CII National Award for Excellence in Energy Management 2022
(General Sector)

Confederation of Indian Industry

JK Tyre & Industries Ltd, Kankroli, Rajasthan

Presented By :-

- *DS Seervi – GM (Engineering) <dsseervi@jkmail.com>*
- *RK Yadav – Chief Manager (Utility) <rkyadav@jkmail.com>*
- *Abhishek Gaggar- Sr. Manager(Energy & EEI) <agaggar@jkmail.com>*

Company Profile

Confederation of Indian Industry

- 1st Plant at Kankroli – 1976
- Initial Capacity – 55 MT/ Day,
- Present Capacity 230 MT/Day
- 9 Plants in India - Capacity 1750 MT/Day
- 3 Plants in Mexico - Capacity 290 MT/Day

GREEN COMPANY RATING SYSTEM
CII - SOHRABJI GODREJ GREEN BUSINESS CENTRE, INDIA
Greenco
JK Tyre & Industries Ltd
Kankroli, Rajasthan
PLATINUM
2022 -2025

PRODUCT RANGE

Sl. No.	PRODUCT CATEGORY	No. of SKU's
1	TRUCK	85
2	LIGHT TRUCK	64
3	SMALL COMMERCIAL VEHICLE	15
4	FARM (TARCTOR REAR / FRONT)	32
5	ADV	2
6	OTR	3
7	INDUSTRIAL	2
8	2 / 3 Wheeler	2
	TOTAL	205

IATF- 16949 : 2016

ISO- 14001:2015

ISO- 45001:2018

ISO- 50001 :2018

SA- 8000:2014

ISO- 27001:2015

.....Many More

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 meet our mission statement of becoming 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.

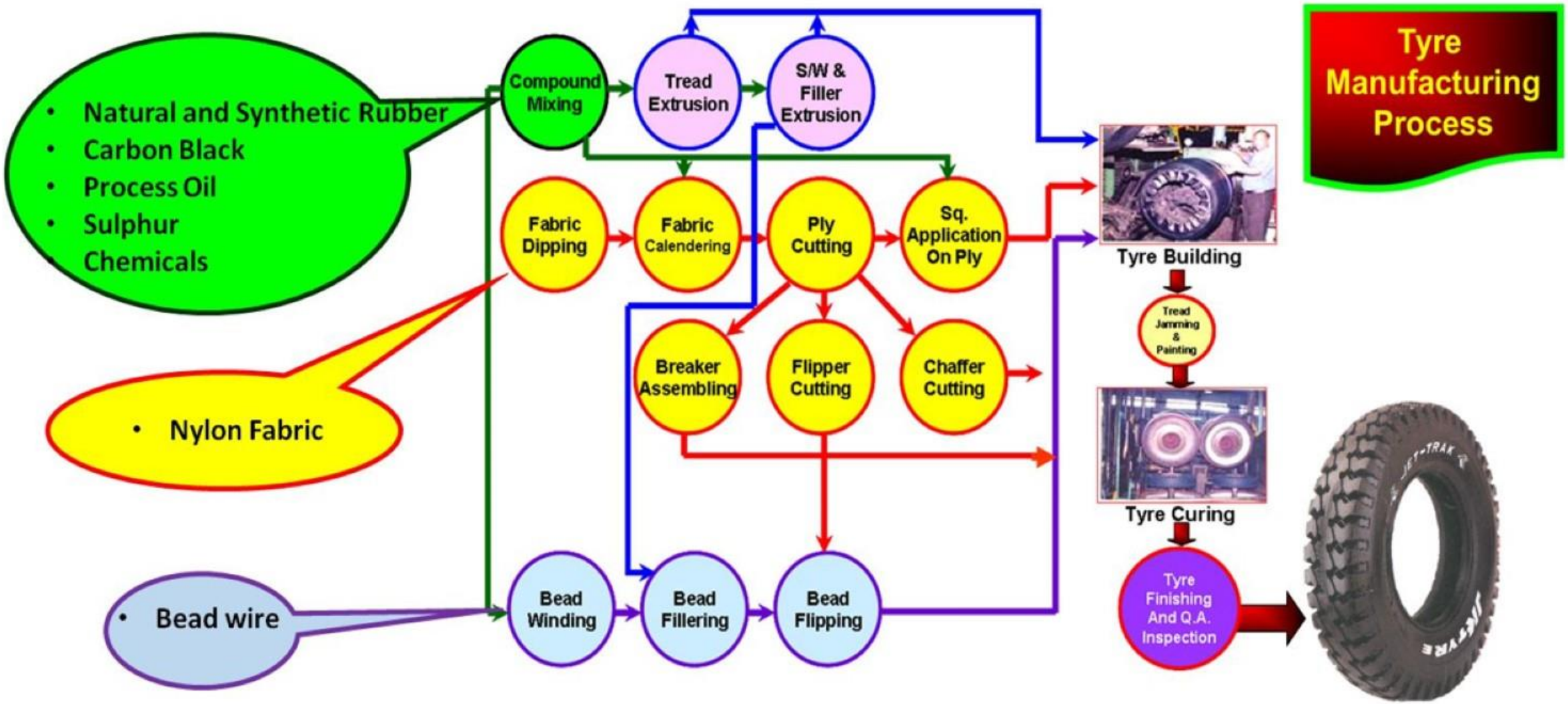
Date : 01.01.2021
Rev : 01

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

JK TYRE & INDUSTRIES LTD.

Manufacturing Process

Bias Tyre Manufacturing Unit



Manufacturing Process

Major Equipment

Banbury Mixer

Extruder

Bead Winding

Dip Unit

Calender

Bias Cutter

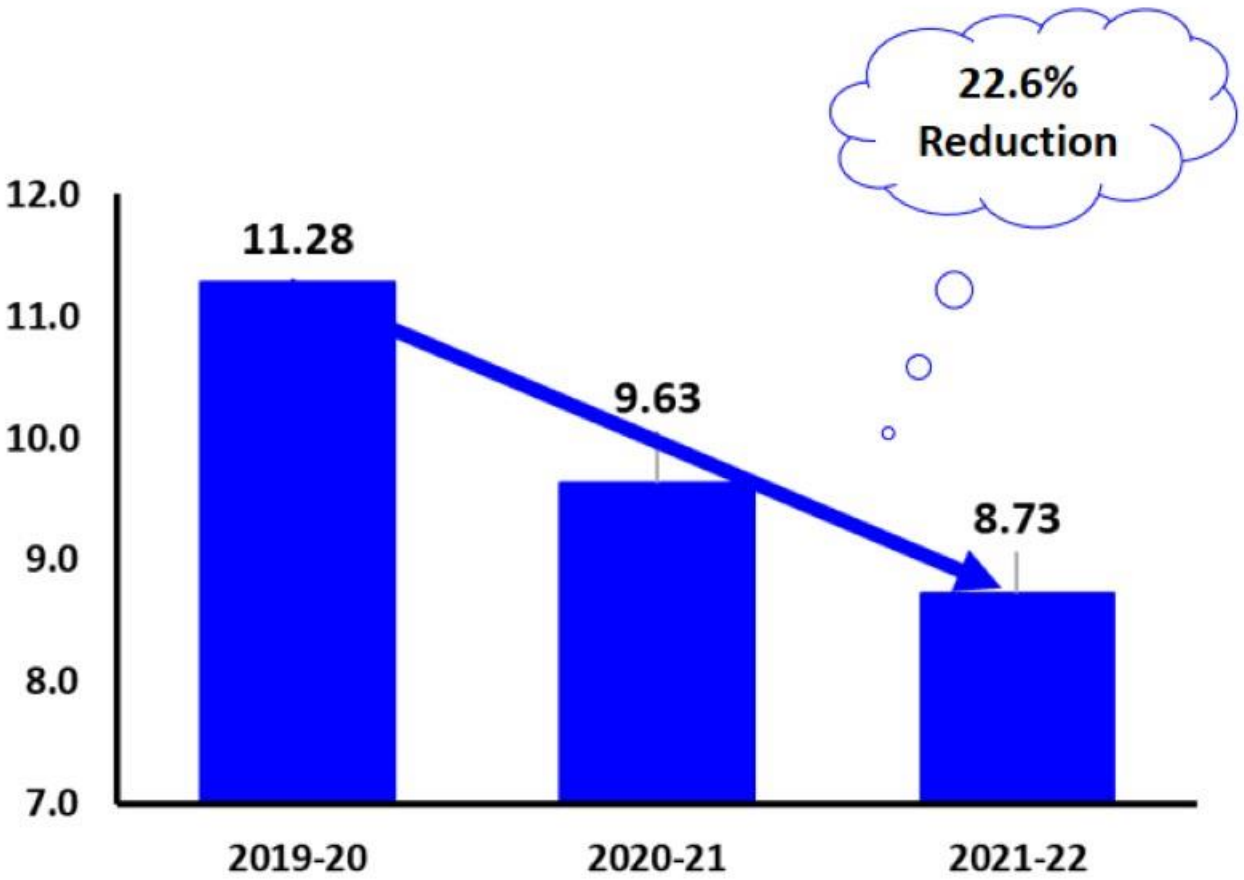
Tyre Building

Tyre Painting &Jamming

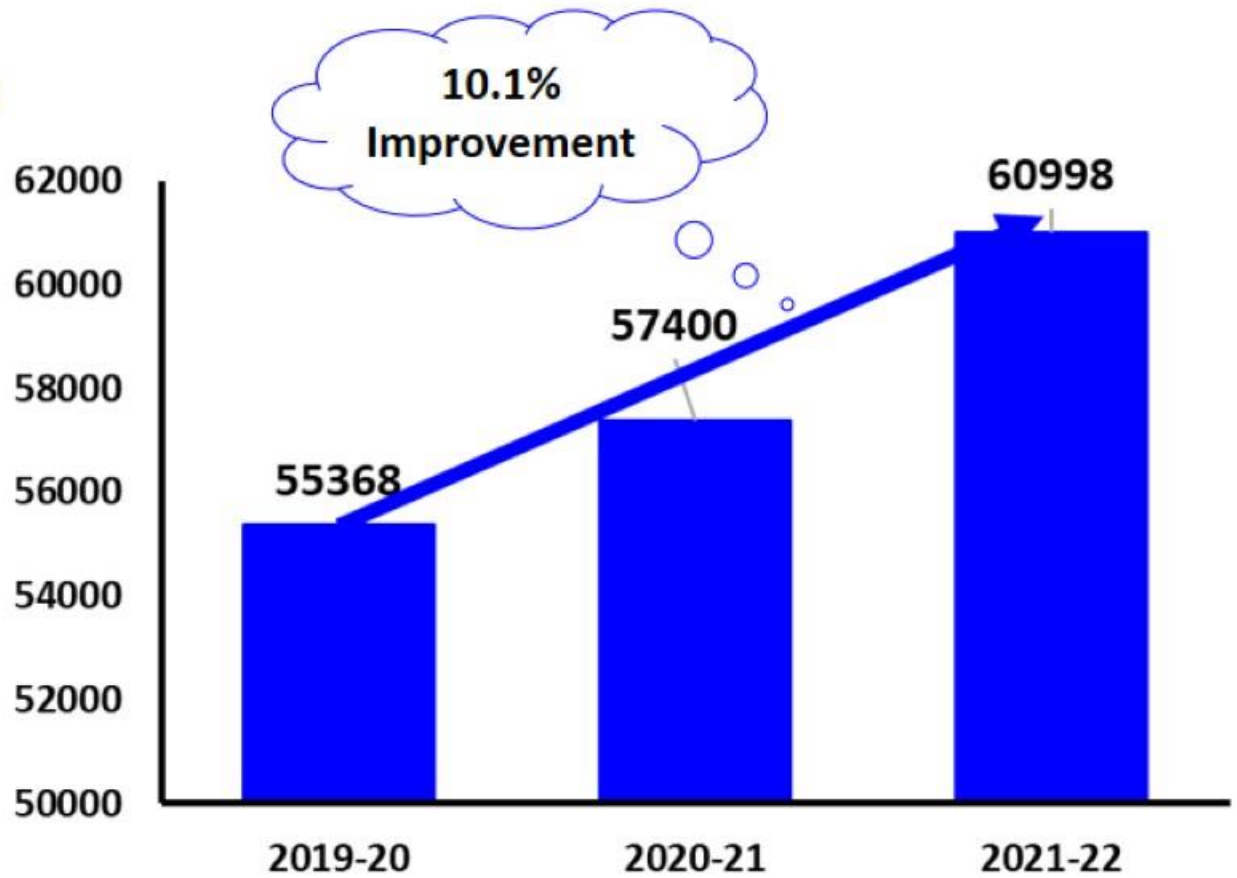
Tyre Curing

Sp. Energy Consumption in last 3 Years (FY 19-20 to FY 21-22)

Specific Energy Consumption (GJ / Ton)



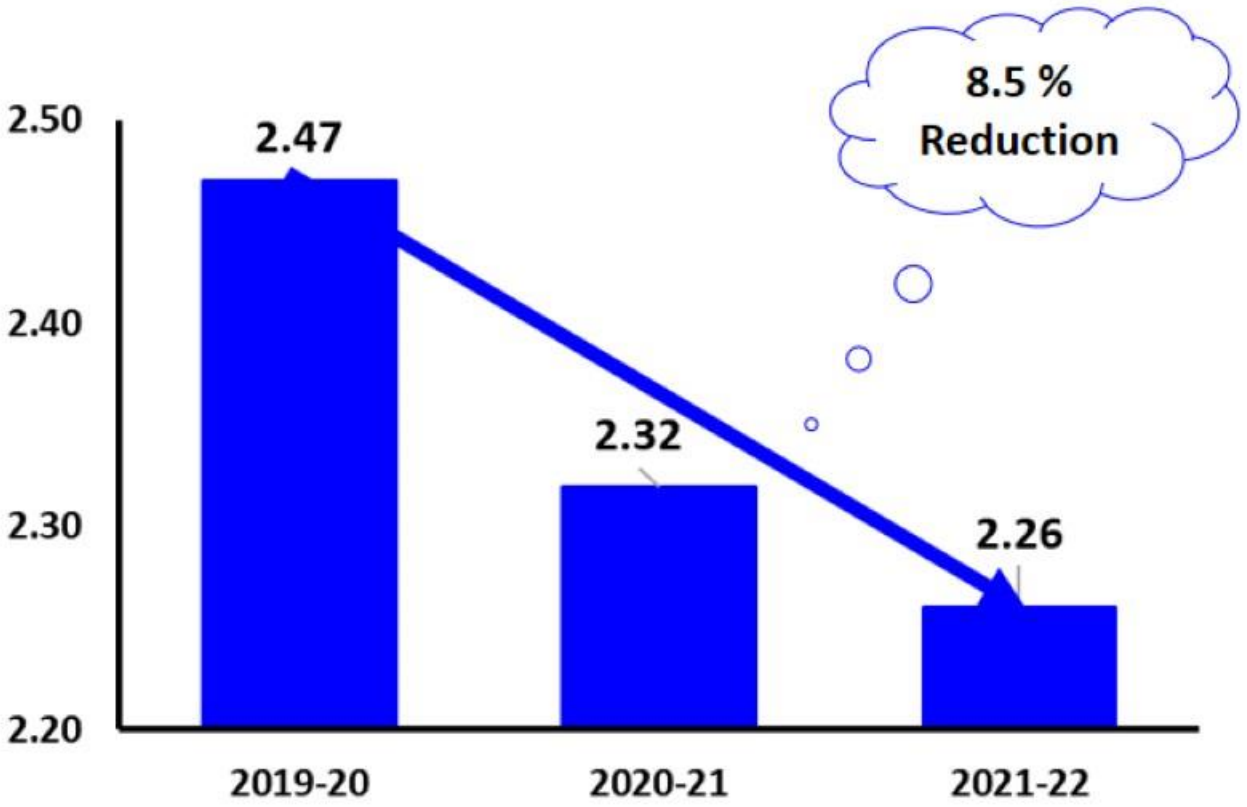
Production Details (MT/ Year)



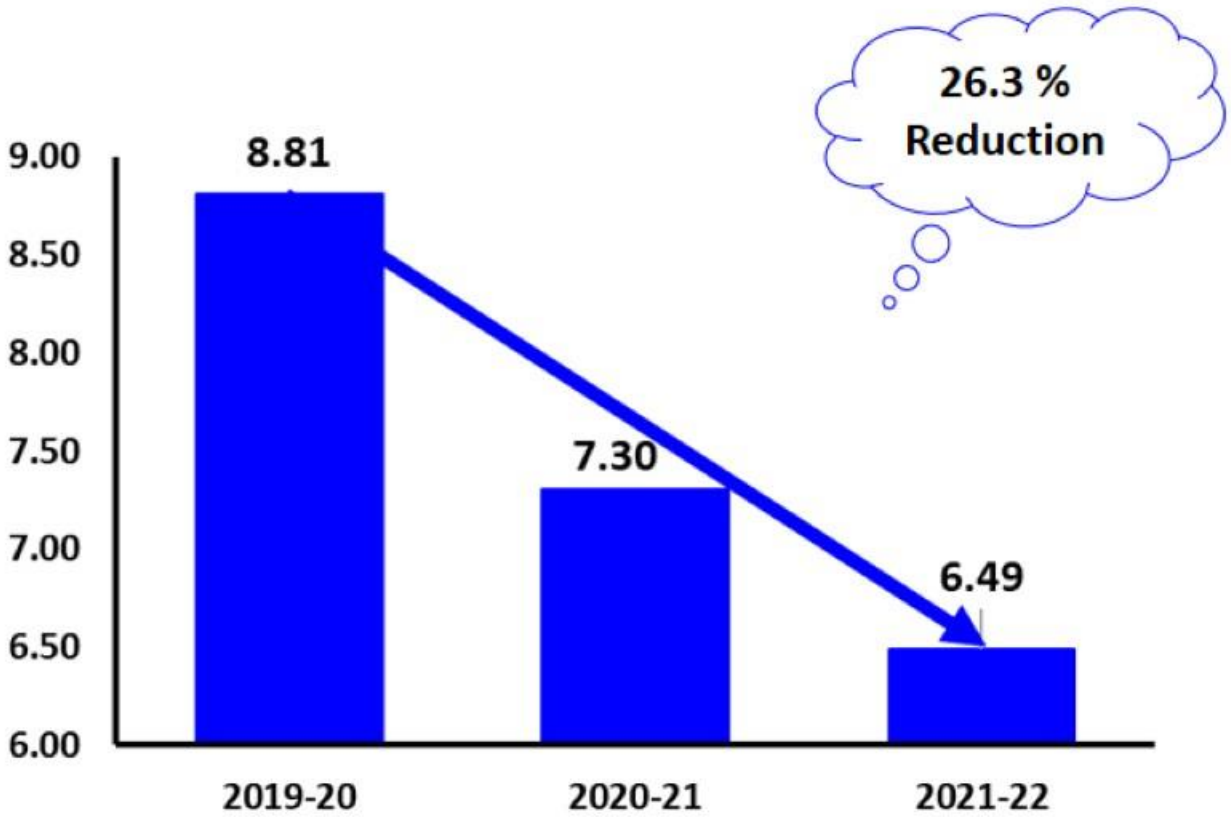
Sp. Energy Consumption in last 3 Years (FY 19-20 to FY 21-22)

Confederation of Indian Industry

Specific Electrical Consumption (GJ/Ton)



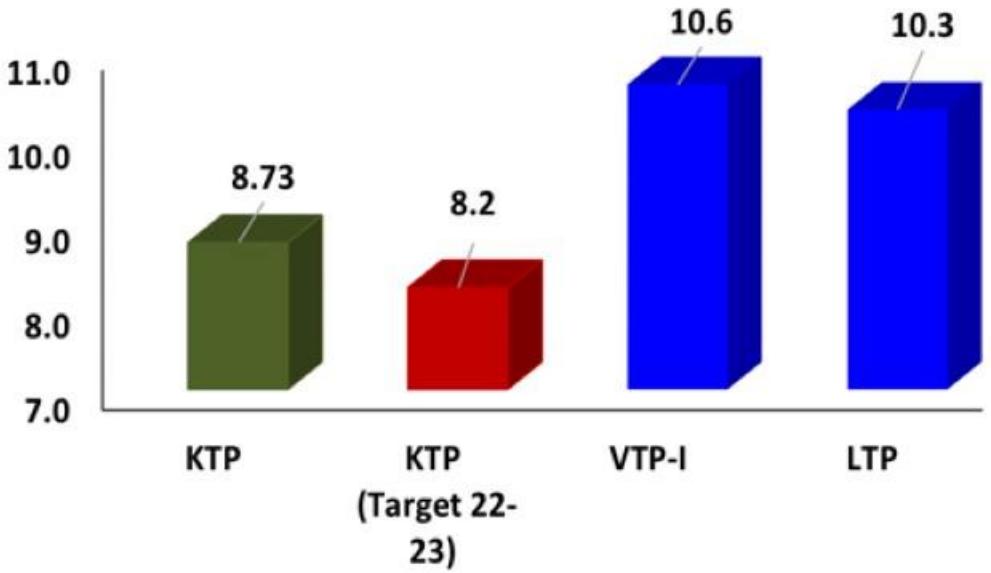
Specific Thermal Consumption (GJ/Ton)



Information on Competitors, National & Global Benchmark

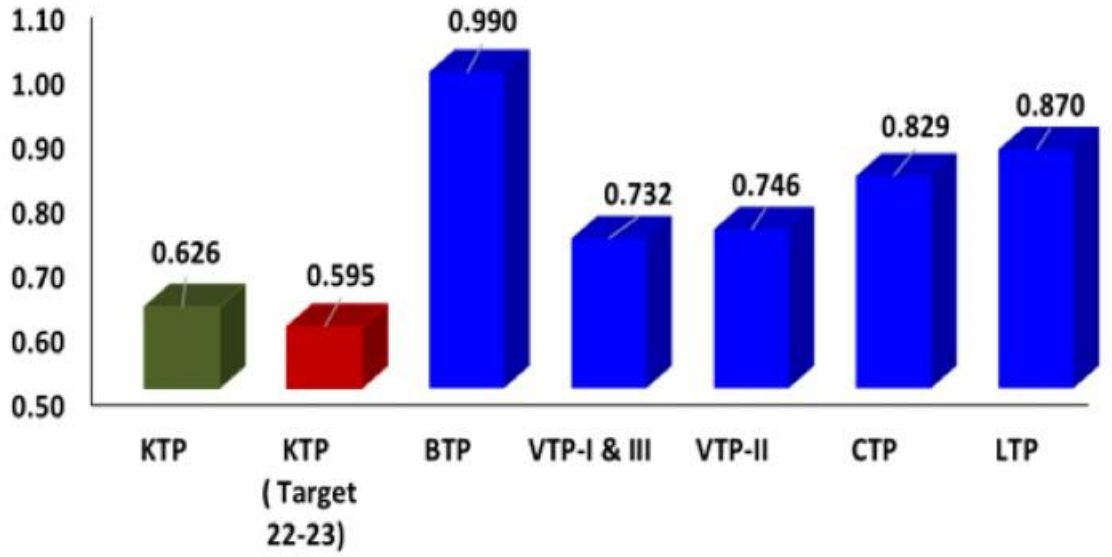
Internal Benchmarking- Bias Tyre Manufacturing (JKTIL Plants)

Energy Consumption- GJ/Ton of Product
FY(2021-22)



Internal Benchmarking- All JKTIL Plants (Bias + Radial)

Specific Power Consumption- Kwh/Kg of Product
FY(2021-22)



Kankroli Tyre Plant:

- ✓ Lowest Among All JK Tyre Plant for Specific Power Consumption.
- ✓ Lowest Among Bias Tyre Manufacturing Plant for Specific Energy Consumption.

Information on Competitors, National & Global Benchmark

Global Benchmarking Energy-GJ/Ton of Product	
Goodyear-2021	15.01
Pireli-2021	13.97
Michelin-2020	12.36
Nokian -2019	10.46
JK Tyre -2021	9.52
Bridgestone-2021	12.71
Source: Sustainability Report	

Kankroli Tyre Plant- Achievement Energy- GJ/Ton of Product

FY	GJ/Ton
2019-20	11.28
2020-21	9.63
2021-22	8.73

Kankroli Tyre Plant- Road Map Energy- GJ/Ton of Product (At Base Line Annual Production 60000 MT/ Year

FY	GJ/Ton
2021-22	8.2
2022-23	7.8
2025-26	7.4

Action Plan to Achieve Global Benchmark

- ✓ Conversion of Mixer RAM from Pneumatic to Hydraulic by 22-23.
- ✓ Provision of VFD's on Mill Motors by 22-23.
- ✓ Energy Efficient Pumping Optimization by FY 22-23.
- ✓ Optimization of Ventilation System by FY 22-23
- ✓ Increase Condensate Recovery by 50 % from existing by 2024-25.
- ✓ Contribution of Renewable Energy to increase up to 25% by 2024-25.
- ✓ Increase Biomass Consumption to 100 % of Boiler Fuel by Year 2025-26.
- ✓ *Digitalization and Real Time Monitoring of Process Parameters*

Energy Saving projects implemented in last three years

Year	No of Energy Saving Projects	Investment (INR Million)	Electrical Saving (Million kWh)	Thermal Savings (Million K Cal)	Savings (INR Million)	Impact on SEC GJ/Ton
FY 2019-20	4	4.5	0.12	1820	3.0	0.15
FY 2020-21	7	27.0	2.3	17912	16.5	1.45
FY 2021-22	8	4.6	0.41	36.7	7.9	0.03

Identification of Energy Projects based on:

- ✓ Technological Up gradation
- ✓ Plant Internal Findings
- ✓ Horizontal Deployment from other JK Tyre plants
- ✓ External Audit Finding

Innovative Project # 1 Implemented

Project: Reduction in Energy Consumption at Dryer Zone of 4 Roll Calendar

Problem Definition

At Kankroli Tyre Plant Fabric Preheating at 4 Roll Calendar dryer Zone was being done using Indirect Heating (Heating Roll Surface by producing Hot water through Electrical Heating System).

Project Start Date : June-2020 ***Project Completion Date :*** Oct-2021

Data Collection

Energy Used For Dryer Heating System (FY 2019-20)

S No	Particulars	UOM	Quantity
1	Electrical Heater Bank at Dryer Zone # 1	Kwh/ Year	138240
2	Electrical Heater Bank at Dryer Zone # 2	Kwh/ Year	117504
3	Pumping of Hot Water Circulation	Kwh/ Year	14400
	Total Power Consumption for Dryer Unit	Kwh/ Year	270144

Data Collection Tools:-

1. Energy Meters from IoT based System

Why Why Analysis

High Energy Consumption of Dryer Zone

↓

Low Efficiency of Heat Transfer to Product & Losses Due to Water Circulation

↓

Indirect Method of Heating

Innovative Project # 1 Implemented

Counter Measure

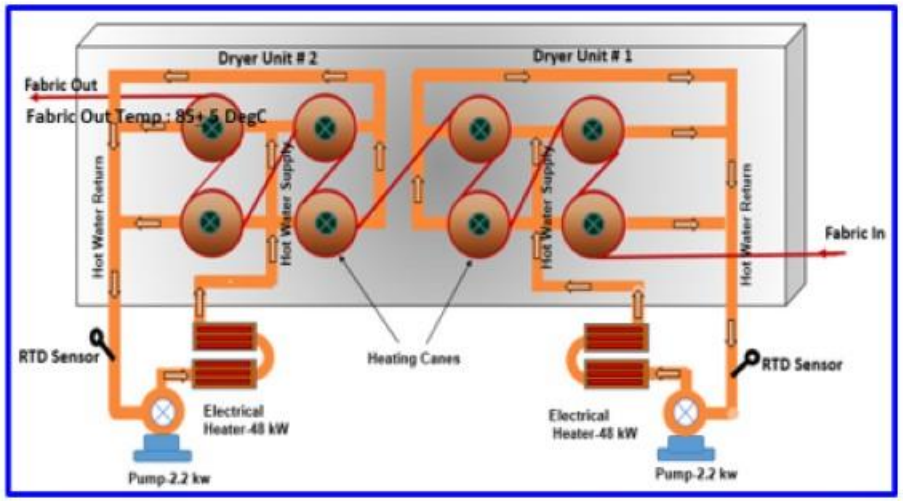
- To Use LPG Gas to produce Hot Air instead of Hot Water for providing the Heat Input to the Process and maintain Temperature as Per Specification of Process.
- Modify Existing System Suitable to Direct Hot Air by provision of Inline Duct Burner to Use LPG in place of Indirect Electrical Hot Water system.

Validation

- A Pilot Project – Using LPG Cylinder Banks and Modification of System Completed with arrangement of Local Burner & Circulation Fan. Energy Consumption data Validated.

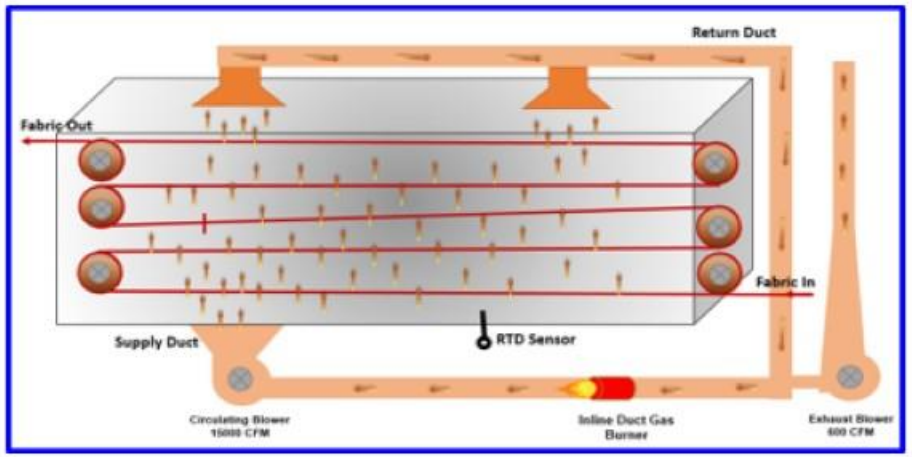
Solution Implemented

BEFORE



Fabric Preheating by In Direct Method

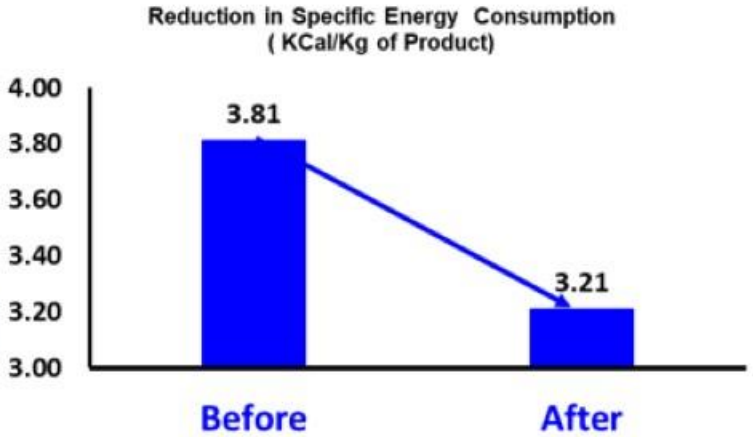
AFTER



Fabric Preheating by Direct Method

Innovative Project # 1 Implemented

Results Achieved



Energy Benefits :-

- Saving in Energy Consumption= 36.7 M Kcal/Year
- 15.8 % Reduction in Specific Energy of Dryer Unit(Kcal/kg of Product)
- Water Saving =75 KL/Year

Tangible Benefits :-

- Saving of Rs. 11.6 Lacs / Year
- Reduction in Equipment Startup Time =3 Hrs.

Intangible Benefits :-

- Consistent Temperature Leads to Better Product.
- Ease of Maintenance.

Uniqueness of the Project :-

- Uses of Clean Energy.
- Reduction in Energy Losses by conversion of Indirect Heating to Direct Heating.
- First Time Fabric Heating by using Direct LPG at 4 Roll Dryer In Bias Tyre Technology .
- Simple Payback on Investment =1.2 Years

156 Ton / Year

Innovative Project # 2 Implemented

Project: **Reduction in Power consumption by provision of VFD with IE-3 Motor on DUAL Extruder 8.5" FD Mill and 10" FD Mill**

Problem Definition

At Kankroli Tyre Plant On Dual Extruder Equipment Power Consumption of 10" Extruder & 8.5" Extruder Feed Mill is High due to running of Inefficient Induction Motors with no provision of speed control.

Project Start Date : July-2020 ***Project Completion Date :*** Aug-2021

Data Collection

Energy Used For 8.5 " FD Mill & 10" FD Mill (FY 2019-20)

S No	Particulars	UOM	Quantity
1	Power Consumption of 8.5 " Feed Mill	Kwh/ Month	55743
2	Power Consumption of 10 " Feed Mill	Kwh/ Month	64462
3	Power Consumption of Feed Conv- 8.5 " Feed Mill	Kwh/ Month	1373
4	Power Consumption of Feed Conv- 10 " Feed Mill	Kwh/ Month	1360
5	Total Power Consumption	Kwh/ Month	122937
6	Dual Production	Eq Truck Tread/Month	220191
7	**Specific Power Consumption for Feed Mill**	**Kwh/Eq Truck Tread**	**0.558**

Data Collection Tools:-

1. Energy Meters from IoT based System

Why Why Analysis

High Power Consumption of 8.5" Feed Mill & 10" Feed Mill

↓

Conventional Motors were running with no provision of speed control

↓

Equipment is running with Old Technology

Innovative Project # 2 Implemented

Counter Measure

- To Use Energy Efficient (IE-3) Motor (160 KW) in place of Conventional Motor along with VFD to Control the Speed of the process.

- Modify Existing System and increase the Existing feed width of the Extruder by Reducing the Mill Speed keeping the feed volume Constant.

Validation

- A Pilot Project – Trial Taken of Increase in Feed width by Rubber Technology team by arranging Local VFD Panel and establish the process . All Process & Energy Data Validated with respect to 20 % reduction in Motor Speed.

Solution Implemented

BEFORE

Conventional Motor with Fixed Starter Panel

AFTER

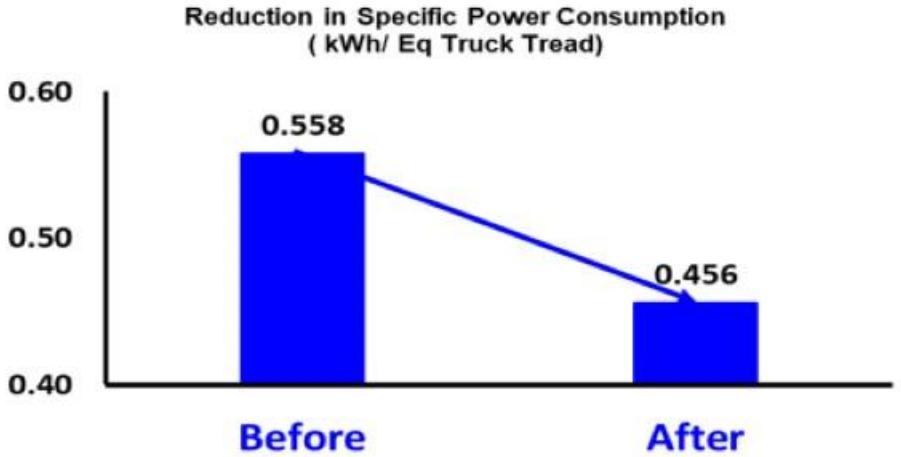
Energy Efficient IE-3 Motor with VFD Panel

Innovative Project # 2 Implemented

Results Achieved

Energy Benefits :-

- Saving in Power Consumption= 17373 Kwh/Month
- Reduction in 87.7 K Cal/Eq. truck Tread of Product
- Elimination of Compound Lumpiness



Tangible Benefits :-

- Saving of Rs. 17.1 Lacs / Year

Intangible Benefits :-

- Lower Maintenance Cost.
- Better Process Control & Reduction in fatigue

Standardization :-

- Change in SOP.
- Revised Process Parameter

Uniqueness of the Project :-

- Optimization of feed temperature and product quality along with energy saving.
- Easy Maintenance of VFD Panel & Motor.
- Reduction in idling Losses by Reducing the Mill Speed.
- Simple Payback on Investment is 1.5 Years

CO_2

170 Ton / Year

Utilisation of Renewable Energy Source

Year	Technology (Electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation Million kWh	% of Overall Electrical Energy
FY 2019-20	Solar PV	Electrical	Onsite	3.020	2.69	7.07 %
FY 2020-21					3.93	10.6 %
FY 2021-22					4.02	10.51 %

- Onsite Generation FY (2019-22) – 10.64 Million kWh ; Investment Made- NIL (Opex Model)
- KTP Contributes 16% of Total JK Group Capacity

Year	Technology (Thermal)	Type of Energy	Installed Capacity (Million K Cal)	Usages Million K Cal	% of Overall Thermal Energy
FY 2019-20	Biomass As Boiler Fuel	Thermal	N.A.	19332	15.0 %
FY 2020-21				17297	20.7 %
FY 2021-22				23427	24.8 %

Utilisation of Renewable Energy Source

- **RPO Obligation**

S No	Details	UOM	2019-20	2020-21	2021-22
1	Total Power Consumed	kWh	41409457	36552600	No Open Access Power Procured.
2	DISCOM Power Utilised	kWh	25028247	16159492	
3	Open Access Power from IEX	kWh	14516880	20393108	
	Total kWh to Comply RPO	**kWh**	**14516880**	**20393108**	
	RPO Compliance				
4	Solar	**% age**	6.0	7.25	
5	Non Solar		9.0	9.40	
	Total RPO		**15.0**	**16.65**	
	Total RPO	**kWh**	**2177532**	**3395452**	

Waste Utilisation and Management

S No	FY	Type of Waste	Quantity (MT/Year)	GCV (K Cal/Kg)	Waste as percentage of Total Fuel
1	2019-20	Coal Fine Dust & Horticulture Waste from Premises	599	3717	2.42 %
2	2020-21		402	3688	1.78 %
3	2021-22		1055	3759	4.4 %

All horticulture waste :-

Tree Leaves / Twigs/ Trimming etc. are Collected & Being Used as Boiler Fuel.

Canteen Food Waste :-

Being Used to Generate Bio Gas &

Being Utilize for Cooking in Canteen.

Waste Qty. = 55 Kg/Day

LPG Saved = 4 Kg/ Day

Implementation = Apr'21 Onwards

Waste Utilisation and Management

Conversion of Inhouse Horticulture waste into powder form and use it in to Boiler

Collection of Horticulture Waste → Grinding it in to Powdered form by Third Party Vendor → Collection by Purchase Deptt with weighment → Blending it with Existing Coal → Feeding it into Boiler

Horticulture Waste Crushing Machine

Capacity :- 170 Kg/ Hour

Pallet Making Machine

Pallet of 25 mm size

Palletization from Dust & Use in Boiler

Collecting Coal Dust → Blending it with Cow Dung & Making Pallets → Feeding to Boiler

Process Waste Management

S No	FY	Type of Waste Generated	UOM	Quantity of Waste Generated Per Year	Disposal Method
1	2019-20	Electrical Scrape, Wooden Material, Metallic Scrape	MT	809	Scrape Sell to Authorised Vendor to Use as input material for further use. **(Zero Waste to Landfill)**
		PVC Barrels, Empty Paper Bags, MS Barrels	Nos	16997	
		Process Waste (Compound ,Cures Tyre , Fabric, Insulated Bead etc....)	MT	112	
2	2020-21	Electrical Scrape, Wooden Material, Metallic Scrape	MT	550	
		PVC Barrels, Empty Paper Bags, MS Barrels	Nos	8805	
		Process Waste (Compound ,Cures Tyre , Fabric, Insulated Bead etc....)	MT	123	
3	2021-22	Electrical Scrape, Wooden Material, Metallic Scrape	MT	1672	
		PVC Barrels, Empty Paper Bags, MS Barrels	Nos	16671	
		Process Waste (Compound ,Cures Tyre , Fabric, Insulated Bead etc....)	MT	134	

GHG Inventorisation

GHG Inventorisation Base Year :2013-14

Public Disclosure: Sustainability Report

Inclusive of :

Scope 1 – Monitoring & Reporting

Scope 2- Monitoring & Reporting

Scope 3 – Monitoring & Reporting from 2020-21

GHG Emission	UOM	2019-20	2020-21	2021-22
Scope 1	CO2 Eq Ton	29141	26377	29427
Scope 2	CO2 Eq Ton	29366	28372	30685
Scope 3	CO2 Eq Ton	-	6594	6516
Total Emission	CO2 Eq Ton	58507	61343	66628
Emission Intensity	CO2 Eq Ton / Ton of Tyre	0.099	0.106	0.098

Target- Short term & Long Term	
FY 2022-23	0.093
FY 2023-24	0.088
FY 2024-25	0.084
FY 2025-26	0.080
FY 2026-27	0.076

Reduction in GHG Emission Intensity = 1.2% in Last 3 Years

GHG Inventorisation

Initiative on carbon Capture

Estimated Carbon sink, Carbon sequestration and Carbon capture

Parameter	Unit	Value
a. Estimated total volume of wood in bole / trunk (Green)	cum (m^3)	9,976.74
b. Estimated total weight of wood in bole / trunk (cum x 0.8 t)	tonnes (t)	7,981.39
c. Estimated total woody biomass (@1.71)*	tonnes (t)	1,364.18
d. Less moisture. Dry Biomass (c/2)	tonnes (t)	6,824.09
e. Estimated carbon in biomass (c/2)	tonnes (tc)	3,412.05
f. Carbon capture (e x 44/12)	tonnes (tCO_2)	**12,510.8**

* Biomass Expansion Factor (BEF) = Root 26% + Branches, Leaves, Bark, leaf litter 45% of the bole/trunk =71%

The carbon sequestration of 12,510.8 tCO_2 is estimated from 423,154 standing biomass from 69.974 ha (174.937 ac) of JKTIL Kankroli Tyre plant. 178.79 tonnes of CO_2 Per ha (71.51 tonnes of CO_2 per ac)CO_2 is offset by plantation.

JK Tyre is in discussion with JK Paper, a paper manufacturing company of JK Organization which is already Carbon Negative for the carbon credit transfer.

Green Supply Chain Management

Best Practices: Vendor/Supplier/Contractor

- ✓ Energy Efficiency Parameter is part of Technical specification before procurement
- ✓ Classification of Material based on Energy Efficiency parameter.
- ✓ After received of material all the energy efficiency parameter verified by vendor and it is linked with payment terms and condition .

Product LCA Study Done for High Volume Product (Tyre Size 10.00-20_JET XTRA XLM_16PR_J_TT) and Improvement Initiative Started by Design Team .

UGPP.01-PY.01

GREEN PURCHASE POLICY

Objective:
To responsibly purchase Products and Services including Outsourced Products by considering environmental protection issues into the sourcing decision making process and to encourage all upstream supporters to adopt green manufacturing and green supply chain, so as to not only reduce the environmental degradation, but to possibly have a positive impact on the environmental and to show commitment towards continual improvement, prevention of pollution and to comply with all the applicable legal requirements.

Scope:
This policy applies to the following categories such as Raw Materials, Engineering Spares, Capital Equipment, Tools, Moulds, Dies and Service offerings.

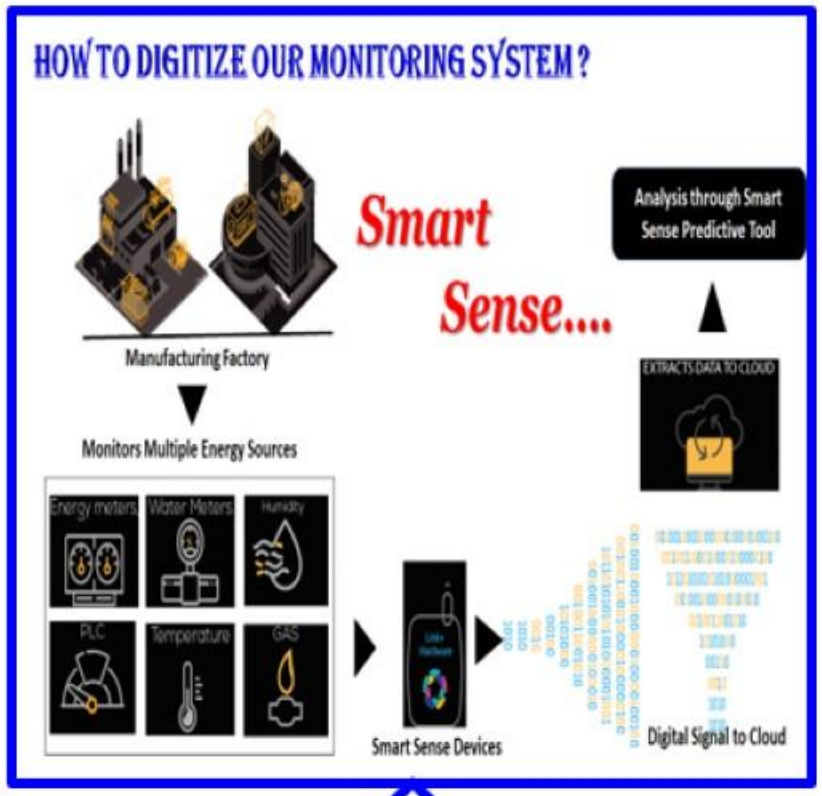
Focus Area:
1. Aim to source products and services that minimize environmental impact in the following areas:
   - Energy Efficiency, Water Conservation and Waste Reduction
   - Prevention / Reduce the use of hazardous substances.
   - Proactive product stewardship & life cycle assessment aspects.
   - Conserve the resources of the planet
   - Use renewable energy
2. We are committed to support our suppliers in adopting green practices through awareness creation and training on the compliance requirements.
3. We give preference to suppliers who adopt green practices in addition to QCD performance in the following areas:
   - Reduce specific energy and water consumption
   - Minimizing the generation of waste and safe disposal of the hazardous wastes generated.
   - Recycle and reuse material to reduce absolute consumption
   - Incorporation the use of renewable resources
4. We shall seek to implement the hierarchy of preference to avoid, reduce, reuse, recycle, recover prevent and dispose throughout the sourcing activity.
5. We commit ourselves to set and review the objectives and targets for the continual improvement in all the areas of our operations through everyone's involvement.

Arun K. Bajoria
Director & President
(International Operations)

Date: 01.01.2021

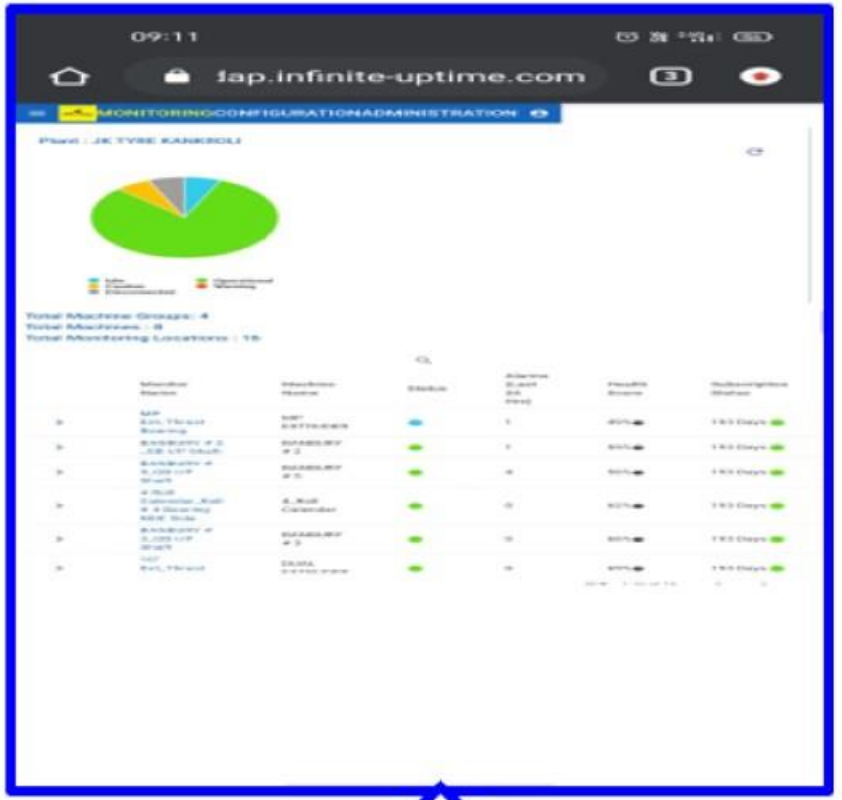
JK TYRE & INDUSTRIES LTD.

Team Work Employee Involvement & Monitoring - Digitalization



Real Time Energy Monitoring at 377 Numbers Energy Meters Using Smart Sense Software

Use of QR Code attached to equipment for easy tracing of Drawings & Manuals



Real Time Monitoring of Vibration , Temperature & Noise Level at Equipment (Pilot Project Implemented)

Team Work Employee Involvement & Monitoring

Strategies adopted for Awareness Creation & Employee Involvement

- Manufacturing Conclave held every year for all 5 Location Plants to share the performance & recognize the best practices with motto of horizontal deployment.
- Energy Conservation Week Celebration : Involving MCS, Workmen, Badli.
- Plant Level Suggestion Scheme Which allows employees including workmen to implementable suggestion for Encon.
- External Audits through expert agencies in key potential area to explore new unexploited area of Encon and Their implementation.
- Feedback from TOP Level Business Meetings, & Regular Brainstorming of Employee groups to generate and explore new ideas..
- Leakages of water, steam and air are identified and corrected on daily basis. This Leakage correction is reviewed on daily basis and accordingly rewards given to workmen as well as Management staff

Team Work Employee Involvement & Monitoring

Phase wise Allocation of Energy Project Budget

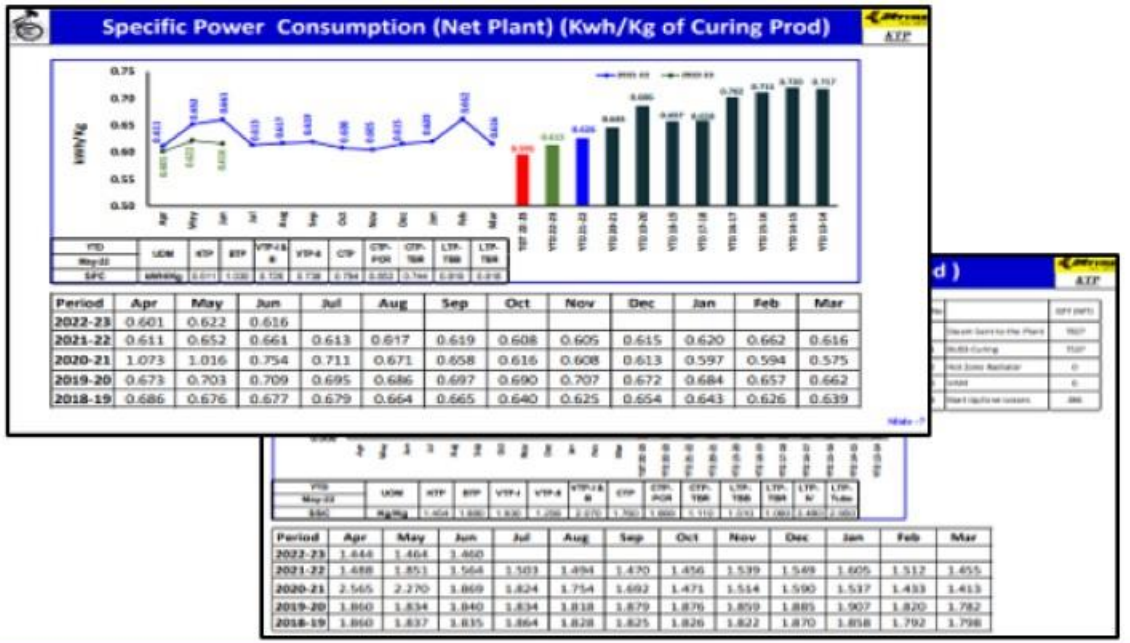
S.No	Year of Approval	No. of Projects	Proposed investment Rs. Lacs	Expected Savings Rs Lacs	Expected Payback (Years)
Energy Phase I	2012-13	9	268	421	0.6
Energy Phase II	2013-14	10	113	136	0.8
Energy Phase III	2014-15	12	158	126	1.3
Energy Phase IV	2015-16	11	154	77	2.0
Energy Phase V	2016-17	13	143	100	1.4
Energy Phase VI	2017-18	7	86	45	1.9
Energy Phase VII	2018-19	11	175	100	1.8
Energy Phase VIII	2019-20	3	292	145	2.0
Energy Phase IX	2020-21	3	47	28	1.6
Energy Phase X	2021-22	5	37	20	1.9
Energy Phase XI	2022-23	8	60	29.4	2.0
Total		92	1533	1227.4	1.3

Employee Involvement

- *All Process Owners – KPI are Linked to Respective Energy Parameter*

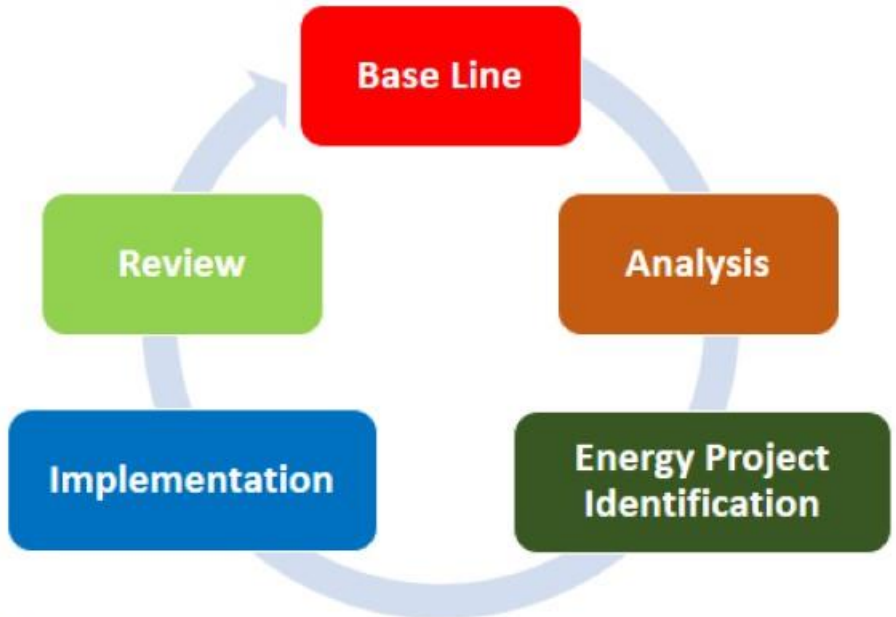
Energy Review :-

- *Chaired By: Top Management (Director Manufacturing)*
- *Process Wise Comperasion with Base Line , Internal Benchmarking & Review of New Initiatives.*



Implementation of ISO 50001/ Green Co / IGBC rating

Kankroli Tyre Plant (KTP)
is
✓Asia's First Tyre Plant &
✓World's Second Tyre Plant
To Get
ISO 50001:2011 Certification



- **CII Green Co Platinum Rating – 2022**
- **BSC- Globe of Honor – 2021 Five Star Rating**
- **Percentage investment on Energy Saving Project is 0.1% of Turnover**

Learning from CII Energy Award or any other Award Program

Confederation of Indian Industry

1. **Replacement of Conventional Old & Inefficient Motors with Energy Efficient – IE3 Motors. (With help of International Copper Association of India) – Learning from CII- Energy Award -2015 Interaction.**

   JKTIL Kankroli Tyre Plant is the First in the Private sector to receive the honor from ICAI for their initiation of IE-3 Motors.

India Copper Forum-2016

2. **Replacement of Conventional Lumminaire with LED Luminaire – CII- Energy Award- 2015**

   Kankroli Tyre Plant has converted all of it conventional luminaire with LED Luminnaire.

3. **Real Time Monitoring of Energy Meters – CII – Energy Circle Competition - 2019**

   Kankroli Tyre Plant has implemented – Real Time Energy Monitoring & Condition Monitoring of All Electrical Installations.

4. **Energy Saving in Fans & Blowers - Input from CII Energy Circle Competition -2019**

   Blowers are Replaced with Energy Efficient Design & with Speed Control based on ambient temperature.

4. **Energy Saving in Pumping System - Input from CII Energy Circle Competition -2021**

   Pumps are Replaced with Energy Efficient Design & with closed loop of Speed Control.

Any Other relevant information

Awards/Accolades

CII GrrenCo Platinum Rating 2022-2025

BEE - National Energy Conservation Awards 2021

BSC-Globe of Honor- Five Star Rating

Rajasthan Energy Conservation Award-2021

6th CII National Energy Efficiency Circle Competition'2022- Appreciation(Large Sector)

6th CII National Energy Efficiency Circle Competition'2022- 2nd Runner Up(Large Sector)

Any Other relevant information

Awards/Accolades

International Convention on QC Circle Par Excellence -2021

CII – National Award for Excellence In Energy Management Energy Efficient Unit – 2021

5th CII National Energy Efficiency Circle Competition'2020- Appreciation Category

2nd CII National Energy Efficiency Circle Competition'2018

Golden Peacock Award For Energy Efficiency-2018

Rajasthan Energy Conservation Award-2019- Recognition Category

Thank you

Contact :-
Davendra Singh Seervi
GM (Engineering)
Email:- dsseervi@jkmail.com
Mobile :- +919799999904

JK Tyre & Industries Ltd.
Kankroli Tyre Plant
At/ PO – Tyre Factory
Jay kay Gram , Kankroli
Dist:- Rajasamand – Rajasthan