



Bilt Graphic Paper Products Limited, Unit- Bhigwan

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Bhigwan Mill Overview

- **Installed Capacity** - **3,15,000 TPA**
- **WGCC plant** - **1,25,000 TPA**
- **Power Generation** - **60 MW**
- - **Own Consumption - 24 MW**
- **ETP capacity** - **22500 M³/Day**
- **Manpower Engagement** - **1285**

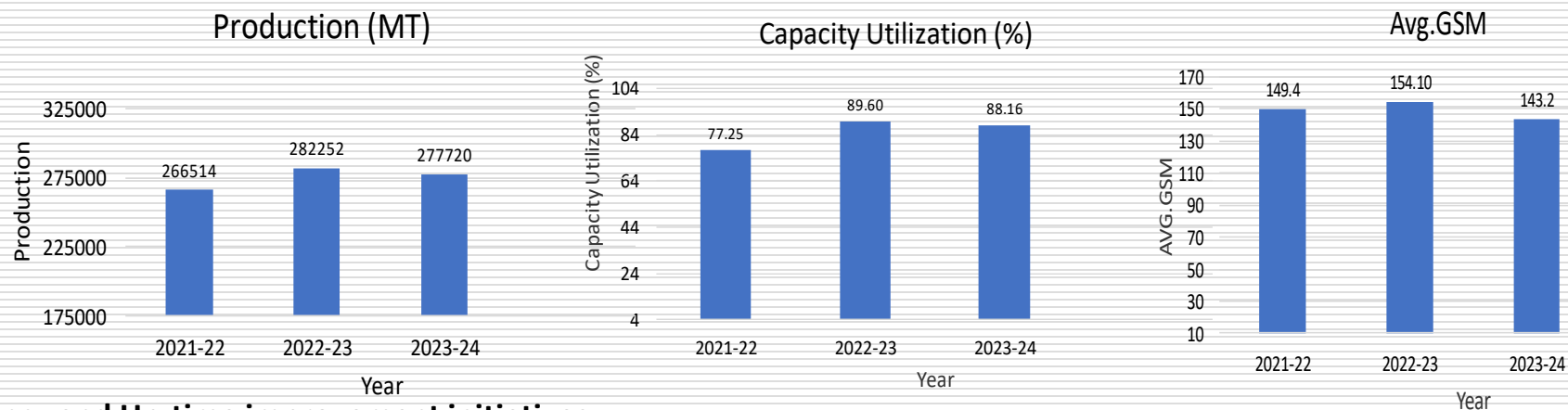
	PM-1	PM-2
Make	Voith	Voith
Year	1997	2009
Configuration	Top Former ; Off-Line Blade Coating	Top Former ; Tandem Shoe Presses On-Line Blade Coating – Jet Coaters
Deckle	3.2 M	4.8 M
Speed	900 M/min	1100 M/min
Capacity	1,55,000 TPA	1,60,000 TPA

Products

- **Art Paper (C1S)**
- **Art paper (C2S)**
- **Art Board (HB,HS,Satin)**
- **Digital**
- **CCK,**
- **Pigmented**
- **Flexible packing (C1S- SP)**

- **Installed Capacity – 3,15,000 TPA**
- **Non Integrated Operation**
- **Two paper Machines**
- **State Of The Art Technology DCS,QCS ,PLC and fully automated plant**

2-Specific Energy Consumption : Production Details

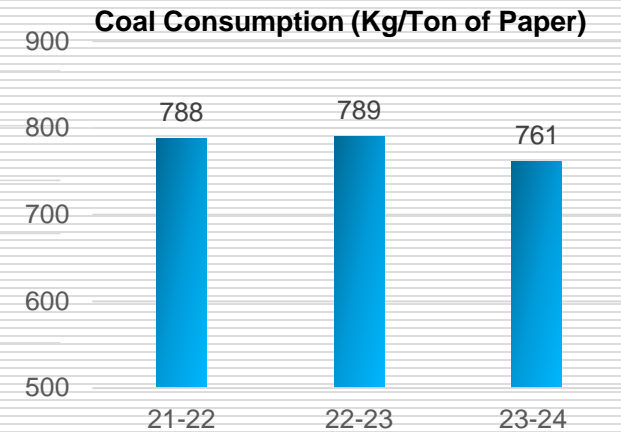
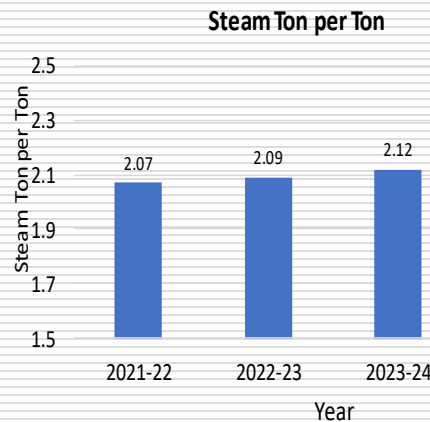
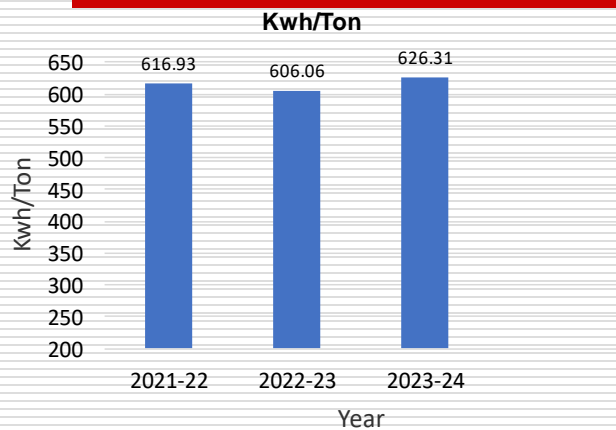


Efficiency and Up-time improvement initiatives :

- Upgradation of ACV700 Drive system to ACS800 Drive system of DTC technology in PM-1 :Investment Rs 500 Lacs
- Upgradation of Yokogawa DCS - centum CS(Unix system) to Centum VP System. Investment-Rs 400 Lacs
- Upgradation of OMC QCS System- Yokogawa BD measurement system to Valmet direct coating measurement system. Investment –Rs 450 Lacs
- Upgradation of PMC and OMC IBS Reel turn up - RCS3000 system to latest RCF5000 technology to improve roll change over on the machine. Investment: Rs 110 Lacs
- Upgradation of Supercalander drive control system from analog to digital technology. Investment : Rs 125 Lacs
- Installation of sheet cutter to increase the sheeting capacity in PM-1 Line .Investment – Rs 425 Lacs
- Upgradation of CCK Papcel system from Windows XP to Windows 10.Investment : Rs 275 Lacs

Inspite of more lower basis weight production ,paper machine production performance- and volumes are maintained.

2-Specific Energy Consumption : Electrical and Thermal



Energy initiatives to reduce the Specific Energy Consumption:

- **Technology improvement to address obsolescence .**
- **Reduction in idle running of the machine :**
 - Interlocks provided to stop the equipment when machine is shut
 - Standard documentation and improvement in visual system
- **Reduction in Wastages:**
 - Zero leakage in steam, air and water.
 - 100% steam and condensate pipelines are insulated.

Coal consumption

- Reduced by increasing boiler efficiency
- Energy conservation initiatives reduced Mill power consumption from 26MWH to 24MWH

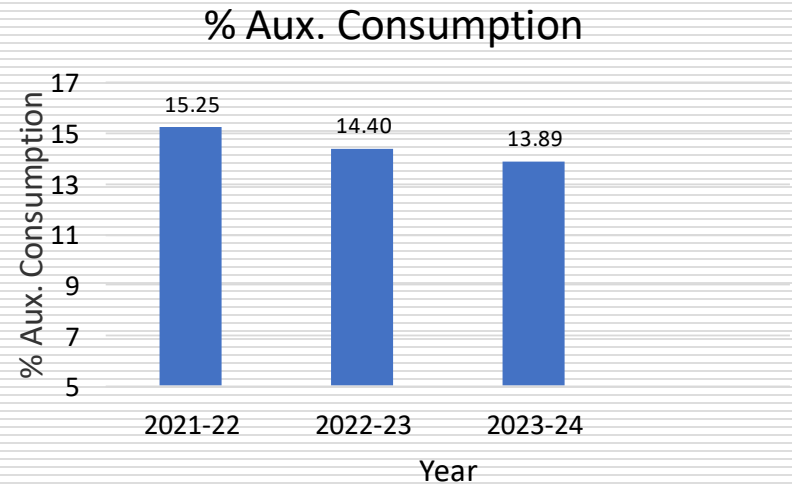
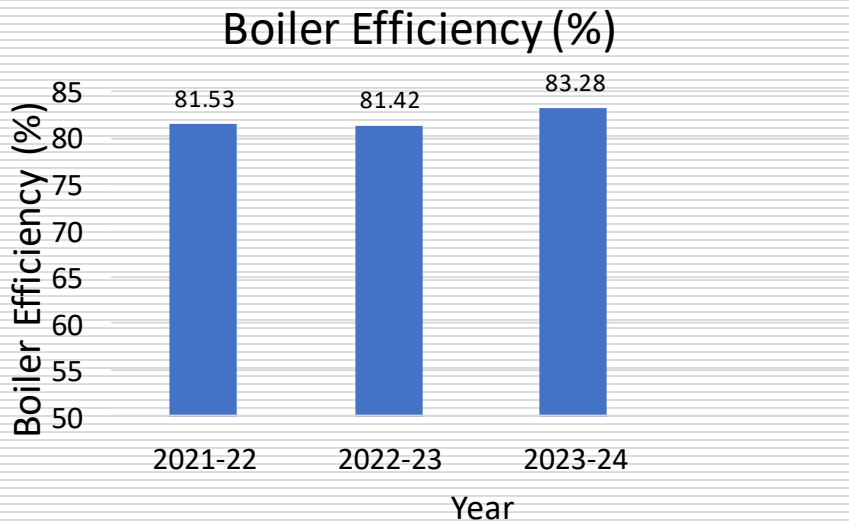
Energy Cell:

-Energy cell having cross functional team members to identify energy conservation opportunities in the mill

• **Procurement:**

-Only Energy efficient products are procured like star rated fans, air conditioners, LED lights and energy efficient motors etc

2 - Specific Energy Consumption :Boiler Efficiency and Aux Consumption



- In year 2023-24,Boiler efficiency increased by 1.86 % as compared to 2022-23
- Reduction in O2 level from 4.5% to 3.5%
- Increase of combustion efficiency by optimizing and close monitoring boiler operating parameters.
- Optimization of boiler auto-combustion loop.
- Condensate and Flash steam recovery from all steam traps.
- Reduction in unburnt losses & radiation losses.
- Heat recovery from bottom ash to heat DM water.
- Coal quality monitoring through third party.

- In year 2023-24,Auxillary consumption reduced due to various energy conservation initiatives
- Trouble free operation of Power plant
- Reduction in compressed air consumption in ESP ash conveying system by reducing air pressure from 7.0 kg/cm2 to 4.5 kg/cm2.
- Reduction in coal handling plant running hours from 16 hours to 12 hours per day by upgrading the crushing and screening equipments.
- Increase of awareness and training to employees by OEM for better efficient operation of the plant

3 - Benchmarking : Specific Energy Consumption

- Bilt Graphic Paper Products Unit-Bhigwan is non integrated coated paper Mill operating on purchased pulp.
- Hence data is not available for one to one comparison for benchmarking.
- However our paper machine is having online coating machine with latest technology and energy efficient equipments in the plant.

3 - Bench Marking :List of Major Encon Project planned for 2024-25:

- Installation of 6MW solar power plant in the premises.
- Installation of Higher efficiency pump at Condenser cooling water pumps at cooling tower
- Modification of Boiler feed pump No 2 by de-staging two stages
- Installation of Higher efficiency pump at Condenser Extraction pumps
- Modification in Re-reeler trim blowing system in PM-1
- Replacement of GRP Fan with FRP fan in cooling tower No. 2
- Installation of VFD at PMC-1 Air turn
- Installation of VFD at hood and ventilation system in coating machine.
- Replacement of Conventional Lights with LED Lights

3 - Bench-marking: Target and achievement

- Bilt Graphic Paper Products Unit-Bhigwan is given target of 0.3488 MTOE/Ton under PAT Scheme.
- Target achieved till Mar-24 is 0.3192 MTOE/Ton
- There is reduction of 9.3 % Energy as compared to target.
- However we are having further reduction of SEC target reduction@ 1% every year.
- We are in the process of implementing Energy Conservation opportunities in the plant to reduce it further,

4 - Summary of Projects implemented in last three years.

Year	No of Energy saving projects	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
FY2021-22	07	29.77	3.32	0	21.58	16.6
FY2022-23	12	47.38	4.81	1256	34.44	10.9
FY2023-24	10	35.93	6.54	3825	50.18	8.6

4 - Summary of Projects implemented in last three years:

Name of Energy Projects (Year FY 2021-22)	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in month)
Installation of MIST Cooling Tower for Power Plant	28.0	3.09	0.0	20.09	16.70
Replacement of Conventional Lights with LED Lights-364 Nos	1.77	0.20	0.0	1.29	16.46
Reduction in idle running of off machine coater due to splice failures	0.0	0.03	0.0	0.19	Immediate

4 - Summary of Projects implemented in last three years:

Name of Energy Projects (Year FY 2022-23)	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
Replacement of three Nos old screw compressors with one centrifugal compressor	38.2	2.49	0.0	16.21	28
Replaced HP line insulation to reduce heat loss. Saving - 299 MT coal /Annum	2.0	0.0	1256	3.14	8
Optimization of ECT power generation by nozzle fine tuning through OEM	0.25	0.09	0.0	0.59	5
Replacement of Conventional lights with LED Lights-688 Nos	3.83	0.58	0.0	3.78	12
Installation of energy efficient pump and VFD in the plant	3.10	0.35	0.0	2.28	16

4 - Summary of Projects implemented in last three years:

Name of Energy Projects (Year FY 2023-24)	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
Installation of additional LP Steam line of lower pressure of 2.5 Kg/cm ² to cater the need of lower pressure steam in post dryer section of PM-1.	18	2.94	0.0	19.1	11
Modification of Boiler feed pump by de-staging two stages	3	1.72	0.0	11.2	3
Additional power generation through Energy Conservation Turbine by supplying LP of 2.5 kg/cm ² to PM1 instead of 5.5 kg/cm ²	3	1.51	0.0	9.8	3

4 - Summary of Projects implemented in last three years:

Name of Energy Projects (Year FY 2023-24)	Investment (INR Million)	Electric al savings (Million kWh)	Therma l savings (Million Kcal)	Total Saving s (INR Million)	Payback period (in months)
Recovery of Energy from the Flash steam of Off machine coater steam and condensate system (Non condensable flash steam) otherwise it would have wasted in atmosphere	0.3	0	2688	5.38	0.6
Installation of VAM Chiller in PM-2 operating on LP Steam instead of MP steam to reduce the energy losses in PRV	7.8	0.15	1137	3.25	41
Replacement of Conventional lights with Energy efficient LED Lights	3.83	0.22	0	1.42	32

5 - Innovative Project 1 : Installation of MIST Cooling System

Initiative 1: Installation of Mist Cooling System :

Replaced old conventional induced draft wooden cooling tower with new technology of MIST Cooling System.

Technology Comparison

Old Technology	New Technology
Conventional type wooden induced draft cooling tower	Louver Type Mist Cooling System (LTMCS)
Require Cooling Fans – 3 Nos	Does not require Cooling Fans
High Fan Power Consumption – 270 KWh	Zero Fan Power
More pumping power – 678 KWh	Less pumping power – 517 KWh

Benefits Achieved :

- Savings in Fan Power : 270 KWh
- Savings in Pumping Power : 116 KWh
- Total Saving : 386 KWh
- Installation Cost : Rs 290 Lacs
- Monitory Benefit Achieved : Rs 200 Lacs / year
- Payback period : 1.5 Years
- Performance : Very Good



Conventional Type Cooling Tower



Louver Type Mist Cooling System

5 - Innovative Project 2 : Installation of Centrifugal Compressor

Replaced old three Nos screw type air compressors with energy efficient new single Centrifugal Air Compressor.

Technology Comparison

Old Screw Compressors	New Centrifugal Compressor
Two stage screw compressor	Three stage Centrifugal Compressor
Qty. Installed : 3 Nos	Qty. Installed : 1 No.
Require more space with 3 individual air dryers.	Requires less space due to single skid with air dryer
High Noise Level	Less Noise Level
Total Power Cons : 1334 KW	Total Power Cons : 950 KW

Benefits Achieved :

- Savings in Power : 297 KWh
- Installation Cost : Rs 382 Lacs
- Monitory Benefit Achieved : Rs 162 Lacs / year
- Payback period : 2.4 Years
- Performance : Very Good



Old Screw Compressors – 3 Nos



Centralized single Centrifugal Compressor

5 - Innovative Project 3: LP steam line modification

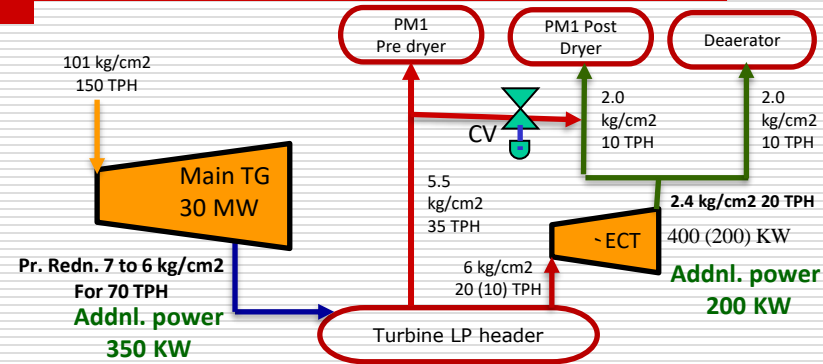
Old system

➤ Energy Conservation turbine.

- Supply of 2.5 KG/cm² pressure steam @10TPH from 6 Kg/cm² pr.
- to deaerators after generation of power through ECT
- Power generated 180-200 KWH

➤ LP Steam Line

- PM-1 requires LP steam 5.0Kg/cm² pre-dryer section and 1.5-2.0 kg/cm² steam in post dryer section.
- To meet PM-1 LP steam 5.0 Kg/cm² & 2.0 kg/cm² demand 6.0-7.0 Kg /cm² pressure was supplied from power plant.
- To meet increased production capacity of PM-1 steam pressure and volume requirement increased . Pressure drop in LP line increased from 0.4 kg/cm² to 1.2 kg/cm²



System after modification:

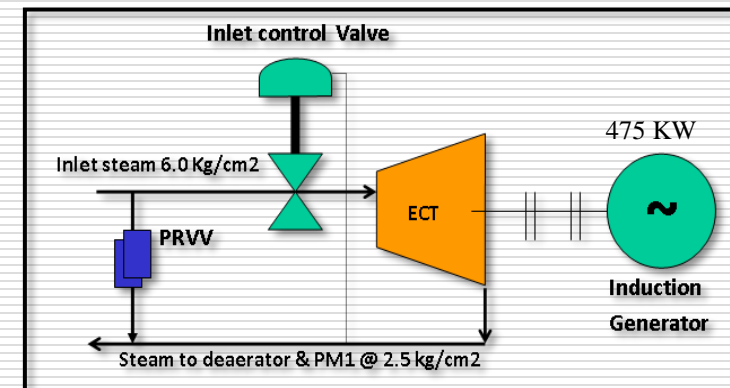
- To meet PM-1 2.5 kg /cm² steam requirement new stem line of 600 meters provided. 2.5 kg/cm² steam supplied from power plant after power extraction from ECT from 6.0kg/cm² steam.
- Pressure drop in old LP steam line reduced from 1.0 kg/cm² to 0.4 kg/cm².
- Turbine LP extraction set point reduced from 7.0 kg/cm² to 6.0 kg/cm². As a result TG power generation increased by around 350 to 400 KW.

Saving:

Net increase in energy extraction from turbine and ECT : 530 KWH

Investment : Rs 180 Lacs

Saving : Rs 289 Lacs



6a- Future initiative : Utilization of Renewable Energy sources (Onsite)



- 6 MW Solar plant in our premises.
- Technical discussion and site selection completed.
- We do not have pulp mill in our plant, hence no black liquor is being generated.

6b - Utilization of Renewable Energy sources (Off site)

Our Cogeneration CPP is commissioned before 01/04/2016, hence 9% target is given as composite. The details of compliance is given below:

Year	Fossil Fuel Consumption (MU)	RPO Obligation @ 9%	REC Required to purchase (Nos)	REC Purchased for Compliance (Nos)	RPO Status
FY 2021-22	188.65	16.969	16979	16979	Complied
FY 2022-23	189.07	17.016	17016	17016	Complied
FY2023-24	214.07	19.267	19267	19267	Complied

7 - GHG Inventorisation

Year	Scope 1 emission Kg/T of paper	Scope 2 emission Kg/T of paper	Scope1+Scope 2 emission Kg/T of paper
FY 2021-22	1185.41	79.28	1264.69
FY 2022-23	1193.96	99.29	1293.25
FY2023-24	1219.77	21.26	1241.03

Target and Action Plan:

- Reduction of 1% every year with the help of implementation of Energy conservation opportunity.
- Installation of 6 MW Solar plant inside the premises
- Our plant is operating based on purchased pulp, one to one unit is not available for comparison.

8 - Waste Utilization and management:

1 – ETP Sludge:

Year	Type of waste Used as fuel in boilers	Quantity (MT)	GCV (Kcal/Kg)	Energy from Waste as a percentage of total energy consumed (%)
FY 2021-22	ETP Waste sludge	2438	500	0.28
FY 2022-23	ETP Waste sludge	2680	500	0.29
FY2023-24	ETP Waste sludge	1855	500	0.20

2 – Fly ash, bottom ash & Pond Ash

Particulars	UOM	2021-22	2022-23	2023-24	Total
Pond Ash Sale	MT	57186	57142	45745	1,60,073
Bottom Ash Sale	MT	11350	7770	3390	22,510
Fly Ash Sale	MT	35568	35774	45684	1,17,026
Revenue earned	Rs Lacs	169	310	212	691

- 100 % fly ash & Bottom ash sale to Cement & brick manufactures, for Road construction and to ready mix concrete.
- 100% pond ash of period 1998-2009 are also sold to cement industries during last three years.

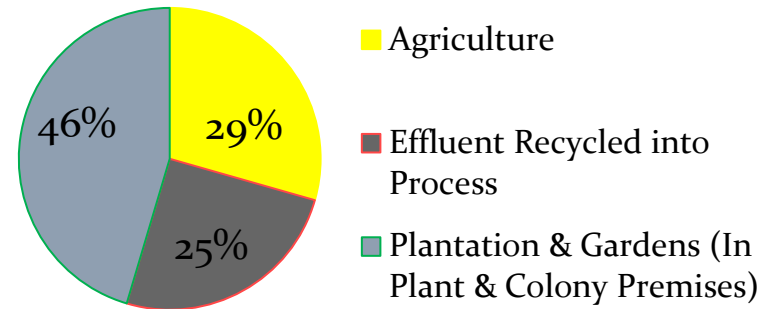
8 - Waste Utilization and management: B) Liquid waste

ETP Treated water : 5 stage state of the art Effluent treatment plant :

Incoming Effluent			Treated Effluent Distribution		
Year	Effluent generated in lacs m ³	Effluent treated in lacs m ³	Process lacs m3	Plantation lacs m3	Water given to nearby Farmers lacs m3
2021 - 22	30.30	30.30	5.82	18.14	6.21
2022 - 23	33.01	33.01	7.13	18.88	6.85
2023 - 24	27.44	27.44	6.87	12.39	8.03

Particulars	MPCB Norms	Bhigwan
COD	120 ppm	20 to 36
BOD	10 ppm	1.2 to 2.6
TSS	10 ppm	2.5 to 4.6
PH	7 to 8.5	7.6 to 8.0

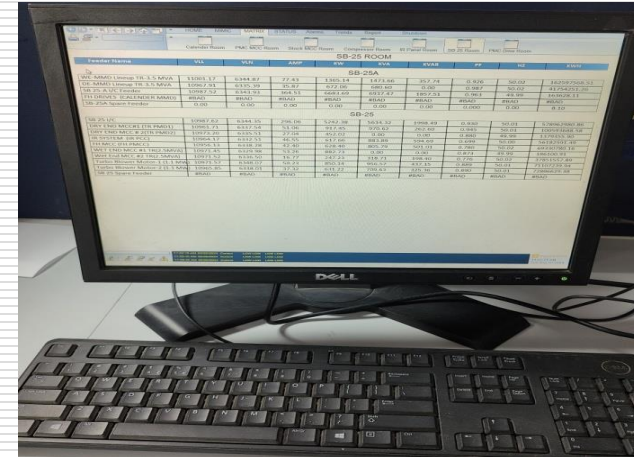
Treated Effluent Water uses



9 - EMS System and other requirements

Electrical :

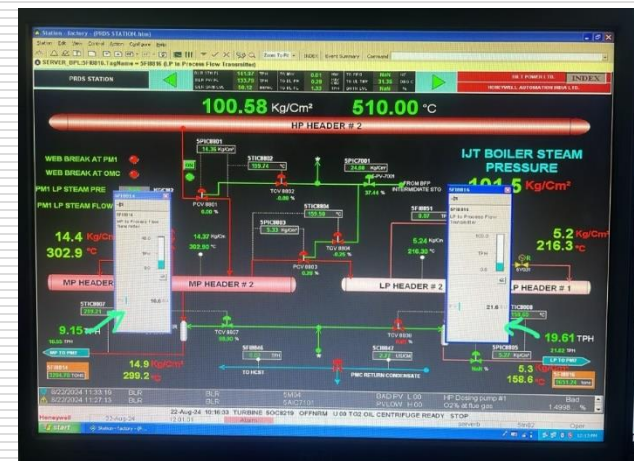
- Electronic energy meters are connected thru online Energy monitoring system.
- Real time Data from EMS is made available online to all users to monitor and controlled
- Harmonics and power factors are measured and controlled from the energy system as well as from active harmonic filter.



Online Energy Monitoring System

Thermal :

- Steam Pressure and temperatures are controlled as per paper machine demand.
- Condensate recovery is measured and monitored.
- Thermal energy loss due to leakages, radiation and venting are monitored and controlled.



DCS Monitoring System

9 - EMS System and other requirements

We are ISO Certified company.

- ISO 50001:2018
- ISO 14001:2015
- ISO 9001: 2015
- ISO 45001:2018



Management of Energy conservation programs



**Brain storming on
Energy Conservation Day**



**Prize Distribution Energy
Slogan competition**



Training on ISO 50001



**Energy Cell Meeting
In Conference Hall**



**Environment day
celebration**

Various Awards received during last three years



Achieved First Prize in Best Boiler User Award 2020



Achieved First Prize in Best Boiler User Award 2022



Received State Level Energy Conservation Award for the performance year 2022-23

Thank You

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