



ITC Limited

Paperboards & Specialty Papers Division



Unit : Bhadrachalam



**India`s largest & Most technologically advanced Integrated Pulp & Paperboard Manufacturing Facility,
Pioneer in Ozone Bleaching, BCTMP Plant & ATFD Plant in India.**

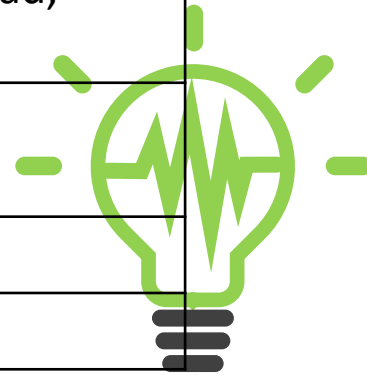




Certifications & Compliances



Category	Certification/ Compliance	Description
Manufacturing & Safety	ISO 9001	Quality Management System (QMS)
	ISO 14001	Environmental Management
	ISO 45001	Occupational Health and Safety Management
	ISO 50001	Energy Management
	BRC Global Standard	Hygiene & quality for Packaging & Packaging Materials
Regulatory	SMETA 4 Pillar	Member of SEDEX (Supplier Ethical Data Exchange)
	REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) - a European Union regulation
	RoHS	Restriction of Use of Hazardous Substances like lead, cadmium, mercury
Food Contact	BfR Recommendation XXXVI	German Regulations for migration
	US FDA CFR 21, 176.170	For contact with aqueous and fatty food
	US FDA CFR 21, 176.180	For contact with dry food



Core Competencies

Unit - Bhadrachalam

- ❖ 8.0 Lakh TPA Paper and Paper Board Production Capacity
- ❖ 1.2 Lakh TPA Bleached Chemi Thermo Mechanical Pulp (BCTMP) Pulp Capacity
- ❖ 100% Self Sufficiency in Power through in-house Co-Generation Power Plant
- ❖ **Green Covered area so far 4.71 Lakh Ha** through Social and Farm Forestry.
- ❖ **55.5% of total energy in 2023-24 is from RENEWABLE SOURCES**
- ❖ **Carbon Positive for 19 Consecutive years**
- ❖ **Water Positive for 22 years in a row**
- ❖ **Solid Waste Recycling Positive for the last 15 years**
- ❖ **Green Co Platinum Plus Certified by CII-GBC**
- ❖ **AWS Platinum Certification**
- ❖ TPM Methodology for manufacturing excellence
- ❖ Adopting I 4.0, IOT Based predictive models for energy & process optimization



Process at Unit Bhadrachalam



High Speed Chippers



Super Batch Digesters
SP. Steam Cons < by 30%



Ozone Bleaching *India's First*



BCTMP *India's First*



State of Art Paper / Board machines & Rewinders

High Speed Sheeters

Automatic Storage & Retrieval Facility Warehouse



Energy Consumption Overview



SOURCES



7 Turbo-Generators

4 Condensing, 3 Back Pressure
Design Capacity – 114.5 MW
Operating Load (Avg.) – 103.9 MW
100% Co-gen Self Sufficiency



Wind Power

Design Capacity – 46 MW
Share the generated power
with other ITC Units



Grid Power

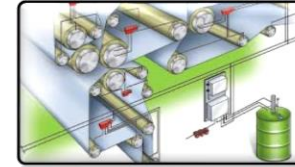
Usage corresponding to
maximum obligation (MD-15MVA)



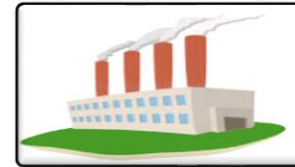
2 Diesel Generators

Design Capacity - 2 MW
Standby

SINKS



Paper Machines & SFT
41.74 MW



Utilities & Others
16.53 MW



Pulp Mill
17.86 MW



BCTMP
13.14 MW



Soda Recovery Plant
14.6 MW



FY 23-24

Energy Consumption Overview



SOURCES



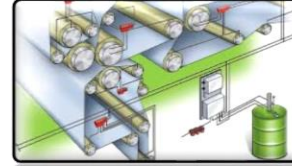
- 7 Turbo-Generators
- 3 AFBC Boilers
- 1 Bi-fuel Boiler
- 1 CFBC Boiler
- 1 Soda Recovery Boiler

All 7 are back pressure
(LP - 4.5 Bar)

4 are also extraction (MP – 11 Bar)
1 is also extraction (MP2 – 22 Bar)

LP Avg. Demand – 385 TPH
MP Avg. Demand – 87 TPH
MP2 Avg. Demand – 41 TPH

SINKS



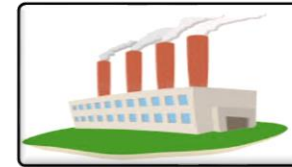
Paper Machines
176 TPH



Soda Recovery Plant
208 TPH



Pulp Mill & PSM
74 TPH



Utilities & Others
42 TPH

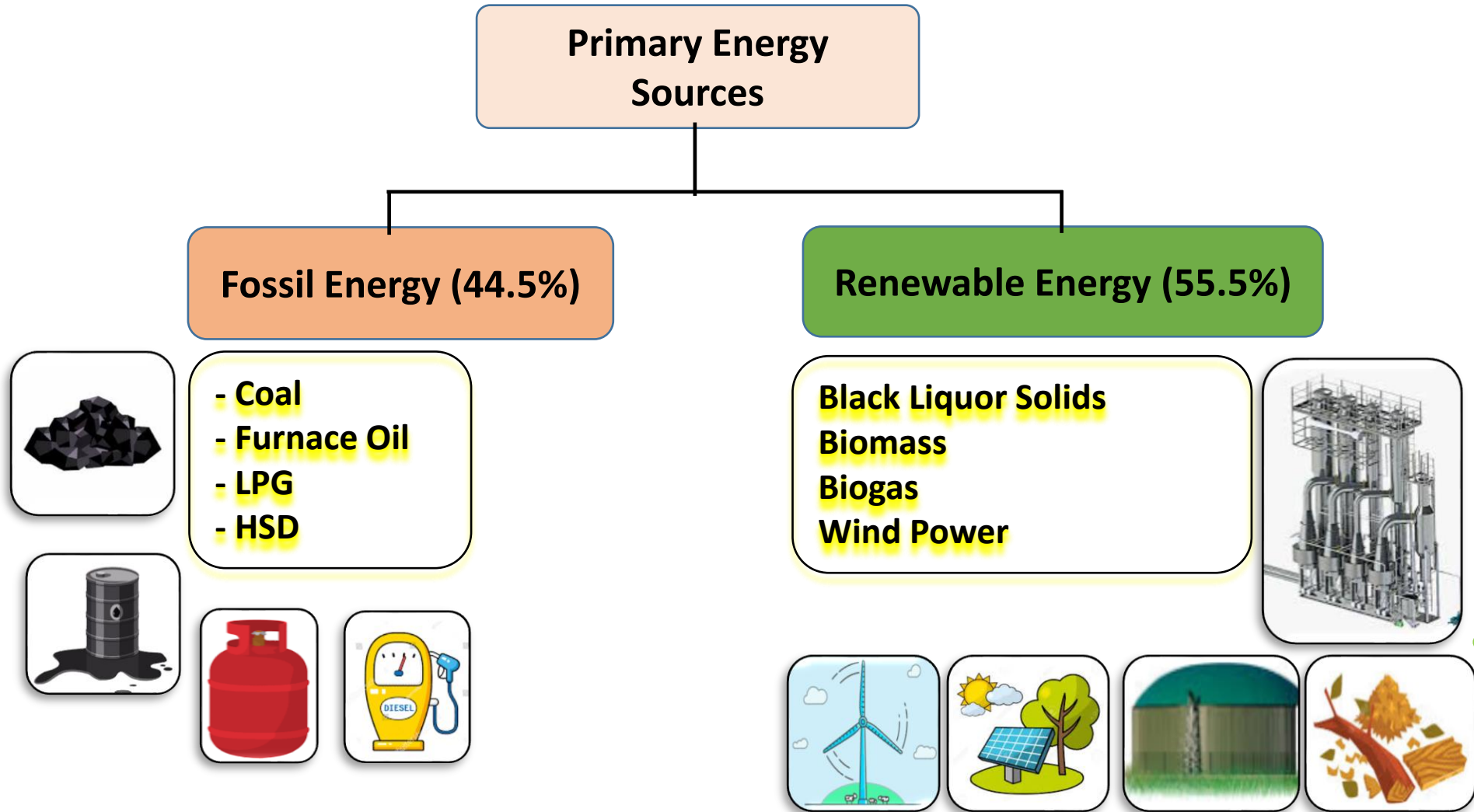


BCTMP
13.0 TPH



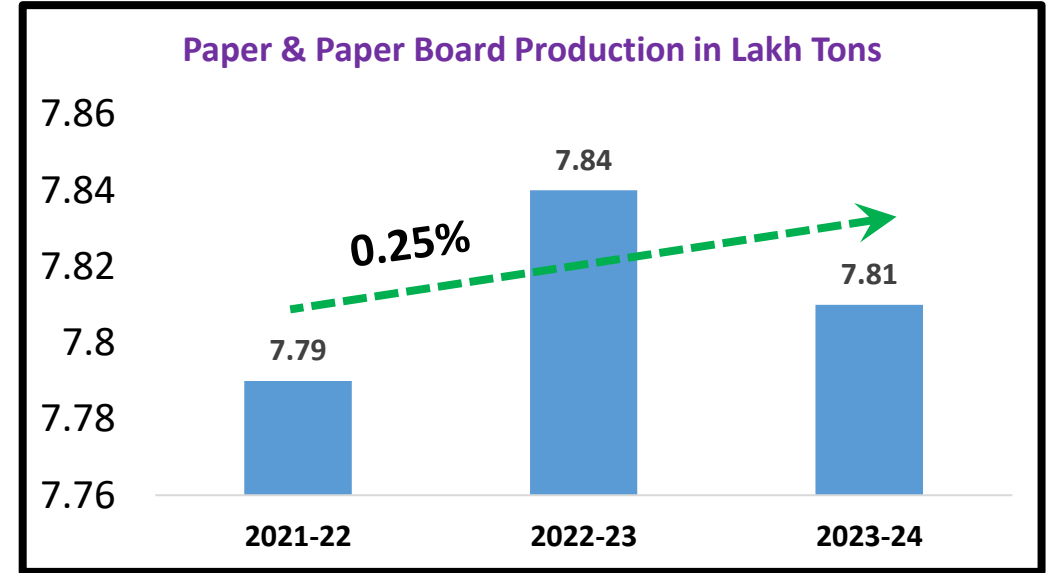
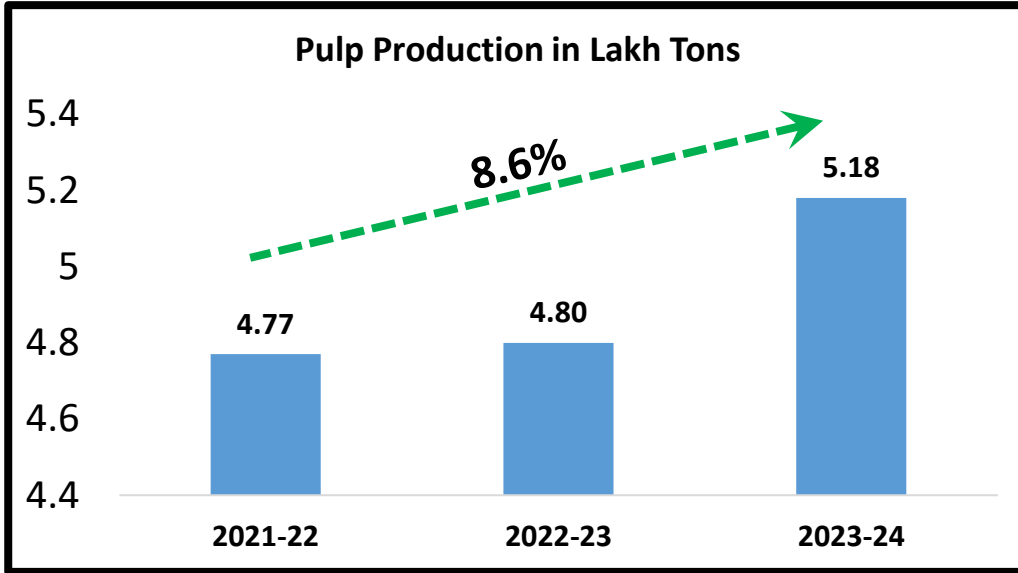
FY 23-24

Energy Consumption Overview

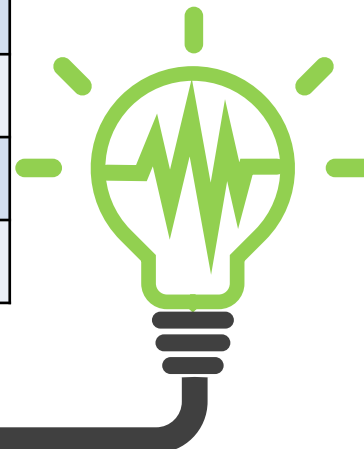


FY 23-24

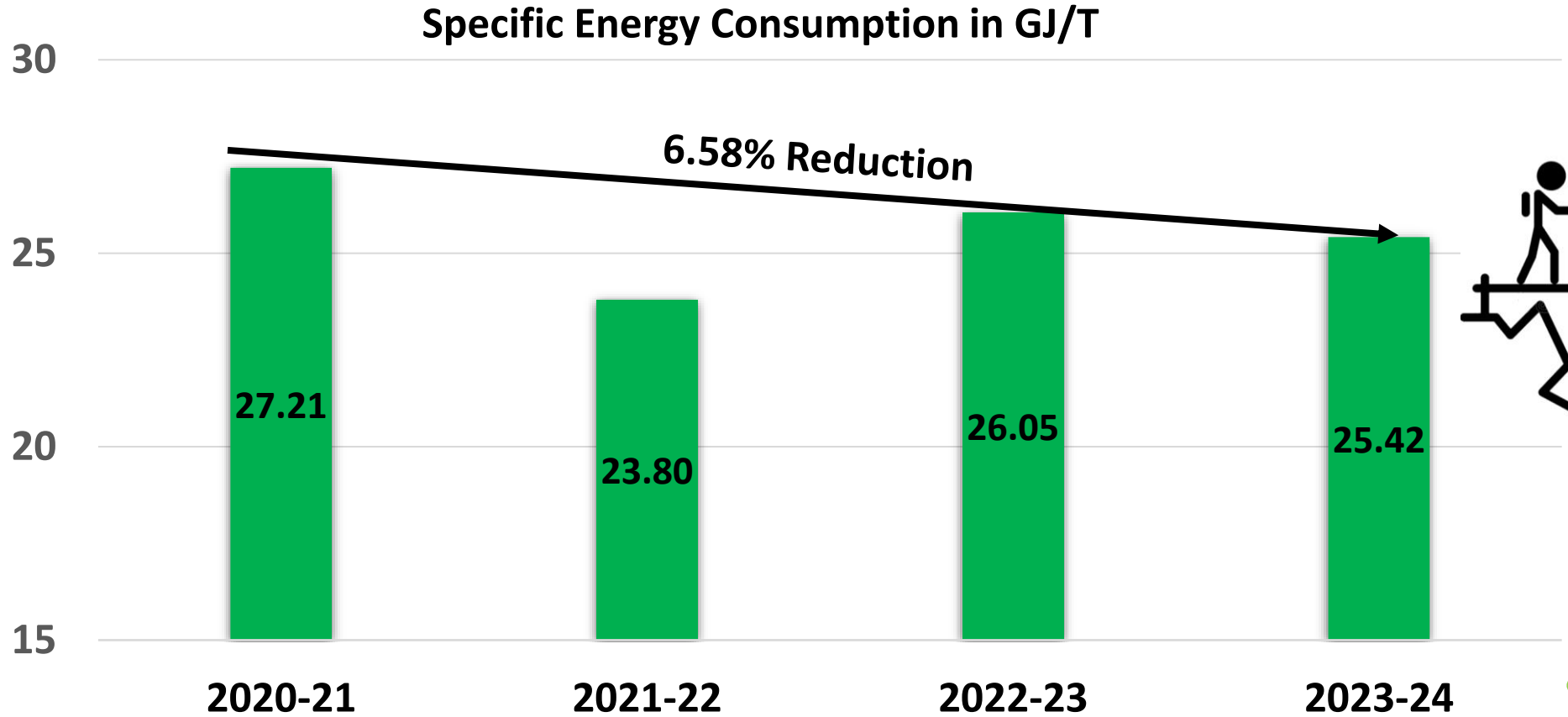
Production & Energy Consumption FY 2021-24



Description	UoM	Year		
		FY 21-22	FY 22-23	FY 23-24
Direct Energy	GJ	20518063	22989652	21264451
Electrical Energy	million kWh	820.12	858.09	912.36
Thermal Energy	million kcal	2553885	2659612	3002659



Specific Energy Consumption Reduction FY 2020-24

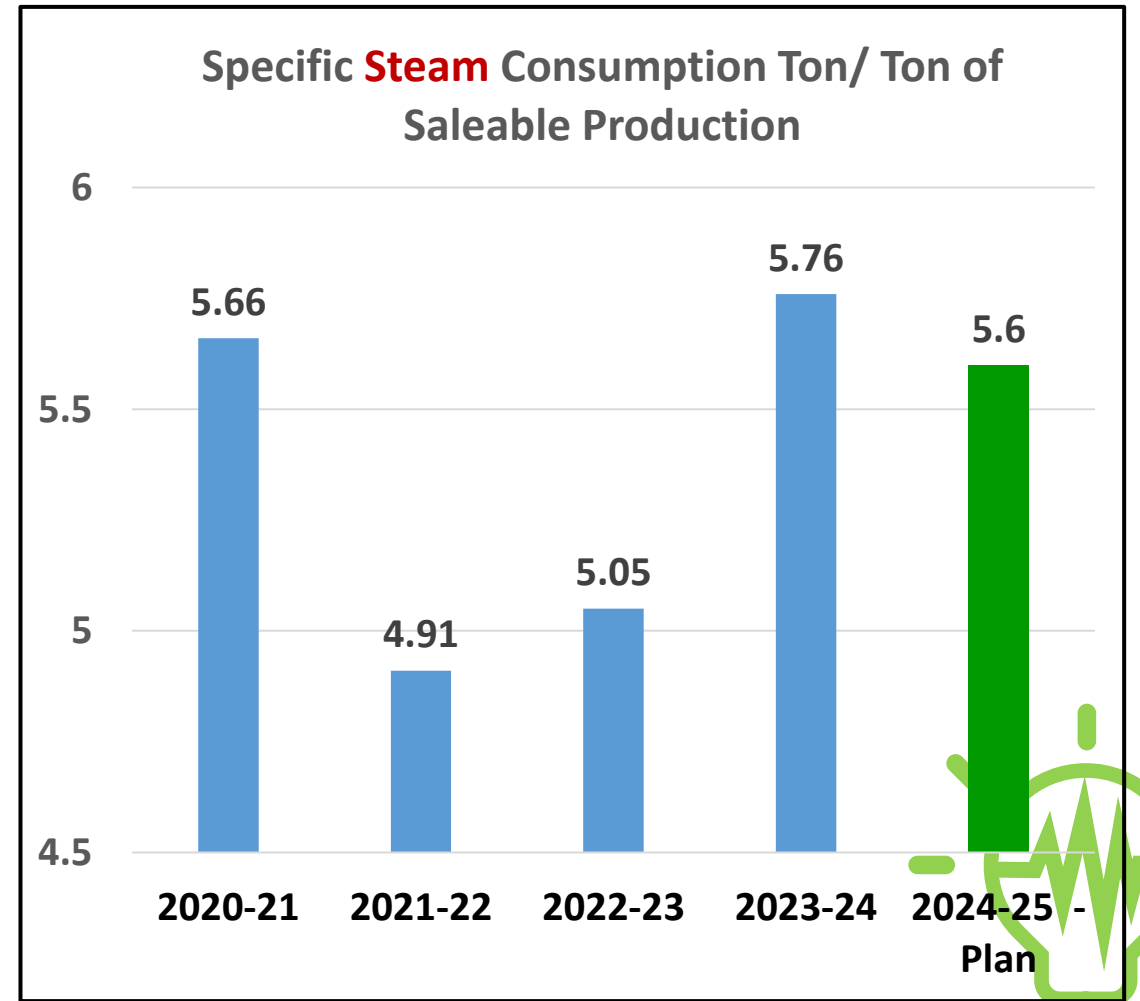
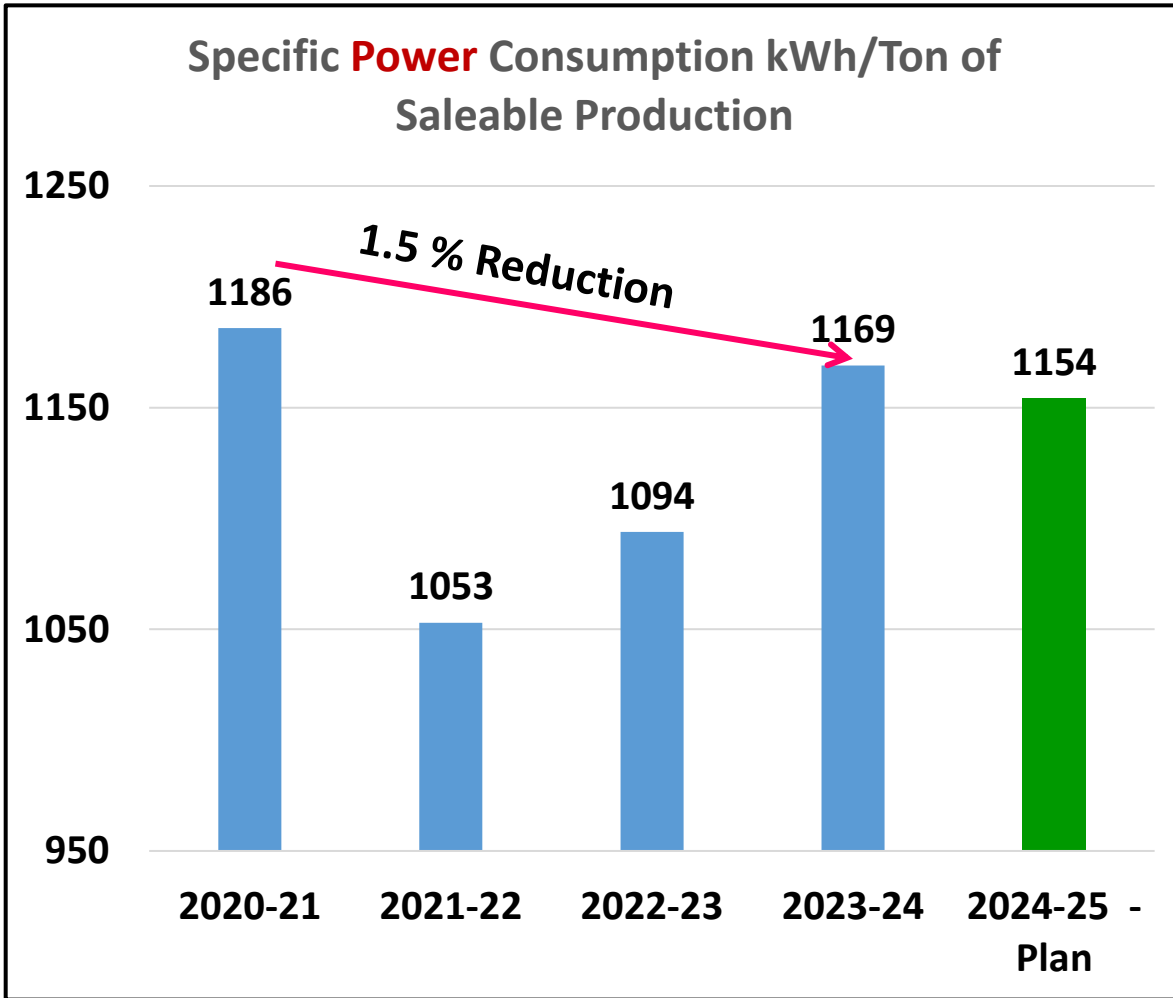


Reduction in Specific Energy Consumption Achieved by 6.58% in Last 3 Years

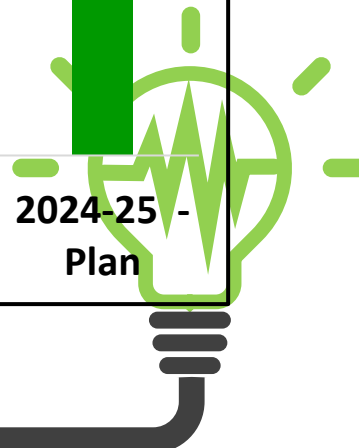




Specific Power and Steam Consumption Reduction FY 2020-23



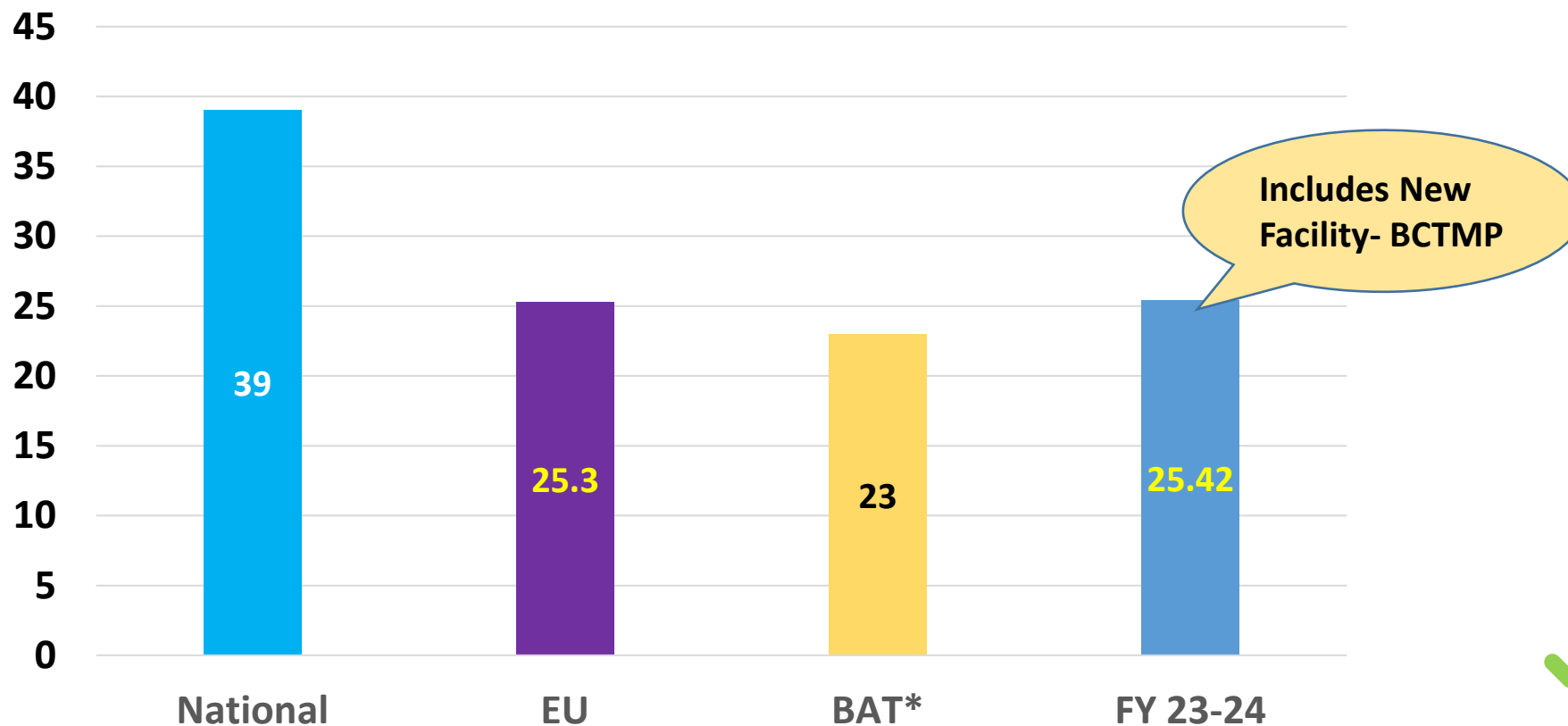
1.5% Reduction in Last 3 Years



Benchmarking with World Class Performance



Specific Primary Energy (GJ/T)



Benchmark Reference:
Centre for Science & Environment study published in 2010 for Pulp & Paper sector

*Best Achievable Technology (Without BCTMP)



Global & National Benchmarking



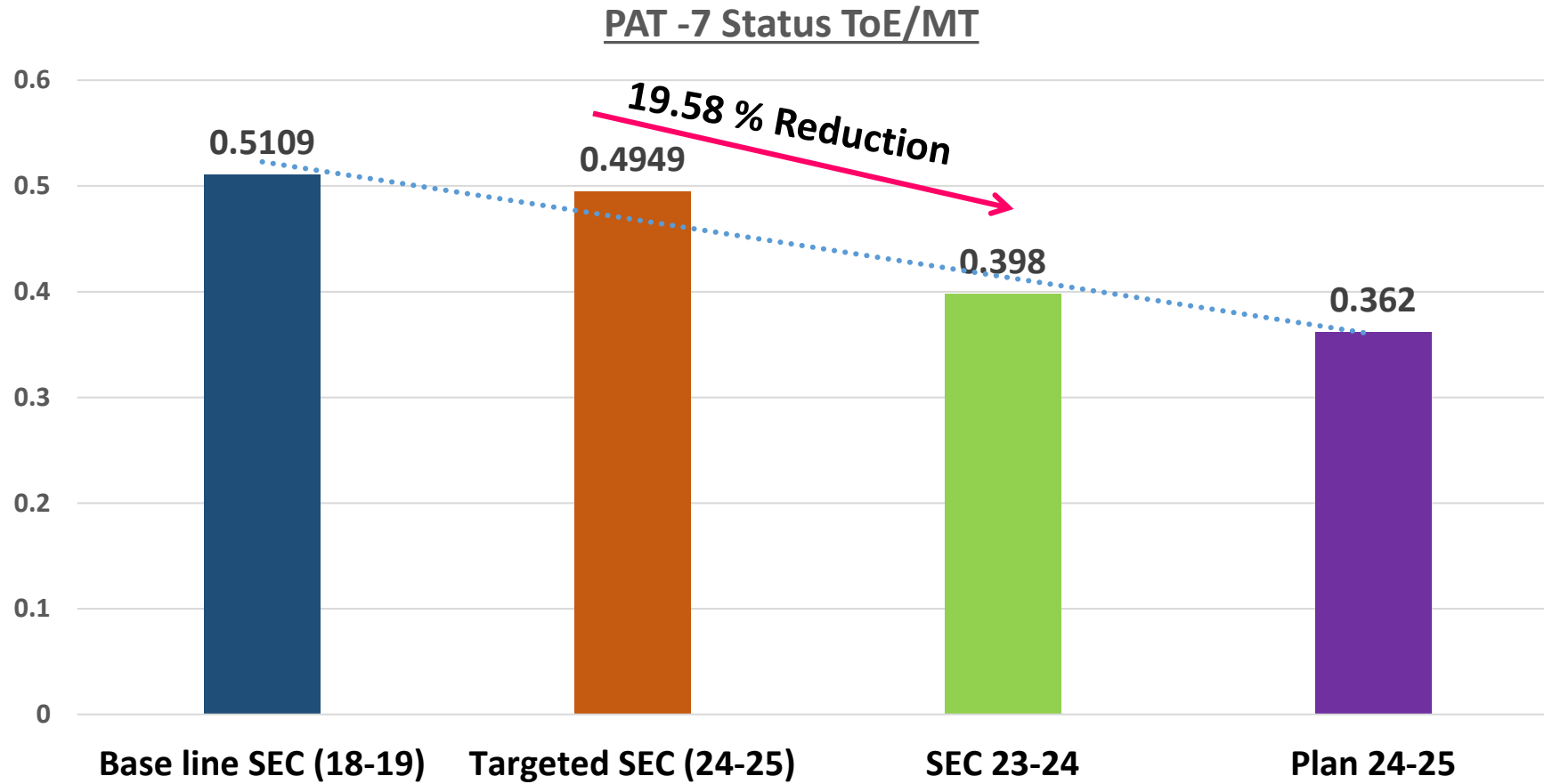
BENCHMARKING – GLOBAL & NATIONAL

Industry Group	Particulars	Units	Global Avg.	India Avg.	ITC BCM
Wood Based Mills	Specific Electrical Energy Consumption	kWh/tonne of paper	1000-1100	1400-1500	1169
	Specific Steam Consumption	Tonne of steam/tonne of paper	7.0-9.0	12.0-13.0	5.67



Reference: CPPRI 2018

PAT Performance



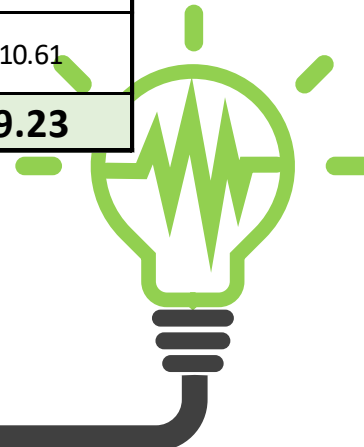
19.58 % Reduction of Specific Energy Consumption against Target in FY 23-24



Energy Conservation Plan 2024-25



S.NO	Proposal	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Annual Energy Saving (ToE)	Investment (Rs in Million)	Annual Savings (Rs in Million)	Estimated Payback Period (months)
1	Improving & maintaining the performance of various pumps at optimal level	7.89	0.00	678.68	25.10	47.36	6.36
2	Replacing Vapor Absorption Refrigeration Machines (VAM) with Vapor Compression Refrigeration Machines (VCM)	0.00	2317.41	231.74	34.50	38.62	10.72
3	Optimizing power consumption of Cooling Tower by installing aero profile FRP blades in place of conventional aluminium blades	0.20	0.00	17.11	1.30	1.19	13.07
2	Operating Cooling Towers with Temperature based ON-OFF controller to optimize fan power.	0.28	0.00	24.25	0.34	1.69	2.41
3	Preheating Boiler Feed Water by recovering heat from Kiln Flue gases to save LP Steam in De-aerators	0.00	3396.52	339.65	50.00	56.61	10.60
4	Recycling part of the exhaust air in the H&PV System to reduce energy loss and optimize energy consumption	0.00	1608.06	160.81	20.00	26.80	8.95
5	Replacing surface aerators with nano cavitation air diffusers for effluent treatment plant	1.79	0.00	154.00	9.50	10.75	10.61
	Total	10.17	7321.99	1606.23	140.74	183.02	9.23



Energy Conservation Projects Implemented FY 2021-24



ENCON Projects with “ZERO” Investment (2021-24)

Year	No. of Zero Investment Projects	Annual Energy Saved	Annual Thermal Energy Saved (T Steam)	Savings
		(Million kWh)		(Rs. Million)
2021-22	22	3.84	22440	44.67
2022-23	14	11.24	26658	139.00
2023-24	5	2.33	0	14.02
Total	41	17	49098	197.69

Total 41 Projects with ZERO Investments implemented in last 3 years resulted saving of Rs. 197.69 Millions

ZERO investment projects are coming from shop floor / TPM where Every employee irrespective of level contributing in Energy & Resource Conservation.



Energy Conservation Projects Implemented FY 2021-24



ENCON Projects with Investment (2021-24)

Year	No of Projects	Annual Electrical savings achieved		Annual thermal Savings			Total Annual savings		Investment made
		Unit Million kWh	Rs Million	Tons of FO	Unit Million Kcal	Rs Million	Unit Million kWh	Rs Million	Rs Millions
2021-22	6	4.87	25.66	435.60	9456.97	263.96	4.87	289.62	31.16
2023-24	3	3.96	23.77	-	-	0.00	3.96	23.77	45.05
Total	9	8.83	49.43	436	9456.97	263.96	8.83	313.39	76.21

Total 9 Encon Projects with investments implemented in past 3 years resulted saving of **Rs. 313.39 Millions**

Total 62 Encon Projects with & with out investments implemented in past 3 years resulted saving of **Rs. 511 Millions**





Innovative Project: 1

Energy Efficiency and RE Share Improvement through HPRB



Background:

Soda Recovery Plant is consist of 3 Boilers. HP Steam is being generated by firing of black liquor solids. Black liquor solids firing capacity is **1975 TPD** & Steam generation capacity is 280 TPH at 62 ata. RE Share is 47.4%.

Trigger Points:

- Frequent Maintenance for every 4 to 5 months.
- Runnability Issues
- Additional Pulp Production Enhancement
- 200 days for health restoration in 11 years

Key Actions Taken:

Replaced of all existing 3 Soda recovery boilers with HPRB (High Pressure Recovery Boiler) with following key performance indicators.

Steam generation pressure – 105 ata

Steam generation temperature – 515 Deg Cel

BLS Solids Firing – **2700 TPD**

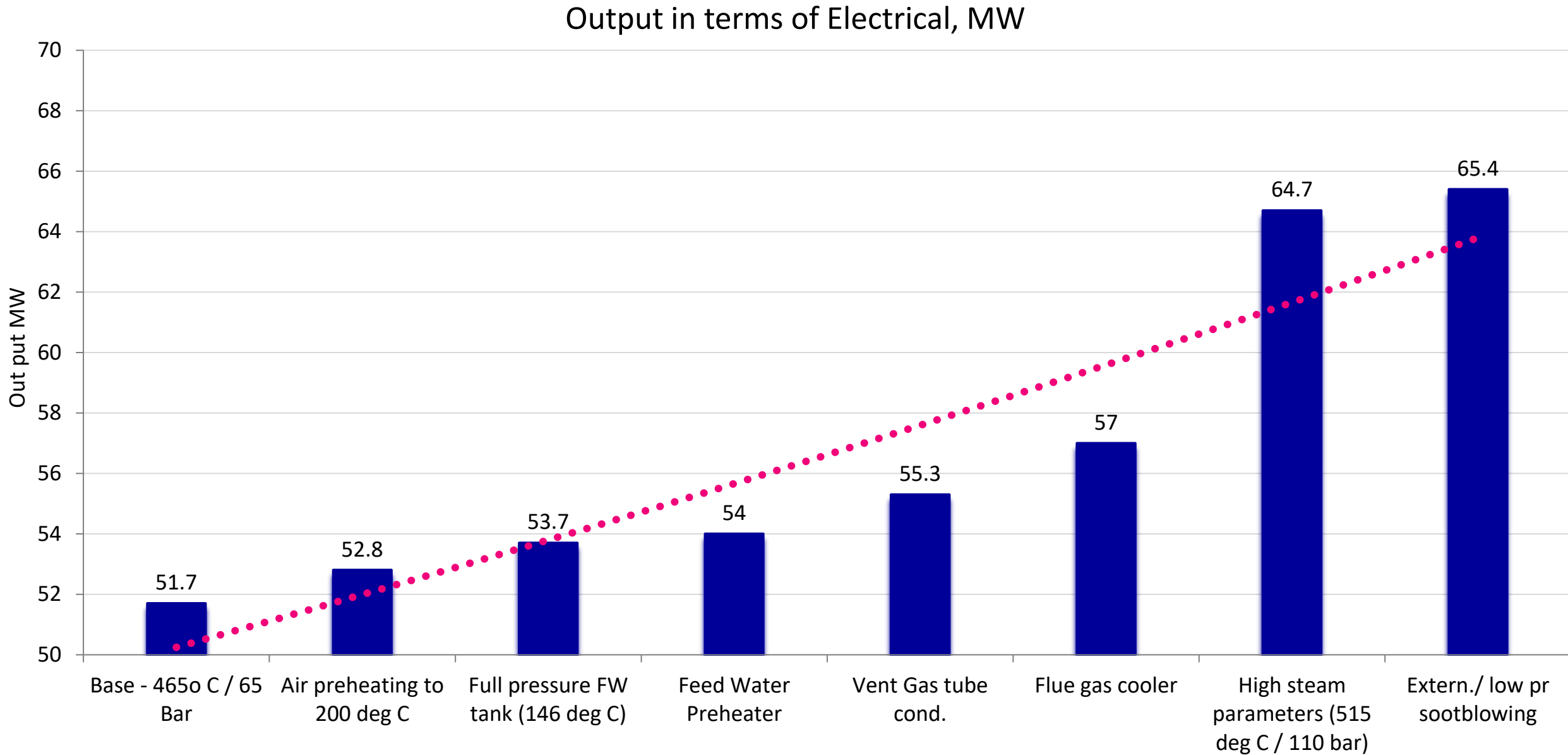


Largest High Pressure Recovery Boiler in India (2700 TPD)

Partnered with Valmet

	UOM	Existing SRB's	HPRB	Benefits
Boiler Capacity	↑ TPD	1975 (3 Boilers)	2700	Support more pulp production
Steam Generation	↑ TPH	270	404	More steam with increase in pulp production
Steam per Ton of Black liquor solids	↑ Tons per Ton of BLS	3.25	3.71	Additional 830 TPD steam at 1400 TPD Blown pulp production
Flues gas out let Temp	↓ °C	160	135 ± 10	More heat recovery and lower LP steam consumption in Deaerator
Steam temperature	↑ °C	460±10	505 ± 8	More power Generation
Steam pressure	↑ Bar	65	110	More power Generation
Dust content in Flue gas	↓ mg/Nm3	115	20	Lower emissions
Green liquor dregs	↓ Mg/l	1800	800	Lower dead load and lower lime consumption in Causticizing Plant

HPRB Features for Higher Thermal Energy



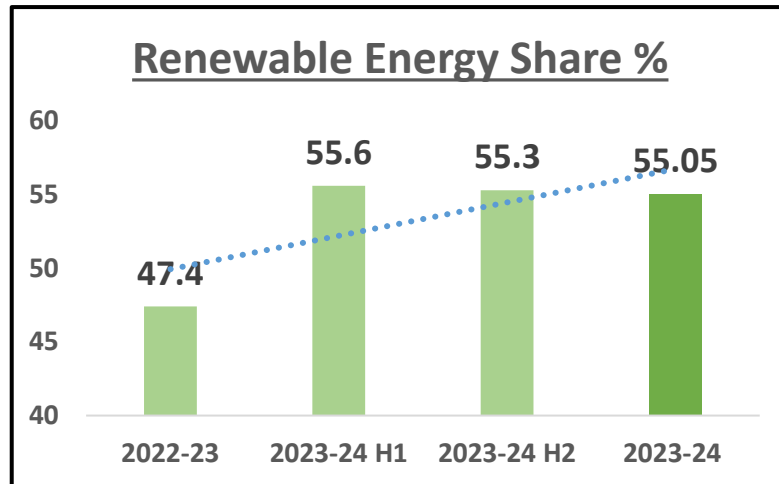
Energy Efficiency and RE Share Improvement through HPRB



Results & Savings:

- RE Share improved from 47.4% to 55.05%. (7.65%)
- Coal consumption reduced by 82446 dry basis Tons (13.6%).
- Specific Energy Consumption (SEC) improved by 2.5%.

Rs. 41.22 Cr



7.65% Improvement



Innovative Project: 2

Refiners Productivity and Efficiency Improvement through Morphology Sensors



Innovation Table

Type of Innovation	Process Model
Parameter	Energy Efficiency
Environmental Focus	Reduction in Coal Consumption
Intangible Benefits	Fiber Properties & Quality Improvement
Uniqueness	Horizontal Deployment
Replicability of the Project	Yes
Cost Benefits of Project	INR 57.43 lakhs Per annum
Investment of Project	INR 188 lakhs

BCTMP, we are measuring the Degree SR, CSF, Buk, Breaking Length, Tear & Burst factor values offline. Any variation in degree SR and Other pulp quality parameters will result in quality deviations. With Morphology sensors, Real time visibility of average fiber length & fines data helps us to optimize BCTMP Process. Which has resulted in savings of 120 kW/Hr power saving.



Refiners Productivity and Efficiency Improvement through Morphology Sensors



Problem Statement:

BCTMP, we are measuring the Degree SR, CSF, Buk, Breaking Length, Tear & Burst factor values offline. It consumes nearly 8-10 hours for result. Any variation in degree SR and Other pulp quality parameters will result in quality deviations. With Morphology sensors, Real time visibility of average fiber length & fines data helps us to optimize BCTMP Process & also corrections can be done at paper machines proactively.

Without this data,

1. It is difficult to assess pulp quality & we are taking actions after some off quality production at jumbo level.
2. Strength properties prediction & closed loop correction is possible with this fiber morphology data to get consistent quality.

Trigger Points:

- Quality Rejections
- Production Loss
- Energy Loss
- Lack of Real time visibility of fiber properties.



Innovative Project: 2

Refiners Productivity and Efficiency Improvement through Morphology Sensors



Key Actions Taken:

- Installed BTG Morphology Sensors at HC Refiner Outlet & Final Tower Inlet.
- Realtime Visibility to BCTMP Process after HC & LC Refiners to help reduce final quality variability of BCTMP pulp.

Results/Savings:

- Reduction in Quality Rejections/ Production Loss.
- Real Time Visibility of Pulp Fiber Properties (length, width, Curl, Kinks & Shives etc.)
- Achieved Power Saving is 120 kW/Hr.
- Coal Savings 1700 MT/Annum

**Rs. 57.43
Lacs**



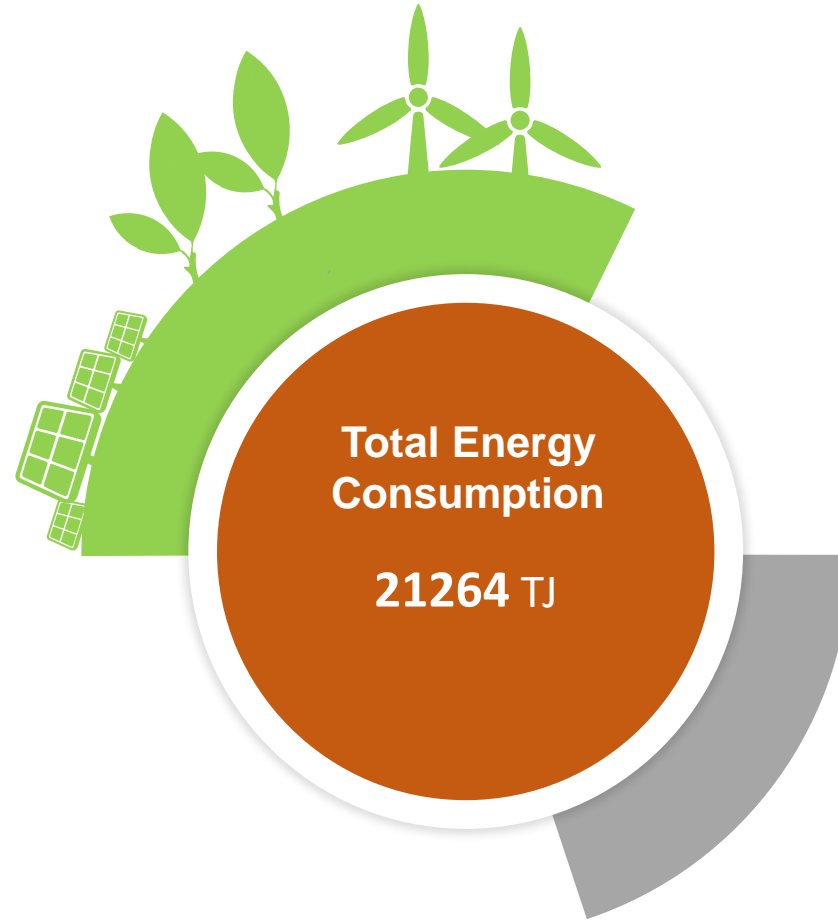
SPM 5550 Sensor



Control Cabinet



Utilisation of Renewable Energy Sources



53.7%

Renewable sources

- Black Liquor (49.08%)
- Biomass & Biogas (4.16%)
- Wind (0.47%)

46.3%

Fossil sources

- Coal (44.01%)
- Furnace Oil (1.57 %)
- HSD & LPG (0.34%)



FY 2023-24

Utilisation of Renewable Energy - Onsite



Type of Fuel	Year	Installation MW	Total Elec energy (Mill Kwh)	% on overall
Black Liquor	2021-22	40	355	43.2%
Black Liquor	2022-23	65	345	41.8%
Black Liquor	2023-24	65	471	49.08



Utilisation of Renewable Energy - Offsite



Type of Fuel	Year	Installation MW	Total Elec energy (Mill Kwh)	% on overall
Wind Energy	2021-22	46	390	0.79
Wind Energy	2022-23	46	257	0.47
Wind Energy	2023-24	46	238	0.47

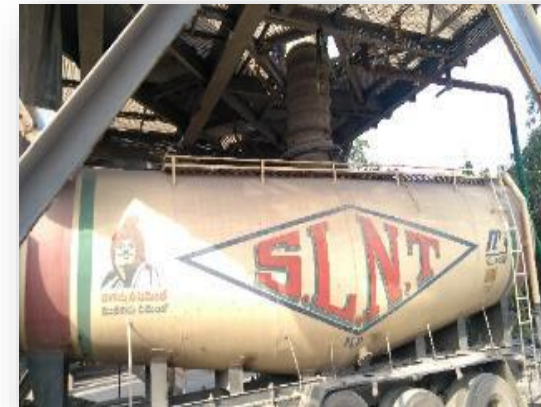
Wind energy is common to ITC group and 32% share to Unit BCM during Monsoon season and it is Avg 5% per annum



Waste Utilisation and Management



- **100% Solid waste utilization/ recycling in Bhadrachalam unit.**
- **Chipper dust & bark** used in Green Boiler for **steam generation** (Also contributing in renewable energy generation)
- 100 % **Fly ash** utilization **in cement industries.**
- **Lime sludge recycled with Lime Kiln.**
- Andritz Press **sludge** is utilized by external agency for **card Board** manufacturing & **Egg tray** manufacturing
- **Effluent Treated discharge for irrigation / plantations.**



Waste Utilisation and Management



Utilization of Waste in FY 2018-21

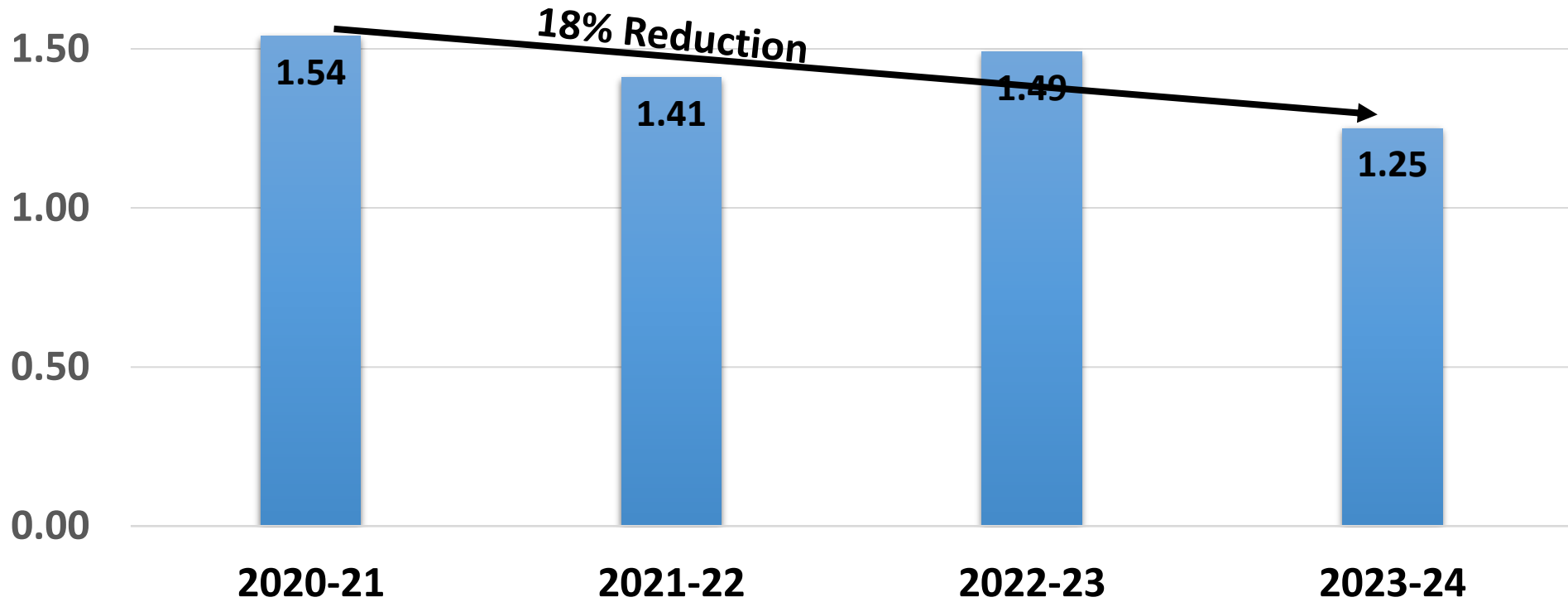
Type of Fuel	Year	Qty in MT	GCV of fuel (kCal/kg)	Heat Value (million kcal/year)
Chip dust & Biomass	2021-22	52293.94	3374	176596
Chip dust & Biomass	2022-23	75100.86	3254	244411
Chip dust & Biomass	2023-24	67152.2	3147.94	211391
Bio Gas equivalent to LPG	2021-22	2.9	10500	30.13
Bio Gas equivalent to LPG	2022-23	1.5	10500	15.76
Bio Gas equivalent to LPG	2023-24	3.5	10500	37.04



GHG Inventorisation



Specific GHG Emissions (t CO₂e/t)



18% Reduction in Sp. GHG Emissions in Last 3 Years





Green Purchasing Policy:



S.No	
1	Procure maximum from Vendors/Service Providers who have robust Management Systems like ISO 9000& 14000 or equivalent
2	Procure energy efficient equipment.
3	Source maximum from the nearest market.
4	Motivate Vendors to conserve natural resources, minimize waste generation, emissions by adopting energy efficient processes
5	Ensure Suppliers & Service Providers to comply with applicable legal requirements w.r.t. EHS



Implementation of ISO 50001:2018 (EnMS)



Continual improvement of energy performance by complying with the requirements of ISO 50001:2018 Energy Management System (EnMS) standards.

- Formulation of Energy Policy
- Initial Energy Review, Baseline establishment
- Identification of EnPIs
- Identification of objectives, targets & management programs
- Operational Controls, Documentation
- Internal auditor Training
- Internal audit
- Audit findings closing
- Management Review
- Certification Audit Stage-1
- Certification Audit Stage-2



MANAGEMENT SYSTEM CERTIFICATE

Certificate no.:
C553262

Initial certification date:
20 January 2023

Valid:
20 January 2023 – 19 January 2026

This is to certify that the management system of

ITC Limited_PSPD_Bhadrachalam Unit

(Paperboard and Specialty Papers Division), Unit- Bhadrachalam, Sarapaka, Dist. Bhadradri Kothagudem - 507128, Telangana, India

has been found to conform to the Energy Management System standard:
ISO 50001:2018

This certificate is valid for the following scope:

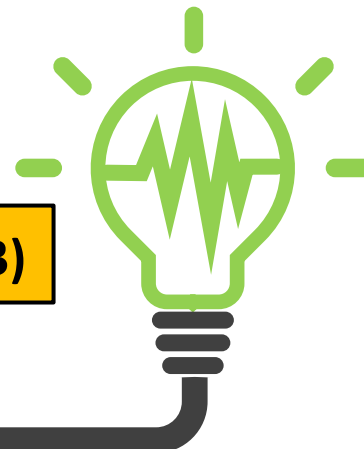
Development and manufacture of pulp, paper, paperboard and specialty paper



GreenCo Certification



ITC PSPD, Unit: Bhadrachalam achieved **Greenco Platinum+ (Plus)** Rating -2023)





AWS – Platinum Certification



CERTIFICATION LABEL: **AWSPSPD-001**
Valid Until: **2027-05-15**

CERTIFICATE

AWS International Water Stewardship Standard v2.0

**ITC Paperboards & Specialty Papers Division-
Bhadrachalam Unit**

Sarapaka Village, Burgampahad Mandal, Bhadradri
Kothagudem District
Telangana, 507128
INDIA

AWS Reference Number: AWS-000454

WSAS herewith certifies that the above mentioned site or group is in compliance with the AWS International Stewardship Standard v2.0. This certificate is valid for a period of three (3) years, contingent upon annual surveillance audits and provided that the site or group continues to meet the conditions as laid out in the AWS Standard, AWS Certification Requirements and the Certification Agreement with WSAS.

Catchment: Godavari River Basin
Industry Sector: Paper & Forest Product Production
Scope: Single Site

Certification level

Certified Platinum

Authorised by Lisa Seufert, Head of Certification

**ITC PSPD, Unit: Bhadrachalam certified AWS Platinum certification
in July'24 (Second in India's Pulp & Paper Sector)**





Thank You