



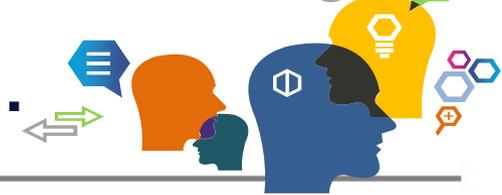
Energy Audit- Spice Powder Making



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A look into Electrical bills....



April-May 2014

Zone	Unit cost(Rs)	Unit consumed	Total cost	% cost
Normal	4.60	49790	229034.00	51.31
Peak	6.90	16000	110400.00	24.73
Off Peak	3.45	31010	106984.00	23.96
Total cost		96800	446418.00	100.00

Recommendations

- Identify non critical loads like cleaning, packing etc.
- Shift non-electrical loads to off-peak hours and bring down the consumption less than 20%
- Expected cost saving per unit of electrical energy is 50%.



A check on Automatic Power Factor Controller....

A check on each capacitor showed that one 5 KVAR is de-rated and not working

Recommendation

A log sheet as shown below should be maintained and once in 15 days the capacitors must be checked for their current out put.

1 KVAR = 1.33 A, if the de-rating is more than 25% replace the capacitor

Date	Location	Rating (KVAR)	A Rating/P h.	A (Actual)			% De-rating	Remark
				R	Y	B		
21/5/14	AFC Panel	5	6.65	0	0	0	100	Replace the Capacitor



Performance Assessment on Air compressors...

Performance at a glance...

Type	Power (HP)	Rated cfm	Run hr	Actual cfm	Generation eff.	Operating Pr	Actual power	Internal Leakage
Screw Type	50	170 cfm	24 hr	154	90.58	9	30	10 cfm
Reciprocating	20	80 cfm	Stand by	56	69	8	14	Nil

A Leaking Valve is set right during performance testing





Performance Assessment on Air compressors...

Recommendations....

Arrest internal leakages in screw compressors by checking valves and flanges. Remove extra valves in the receiver and air lines and cap the pipe to arrest leakages

Unused valves in receiver cause leakages





Performance Assessment on Air compressors...

- Replace inefficient reciprocating compressor with energy efficient screw compressor and save power consumption up to 15%
- Present consumption 14 kW will reduce to 12 kW
- Replace GI air pipes with Aluminium Modular pipes for compressed air network to arrest 100% leakage and reduce pressure drop.



Al.
Modular
Piping



Replace inefficient reciprocating compressor, Reduce energy consumption and maintenance cost



Performance Assessment on Air compressors...

- Isolate high pressure air line from cleaning system and group the cleaning locations. Use a small compressors for cleaning at low pressure of 2 bar to reduce power consumption to generate high pressure area.
- Present consumption is 24 kW. Small compressor of 5.5 kW will consume 4.5 kW. The saving would be 19.5kW.



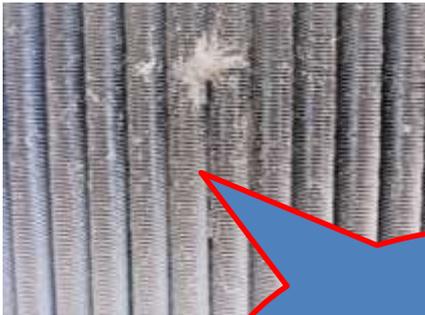
Group the
Cleaning
Locations & use
low pressure air





Hidden in-efficiency in Pepper Dryer.....

- Hot Air blower and cold air blowers suction line is .80% choked
- No significant air flow measured in these blowers
- Flow rate from dryer was measured at 551 k/hr
- Cooler surfaces are insulated



Choked Steam heater coil attached with Hot air blower



Cold air suction placed near steam trap and covered



Hidden in-efficiency in Pepper Dryer.....

Recommendations

- Regular cleaning of steam heater coil and improve air flow
- Remove the insulation from cooler surfaces
- Isolate dryer area from cooler area by providing partitions strips
- One cooler having the suction near steam trap fan can be removed
- Clean the suction filter of 2nd cooler fan and improve the air flow. This flow can be split and connected to the cooler
- **Improve dryer productivity to 1000 kg/r and reduce blower energy consumption by 1.5 kW.**



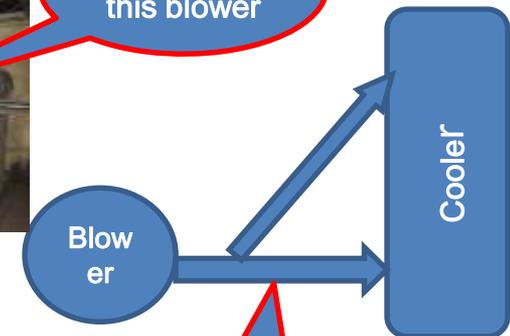
Chocked Steam heater coil attached with Hot air blower



Cold air suction placed near steam trap and covered



Disconnect this blower



Suggested scheme



Hidden in-efficiency in Pepper Dryer.....

Recommendations

The steam heater is placed at suction end of the hot air blower. It is recommended to place the steam heater on the delivery side of the steam heater.

The higher velocity of air at deliver end of the blower will enhance the heat transfer rate and improve efficiency of heat utilization

At present the blower handles hot air thus reducing flow rate due to hot gas. If the blower handles cold air the specific energy consumption will decrease and floe rate will increase



Steam heater
before suction

EXISTING



Steam heater
at delivery end

PROPOSED



Improve Boiler Performance....

- **Steam requirement 3.00 Ton/shift (375 kg/h)**
- **Boiler utilization is , 20% of its capacity (2 ton/h capacity)**
- **Condensate left unutilized at the rate of 1.9KL/shift at 75°C, equivalent to 100 kg of fuel per day**
- **Manual fuel feeding is a bottle neck to use low capacity boiler (1 t/h)**

Recommendations



Recover and reuse condensate to save water and fuel



Install material handling system for semi automatic feeding of fuel



Use low capacity boiler save fuel

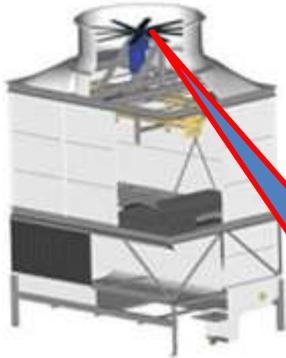


Reduce cooling tower fan power consumption....

- Cooling tower fan runs for 24 hrs irrespective of outside temperature and water outlet temperature
- Fan power consumption 2.5 kW

Recommendations

Install commercially available cooling tower energy saver and reduce fan power consumption by 15%



Cooling tower fan



Commercial cooling tower fan controller



Monitoring and analysis of energy consumption

- Install our energy monitoring and analysis software and integrate with production monitoring system
- Allocate energy cost to each department/mill
- Bench mark energy cost for utility and production in terms of kWh/ton of production
- Bench mark CO₂ emission in terms of tCO₂/ton of production
- Present CO₂ emission related to grid power consumption is 0.93 tCO₂/MWh
- Plant Lipids CO₂ emission = 90 tCO₂/month
- Expected reduction @5% = 4.5 tCO₂/month



Instruments used for this study.....



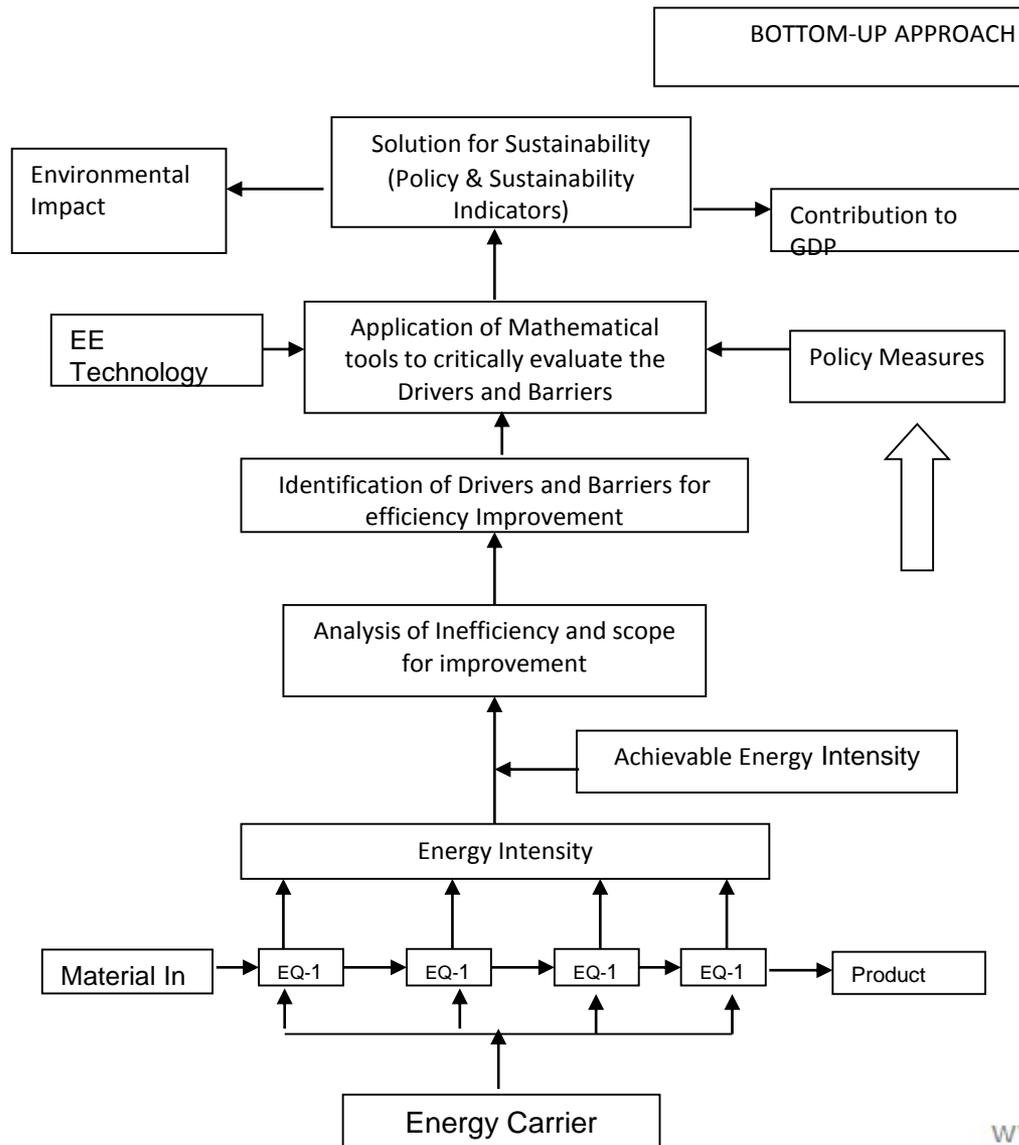
PORTABLE MEASURING INSTRUMENTS



Triassic Solutions..

- **Development, installation, integration and commissioning of the complete energy management system**
- **Provide solutions for efficient use of compressed air system through improving piping network to arrest air leakage and pressure drop through AI-Modular air piping**
- **Consulting the design, installation and commissioning of semi-automatic fuel feeding system for boilers**
- **Design, installing and commissioning of condensate recovery system**

Our approach- 'Bottom-Up'



How to reach TRIASSIC ?



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THANK YOU!!!