction in Greenhouse Gas (CO₂) emission: 4.48 MT of CO₂
Economical	<p style="text-align: center;">Investment: Rs. 50,000/- (for 2 nos. of Furnace)</p> <p style="text-align: center;">Annual Savings: Rs. 71,253/- per annum</p> <p style="text-align: center;">Payback Period: 9 months</p>