



Seshasayee Paper and Boards Limited, Erode

Fine Papers - Lasting Impressions

EXCELLENCE IN ENERGY MANAGEMENT

11.09.2024

“Healthy Performance Based on Conservation & Sustainability Principles”

Team: D Radhakrishnan, CM (Pulp Operations) & A Kavinkumar, AM (Boiler)

Core values...

WORLD CLASS MANUFACTURING



Seshasayee Paper and Boards Limited

Erode - 638 007 - Tamilnadu - India

Q-E-E-G-H-S Policy



We, at SPB are committed to continually improve our Quality, Environment, Energy, Green Resources, Occupational Health and Safety Management Systems with a view to promote :

- ★ trust of customers and other stakeholders;
- ★ abatement of pollution;
- ★ efficient use of energy, water and other resources;
- ★ the availability of information and necessary resources to achieve QEEGHS objectives and targets;
- ★ larger use of Green resources and renewable energy;
- ★ well being of employees and safety of occupational work place by eliminating hazards and reducing OH&S risks;
- ★ competence and effective participation of all employees and service providers; and
- ★ compliance of all applicable legal and other requirements

01.03.2023

N. Gopalaratnam

N. GOPALARATNAM
Chairman

We, at SPB are committed to continually improve our Energy Efficiency by:

- Analysing the present status of energy generation and consumption in our mill
- Fixing energy consumption targets for each department
- Monitoring energy consumption on a daily basis
- Conducting periodic energy audits
- Fixing the yearly target for energy reduction and implementing the energy conservation schemes to achieve the target
- Involving and motivating all employees to reduce energy consumption

08.02.2016

"Our Energy Policy"

K S Kasi Viswanathan
K S Kasi Viswanathan
Managing Director





SPB's Commitment for Excellence



“ Without standards & Measurements, there can be no improvement ”

Plantations – 20.41 Crores of Seedlings in 24,764 Acres of Land

Sustainable Process

All our products are 100% Biodegradable & Recyclable



Farmer



SPB

Ponni



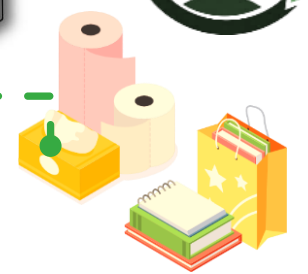
Substitution Furnace oil with Biomethane gas – 3.5 KL / day

2 Stage ODL

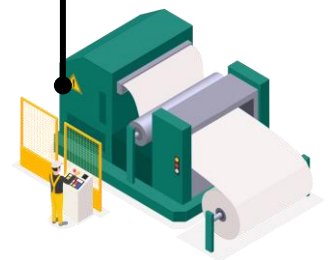
RDH Technology

ECF Bleaching

Paper M/c
165000 TPA



Wet lap M/c
35000 TPA



Recausicizer

Evaporator

Limekiln

O₂

R8 - ClO₂

Power Boiler

Recovery Boiler

21 MW TG – Extraction cum Cond
16 MW TG – Back pressure

RE share – 61%

Substitution of coal with Biomass – 15%



Highlights of the Year



Highest ever production in Unit : Erode – 1.65 lakhs MT



Key contributors for achieving 100% of its production capacity.
MF1, MF2 & MF3 Machines



Good progress in Tree Farming initiative.



Company certified under the Energy Management System ISO
50001 : 2018



During the crisis, usage of alternate raw material in place of
wood - Increase in bagasse production 52 TPD avg



**CII-SR EHS – Energy /
Carbon Footprint - 2023**

Efficiency



Generation side

- Coal Boiler efficiency – **79% even with usage of Biofuels**
- Recovery Boiler - Steam / T of solids – **3.12 t/t**
- TG Steam to Power ratio
 - Condensing Turbine – **6 t / MWh**
 - Back pressure Turbine – **8.30 t / MWh**
- Turbine efficiency
 - Condensing Turbine – **45.67%**
 - Back pressure Turbine – **86.57%**

Vs

Effectiveness



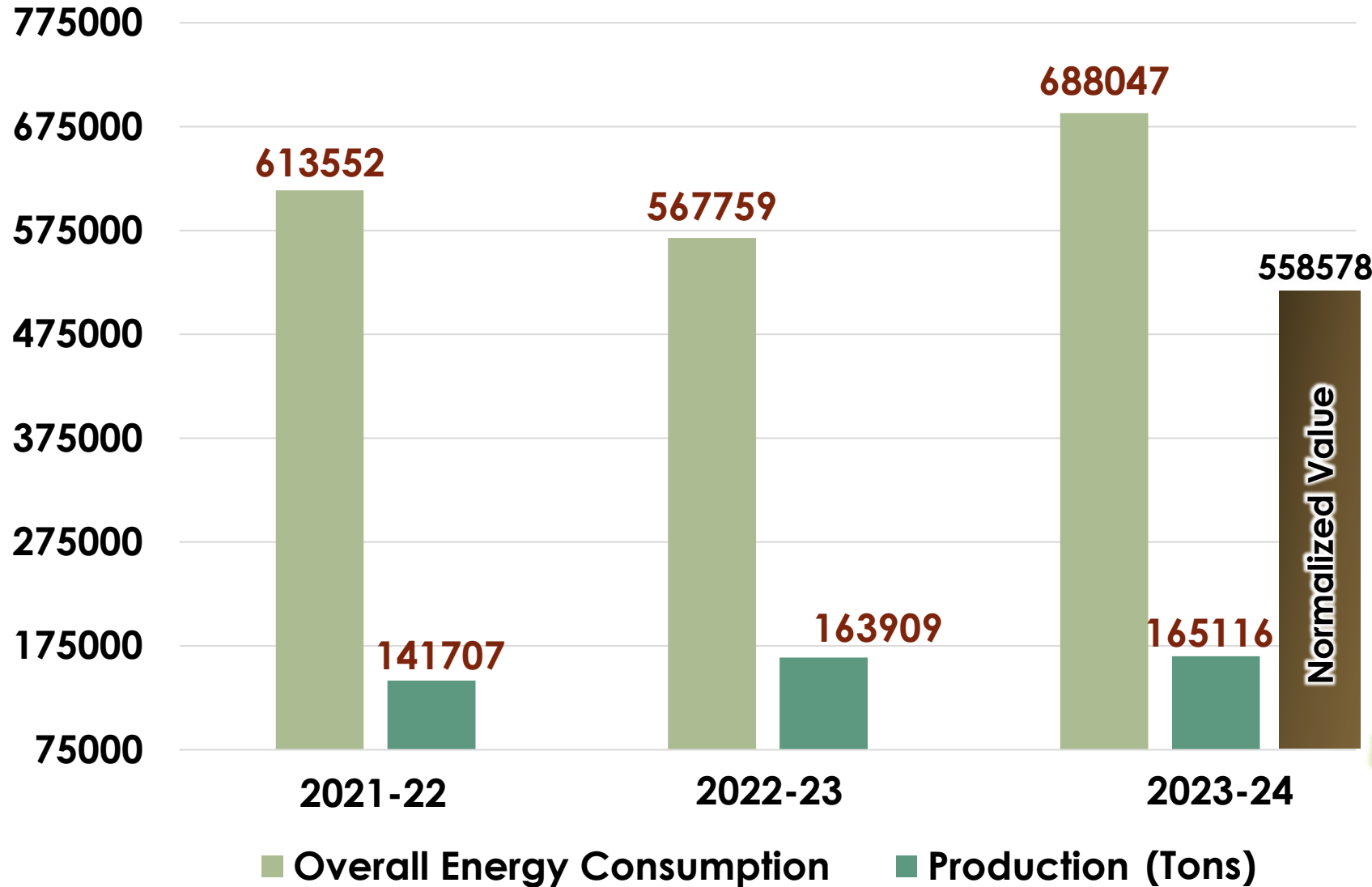
Utilization side

- Minimum usage of live steam below **90 °C**
- Maximum utilization of flash vapours
- IE3 motors installation – **158 Nos**
- Steam trap monitoring
- Condensate recovery and re-utilization
- Steam consumption study and its optimization
- Conducting periodical Energy Audits

Highlights of the Year (Contd...)

2% of the employees are Green Professionals

Overall Energy Consumption



SEC, MTOE / T of Finished Production

- Target SEC - 0.488
- Present SEC - 0.445

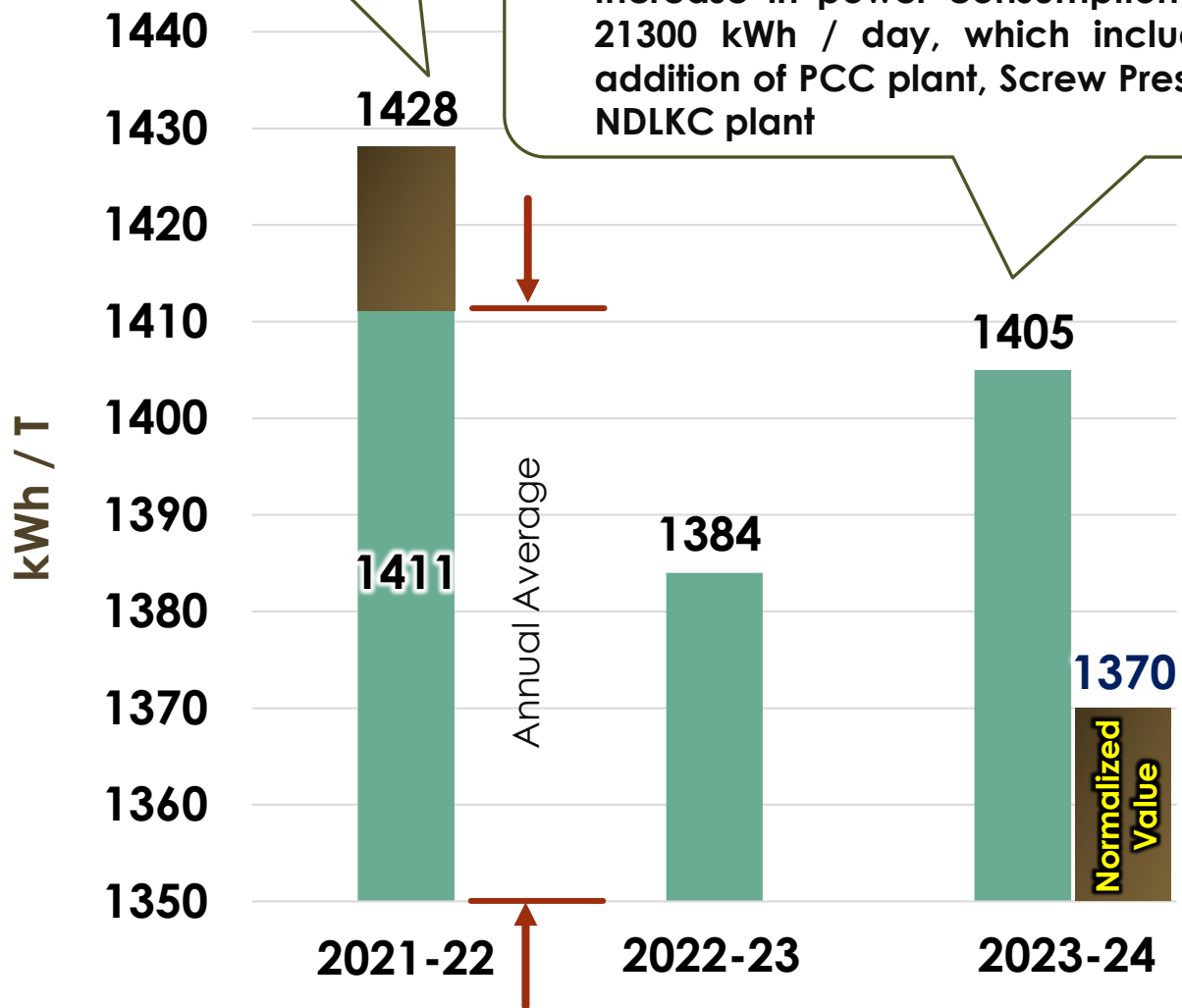
- Ever highest paper production
- Changes in
 - Raw material mix
 - Product demands
- Raw material & fuel substitution

“Small changes, big impact”

SPC & SSC Trend

Excluding chemical mill upgradation shut (48 days)

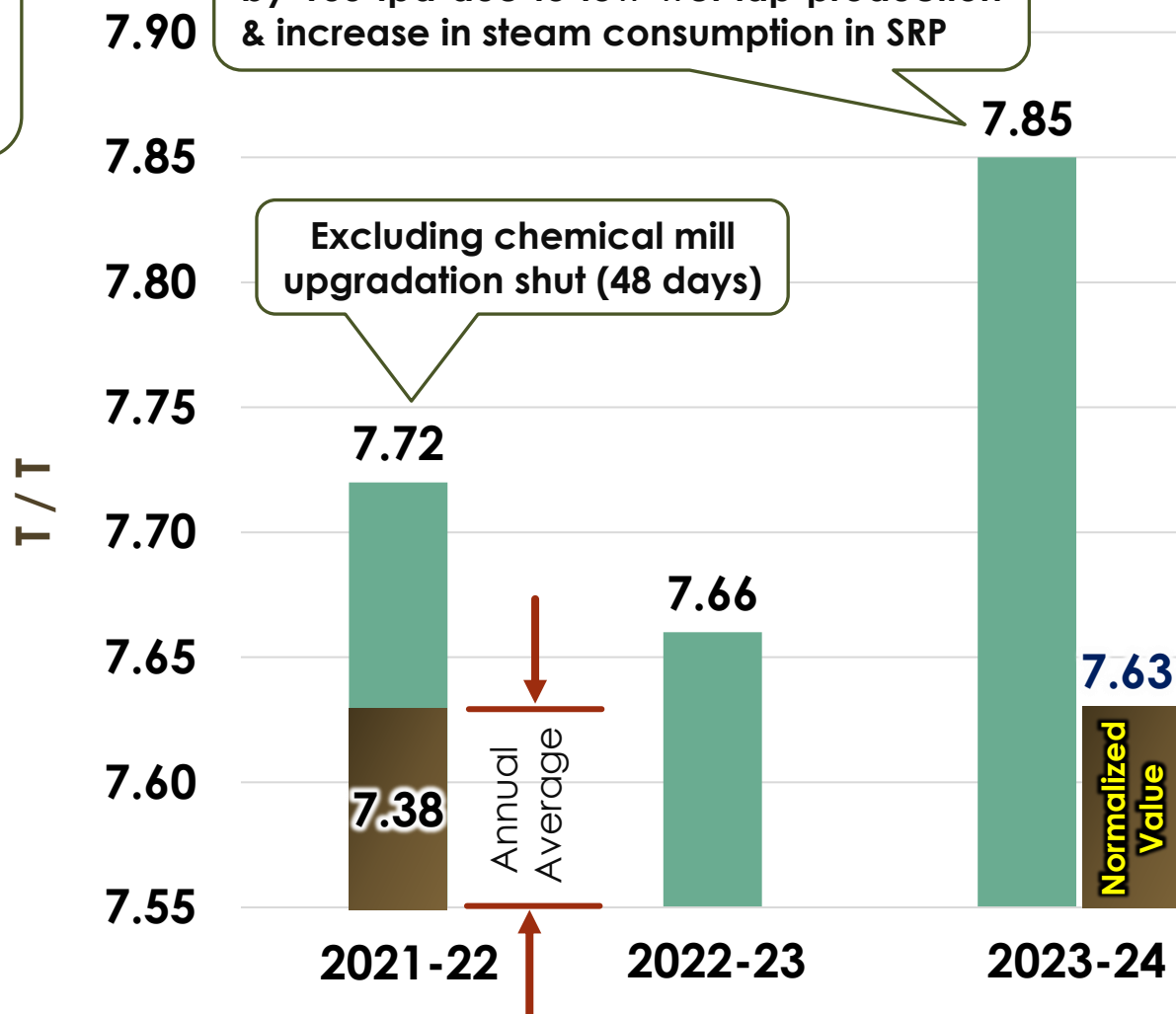
- Lower Wet lap production by 16 TPD
- Increase in power consumption by 21300 kWh / day, which includes addition of PCC plant, Screw Press & NDLKC plant



Specific Power Consumption

Increase in process steam consumption by 100 tpd due to low wet lap production & increase in steam consumption in SRP

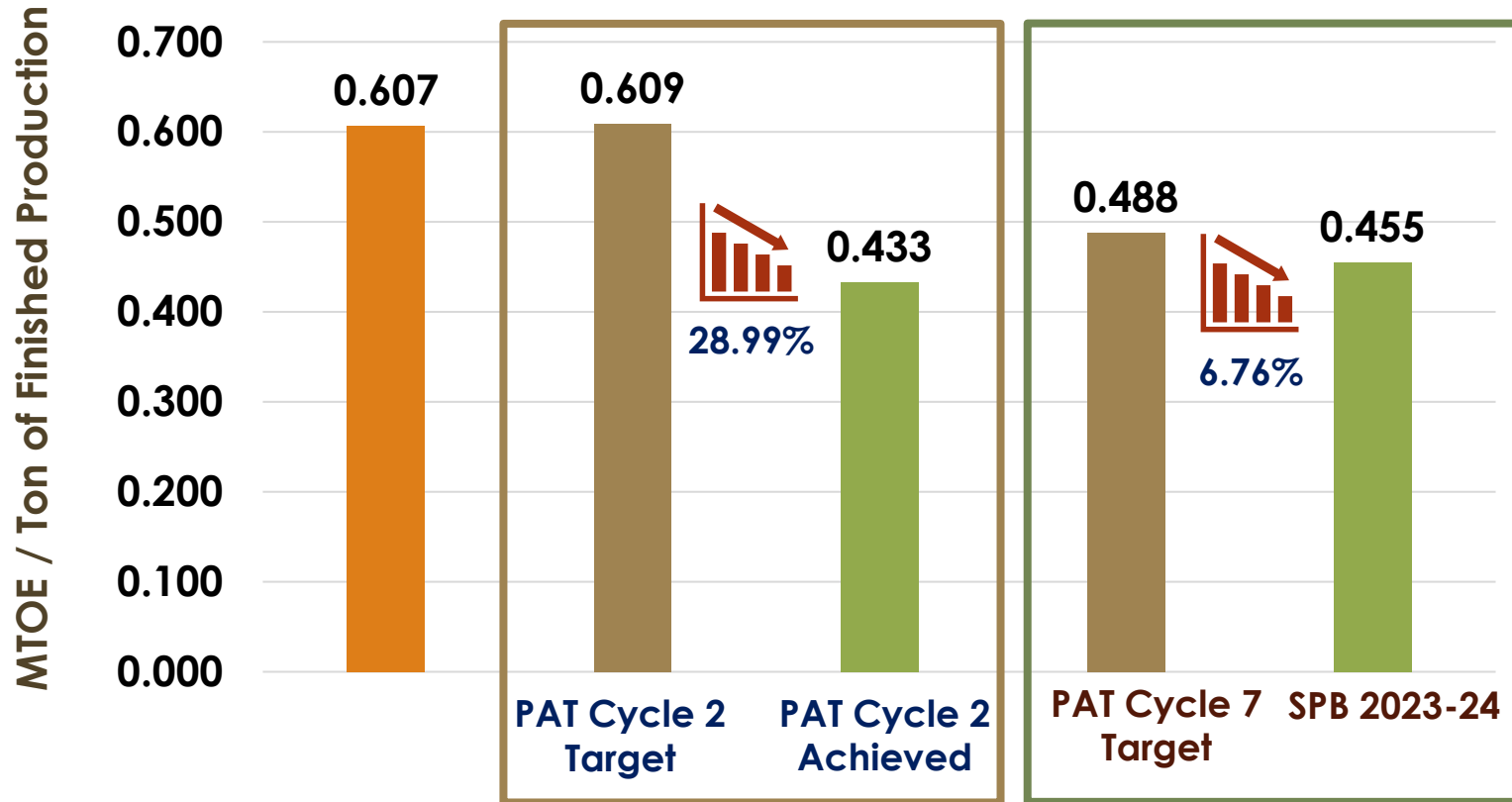
Excluding chemical mill upgradation shut (48 days)



Specific Steam Consumption

Benchmarking & Road Map

Specific Energy Consumption



(Source: Gazette Notification Dt: 31.03.2016 & 26.10.2021)

Notable Project:

- Elimination of 22 KV system – Power saving – 960 kWh / day
- Installation of Cal coil system in PM 5 – Power saving – 1500 kWh / day



Live Projects – FY: 2024-25	
In Pipe line	5
Annual Savings	8162 MKcal
Reduction in SEC	8%
Investment	375 Lacs

➡ Projects Planned – FY 24-25

“Leading the charge towards a sustainable future”



Road Map Based on NAPCC

1

National Solar Mission

- ### Solar Mission
- Admin block, Godown and Project office are powered by solar system.
 - In Unit-2 installing a 3 MW solar system

2

National Mission for Enhanced Energy Efficiency

- ### Enhanced Energy Efficiency
- PAT - Both units have achieved the Targets
 - EEFP – Identified us for the DEEP Project & is being implemented
 - FEEED - Conversion of IE2 to IE3 motors

3

National Mission on Sustainable Habitat

- ### Sustainable Habitat
- Sustainable farm forestry making us wood positive
 - Procuring FSC certified wood
 - Self-sufficient in steam & power

4

National Water Mission

- ### Water Mission
- SWC reduction – 9%
 - Covering 1200 acres of land with treated effluent for cultivation of sugarcane
 - Unique models are in pipe line which will be first in the Paper industry to reduce pollution load and water consumption by 30%

“Investing in a greener tomorrow. Our contribution to NAPCC is a step towards a sustainable world”



Road Map Based on NAPCC (Contd...)

5



National Mission
for Sustaining
the Himalayan
Ecosystem

Sustaining the Himalayan Eco system

- We take care of flora and fauna
- Wood positive
- Carbon positive through sequestration

6



National Mission
on Strategic
Knowledge for
Climate Change

Strategic Knowledge for Climate Change

- Present global trends in CCUs
- Net Zero efforts
- Energy switch over

7



National Mission
for a Green India

Green India

- Plantations – 20.41crores of seedlings in 24,764 acres of land
- Green Manufacturing system guided by CII
- Self sufficient in wood

8



National Mission
for Sustainable
Agriculture

Sustainable Agriculture

- Pioneer in circular economy
- Sugarcane Plantations absorbs 4 times more CO2 than normal trees
- Reducing dependency on virgin fibers by using agro residues

“Investing in a greener tomorrow. Our contribution to NAPCC is a step towards a sustainable world”

Project Summary – 2021-22 to 2023-24



Emission reduction
29361 tCO₂e

2021-22

- ECS Implemented – 24
- Investment – Rs. 89 Lacs
- Steam Saved – 50077 Tons
- Power Saved – 69 Lakh kWh
- **Cost Saved – 1106 Lacs**
- Pay back – 1 Month

2022-23

- ECS Implemented – 17 Nos
- Investment – Rs. 211 Lacs
- Steam Saved – 3805 Tons
- Power Saved – 2.31 Lakh kWh
- F.Oil saved – 274 KL
- **Cost Saved – Rs. 621 Lacs**
- Pay back – 4 Months

2023-24

- ECS Implemented – 17 Nos
- Investment – Rs. 48 Lacs
- Steam Saved – 10024 Tons
- Power Saved – 6.10 Lakh kWh
- **Cost Saved – Rs. 194 Lacs**
- Pay back – 1 Month

Steam saved
63906 Tons

Power saved
77 Lakh kWh

F. Oil saved
274 KL



ECS Implemented
FY 21-22 to FY 23-24

● 16MWTG GRID II	● 110KV TRF2 (22f)	● 21MWTG	● 16MWTG
Energy (kWh) : 0.00 kWh	Energy (kWh) : 0.00 kWh	Energy (kWh) : 92236.00 kWh	Energy (kWh) : 73480.00 kWh
Power (Mw) : 0.00	Power (Mw) : 0.00	Power (Mw) : 15.31	Power (Mw) : 12.18
Frequency (Hz) : 0.00	Frequency (Hz) : 0.00	Frequency (Hz) : 49.26	Frequency (Hz) : 49.25
RY Volt : 0.00	RY Volt : 0.00	RY Volt : 11.02	RY Volt : 11.02
Total current : 0.00	Total current : 0.00	Total current : 836.33	Total current : 655.80

Key Project – 2021-22

TG Frequency Reduction

- Investment – Nil
- Power saved – 19200 kWh / day
- Cost saved – Rs. 410 Lakhs
- Pay pack - Immediate

Key Project – 2022-23

Firing of Bio fuels through overfeeding

- Investment – Rs. 36 Lakhs
- Coal saved – 9 TPD
- Cost saved – Rs. 291 Lakhs
- Pay pack – 1 ½ Months



Key Project – 2023-24

Installation of Flash tank near RDH hot water tank

- Investment – Rs. 18 Lakhs
- Steam saved – 18 TPD
- Cost saved – Rs. 85 Lakhs
- Pay pack – 3 Months





Innovative Project

Production Increase in MF 1 by 10%

Trigger for the project

- Work on increasing the productivity with **optimum energy utilization in old machines**
- Cost for silent drive system is quite high.

Challenges

- **To enhance the production within the available system**

Approach

- Brain storming
- Available potential of each equipment
- **Minimum investment and PDCA cycle**



Innovative Project (Contd...)

Production Increase in MF 1



Description	Wire part	Press part	Dryer part
Moisture Removed (%)	95	2.5	2.5
Cost (%)	15	15	70

Solutions

- **Wire part** - Without changing the motor (600 KW) of high speed, we simply introduced a pulley system that makes our requirement possible without much investment.
- **Press part** - Load improvement by increasing cylinder size from 10 inches to 14 inches.



Innovative Project (Contd...)

Production Increase in MF 1

Outcome achieved by the project

S. No	Description	UOM	Value
1	Moisture Reduction	%	71 to 65
2	Increase in Press load	Kg / CM	38 to 60
3	Increase in M/c speed (47 GSM)	MPM	260 to 300
4	Increase in Production	TPD	6
5	Specific Steam Reduction	T / T	0.06
6	Annualized Cost Savings	Rs. in Lacs	2

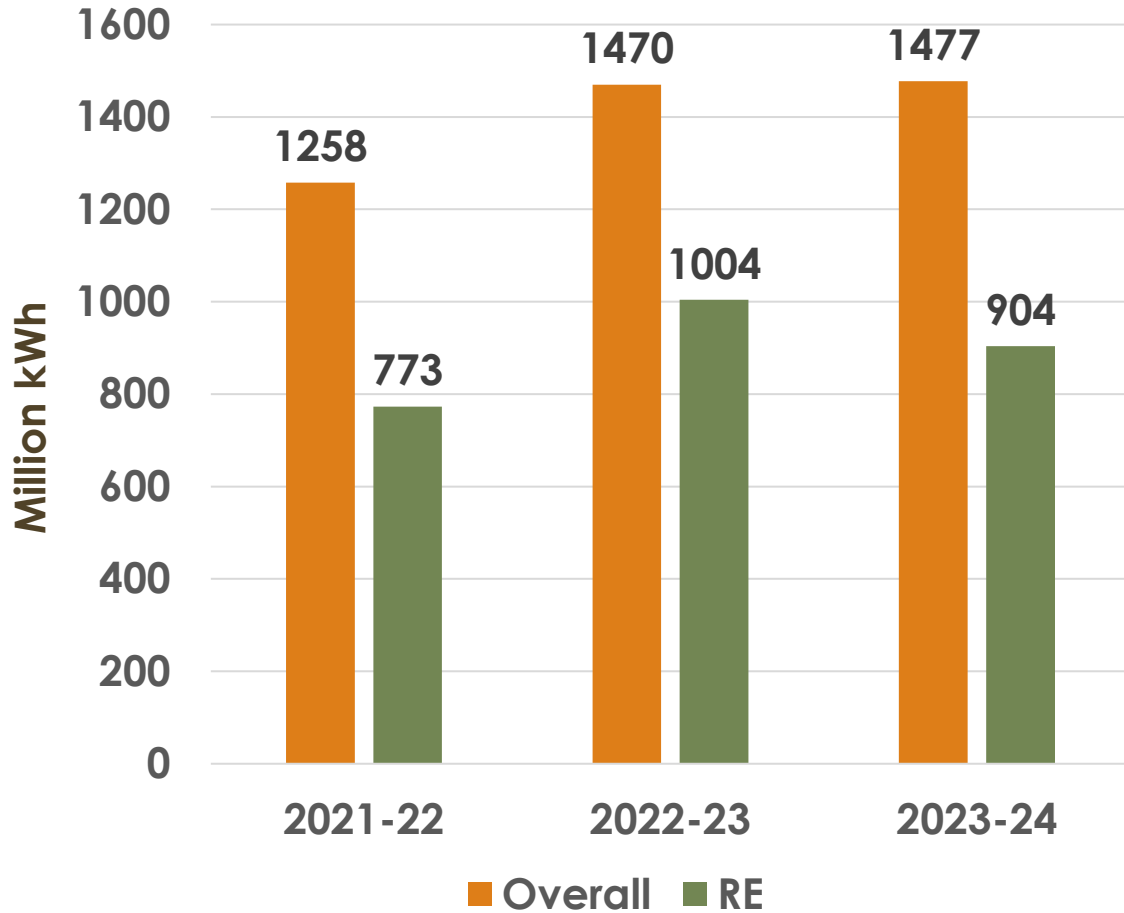


Feasible, Sustainable, Self driven and beyond OEM

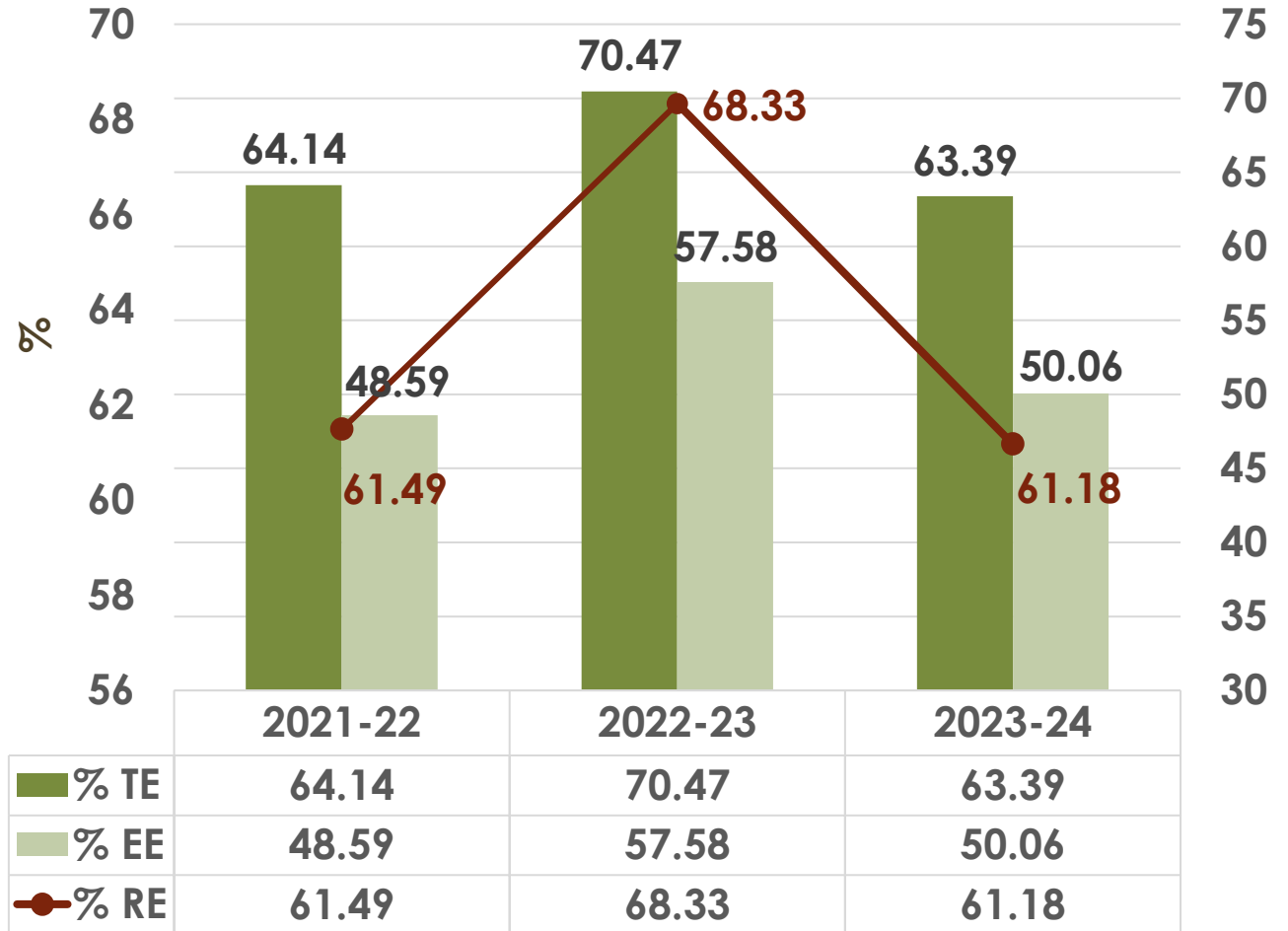
Replication Potential – Can be considered by all Paper Machines

Utilization of Renewable Energy Sources & Road Map

Overall Generation including RE



RE Share – Source: BLS, Bio fuel & Solar



FY 23-24
61.18%



- Change in raw material mix
- Fuel substitution

Utilization of Renewable Energy Sources & Road Map (Contd)...



2025-2030

- After MDP 3, with upgradation in pulp mill and recovery complex – Increase in RE share **1.64%** - Investment Rs. 20 Crores
- Bio fuel consumption in coal fired Boiler to be increased by **3.90%** by improving fuel handling system and increasing feeding points



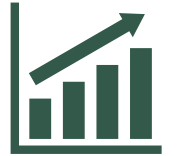
2025-2030

- After MDP 4, with new recovery boiler firing at 550 tpd and Recovery Boiler firing at 959 tpd – Increase in RE share **2.71%**
- Bio fuel consumption in coal fired Boiler to be increased by **2.38%**



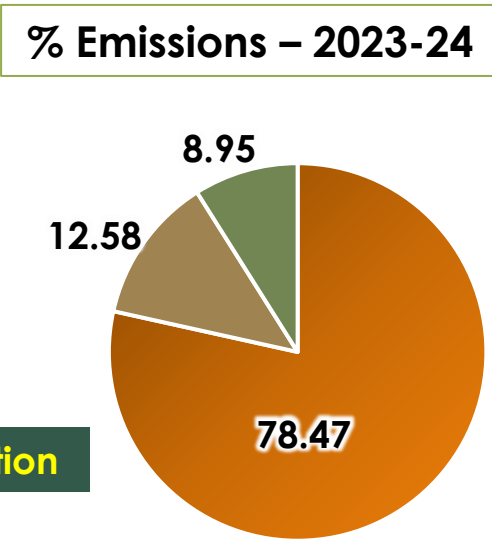
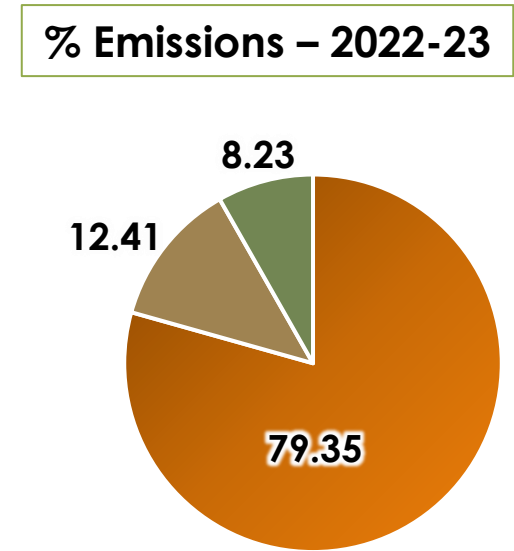
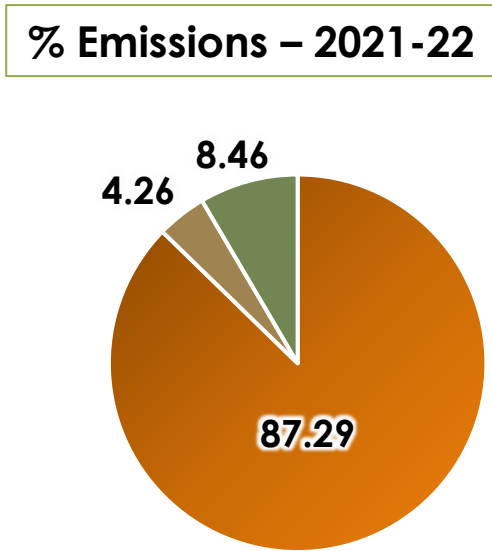
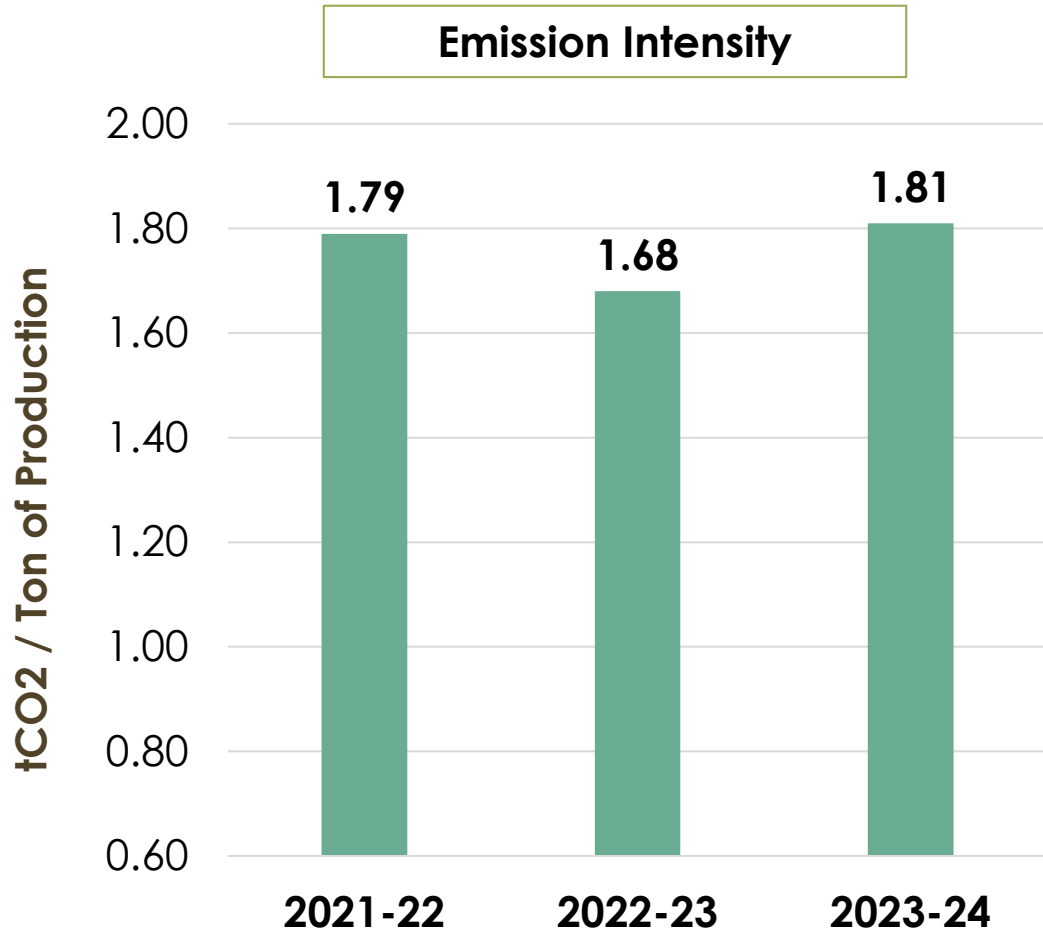
2031-2035

- Coal fired Boiler to be retrofit for conversion from coal to 100% Bio fuel - Increase in RE share **3.50%**
- Furnace oil consumption to be reduced by 30% - Increase in RE share **1.70%**



Conserve energy, protect the planet

GHG Inventorization



- **Scope 1** (Coal, Bio fuels, Furnace oil and Lime stone)
- **Scope 2** (Grid import and purchased pulp)
- **Scope 3** (Raw material transport, Fuels transport, Chemicals transport, Employee commute & Despatch to depots)

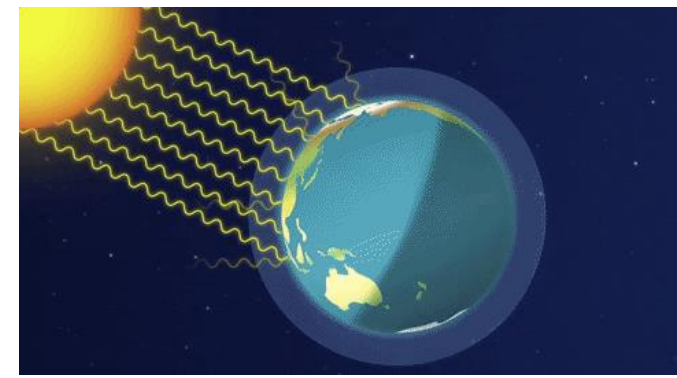
We are carbon positive @ 12.35 tCO₂ / Ton of Finished Production



The Company has drafted the Business Responsibility and Sustainability Report for FY 2023-24, in line with the format prescribed by SEBI, which is given in Annexure - III in the Directors' Report

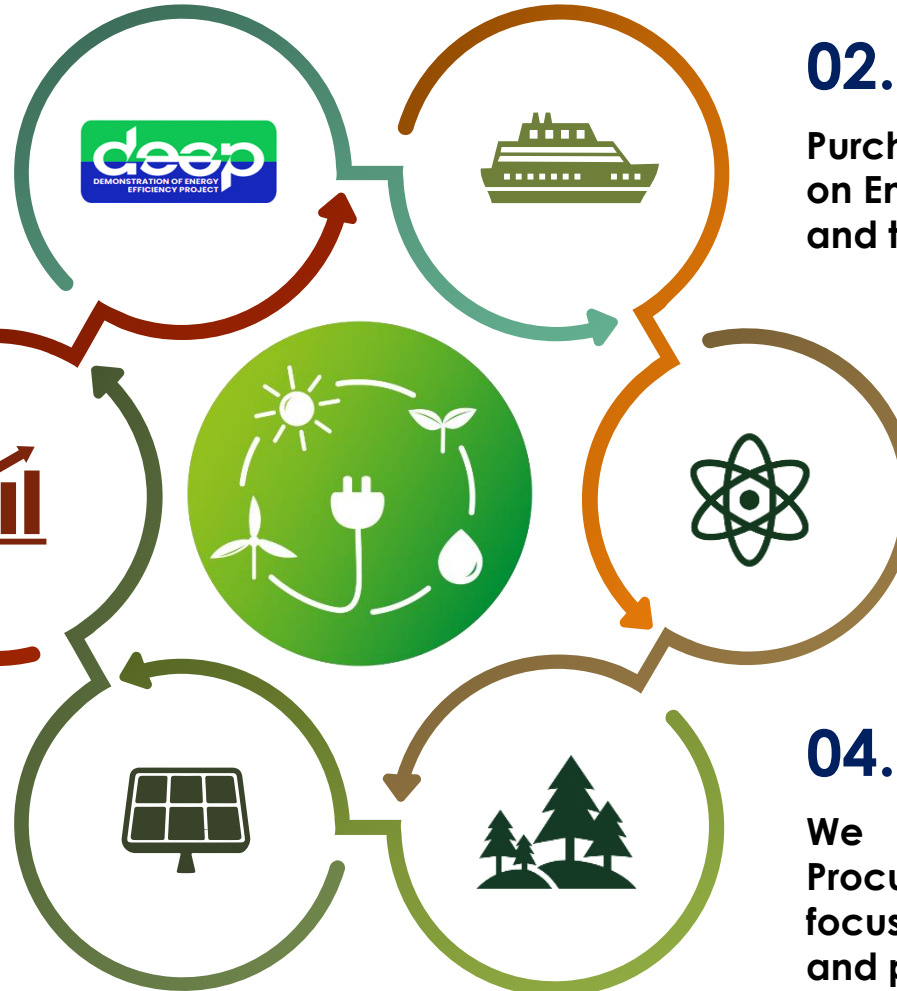
GHG Inventorization (Contd...)

Short term & Long term plan for GHG reduction



01. DEEP

Key DCs implementation of projects under “DEEP” as per BEE. (Utilization of waste heat flue gas for heating the biomass and minimize emission)



02. Logistics

Purchase Policy – buying products based on Energy labelling to increase loadability and to reduce the transportation distance

03. RE share

Increase in RE share – 60% to 71%

06. Pulp Production

Work on increasing the % RE share through step up in pulp production, which in turn will reduce dependency on imported pulp for the Unit 2 & 3

05. Solar

Work on captive solar projects, to increase the renewable energy share and bring down dependency on grid Power

04. Green Policy

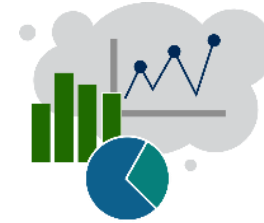
We have separate Green Procurement Policy which focuses on reduction in energy and procuring green products.

Green Supply Chain Management

Buying from **ISO certified vendors**

Ban on the usage of one-time plastic

As per the notification UPC-II-PWM(SUP)/2022 dt 12/08/2021, Ministry of Environment, Forest & Climate change



Evaluation of **Supplier Performance** data

Choosing material from suppliers with **lesser plastic/polymer content**



Awareness creation and efficiency improvement programs

Purchase of **BEE star rated electrical items**, usage of LED & energy efficient motors.

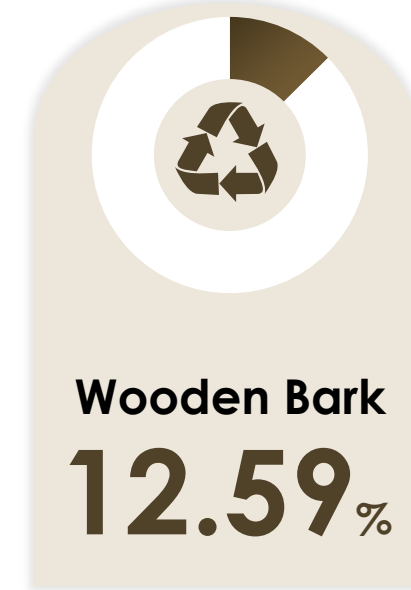
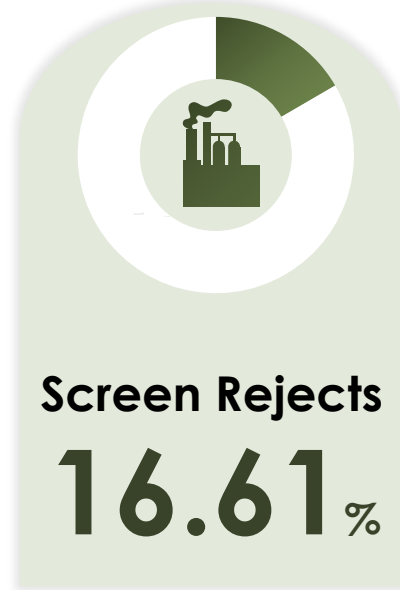


Use of more **indigenous** raw material



Efforts on **purchasing the batteries** with the buyback options.

Waste Utilization & Management System – Last 3 Years



Board Manufacturing

Filter cake – 95426 Tons
Wet pith – 10068 Tons



Cement Manufacturing

Lime sludge – 88747 Tons
Lime grits – 19346 Tons
Fly ash – 40791 Tons



Soap Manufacturing

Sodium sulphate – 3889 Tons

Description	Chipper Dust	Screen Rejects	Bagasse Pith	Wooden Bark
Quantity (Tons)	41271	12046	10068	9128
Fuel GCV (Kcal / Kg)	2574	3832	2119	1795
Usage Point	In House	Sold Outside	In House & Sold Outside	Sold Outside

Waste Component	Quantity in Tons	Usage Point
Methane gas	1980	Rotary Lime Kiln
Food waste	Converted in to Biogas in anaerobic digester and used as cooking fuel	

“Waste utilization: Its not just a job, it’s a passion”

Energy Management System

Daily Monitoring – Review Formats

S. No	Dept	UOM	Norm - 2023-24			SSC Analysis on 03.03.2024								
			SSC T/T	Production TPD	Steam, TPD	Gap					Reason for excess Steam & Corrective Action			
			SSC T/T	Production TPD	Steam TPD	Production	Steam	SSC	% Dev	Excess Steam				
1	RDH	t / t of Bl. Pulp	1.50	400	599	1.49	402	597	2	-2	-0.01	-1.00	-6	-
2	CLO2	t / t of CLO2 prod	11.20	8.50	95	10.96	9.76	107	1	12	-0.24	-2.12	-2	Plant stoppage for 1.50 hrs due to mech problem
3	Bagasse Pulp Mill	t / t of Bl. Pulp	2.10	54	113	2.03	78	159	24	46	-0.07	-3.30	-5	Pandia and ECF running - 20 Hrs.
4	SRP	t / t of TAA prod	5.20	257	1335	6.26	250	1563	-7	228	1.06	20.33	264	1) B 11 MP & LP APH -4 tons (7-11) 2) Deaerator +27 tons 3) Evaporator -8 tons 4) Cal +2 tons 5) TAA production -16 tons
5	MF 1	t / t of EFP	2.37	53	126	2.23	49	110	-4	-16	-0.14	-5.84	-7	Size press order - Nil. Paper break - 25 Mins. Steam pressure variation - Nil. Total down time - 2.30 Hrs.
6	MG	t / t of EFP	2.37	74	176	2.87	62	179	-1	3	0.50	21.21	31	Size press order - 100%. Paper break - 40 Mins. Steam pressure variation - 15 Mins. Total down time - 1.25 Hrs. Paper break - Nil.

SPC analysis for 28.01.2024						
Dept	Description	Norm	Actual	Gap	Positive Remarks	Negative Remarks
RDH	Power (kWh/day)	127882	136626	8744	Higher wood pulp production	
	Production (tpd)	400.00	405.2	5.2		
	SPC (kWh/ t of Bl pulp)	320	337	17		
CLO2	Power (kWh/day)	6163	5950	-213	Higher production	
	Production (tpd)	8.50	9.506	1.006		
	SPC (kWh/ t of CLO2)	725	626	-99		
BPM	Power (kWh/day)	24320	22040	-2280	Plant stopped for Insulation issue problem (2:30 hrs) & High bleaching (2:30 hrs)	
	Production (tpd)	54	46	-8		
	SPC (kWh/ t of Bl pulp)	450	480	30		
SRP	Power (kWh/day)	105245	106388	1143	1) 2C body cut out for tube cleaning & Lower kW pumps are running in 1A, 1C, 2A, 2B and 2C 2) Higher TAA production	
	Production (tpd)	257	271.3	14.3		
	SPC (kWh/ t of TAA)	410	392	-18		
PM 1-4	Power (kWh/day)	162887	180373	17486	Higher EFP production	1) Absolute power got increased due to MF1 machine speed varies from 285 to 290 mpm, Yankee machine running at 195 MPM & MF2 machine speed increased from 590 to 600 mpm 2) stock power increased due to low bagasse consumption
	Production (tpd)	255	264.01	9.01		
	SPC (kWh/ t of Bl pulp)	638	683	45		

SESHASAYEE PAPER AND BOARDS LTD, ERODE-638007
SPECIFIC STEAM CONSUMPTION FROM 01/03/24 TO 05/03/24 DATE : 25/08/2024

STEAM SPECIFICATION	2024/03/01	2024/03/02	2024/03/03	2024/03/04	2024/03/05	TOTAL
EQU FINISHED PAPER	464.88	397.56	445.21	447.95	484.78	2240.38
MARKET WETLAP PULP	75.00	94.00	150.00	159.00	110.00	588.00
IMP/IND/WPP PULP	28.40	29.20	30.80	31.20	26.50	146.10
TOTAL STEAM CONSUMPTION	4814.00	4570.00	4865.00	4822.00	4710.00	23781.00
CONDENSATION	746.00	709.00	825.00	778.00	814.00	3872.00
DEA STEAM FOR CONDENSATION	126.82	120.53	140.25	132.26	138.38	658.24
STEAM FOR PROCESS	3941.18	3740.47	3899.75	3911.74	3757.62	19250.76
STEAM / T OF BLD PULP	4.26	5.05	4.10	3.98	4.28	4.255
STEAM FOR MARKET PULP	198.61	326.98	488.80	508.71	357.24	1880.34
STEAM FOR PAPER PRDN	3742.57	3413.49	3410.95	3403.03	3400.38	17370.42
SP.STEAM CONSN./T OF EFP	8.05	8.59	7.66	7.60	7.01	7.75

SESHASAYEE PAPER AND BOARDS LTD, ERODE-638007
SPECIFIC POWER CONSUMPTION FROM 01/03/24 TO 05/03/24 DATE : 25/08/2024

POWER SPECIFICATION	24/03/01	24/03/02	24/03/03	24/03/04	24/03/05	TOTAL
EQU FINISHED PAPER	465	398	445	448	485	2240
MARKET WETLAP PULP	75	94	150	159	110	588
IMP/IND/WPP PULP	28	29	31	31	27	146
TOTAL POWER AVAILABILITY	715497	648282	705654	725195	692180	3486808
POWER WHEELING-TVL	0	0	0	0	0	0
OVERALL POWER CONSN.	715497	648282	705654	725195	692180	3486808
POWER / T OF BLD PULP	596	648	560	553	541	571
POWER FOR MARKET PULP	27796	41991	66711	70693	45152	252343
POWER FOR PAPER PRDN	687701	606291	638943	654502	647028	3234465
SP.POWER CONSN./T OF EFP	1479	1525	1435	1461	1335	1444



01 Technological limitation

02 Cost intensive - Renewable energy sources

03 Lack of Regulatory support

04 Increase in demand for Resources vs GHG

05 System Security

06 Understanding the Normalization and Integration with multiple variables

EnMS Challenges

Energy Management System (Contd...)

SS26

KWH : 1001.5
C.KWH : 6660289.5

SS27

AVG V_{LL} : 325 KWH : 3936.3
AVG Current : 54. C.KWH : 38339022.8

Total Watts : 303
AVG PoFactor : -1.1
Frequency : 50.

AVG V_{LL} : 32
AVG Current : 26
Total Watts : 11
AVG PoFactor : 0.8
Frequency : 50

ELECTRICAL ENERGY PARAMETERS

PARAMETER	UNIT	VALUE	UNIT	VALUE	UNIT	VALUE	UNIT	VALUE
...

RB PUMP TOTALIZER

DESCRIPTION	TRUCK	SHIFT-A	SHIFT-B	SHIFT-C	TODAY	LASTDAY	CURRENT MONTH	LAST MONTH
...

POWER(MW)	LOAD	FREQUENCY	POWER FACTOR	POWER1	POWER2
5046.50	11.12	49.70	0.97	3.345	8.5552

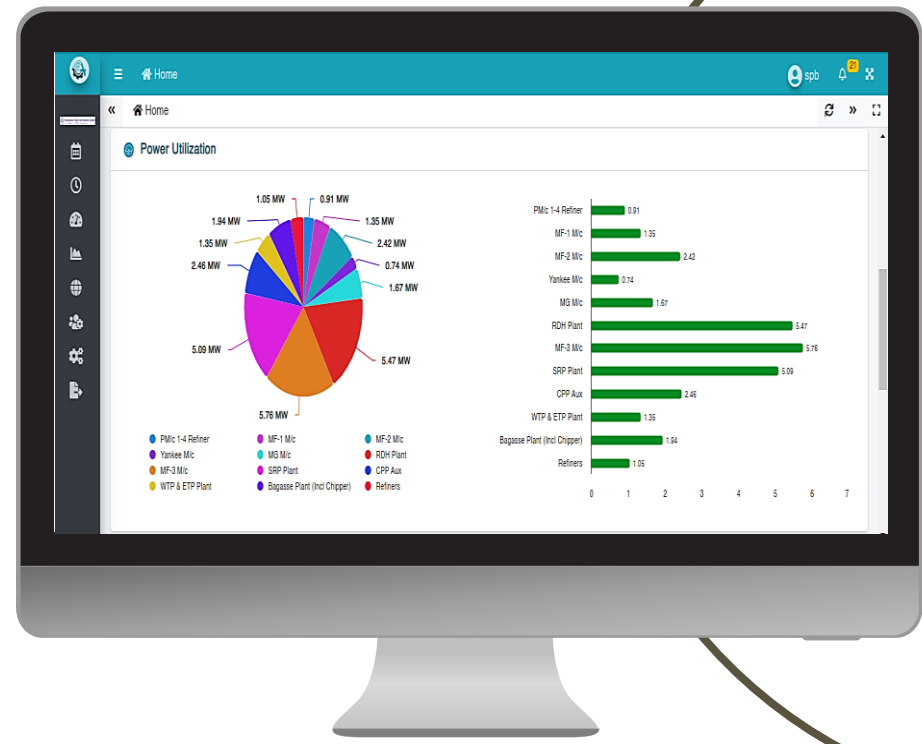
Automatic reading recorder, thus no manual errors

Precise tracking & real time monitoring of energy utilisation

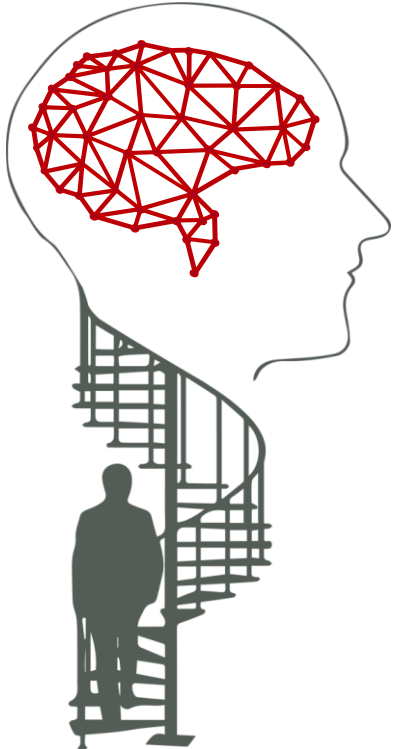
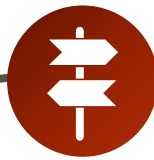
Overcomes the drawbacks of DCS in terms of storage and retrieval

Improved efficiency and cost reduction

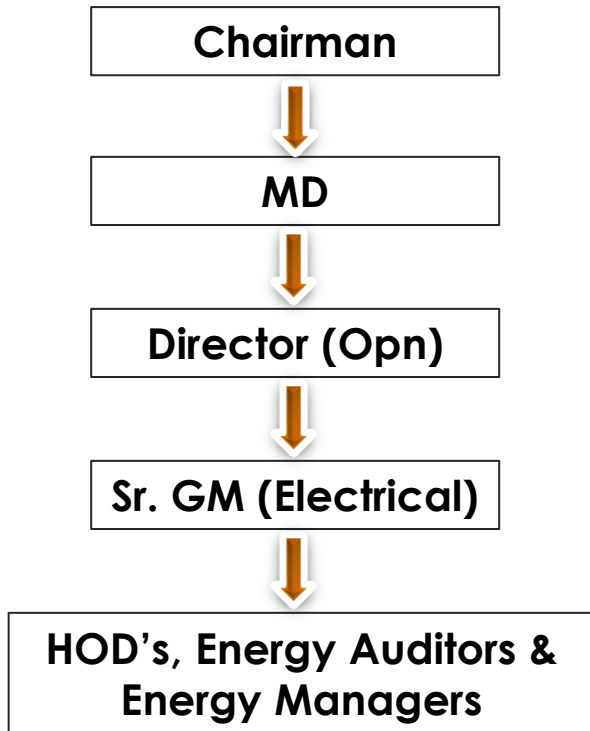
System capability to calculate scope 1 & 2 emissions to achieve lowered carbon foot print



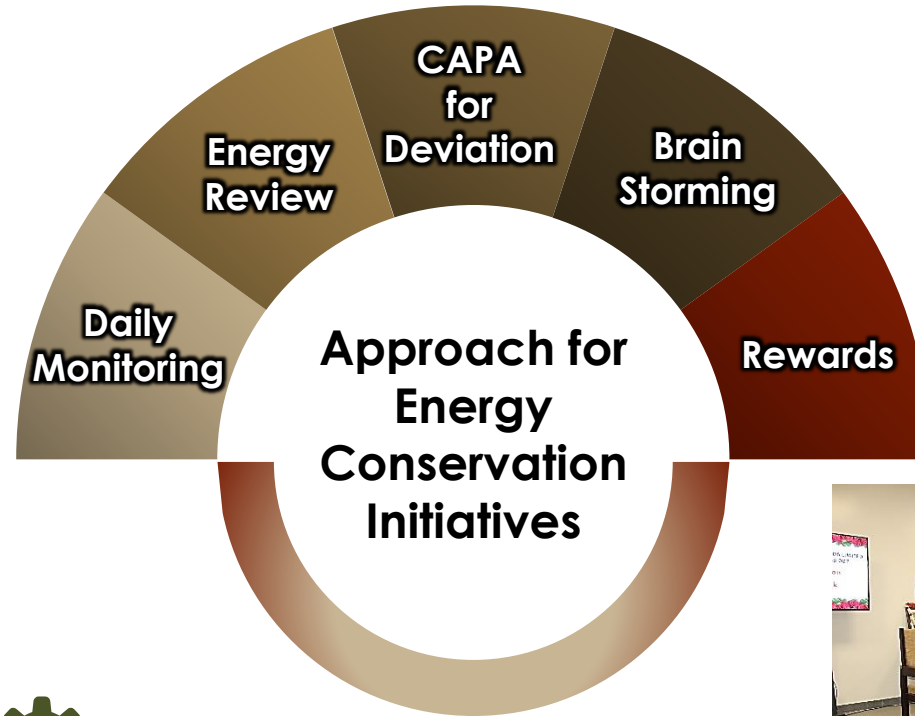
Online EMS



Energy Management Structure



Teamwork & Employee Involvement



Functioning Focus Area



Honesty

Dedication

Trust

Passion

Success

Learnings from CII Events

● Energy

- Modern trends and latest updates on **Steam Turbo Generator**
- Use of solid waste from recycled paper mills to develop **biofuels**
- Awareness about **future energy** sources / trends, available technologies

● Best Practices

- Resource Efficiency
- Optimization of minimal usage of **energy, water and fiber**



● Sharing of Knowledge

- **Sustainable pulp production**
- Advancement in automation for Pulp & Paper mills
- Exposure to experts in different fields



● Environment

- Exploring alternate Fuels
- New age evaporator system for **Zero Liquid Discharge**

Fostering towards NET ZERO Commitment

Moving towards Net Zero Emissions including scientific based targets for scope 1, 2 & 3 emissions

2015 -
2023

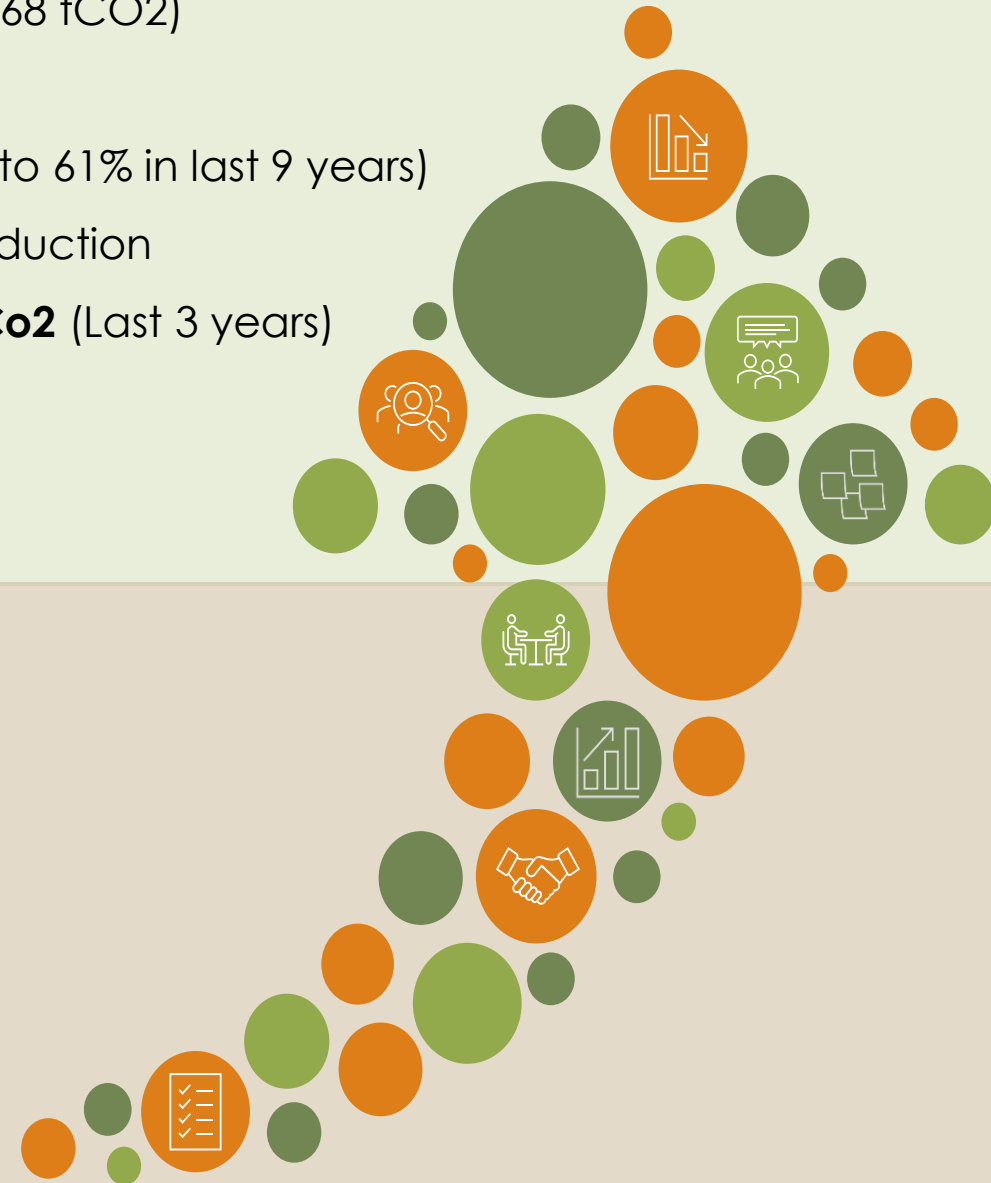
- **32% reduction** in Emissions (FY 15-16: 2.46 tCO₂; FY 22-23: 1.68 tCO₂)
- **100%** FSC Certified Wood Procurement – **Achieved**
- Increased Renewable Energy Source to **61%** (From 51.65% to 61% in last 9 years)
- **Installation of PCC plant** by Dec 2022 – 8050 TPA of CO₂ reduction
- Carbon positive through Farm Forestry Management: **12 tCo₂** (Last 3 years)

2023-
2027

- Procurement of more Indigenous material
- **ISO 50001 EnMS** Certification by 2023– **Achieved**
- Increase Renewable Energy Source to **71 %**
- **Elimination of Plastics** in our product
- **Biomass heating** with flue gas

2027-
2030

- **Hybrid Energy** (Solar) & Process heating by Solar thermal
- Supplier Emission Reduction by **40%**
- Scale up Renewable Thermal Energy Innovations
- Scaling up Pulp Production for Self Sufficiency & increasing Renewable Energy to the level of **75% to 80%**



Excelling Efforts



IPMA Paper Mill of the Year Award 2019-20
presented to
M/s Seshasayee Paper and Boards Ltd., Erode

Paper Mill of the Year Award recognizes an Indian paper mill that sets an example in areas of productivity, quality, HRD, research & development, developing export markets etc.



IPMA Energy Conservation Award 2021-22
presented to
M/s Seshasayee Paper and Boards Ltd., Erode

IPMA Energy Conservation Award recognises the efforts of Indian paper mills to become more energy efficient employing a range of innovations and technologies.



Recognize

Empower

Repeat





Our Efforts & Journey Continues in the Pursuit of “**Manufacturing Excellence in Energy Performance**”



**Proud to be a Responsible Paper Maker
& Energy Leader**

Thank You