CII National Award for Excellence in Energy Management

JK PAPER Ltd, Unit: JKPM,Rayagada

VISION

To be a trusted industry leader enriching lives and creating a better future

MISSION

Deliver sustainable solutions & profitable growth through:

- Digitalization and Innovation
- Cost Competitiveness
- Customer Centricity
- People and Community care
- Outstanding & Agile Talent

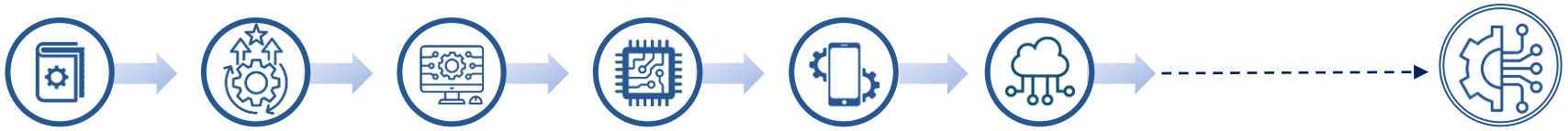
CORE VALUES

- Caring for People
- Integrity including Intellectual Honesty, Openness, Fairness and Trust
- Commitment to Excellence

2024

Creating Lasting Impression

Harnessing Technology for Growth



1962 — PM-1

1970 — PM-2

1988 — Coating Plant | LFB | ETP

1995 — 5.4 MW-TG | 12 MW-TG

1998 — PM-4 | WILLS Cutter-2 | RDH

2001 — PM-3 | PM-5 | PD-Plant

2004 — WILLS Cutter-1 | New Coating Plant | Lime-Kiln

2007 — WILLS Cutter-3

2008 — New Expansion

2013 — Pet-Coke

2014 — Centralize -Refiner | 3.4 MW-TG

2016 — MeOh Plant

2018 — LEAP-200

2020

2024

2021

• *Phased Out Plant*

CLIMATE GROUP
RE100

POWERING PROGRESS WITH RE100

Proud to be the **first Indian paper** company to join this initiative, leading the way in **sustainable energy and making every impression a green one**

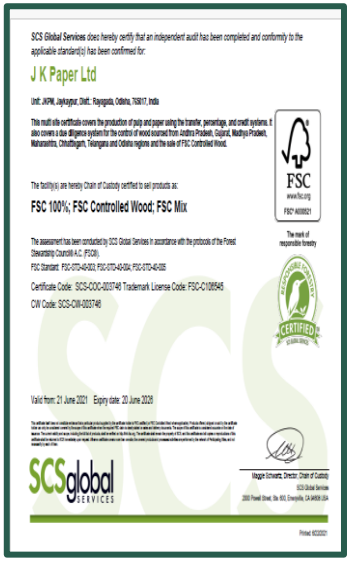
Commitment to Excellence

ISO 9001:2015

ISO 14001:2015

ISO 45001-2018

FSC



On – Going

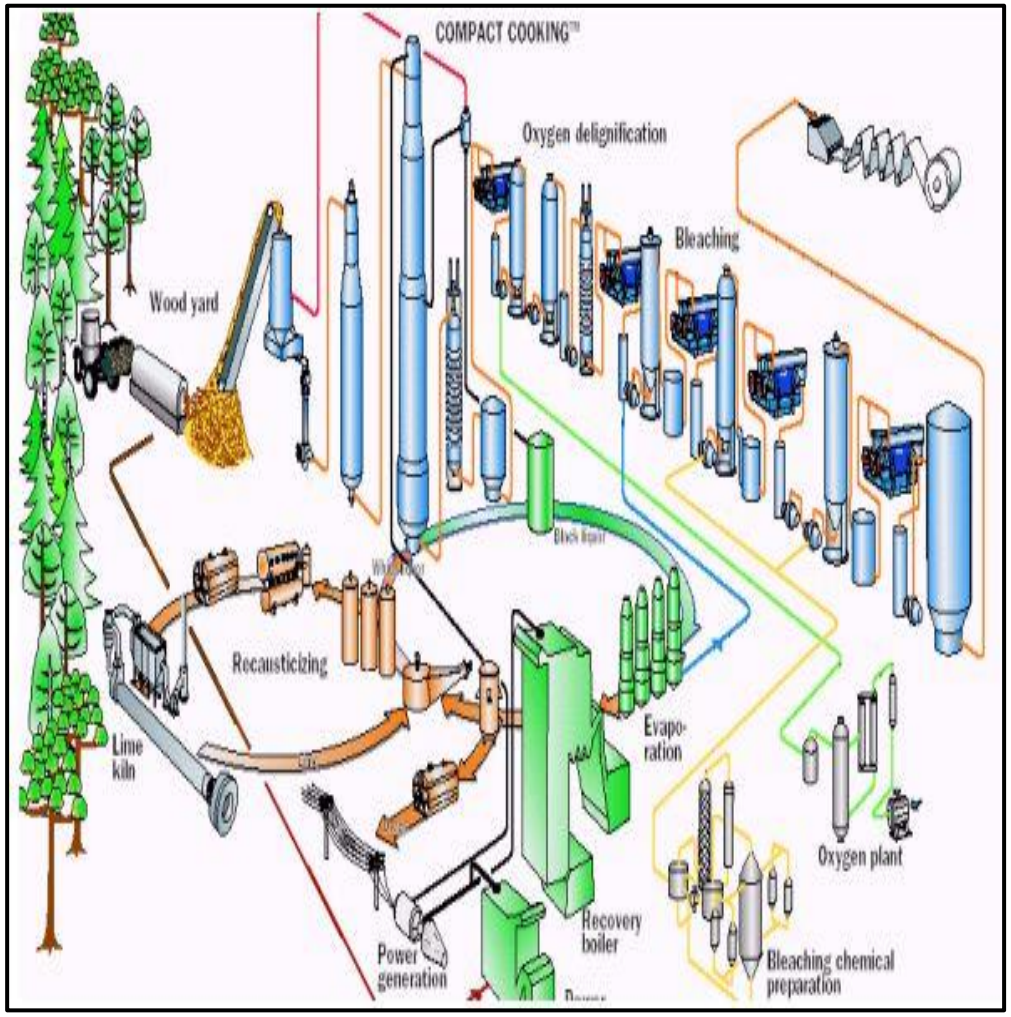
ISO 50001

Proposed Certification Audit – **January-2025**

Up – Coming

CARBON FOOTPRINT
ISO 14064-1 VERIFIED

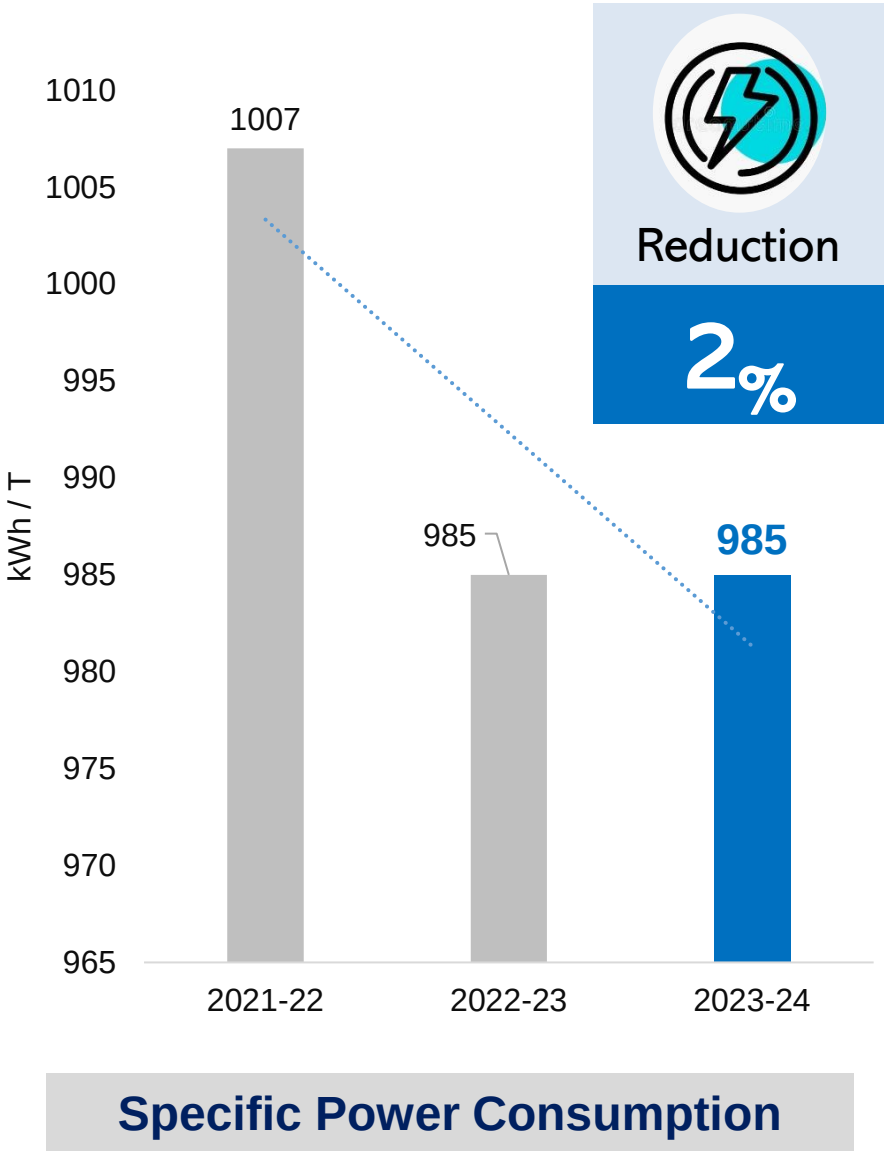
PROCESS FLOW



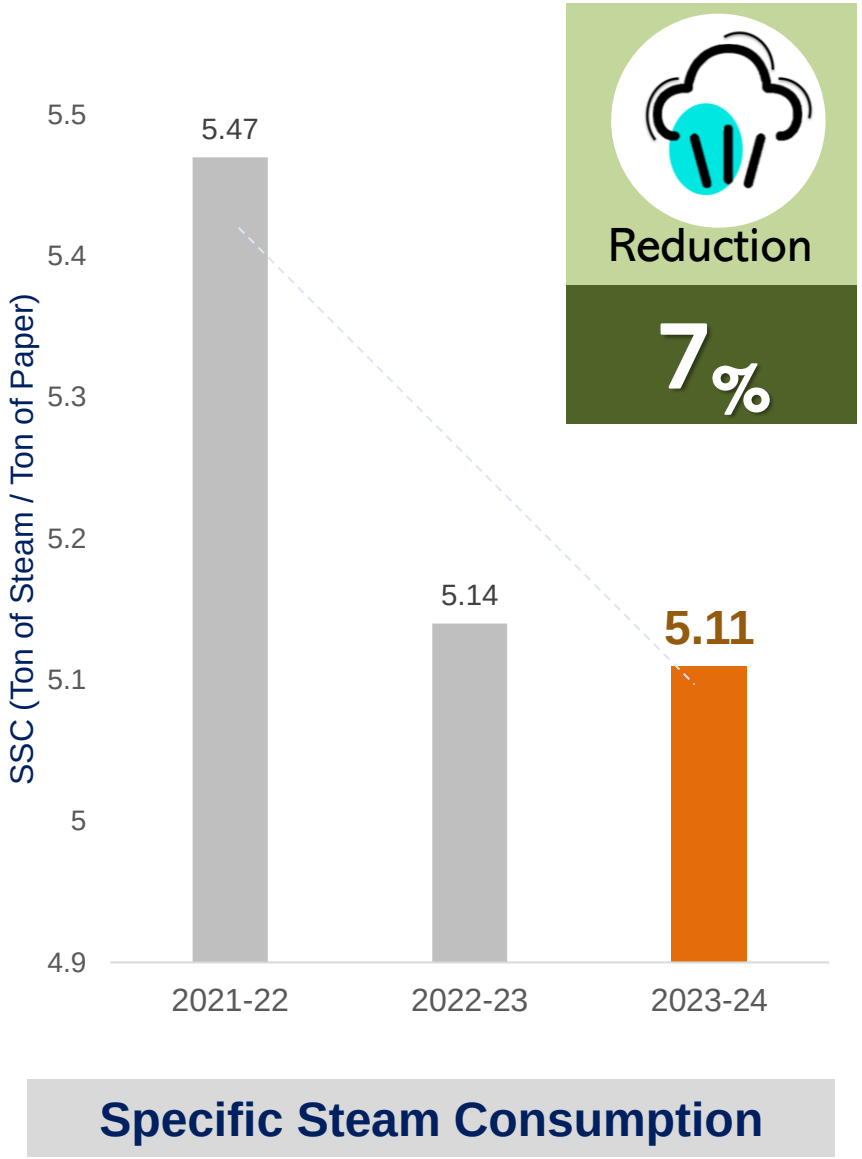
Pulp Mill *Capacity (Bleached Pulp)	**Capacity Utilization**
2,35,000 TPA	**104 %**
Soda Recovery (Solids)	
1,400 TPD	
Paper Machine *Capacity	**Capacity Utilization**
3,20,000 TPA	**103 %**
Power Block	
58.4 MW	

*Revised Capacity FY-23-24

Sp. Energy Consumption



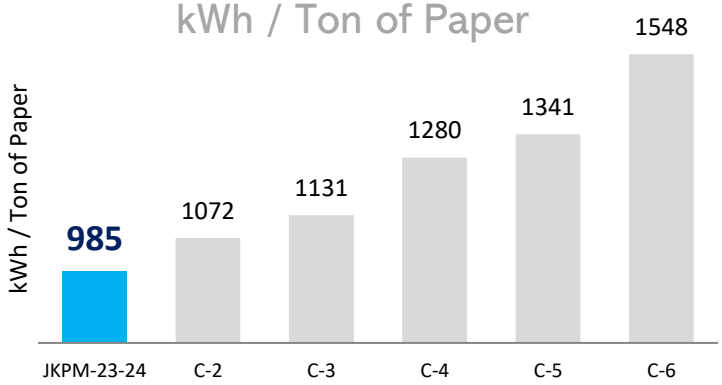
Specific Power Consumption

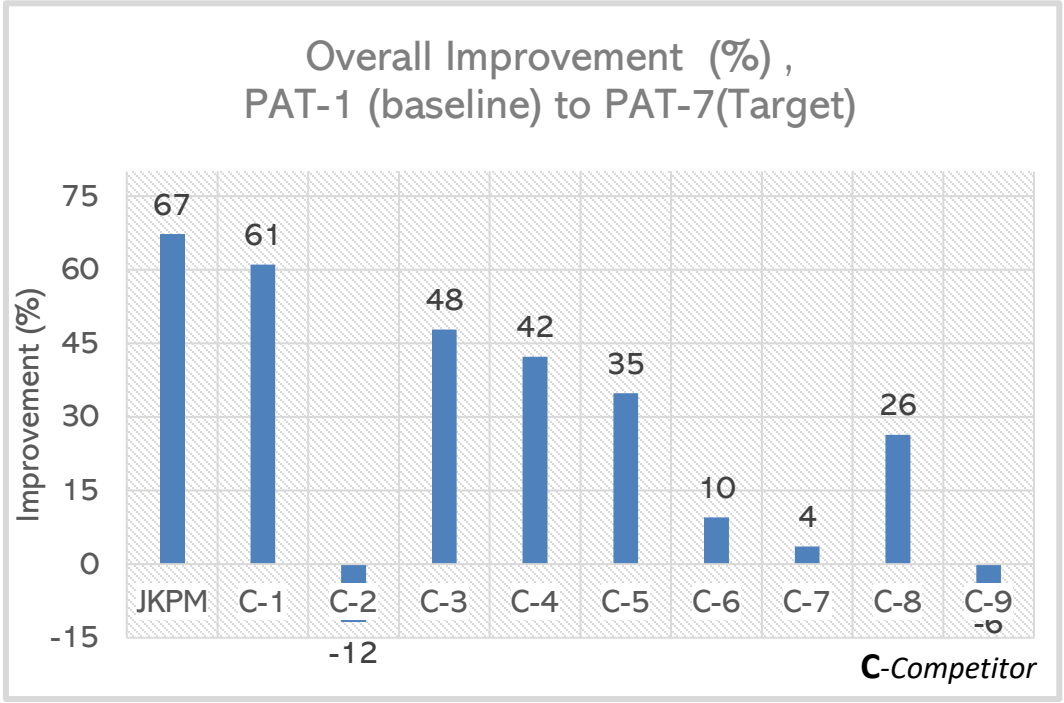


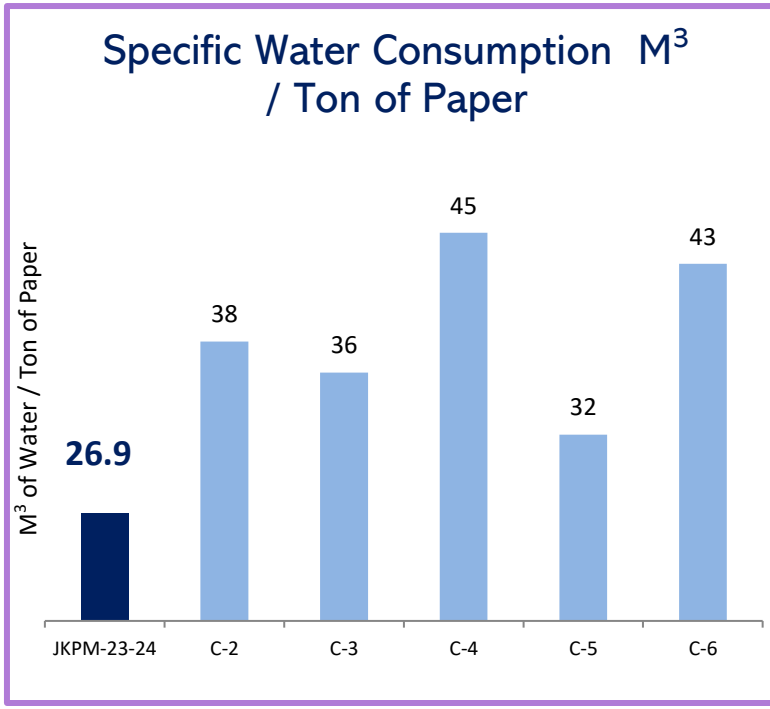
Specific Steam Consumption

Competition and Benchmark

	SPC (kWh/T)	SSC (T/T)	SWC (M^3/T)
	985	**5.11**	**26.92**
Global Best	1000-1100	7.0-9.0	Lowest among Indian Industry
National Best	1400-1500	12.0 -13.0	







* Data source- PAT gadget

* Data source-CPPRI 2018-Wood Based Mill Global & National Best Figures & 22-23 CII sectorial Presentation data

*CII

Major Encon Projects planned FY 2024-25

Electrical Energy Saving — **350 Lakh kWh**

Thermal Energy Saving — **14,500 Million Kcal**

Equivalent Coal Savings — **12,324 MT**

Average payback is

< 2 Yrs.

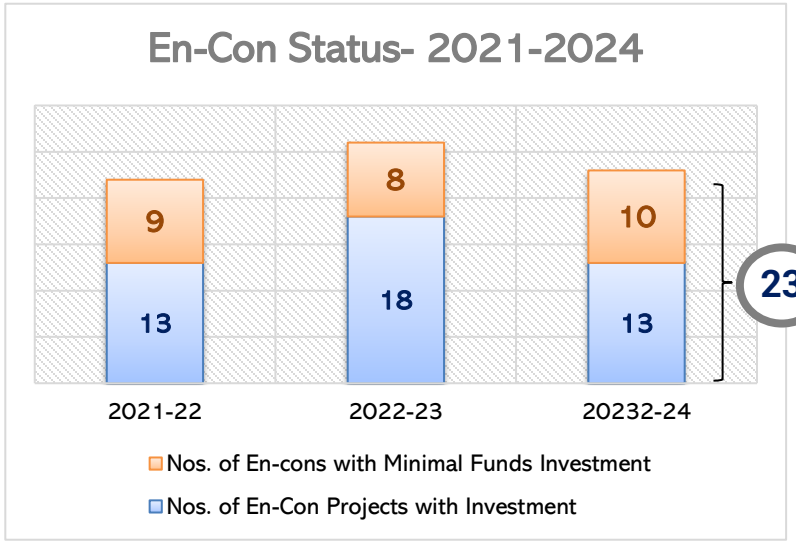
Sl.No.	Proposed EnCon	Project description	Annual Electrical Savings (kWh) Thermal Savings (MT of Steam)
1	ESP -Three Phase (3ϕ) High Frequency Silicon Rectifiers (HFSR) installation	Retro-fitment of Three Phase (3ϕ) High Frequency Silicon Rectifiers (HFSR) in place of single-phase TR set.	329 Lacs kWh, 25 MT of Steam
2	Upgradation of DC Motors and drive with Energy Efficient AC system at Coating Pre-Reeler Machine.	Upgradation of DC Motors and drive with Energy Efficient AC system at Coating Pre-Reeler Machine.	19 Lacs kWh, 32 MT of Steam
3	HTPQR installation	Improvement of Power factor ,hence results increase in Green Energy share upto 2%.	2.48 Lacs kWh 27 MT of Steam
4	Intelligent Soot Blowing System & 3-Phase transformer for Process Optimization in Recovery Boiler.	optimize the soot blowing sequence to save high-pressure steam and enhance power efficiency and ESP performance, resulting in significant improvements in operational effectiveness.	22050 MT of Steam

18,617 tCO_2e

CO_2

The mentioned Major Projects are under nascent stage , the values are tentative and indicative only.

Energy Saving Projects implemented in last three years



Electrical Energy Saved (Million Units)

9.44

Thermal Energy Saved (Million Kcal)

24,519

Savings (t CO_2e)

10,218

Key Project 1

Stock Parameter Optimization through "CLC" *(Close Loop Control)*

Reduction (kWh/Day)	40
Savings (Rs. In lacs)	18

Key Project 2

"**Steam Saving**" through New technology Adoption " **Venturi Steam Traps**"

Savings (Steam MT / trap / Annum)	24
Emission of CO_2 Savings – MT / Annum	14.2

Stock Parameter Optimization through "CLC" *(Close Loop Control)*

Problem : There is continuous variation of pulp refining as no control over measurement where as control over refining load.

Need for Innovation

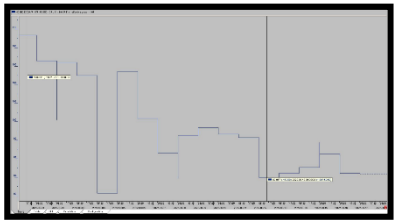
Process stability at wet end
Power saving

Action Taken

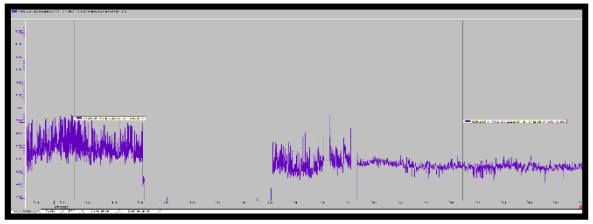
Freeness control logic has been provided and auto freeness control has taken into operation.

Benefits:

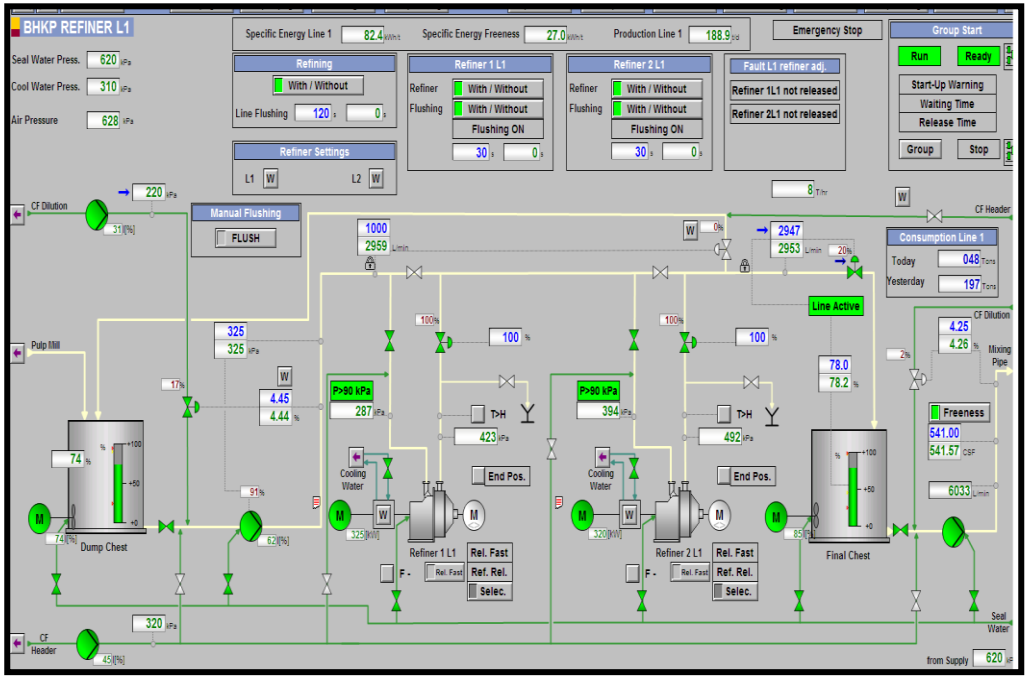
40kw/hr power saving/day
Refiner tackle life enhanced
Dewatering control in wire and press.
Tangible bnefit-17.88lacs /annum



Variations



Before Vs After



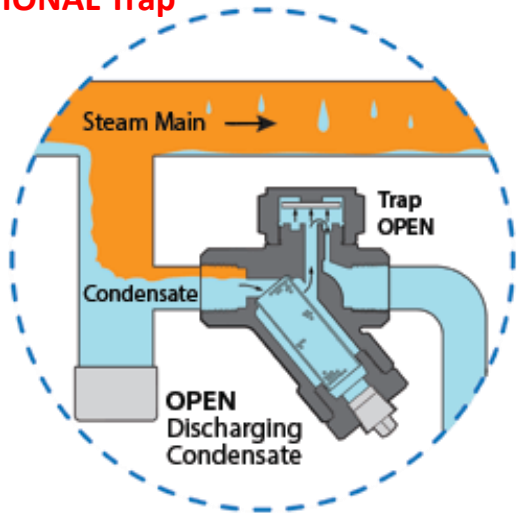
Contd.

After survey of 300 TD traps found there is continuous discharge of hot condensate and flash steam from 10-12% traps resulting in a loss of heat to the atmosphere, which cannot be recovered.

Need for Innovation

Heat recovery
Steam Saving.

CONVENTIONAL Trap



Flash steam generated

Steam	Pressure	Temperature	% Flash Steam
Medium Pressure	12 bar(g)	195°C	10.5
Low Pressure	4.50 bar(g)	160°C	17.6

Action Taken

Venturi steam traps installed against conventional steam traps.

In Venturi-Nozzle traps only hot condensate is discharged and the flash steam generated from the hot condensate is held back.

Location of Trap : Medium Pressure Steam line to Coating Plant , 12 kg/cm2 ,200°C

Trap Type	Initial mass of water (kg)	Initial temp of water (°C)	Finished mass of water (kg)	Finished temp of water (°C)	Increased mass of water (kg)	Increased temp of water (°C)	Heat Energy in the final condensate (kcal)
TD Steam Trap 20 NB	15.00	32.0	17.26	61.0	2.26	29.0	
	15.00	32.0	17.87	66.0	2.87	34.0	
	15.00	32.0	17.23	67.0	2.23	35.0	
Average	**15.00**	**32.0**	**17.45**	**64.7**	**2.45**	**32.7**	**633.6**
ARISITI Steam Trap - Size 20 NB with Nozzle-1	15.00	32.0	17.36	44.0	2.36	13.0	
	15.00	32.0	17.44	47.0	2.44	15.0	
	15.00	32.0	17.41	44.5	2.41	14.0	
Average	15.00	32.0	17.40	45.2	**2.40**	**14.0**	**291.1**

DURATION of TEST = 15 minutes

- Savings in Heat : 633 – 291 = 342 kcal
- Test Duration : 15 mins = 0.25 hrs
- Latent Heat of MP Steam : 471 kcal/kg
- Steam Saved / hours : 342 kcal / 0.25/471 = 2.91 kg/hour
- Annual Steam Savings = 2.91 x 24 x 350 /1000 = **24 Tonnes**

Reduction in yearly CO_2 Emission by 14.2 MT

Innovative Project : Category - B

Abnormality Alerts

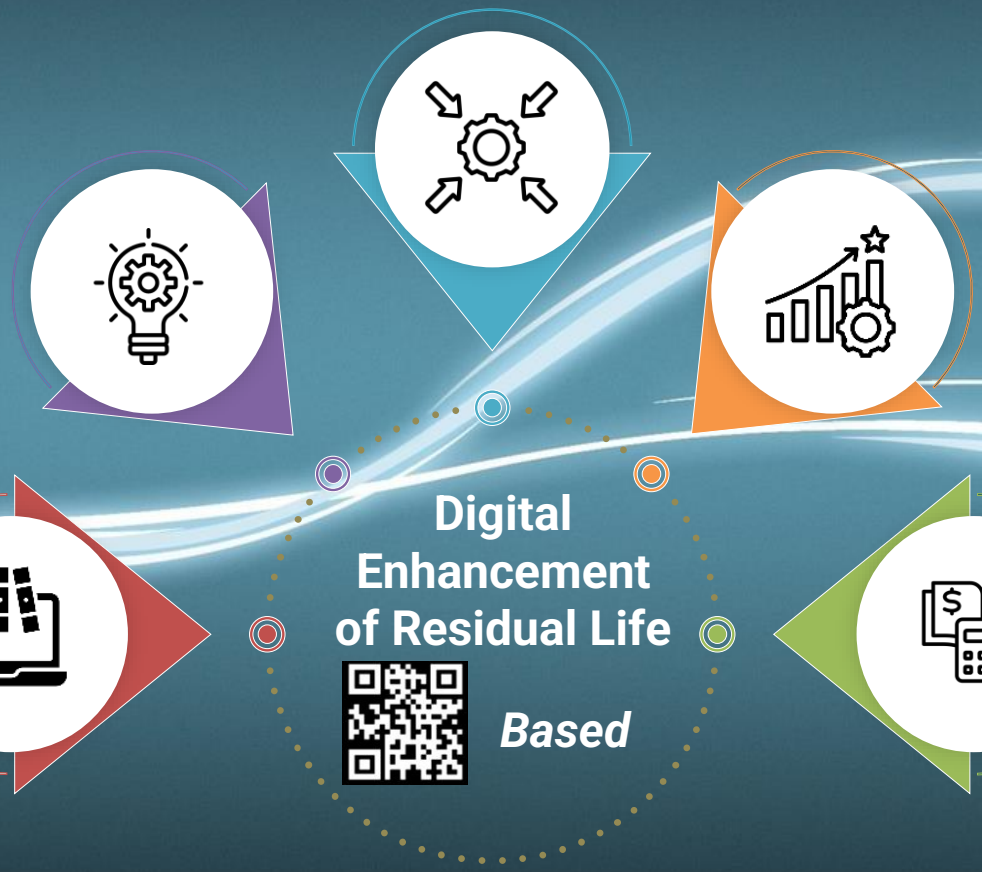
Instant alerts for deviations in equipment performance enable proactive maintenance and reduce downtime.

CBM and PM Through Tablets

Real-time condition monitoring and preventive maintenance tasks are efficiently performed using industrial tablets.

Improved Accuracy and Efficiency in Plant Operations

Digital checklists and real-time data capture enhance operational precision and efficiency.



Online Record Storage

Centralized, secure storage of all equipment data and maintenance records for easy access and retrieval.

Elimination of Manual Logbook Entries: Automated digital entries replace manual logbooks, reducing errors and saving time.

Orbital shift - in Culture

Need for Innovation

Manual System limitation,
High Manhour engagement.

Action Taken

- Customized Digital solution,
- “LLF” (Look, Listen & Feel) values are Digitally integrated,

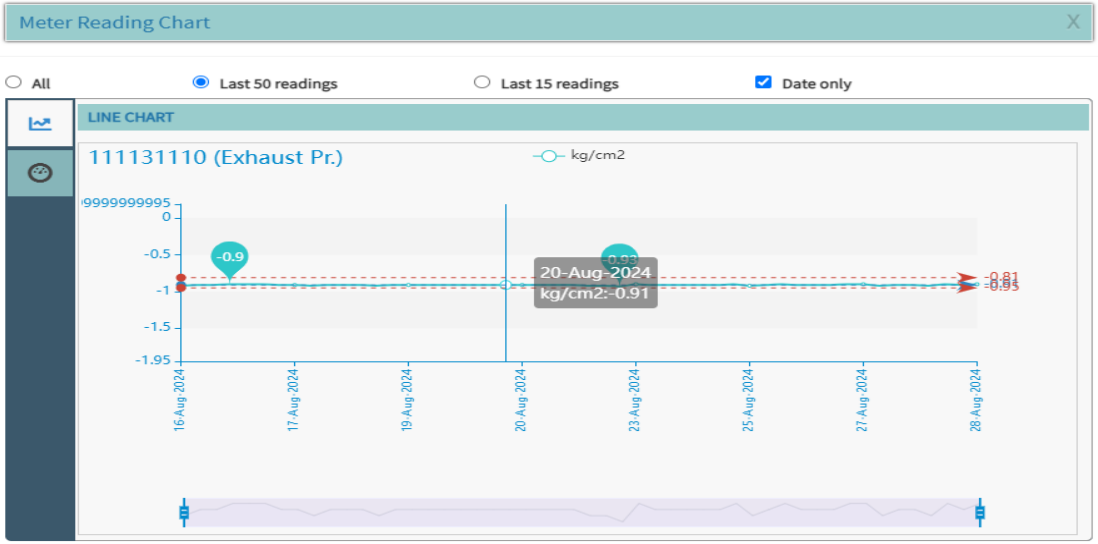
- **24,620 Plant Equipments** monitoring to be covered.
- Pilot project completed on March-2023,
- Presently 20% Equipment is under monitoring

Benifits

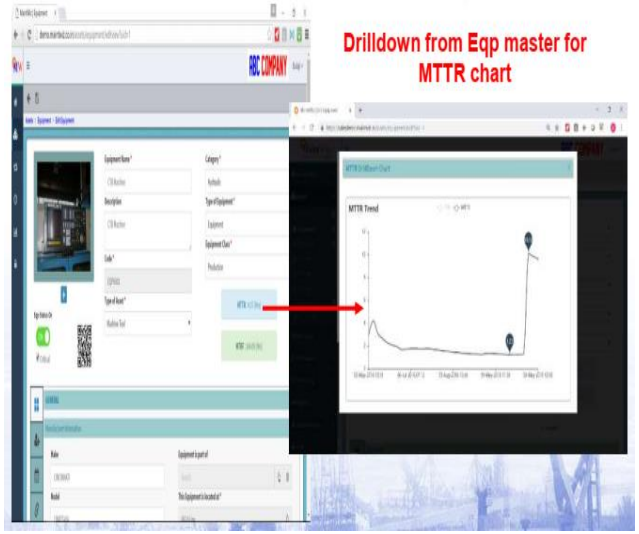
- Variance analysis and Integration of Messaging,
- Multifold monitoring increased,
- Future ready for “Augmented Reality”

Mobile Application

QR SCAN THROUGH TABLET



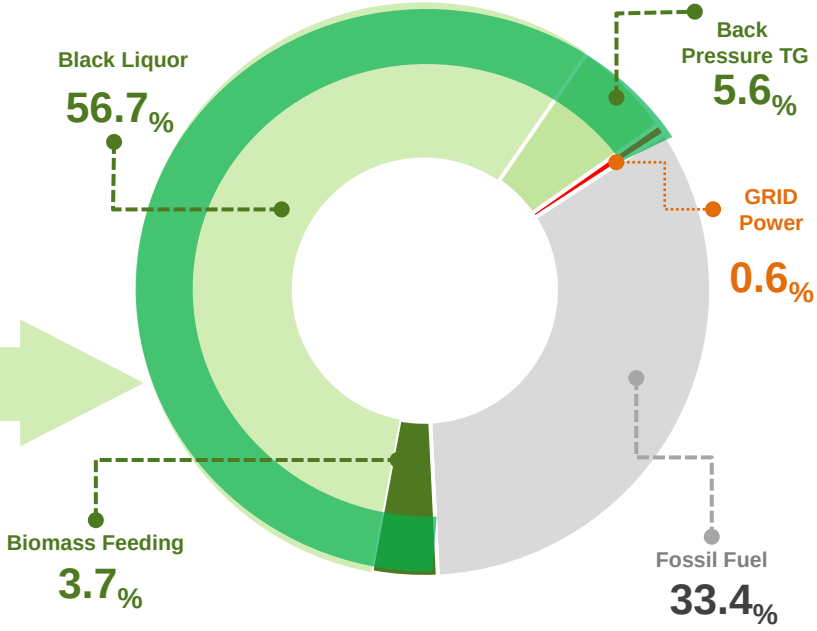
EQUIPMENT IDENTIFICATION



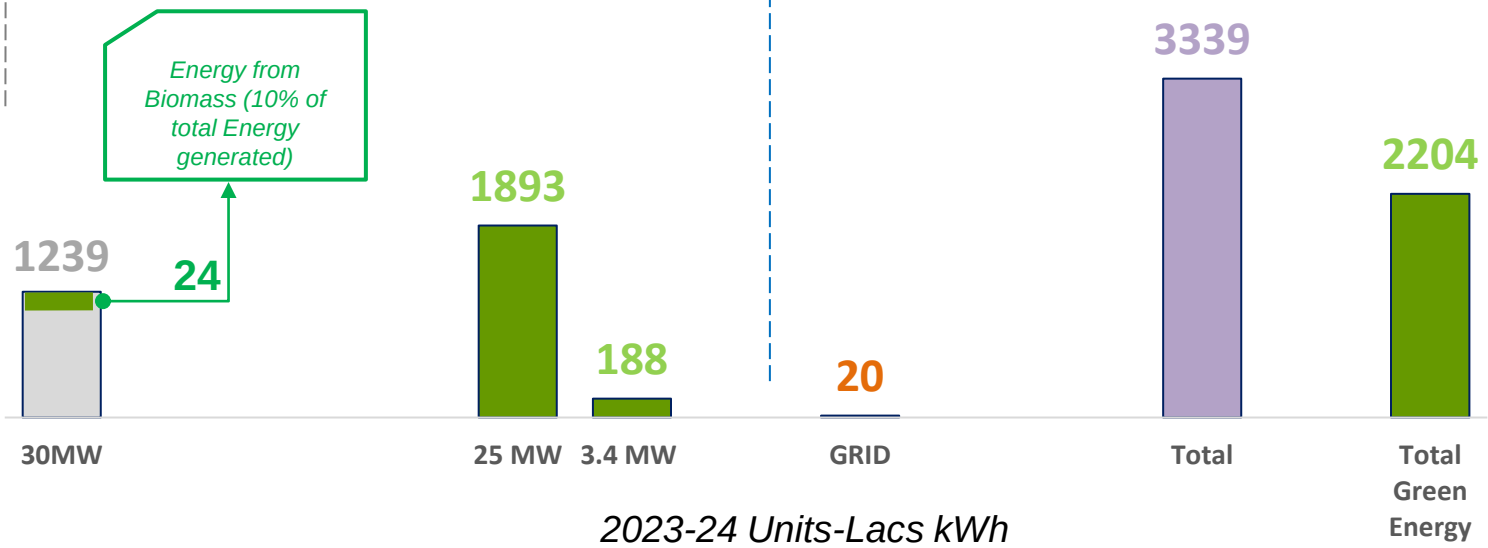
TREND ANALYSIS

JKPM - Energy Panorama

Power from Fossil Fuel	Green Energy	Purchased Power
33.4%	66%	0.6%

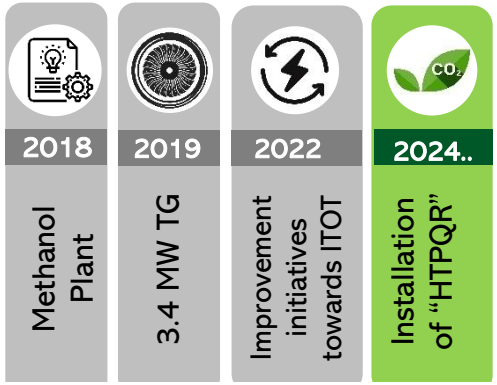


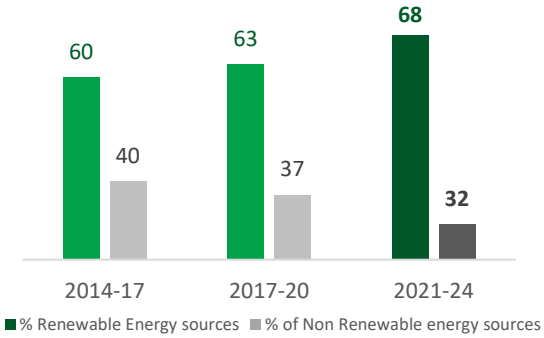
Own Generation



2023-24 Units-Lacs kWh

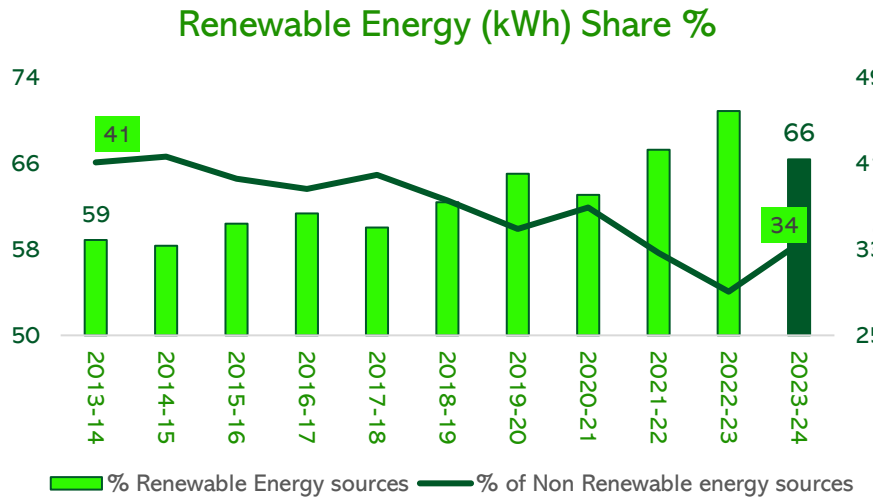
Utilization of Renewable Energy sources

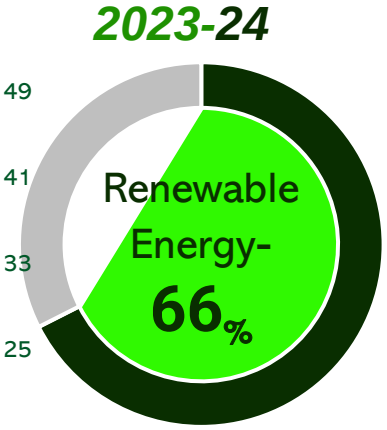




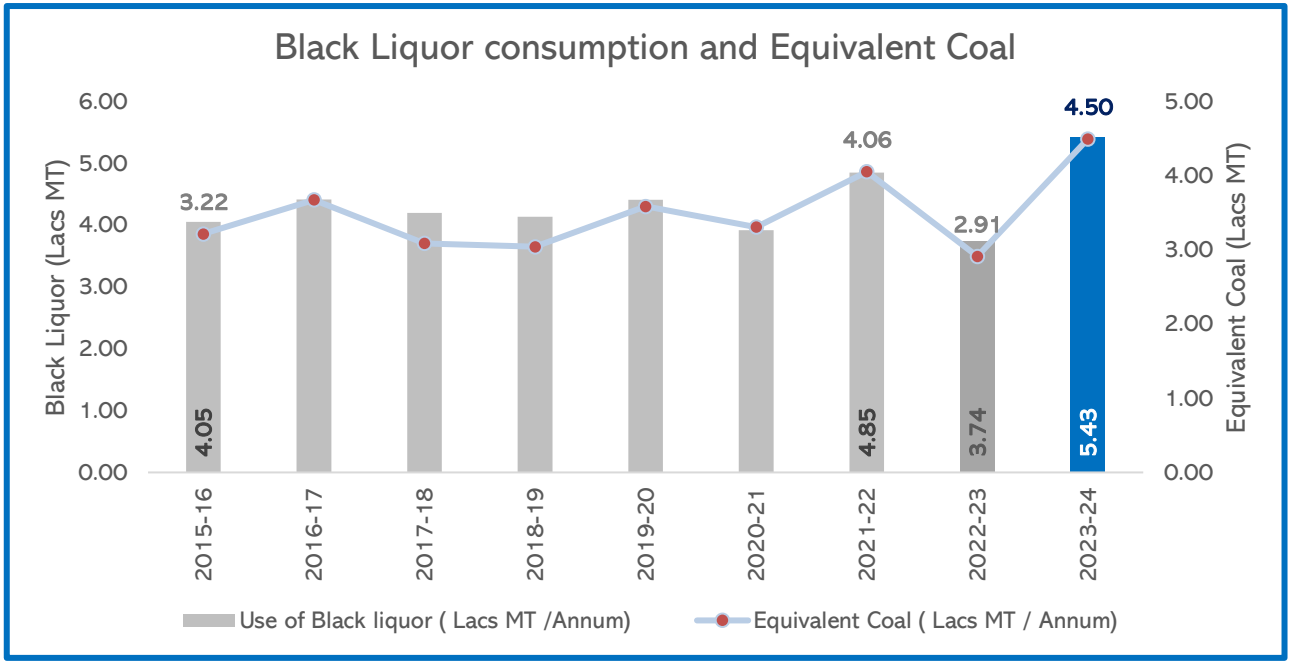
Renewable Energy Share increased over the Decade by

14%





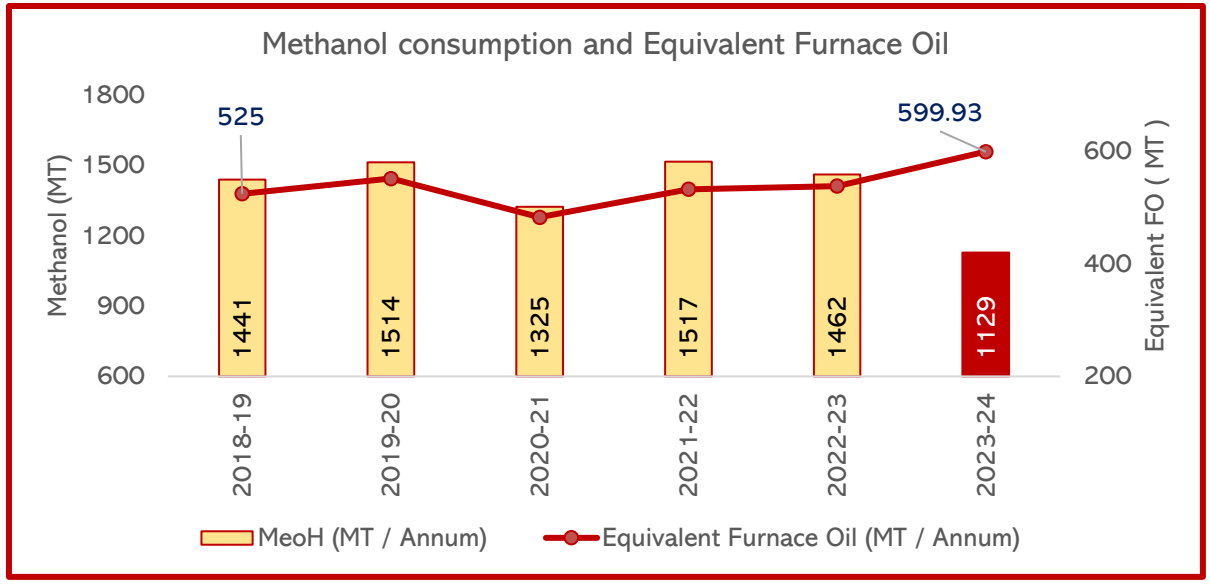
REC – 109906 Nos.

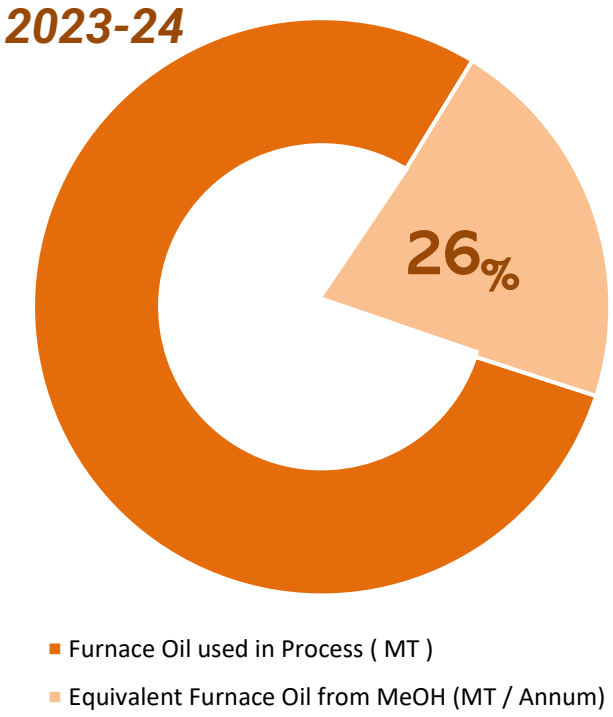


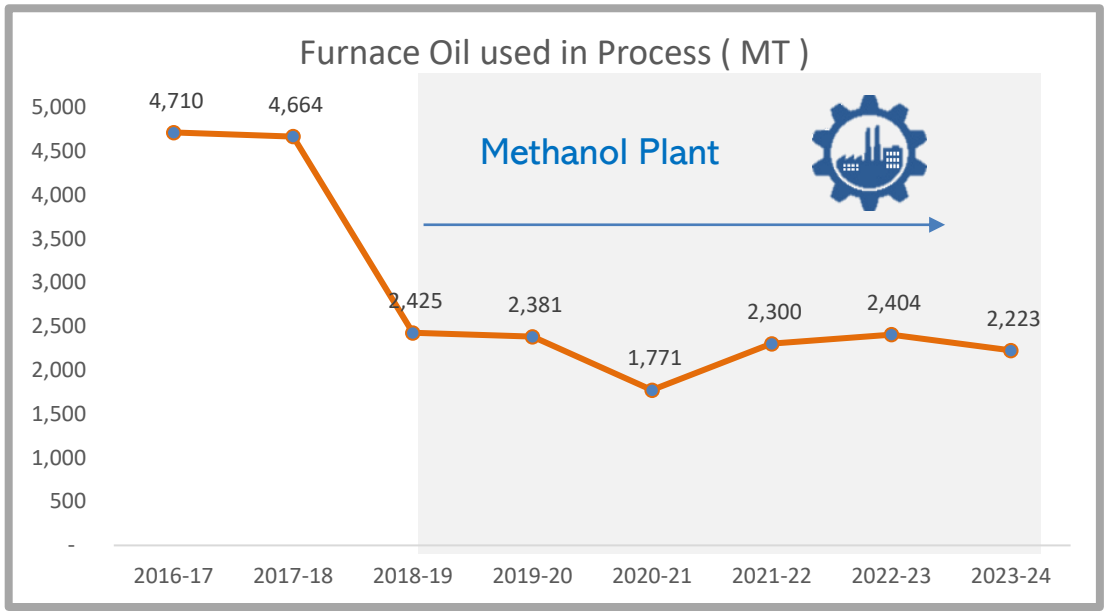
Utilization of Renewable Energy sources

Alternate Fuel Source increased (*equivalent FO)

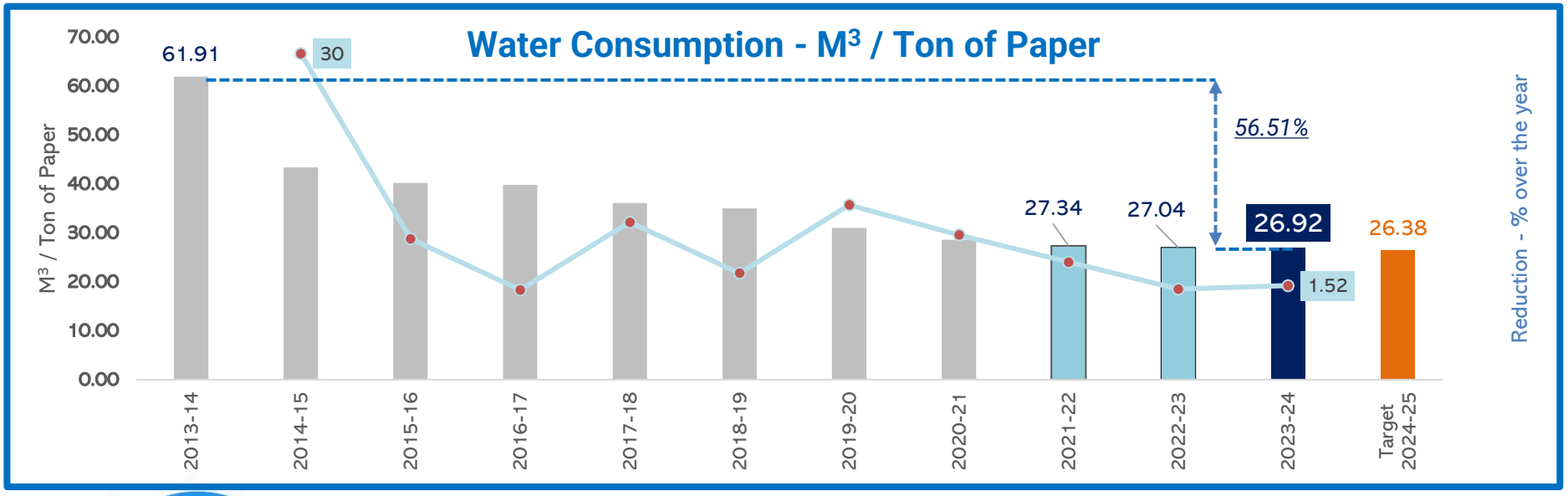
12.5%







Water Conservation



Specific Water Consumption

27 M³

Reduction (FY-2021-22)

2 %

Water Conservation

Annual Saving

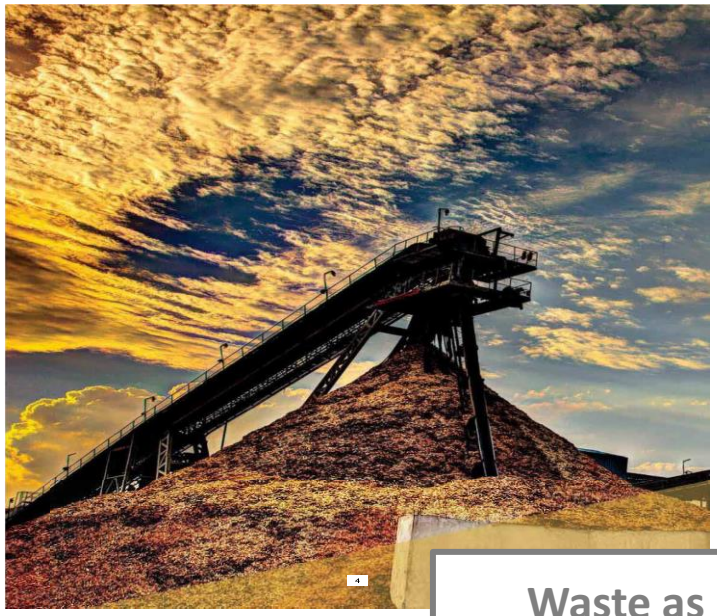
35,500 M^3

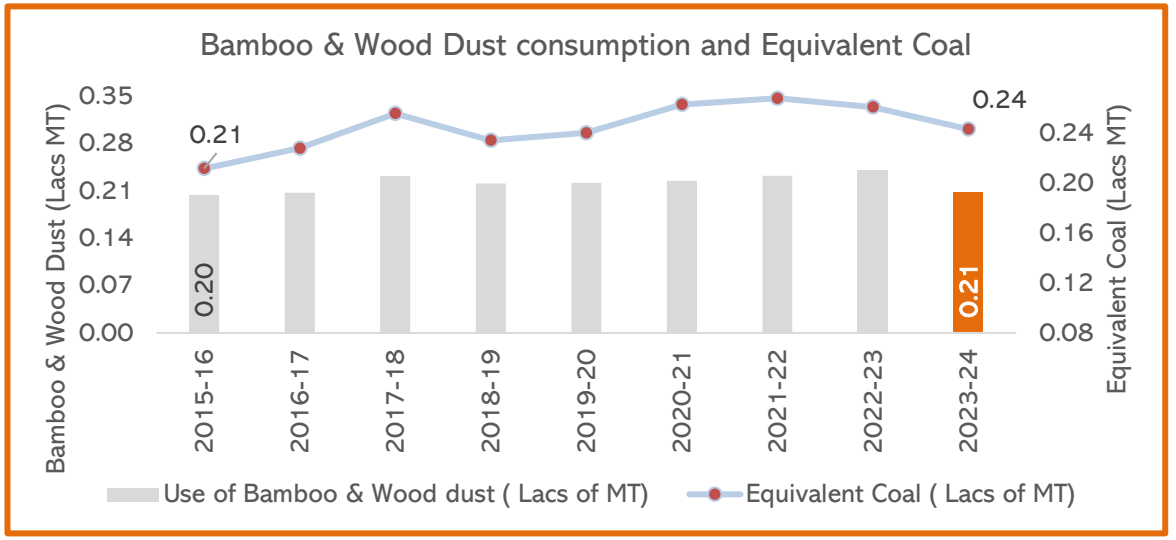
Average payback

< 2 Year

Water Conservation Major initiatives 2023-24		
Sl. No.	**Title of water saving project implemented**	**Annual Water Saving M^3/Annum**
1	In Pulp Mill, pump sealing water is now going to 3-cell cooling Tower as makeup. It is Proposed to use this pump sealing water in warm water tank (Pulp Mill) in place of fresh water and same quantity of treated STP water will be used in 3-cell cooling Tower as make up.	21,300
2	In Evaporator, 3-cell cooling tower recirculating water to be used for Evaporator pump sealing purpose in place of fresh water.	10,650
3	PM-6 Vacuum Pump Sealing water to be taken to Fibre Recovery Tank then to Reclamation Plant and then it will be used in pulp mill D1 washer in place of fresh water. This water was earlier going to drain then to ETP.	3,550

Utilization of Renewable Energy sources



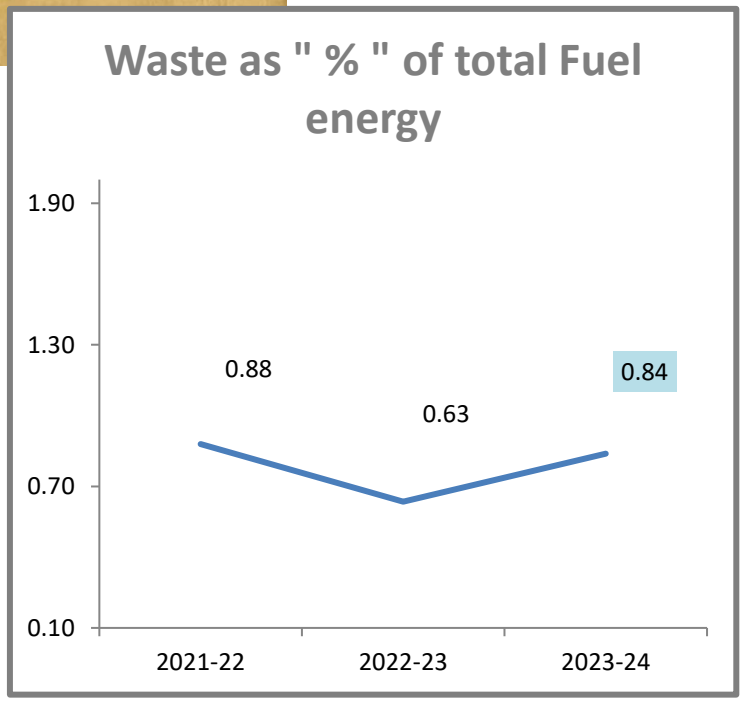


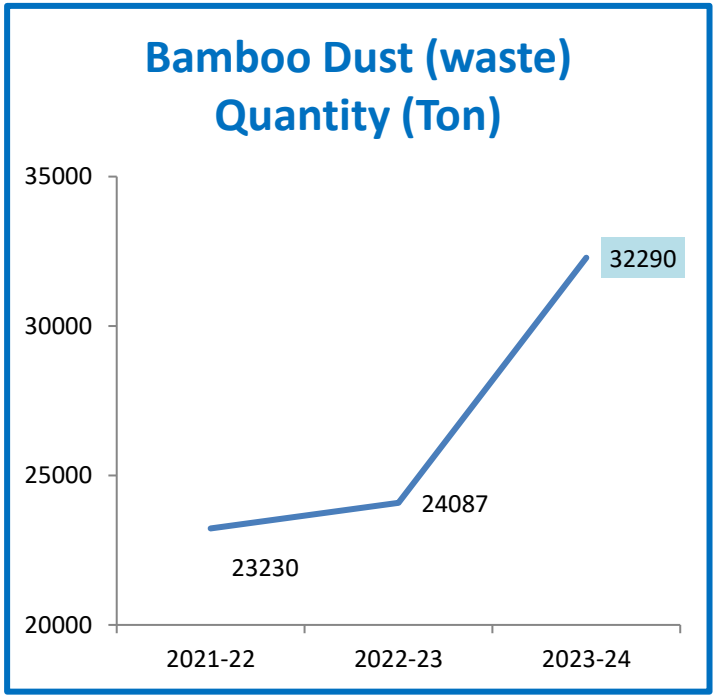
Equivalent Coal (MT)

3,921

Energy from "Waste"

0.84%





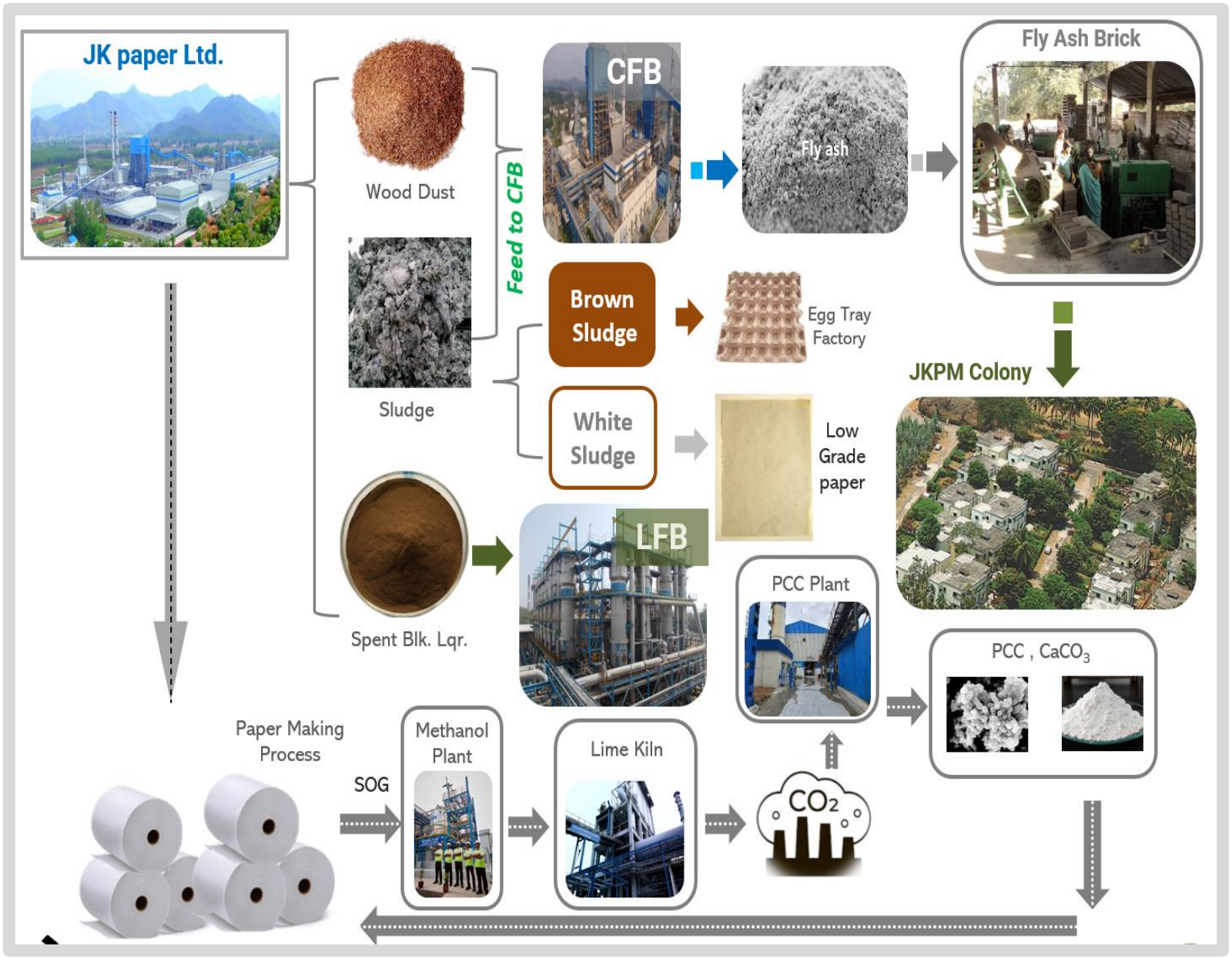
Waste Utilization and Management

Waste

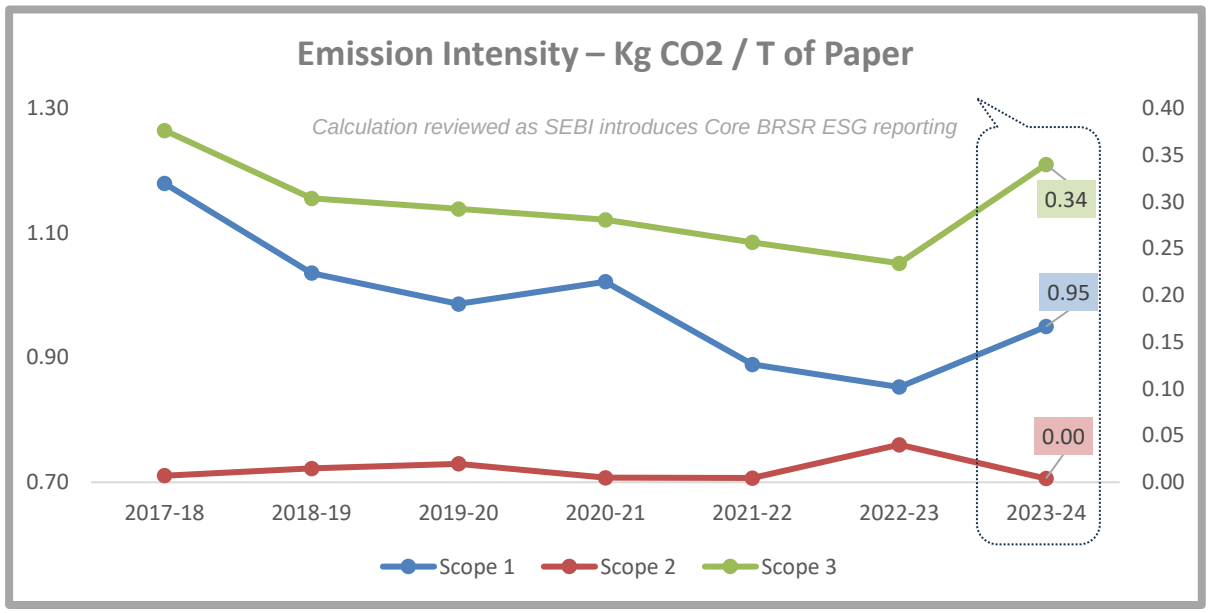
- Hazardous Waste
  - Used Oil
  - Used Batteries
- Other Solid Waste
  - Bamboo & Wood Dust
  - Fly Ash
  - Effluent Sludge
  - Lime Sludge

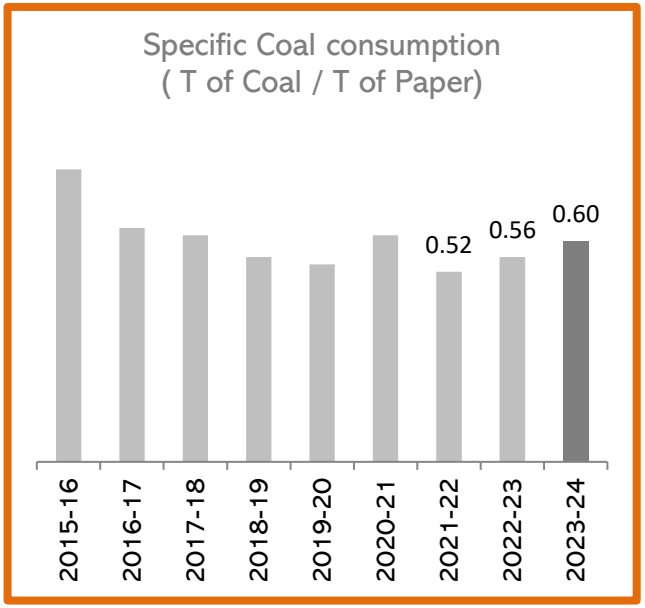
	Used Oil	Used Batteries	Bamboo & Wood Dust	Fly Ash	Effluent Sludge	Lime Sludge
Characteristic	Oil Emulsion	Pb Collection	Organic-96% Inorganic-4%	SiO2-62% R2O3-3% UBC-1.9%	Organic-55% Inorganic-50% Moisture-66%	Alkaline (Na2O)-0.48%
Method of Collection	Leak proof Container	Collected as such	Collected in Trolley /Trucks	Collected in Trolley /Trucks	Collected in Trolley /Trucks	Collected in Trolley /Trucks
Method of Disposal	Sold to Authorized Party	Buy Back system for Vendors	Used as Fuel in Boiler	Used 100% by Ash brick industry	Used for Cardboard/Low grade Pulp sheet by External Agencies	Reprocess at LMK to generate Lime and part quantities used in scientific landfilling at Low Laying Area
	21715 LTR (100 %)	270 Nos. of different capacities (100 %)	32290 MT (100 %)	73740 MT (100 %)	18285 MT (100 %)	1083 MT (68 %)

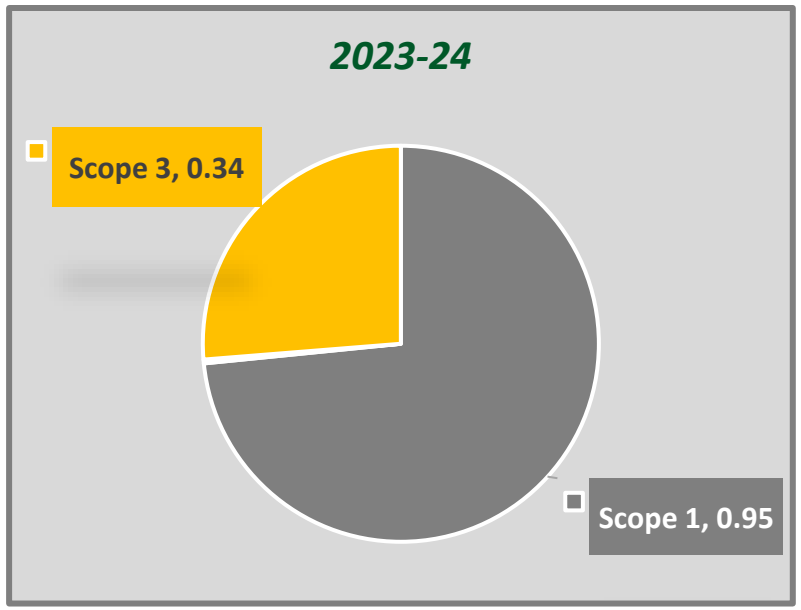
GHG Incentivization- JKPM Circular Economy

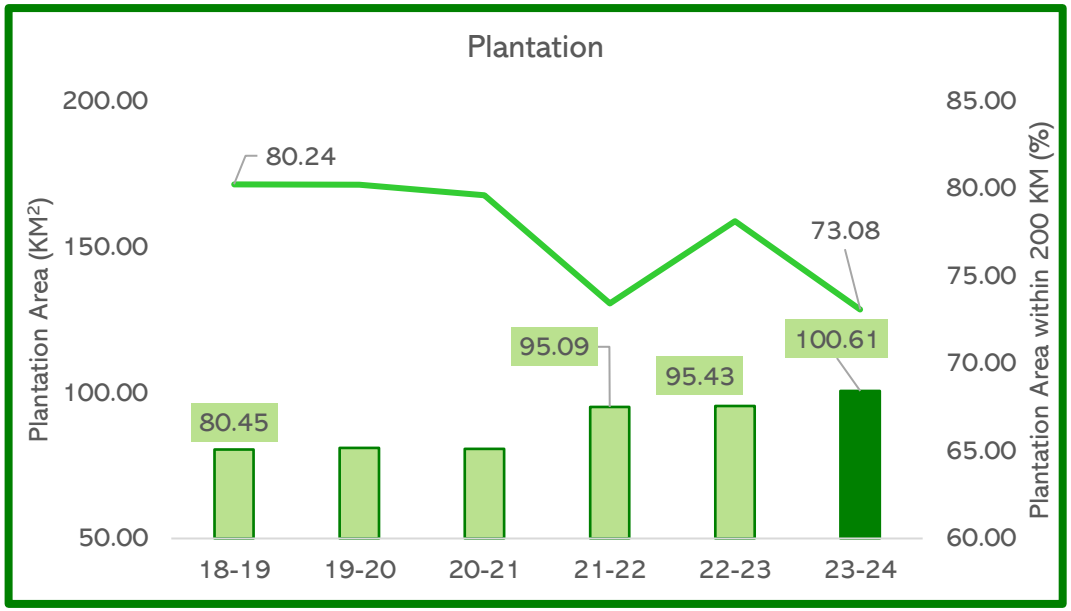


GHG Inventorisation





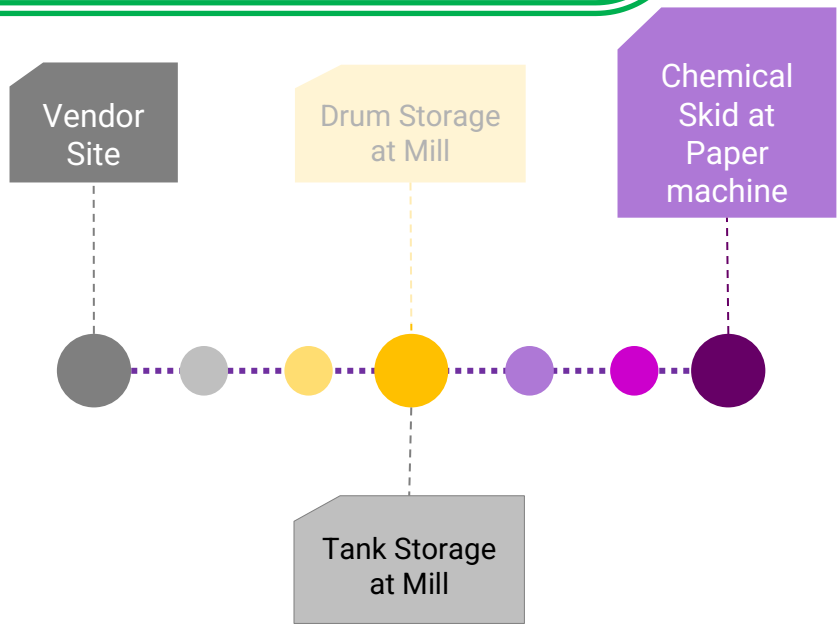




Scope-3 Emission reduction by replacing Chemical Drums

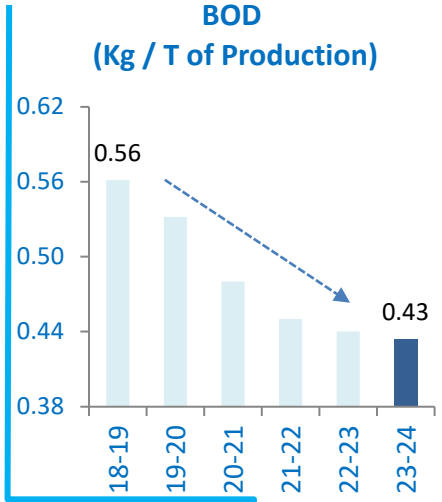
Previously	UOM	QTY
Drum Capacity	T	0.04
OBA supplied per Trip / Load	T	10
Trip / Load per Annum	Nos.	105

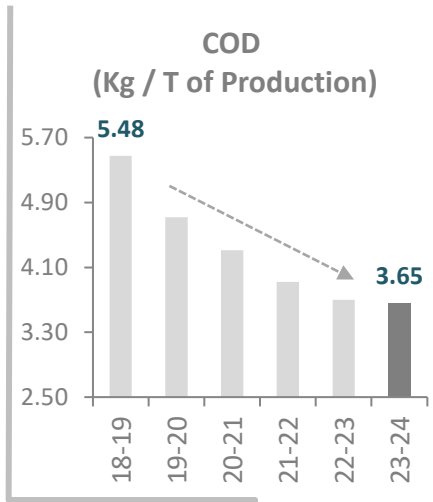
Presently	UOM	QTY
SS Container Capacity	T	20
OBA supplied per Trip / Load	T	25
Trip / Load per Annum	Nos.	**04**

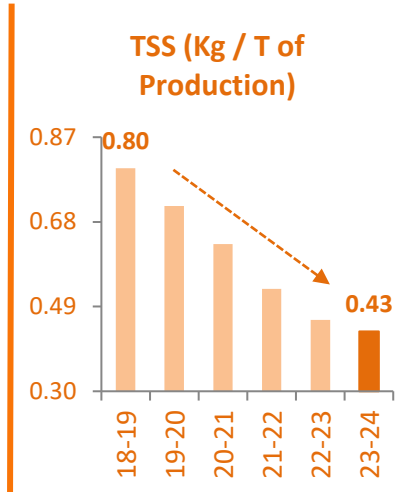


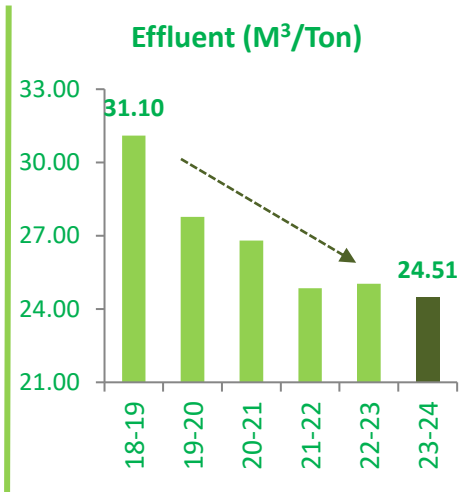
Yearly Trip reduced by	→	Nos.	101
Travel KM saved (to & fro) @ 1481 KM, one side journey		KM	299162

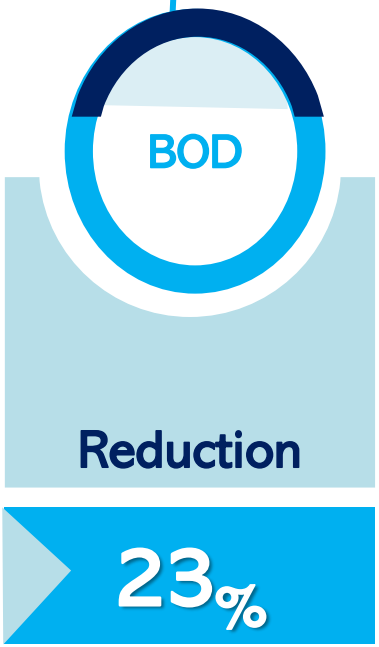
Treated Effluent Quality parameters

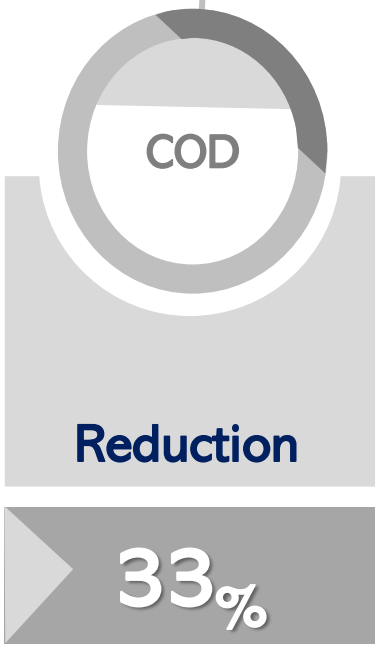












***Reduction in consecutive 5 Yrs.*

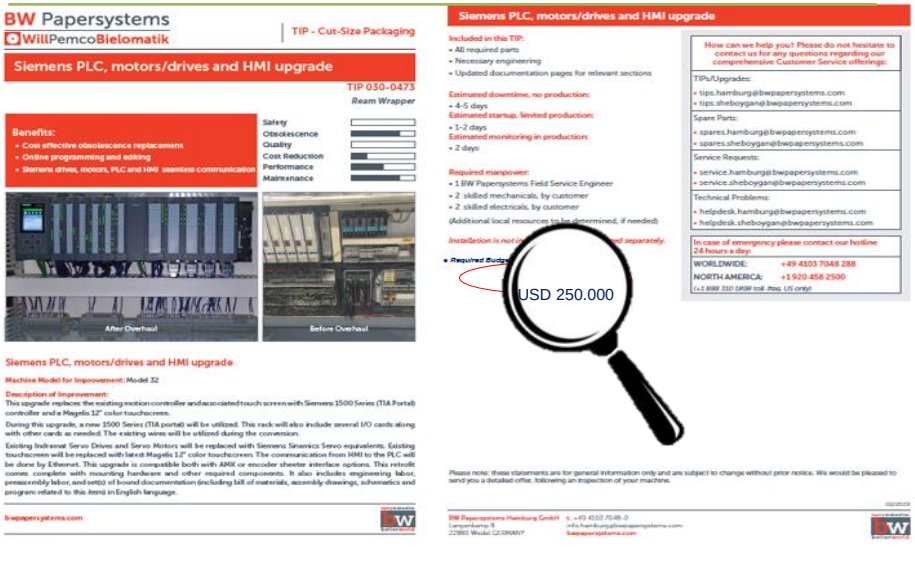
Green Supply Chain Management

Plantation

Carbon Sequestration	2151816 MT of CO_2
Total Plantation Area	10600 Hectare
Total Plantation Area – *Under 200 KM*	7758 Hectare i.e. 73%
Total Clone distribution	303 Lacs.

Import Substitution

Imported Spare Substitution 21 Million of Rs.

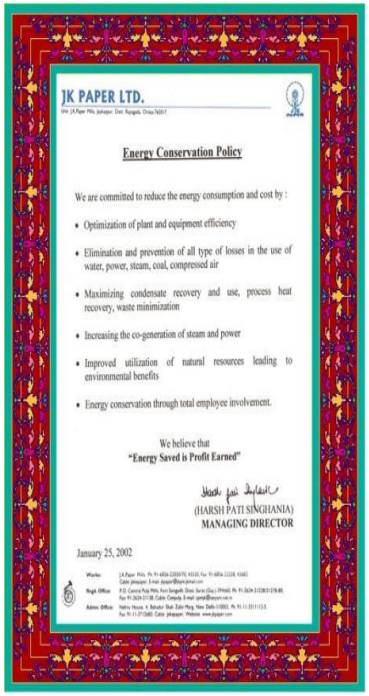


Diversified Product Development

Teamwork, Employee Involvement & Monitoring

Optimization	Elimination and prevention	Maximize	Minimize	Increase	Improve
Plant and Equipment Efficiency	All type of losses in the use of water, power, steam, coal, compressed air.	Condensate recovery and use process heat recovery .	Waste	Co-generation of steam and power	Utilization of natural resources leading to Environmental benefits.
Paper Machine	SPC reduction	SWC reduction	Black Lqr. Energy	Self Power	Waste utilization Wood Dust
↑103%	↓2%	↓2%	↑66%	~ 100%	↑0.84 %
Pulp Mill	SSC reduction	SCC reduction		Self Steam	
↑104%	↓7%	↓9%		100%	

Energy conservation through Total Employee Involvement.


JK PAPER LTD.

Energy Conservation Policy

We are committed to reduce the energy consumption and cost by :

- Optimization of plant and equipment efficiency
- Elimination and prevention of all type of losses in the use of water, power, steam, coal, compressed air
- Maximizing condensate recovery and use, process heat recovery, waste minimization
- Increasing the co-generation of steam and power
- Improved utilization of natural resources leading to environmental benefits
- Energy conservation through total employee involvement.

We believe that
"Energy Saved is Profit Earned"

(HARSH PATI SINGHANIA)
MANAGING DIRECTOR

January 25, 2002

Specific calculation Base line year – 2020-21

Teamwork, Employee Involvement & Monitoring

Apex-Group

Constituting the organization Chief and General Managers

Core-Group

DGMs and Line Managers of Process , Maintenance

Working-Group

Dy. Mgrs. / Asst. Mgrs. / Supervisors / workmen

En-Con Idea

241 Nos.

Daily Energy Consumption & Production Report

Monthly Energy Report

Daily Specific Energy Consumption Report

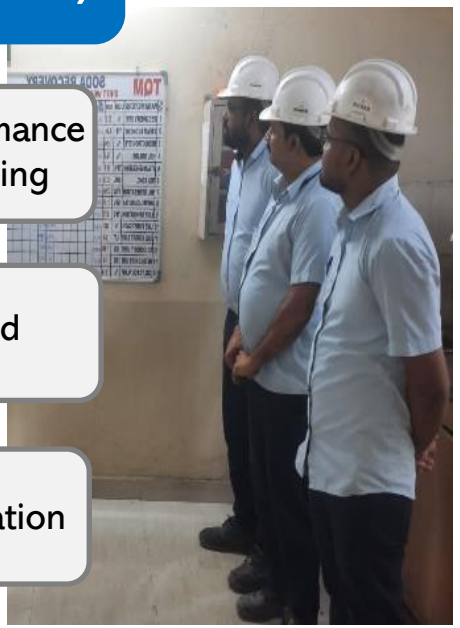
Energy Manager → HEAD (BD) → EVP (Works)

Monthly En-Con Meeting

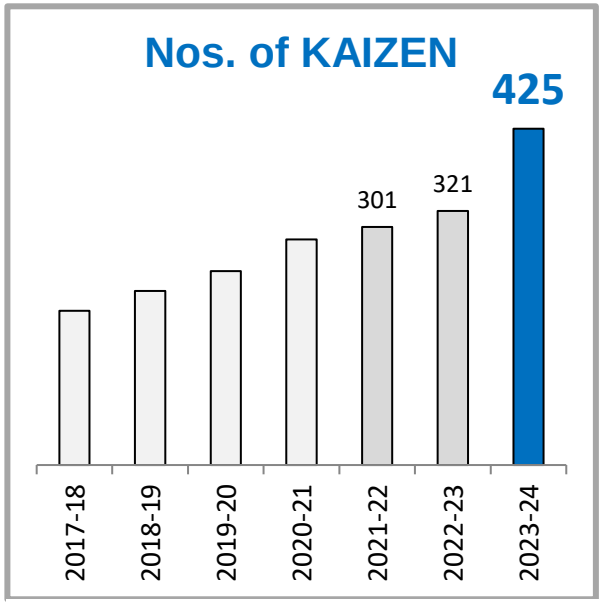
Performance Meeting

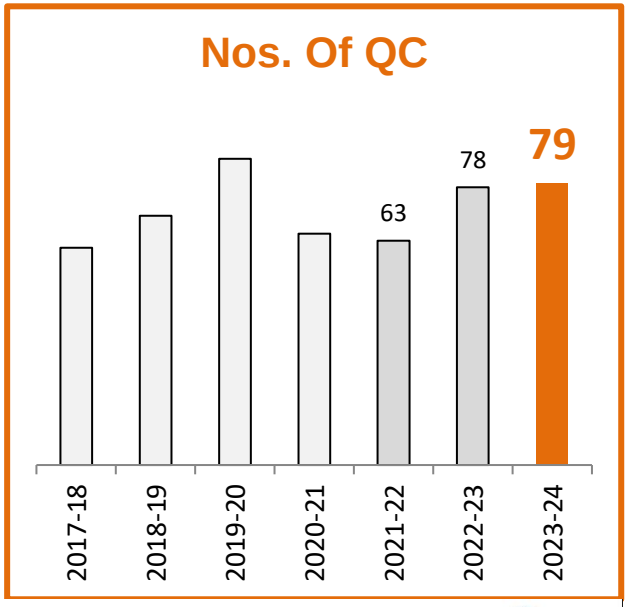
Idea Generation → Functional Head

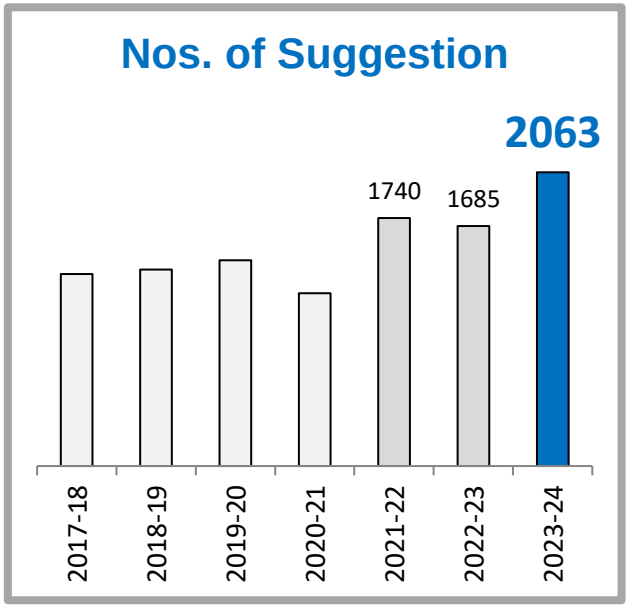
Action Plan → Implementation



Teamwork, Employee Involvement & Monitoring

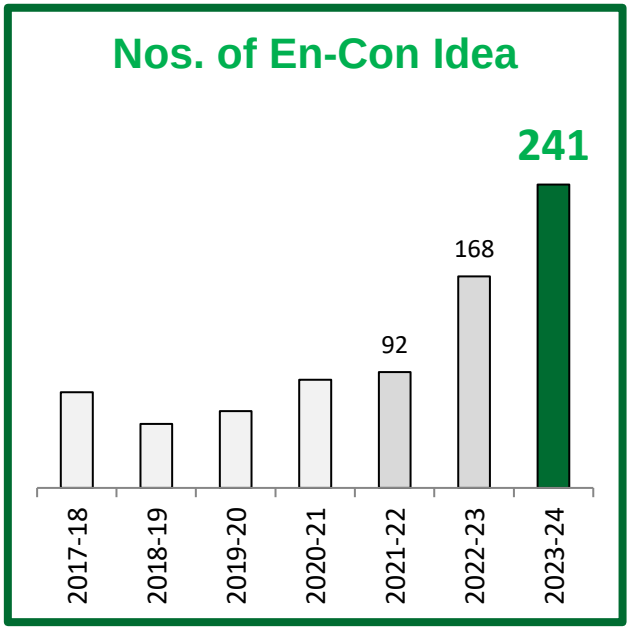






Release of Energy Conservation pocket calendar

JK PAPER LTD.
Creating lasting impressions



Teamwork, Employee Involvement & Monitoring

SEC - Template

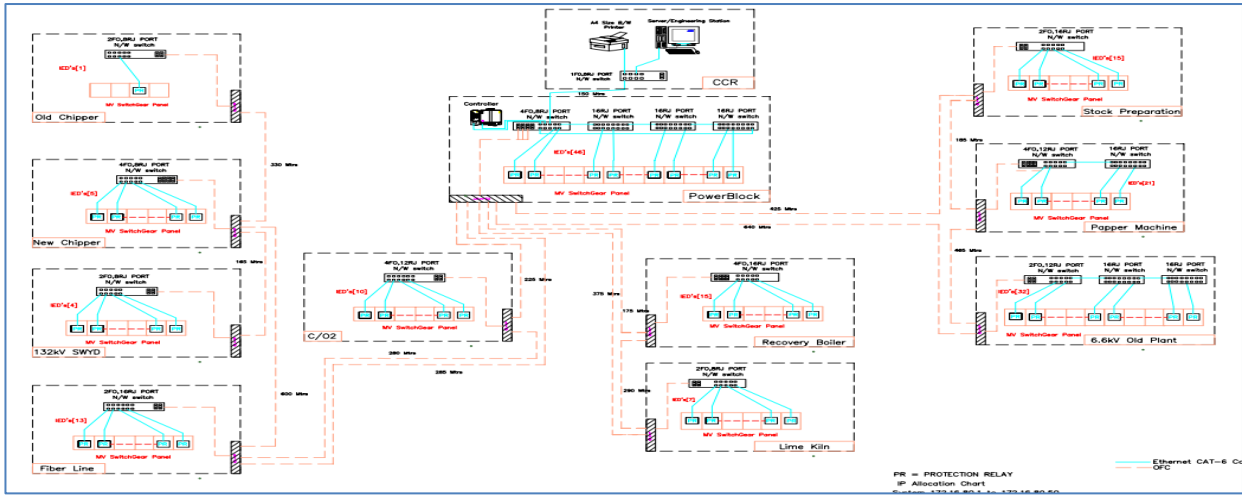
QF/100/ESO/02

ELECTRICAL DEPARTMENT — Date 23-Jul-23

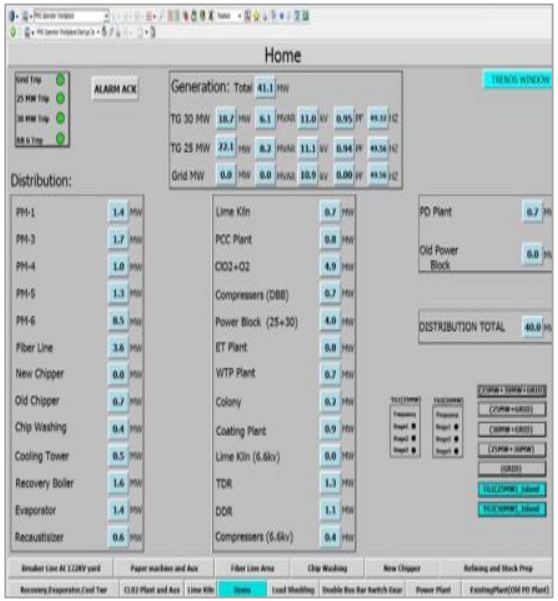
DAILY ELECTRICAL ENERGY UTILISATION REPORT

SLNO	DEPARTMENT NAME	POWER CONSUMPTION TODAY KWH	TODAY MW	TODATE KWH	TODATE MW	AVERAGE/DAY KWH	AVERAGE/DAY MW
(A)	CONSUMPTION						
1	COMPRESSORS	35275	1.47	765880	31.91	33299	1.39
2	POWER BOILER-VI	49934	2.08	974542	40.61	42371	1.77
3	LF BOILER-VI	53981	2.25	1305092	54.38	56743	2.36
4	EVAPORATOR+COOLING TOWER	48256	2.01	1149196	47.88	49965	2.08
5	RECAUSTISIZER	13907	0.58	334948	13.96	14563	0.61
6	LIME KILN	13212	0.55	315081	13.13	13699	0.57
7	PCC PLANT	20688	0.86	459545	19.15	19980	0.83
8	CHIPPER HOUSE	3787	0.16	84053	3.50	3654	0.15
9	CHIPS WASHING	6056	0.25	138905	5.79	6039	0.25
10	NEW FIBRE LINE	108119	4.50	2422874	100.95	105342	4.39
11	CLO2	70369	2.93	1872723	78.03	81423	3.39
12	O2 PLANT	7445	0.31	170040	7.08	7393	0.31
13	PAPER MACHINE-VI	219367	9.14	4973981	207.25	216260	9.01
14	NEW E.T. PLANT	5647	0.24	134659	5.61	5855	0.24
15	25MW TG AUX	14277	0.59	332423	13.85	14453	0.60
16	30MW TG AUX	14554	0.61	363519	15.15	15805	0.66
17	3.4MW TG AUX	272	0.01	7960	0.33	346	0.01
18	WATER SUPPLY-I & II	12695	0.53	286292	11.93	12447	0.52
19	COMPPRESSOR & AUX	0	0.00	0	0.00	0	0.00
20	SEWAGE TREATMENT PLANT	3516	0.15	79981	3.33	3477	0.14
21	MCC-7 (OLD PMC STOCK)	2806	0.12	66126	2.76	2875	0.12
22	CHIPPER HOUSE (Old)	5984	0.25	163530	6.81	7110	0.30
23	PET COKE	685	0.03	17405	0.73	757	0.03
24	PAPER MACHINE - I	45169	1.88	1013494	42.23	44065	1.84
25	PAPER MACHINE - III	42886	1.79	970605	40.44	42200	1.76
26	PAPER MACHINE - IV	25195	1.05	597388	24.89	25973	1.08
27	PAPER MACHINE - V	26498	1.10	601408	25.06	26148	1.09
28	TDR+DDR	41155	1.71	996240	41.51	43315	1.80
29	COATING PLANT	19279	0.80	468026	19.50	20349	0.85
30	P D PLANT	0	0.00	0	0.00	0	0.00
31	E.T. PLANT	14108	0.59	356651	14.86	15507	0.65
32	WATER RECLAMATION	3500	0.15	80500	3.35	3500	0.15
33	ADM. BUILDING & TECH BUILD	700	0.03	18950	0.79	824	0.03
34	COLONY	9300	0.39	227040	9.46	9871	0.41
35	DM PLANT (NEW)	1627	0.07	40443	1.69	1758	0.07
36	GRID EXPORT	0	0.00	500	0.02	22	0.00
	TOTAL	**940250**	**39.18**	**21790000**	**39.47**	**947391**	**39.47**
(B)	GENERATION					TODAY R/H	TODATE R/H
1	30MW GENERATOR	390000	16.25	7811000	14.15	24	552.00
2	25MW GENERATOR	506000	21.08	12836000	23.25	24	552.00
3	3.4MW GENERATOR	44000	1.83	1137100	2.06	24	552.00
4	SUB TOTAL	**940000**	**39.17**	**21784100**	**39.46**		
5	GRID	**250**	**0.01**	**5900**	**0.01**	**24**	**545.00**
6	750 KVA LT DG	0	0.00	0	0.00	0	**0**
7	TOTAL	**940250**	**39.18**	**21790000**	**39.47**		
(C)	POWER FACTOR					REMARKS	
1	30MW GENERATOR	0.926	0.925	RUNNING			
2	25MW GENERATOR	0.934	0.929	RUNNING			
3	3.4MW GENERATOR	0.932	0.933	RUNNING			
4	GRID	0.417	0.397	RUNNING			
5	750KVA DG	0	0.000	SHUT			
(D)	GRID MD IN MVA	1.084					
(E)	SPECIFIC POWER	TODAY	TODATE				
1	PAPER UNITS	**917293**	**21237404**	SPECIFIC POWER = (TOTAL POWER(A) - COATING(SL-29)- PD PLANT(SL-30) -COLONY(3677 KWH) / TON OF PAPER CONSIDERING 8% FINISHING LOSS			
2	TOTAL PAPER PRODUCTION	**1027**	**23434**				
3	PAPER SPECIFIC POWER	**971**	**985**				
4	COATING UNITS	**19279**	**468026**				
5	COATING PLANT PRODUCTION	**154**	**3972**	SPECIFIC POWER=COATING(SL-29) / TON OF COATING CONSIDERING 8% FINISHING LOSS			
6	COATING SPECIFIC POWER	**136**	**128**				
7	PD PLANT PRODUCTION	**0**	**0**				

EMS – Configuration layout

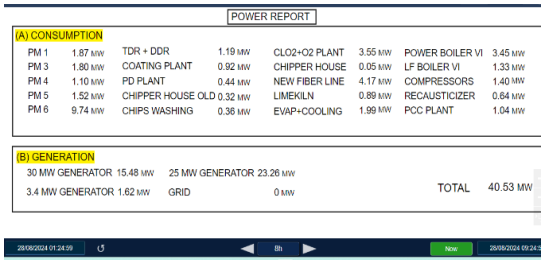


PMS - Screenshot



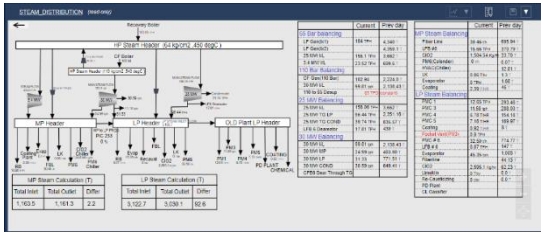
Any Time, Any Where, Any Device

Power Consumption



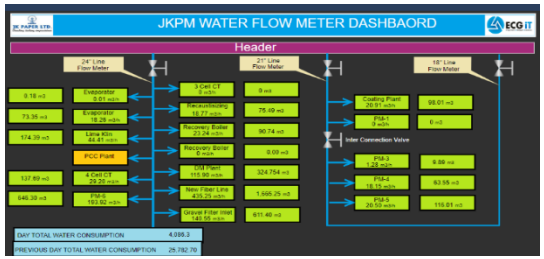
- **176** Nos. Monitoring Points
- **5** Sec Scanning time
- **45** Nos. HT feeder

Steam Consumption



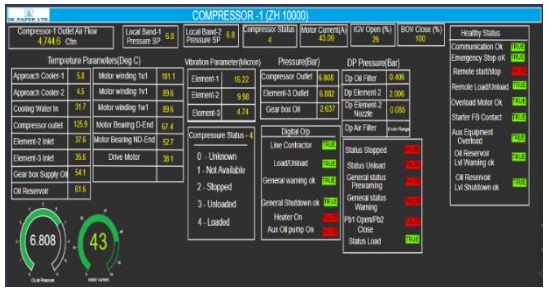
- **44** Nos. Monitoring Points
- All Condensate monitored

Water Consumption



- **31** Nos. Monitoring Points,
- Every drop counted,
- Reclaimed Water monitored.

Compressed Air Monitoring



- **6** Nos. Air flow monitoring points
- Equipment Insights.

Sensorization of Remote Zones with IoT

Work Under Progress…..

Problem

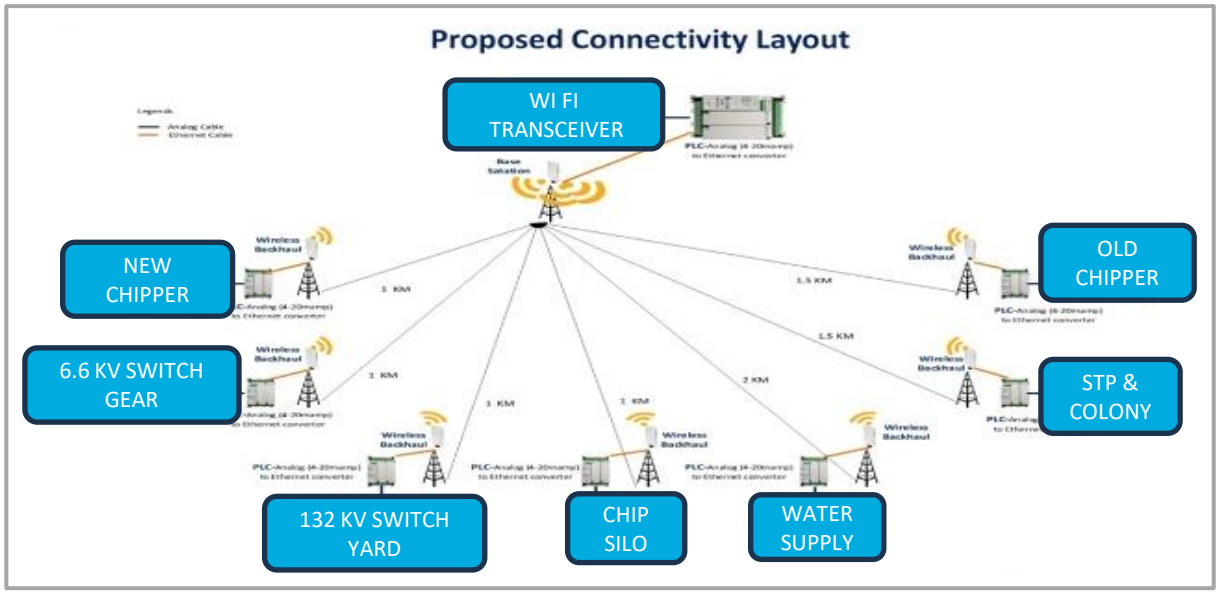
- Remote connection of Variables,
- Historian Back up Data.
- Open-Loop Operation system

Challenges

- Long distance Physical cabling.
- Infrastructure hurdle / road crossing obstacle.

Opportunity

- Wireless data transfer of field values.
- No location constraints.



Implication

- ✓ **Seamless data transmit wirelessly** from remote (like ETP, water supply) to central DCS.
- ✓ **Enhances accessibility & efficiency** throughout the facility
- ✓ **Optimal data utilization** ensures system availability
- ✓ **Enables efficient operation** and management of each system

Award & Accolades

IRIM ,**Net Zero Torch Bearer's Program – Excelsior,** Award 2023

State **Business Leadership** Award for Promoting Corporate Odisha 2023

Golden Peacock **Energy Conservation** Award

IRIM ,**Indian Green Manufacturing Challenge-23**, Gold Medal

CII Excellence in **Water Management**

Learning from CII Award or any other Award program

CII Excellence in Energy Management

Energy Efficiency Journey
with -CII

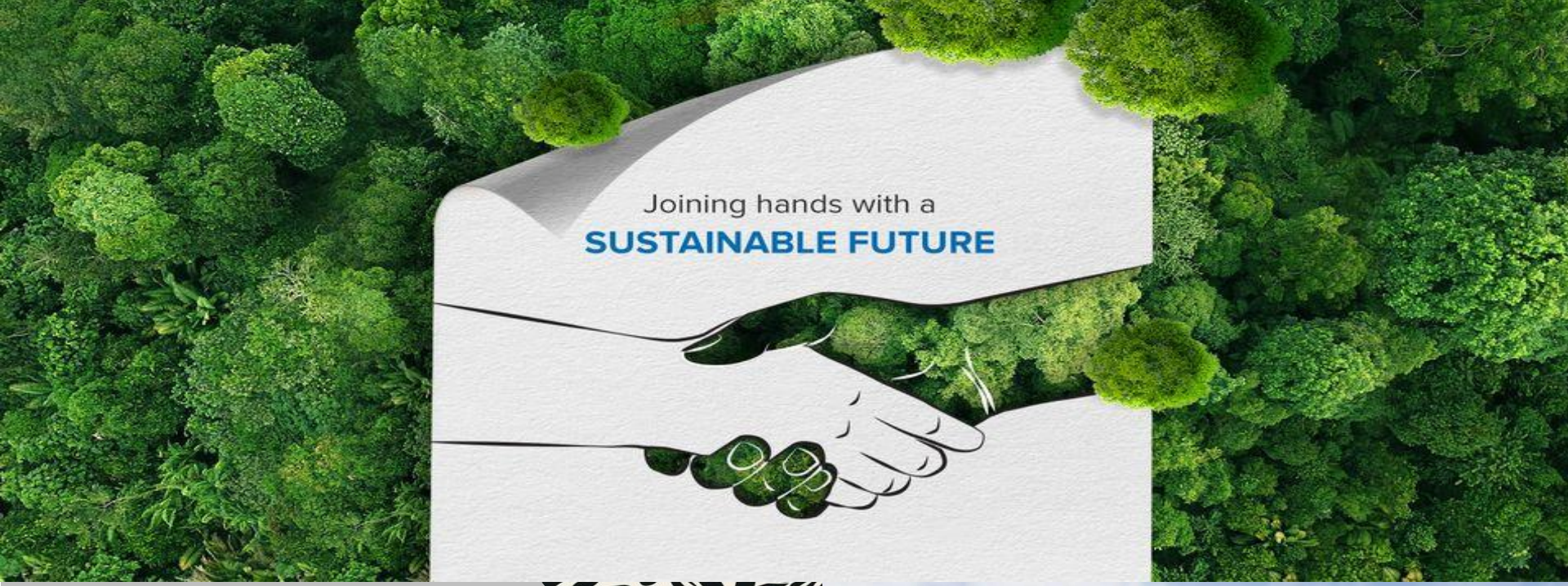
2022-23	Energy Leader
2021-22	Energy Leader
2020-21	Energy Leader
2019-20	Excellent in Energy Management
2018-19	Excellent in Energy Management
2014-15	Energy Efficient Unit

Learnings

1. **4 capital projects** from the learning of Energy award program in 2018-19 & 2017-18
2. **Use Energy Efficient Equipment** PM-4,5 and Stock all old motors are changed phase wise with new IE rated motor to achieve better efficiency (Phase-3 Completed).
3. **Maximize the usages of Natural Resource** Light pipe project is installed to resolve the lighting issue at various sheds of the Plant & Go-Down areas , walk ways.
4. **Implementation of ISO 50001,** the implementation is under progress

*Networking with other Energy managers has improved and it is helping to reduce the time gap

*Greenco document is of great help to implement best practices



Consumer

Investors / Shareholders

Value chain partners (upstream and downstream)

Government and regulatory bodies

Employees

Community