



ITC SAHARANPUR

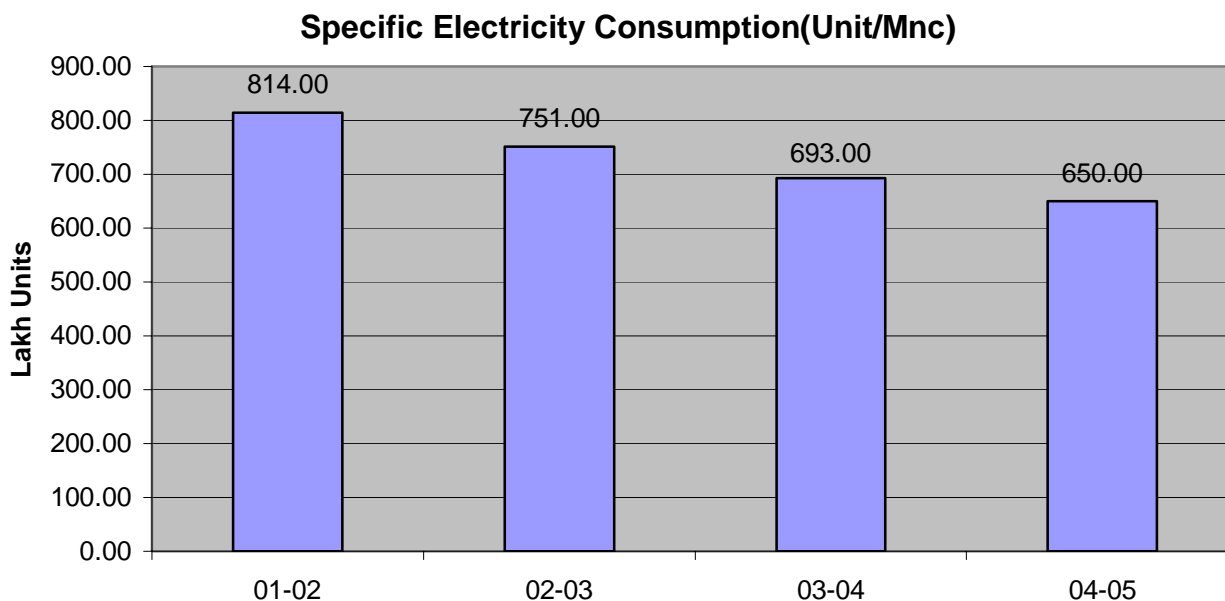
India Tobacco Division  
ITC Limited

### Unit Profile

ITC is one of the most successful corporates in the recent times. Its consistent performance and alignment towards social needs has taken it a long way since its inception. ITC Saharanpur is the second largest cigarette factory of ITC Limited after Bangalore factory and production facility of almost all the major brands in ITC's portfolio. ITC Saharanpur is a 77 year old establishment which manufacturers processed Leaf tobacco and Packed Cigarettes. The products are shipped to all parts of the country. The factory has been through a series of modernization process in the recent past with induction of new generation technologies. The factory as it stands today is a state of the art facility catering to the needs of the consumer. In line with the company's policy the unit has a robust resource conservation orientation which is embedded into the design as well as management philosophy.

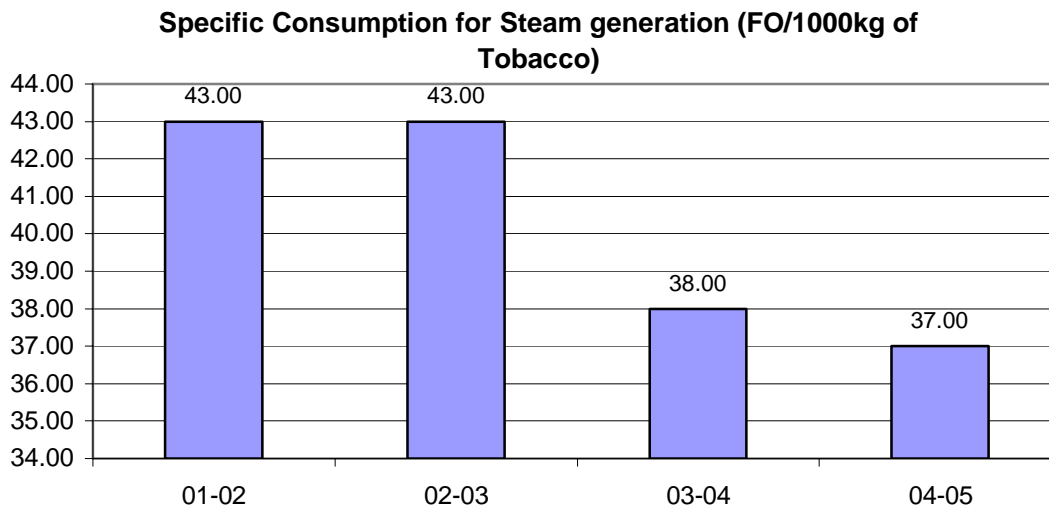
### Energy Consumption

- **Electricity Consumption**



Note : 2004 – 2005 (Outlook)

## Furnace Oil Consumption



## **Energy Conservation Commitment, Policy and Set up**

ITC Saharanpur monitors committed to energy conservation through its commitment and actions. The unit is monitoring energy efficiency of supply and demand on daily basis. The unit has undergone periodic energy audits by competent organizations e.g. Siemens, TERI, Forbes Marshall, etc. Energy Conservation forms part of the unit's Environment, Health and Safety Management System. The Unit takes active participation in the divisional meet of ITC on energy every year to review the status of the projects and share the plans for the coming year. The senior management team chaired by the unit head reviews the performance on each of the performance indices in the area of energy conservation regularly. Variance on any index against the target is discussed in the daily review meetings.

Energy conservation projects and targets are part of yearly objectives for performance appraisal for engineers in the plant. Half yearly review is done by the superiors to ensure progress and mid term correction. Along with inputs from the expert team at the Divisional Head Office, potential areas for conservation are studied and various solutions are explored towards achieving the potential savings.

The energy conservation drive at ITC Saharanpur has been one of involvement and constant perseverance. The concept of kaizen has been used to drive this process across the factory. The energy conservation drive is being taken forward through self-driven cross-functional teams. The teams hold regular meetings to deliberate on issues related to energy conservation. It is interesting to note that the suggestions put forward by the team members are implemented by the team members themselves. Following the principles of kaizen the team looks out for avenues at the Gemba (shopfloor) where muda (waste) is being generated. The works done by the team are small but the results achieved are excellent and large in magnitude.



**The unit has adopted the following strategies towards energy conservation:**

Strategy is the AIDA model (Awareness - Interest - Desire - Action)

Use of multiple channels & layers of communication leading to awareness, interest & desire

- 1) Daily tracking of energy consumption per unit production (kWh/Mnc) with analysis at the morning meetings.
- 2) One to one interaction amongst the members of energy team on fixed days every week in which the energy team members highlight the energy issues relevant to their respective areas.
- 3) Special issue of the Unit's In-house magazine "Pukaar" (A Clarion Call) with Energy conservation being the theme. **(A copy of "PUKAR" is enclosed)**
- 4) Monthly meetings of energy team which is a cross functional group of managers and employees across departments, rank & hierarchy to discuss & resolve issues related to energy conservation.
- 5) Energy suggestion scheme & felicitation of winners in public by the Unit head
- 6) Devoting a cross functional team, as a fall out of the Kaizen initiative undertaken by the unit, to generate ideas related to energy conservation, evaluate, implement & share results with the Energy team
- 7) Making energy a key indices to measure the unit's performance and reviewing it every month at the Branch Performance Review chaired by the Unit Head.

**Monitoring and Reporting Systems**

Use multiple forums for effective review of energy consumption and sharing energy conservation projects

Daily

1. Unit is reviewing performance every day morning, attended by top management, shop floor managers and key employees. Energy data is shared with team members in that meeting.
2. Data on specific energy consumption for each department is monitored, recorded, compared against internal target and shared.

Weekly

One of the energy team member , shares the performance on energy against the target as well as compare the same with last year performacne for the corresponding period.

Monthly

1. Energy committee members are meeting on monthly basis to review the status. Energy consumption data, actions to be taken and energy conservation projects to be undertaken in the future are discussed.

2. The Senior Management reviews the performance of the unit every month with managers from all functions being the reviewee.

Daily reporting

Online energy monitoring captures data on differrent key areas of the factory and energy reports being generated every day.

**Energy Conservation Achievements**

During the last two years the unit has implemented various energy conservation measures and the results of which have been very encouraging.

**1. FRP fan replacement for airwashers**

**Pre FRP installation**

Supply air fan installed capacity per fan	50 HP
Return air fan installed capacity per fan	40 HP
Average power consumed / month	282960 Units

**Post FRP installaion**

Supply air fan installed capacity per fan	40 HP
Return air fan installed capacity per fan	30 HP
Average power consumed / month	239520 Units

Total Savings / Month	43440 Units
Total cost savings / Month	2.38 Lacs



## 2. Replacement of old engine with energy efficient engine

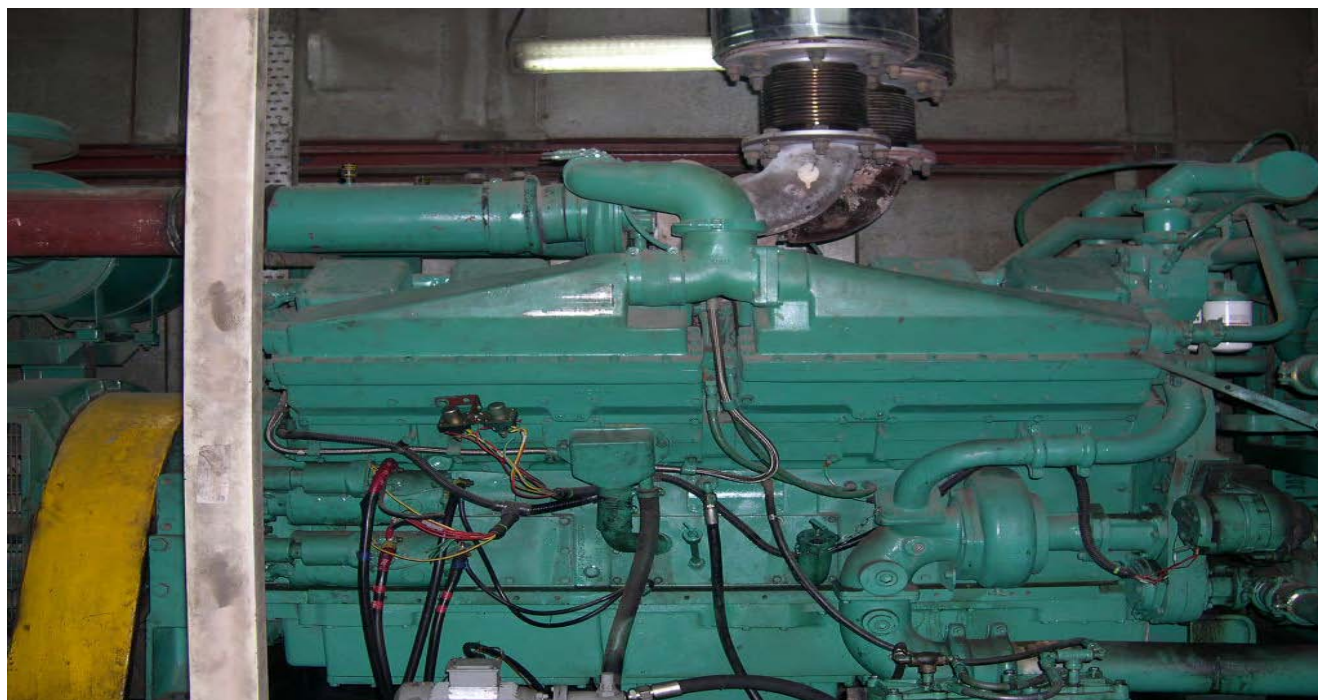
### Old KTA 3067 engine

Specific fuel consumption	0.290 Lts/Unit
Monthly power generation	322560 Units
Monthly fuel (HSD) consumed	93.542 KL



**Post replacement of energy efficient engine KTA 38 G5**

Specific fuel consumption	0.255 Lts/Unit
Monthly power generation	322560 Units
Monthly fuel (HSD) consumed	82.252 KL
Total fuel (HSD) savings / Month	11.289 KL
Cost of HSD	Rs. 19.60 / KL
Total cost savings / Month	2.21 Lacs.



### Energy Conservation Plans and Targets

The cross functional team at the unit prepares the unit plan for each year in line with divisional plan with unit perspectives. Energy Conservation has been identified as a major area of focus by the division and thus the unit.

Following are the details of the plans for the coming years

Sl. No.	Proposal	Annual Savings		Cost of Implementation	Pay Back Period
		Energy L.acs. kWh*	Value (Rs. Lakh)	Rs. Lakh	Years
1	Screw chiller replacement in place of VAM for HVAC system	538 KL of FO PA	70	110	1.57
2	Dynamic VAR compensation for Grid supply	394 MVAH PA	13	25	1.92
3	Replacement of boiler for PMD operation	72 KL OF FO PA	10	20	2
4	Super energy efficient motors	2	12.6	16	1.26



## **Environment and Safety**

We, at ITC believe that our existence is for reasons beyond just the business. We believe that we owe it to the nation, environment, employees and other stakeholders what we get from them. It is our endeavour to constantly upgrade our facilities, improve our performance, benchmark our practices and ensure safety, health and hygiene of our employees both permanent and contractual as well as protection of the environment around us.

The significant work in the area of EHS like reducing emissions & discharges, conserving water & energy, noise abatement, solid waste management system etc. are hallmark of our contribution in an attempt to make us a company conserving natural resources & create a healthy environment.

In order to create the culture and facilities required in a EHS focused organization, close to 10 % of operating / capital expenditure is directed towards improvement in health and safety.

Various certifications, recognitions and awards we have received in the past as well as during last year are a testimony of our commitment towards EHS. The learning acquired from various certification audits has helped us in our pursuit from best practices to next practices. We have been participating in more and more such audits, which helped us, achieve numerous accreditations and accolades.

## **Afforestation**

### **Actions Taken in last two years**

- 989 tall trees planted in the green area available
- Saplings of 5 to 8ft have been planted which will mature to a height of 30 to 40 ft in 6 years time
- 790 short stature trees have been planted in the landscaped area
- 250 trees planted in the sports field area
- Selection of plants/trees based on local climatic conditions
- 65 neem trees planted

ITD Saharanpur gives utmost importance to EHS and is committed to apply the best standards of practice in all aspects of environment, occupational health and safety management. Various awards received in the field of EHS by the unit are:

- a. ISO 9001 : 2000 certification.
- b. ISO 14001 : 1996 certification.



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- c. OSHAS 18001 : 1999 certification
- d. 5 Star Rating from British Safety Council, 2003 & 2004
- e. Sword of Honour from British Safety Council, 2003
- f. RoSPA Gold award for Occupational Safety for, 2003 & 2004 from the Royal Society for the Prevention of Accident, UK

## Project Title

Replacement of metallic fan blades with FRP blades

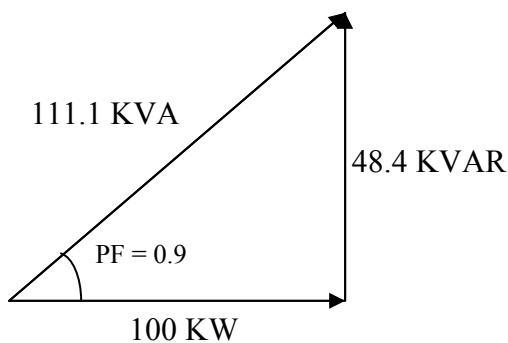
## Back ground

FRP blade replacement has been normally seen as a good energy saving tool to achieve savings to the tune of 20%. Normally when we plan for such a change tendency is biased to look at only the fan and change the fan to FRP without looking at the entire system efficiency.

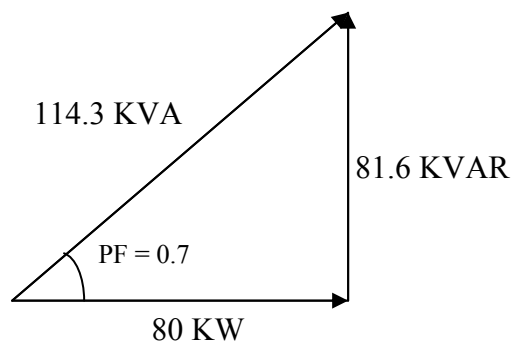
## Approach towards FRP replacement

Consider the case where the present power consumption is 100Kw at a power factor of 0.9. It is seen that as the loading comes down the power factor also tends to drop. On retrofitting with a FRP fan the load on the motor is reduced, mainly due to the better aerodynamic properties and the lower weight of the blades. Assuming the PF now is 0.7 with 20% reduction in Kw. We see that the Maximum demand now is greater than the previous value. FRP will only reduce the active power but the reactive power will increase. Even though active demand is coming down in real terms maximum demand of the system is going up and will increase the demand charges which will not be taken into account for calculating the Return on Investment (ROI). Efficiency of motor also comes down drastically when the motor is not loaded properly.

When a capacitor bank counters the drop then the cost of such investment also needs to be taken care of while calculating the ROI.



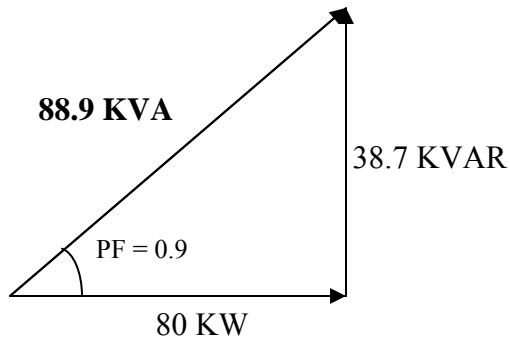
**Fig 1: Pre FRP Change**



**Fig 2: Post FRP Change**

However the above figure may be an eye-opener to the FRP proposition, there are still huge merits only if they are thought through properly. The ideal benefit comes in when the motor is also changed along with the fan too. Following are the benefits for such an arrangement:

- 1) The loading & the PF of the motor remains at a healthy rate. Loading being > 80% and PF > 0.8. The Maximum demand in this case drops by 20%.

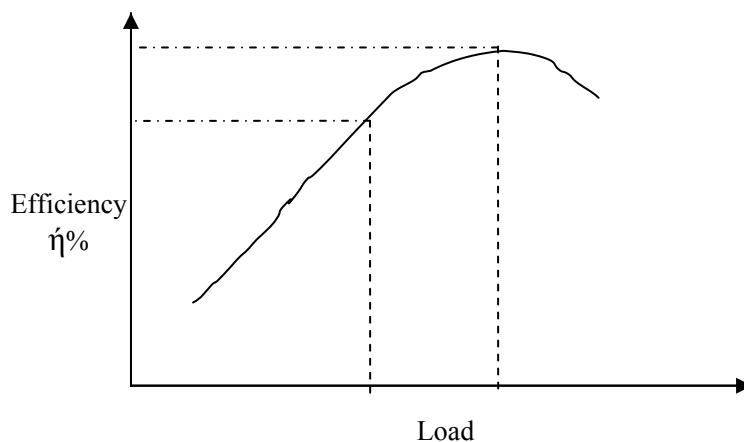


**Fig 3: Post FRP + motor Change**

- 2) By changing the motors in Air washers the heat load comes down. As per ASHRAE “Handbook of fundamentals”, 1972 following is the fan gain of the motors at full load.

Fan	Current Heat Load	Load After change	Reduction in Heat Load	No. Of motors	Total Reduction
SMD AW S/A	10.57	8.25	2.32	8	18.58
SMD AW R/A	8.25	5.75	2.50	8	20.00
CTS AW S/A	5.75	3.5	2.25	2	4.50
CTS AW R/A	3.5	2.75	0.75	2	1.50
				<b>Total Tr Reduction:</b>	<b>44.58</b>

- 3) The load v/s efficiency curve for a 3-phase induction motor is as shown below. With energy efficient motor of lower rating it will be possible to maintain the current loading and attain higher efficiency.



### **Optimizing the energy saving and cost in Air washing system**

ITD – Saharanpur is having 4 nos. of air washing plants and each plant consists of 2-supply air fan of 37 KW capacity and 2 return supply air fans of 30 KW capacities. As a trial it was decided to change in one of the plant and measure the effectiveness. The data derived is reproduced below :

#### **Load pre-change**

Description	Installed KW	Running load (KW)	Running KVA	% Of load	Power factor
Supply air fan	37	28	34	76	0.81
Return air fan	30	22	27	73	0.81

After changing the FRP blade assembly it was found that load on the motor came down drastically and increased the maximum demand (KVA).

#### **Load post-change (Only FRP fan)**

Description	Installed KW	Running load (KW)	Running KVA	% Of load	Power factor
Supply air fan	37	23	31	62	0.74
Return air fan	30	18	24	60	0.74

Even though FRP replacement gives a savings of 18% in KWh energy, the savings on account of KVAh energy is only to the tune of 11%. Hence still there is a potential to save further by sizing the motor properly. After the trials it was found that Supply air fan needs only 30 KW motor and Return air fan needs only 22 KW motor.

After analyzing the data and interaction with motor supplier it was decided that, return air fan motor of 30 KW can be installed in Supply air fan and new energy efficient motor of 22 KW can be installed for return air fan for optimizing the installation.

#### **Data post Motor and FRP change**

Description	Installed Kw	Running load (Kw)	Running KVA	% Of load	Power factor
Supply air fan	30	23	28	77	0.81
Return air fan	22	18	22	81	0.82

Post motor change it was observed that motor was loaded up to a healthy 80% and power factor also maintained at 0.81 and demand also reduced.

**Cautions while calculating ROIs in case of FRP fans:**

1. Most FRP blade manufacturing companies quote prices and indicate ROI based on the rated KW mentioned in the information plate of the motor. Most motors are loaded only to about 80%; hence the savings quoted may be skewed by nearly 4%.
2. ROI should be calculated taking full system efficiency into consideration.
3. Vendor makes a flat assumption of 24hrs run of each fan and 350 days run (as the case may be) and presents the ROI, this too can end up misleading the person concerned.