Seshasayee Paper and Boards Limited, Erode

EXCELLENCE IN ENERGY MANAGEMENT

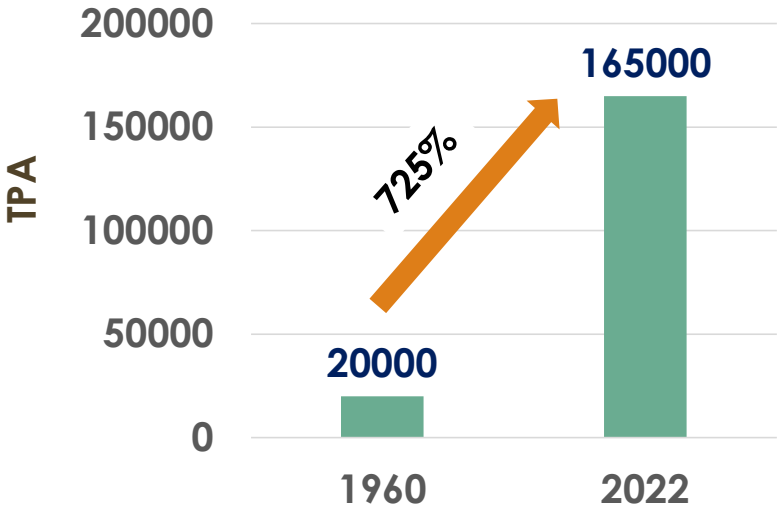
23.08.22

Team: D Radhakrishnan, Manager (Pulp Mills) & A Kavinkumar, Jr. Manager (Boiler)

"Healthy Performance Based on Conservation & Sustainability Principles"

About Us

- Flagship company of SPB ESVIN group
- Product Portfolio – Writing, Printing, Posters & Specially Boards
- **Production capacity**



- Carbon & wood positive
- All our products are 100% Recyclable & Biodegradable
- Help marginal farmers to plant over 17.29 crores of seedlings every year in about 20,000 acres of land

61.50% Energy from Renewable Sources, at present we are at 70%

"Tested by time and Trusted by all"

Sustainable Practices in SPB – Paper Manufacturing Process

White Liquor

Black Liquor

Burnt Lime

Lime Mud

Green Liquor

"To Manufacture Quality Products at Competitive Cost through Technology and Team Work"

Our Energy Policy

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

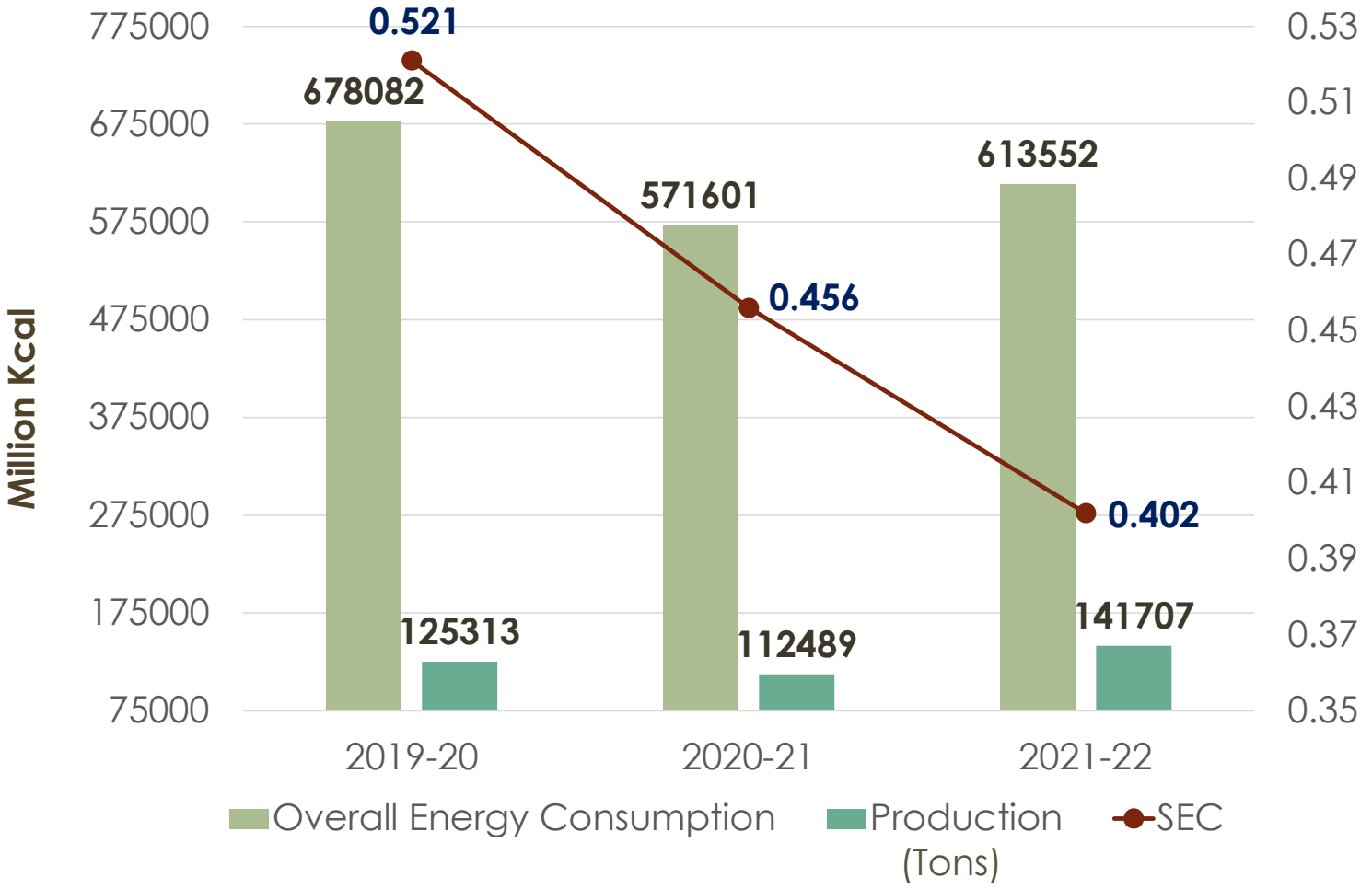
- **Analysing** the present status of energy generation and consumption in our mill
- Fixing energy consumption **targets** for each department
- **Monitoring** energy consumption on a daily basis
- Conducting periodic **energy audits**
- Fixing the yearly target for energy reduction and implementing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

K S Kasi Viswanathan
Managing Director

08.02.2016

Plan **Do** **Check** **Act**

Overall Energy Consumption & SEC Trend

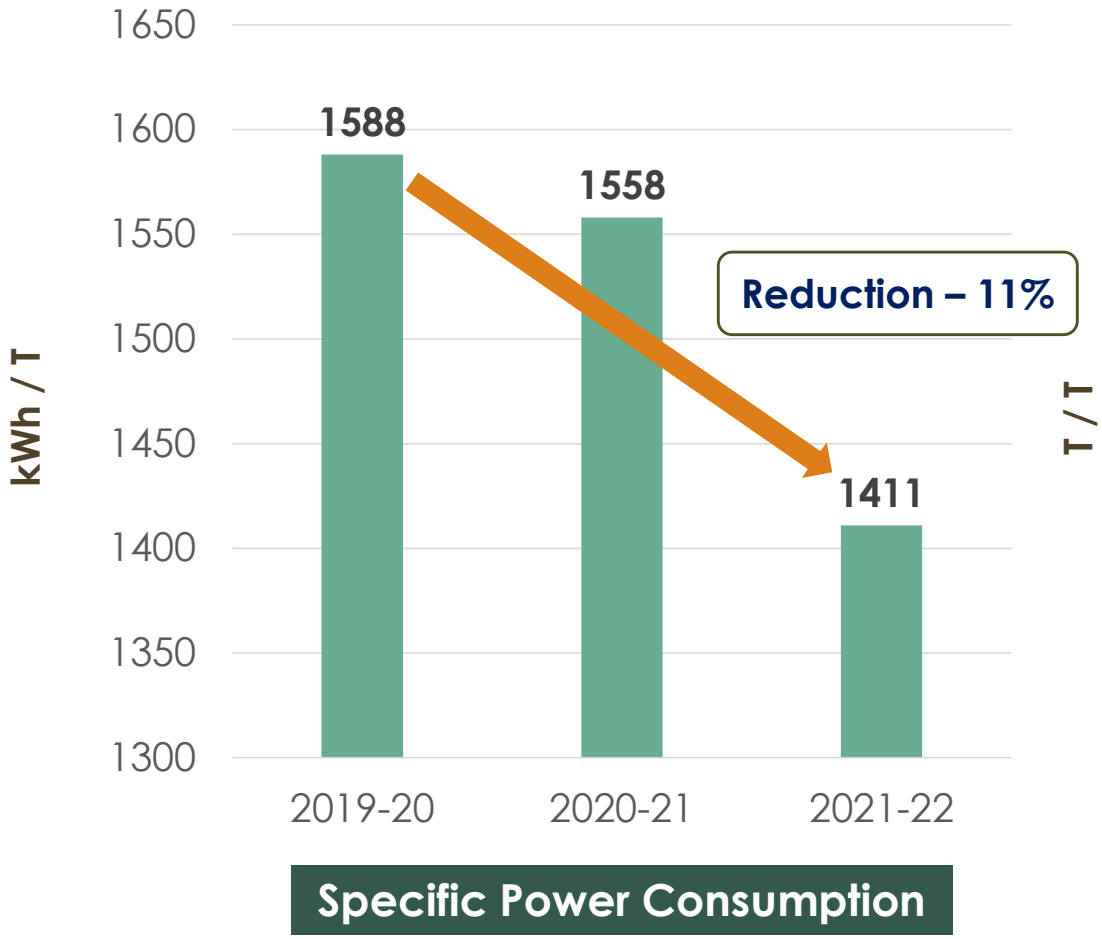


Key Highlights

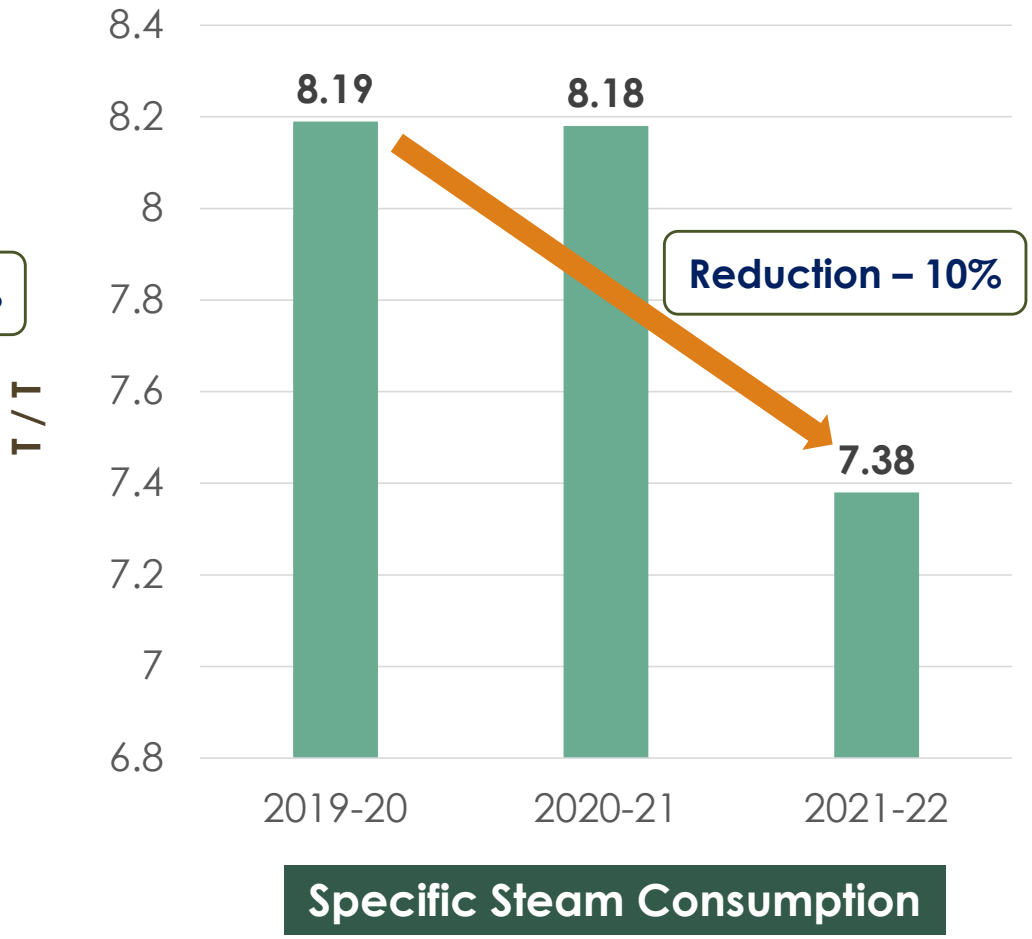
- Reduction in Energy Consumption – **10%**
- Increase in Paper Production – **13%**

Reduction in SEC – 23%

SPC & SSC Trend

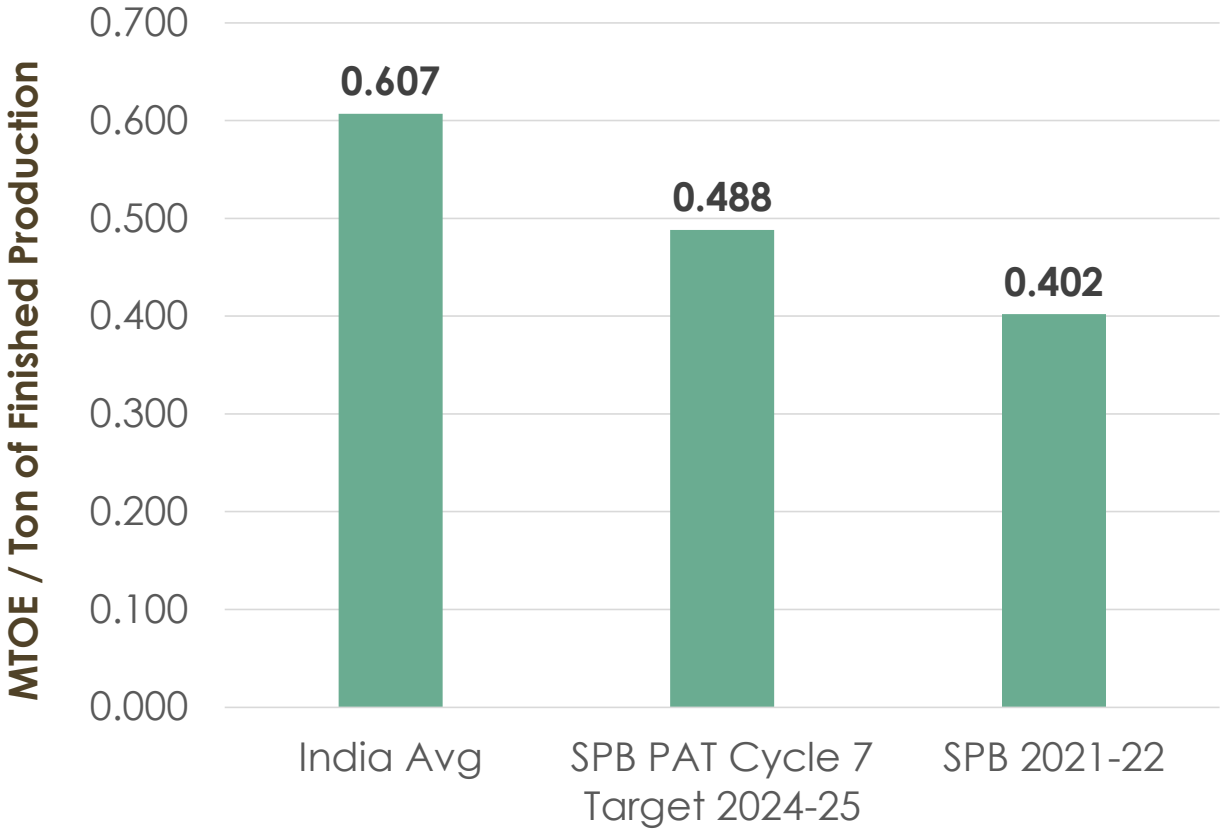


Specific Power Consumption



Specific Steam Consumption

Benchmarking & Road Map



Specific Energy Consumption

Live Projects – FY: 2022-23	
In Pipe line	16 Projects
Annual Savings	1100 MKcal
Reduction in SEC	8%
Investment	89.3 Lacs

Projects Planned – FY 22-23

(Source: Gazette Notification Dt: 31.03.2016 & 26.10.2021

Benchmarking & Road Map (Contd...)

Our aim: Moving towards Net Zero Emissions including Scientific based Targets for Scope 1, 2 & 3 Emissions

2015-2023

Initial Stage

- **27% reduction in Operations Emissions** (FY 15-16: 2.46 tCO2; FY 21-22: 1.79 tCO2)
- **100% FSC Certified Wood Procurement** - Achieved
- **Increase Renewable Energy Source to 70%** (FY 21-22: 61.50%)
- **Carbon Neutral through Farm Forestry Management** – 15 tCo2 (Last 3 years) – Already we are **Carbon Positive**

2023-2027

Mid Term Plan

- Procurement of more Indigenous material
- **ISO 50001 EnMS Certification by 2023**
- **Installation of PCC plant by Dec 2022** – 100 TPD of CO_2 reduction
- Process heating by Solar thermal
- **Elimination of Plastics in our product**
- **Biomass heating** with flue gas

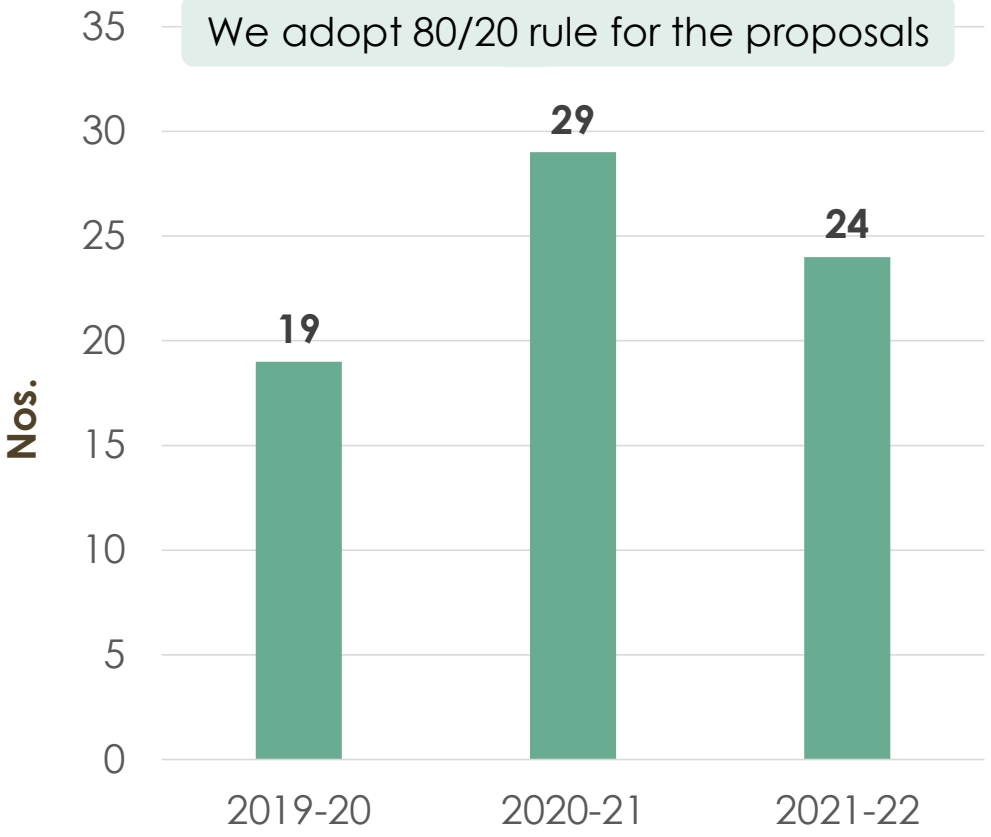
2027-2030

Long Term Solutions

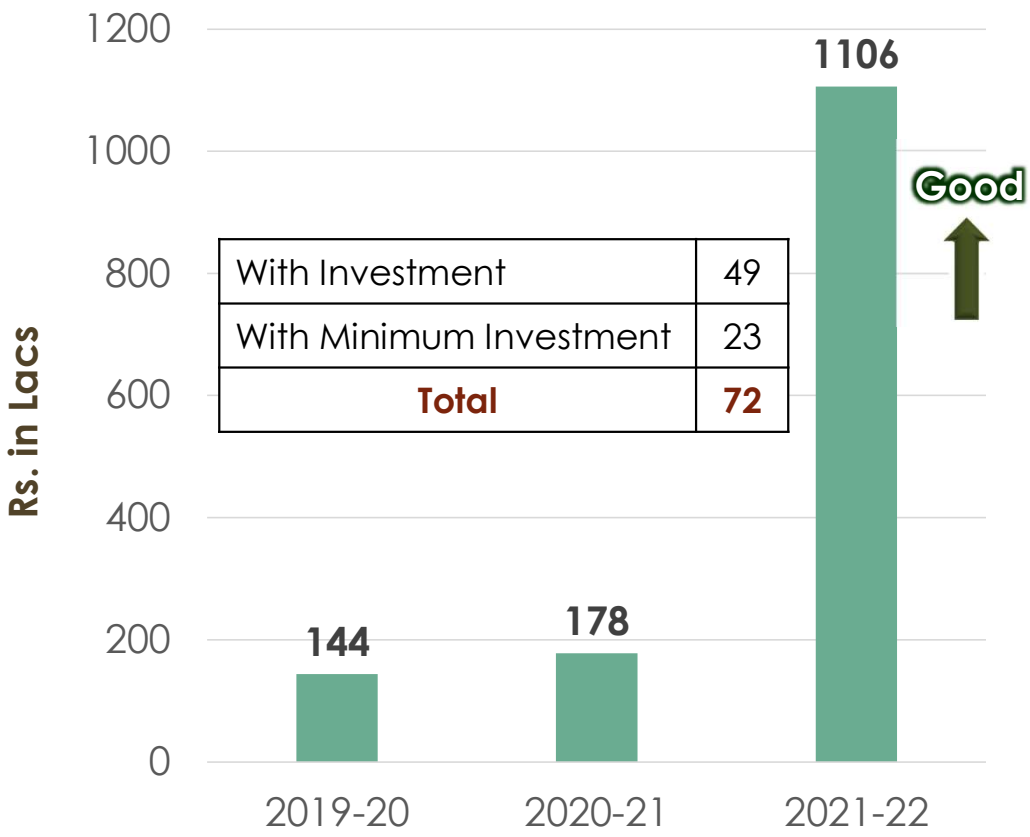
- Hybrid Energy (Solar)
- **Supplier Emission Reduction by 40%**
- Scale up **Renewable Thermal Energy Innovations**
- Scaling up **Pulp Production for Self Sufficiency** & increasing Renewable Energy to the level of **75% to 80%**

Project Summary: 2019-20 to 2021-22

We adopt 80/20 rule for the proposals



ECS Implemented

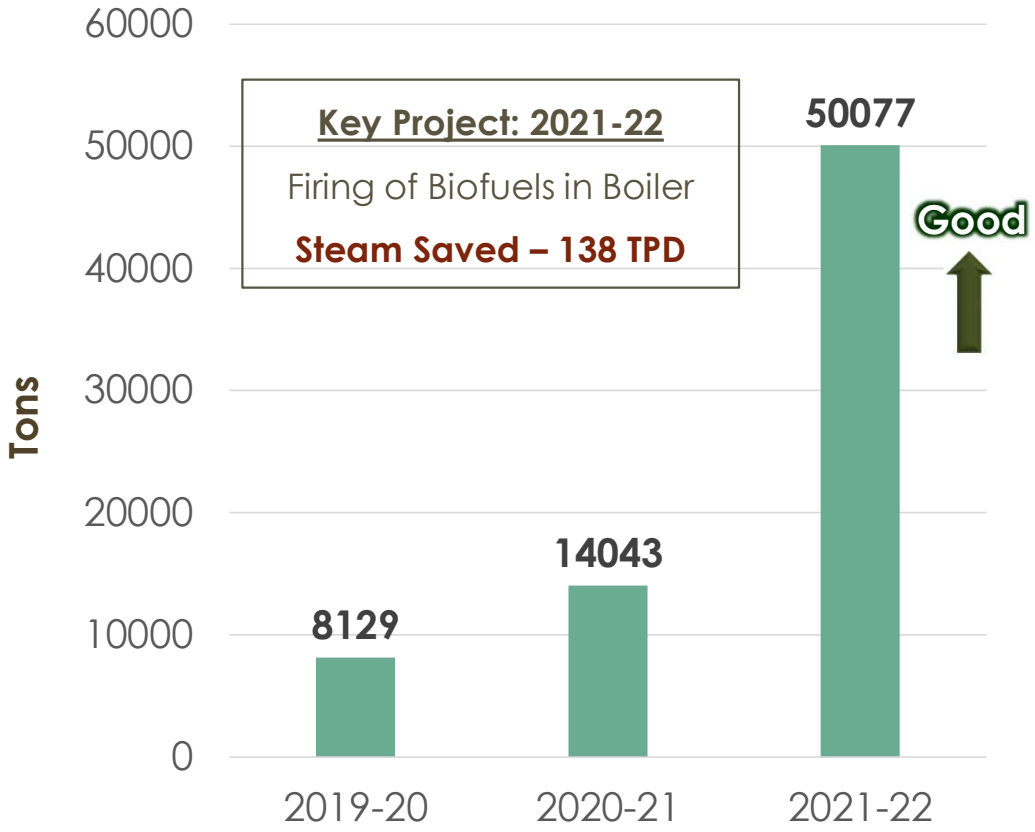


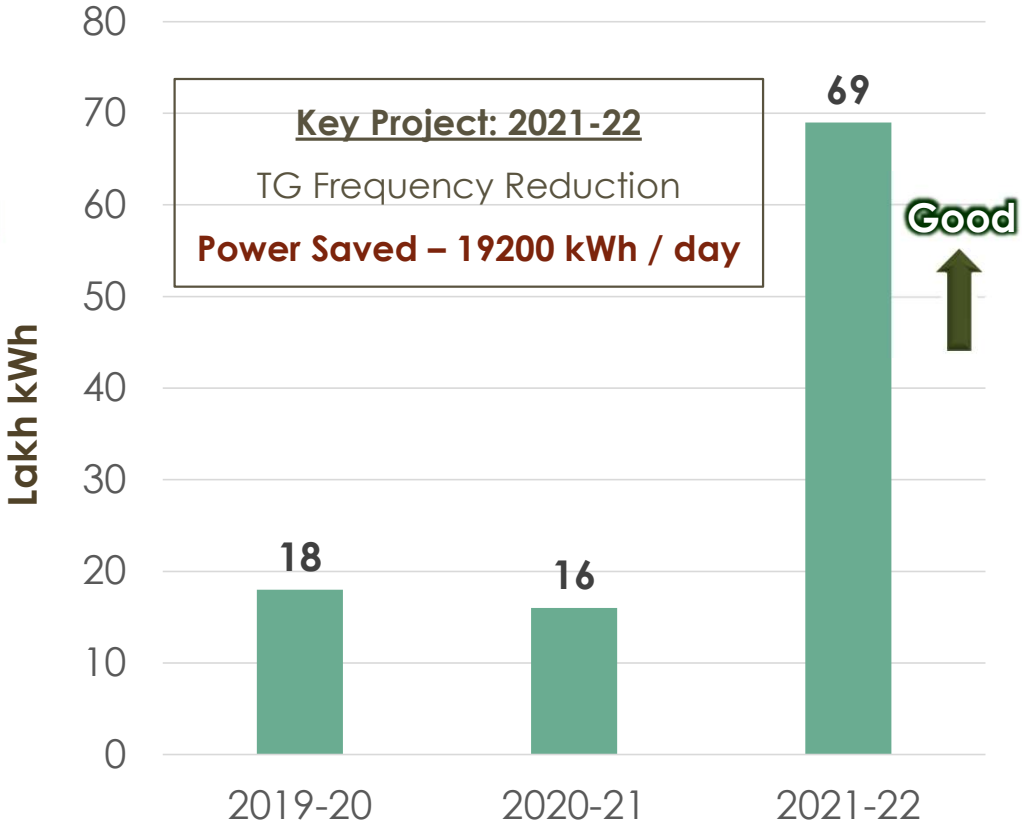
With Investment	49
With Minimum Investment	23
Total	**72**

Cost Saved

"Continuous Improvement, Our Way of Life"

Project Summary: 2019-20 to 2021-22 (Contd...)





Steam Saved

Emission Reduction - 28578 tCO2e

Power Saved

"Continuous Improvement, Our Way of Life"

Innovative Project

Firing of Biofuels in Coal Boiler

(Over & above the designed capacity of 10% through underfeeding)

- Originally CPP AFBC Boiler when commissioned in 2005 was designed to handle the fuel mix of **A) Imported coal (60% by underfeeding) B) Raw lignite (30% by under feeding) C) Bagasse pith** (10% by overfeeding). **But, it is not incorporated in the system since commissioning.**
- Imported Indonesian coal is the primary fuel.
- More over, necessity of generating more green steam & power is the need of the hour.
- Firing of Biofules in the Boiler was developed with the help of In-house team and utilising the existing facilities.
- **By this, we have reduced coal consumption by 79 TPD and increase in Green Energy by 7.46%.**

"An innovative approach to reduce the coal consumption"

Innovative Project (Contd...)

Trigger for the project

- **To increase and sustain the Green Energy** in the mill operation and
- To explore alternative usage of green fuel, **thereby reducing the environmental impact.**
- Offsetting imported coal with Biofuels.
- Reduction in GHG.

Challenges Faced

1. **Coal screening** become bottleneck to handle more biofuels.
2. **Almost all the drag chain coal feeders** went to full RPM and we are unable to push more Biofuel.

"An innovative approach to reduce the coal consumption"

Innovative Project (Contd...)

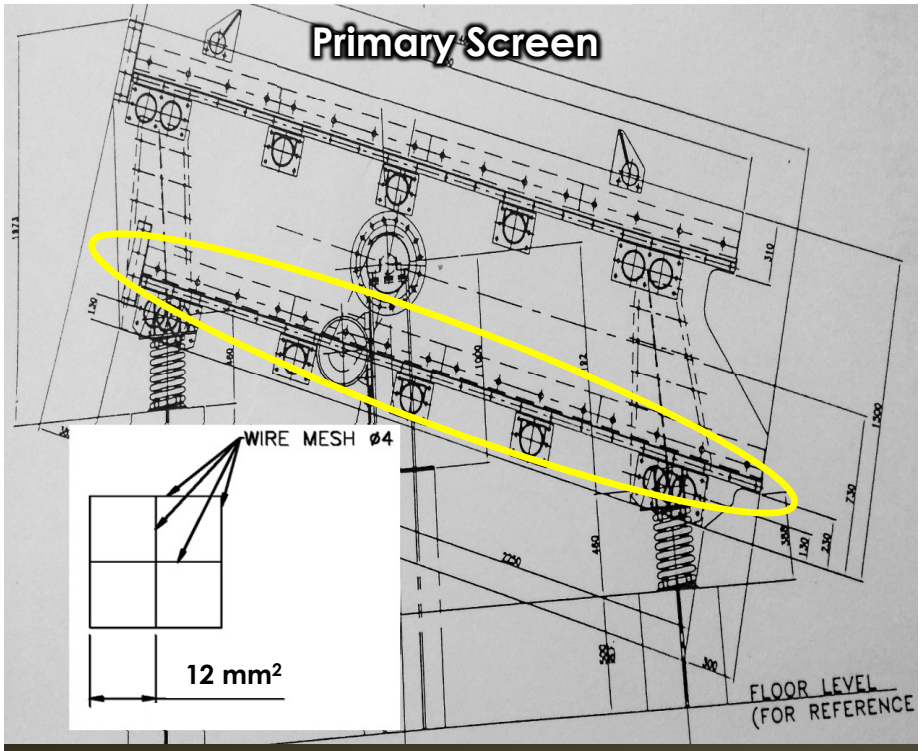
A Brief Introduction

- Chipper dust was used in underfeeding along with coal to replace requirement of coal. **Chipper dust around 45 to 50 T was mixed with coal** on regular basis from August 2021 onwards. This reduced around 20 TPD of imported Indonesian coal.
- During use of Chipper dust as a fuel, various Boiler parameters were closely monitored. **No deviation was observed in Boiler parameters and flue gas temperatures.**
- Next step, around 50 to 60 T of Paddy husk was mixed with coal along with Chipper dust fed through underfeed. During this operation also **no change in the Boiler parameters were observed except increase in the fly ash generation**. This has increased in the operation of ash conveying system from 6 to 7 hrs daily to around 24 hrs daily.
- Availability of other Biofuels like – Coffee Husk, Turmeric Spent & Horkel Pith were explored and stared consuming in the Boiler.

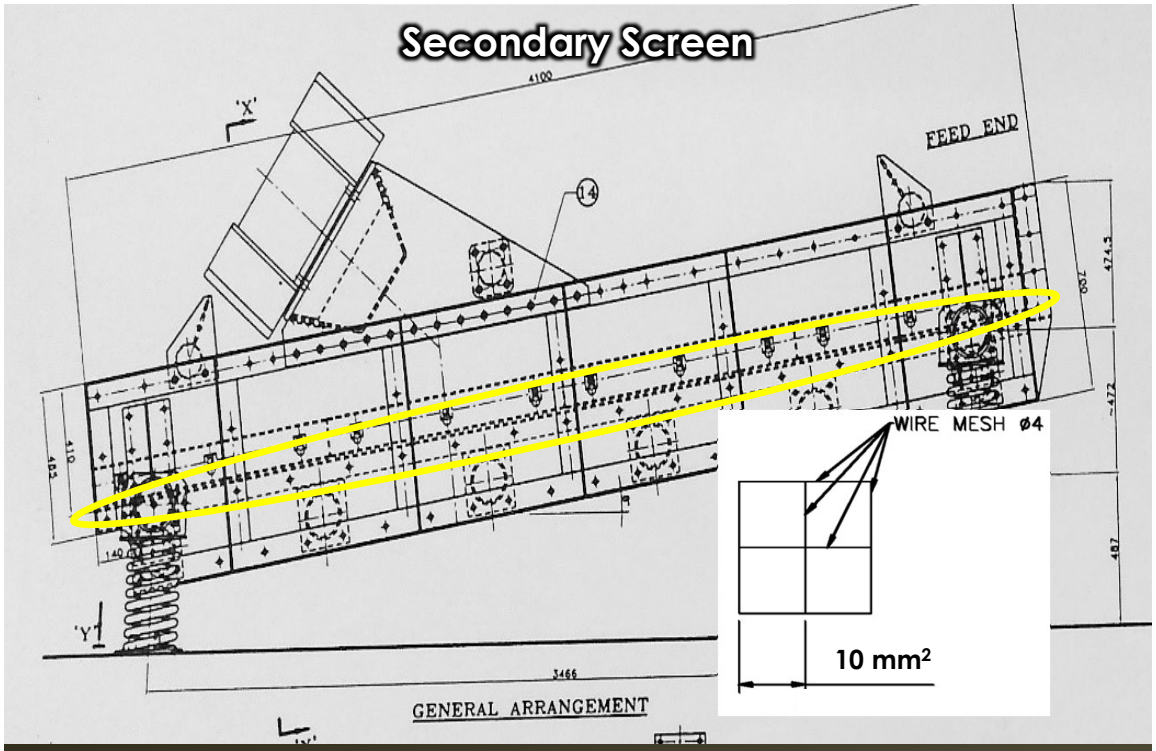
"An innovative approach to reduce the coal consumption"

Innovative Project (Contd…)

1. Modifications carried out in the existing system – Primary & Secondary Screen



Mesh size changed from 8 mm² to 12 mm² opening

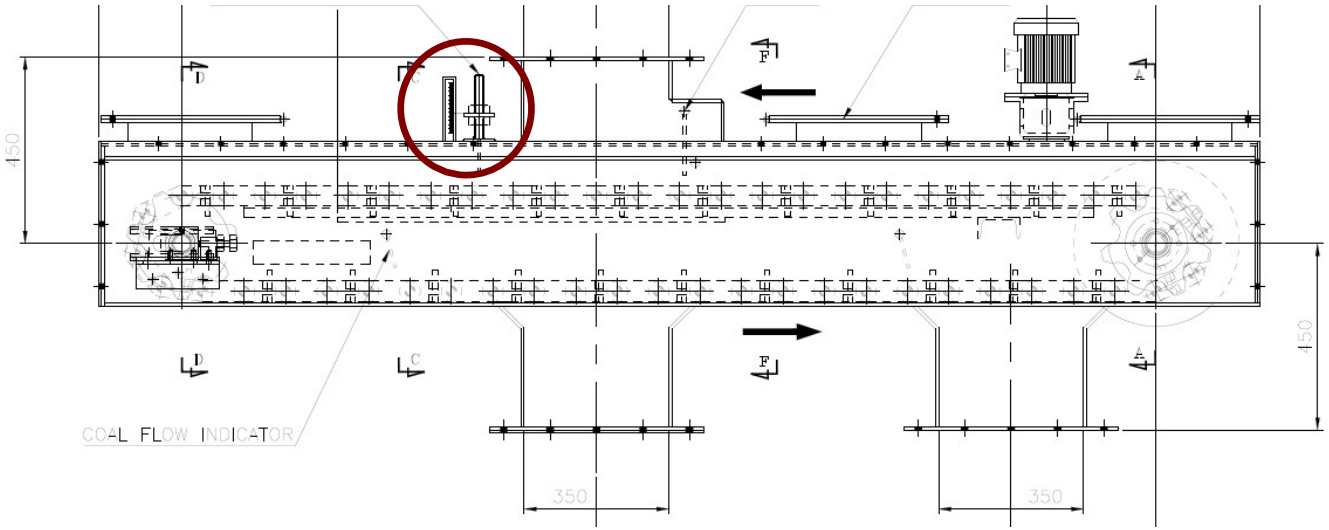


Mesh size changed from 8 mm² to 10 mm² opening

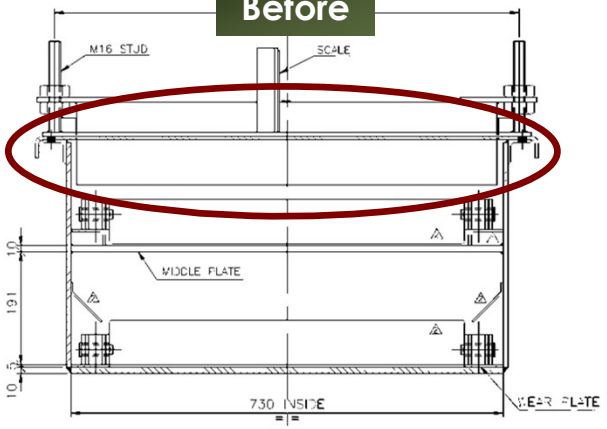
"An innovative approach to reduce the coal consumption"

Innovative Project (Contd…)

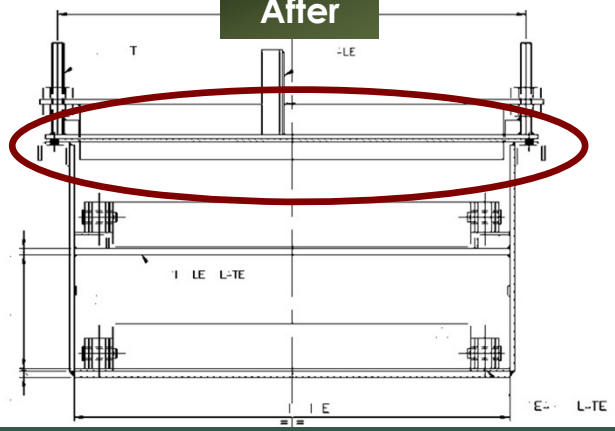
2. Modifications carried out in the existing system – Drag Chain Coal Feeders



Before



After



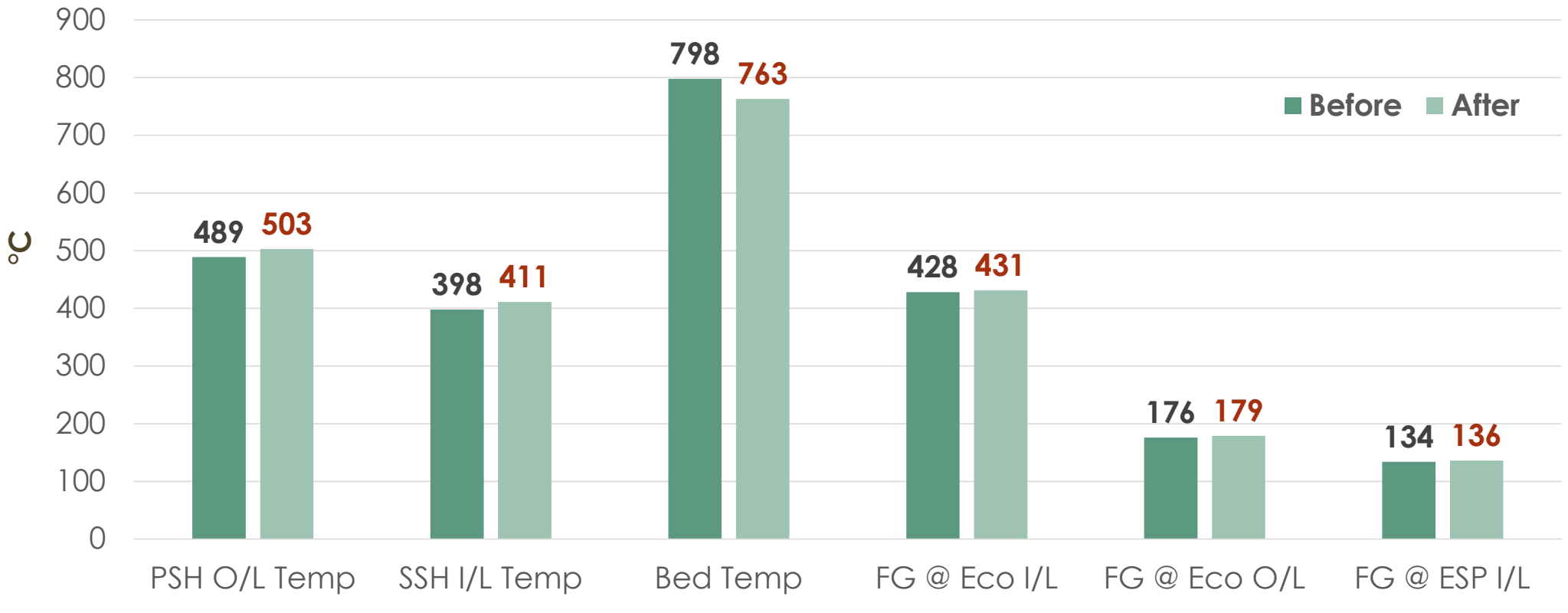
All the flow adjusting gates were lifted to maximum and now fuel feeding was achieved.

"An innovative approach to reduce the coal consumption"

Innovative Project (Contd...)

For Boiler steam: Flow, Pressure & Temperature – 76 TPH / 103 KSC / 507 °C

Operational & Control Parameters



"An innovative approach to reduce the coal consumption"

Innovative Project (Contd...)

Why it is Innovative?

- **All the Biofuels are mixed with coal and are fed through under feeding in Boiler since Biofuels feeding through underfeeding was not considered in original design.**
- This project is innovative since without any modification in the Boiler furnace, fuel handling and ash conveying system **we are able to feed around 153 TPD of Biofuel, which is almost 47% of the plant coal requirement in there by, reducing Imported coal requirement by around 79 TPD.**
- We have taken up over OEM recommendation and this year by the usage of the Biofuels we had offset fossil fuel consumption in Boiler by 35%.
- Our overall Green energy substitution is at 61.50% **(7.46% exclusively from usage of Biofuels)** from the previous year of 60.72%. (Inspite of stoppage of chemical mill for 48 days for the health restoration).

"An innovative approach to reduce the coal consumption"

Innovative Project (Contd…)

Why it is Innovative?

- To opt for Biofuels in the existing system over and above design.
- The Boiler investment is always a capex intensive and time consuming.
- Following the concept of 6R as a part of moving from Green to Sustainable Manufacturing
- Suitable arrangements made in the existing system without affecting the operation
- **We are running the system successfully for the past 1 year and avoided additional Boiler investment.**

"An innovative approach to reduce the coal consumption"

Innovative Project (Contd...)

Consumption of Biofuels and Coal

Description	UOM	Base Line	Present Level	Gap
Bio fuels	TPD	0	153	**+153**
Imported Coal	TPD	325	246	**-79**

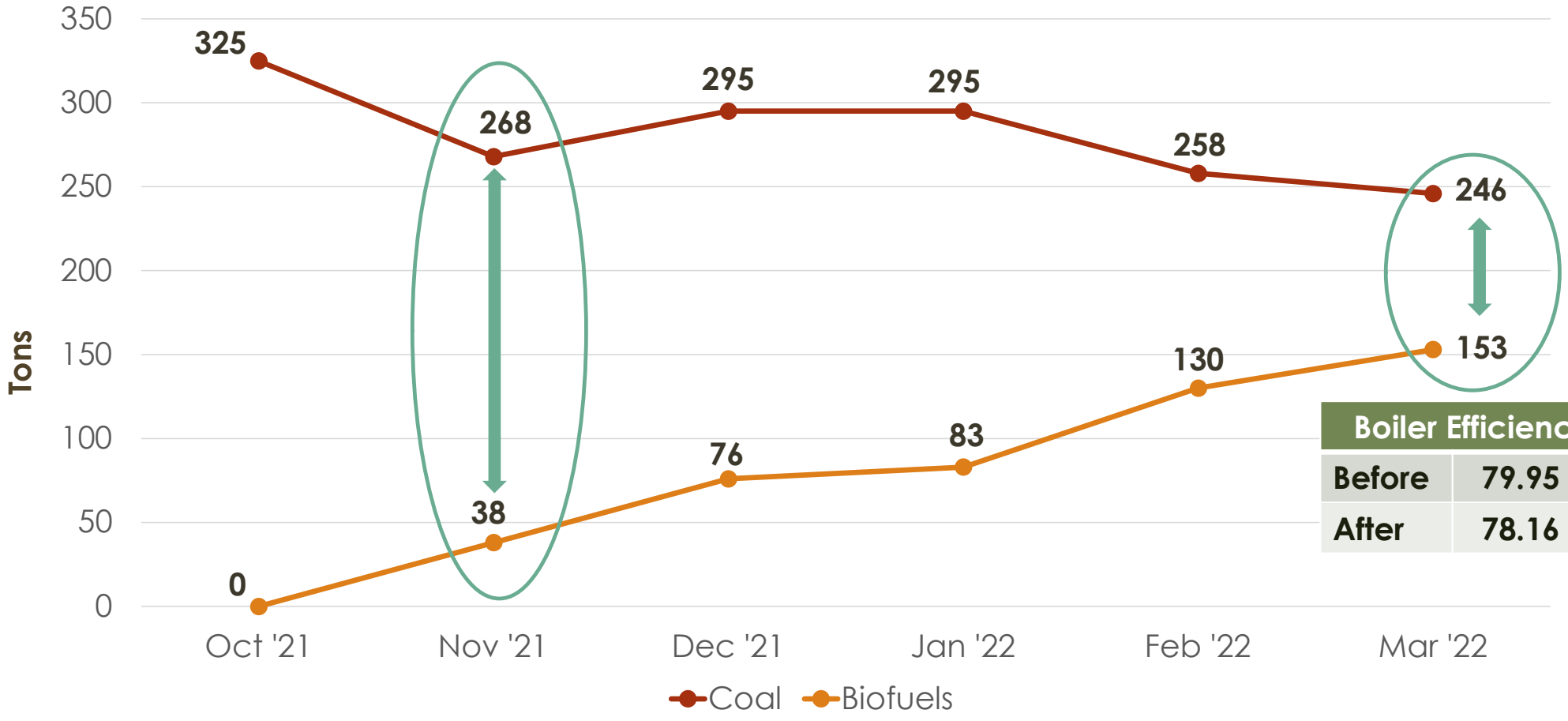
Break up of Bio fuel consumption

S. No	Description	UOM	Consumption
1	Chipper dust	TPD	40
2	Paddy husk	TPD	66
3	Saw dust	TPD	4
4	Horkel pith	TPD	5
5	Coffee husk	TPD	36
6	Turmeric spent	TPD	2
Total		**TPD**	**153**

"An innovative approach to reduce the coal consumption"

Innovative Project (Contd...)

Consumption of Biofuels and Coal – Month wise Breakup



Boiler Efficiency	
Before	79.95 %
After	78.16 %

"An innovative approach to reduce the coal consumption"

Innovative Project (Contd…)

Outcome achieved by the project

S. No	Description	UOM	Value
1	Coal savings	TPA	**27650**
2	Increase in Green Energy	%	**7.46**
3	Annualized cost savings	Rs. in Lacs	**1123**

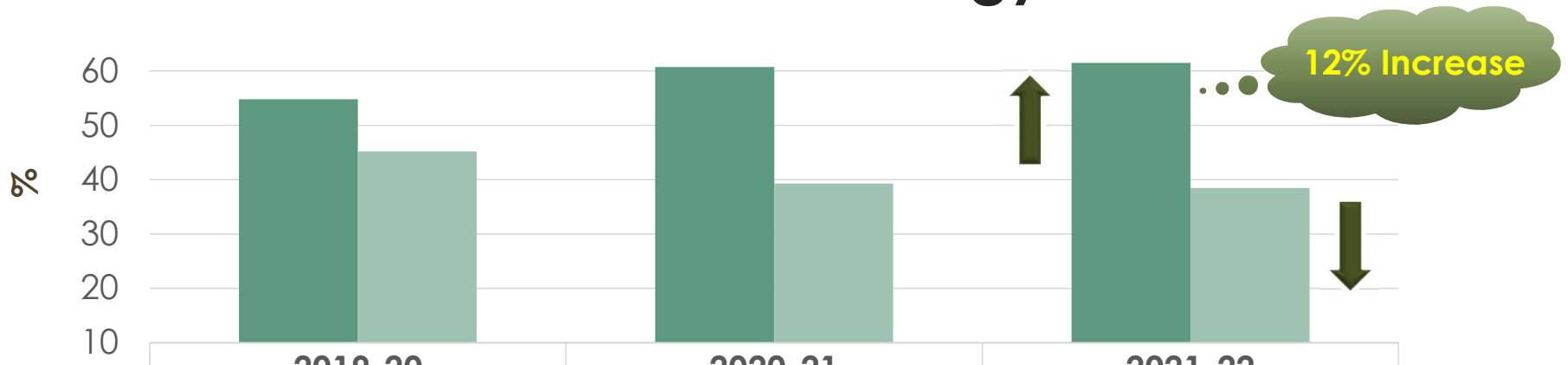
First time implementation on National Level

Feasible, Sustainable, Self driven and beyond OEM

"Replication Potential – Yes can be horizontally applied based on Boiler design"

"An innovative approach to reduce the coal consumption"

Utilization of Renewable Energy Sources

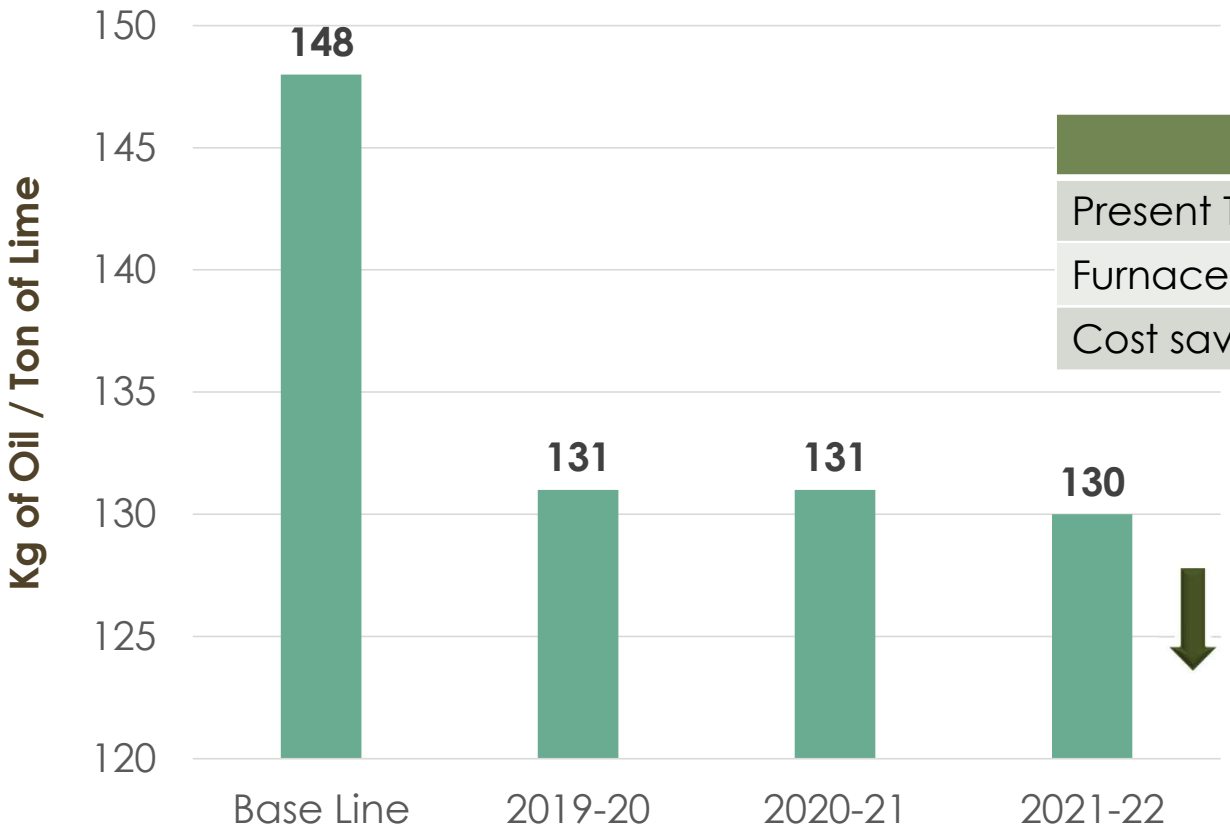


	2019-20	2020-21	2021-22
Renewable %	54.82	60.72	61.50
Non Renewable %	45.18	39.28	38.48

S. No	Source	UOM	Offsetting Electrical Energy	Offsetting Thermal Energy
1	Building Integrated PV	%	0.01	-
2	Biofules	%	4.66	2.80
3	Biogas from Anaerobic Lagoon	%	-	0.24
4	Black Liquor Solids	%	43.93	61.35
Total		**%**	**48.60**	**64.39**

"Substitution of Overall Energy by 61.50% in 2021-22"

Utilization of Waste as Fuel



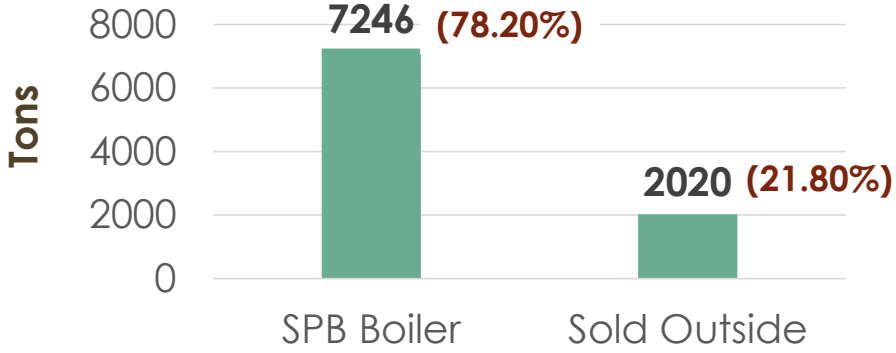
Monetary Savings	
Present Trend	**126 Kg**
Furnace Oil Saved	**3.5 KL / Day**
Cost savings	**Rs. 773 Lacs / Annum**

"Offsetting Fossil Fuel Consumption by Usage of Biogas in Rotary Lime Kiln"

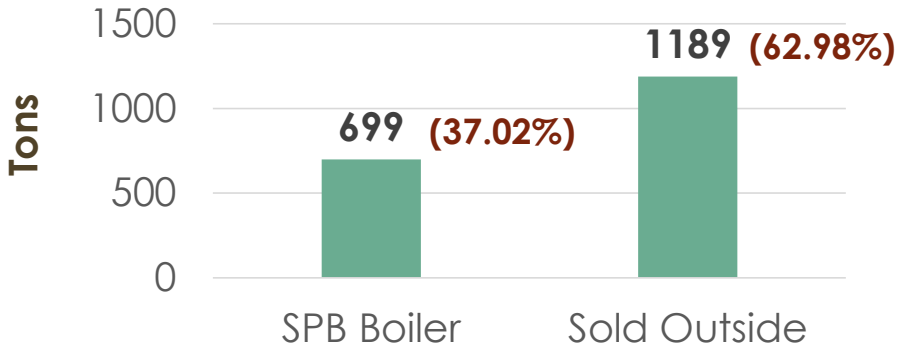
Utilization of Waste as Fuel (Contd…)

	2019-20	2020-21	2021-22
Bagasse Pith	4004	1580	1888
Chipper Dust	14204	10637	9266
Wooden Bark	2144	2010	2277
Screen Rejects	4067	3422	3769

Chipper Dust Consumption – 2021-22



Bagasse Pith Consumption – 2021-22



"Wooden Bark and Screen Rejects are sold outside for generating Green Energy"

Utilization of Waste as Fuel (Contd…)

Key Initiatives taken for Enhancing Waste Utilization

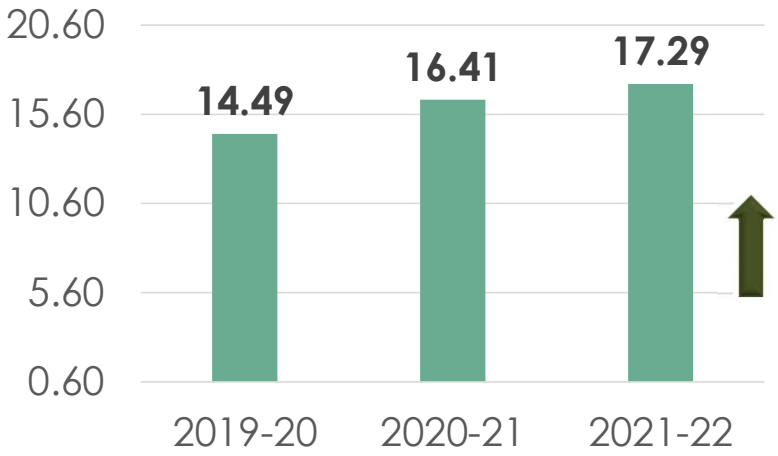
Waste Component	Quantity in Tons	Industry
Filter Cake	36357	Board Manufacturing
Wet Pith	2402	
Lime Sludge	19683	Cement Manufacturing
Lime Grits	2494	
Fly Ash	13754	
Sodium Sulphate	1074	Soap Manufacturing

"Waste is only Waste if we Waste it"

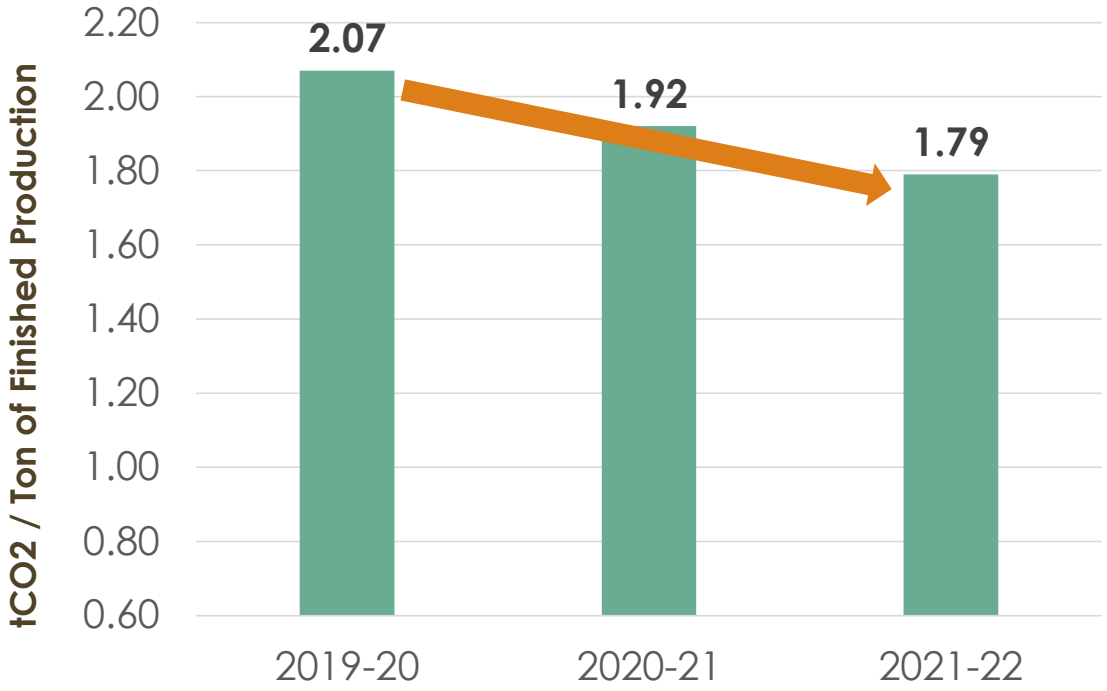
Year	UOM	Absolute Emissions
2019-20	tCO2	259405
2020-21	tCO2	215536
2021-22	tCO2	253888

Description	UOM	2021-22	% Emissions
Scope 1	tCO2	221614	87.29
Scope 2	tCO2	10805	4.26
Scope 3	tCO2	21469	8.45
Total	**tCO2**	**253888**	**100**

Farm Forestry – Plants Nurtured



GHG Inventorization



Emission Reduction – 13.53%

"Promising progress made in Carbon Sequestration through tree farming"

GHG Inventorization (Contd…)

Short Term Plan & Long Term Plan

Area	Activity
Energy	• **Work on group captive solar model,** to increase the renewable energy share and bring down dependency on grid power • **Increase in usage of Biofuel** and increase Renewable Energy share to 70% • **Collection of CNG** from unit II and fire in unit I lime kiln (600 MT / year of oil replacement)
Supply Chain	• **Purchase Policy** – Buying products based on Energy labelling to increase loadability and to reduce the transportation distance • We have separate **Green Procurement Policy** which focus on reduction in energy and procuring green products
GHG	• **Work on the Net Zero Emissions target**

Green Supply Chain

- Out of **25 Critical suppliers, 17 suppliers are ISO certified.**
- 2 suppliers with ISO certifications included

  1) M/s. Blue Craft Agro PVT Ltd

  2) M/s. Kalchi Controls Ltd

- 83% of the suppliers and vendors are covered in the **awareness creation programs and efficiency improvement programs** with a specific focus on environmental parameters

"Green Supply Chain is driven by a change in perception towards becoming socially responsible"

Green Supply Chain (Contd…)

Information on Projects Implemented

Action	Gains	Impact
Procurement of Low Sulphur Furnace Oil	Sulphur content reduced from 1.04% to 0.63%	GHG Emissions Reduction
Identification of alternate fuel to reduce coal consumption. Alternate fuels like Paddy Husk, Saw dust and Coffee husk made as alternate fuels for AFBC boiler.	Reduce coal consumption by 40% which in turn reduces the consumption of sulphur content(%)	Reduction in Energy cost
Identification of new supplier M/s RKS for the wooden plank procurement which reduces GHG emission - Distance reduction	Reduction in GHG emission - 97 kg of C02 emission saved per supply load of material	GHG Emissions Reduction
Identification of new supplier M/s Srinivasa Balaji Paper mills for the Plain sack kraft wrapper - Distance reduction	Reduction in GHG emission - 411kg of C02 emission saved per supply load of material.	GHG Emissions Reduction
Usage of Miracle HFO Additive	Reduction in FO consumption by 4%	Savings of 0.918 MT/day of FO

"A Supply Chain is oriented for improved performance"

Green Supply Chain (Contd…)

Plantation of Trees for SPB by M/s. Buyofuel

- Initiative from M/s Buyofuel, Sawdust supplier of SPB, **to make plantation of a tree for every 10 MT of saw dust supply.**
- **This is a carbon negative program** where they make plantation of trees **to compensate the GHG emitted.**
- The program is initiated with the help of **Sankalp Taru.org platform where we can track each plantation made by Buyofuel on behalf of SPB.**
- Currently they made plantation of **50+ trees on behalf of SPB.**

Green Supply Chain (Contd...)

Information on Supplier Evaluation done

Specific Steam Consumption

Year	UOM	M/s. Ivax	M/s. Arroma Industries	M/s. Deepak Nitrite
2019-20	T / T	12.60	5.63	14.24
2020-21	T / T	12.61	5.81	12.69
2021-22	T / T	12.55	5.32	10.79
Reduction	**%**	**0.40**	**5.51**	**24.23**

Specific Power Consumption

Year	UOM	M/s. Gem Polypacks	M/s. Kamakshi Lamipacks	M/s. Deepak Nitrite
2019-20	kWh / T	15380	890	1683
2020-21	kWh / T	15200	914	1794
2021-22	kWh / T	14072	878	1479
Reduction	**%**	**8.50**	**1.35**	**12.12**

"We have evaluated 17 suppliers who are ISO certified"

Green Supply Chain (Contd…)

Information on Supplier Evaluation done

Specific Water Consumption

Year	UOM	M/s. Gem Polypacks	M/s. Ivax	M/s. Arroma Industries	M/s. Deepak Nitrite
2019-20	m^3 / T	980	2.65	15.95	44
2020-21	m^3 / T	922	1.32	16.00	42
2021-22	m^3 / T	937	0.82	15.75	36
Reduction	**%**	**4.39**	**69.06**	**1.25**	**18.18**

Waste Disposal

Year	UOM	M/s. Gem Polypacks	M/s. Kamakshi	M/s. Ivax	M/s. Arroma Industries
2019-20	m^3 / T	980	2.65	15.95	44
2020-21	m^3 / T	922	1.32	16.00	42
2021-22	m^3 / T	937	0.82	15.75	36
Reduction	**%**	**4.39**	**69.06**	**1.25**	**18.18**

"We have evaluated 17 suppliers who are ISO certified"

Green Supply Chain (Contd…)

Logistics Cost Reduction in Wood Procurement

Distance	2019-20	2020-21	2021-22
1-100 KMS	17312	14047	16838
	3.27%	**2.92%**	**3.00%**
101-200 KMS	141395	145232	188151
	26.73%	**30.21%**	**33.58%**
201-350 KMS	370295	321445	355347
	70.00%	**66.87%**	**63.42%**
Total	**529002**	**480724**	**560336**

- Recovery & Pulp Mill shut of 48 days was managed without stopping Paper Machines – **Reduction in Imported Pulp by 22396 Tons in Unit 1**
- Substitution of Imported Pulp by own pulp of Unit 2: **32107 Tons & GHG reduction – 8144 tCO2**

"Procurement of wood increased by 3.45% within the radius of 200 KM in 2021-22"

Action Plan to Expand Green Supply Chain

1. Usage of Green Material or organic material wherever possible

- We have made communication in PO copy for all the suppliers to avoid using only one time plastic lesser than 75 microns as per latest plastic waste amendment rules , "GSR 571 (E) dt 12/8/2021, Notification of Ministry of Environment, Forest & Climate change notified.

2. Use of some catalyst in coal fired boiler to reduce sulphur emissions and coal reduction – Trials already initiated

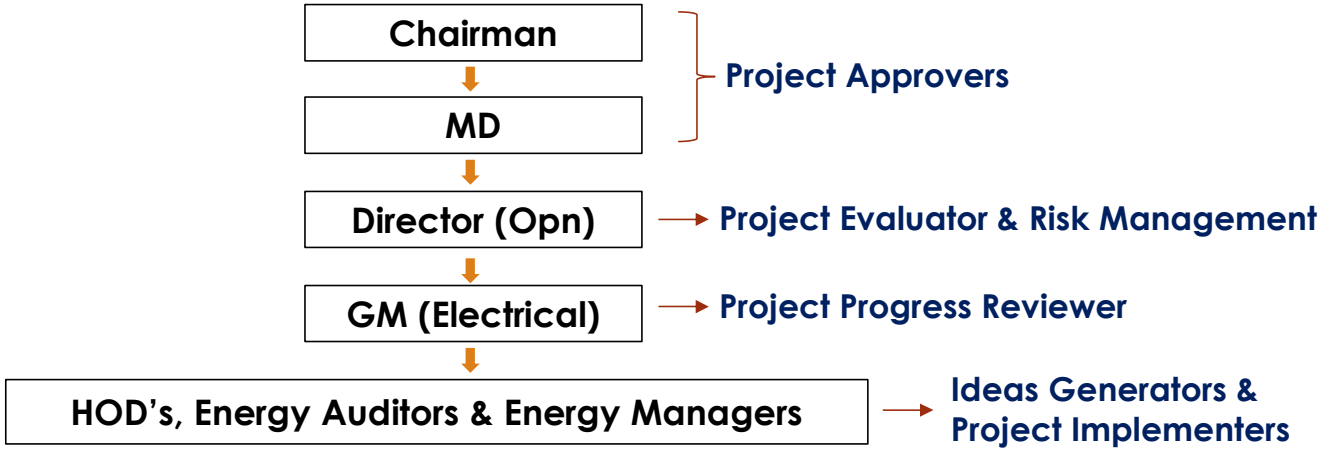
- Use of Petroleum Based additive Miracle HFO to reduce Furnace Oil consumption
- Savings per day - Rs. 65,591/day.

3. Use of more indigenous raw material like felts and clothings in Paper Machines, fillers like GCC, sodium chloride etc

- Further utilize of Indigenous GCC in place of Imported GCC
- Planning to maximize Indigenous Sodium Chlorate in place of Imported Sodium Chlorate

Teamwork, Employee Involvement & Monitoring

Energy Management Structure



Review Mechanisms

S. No	Review	When	Headed By
1	Shift Meeting	Shift wise	SIC / HOD
2	Production Meeting	Daily	D (O)
3	Energy Cell Meeting	Weekly	GM (Electrical)
4	Energy Review Meeting	Fortnightly	Chairman / MD
5	Energy Projects Meeting	Fortnightly	D (O)

Teamwork, Employee Involvement & Monitoring (Contd…)

Daily Monitoring – Review Formats

Specific Steam Consumption

STEAM SPECIFICATION	UM	2022/03/12	2022/03/13	2022/03/14	2022/03/15	TOTAL
EQU FINISHED PAPER	T	424.15	487.10	476.46	449.03	1836.74
MARKET WETLAP PULP	BD T	48.00	105.00	83.00	76.00	312.00
IMP/IND/WPP PULP	BD T	0.00	0.00	0.00	16.00	16.00
TOTAL STEAM CONSUMPTION	T	4260.00	4832.00	4670.00	4473.00	18235.00
CONDENSATION	T	766.00	870.00	886.00	827.00	3349.00
DEA STEAM FOR CONDENSATION	T	130.22	147.90	150.62	140.59	569.33
STEAM FOR PROCESS	T	3363.78	3814.10	3633.38	3505.41	14316.67
STEAM / T OF BLD PULP	T	4.46	3.84	4.06	4.05	4.044
STEAM FOR MARKET PULP	T	214.29	403.32	336.62	242.80	1197.03
STEAM FOR PAPER PRDN	T	3149.49	3410.78	3296.76	3262.61	13119.64
SP.STEAM CONSN./T OF EFP	T	7.43	7.00	6.92	7.27	7.14

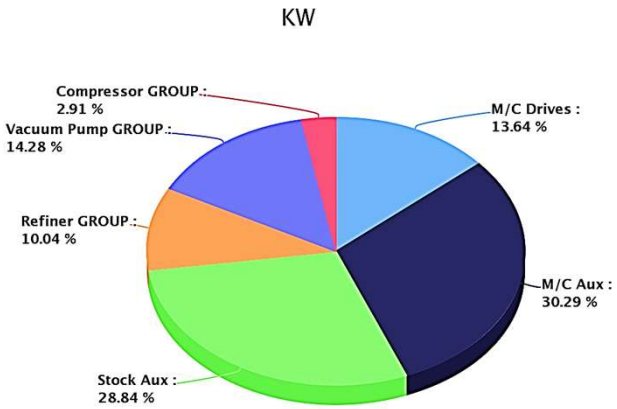
Encon Projects – Monitoring Formats

S. No	Dept	Implemented Projects - Coal	Implemented on	No. of days sustained	Savings	
					TPD	Rs / day
1	CPP	Usage of bio fuels in Boiler 10	25.08.2021	212	47	198254
Total			-	-	**47**	**198254**

S. No	Dept	Implemented Projects - Steam	Implemented on	No. of days sustained	Savings	
					TPD	Rs / day
4	CPP	CPP Deaerator steam pressure reduction (From 3.2 To 2.3 kg/cm2)	29.04.2021	330	37	55500
5		Introduction of additional spray nozzle in MF#3 steam line	01.08.2021	236	3	4800
6	RDH	MP Steam line modification - 200 to 250 mmØ	01.01.2022	83	16	24000
7		Retrofit of the existing spiral HX	02.03.2022	23	36	54000
Total			-	-	**92**	**138300**

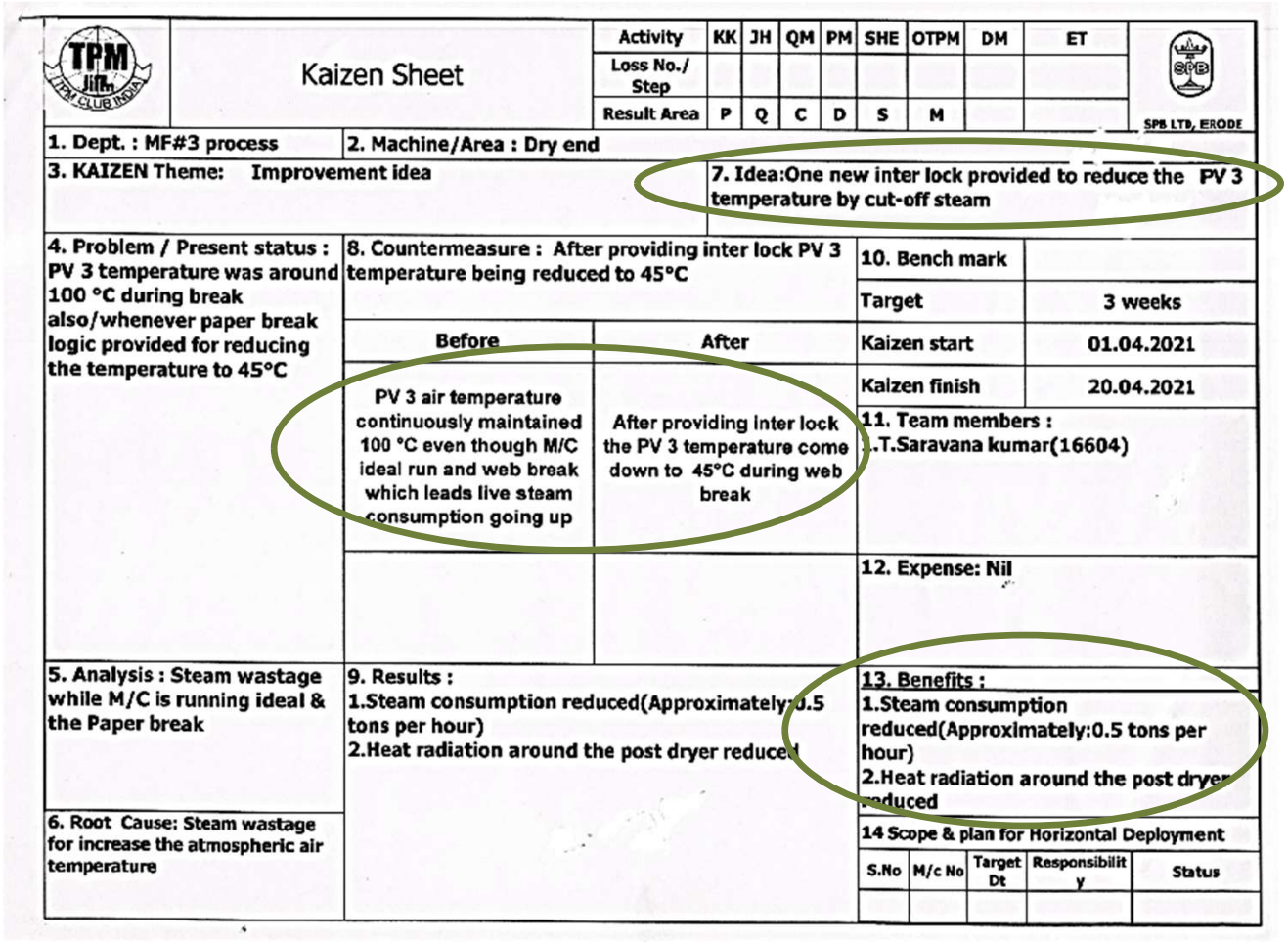
Teamwork, Employee Involvement & Monitoring (Contd...)

Online Monitoring & Energy Management System



PM 5

Teamwork, Employee Involvement & Monitoring (Contd...)



TPM Jiffy TPM CLUB INDIA	Kaizen Sheet	Activity	KK	JH	QM	PM	SHE	OTPM	DM	ET
		Loss No./ Step								
		Result Area	P	Q	C	D	S	M		

SPB LTD, ERODE

1. Dept. : MF#3 process
2. Machine/Area : Dry end
3. KAIZEN Theme: Improvement idea
7. Idea:One new inter lock provided to reduce the PV 3 temperature by cut-off steam

4. Problem / Present status : PV 3 temperature was around 100 °C during break also/whenever paper break logic provided for reducing the temperature to 45°C

8. Countermeasure : After providing inter lock PV 3 temperature being reduced to 45°C

Before	After
PV 3 air temperature continuously maintained 100 °C even though M/C ideal run and web break which leads live steam consumption going up	After providing inter lock the PV 3 temperature come down to 45°C during web break

10. Bench mark
Target: 3 weeks
Kaizen start: 01.04.2021
Kaizen finish: 20.04.2021
11. Team members :
1.T.Saravana kumar(16604)
12. Expense: Nil

5. Analysis : Steam wastage while M/C is running ideal & the Paper break

9. Results :
1.Steam consumption reduced(Approximately:0.5 tons per hour)
2.Heat radiation around the post dryer reduced

13. Benefits :
1.Steam consumption reduced(Approximately:0.5 tons per hour)
2.Heat radiation around the post dryer reduced

6. Root Cause: Steam wastage for increase the atmospheric air temperature

14 Scope & plan for Horizontal Deployment

S.No	M/c No	Target Dt	Responsibility	Status

"Employee Recognition – The Successful Relationship"

The cultural change and the Impact that it has made, has earned us our "Gold Rating"

Energy Efficiency
SEC reduction – 23%
ECS implemented – 72 Nos

Green Supply Chain
Initiatives taken to minimize GHG impacts in supply chain

Water Conservation
SWC reduction – 23%
Rain Water Harvesting

Material Conservation
100% Sustainable sourcing of Bagasse through WOW concept
83% replacement of Limestone

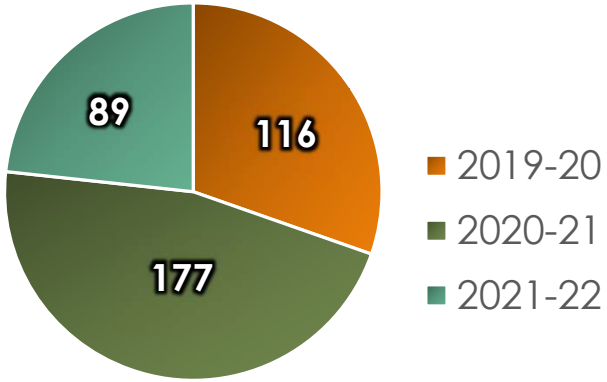
Renewable Energy
Substitution – 61.50%
Usage of Biofuels to reduce coal consumption

Waste Management
Our treated waste water is used for irrigation –
Pioneer in Circular Economy

GHG Emission
Emission Reduction – 25%
Usage of Bio-methanation gas to replace F. Oil

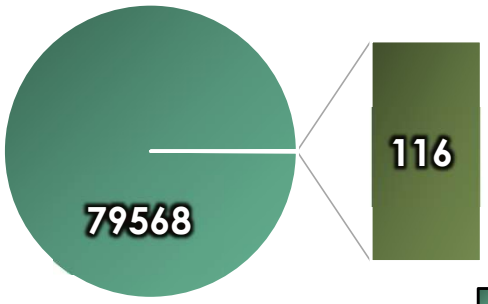
Finance Resource Allocation

Amount approved for Energy Efficiency Improvement Projects by the Management

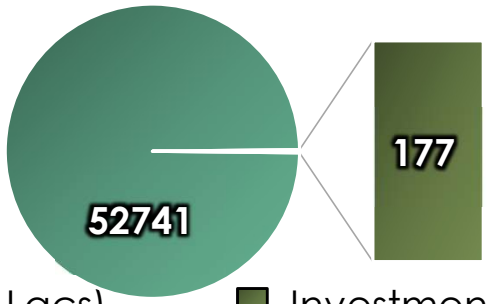


% Investment on Turn Over

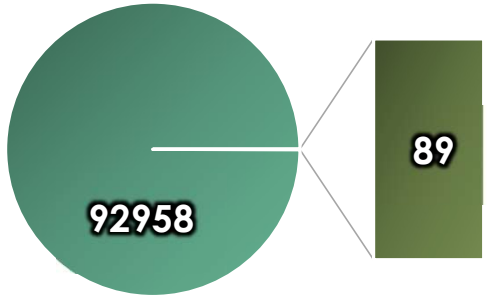
2019-20 – 0.15%



2020-21 – 0.34%



2021-22 – 0.10%



Turn Over (Rs. Lacs) Investment (Rs. Lacs)

Usage of Hot Condensate from Evaporator in Hot water

Usage of Turbo Separators in place of Vacuum Pumps

Steam Pressure regulation in Pulp Mill

Optimization of Relay Coordination

Chemical free treatment for Cooling Tower

Turbine Scheduling to improve Specific Power

Major Achievements

Year	Awards Won	Awarded By
Last 2 Consecutive Years	National Energy Leader	CII
Last 4 Consecutive Years	Excellence in Energy Management	CII
2019-20	Mill of the Year	IPMA
2018-19	Innovative Project	CII
2017-18	Most Useful Presentation	CII
2017-18	Safety Performance – Star Award	National Safety Council
2016-17	Environment Award	TNPCB
2016-17	Environment Award	IPMA

Our Efforts & Journey Continuous in the Pursuit of

"Excellence in Energy Performance"

Proud to be a Responsible Paper Maker

Thank You