JK Tyre & Industries Ltd
Chennai Tyre Plant

Best Practices in Energy Efficiency to attain carbon neutrality by 2050 – JK Tyre & Industries Ltd

Name	Designation	E Mail Id
Bharathidasan.M	Head EEI	bharathidasan.m@jkmail.com
Jayakanthan. T	Chief Manager – EEI	Jayakanthan.t@jkmail.com
Prabhu. D	Chief Manager – Utility	Prabhu.d@jkmail.com

Company Profile

Chennai Tyre Plant in Tamil Nadu *is the 6th manufacturing plant of JK Tyre which went on stream on 05th February 2012 presently produces 48.5 Lakhs Passenger Car Radial (PCR) tyres and 12.3 Lakhs Truck / Bus Radial (TBR) tyres per annum.*

Salient Features of Chennai Tyre Plant

- ***Location Selection – Automobile Hub***
- ***Advance manufacturing digital operations with industrial IoT solutions***
- ***Equipment Selection for high Energy Efficiency***
- ***Environment friendly technology considered during Plant Inception itself***
- ***Zero Liquid Discharge Plant – certified by BSI***
- ***Single use plastic free plant – certified by CII***
- ***Zero waste to land fill – certified by BSI***
- ***Usage of Maximum Day lights***
- ***Highly optimized WIP material flow***
- ***Modular designs for seamless expansion***

JK TYRE & INDUSTRIES LTD.

iDeeksha
An Initiative by BEE to Promote Industrial Decarbonisation

Manufacturing Process

Common Process

Raw Material → Mixing → 4 Roll Calender → Cap Ply Slitter

TBR Stock

- EBR
- TBR Cutters
- TBR Extrusion

Truck Bus Radial Tyres - TBR

TDA → Super assembly → TBR Building → TBR Curing → TBR Insp. & Testing → TBR Warehousing → Customer

PCR Stock

- Cap Strip
- PCR Cutters
- PCR Extrusion

Passenger Car Radial Tyres - PCR

Bead Winding & Apexing → Ply Cutter → PCR Building → PCR Curing → PCR Insp. & Testing → PCR Warehousing → Customer

JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Excellence in Energy Management

Energy Policy

UEnM.01-PY.01

ENERGY POLICY

We at JK Tyre are committed to design, manufacture and distribute our products & services in an energy efficient manner to become a green company. We will continually improve our energy performance for sustainable growth by:

- Complying with all applicable legal and other requirements related to our energy use, consumption and efficiency.
- Taking measure in Energy Management System by being proactive, innovative and cost effective including procurement of energy efficient product & services.
- Enhancing effectiveness of energy management system by ensuring the availability of information and necessary resources to achieve the objectives and targets.
- Integrating energy policy into our business planning, decision making and performance review at appropriate level.

We commit to communicate this policy to all our employees, persons working for and on our behalf and also will make it available to all interested parties on request.

Date : 01.01.2024
Rev : 03

Authorised and Approved by
Arun K. Bajoria
Director & President
(International Operations)

JK TYRE & INDUSTRIES LTD.

USUS.01-PY.01

Sustainability Policy

JK Tyre & Industries Ltd commits itself to minimising its impact on our environment through

- Providing a safe and pleasant workplace free from Hazard & Risk;
- Create environmentally sustainable culture, where responsibility is assigned and understood;
- Being an Socially & environmentally responsible neighbour in our community;
- Conserving natural resources by adopting reduce, reusing and recycle concept;
- Reduce Energy consumption by ensuring the responsible use of energy throughout the organisation;
- Increase the share of Renewable energy throughout the organisation
- Participating in efforts to improve environmental protection and understanding
- Taking steps to improve environmental performance continually;
- Conducting rigorous audits, evaluations, and self-assessments of the implementation of this policy;
- Working with suppliers who promote best environmental & sustainable practices
- Enhancing awareness among our employees, volunteers, and users–educating and motivating them to act in an environmentally responsible manner.

Date : 01.01.2024
Rev : 02

Authorised and Approved by
Arun K. Bajoria
Director & President
(International Operations)

JK TYRE & INDUSTRIES LTD.

UREW.01-PY.01

Renewable Energy, Resource And Water Policy

We at JK Tyre are committed to :

A) Conserve and ascertaining Clean Energy through
- Enhancing Energy Efficiency
- Increase part of Renewable Energy

B) Conserve Natural Resources & Water through
- Enhancing Utility Efficiency
- Increase Recycling & Minimize Waste

C) We will achieve these objectives by adopting
- Use of Technology innovation
- Periodic Reviews
- Skill Up gradation
- Employee Involvement and
- Community Involvement

We will continuously Benchmark to Reduce Resource Consumption and become Water Positive. Also We will increase share of Renewable energy in Our Total Energy Requirements and will continuously effort for Conservation of Energy.

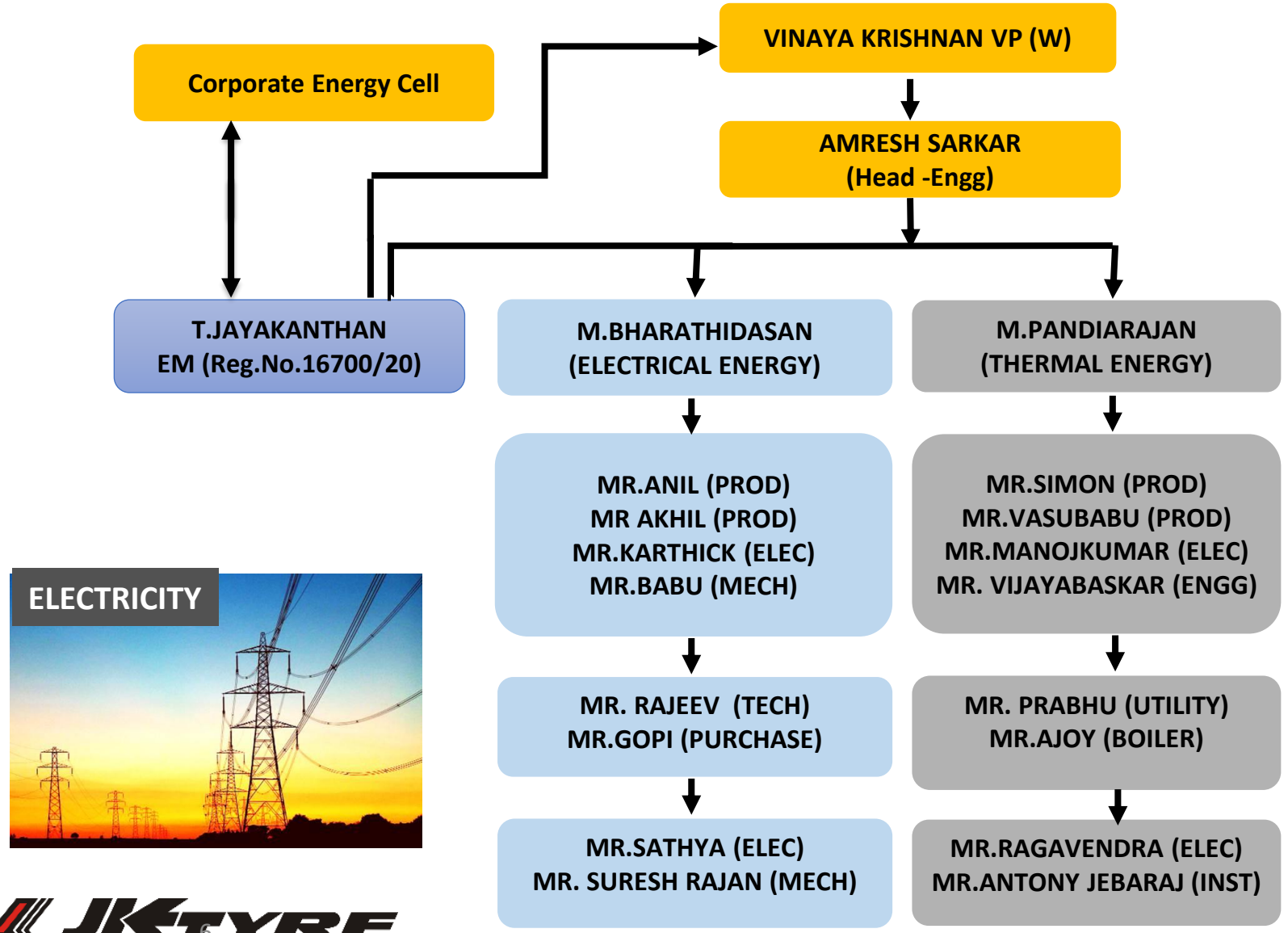
Date : 01.01.2024
Rev : 02

Authorised and Approved by
Arun K. Bajoria
Director & President
(International Operations)

JK TYRE & INDUSTRIES LTD.

JK TYRE & INDUSTRIES LTD.

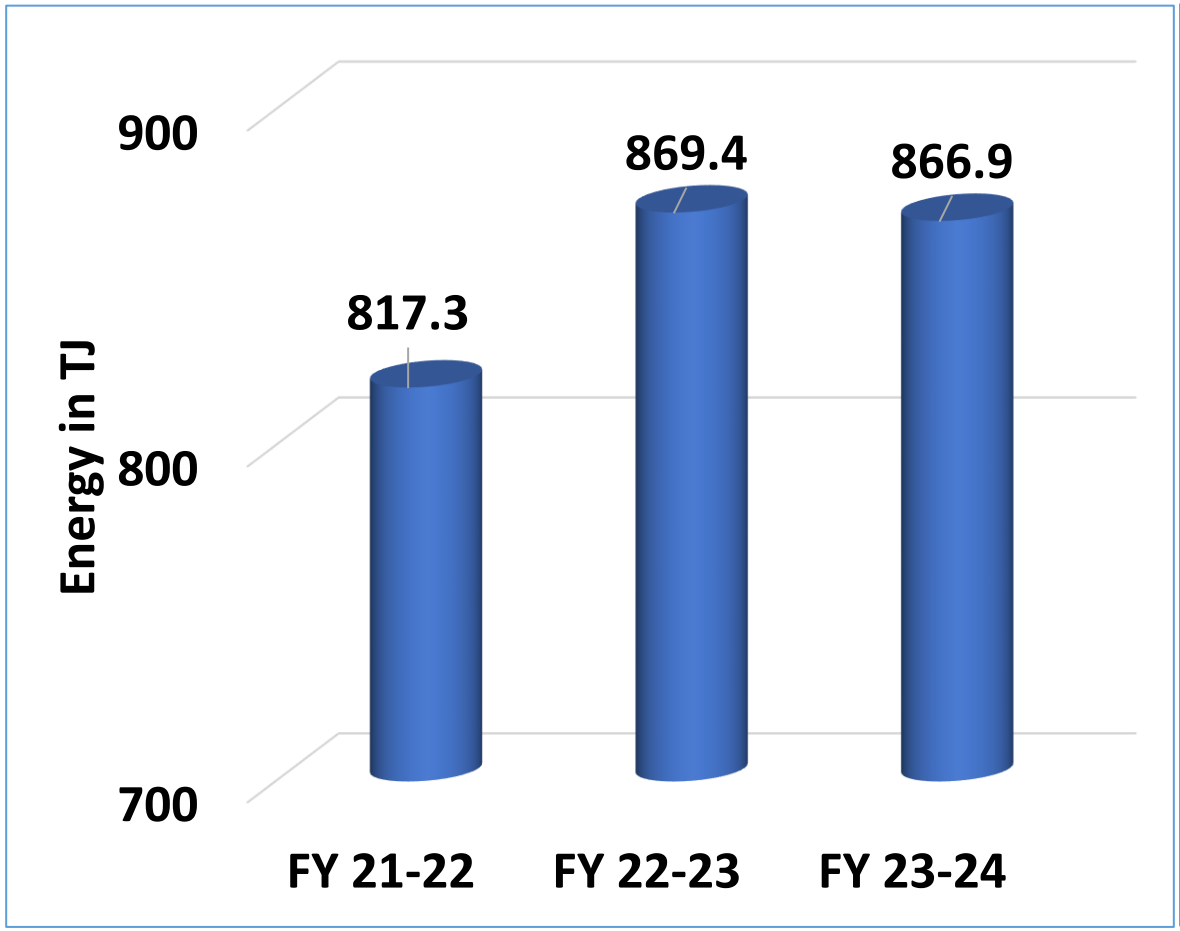
Energy Management Team



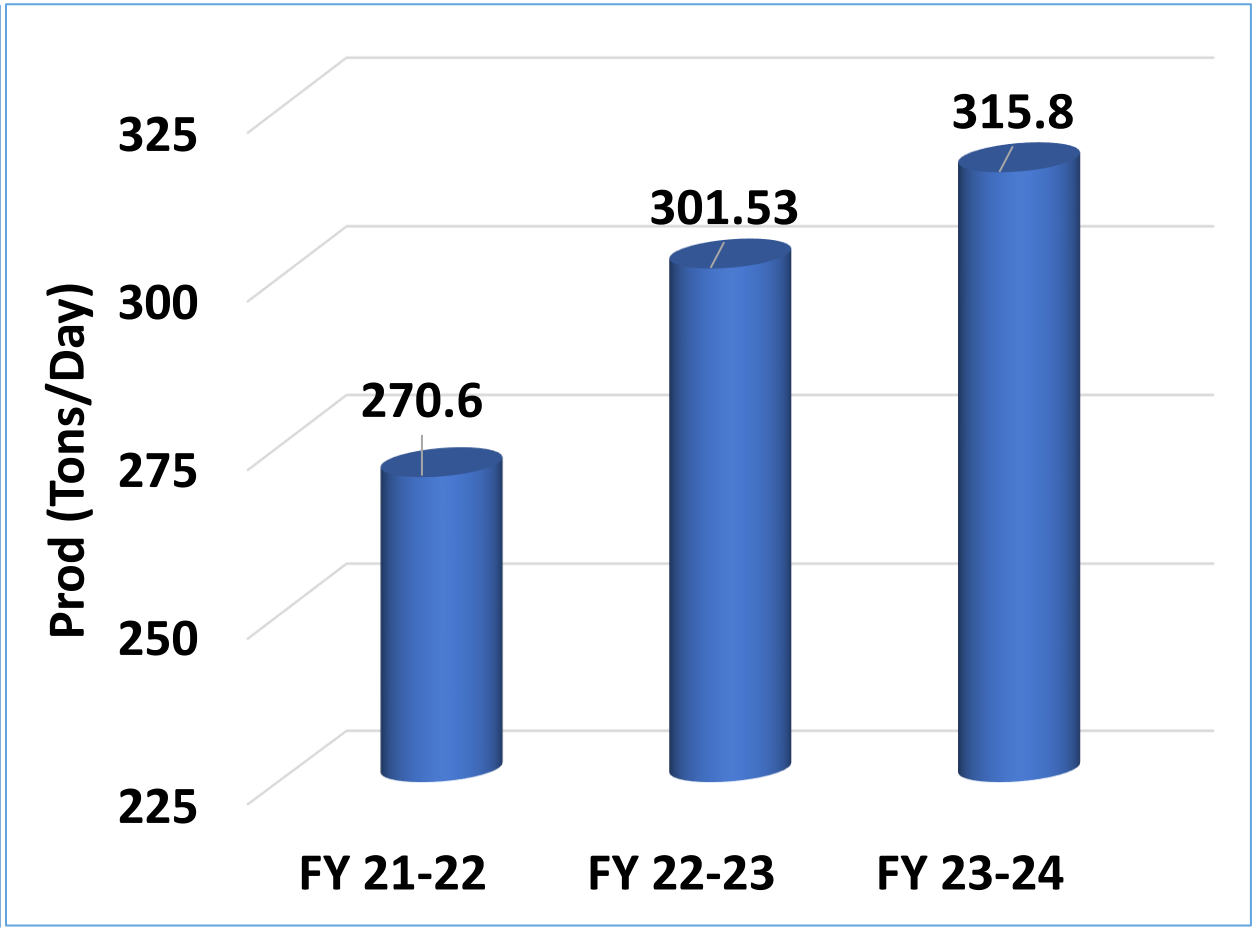
Si.No	Name	Certification	Certificate No.
1	Pandiarajan.M	EM	18933/T
2	Jayakanthan.T	EM	16700/20
3	Prabhu.D	EM	18958/T
4	Manojkumar.J	EA	EA-32640

Sp. Energy Consumption in last 3 years (FY 21-22 to FY 23-24)

Plant absolute Energy consumption (in TJ)



Plant Production (in Tons Per Day)

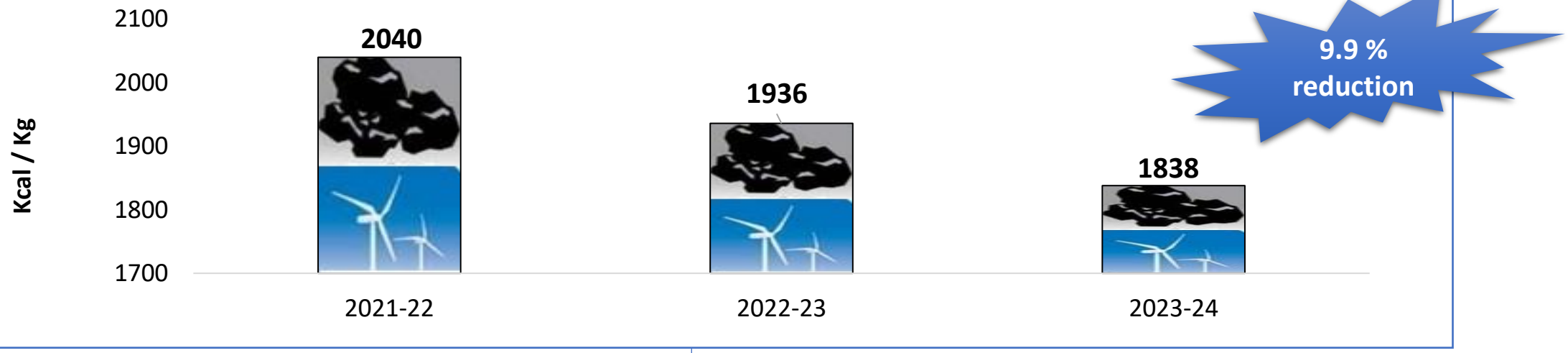


JK TYRE & INDUSTRIES LTD.

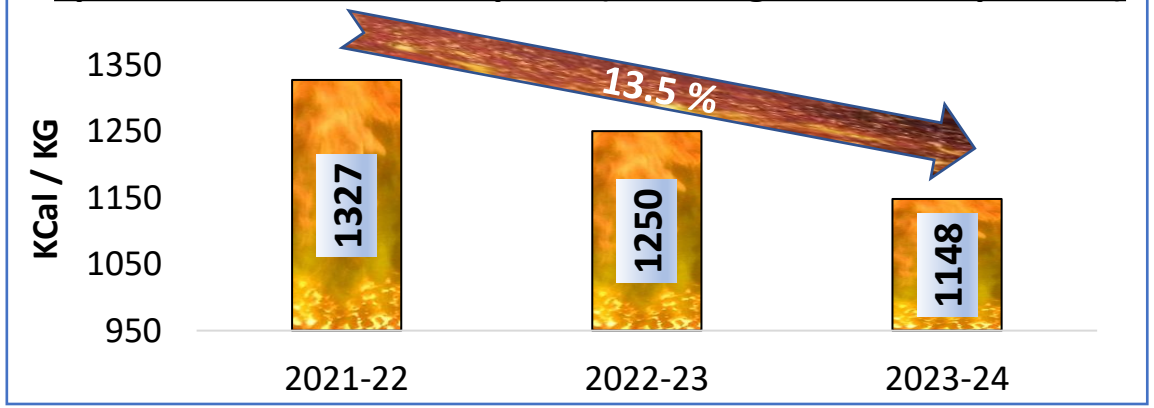
iDeeksha
An Initiative by BEE to Promote Industrial Decarbonisation

Sp. Energy Consumption in last 3 years (FY 21-22 to FY 23-24)

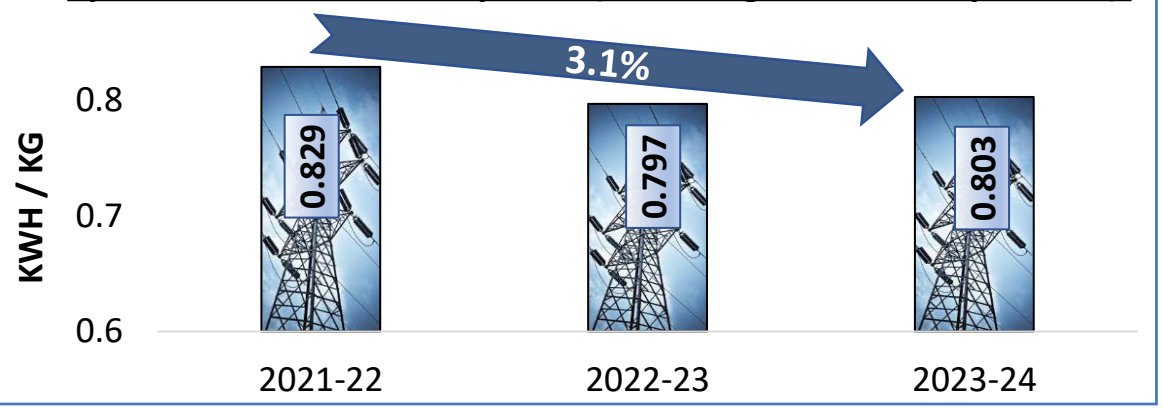
Specific Energy Consumption – Electrical & Thermal (Kcal/Kg of finished product)



Specific Thermal consumption (KCal / Kg of finished product)



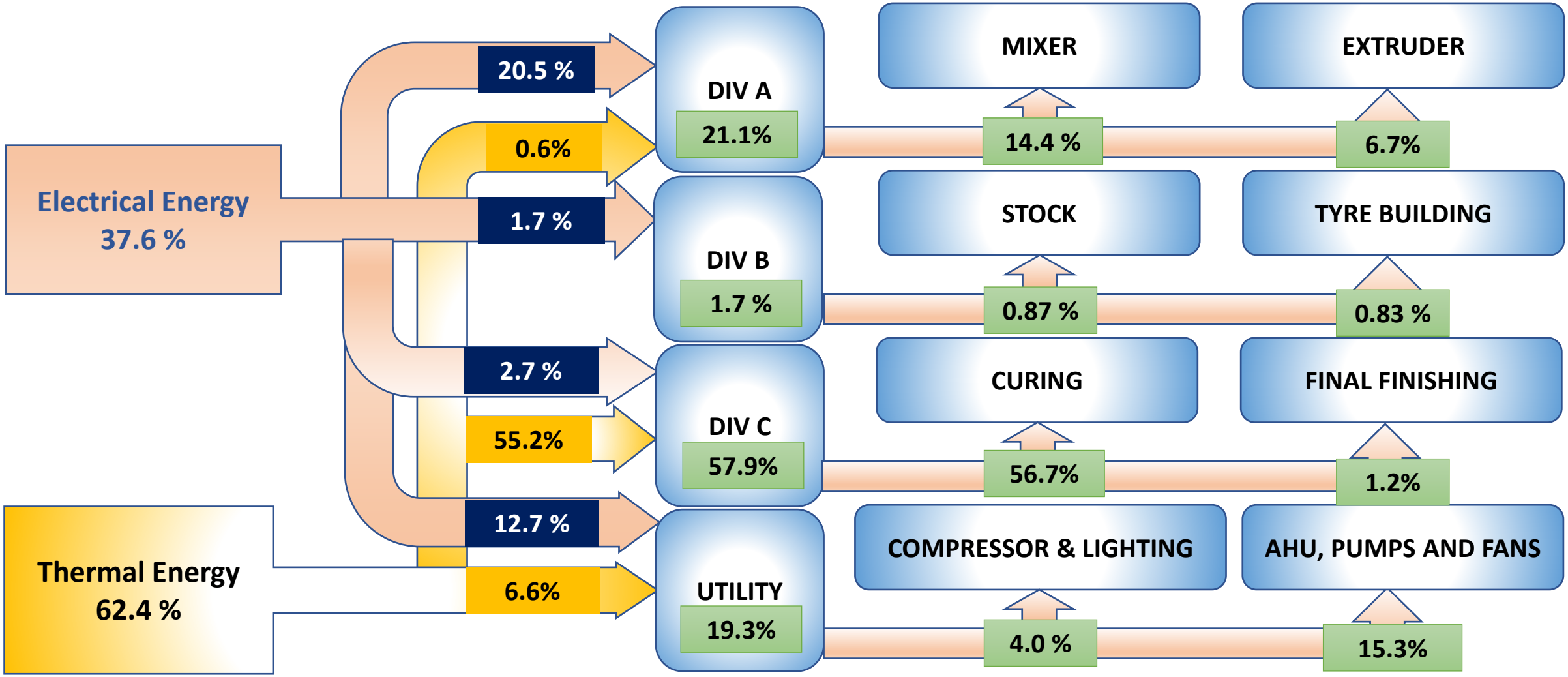
Specific Power Consumption (Kwh / Kg of finished product)



JK TYRE & INDUSTRIES LTD.

iDeeksha
An Initiative by BEE to Promote Industrial Decarbonisation

Plant Area/Equipment wise Energy consumption (Kcal in %)



JK TYRE & INDUSTRIES LTD.

iDeeksha
An Initiative by BEE to Promote Industrial Decarbonisation

Reasons for SEC variations

Internal context

- Tyre technology development trials
- Scrap and reworks
- Machine availability
- Employee involvement
- Effective Energy Management System

External context

- Pandemic Situation
- Capacity utilization because of market changes
- Climatic condition
- OEM/Customer requirements/ No of SKU's in market
- Fuel price and availability in market

Information on Competitors, National & Global benchmark

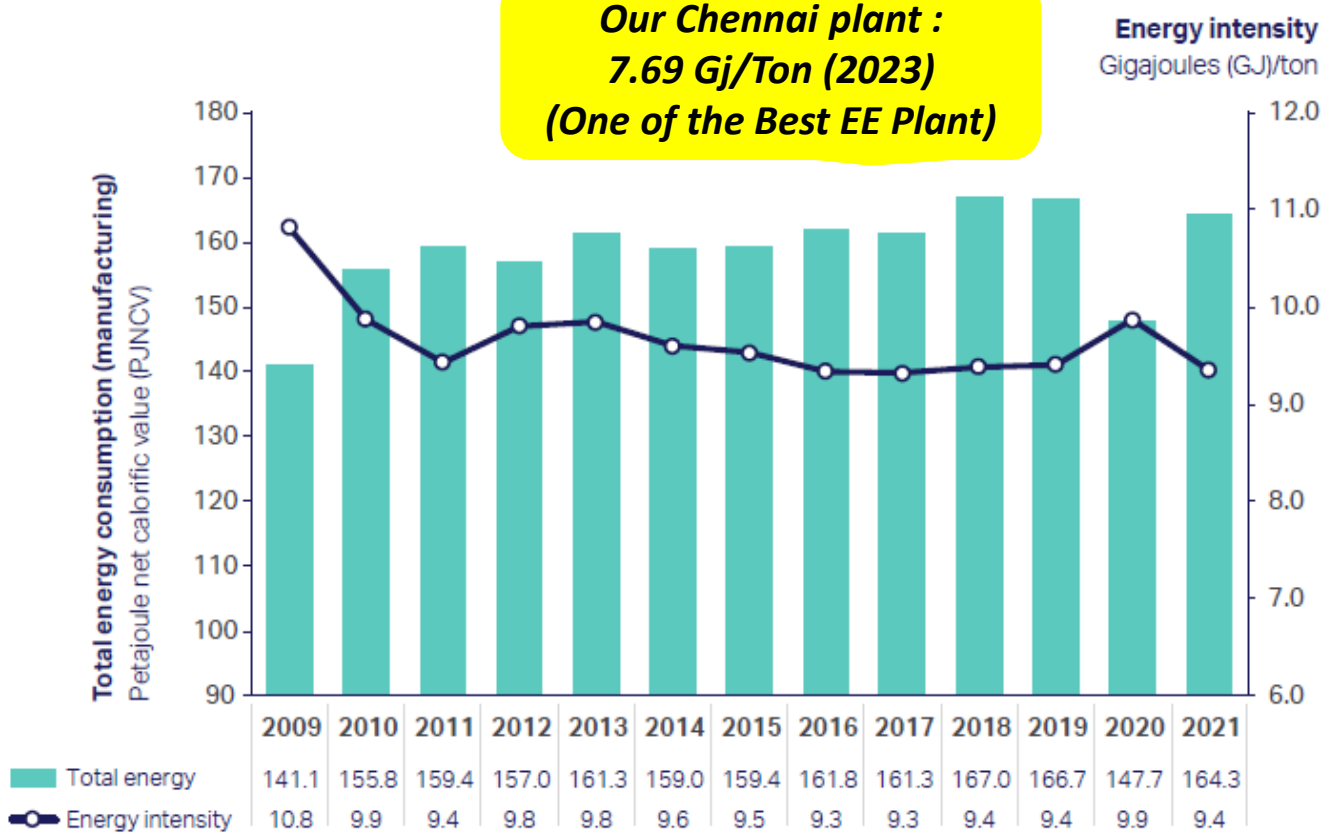
Global Benchmarking – Energy (Gj/Ton of Finished Product)

Members of the World Business Council for Sustainable Development (WBCSD) Tire Industry Project (10 Tyre companies) has published their weighted average Energy intensity for last 12 years; FY-2021 as 9.4 GJ/Ton

Weighted average energy intensity:

$$= \frac{\text{Total energy consumption for 10 TIP members}}{\text{Total production volume of these companies}}$$

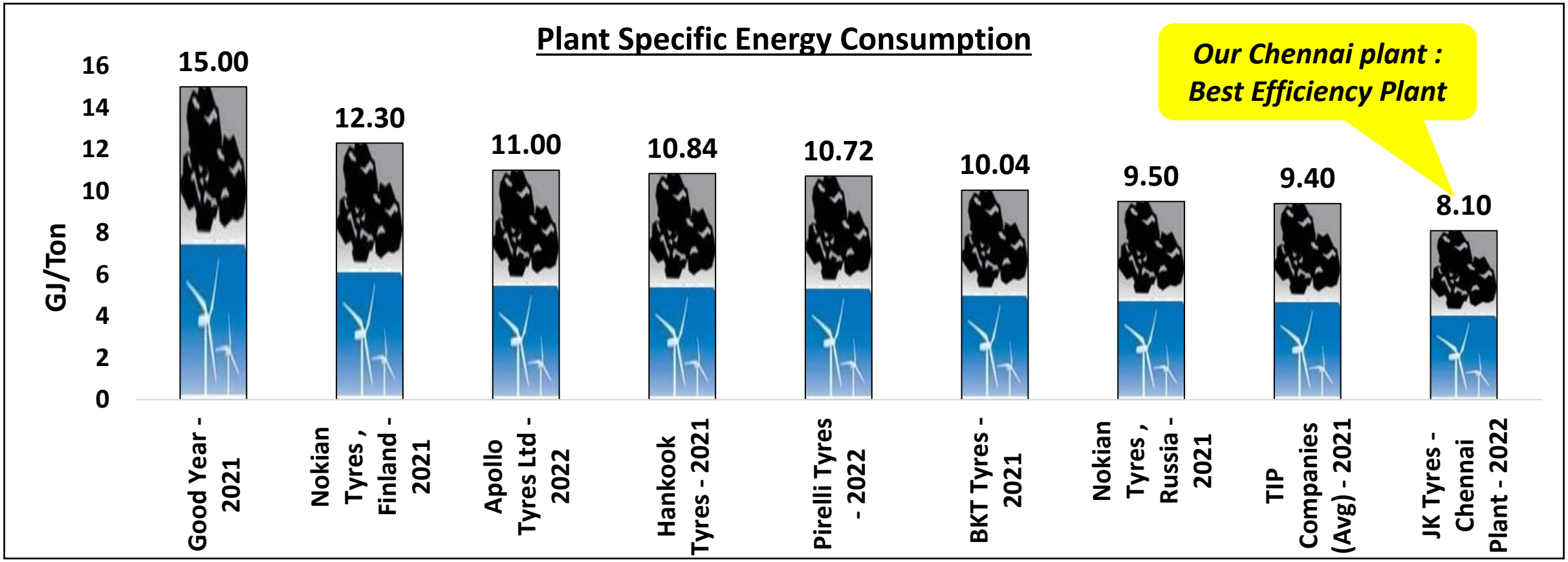
Our Chennai plant : 7.69 Gj/Ton (2023) (One of the Best EE Plant)



Source : https://www.wbcsd.org/wp-content/uploads/2024/05/WBCSD_Environmental_KPI_for_Tire_Manufacturing_2009-2021-1.pdf

Information on Competitors, National & Global benchmark

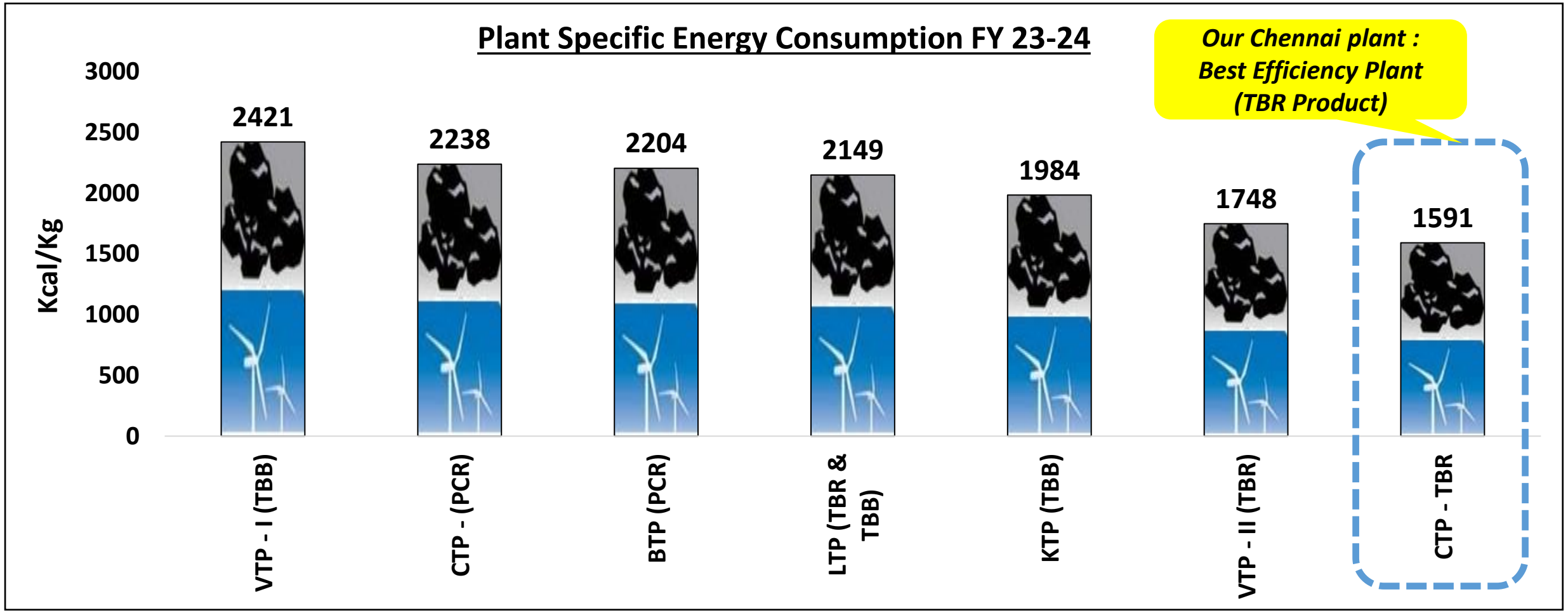
Global Benchmarking – Energy (Gj/Ton of Finished Product)



Chennai Tyre Plant is the one of the most Energy Efficient plant in Tyre sector. The Specific Energy values are taken from respective plant Sustainable report published in their web page.

Information on Competitors, National & Global benchmark

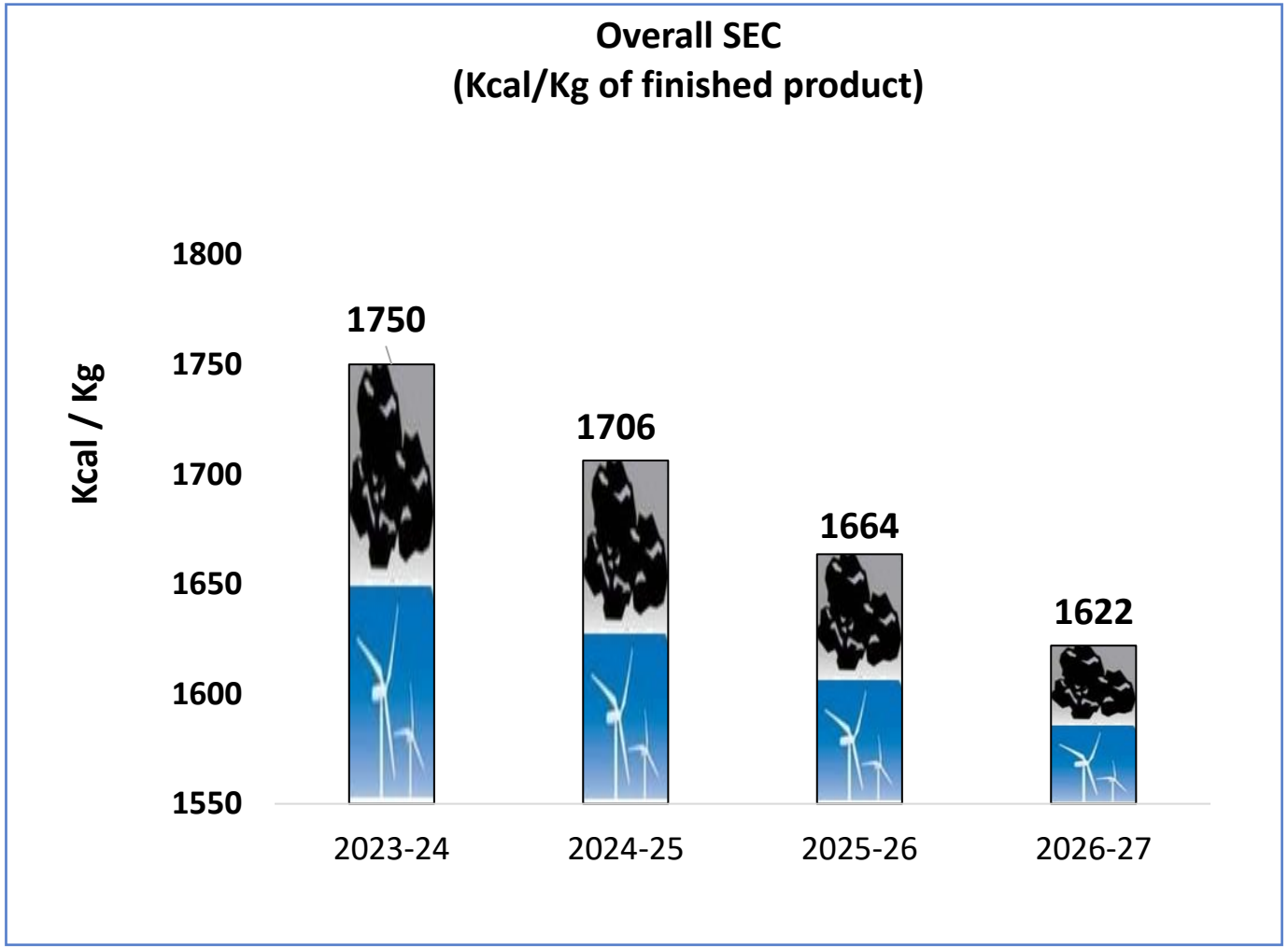
Internal Benchmarking – Energy (Kcal/Kg of Finished Product)



13

Target setting and Road map to achieve the target

Target setting and Road map to achieve the target



Short term Targets

- Energy reduction @ pumping system, ventilation, Cooling & Compressors
- *Nitrogen recovery and substitution to compressed air / PCI application.*
- *PCR Tires 100% Nitrogen curing*
- *GDAM Energy purchase*

Medium Term Targets

- *AHU Axial fan conversion – Phase III*
- *Hot Nitrogen system in place of steam - internal curing process.*
- *2 crore units Green energy purchase*

Long term targets

- *100% Biomass fuel mix-up with coal @ boilers*
- *Electrical energy substitution in place of Thermal Energy*
- *Increasing Renewable Power substitution to 100%*

14

Carbon neutrality by 2050

NET ZERO commitment

With a focus on sustainability, we align with the government's targets to be net zero by 2070 and reduce carbon intensity by 50% by 2030. We aim for carbon neutrality by 2050, driven by a strategic roadmap that emphasizes sustainable manufacturing practices to minimize waste, conserve resources, and bolster supply chain efficiency.

Overall JK Tyre Emission Intensity (2023-24)

Scope 1	Scope 2	Scope 3
Emission intensity:	Emission intensity:	Emission intensity:
0.37 tCo_2e/MT	**0.29 tCo_2e/MT**	**0.19 tCo_2e/MT**

Carbon neutral approach

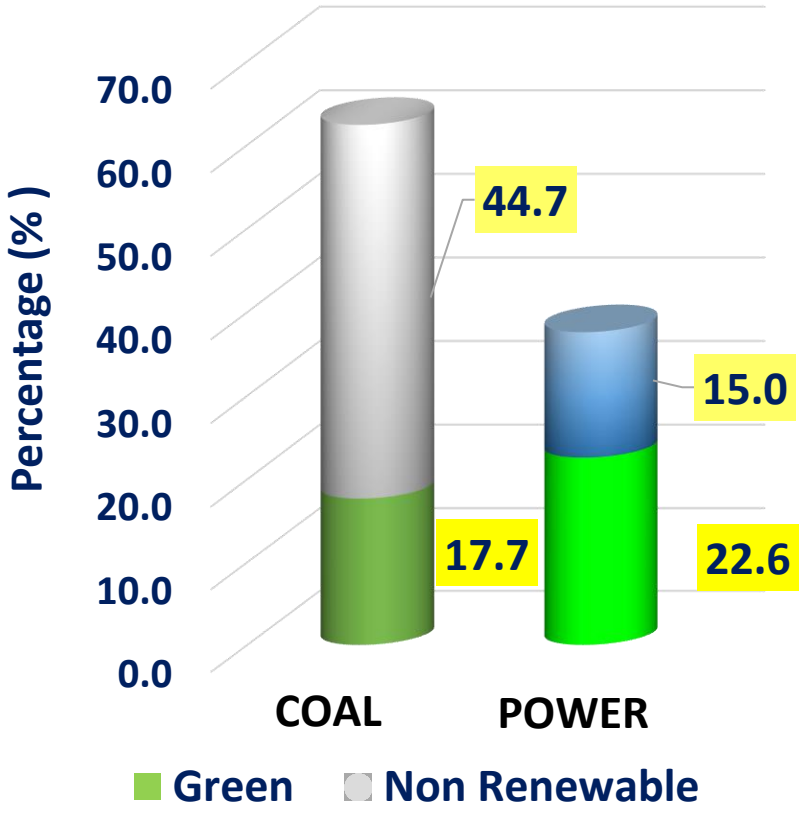
Carbon Offset / sequestration > 50% of total GHG emission

Energy Front	Greening the Environment	Indirect Emission Sources
Renewable Energy Substitution • Electrical • Thermal EnCon Projects	• Tree Plantation with in Fence • Tree Plantation Beyond the Fence	Projects on Transportation • Material Logistics • Business Travel • Employee Commute • Disposal

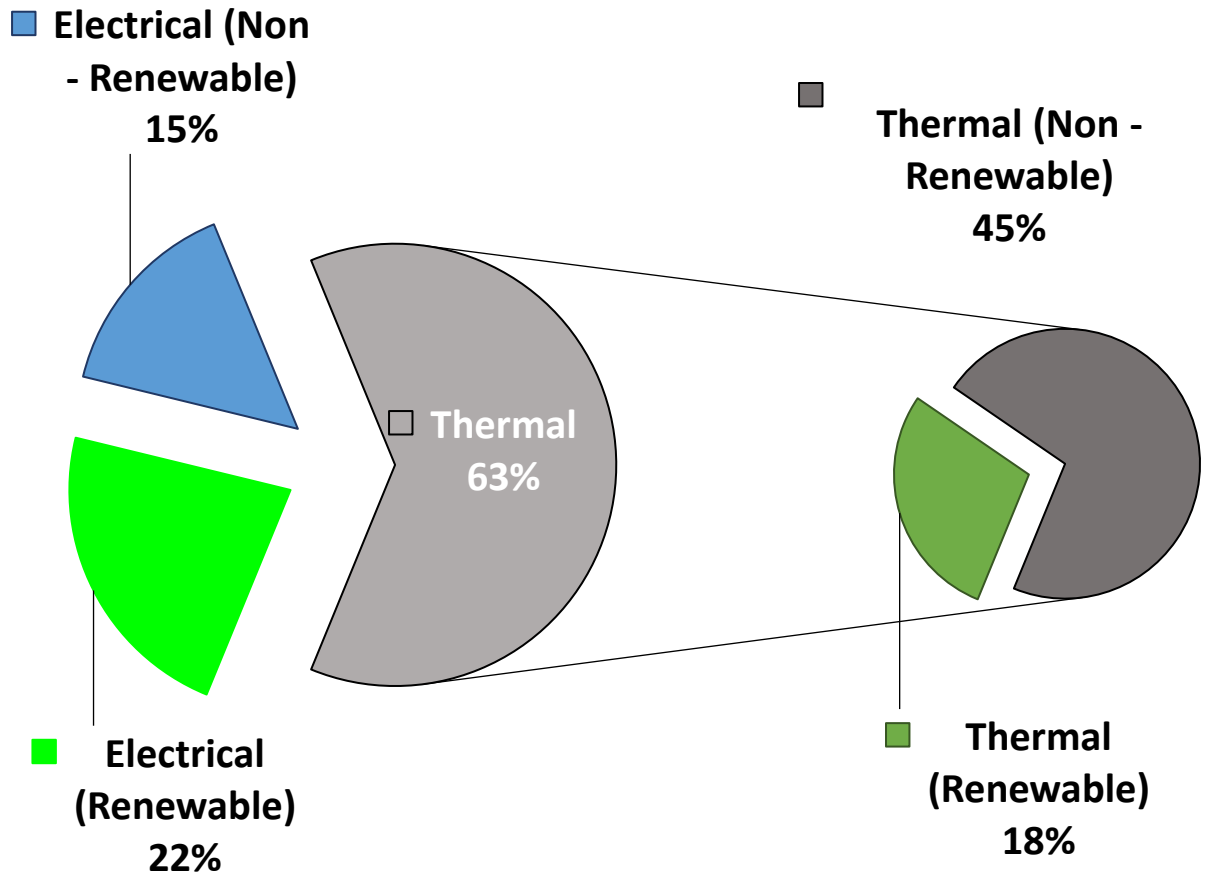
Renewable Energy

Renewable Energy Mix

Plant Energy consumption in percentage (TJ) FY 2023-24



Plant Energy Mix 2023-24 (in %)



Renewable Energy

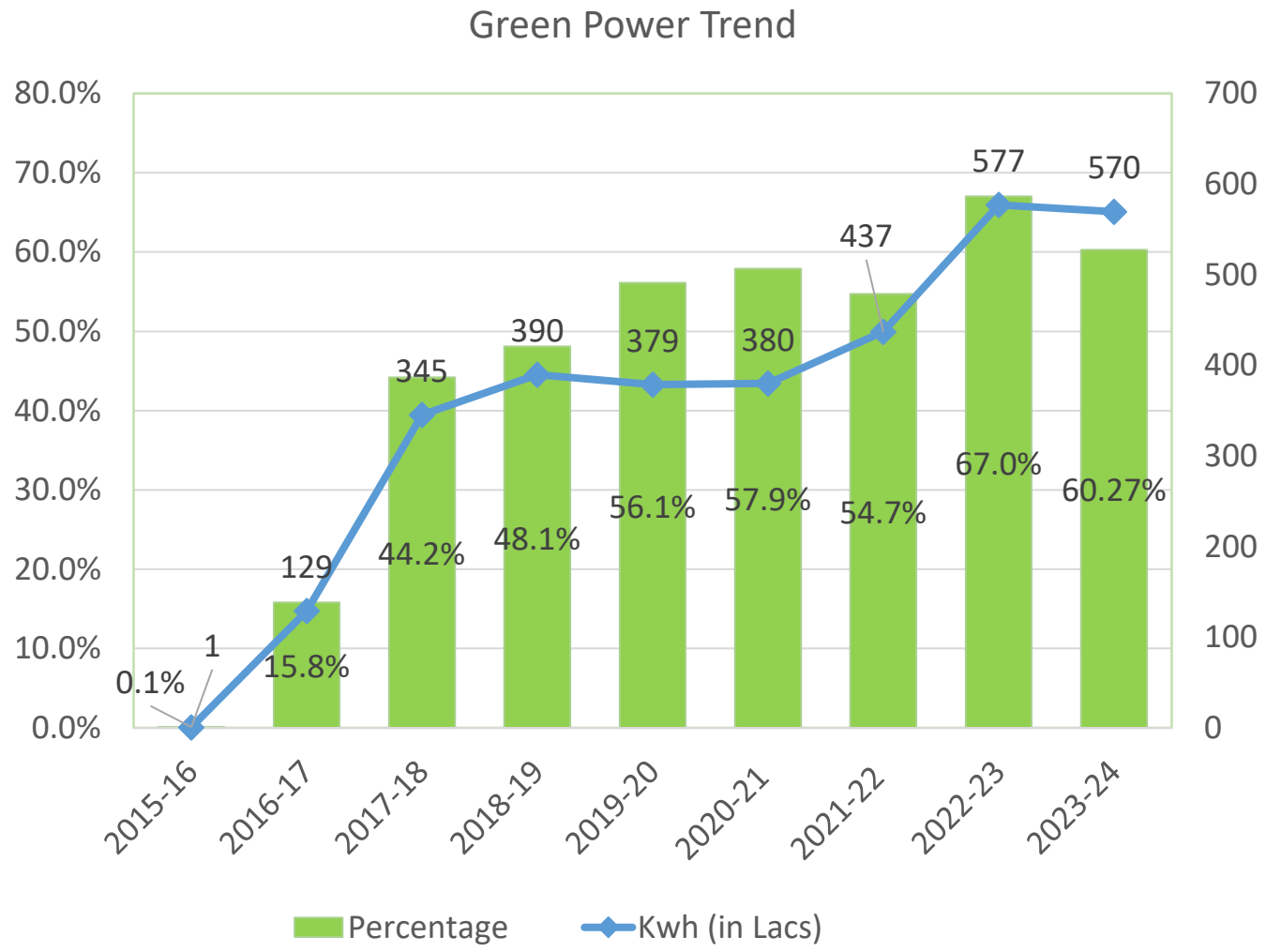
Renewable Energy – Power

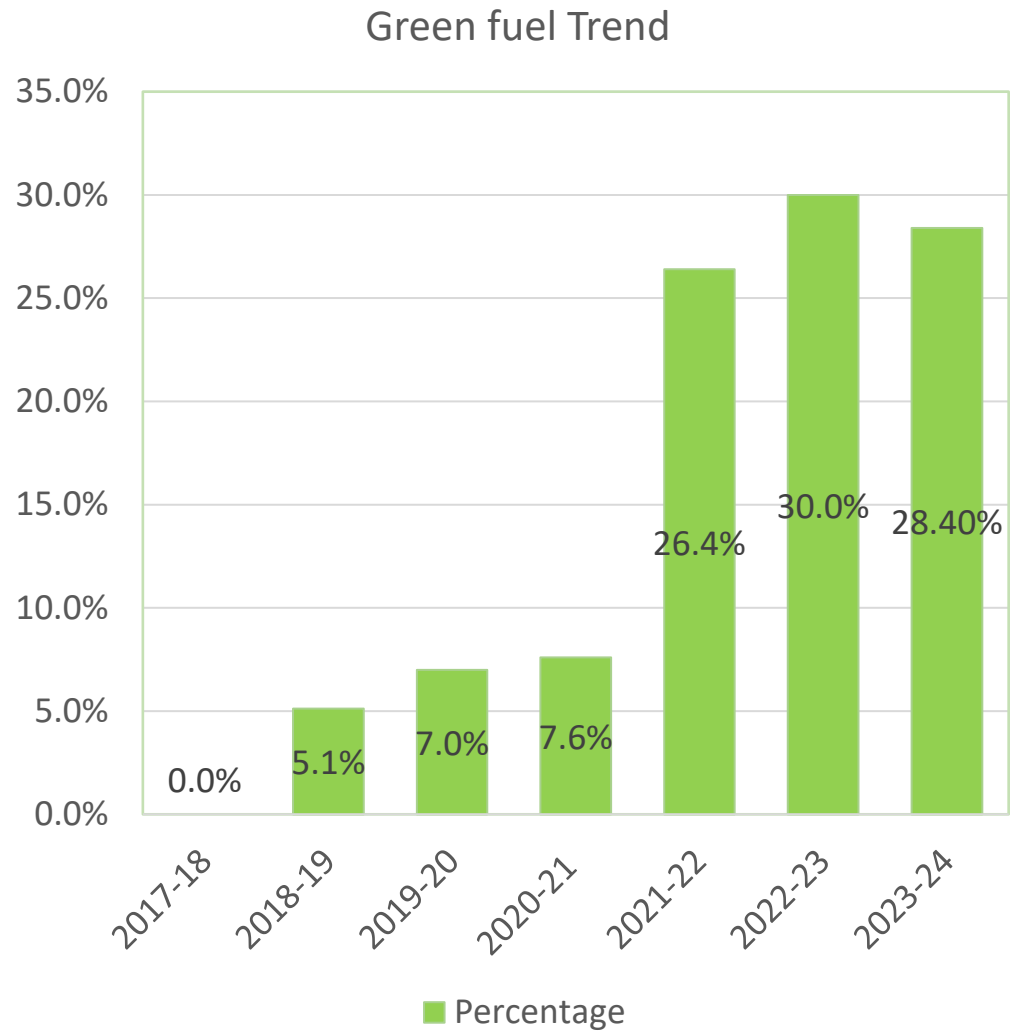
- Renewable Power usage 60.2 % as of now
- 6 MWp roof top solar panel which produces 75 lakhs units of power/Annum. Additional 1.5MWp Roof top Solar project has completed on Jun'24. (In Total 7.5MWp Solar Capacity)
- 200 Lacs Solar units purchase also in pipeline
- 24 MW Capacity of off-site green power (WindMills) which generates 502 lakhs units/Annum
- 100% of non process demand of the factory energy are catered through renewable power sources

Renewable Energy - Thermal

- Biomass usage is 35% as of now
- All plant Vegetation waste collected and crushed and used in Boiler

Renewable Energy Trend





JK TYRE & INDUSTRIES LTD.

iDeeksha
An Initiative by BEE to Promote Industrial Decarbonisation

EnCON Projects / Best practices in EE

Energy Saving projects implemented in last three years

Summary of Encon projects implemented in Last 3 Years

2023-24

DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
Projects in (Nos)	0	4	4
Total savings in (Million Kcal)	0	10580	10580
Total Savings in (Million Rs)	30.69		
Total Investment in (Million Rs)	69.83		
Payback in (Months)	27		

2022-23

DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
Projects in (Nos)	0	8	8
Total savings in (Million Kcal)	0	4543	4543
Total Savings in (Million Rs)	10.76		
Total Investment in (Million Rs)	30.82		
Payback in (Months)	34		

2021-22

DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
Projects in (Nos)	0	7	7
Total savings in (Million Kcal)	0	2894	2894
Total Savings in (Million Rs)	12.80		
Total Investment in (Million Rs)	9.95		
Payback in (Months)	9		

List of Major Encon projects implemented in FY 2023-24

LIST OF ENCON PROJECTS COMPLETED FY 23-24										
S.No.	**Proj No.**	**Title of Project**	**Year**	**Annual Electrical Saving, Million kWh**	**Annual Electrical Cost Saving, Rs Million**	**Annual Thermal Saving, Million kcal**	**Annual Thermal Saving, Rs Million**	**Total Annual Savings, Million Rs**	**Investment Made (Rs million)**	**Payback months**
1	**CEP 90**	Screw chiller (VCC) 300TR (VCC 2) replacement inplace of VAM chiller 300TR for HVAC system	**2023-24**	0.00	0.00	6913.2	12.07	**12.070**	**18.7**	**18.5**
2	**CEP 91**	Fresh Air ventilation units energy performance improvement by replacing belt driven centrifugal type blowers with direct copled, high efficiency axial fans with VFD control - 36 Nos	**2022-23**	2.00	15.14	0.0	0.00	**15.143**	**50.6**	**40.1**
3	**CEP 92**	VFD on FAN with temperature controller @ Process Cooling Tower and VAM cooling towers	**2023-24**	0.01	0.10	0.0	0.00	**0.097**	**0.4**	**43.4**
4	**CEP 93**	PCR curing press Nitrogen shaping instead LPS shaping - Phase1, PCR curing trench-1	**2023-24**	0.00	0.00	1935.7	3.38	**3.380**	**0.3**	**0.9**
		TOTAL		**2.01**	**15.24**	**8848.84**	**15.45**	**30.69**	**69.83**	**27.3**

List of Major Encon projects implemented in FY 2022-23

LIST OF ENCON PROJECTS COMPLETED FY 22-23										
S.No.	Proj No.	Title of Project	Year	Annual Electrical Saving, Million kWh	Annual Electrical Cost Saving, Rs Million	Annual Thermal Saving, Million kcal	Annual Thermal Saving, Rs Million	Total Annual Savings, Million Rs	Investment Made (Rs million)	Payback months
1	CEP 82	Quintoplex & Triplex machines BD water recovery	2022-23	0.000	0.000	0.00	0.000	0.151	0.23	18
2	CEP 83	Platen insulation for TBR curing presses to eliminate surface radiation loss (Phase-1, 26 Nos press completed)	2022-23	0.00	0.000	641.2	1.30	1.304	1.0	9.2
3	CEP 84	Small NIBR Boiler 0.5 TPH for 4 roll calandar machine early startup, which will eliminate early startup of 35TPH big capacity boiler during plant shutdown startup time, thus by saving energy.	2022-23	0.008	0.057	240.8	0.59	0.648	0.85	16
4	CEP 85	Screw chiller (VCC) 100TR replacement inplace of VAM chiller 300TR for TBR stock area process control	2022-23		-4.84	2375.0	5.83	1.169	7.2	73.4
5	CEP 86	Fresh Air ventilation units energy performance improvement by replacing belt driven centrifugal type blowers with direct copled, high efficiency axial fans with VFD control - 13 Nos	2022-23	0.72	5.47	0	0.00	5.468	18.3	40.1
6	CEP 87	Providing VFD on F270 Master and M440 Master TSS TCU pumps	2022-23	0.05	0.38	0	0.00	0.376	0.1	3.8
7	CEP 88	Provide humidity sensor in curing presses to idendify premature failure of bladder leak and by eliminating the tyre scrap	2022-23	0.01	0.07	1.4	0.00	0.077	2.7	423.4
8	CEP 89	Reducing ETP running time 5 hours, by implementing inhouse water filtration system at curing area drain water pit	2022-23	0.01	0.11	593.7	1.46	1.565	0.5	3.8
				0.80	1.24	3852.19	9.18	10.76	30.82	34.4

List of Major Encon projects implemented in FY 2021-22

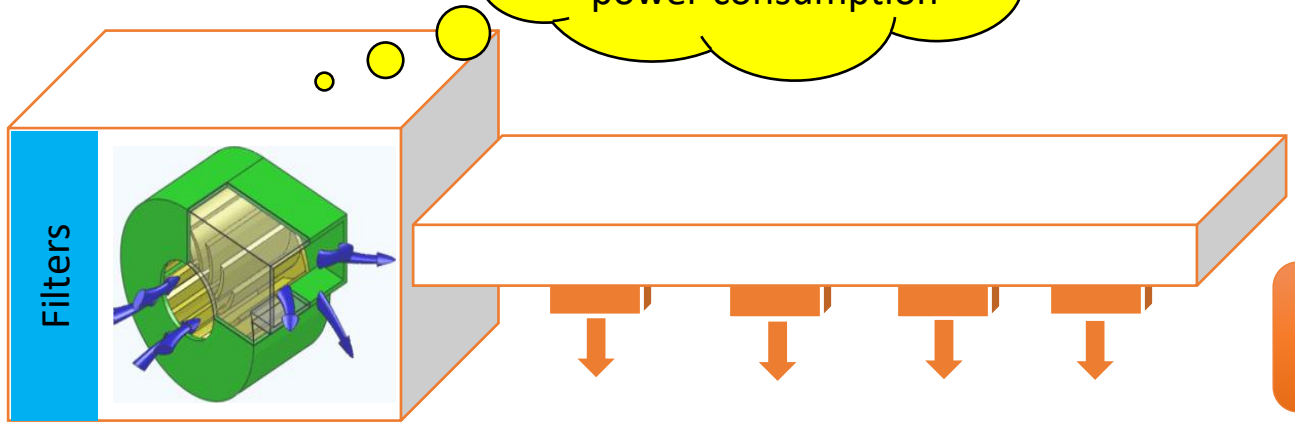
LIST OF ENCON PROJECTS COMPLETED FY 21-22										
S.No.	Proj No.	Title of Project	Year	Annual Electrical Saving, Million kWh	Annual Electrical Cost Saving, Rs Million	Annual Thermal Saving, Million kcal	Annual Thermal Saving, Rs Million	Total Annual Savings, Million Rs	Investment Made (Rs million)	Payback months
1	CEP 75	Increasing Boiler feed water temperature from 105 to 115 by using flash steam.	2021-22			2042	4.79	4.79	0.45	1
2	CEP 76	To improve the Energy Performance in Mixer Batch off Fan group by optimizing the Speed (Air Flow) of Fan - 5 Mixers	2021-22	0.129	0.844			0.84	0.6	9
3	CEP 77	TBR hydraulic pressure optimisation. Operating Pressure reduction from 23Kg/Cm2 to 19 Kg/Cm2	2021-22	0.123	0.809			0.81	1.10	16
4	CEP 78	Cogged belt with weightless pulley replacement @ Air handling units, in place of V belt and higher weight pulley (20 Nos)	2021-22	0.153	1.008			1.01	1.00	12
5	CEP 79	Air Flow Meter Installation (LP) to process areas to set bench mark on consumption (CFM/Kg) and by eliminating losses and air consumption in the process - 10 Nos	2021-22	0.533	3.50			3.50	1.00	3
6	CEP 80	Upgrading Plant Irrigation system from manual control to Solar based Smart water management system	2021-22	0.011	0.069			0.35	0.80	27
7	CEP 81	Improve the Quality of Green Tyre Painting by using Robot in Truck Bus Radial section and also eliminating Idle time loss and scrap loss	2021-22	0.043	0.280			1.50	5.00	40
				0.991	6.509	2041.878	4.786	12.799	9.950	9

Significant En CON activities – Project 1

IDEA: *High Power consuming Centrifugal Fan can be replaced with High Efficiency Axial Fan*

Present System :

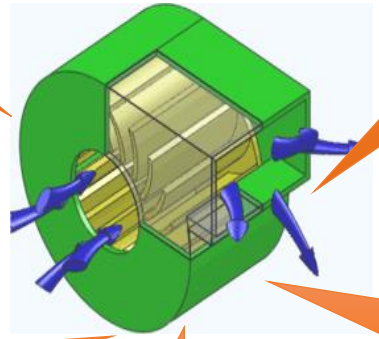
Ventilation System contributes 42% of Overall Plant Fixed power consumption



No Auto damper Control

Star Delta Starter

High Vibration



No control on Speed

High Maintenance

Belt Driven

Results in High Power Consumption

Total No of Ventilation System: 95 Nos
Total Connected Load: 1526 KWH

JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant En CON activities – Project 1

Centrifugal Fan	Axial Fan
Power consumption high	**Power consumption low(15 – 30%)**
Belt driven	Direct driven
Star-delta starter	VFD control for step-less load control
No control in speed	Speed can be controlled
No flow control	Based on requirement flow can be controlled

Result: *63 Nos of units converted with investment of 9.5 Crore Rs. In two phases, 48% of Energy Saving achieved.*

ROI is 2.5 Years

Horizontal Deployment:

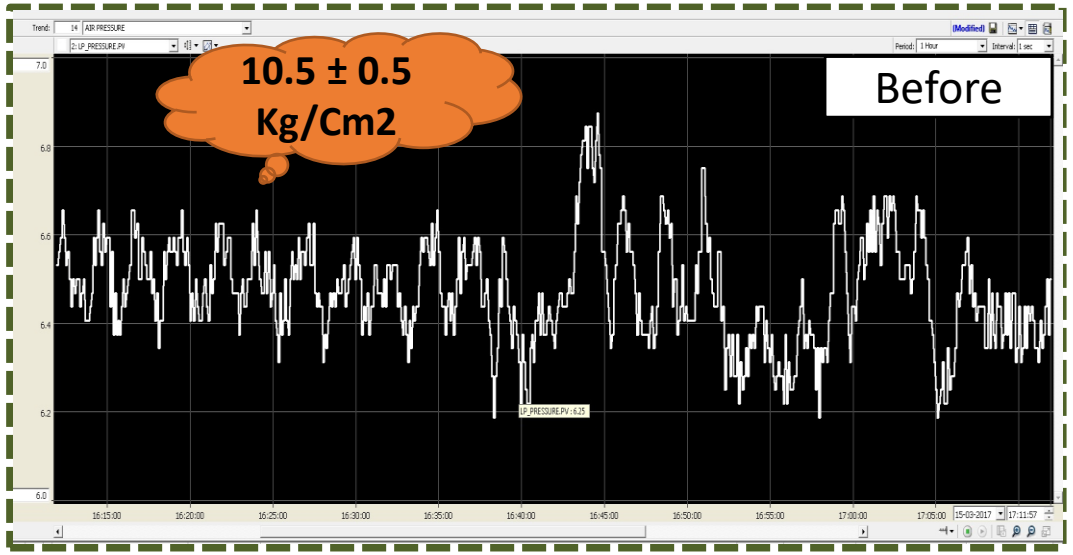
32 Nos of fan conversion project is in progress FY 24-25

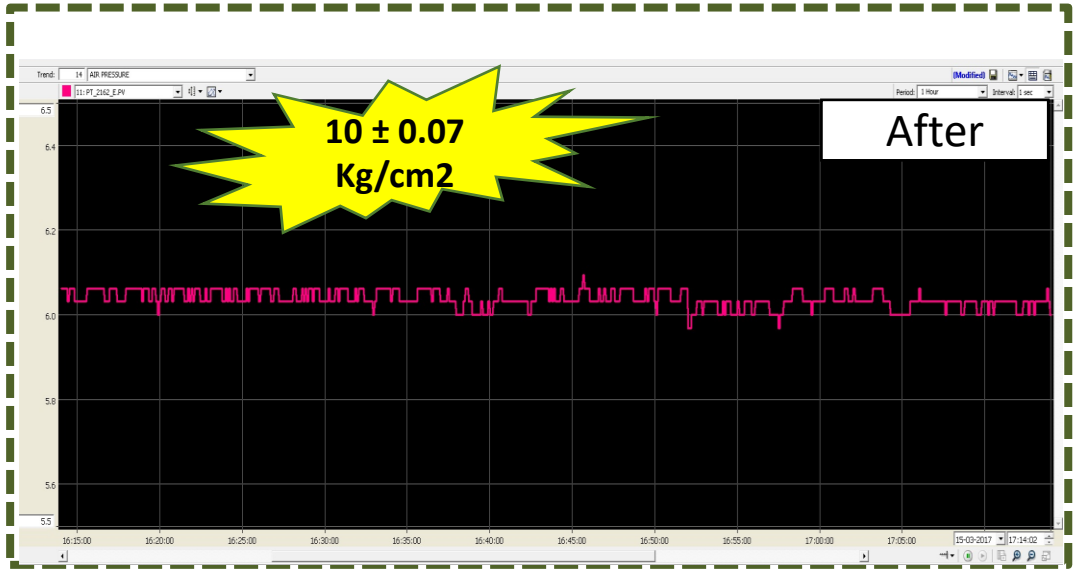
JK TYRE & INDUSTRIES LTD.

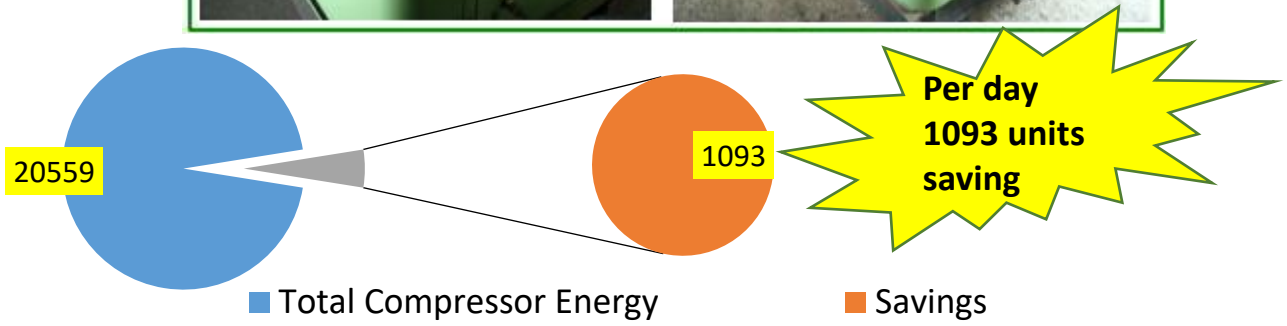
iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant En CON activities – Project 2

In addition, with VFD compressor control, installation of intelligent flow control (IFC) reduces 5% of compressor energy by optimizing pressure at +/-1 psi level







Significant En CON activities – Project 3

Project Name: To eliminate Coal and Power Consumption of Boiler during restart of plant after shutdown

Problem/Present status :

- During plant shutdown startup, due to process heating requirement (4roll calendar) the coal fired boiler need to be started much earlier (8 Hrs).
- To avoid the early startup of boiler we required alternative suitable solution.

Solution:

Introducing Separate electric boiler for 4Roll Calendar process (TCU) to avoid early startup of Coal fired Boiler during plant shutdown startup time.

- Known concept but unique application.

Small capacity boilers are commonly used by industry in various applications. However we are using the concept in new area (4 roll calendar machine) first time in Tyre industry, which includes major modifications in the existing equipment setup beyond OEM design

Result

Average 45 Running Hrs (9 earlier startups) of higher capacity boiler saved.

Investment : 8.5 L Rs
Savings:
170 MT/annum Coal
17 L Rs/annum
ROI : 6 Months

JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant En CON activities – Project 4

Energy Theme – Reduction of PCR Hydraulic Power consumption

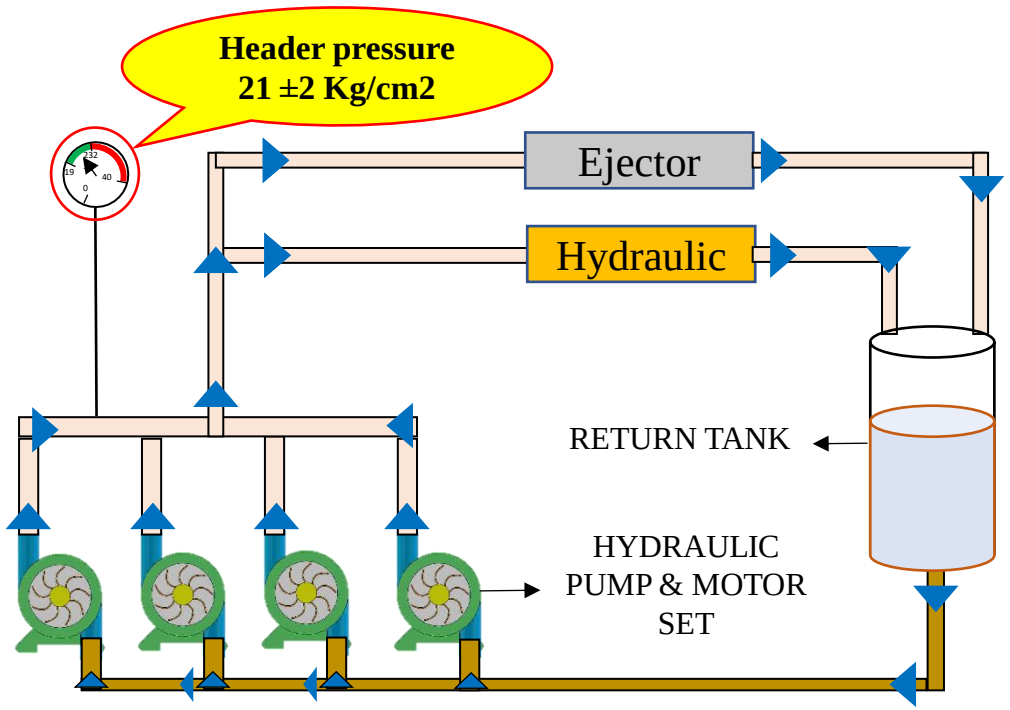
Present status - Presses in PCR trench are operating with hydraulic and ejector pressure of 21 ±2 Kg/cm² for tyre loading & unloading operations and vacuum operations

Problem point – Leads to excess power consumption because of common Header for Ejector system & Hydraulic Press Operation

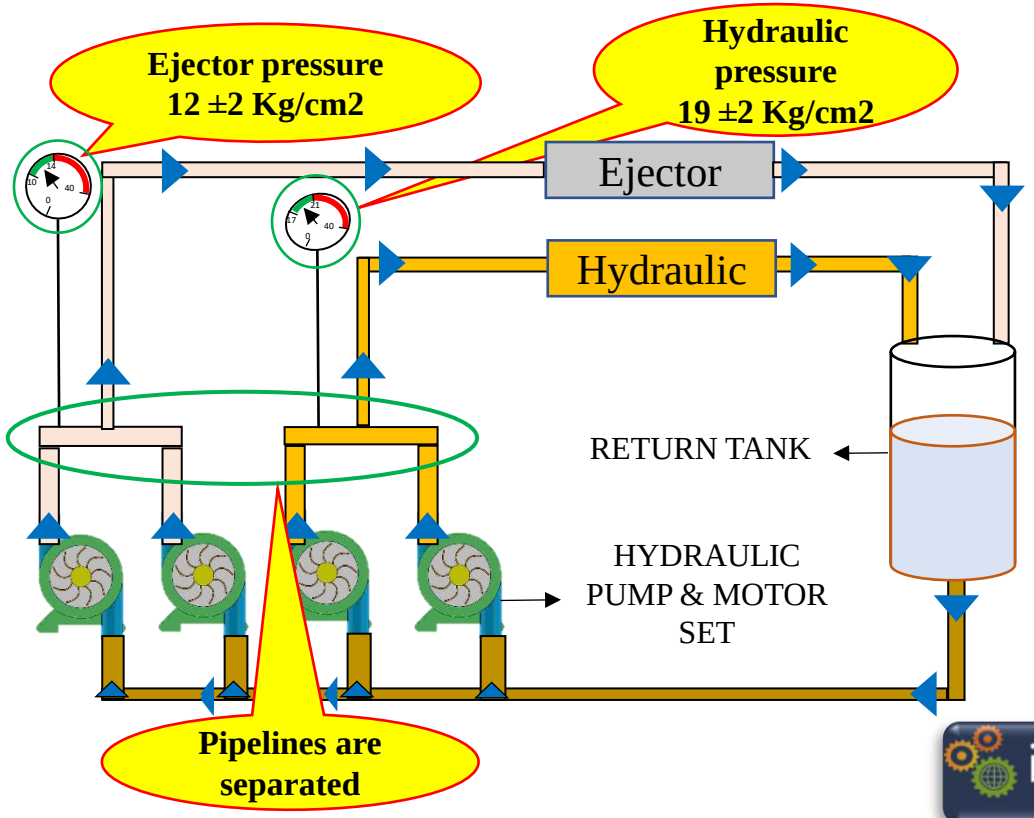
Idea – Pipelines modification can be done so that both of the systems will run independently with required pressure for better process quality control and there by energy can be saved

Savings - 650 Units/Day

CURRENT CONDITION:



IMPROVED CONDITION:



JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant En CON activities – Project 5

IDEA: To improve the Energy Performance in Mixer Batch off Fan group by optimizing the Speed (Air Flow) of Fan

The energy performance improvement done by ON/OFF method, increased the Spares and PM maintenance cost. Then there is the need for low maintenance, same time less investment project

Innovation Details: *The processed rubber sheet of 120 Deg temperature being cooled to atmospheric temperature in the 15 mtr cooling conveyor with the help of 40 Nos of small fans. These fans are running with DOL starters. Previously the energy saving achieved based on ON/OFF operation of the fan groups (4X10 nos). As this increase PM maintenance cost and Spares cost, VFD has been introduced to control the airflow based on temperature.*

This project is unique because instead providing 40 Nos small size VFDs, we have provided only 4 Nos VFD (1 VFD controls 10 nos fans) by doing necessary design modification in the electrical circuit and providing appropriate rated choke.

Result:

- ***This is implemented at 6 no Mixers Batch off unit***
- ***Power savings of 1.5 Lacs Units / annum***

JK TYRE & INDUSTRIES LTD.

iDeeksha
An Initiative by BEE to Promote Industrial Decarbonisation

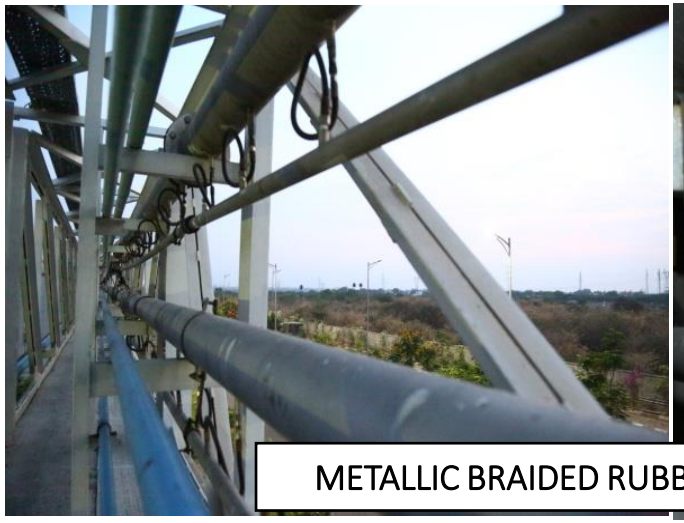
Significant En CON activities – Project 6

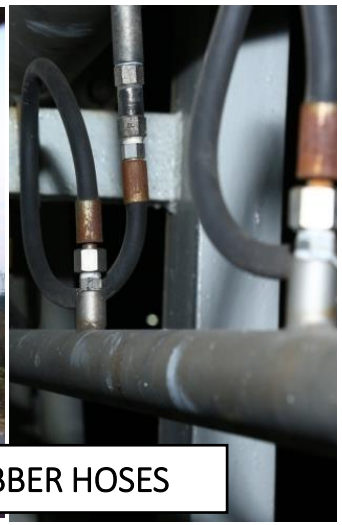
Project Details: Carbon Conveying system redesigned

- *Cut off Valve provided near the Air Reservoir Outlet*
- *PRV provided in the Conveying Line to regulate the required pressure*
- *PU hose replaced with High Pressure Metallic Braided Hoses* ***(Extended Life of 10 yrs)***

CUT OFF VALVE

PRESSURE CONTROL VALVE





METALLIC BRAIDED RUBBER HOSES

Result: *8.6% saving of Compressor Energy (i.e. Power Consumption reduced to 1650 kWh/day. Cost Savings of 38 Lacs /Annum*

Horizontal Deployment: *Can be deployed and there is a replication potential for all other JK Units and for Similar Industries*

JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant En CON activities – Project 7

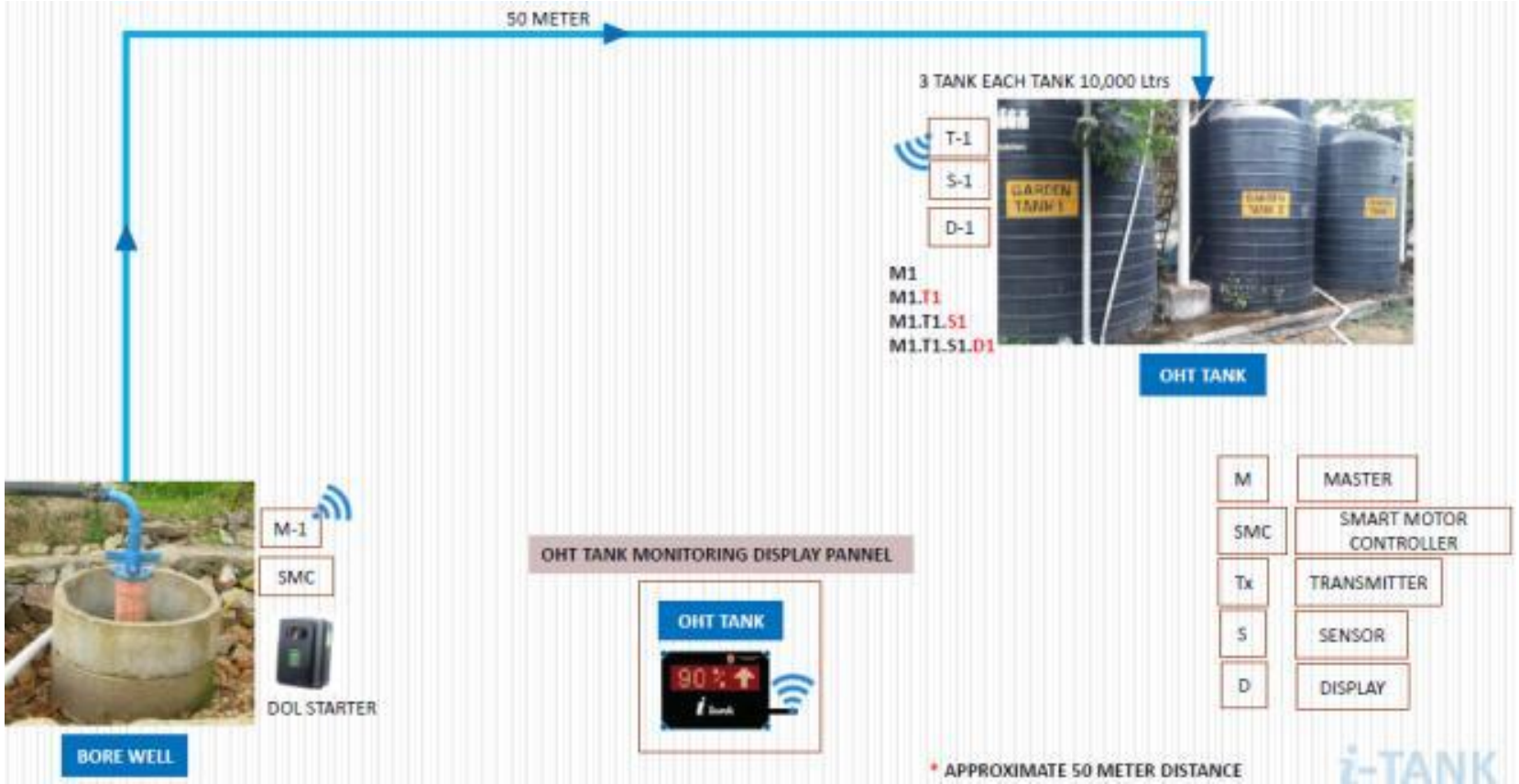
Project Name: Upgrading Plant Irrigation system from manual control to Solar based Smart water management system

Problem/Present status :

- Presently we are watering 25 Acres of greenbelt area. Following are the concerns during this process.

- Dry running of pump and failures
- Frequent water tank Overflow
- Non availability of data like water/power consumption
- Manual control leads careless and over irrigation

Solution: Fully Automatic irrigation system



Significant En CON activities – Project 7

Advantages:

- No Manual irrigation
- Periodic Auto and remote control
- Stops Over Flow
- Stops Dry Run
- Accountability for Water Consumption

Expected Result

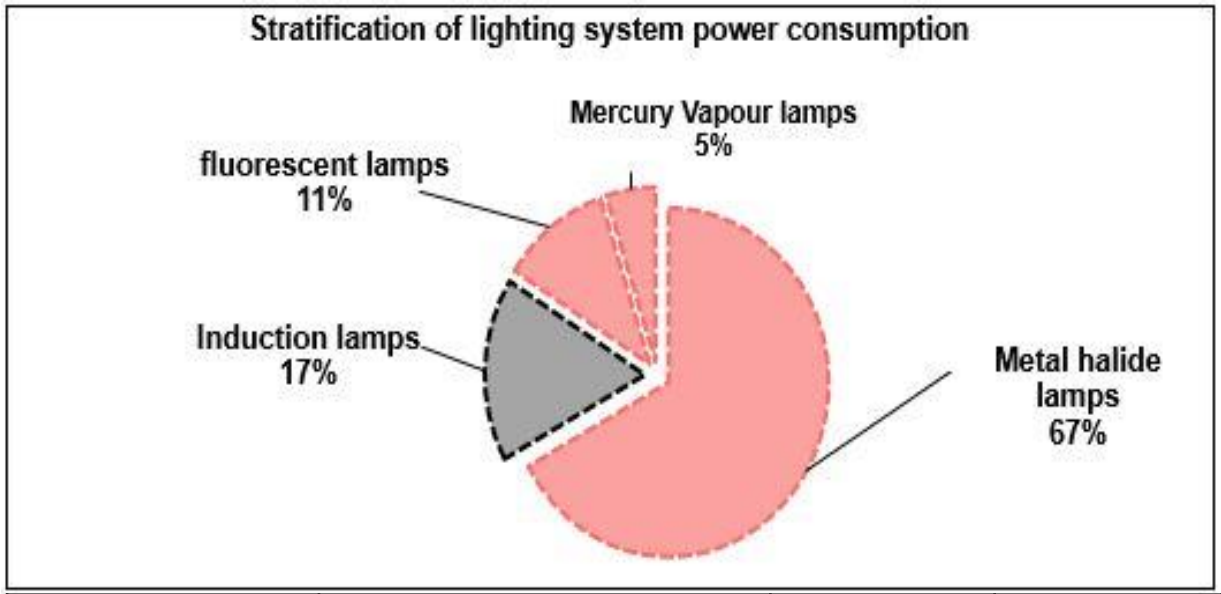
Average 45 Running Hrs (9 earlier startups) of higher capacity boiler saved.

Investment : 8 Lacs Rs
Savings:
1 Manpower
10KL/Day water
2.9 L Rs/annum
ROI : 2.8 Years

Significant En CON activities – Project 8

Theme : Reduction of lighting power

Idea : 100% LED Conversion

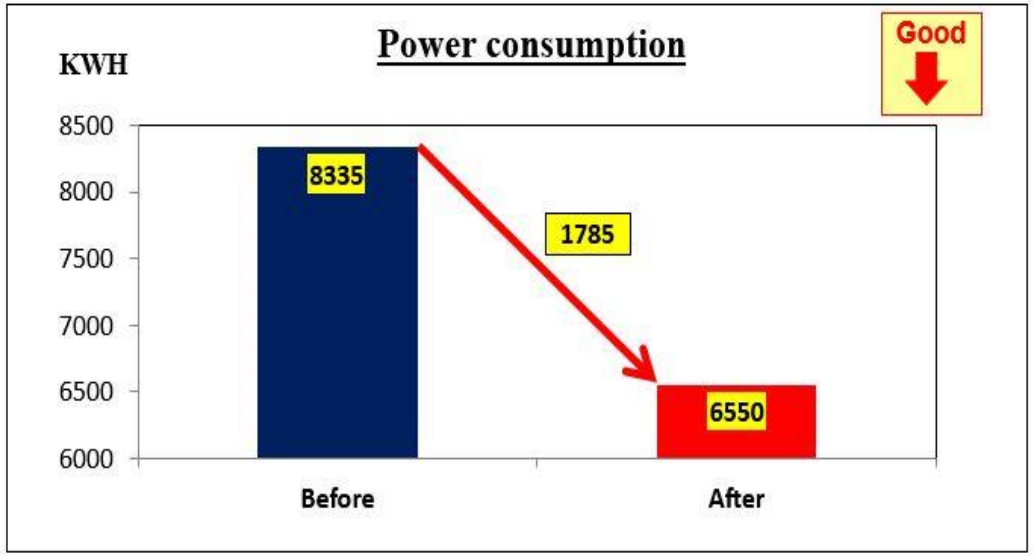


Lamp Type	Lumens/Watt		Life Hours	Overall Result
	Range	Avg		
Metal Halide lamps	40-70	60	10000	Not Good
Fluorescent lamps	40-60	50	5000	Not Good
Mercury Vapour lamps	44-57	50	5000	Not Good
Induction lamps	90-110	100	50000	Satisfactory
LED	100-150	130	50000	Good

Implementation

- ❑ All conventional lightings were converted to LED fitting
- ❑ Plant is 100% LED

RESULT:

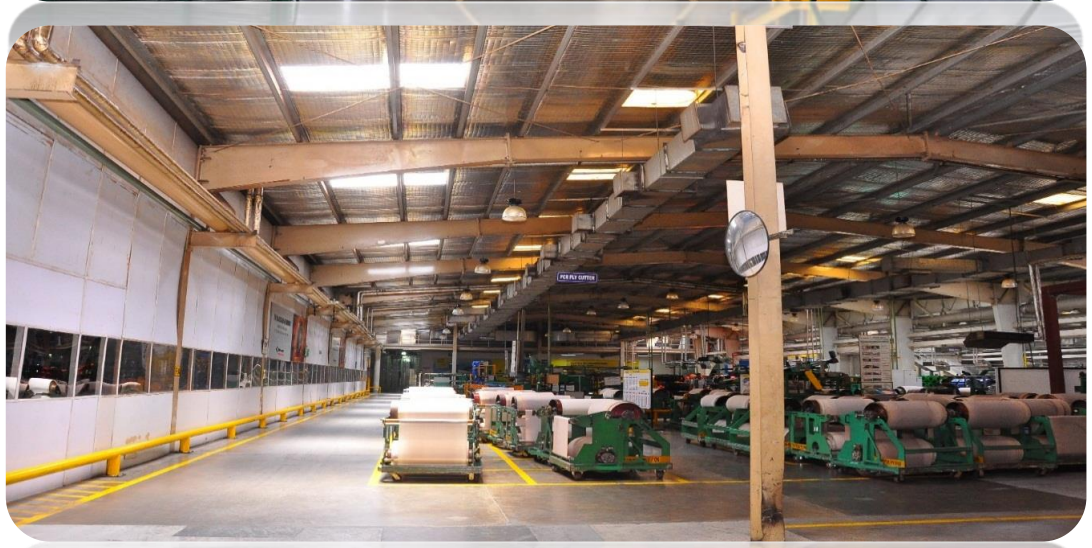


JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant En CON activities – Project 9

Maximum Daylights used inside the plant & Natural turbo ventilators are used to improve the air circulation



JK TYRE & INDUSTRIES LTD.

iDeeksha
An Initiative by BEE to Promote Industrial Decarbonisation

Significant En CON activities – Project 10

BEFORE

35TPH Boiler earlier started for VAM operation

AFTER

- We were using 3 no's of 300 TR & 1 No of 600 TR capacity of VAM chiller for serving the requirement of HVAC & Process requirements. During plant start up after shutdown, Boiler is started for process requirement alone (Extruder & Calendar)
- Redesigned our internal chilled water distribution, to supply from both VAM and VCC chillers, so that VCC would be operated during shutdown startup time to avoid earlier startup of boiler and steam losses
- Savings 540 MT/Annum Coal, 24600 Kwh/Annum

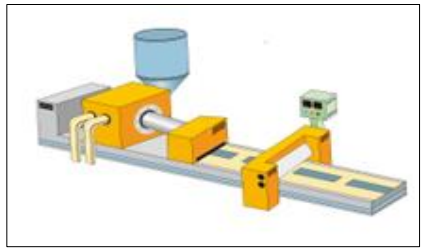
JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant En CON activities – Project 11

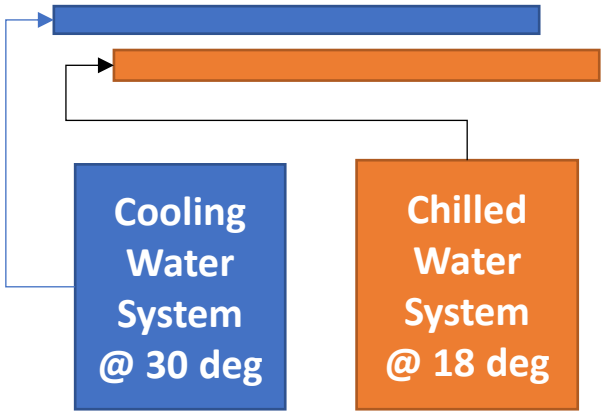
IDEA: *Quintoplex extruder cooling water system can be merged with chilled water system with the increased temperature from 18 Deg C to 23 Deg C without any process change. By that pumping load for cooling water system and reduction in chiller load as well reduction in steam consumption of VAM chiller.*

Innovation Details: *Elimination of Traditional cooling water system and using the Existing Chilled water system in place of Cooling Water requirement by fine tuning the Temperature.*

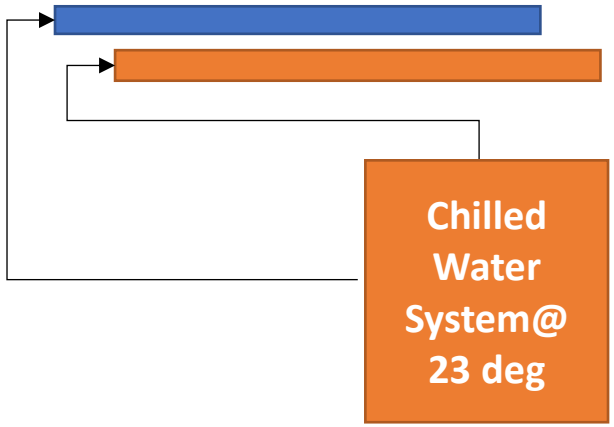


Quintoplex Extruder

Conveyor for Cooling the Product to Ambient



Conveyor for Cooling the Product to Ambient



Result:

- ***Zero Investment***
- ***Savings - 384 unit /Day,***
- ***Steam consumption – 5 MT/Day,***
- ***Cost : 25.01 lacs / annum***

Redesigning of Chilled Water Distribution System

JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

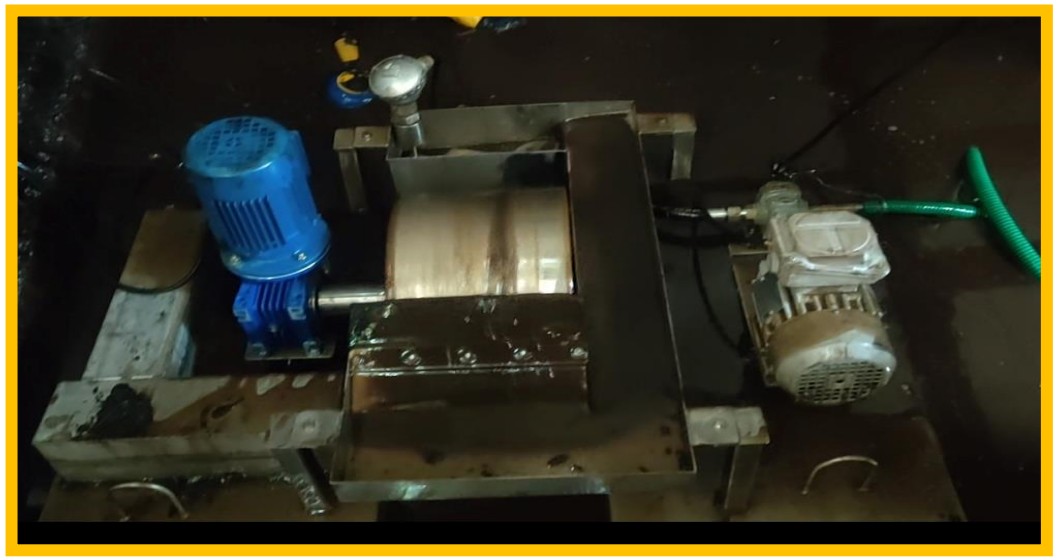
Significant Projects implemented - 12

Project Name: ETP running time reduction by introducing oil skimmer and filtration system in curing drain water pit

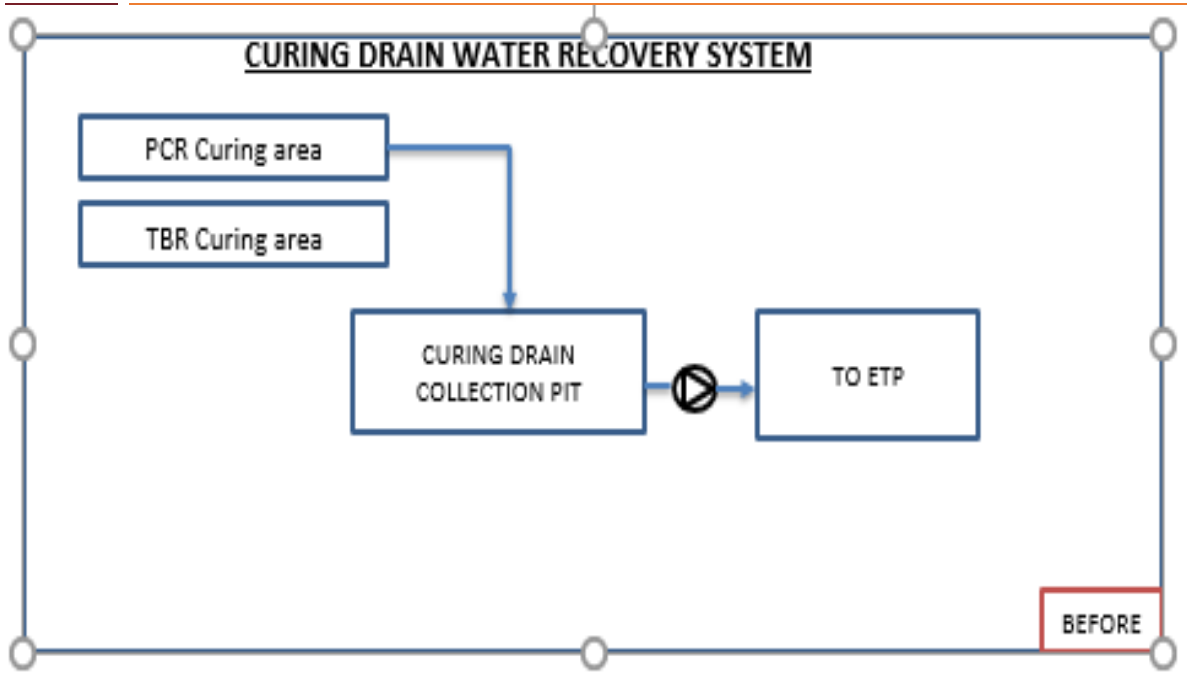
Problem / Present status :

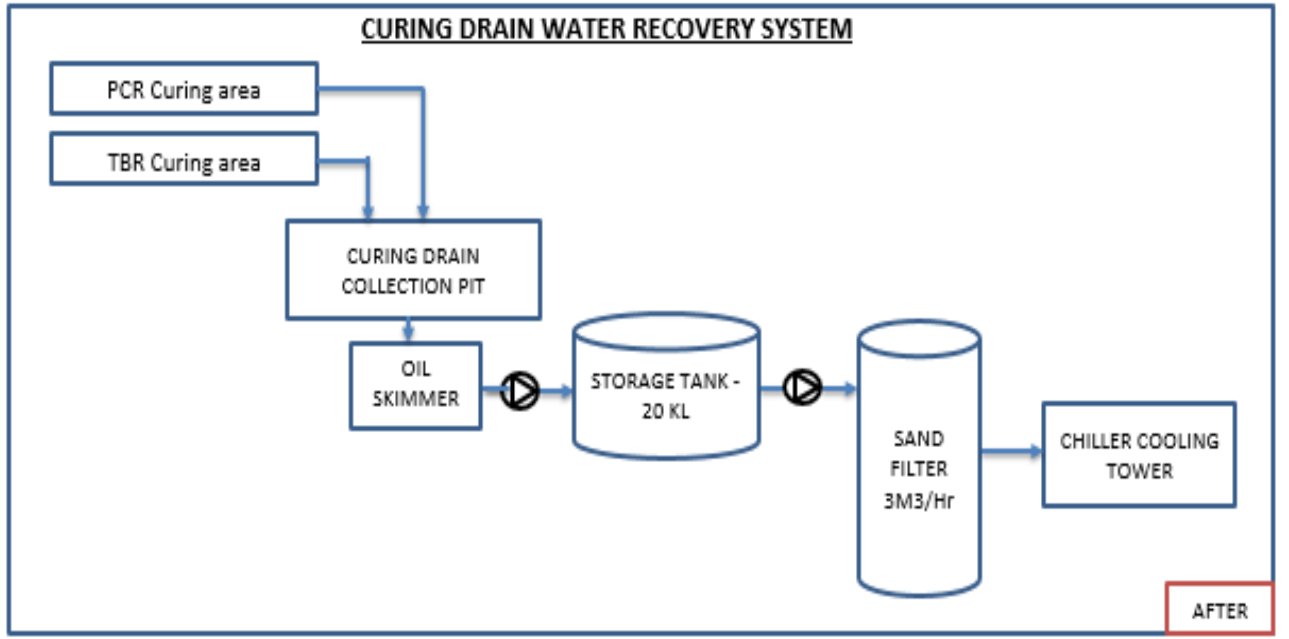
- From our curing process there will be the gravity drain with the oil contamination is collecting in the pit and being sent to the ETP for recycle.
- For this water recycling we need to run the ETP with Multiple Effect Evaporator for 5 hours additional in a day, Which impacts in increase of power and steam consumption.

Solution : Introducing oil skimmer(in house made) & sand filtration system in the curing drain water to extract the layer oil contamination from the drain water
Outlet connected to sand filter to reduce the turbidity of water and can be used for cooling tower make up.



Significant Projects implemented - 12





Advantages:

ETP running hours reduced

Investment : Rs.5 Lacs ,

Savings:

Power consumption - 142000 Kwh/annum

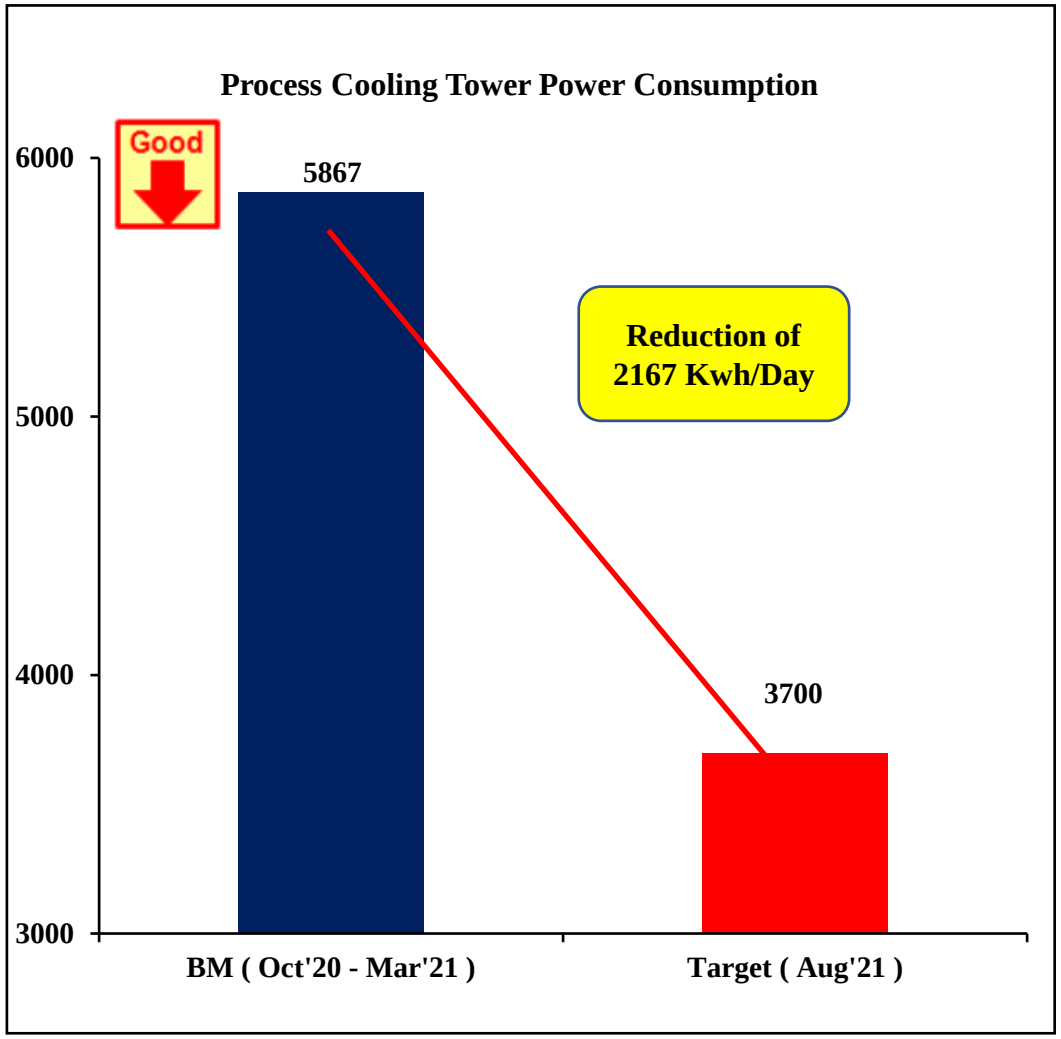
Steam Consumption – 710 MT/annum

Cost saving = Rs.22.4 Lacs/annum

ROI= 3 Months

Significant Projects implemented - 13

Theme : Reduction of Cooling tower power consumption



KAIZEN SCHEDULE						
Kaizen.No	Problem Details	Kaizen Details	Resp.	July' 21		
				1st Week	2nd Week	3rd Week
Kaizen - 1	Variable cooling water flow for mixing process.	Flow meter to be installed in individual mixer and to be monitored. Water Flow to mixer to be optimized by installing VFD in cooling water pump.	K.Arvind	P		
Kaizen - 2	High cooling water flow for Stock preparation area.	Flow to individual extruder to be monitored and flow to be optimized. Stock area cooling water header line to be merged with the new cooling tower thereby to stop one cooling tower.	D.Prabhu S.Praveen	P		
				P	Plan	

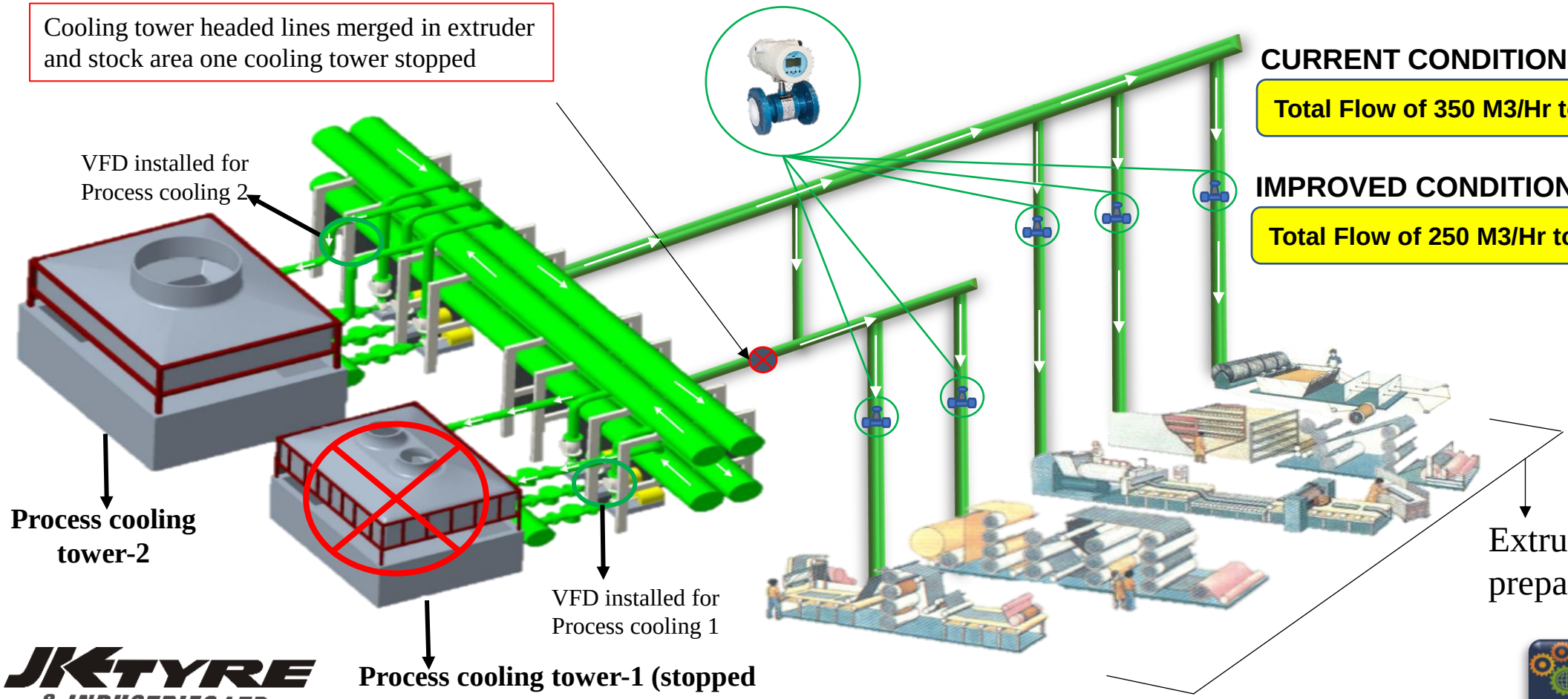
JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant Projects implemented - 13

Energy Theme – Optimization of Cooling water flow in Mixer & Stock preparation area
Problem point – Mixer – Variable flow, Stock area – Fixed higher volume flow
Idea – Electromagnetic flow meter installed for all individual mixer and cooling water flow measured and monitored in SCADA. VFD installed in both cooling tower pumps and actual cooling water flow optimized based on the design data of mixer water flow
Process cooling tower 1 & 2 cooling water flow measured in individual extruder by installing flow meters. Cooling water flow optimized for Extruder and stock preparation area thereby stopping Process cooling tower-1.

Cooling tower headed lines merged in extruder and stock area one cooling tower stopped



CURRENT CONDITION:

Total Flow of 350 M3/Hr to Mixers

IMPROVED CONDITION:

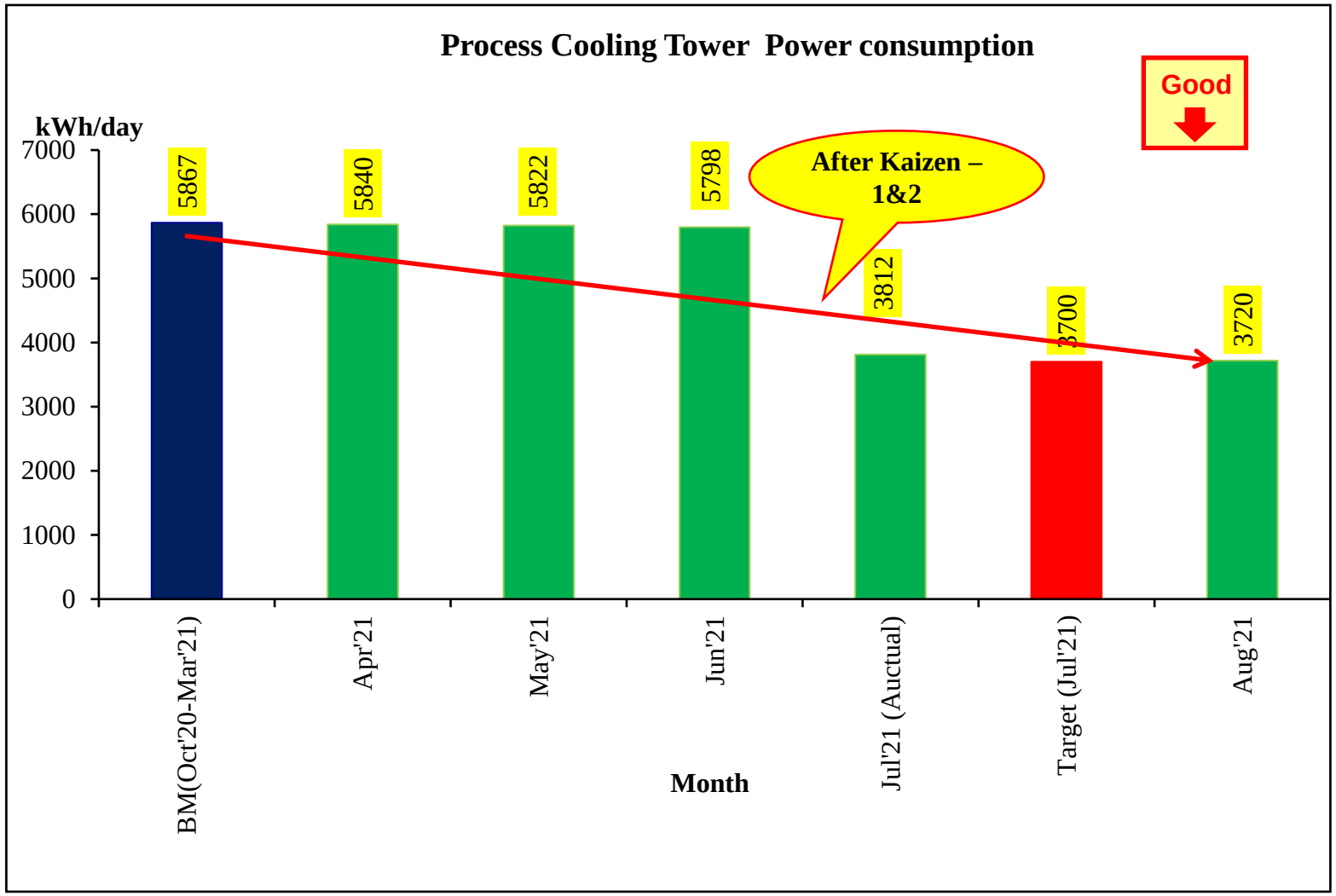
Total Flow of 250 M3/Hr to Mixers

JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant Projects implemented - 13

Result:



Before

Name	Design Capacity (M3/hr)	Running Capacity (M3/Hr)
PCT 1	700	350
PCT 2	700	500
TOTAL	1400	850

- One of the cooling Tower shall be stopped by
  1) Optimizing total flow from present level of 850 M3/Hr to 700 M3/Hr
  2) Merging both Cooling tower Pipe lines

After

Name	Design Capacity (M3/hr)	Running Capacity (M3/Hr)
PCT 1	700	0
PCT 2	700	700
TOTAL	1400	700

- **Process Cooling Tower – 1 Stopped**
- **Process Cooling Tower – 2 Capacity Optimized**

JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Significant Projects implemented - 14

Cemented Coal Yard

- Cemented Floors are used resulting elimination of carpet loss
- Fuels are saved inside the shed which helps elimination of fly loss

JK TYRE & INDUSTRIES LTD.

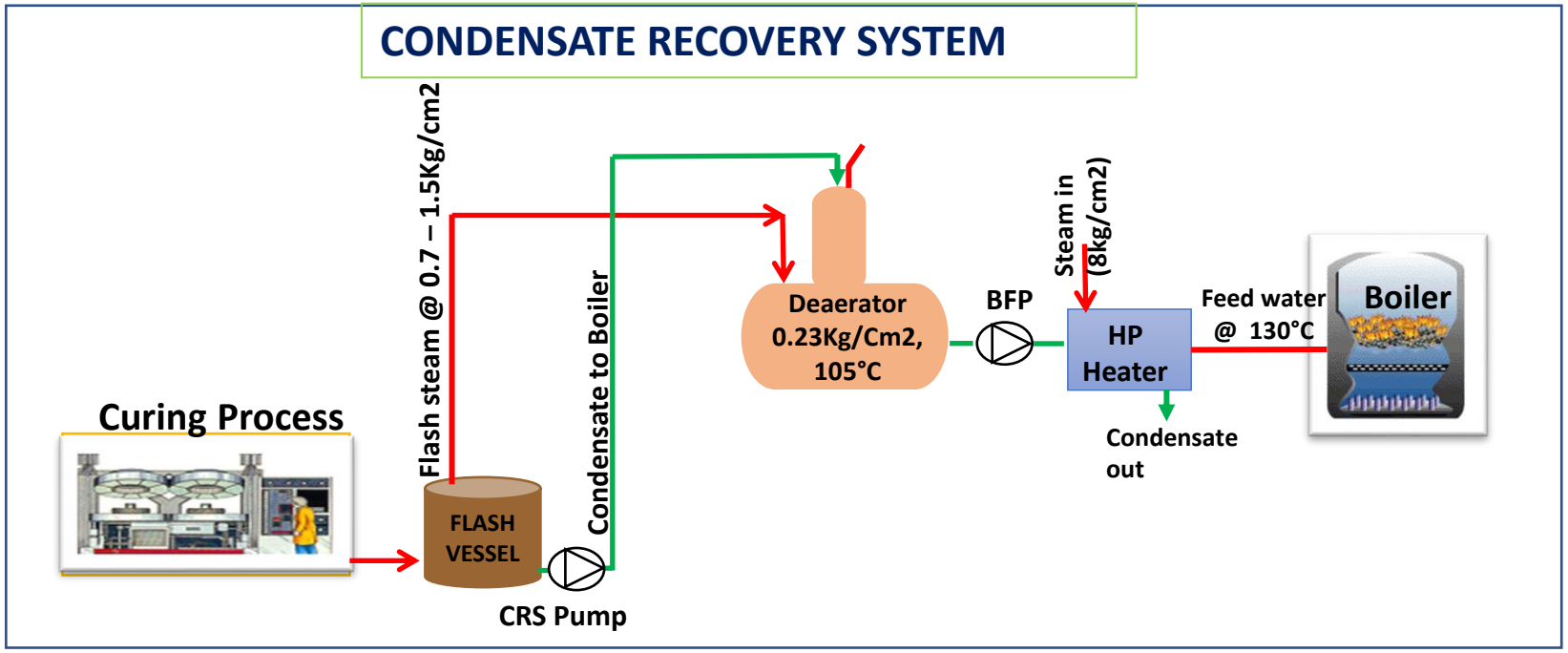
iDeeksha
An Initiative by BEE to Promote Industrial Decarbonisation

Significant Projects implemented - 15

Project Name: Fuel Consumption reduction by Effective Utilization of Flash Steam from Curing Process

Problem/Present status :

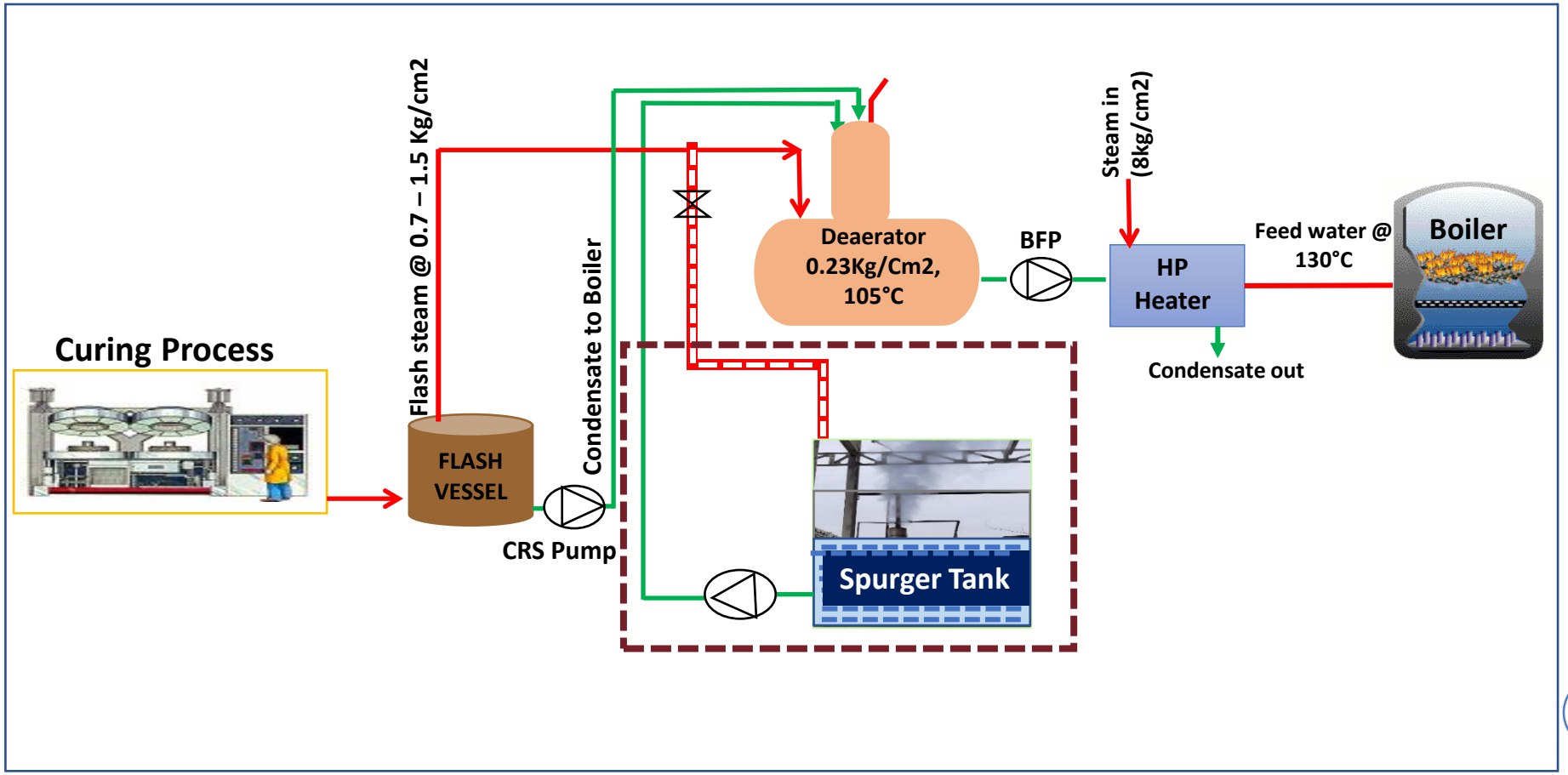
- Tyre curing process 915 steam traps connected to condensate recovery system
- Flash steam pressure from curing process varies from 0.7 to 1.5 Kg/Cm2. This flash steam is used in boiler to increase the feed water temperature at deaerator to 105°C @ 0.23 Kg/Cm2 and unutilized flash steam vented to atmosphere which results in Energy Loss.



Significant Projects implemented - 15

Project Name: Fuel Consumption reduction by Effective Utilization of Flash Steam from Curing Process

Action - 1



- Flash steam partially Recovered through Spurger tank by condensing with DM water

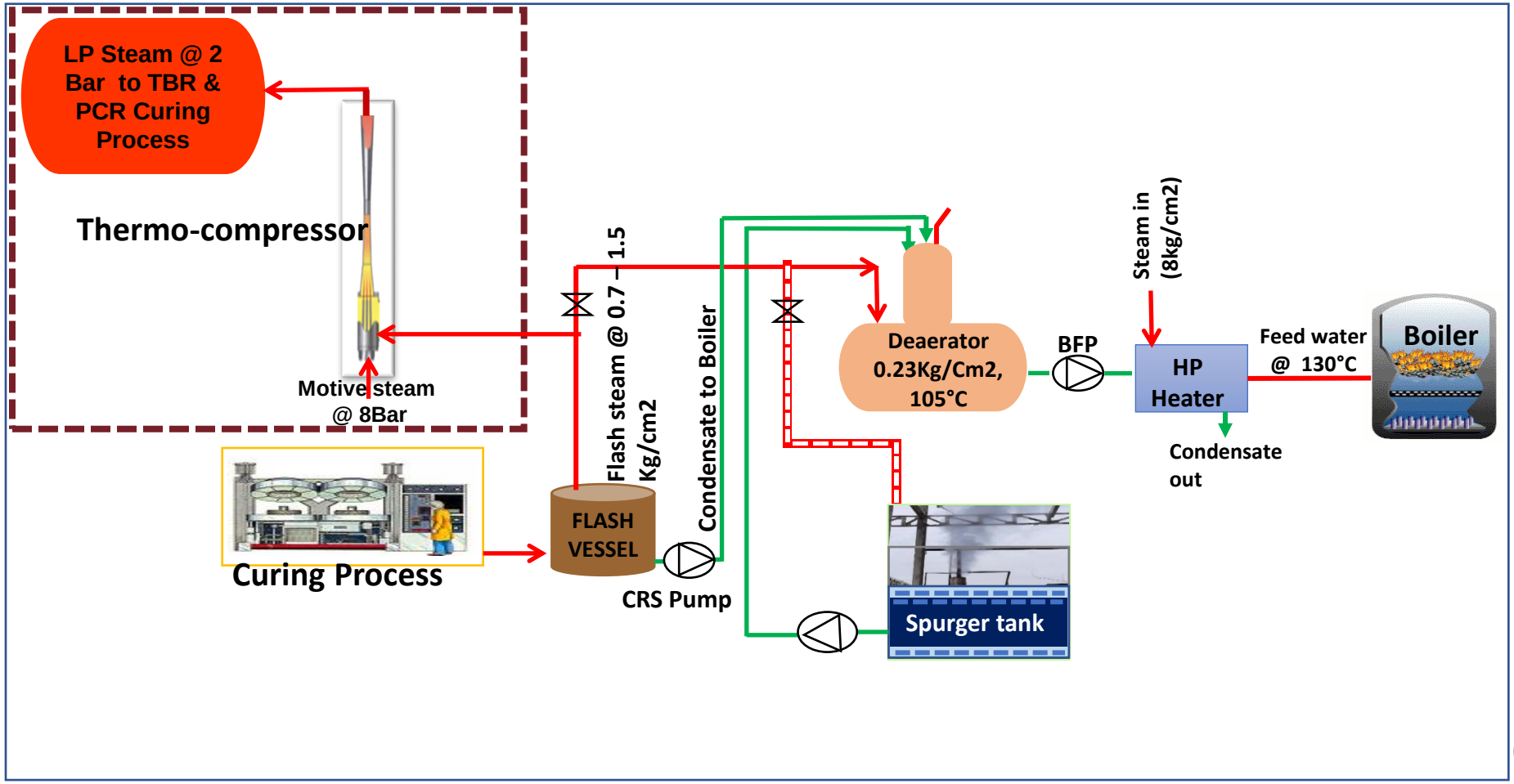
Still unutilized flash from Spurger tank vented to atmosphere

Savings:- 4KLD DM water

Significant Projects implemented - 15

Project Name: Fuel Consumption reduction by Effective Utilization of Flash Steam from Curing Process

Action - 2



Introduced Thermo-compressor to recover flash steam to Tyre Curing Process as LP Steam by redesigning of Traditional Flash Steam recovery system,

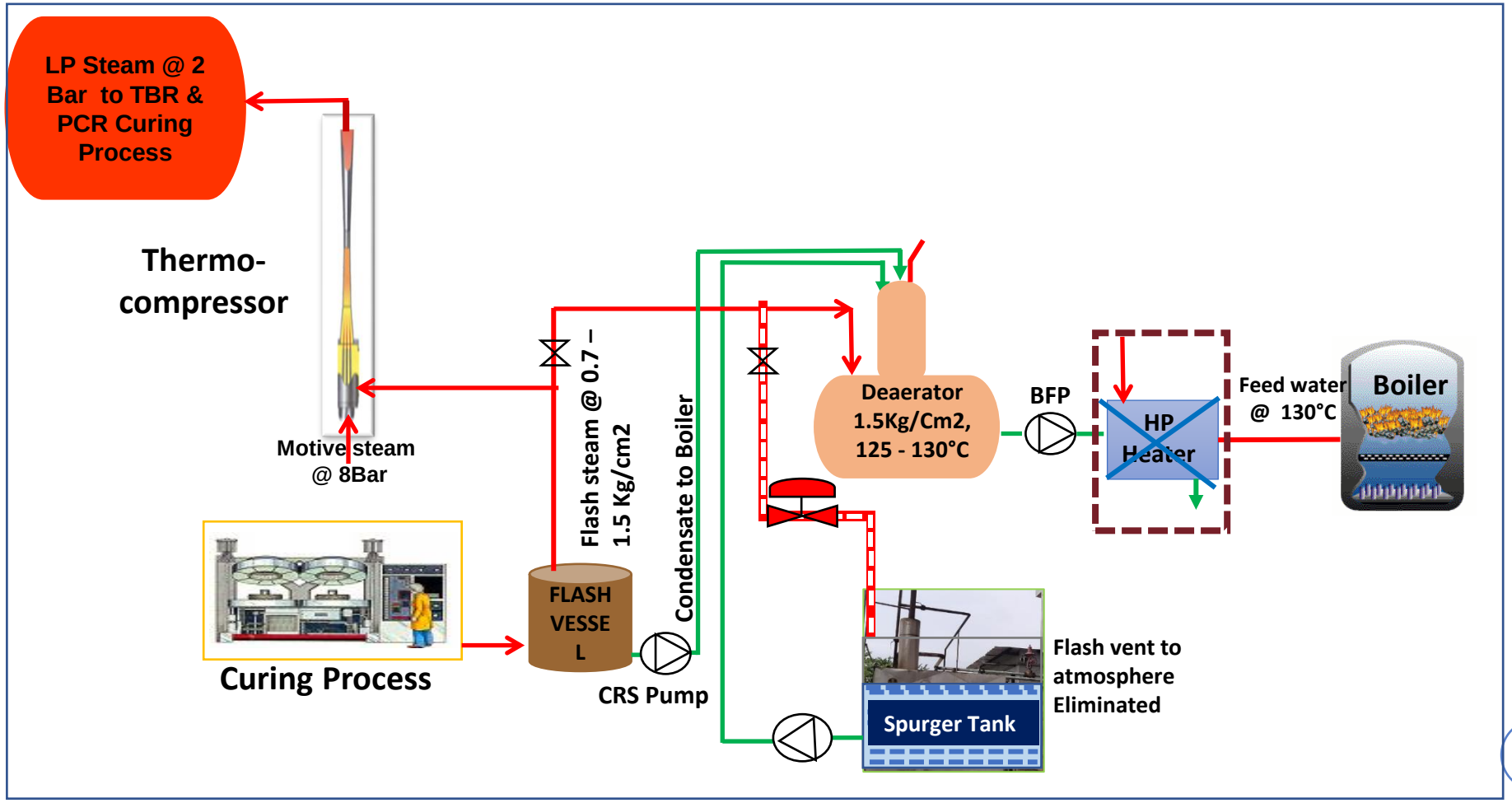
Still unutilized flash steam vented to atmosphere

Coal Savings:-
107 MT / Year

Significant Projects implemented - 15

Project Name: Fuel Consumption reduction by Effective Utilization of Flash Steam from Curing Process

Action - 3



Deaerator Operating Working Pressure enhanced to 1.5Kg/Cm2 @130Deg C by unutilized flash steam.

Result:-
HP heater eliminated.

Coal Savings:-
1534 MT/Year

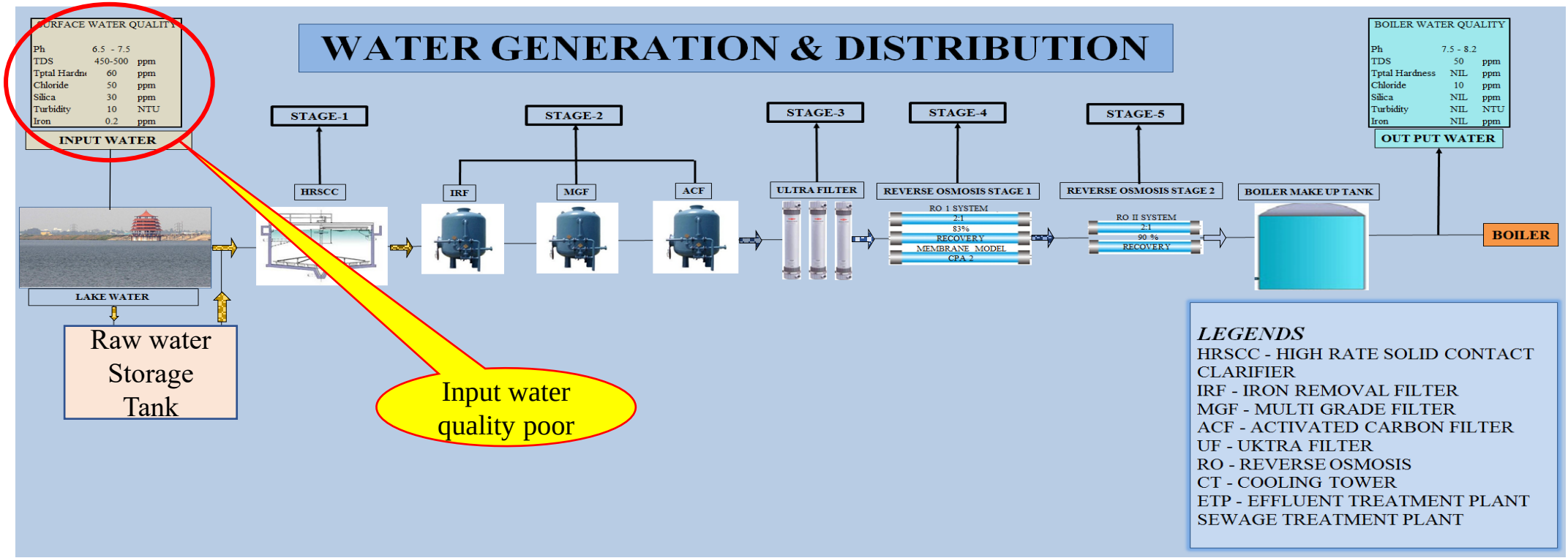
Significant Projects implemented - 16

Excess power consumption in WTP:

Our raw water source is surface water (lake water) which requires five stages of treatment system to meet the specification of boiler feed water. This treatment process consumes 2483 Kwh/Day against the target of 1975 Kwh/Day

Mechanism:

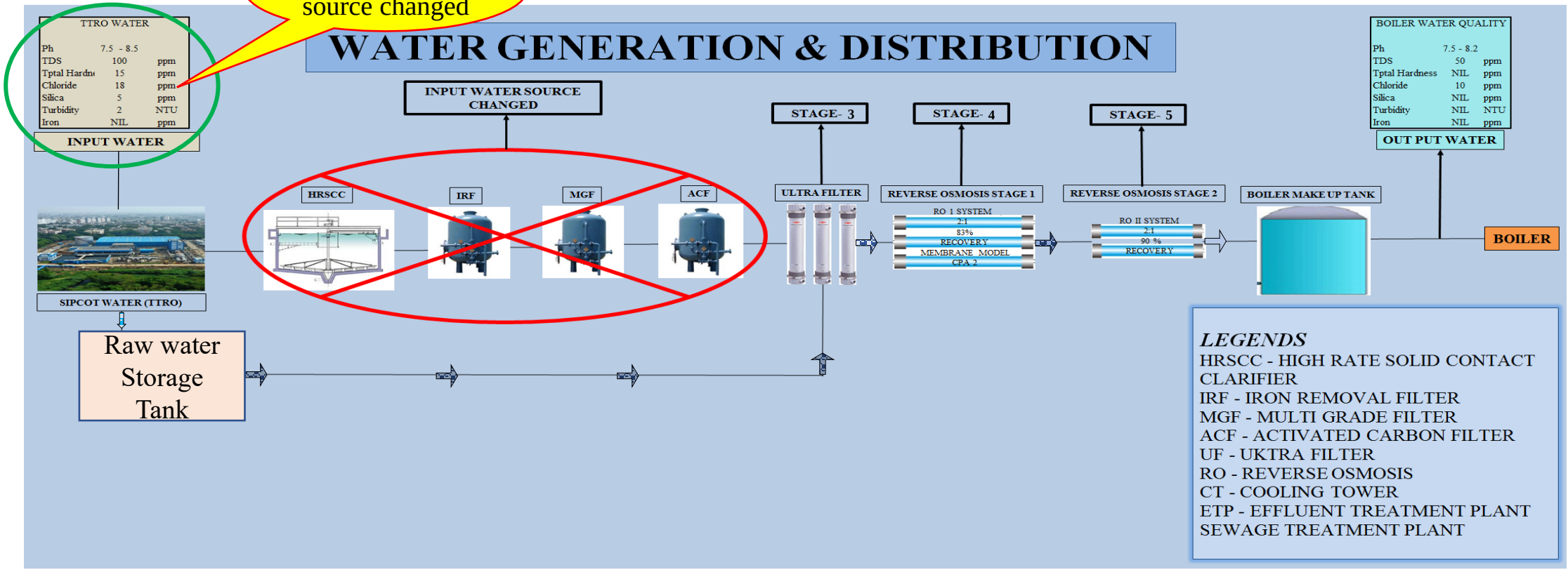
Raw water treatment is to supply water for process requirement (Boiler). Raw water treatment includes steps like HRSCC, sand filtration, Ultra filtration and Reverse osmosis stage 1 & 2.



Significant Projects implemented - 16

Energy Theme - Reduction of Water Treatment Plant Power consumption
Problem point – Excess power consumption in Water Treatment Plant
Idea – Raw water source to be changed from surface water to Tertiary (Sewage) Treated Reverse Osmosis (TTRO) water to stop pre treatment and RO stage – 1 in Water Treatment Plant.

IMPROVED CONDITION:



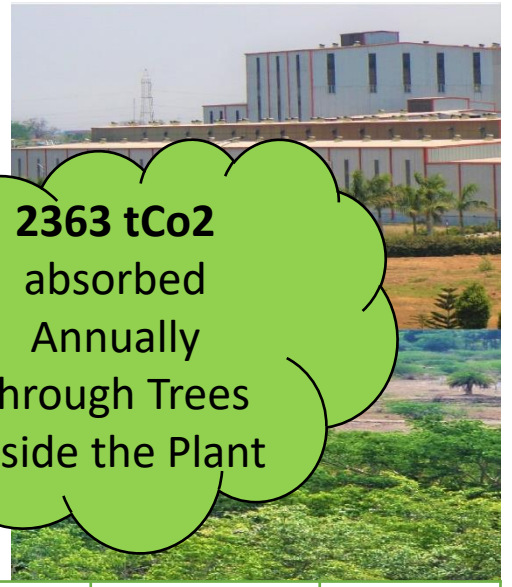
Greening The Environment

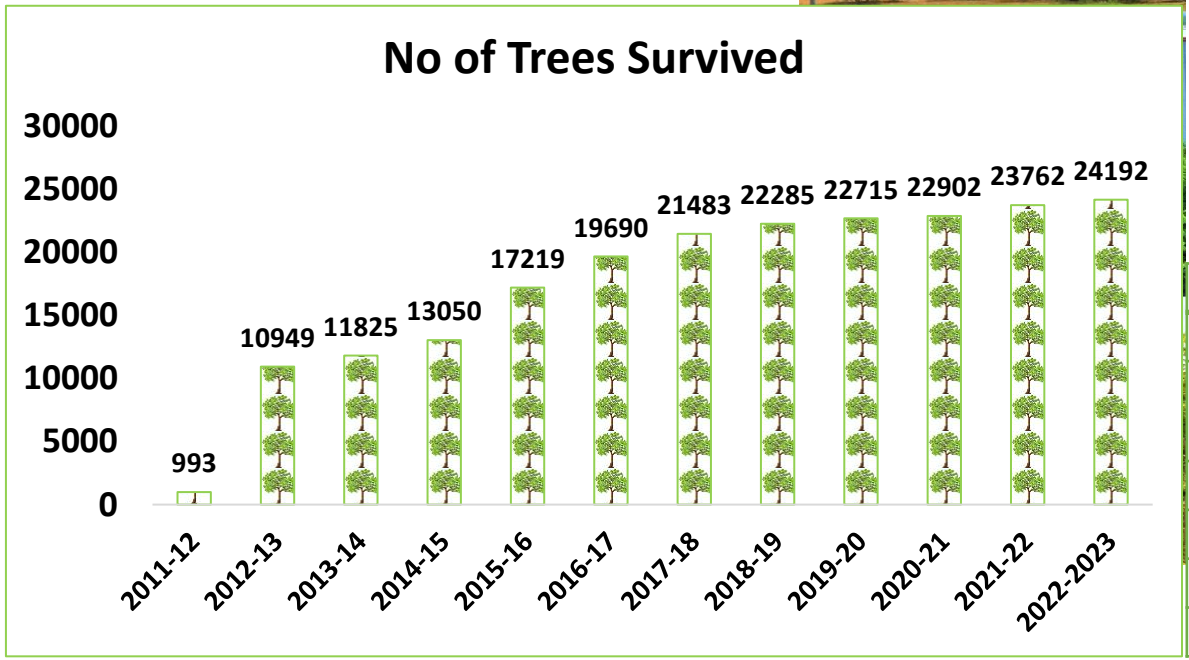
Greening The Environment

Greening the Environment

- Tree Plantation with in Fence
- Tree Plantation Beyond the Fence

Tree Plantation with in Fence





Parameter	Unit	Value
a. Estimated total volume of wood in bole / trunk (Green)	cum (t)	1,885.06
b. Estimated total weight of wood in bole / trunk (cum x 0.8 t)	tonnes (t)	1,508.05
c. Estimated total woody biomass (@1.71)*	tonnes (t)	2,578.77
d. Less moisture. Dry Biomass (c/2)	tonnes (t)	1,289.38
e. Estimated carbon in biomass (c/2)	tonnes (tc)	644.69
f. Carbon capture (e x 44/12)	tonnes (tCO_2)	2,363.87

JK TYRE & INDUSTRIES LTD.

iDeeksha An Initiative by BEE to Promote Industrial Decarbonisation

Projects on Transport

Projects on Logistic improvement

Indirect Emission Sources

Projects on Transportation

- Material Logistics
- Business Travel
- Employee Commute
- Disposal

Improvement Projects

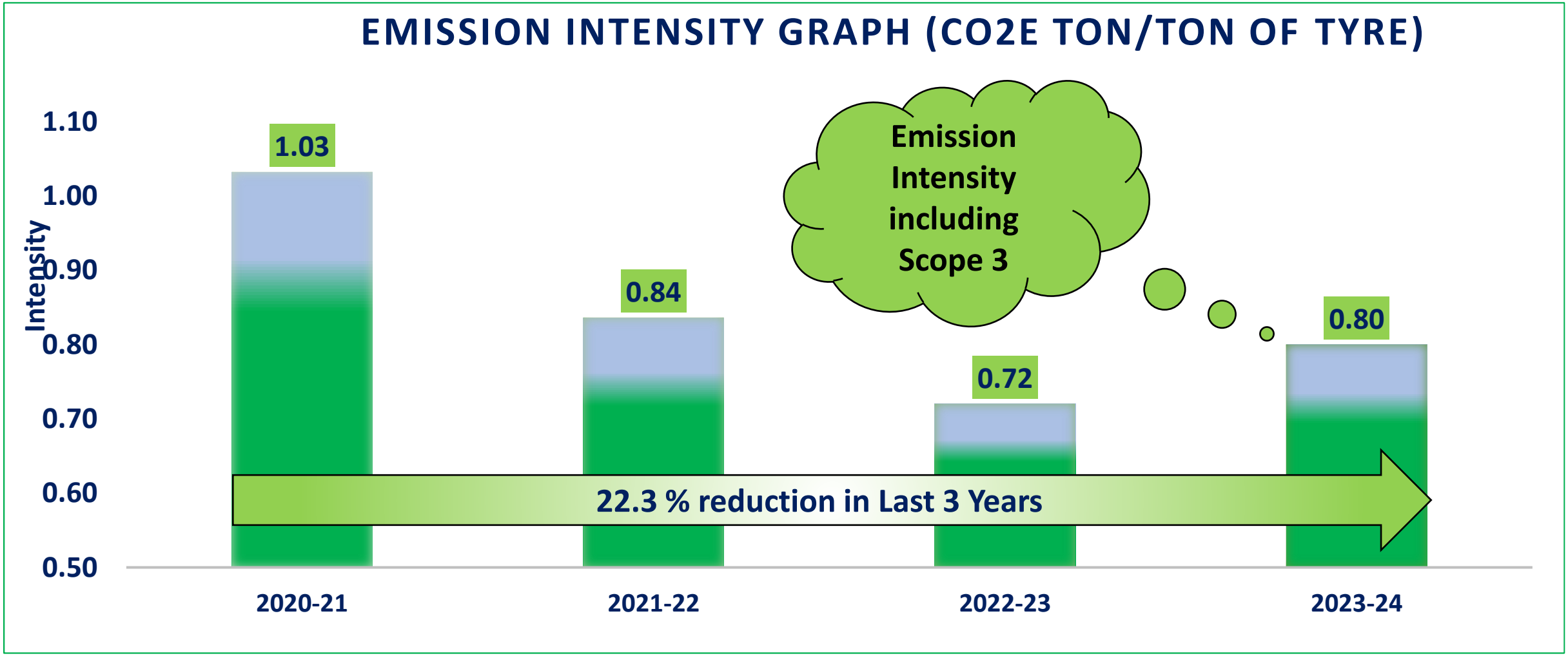
- Standardisation of cargo weight – Inward Freight
- Standardisation of truck size – Outward Freight
- Increasing of Load ability – Outward Freight
- Transport Route Optimization & Reverse Logistics

JK TYRE & INDUSTRIES LTD.

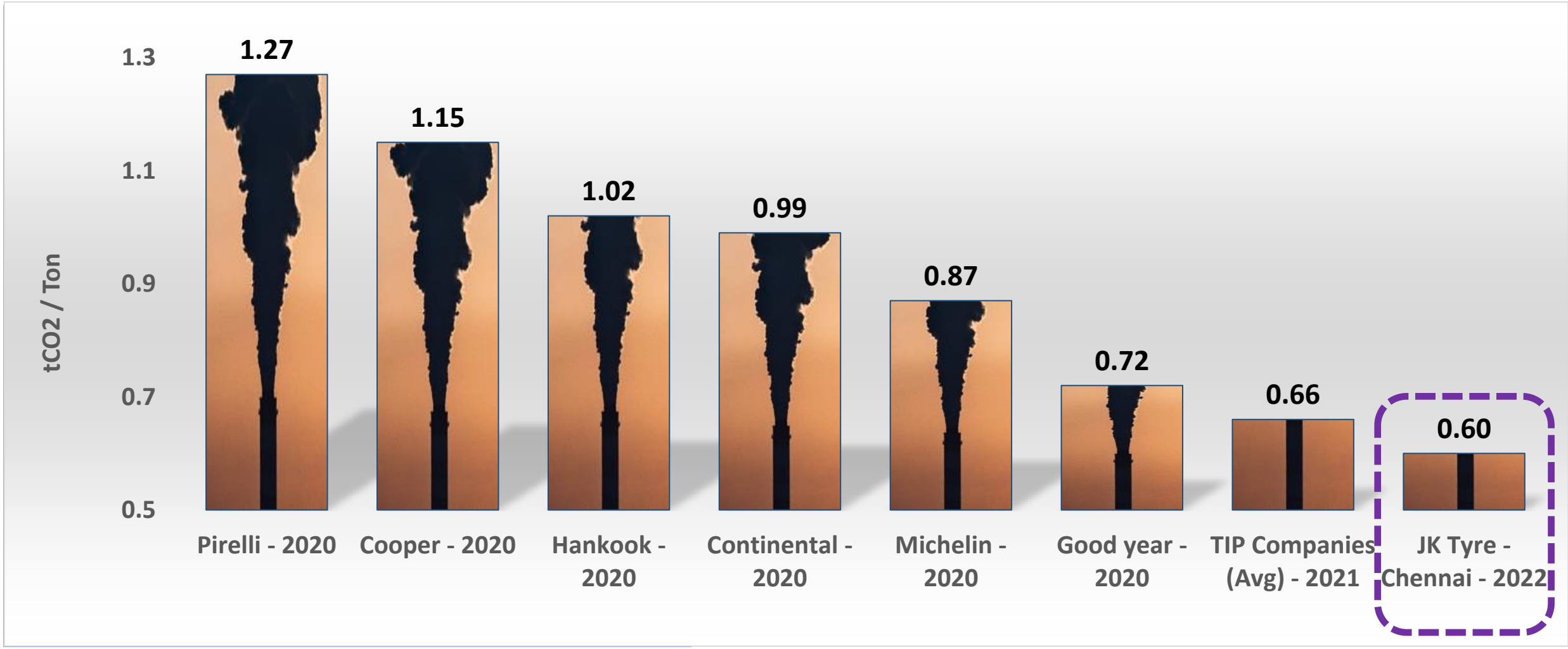
iDeeksha
An Initiative by BEE to Promote Industrial Decarbonisation

Carbon Emission Intensity

Carbon Emission Intensity



Global Benchmarking – CO2 Emission (tCO2/Ton of Finished Product)



Promoting Energy Efficiency

Capacity Building

1.Class room training –All Employees and relevant stakeholders were trained with Green Initiatives like plant Energy consumption & Energy efficiency methodology in planned intervals

2.Visual aids – Training has been taken with different visual aids for better understanding on Green Initiatives.

3.Displaying posters – On shop floor stickers/posters were pasted to create awareness in every individual.

4.Cross Functional Team /Kaizens – In shop floor, CFT Approach followed to understand the Energy consumption & process of their equipment/machine.

5.Motivation by Awards & Recognition – Awards & recognition has been given to employee and stakeholders upon their performance which can be indicated as KAIZEN's etc.,

Employee Involvement

Rewards & Recognition Scheme

JK TYRE encourage the practice of continuously improving new ideas, suggestions and recommendations pertaining to energy efficiency and recognizing and rewarding ideas, which add value to the company's operations

- Star Performers of the Quarter – Relevant to its Scope of Work (Includes Energy Performance)
- Monthly Best Performance Award
- Best Kaizen and Suggestion Award
- Participation in Break Through Projects – JK organization Level Competition
- Self Development Scheme for Higher Education
- Participation in Kaizen & CFT Competitions (Regional Level)
- Encouraging to participate in National Conference to acquire knowledge on recent technologies so that same can be applied based on applicability
- Spot Awards for uncertainty identification
- Core Training to the identified personal for skill enhancement

Employee Involvement

Energy Conservation day celebration @ plant

- National energy conservation day celebrated our plant on Dec'14th day to encourage people for efficient energy use in order to reduce the energy consumption and prevent the energy loss both in factory as well as daily lives.

Energy Pledge of Chennai JK Tyre Plant

- On National Energy Conservation Day I pledge my wholehearted commitment towards energy conservation in my daily lives that will reduce greenhouse gas emissions and help protect our climate and preserve the environment for years to come. I understand that energy consumption affects our natural environment and human health and well-being.
- I pledge that I will strive to:
- Improving machine efficiency by reducing energy wastage and losses, through improved operation and maintenance.
- Encourage my workforces to avoid excessive and wasteful uses of energy to reduce energy consumption.
- I Promote people for less energy usage by eliminating the excessive and wasteful uses.

Awards & Accolades

2023
AL - "Best Performance Award in ESG“
NSC – Tamilnadu - "Best Safety Award" for 2023

2022
CII National Energy Leader Award – 5th consecutive Year
Chairman’s People Management Award - Winner

2021
BEE National Energy Conservation award, CII National Energy Leader Award – 4th consecutive Year British Safety Council – Globe of Honour Award

2020
CII National Energy Leader Award – 3rd consecutive Year SEEM National Energy management-Platinum award

2019
CEM Global award, TPM- Excellence Award, British Safety Council – Sword of Honour; CII Green Co- Platinum Award

2018
Excellent Energy Efficient Unit, Exceed Award for CSR

2017
National Energy Management - Gold,CII Excellence Award in Water Management, MT Awards for Sustainability, HR & Safety

2016
Green Factory Building - Platinum, Green Manufacturing Award, Quality System Excellence, Excellent Energy Efficient Unit

2015
BEE National Energy Conservation award, Industry Excellence Award - Excellent, Green Manufacturing Excellence, Chairman's People Management Award,

Thank You

JK TYRE & INDUSTRIES LTD.