SUSTAINABLE PRACTICES

For Environmental Stewardship

A CASE STUDY OF WCPM

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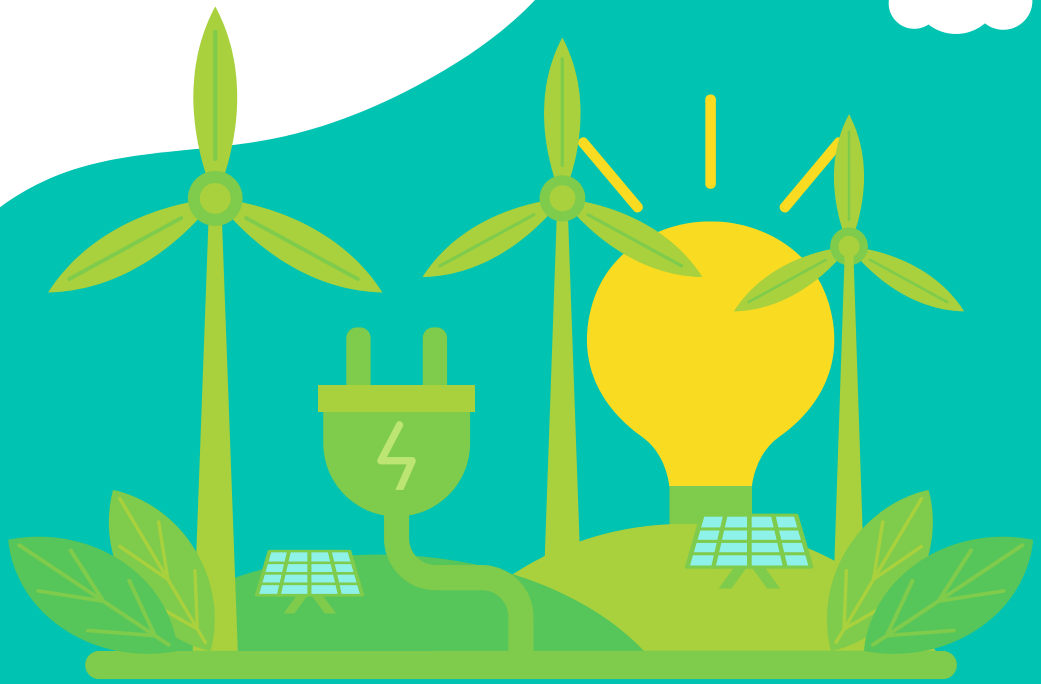
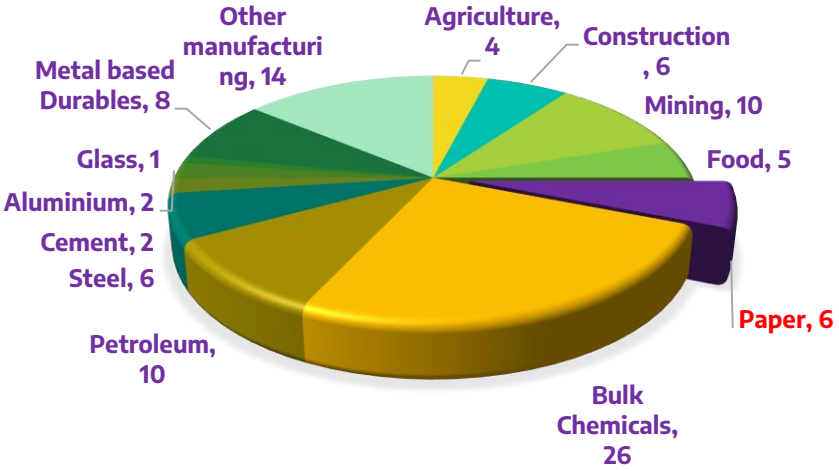


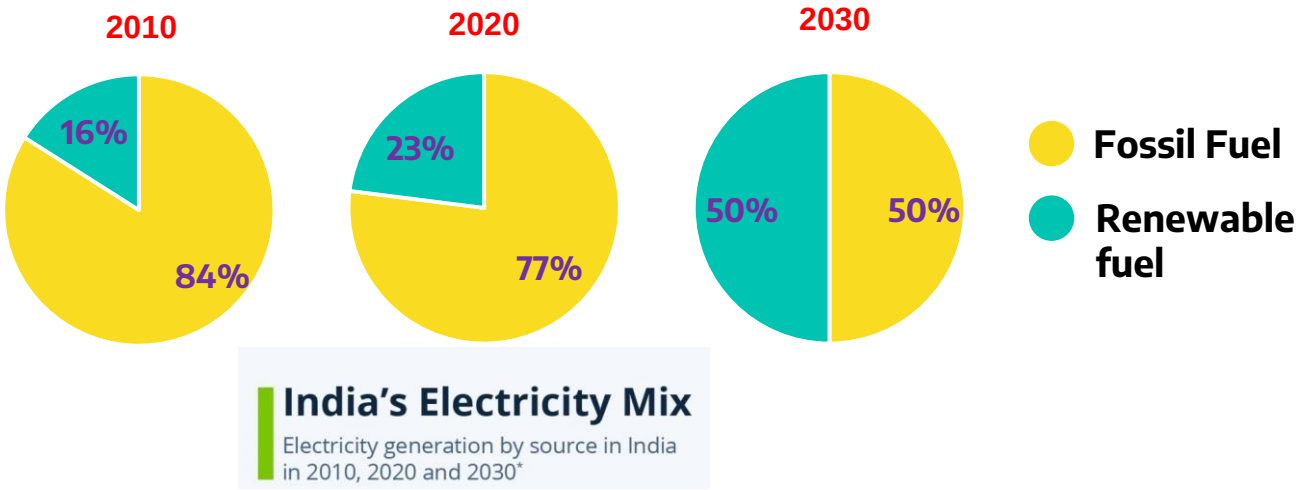
Introduction

Pulp & Paper Industry : Energy intensive sector

Accounted for approx. 6% of global industrial energy consumption in 2017 *(as per International Energy Agency)*



Increasing trend in renewable fuel use, still rely on *fossil fuels* and emit a significant amount of CO_2

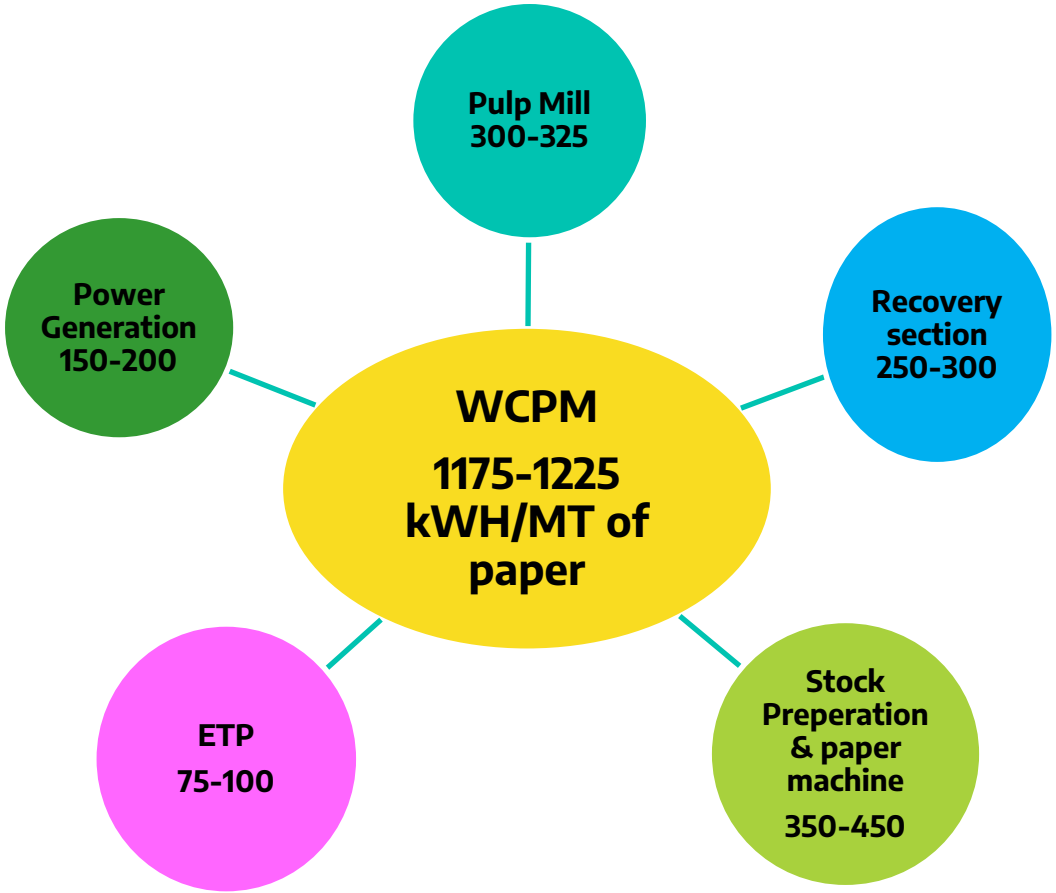


Source: https://thewire.in/energy/chart-india-renewable-energy-generation

Power Consumption Review

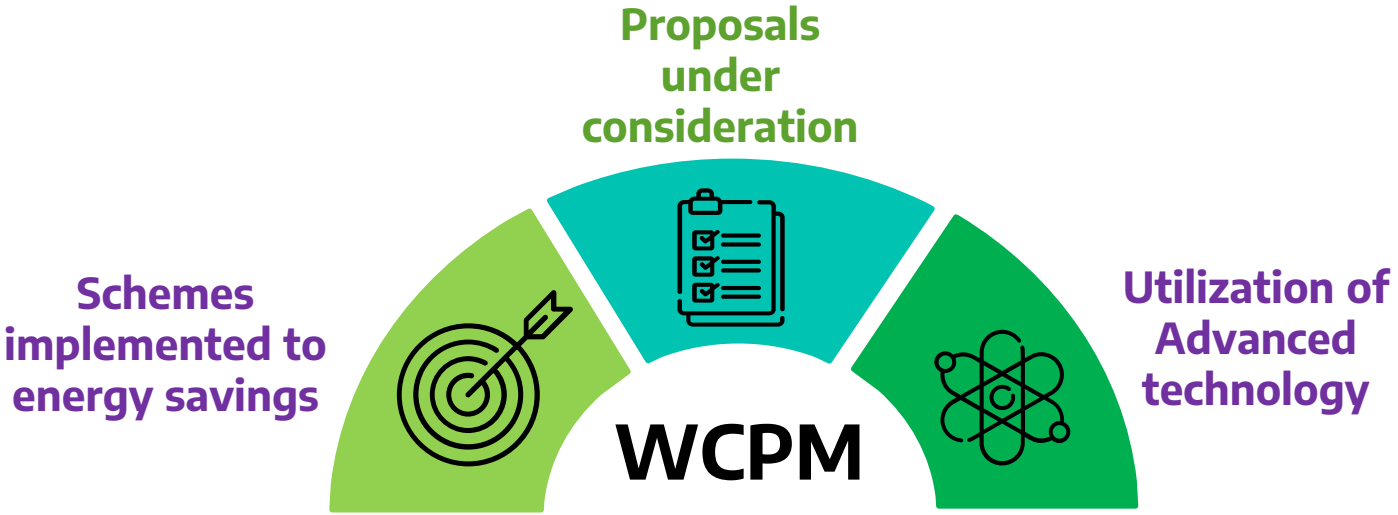
In Integrated Paper Mills

1180 - 1300kWH/MT



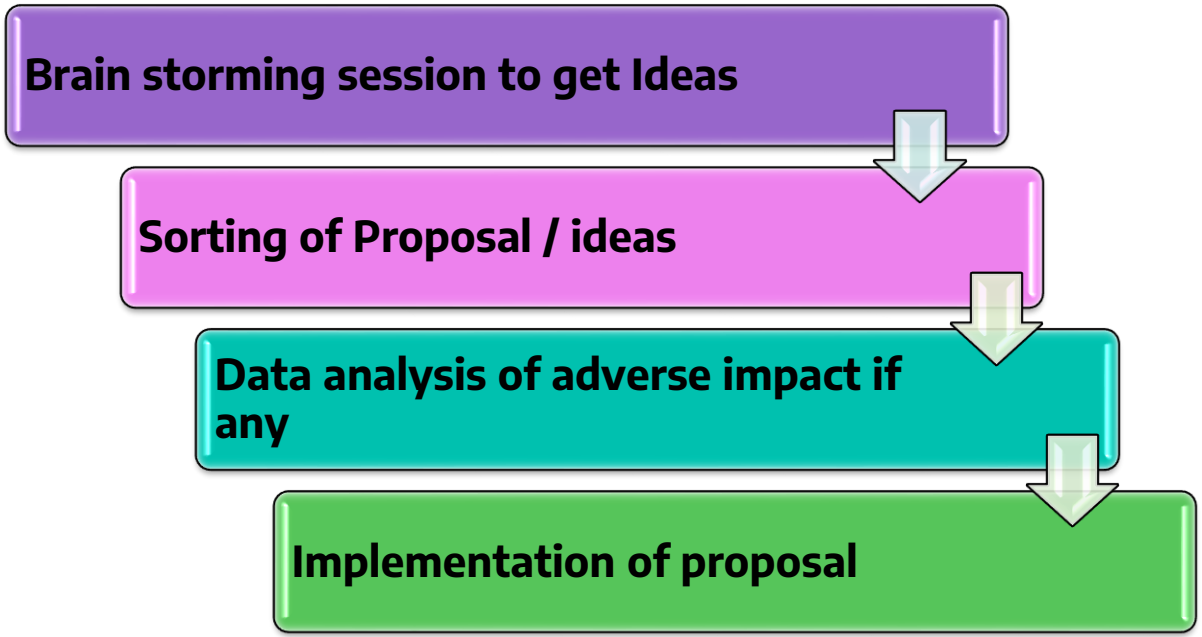
Approach towards Energy Conservation

Energy is dominating factor that affects economics and environment performance



WCPM Methodology in energy conservation

Keeping in view of paper plant as energy intensive the WCPM approach towards the energy conservation is;



Some of the Case studies are as follows:

Case Study-1 Cooling Tower fan

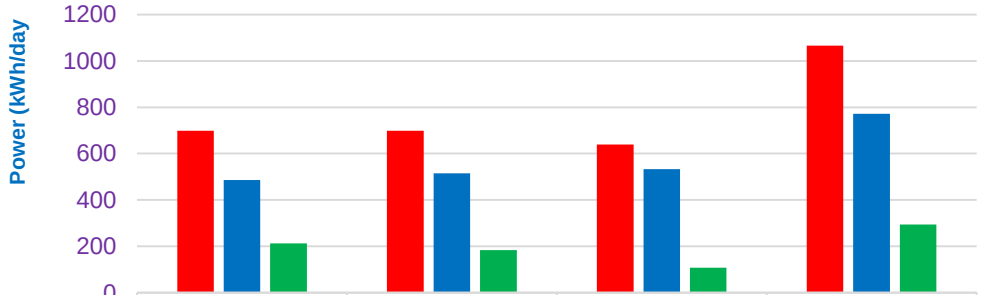
Before

Cooling tower fan with 8 blades

After

Cooling tower fan with 6 blades (Light Weight)

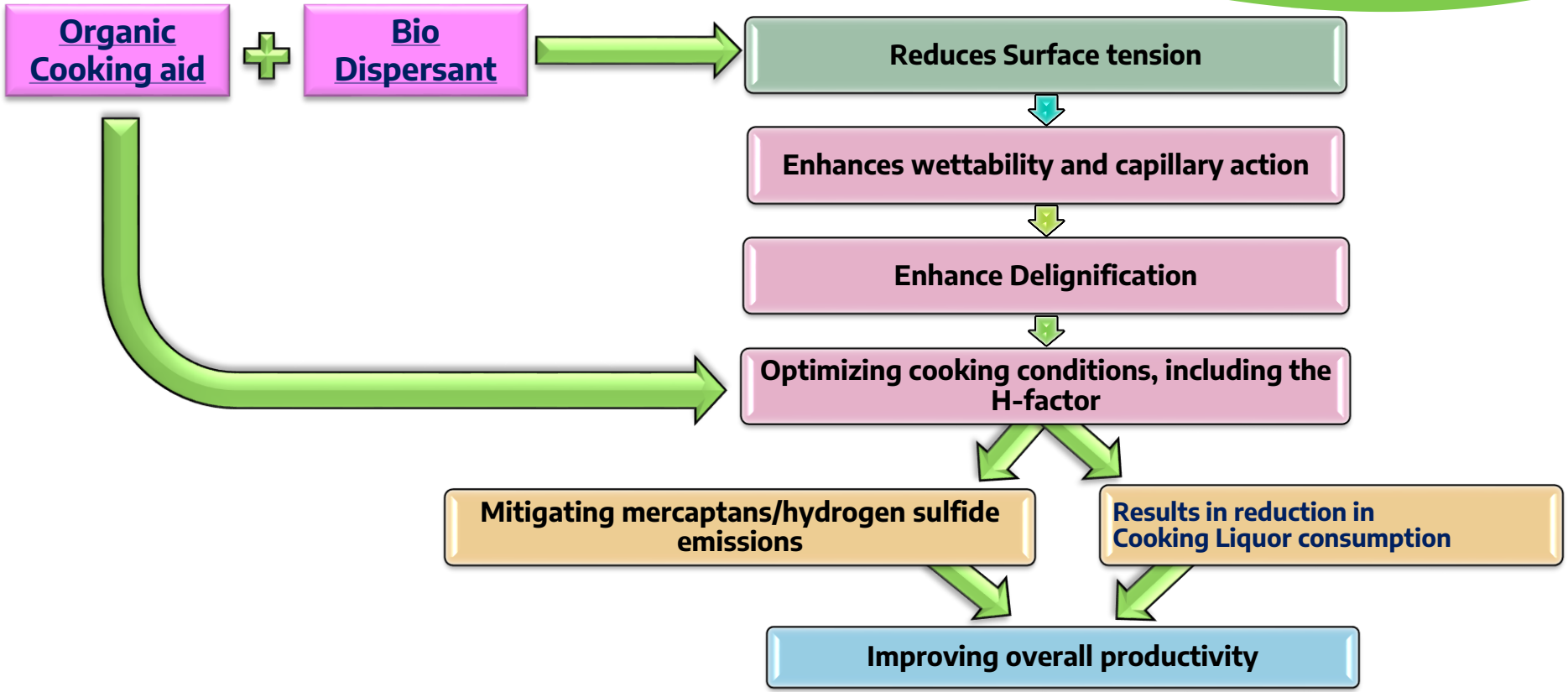
Energy savings achieved



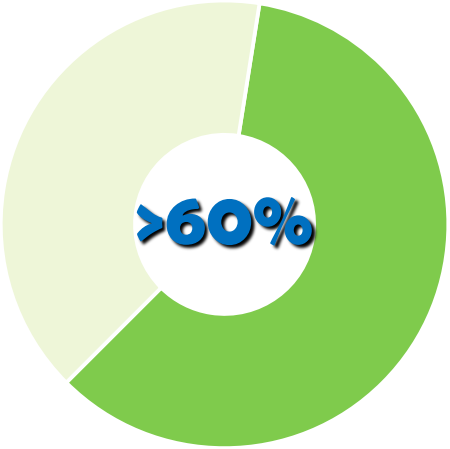
	FFE1	FFE2	TG4	TG3
Before schemes	698.4	698.4	639.84	1066.1
After schemes	485.52	515.28	532.32	772.3
Savings achieved	212.88	183.12	107.52	293.8

Before schemes After schemes Savings achieved

Case Study-2
Improvement in Raw Material Cooking

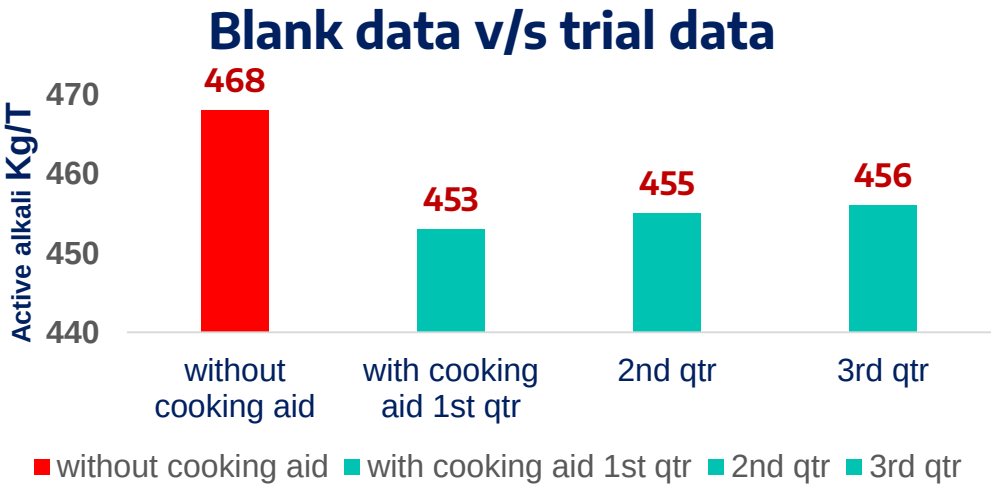


Achieved Results



>60% reduction in Odor

White liquor reduced 6-8 M^3/digester & that also reflected in low WBL generated per digester

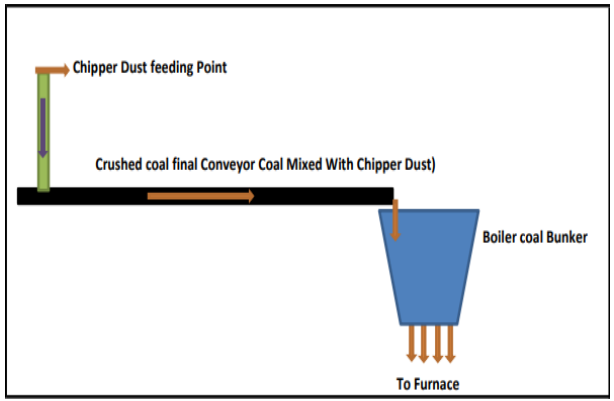


Case Study-3

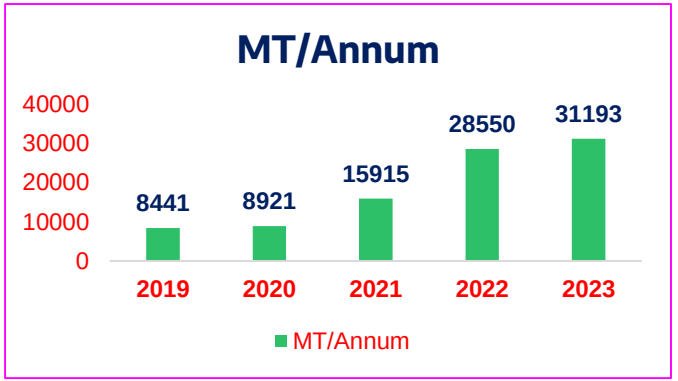
Chipper Dust as fuel at Boiler

Chipper dust generation 3% per MT of raw material *(Gross calorific value as such of 2500-2600 KCal/kg at 40% moisture)* used in boiler as an alternative fuel with

1. providing pneumatic purging system at bunker
2. improve screening at source
3. Improved mixing



mixing of Chipper dust



Chipper Dust Consumption mixing of Chipper dust

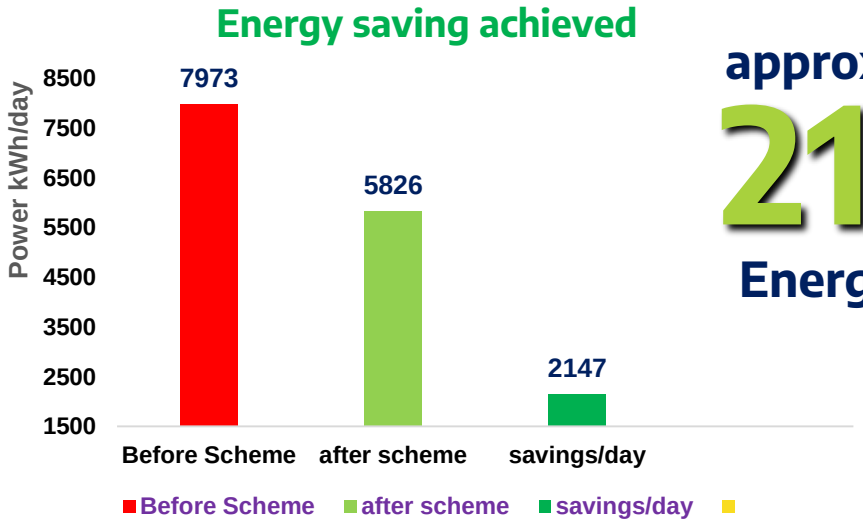
Case Study-4 Trimming of oversize impeller

WCPM Continuously reducing the water consumption, so need of power saving at the water intake pumps.

Impeller trimming

(From 505 mm to 480mm)

Resulted in Power saving



approximately

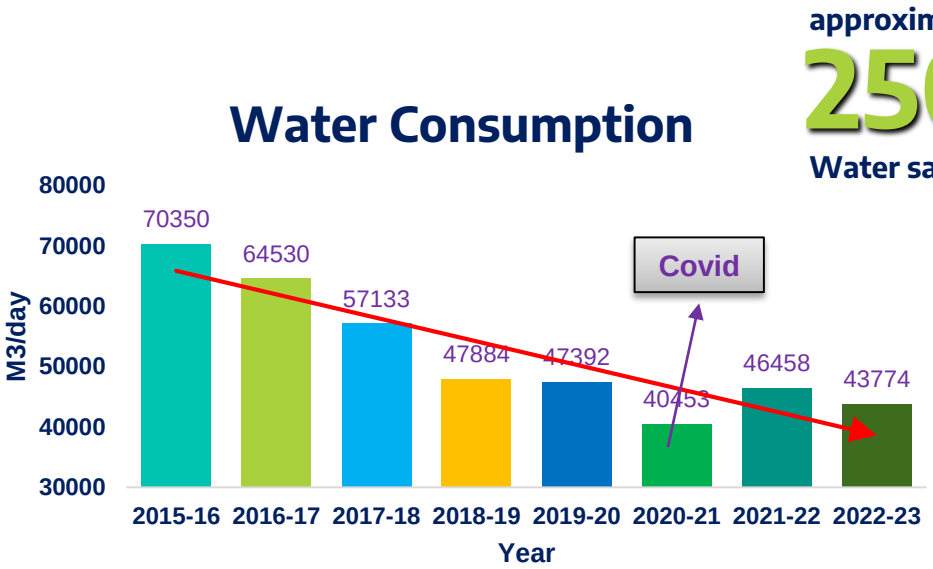
2147 kWH/day

Energy saved

Case Study-5 Systematic Water Distribution

Modified the fresh water Header with section wise water supply line. The pump speed control through VFD with pressure set point, resulted saving of fresh water & also easy to analyze the area of fresh water consumption variation.

Systematic Water Distribution



approximately

2500 M^3/day

Water saved

Proposals Under Consideration

A. Use of catalyst at furnace oil

- Catalyst break long chain hydrocarbons to lower weight hydrocarbons results to improve combustion.
- Higher temperature resistance.
- Reduce the fuel droplet size, improve atomization.
- Lower air requirement, higher combustion efficiency.

By using the catalyst, proposed reduction in fuel consumption by **3-4%**

B. Use of Thermal Resistance paint

- **Better heat resistant system where insulation is not possible like dryers side surface, Lime Kiln cell, MG side surface.**
- **Reduced heating and cooling costs.**
- **Lower carbon footprint by minimizing energy use.**

Shell outlet temperature minimized by ≈ **10-14°C**

C. VFD at HT motors

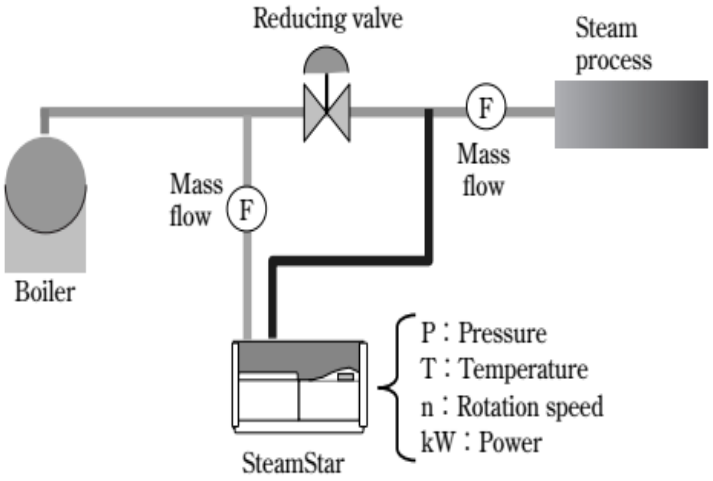
We have already installed VFDs on Boiler ID Fan and planning to provide VFD on boiler feed water pump.

Tentative savings of 650000 KWH/year with additional advantages as :
(Present HT Motor 860 KWH for Boiler feed water Pump)

- **Efficiency is around 98% compare to LT (95 %)**
- **More Life around 10 years compare to LT 7 years**
- **Harmonic issues are eliminated as compared to LT**

Advance Technology Adoption

A. Micro turbine in place of Pressure reducing valve



Micro Turbine : A new concept to utilize the steam ΔP to generate power through the auto system.

Advantages:

- **Power Generation**
- **Easy Auto System**
- **No Manpower**

B. Advance Process Control System

(Furnace oil optimization at Lime kiln)

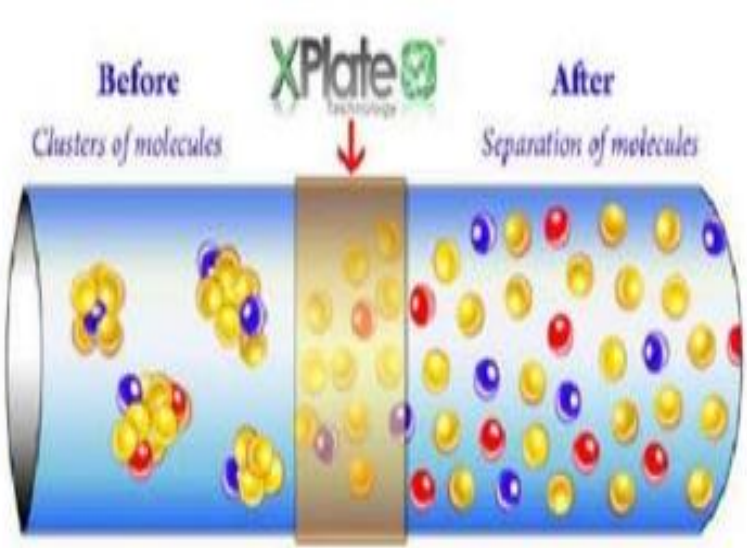
APC is multi-variable feedback control & Optimization system having several input & Output variables. The main objective of APC are

- Control of flue gas temperature
- Optimal control of ID Fan & Fuel,
- Control excess oxygen in the flue gas and maintain the lime quality.

Possibility of **3-5%** reduction of fuel consumption, less variability in the amount of residual carbonate in the lime

C. X-Plate technology

The X Plate Nano Technology based on the separation of O_2 molecules from the clusters so that they are available for combustion



- Free Oxygen molecules are available for reaction with Carbon.
- Carbon Monoxide will reduce and the amount of O_2 present in air supply will be completely utilized for combustion.
- O_2 is completely consumed from the air supply giving Complete Combustion
- Reduction in Fuel consumption.
- Reduce NOx, Sox & CO2 emission (Ton/day)

Energy savings at a glance

Year	No of Schemes Implemented	Energy Savings achieved /Year	
		Steam (MT)	Electrical Units (KWH)
2020-21	13	33030	2224320
2021-22	9	2644	3478951
2022-23	16	2085	3661106
2023-24 (till Dec)	8	1632	1255984

Proposals under Consideration

No of Schemes Proposed	Tentative Energy Savings Per Year	
	Steam (MT)	Electrical Units (KWH)
17	14123	2174864

Conclusions

- Sustainable practices in terms of utility savings helps to reduce carbon foot print.
- Need involvement of AI to further optimize process .
- Proper analyze of the adverse impact if any prior to modified cooking aid or new systems.
- Use of Microturbines to take advantages against Delta P.

Thank You

Reduce- Reuse - Recycle