JK Tyre & Industries Ltd
Chennai Tyre Plant

CII - NATIONAL AWARD FOR EXCELLENCE IN ENERGY MANAGEMENT 2021

Team Members

Name	Designation	E Mail Id
S.K Satpathy	Head Engineering	satpathy.sk@jkmail.com
B.Rameshkumar	Head EEI	rameshkumar.b@jkmail.com
M Pandiarajan	Head Utility	pandiarajan.m@jkmail.com

1. COMPANY PROFILE

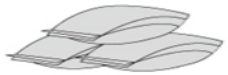
Chennai Tyre Plant in Tamil Nadu *is the 6th manufacturing plant of JK Tyre which went on stream on 05th February 2012 presently produces 45 Lakhs Passenger Car Radial (PCR) tyres and 12 Lakhs Truck / Bus Radial (TBR) tyres per annum.*

Salient Features of Chennai Tyre Plant

- *Location Selection – Automobile Hub*
- *Most technologically advanced plant*
- *Equipment Selection for high Energy Efficiency*
- *Environment friendly technology considered during Plant Inception itself*
- *Zero Liquid Discharge Plant*
- *Usage of Maximum Day lights*
- *Highly optimized WIP material flow*
- *Modular designs for seamless expansion*

2.MANUFACTURING PROCESS

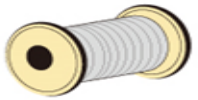
Raw Materials



Rubber Bales

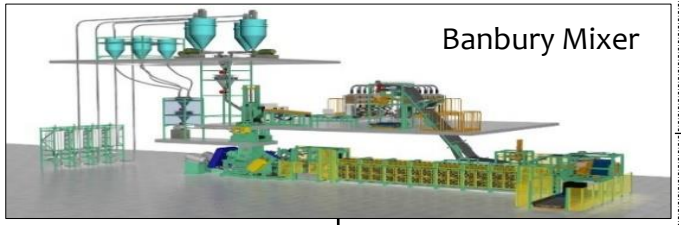
Rubber Chemicals

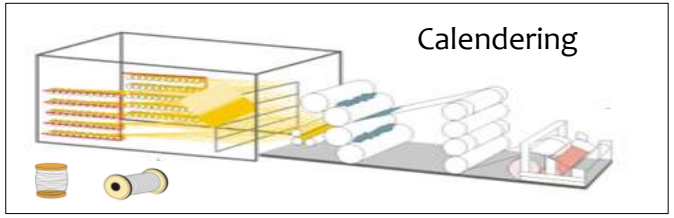
Textiles



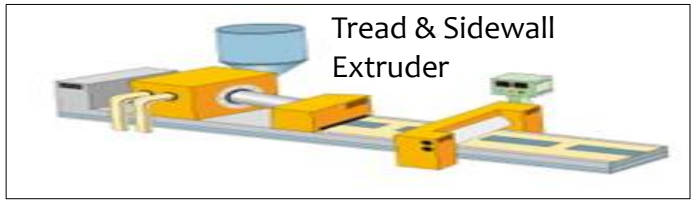
Steels

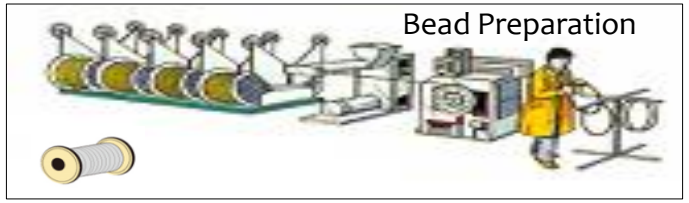
Mixing & Calendering

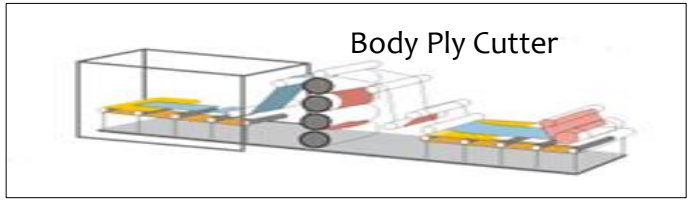


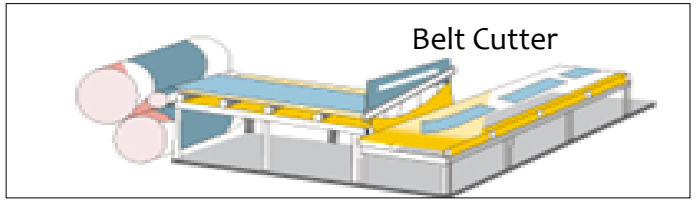


Tyre Components

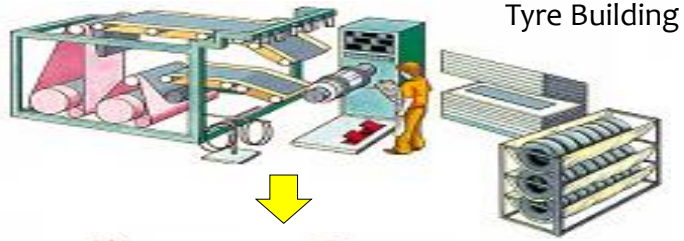


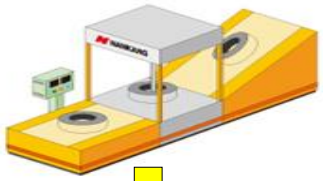






Building & Inspection





3.IMPACT ON COVID -19

Energy performance Comparison

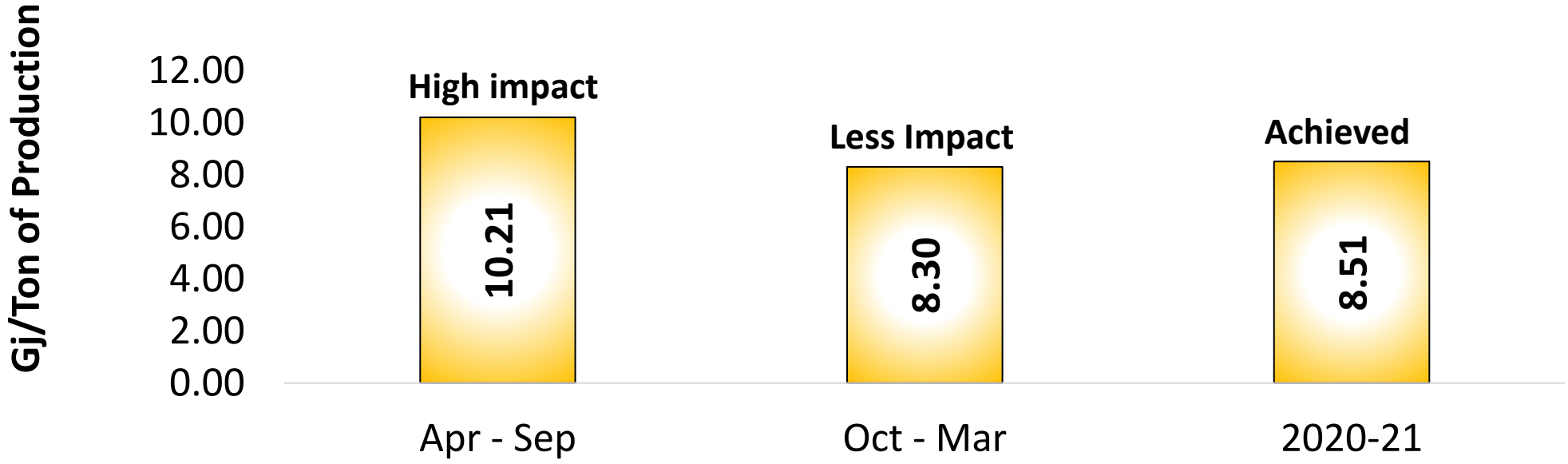
Apr'20 to Sep'20 (High impact due to Covid -19)

- Electrical specific power : 0.992 Kwh/Kg of product
- Thermal specific energy : 1589 Kcal/Kg of product
- Total specific energy : 10.21 Gj/Ton of product

Oct'20 - Mar'21 (Post Covid with relaxation)

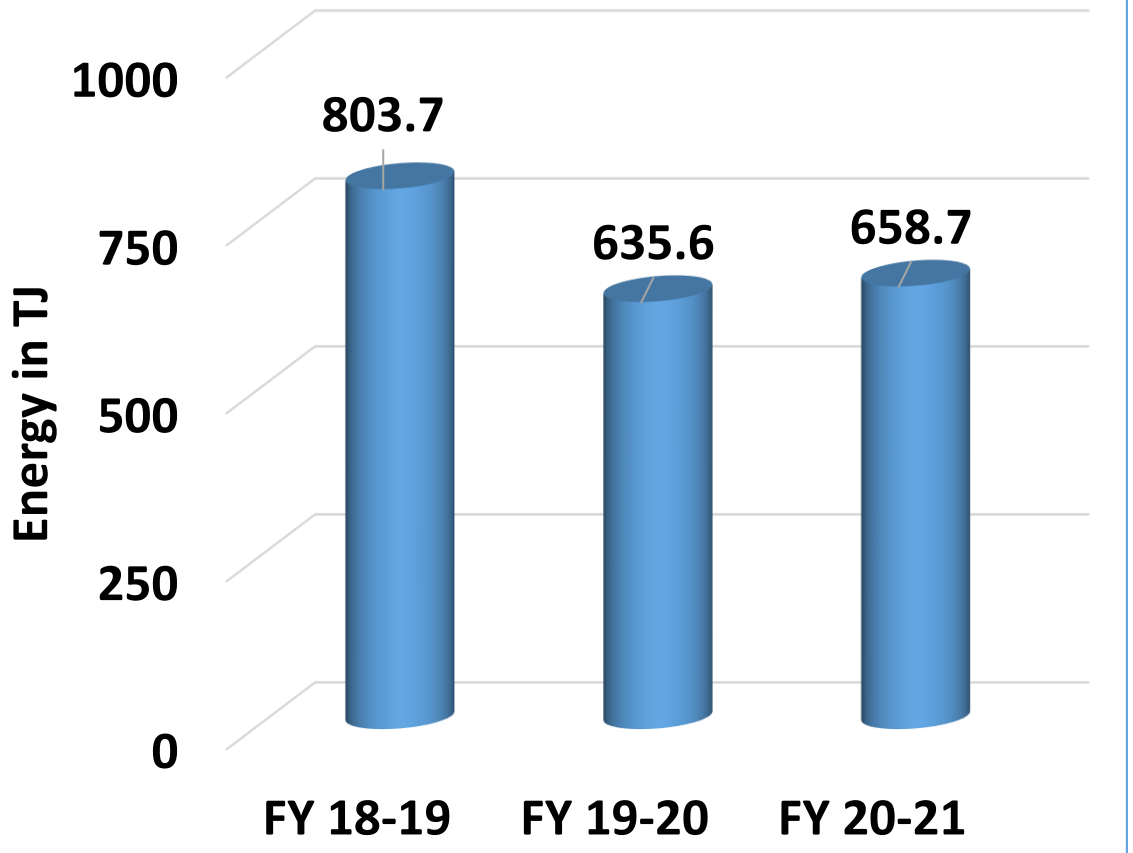
- Electrical specific power : 0.812 Kwh/Kg of product
- Thermal specific energy : 1286 Kcal/Kg of product
- Total specific energy : 8.30 Gj/Ton of product

Total Specific Energy Consumption

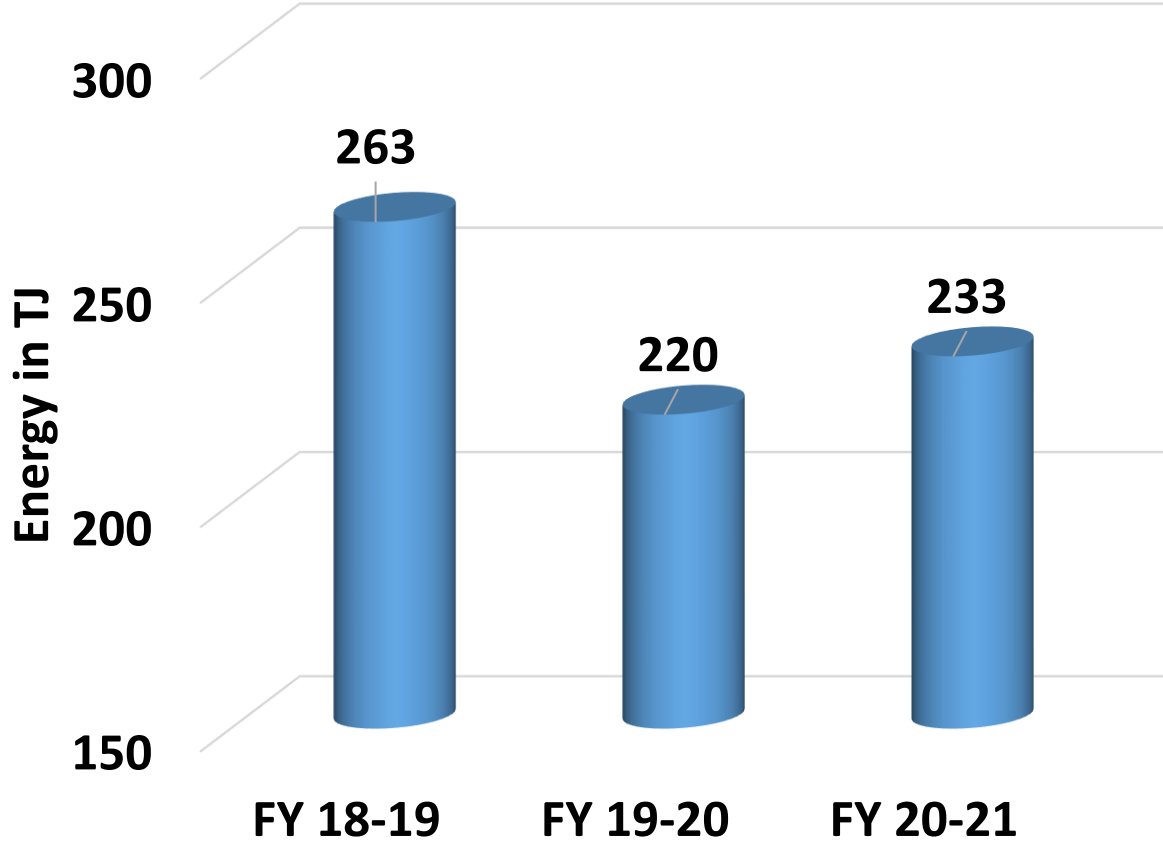


4. OVERALL ENERGY CONSUMPTION & PRODUCTION DATA – LAST 3 YEARS

Plant absolute Energy consumption (in TJ)

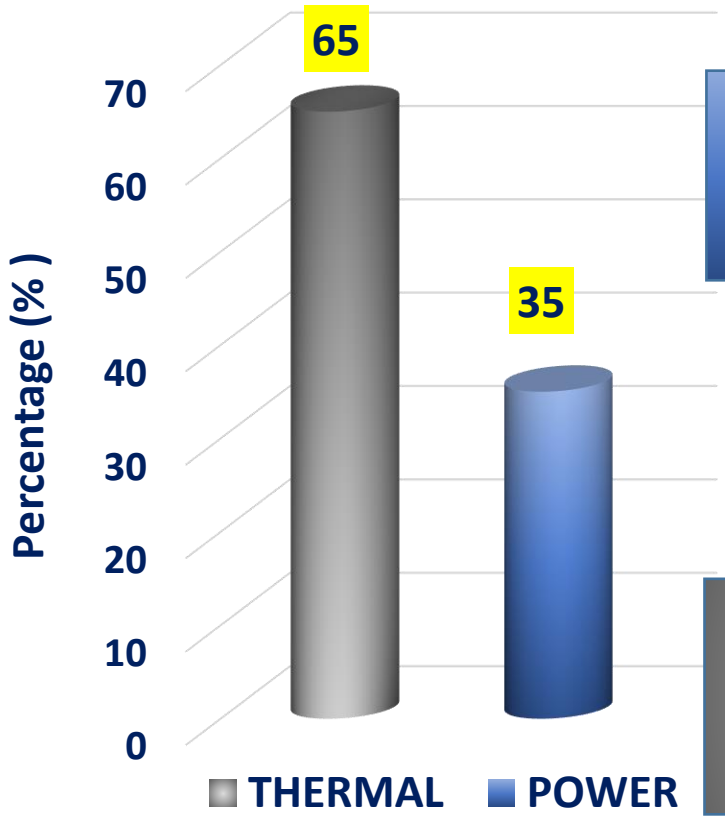


Plant Production (in Tons Per Day)

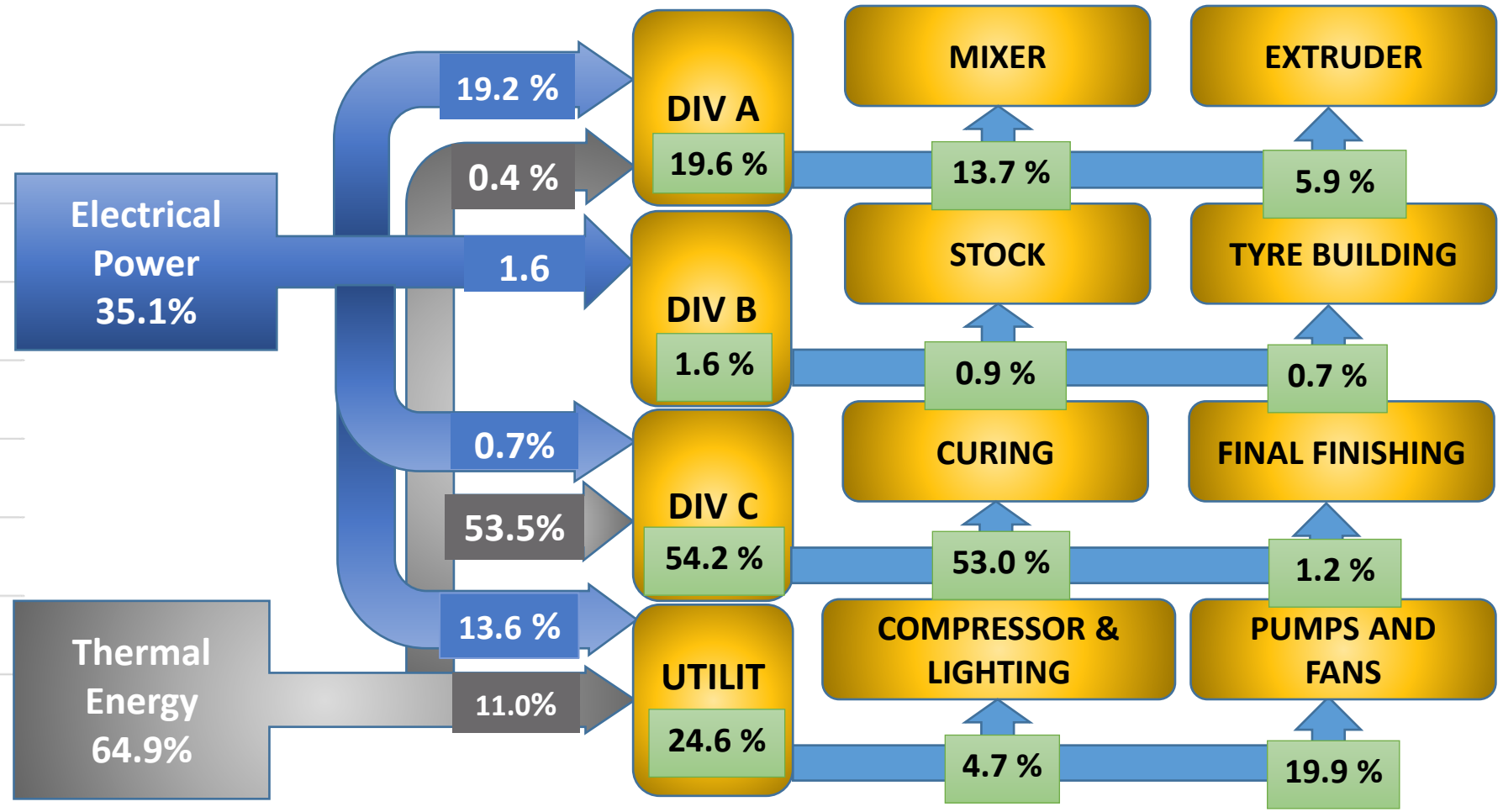


4. ENERGY MAPPING 2020-21

Plant Source wise Energy consumption (Kcal)

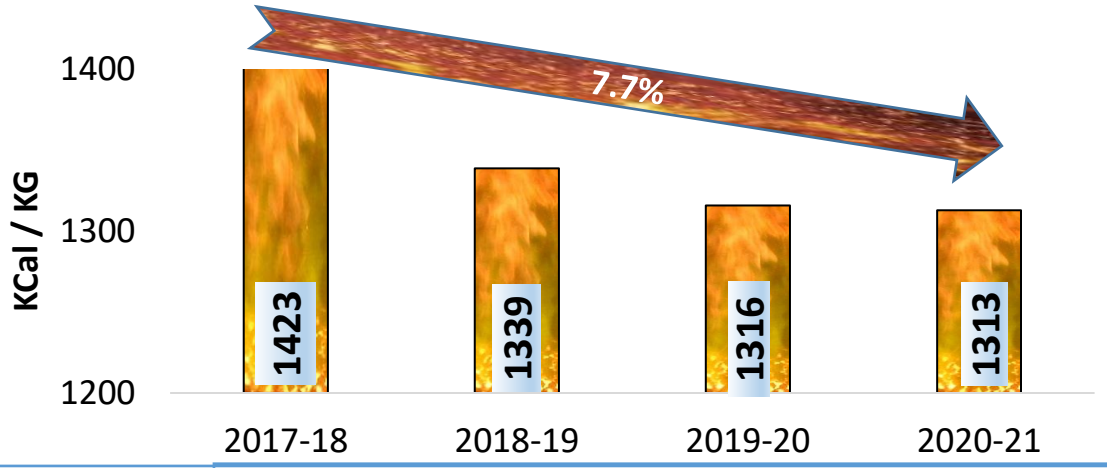


Plant Area/Equipment wise Energy consumption (Kcal)

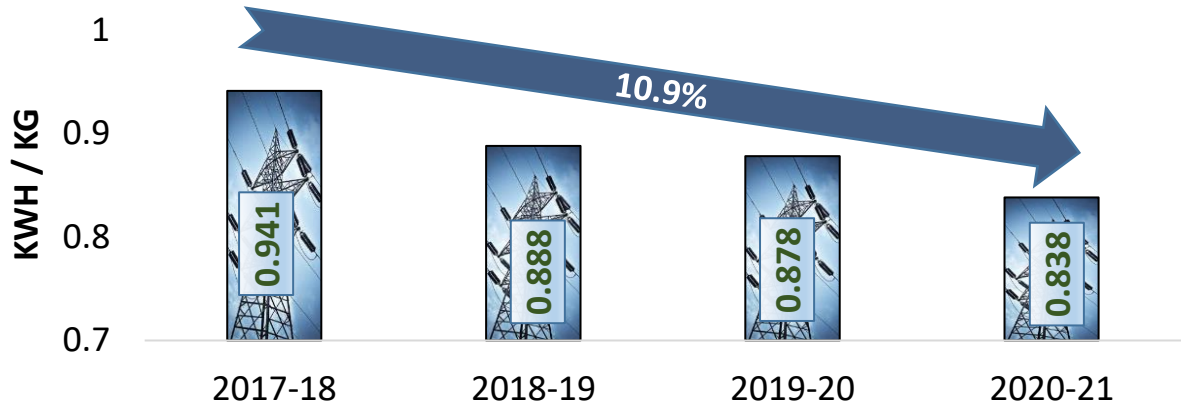


4. SPECIFIC ENERGY CONSUMPTION (THERMAL & ELECTRICAL) TREND

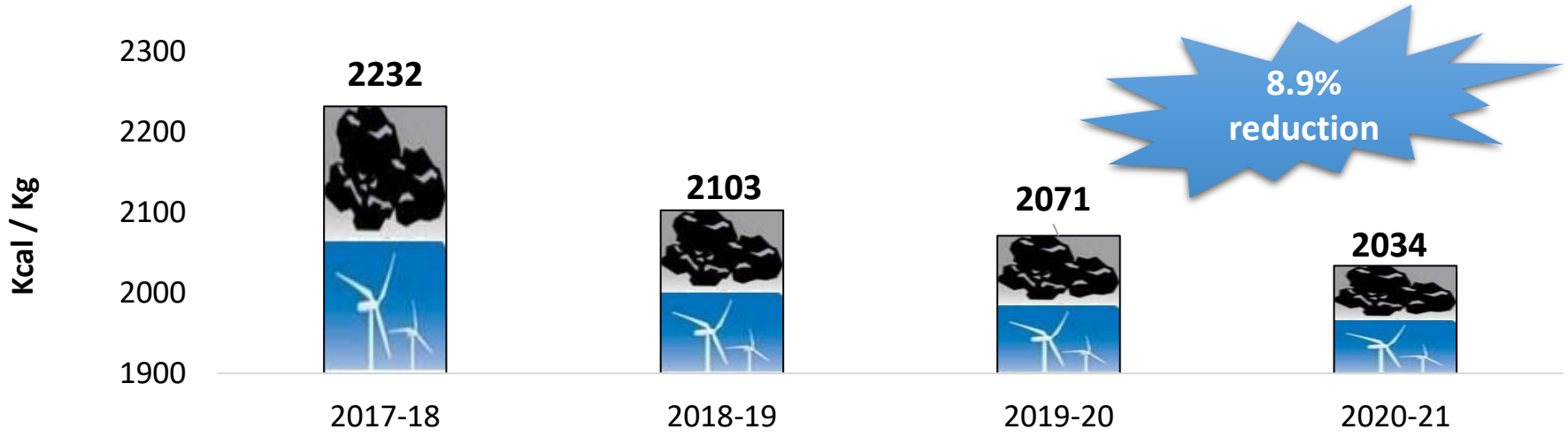
Specific Thermal consumption (KCal / Kg of finished product)



Specific Power Consumption (Kwh / Kg of finished product)

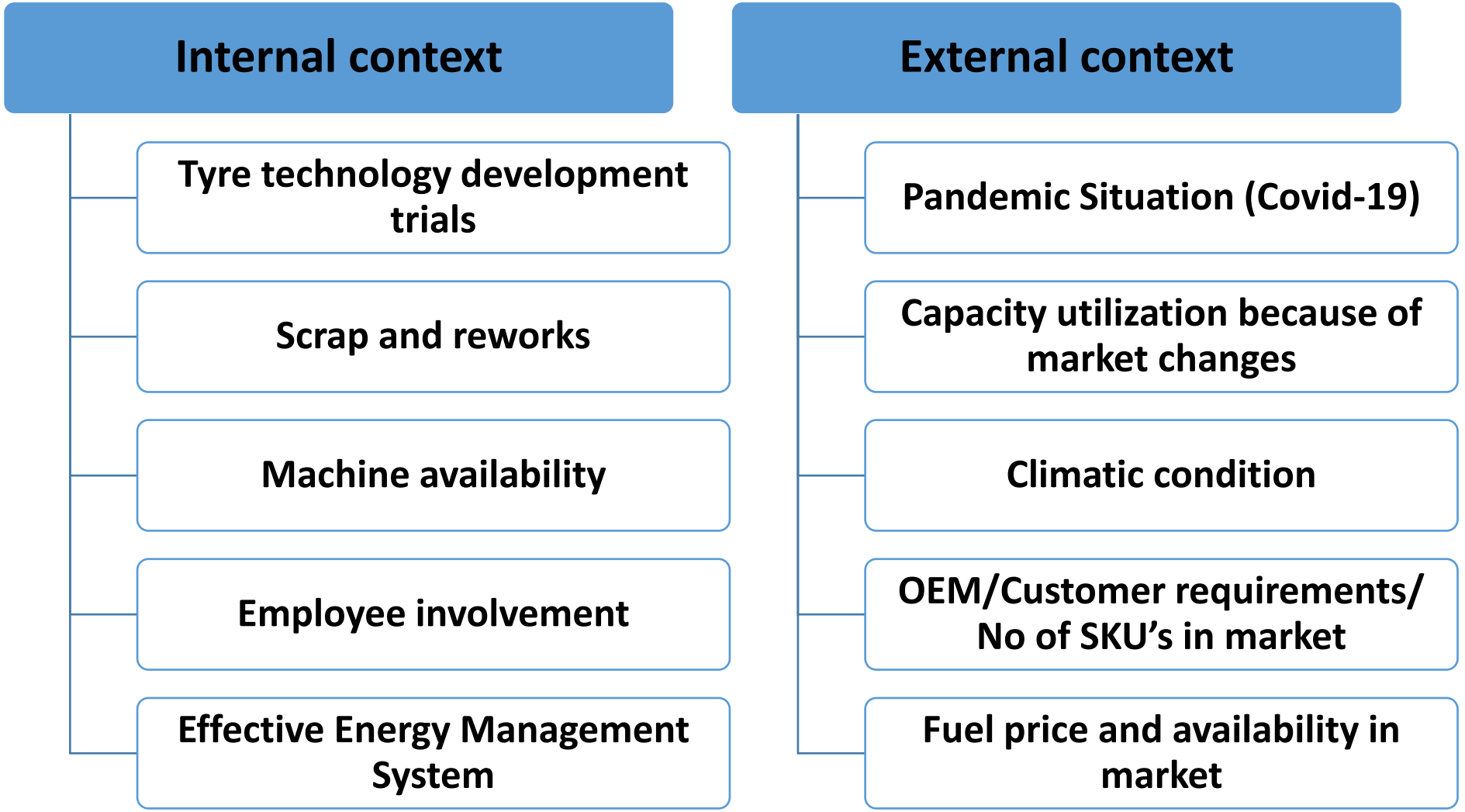


Specific Energy Consumption – Electrical & Thermal (Kcal/Kg of finished product)



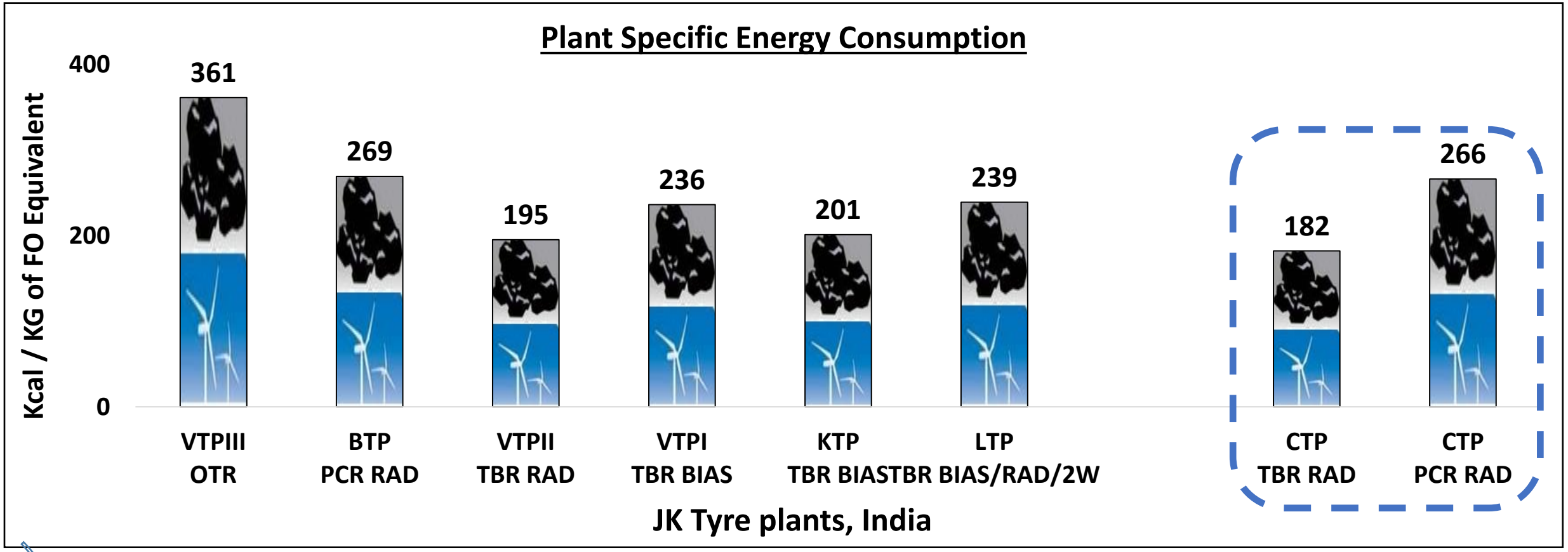
4.REASONS FOR SEC VARIATION

Factors influence SEC variation



5. BENCHMARKING

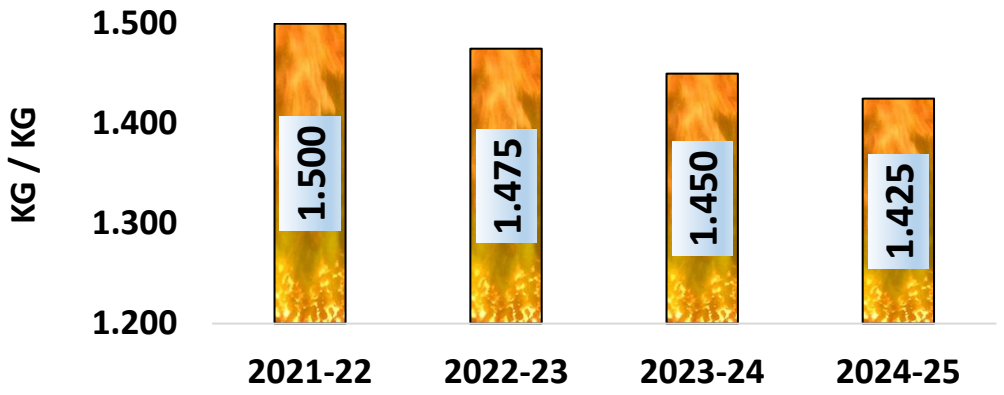
Internal Benchmarking



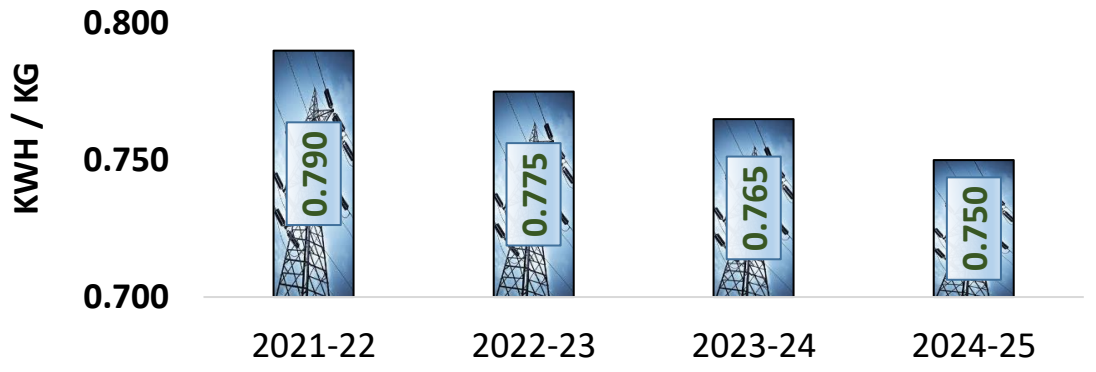
Chennai Tyre Plant is the most Energy Efficient plant among JK Tyre group, having six plants located various parts in India (FY 20-21)

5. LONG TERM VISION ON ENERGY EFFICIENCY

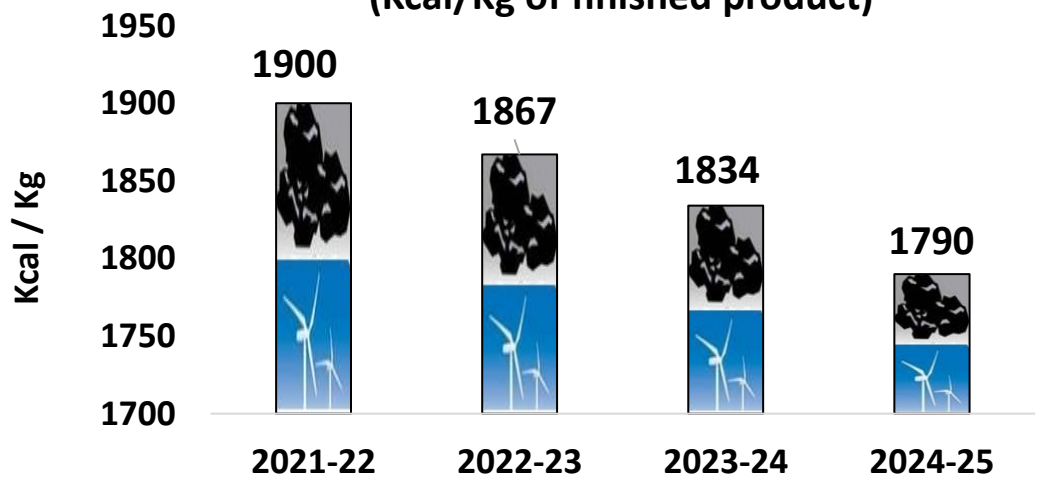
Specific Steam consumption
(Kg / Kg of finished product)



Specific Power Consumption
(Kwh / Kg of finished product)



Overall SEC
(Kcal/Kg of finished product)



Action Plan to achieve target

- 9 Crore rupess budget allotment for energy projects in next 3 years
- Strengthening the Team on Energy Conservation by SGA & MFT concept
- Participating in National Conferences to understand the New Technologies in Energy Front

5. LIST OF MAJOR ENCON PROJECTS PLANNED FY 21-22

S.No	Short description of the EnCon Project	Target	Project Cost (Rs. in Lacs)	Savings (Rs. in Lacs)	ROI (Year)
1	Increasing Boiler feed water temperature from 105 to 115 by using flash steam.	Jan'22	4.5	14.38	0.3
2	Cogged belt and pulley replacement @ ventilation system (20 Nos)	Dec'21	10	22.39	0.4
3	To improve the Energy Performance in Mixer Batch off Fan group by optimizing the Speed (Air Flow) of Fan - 5 Mixers	Dec'21	6	11.27	0.5
4	Quintoplex & Triplex Extruder BD water recovery	Dec'21	2.30	2.84	0.8
5	NIBR Boiler for 4RC for startup	Mar'22	8.5	8.02	1.1
6	Air handling unit and Ventilation performance improvement - 4 Nos	Mar'22	37.8	31.46	1.2
7	TBR hydraulic pressure optimization. Pressure reduction from 23Kg/Cm2 to 19 Kg/Cm2	Jan'22	11.0	9.33	1.2
8	VFD on FAN with temperature controller @ Process CT & VAM	Dec'21	3.5	2.032	1.7
9	Shed Provide in TS-2 & TS-3 substation Distribution transformers to reduce transformer losses	Jan'22	3	1.75	1.7
	TOTAL		**86.62**	**103.5**	**0.84**

6. ENERGY SAVING PROJECTS IMPLEMENTED IN LAST 3 YEARS

2018 - 19

DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
Projects in (Nos)	0	8	8
Total savings in (Million Kcal)	0	3837	3837
Total Savings in (Million Rs)		13.24	
Total Investment in (Million Rs)		13.59	
Payback in (Months)		12	

2019 - 20

DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
Projects in (Nos)	2	8	10
Total savings in (Million Kcal)	517	2233	2750
Total Savings in (Million Rs)		9.47	
Total Investment in (Million Rs)		3.82	
Payback in (Months)		5	

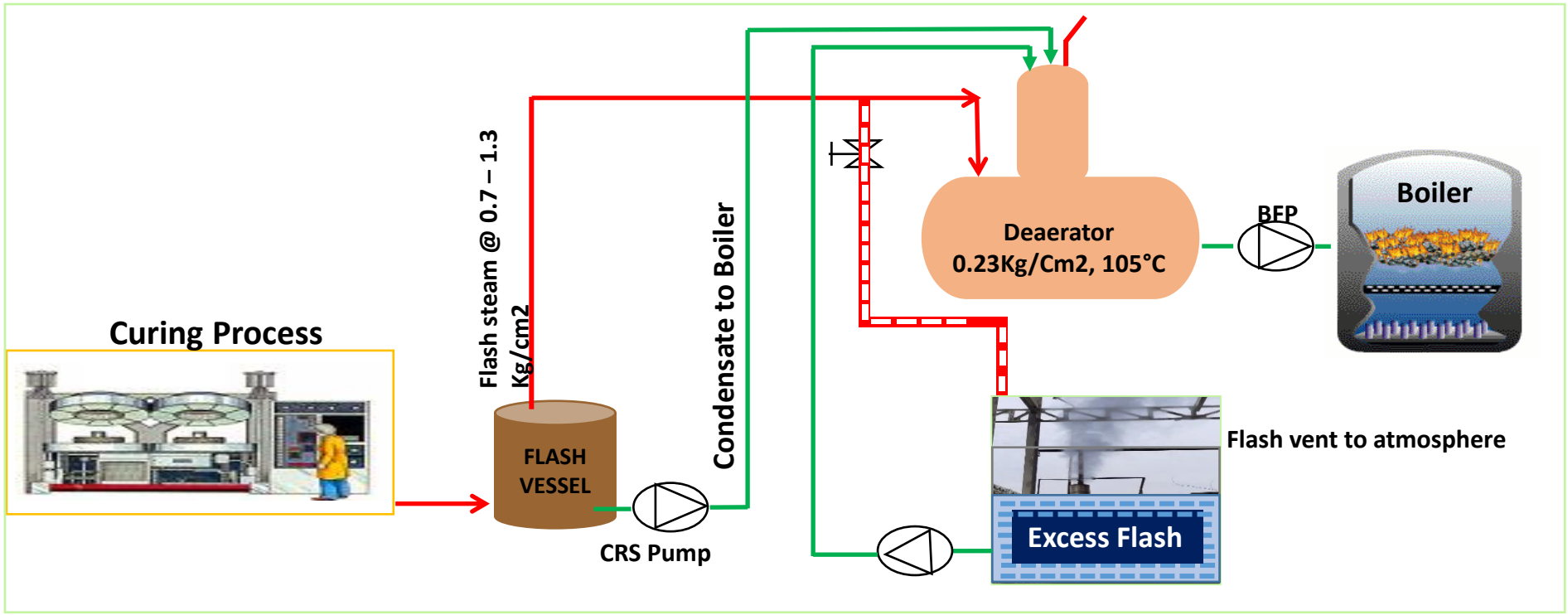
2020-21

DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
Projects in (Nos)	5	4	9
Total savings in (Million Kcal)	1287	3214	4501
Total Savings in (Million Rs)		15.2	
Total Investment in (Million Rs)		6.4	
Payback in (Months)		5	

7.INNOVATIVE PROJECT

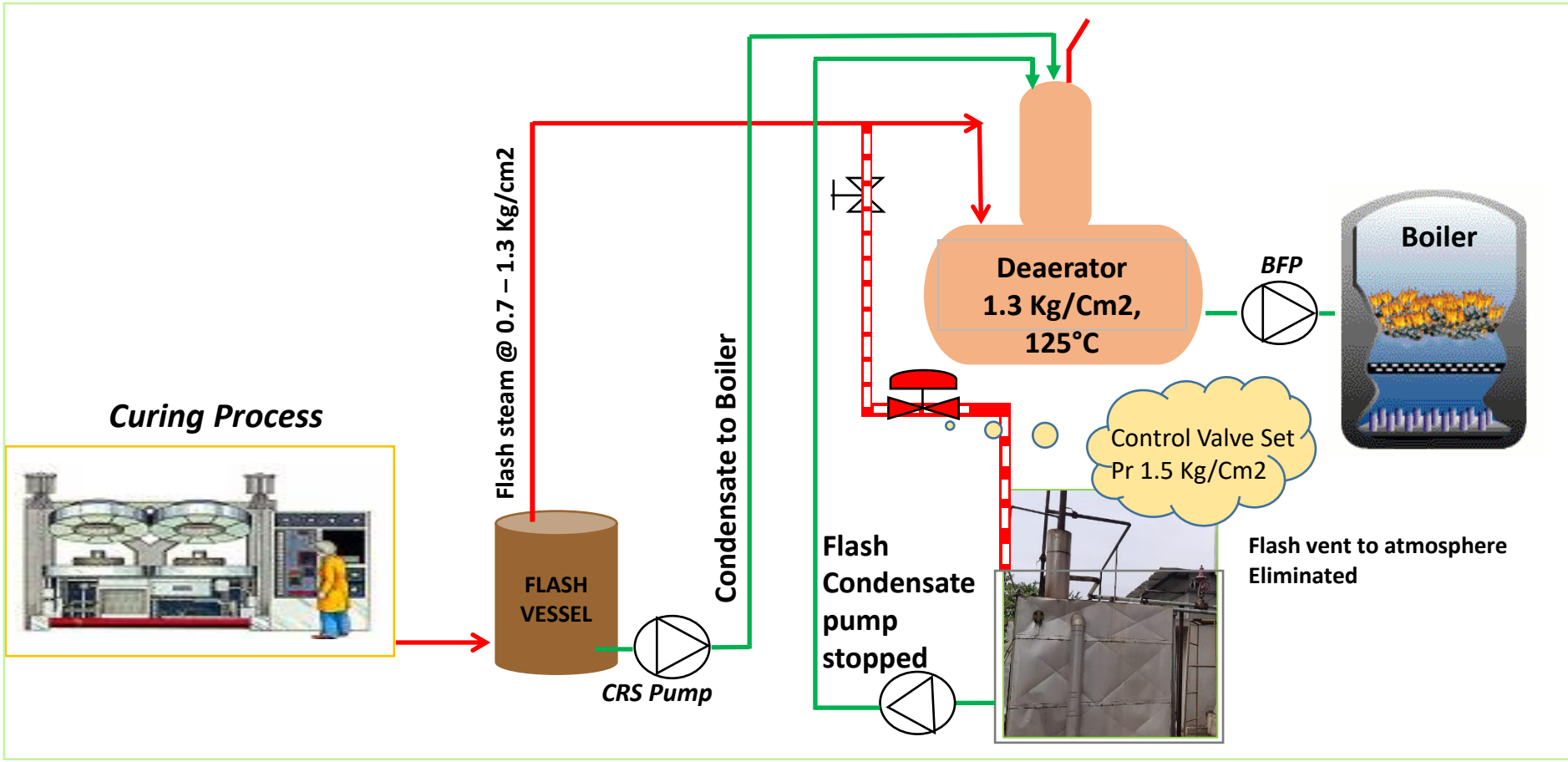
Project Name: Fuel Consumption reduction by Effective Utilization of Flash Steam from Curing Process

Problem/Present status : Flash steam pressure from curing process varies from 0.7 to 1.3 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 excess flash vented to atmosphere through flash tank. Excess Flash not recovered back to the process which results in Energy Loss



7.INNOVATIVE PROJECT

Solution : Deaerator Operating Working Pressure enhanced to 1.3Kg/Cm2 to utilize the excess flash steam by looping with pegging steam line and introduced the control valve to maintain the Deaerator Pressure



7.INNOVATIVE PROJECT

Cost Saving

GHG Emission reduction : 1807 t CO2

Description	Steam flow	Enthalpy of steam	Enthalpy of water	GCV of Coal	Boiler Effciency	Coal consumption	Coal Savings by increasing FWT		
Feed water Temperature	TPH	Kcal/kg			%	MT/Hr	MT/Day	MT/Annum	Rs in Lacs/Annum
105 Deg°C	22	669	105	4073	75	4.06	3.46	1104.48	49.7
120 Deg°C	22	669	125	4073	75	3.92			
Investment : 2 Lacs						ROI: Less than a Month			

Why innovative : Out of box thinking – In-house Innovation by modifying the deaerator operating conditions to utilize the excess flash steam, which contributes to the saving of 1100 MT of Coal/Annum saving

Take away: Horizontally can be deployed to the similar process industries. Where we are being parallel implemented in our other plants of JK Tyre.

8.UTILISATION OF RENEWABLE ENERGY SOURCES - ELECTRICAL

FY 2018-19

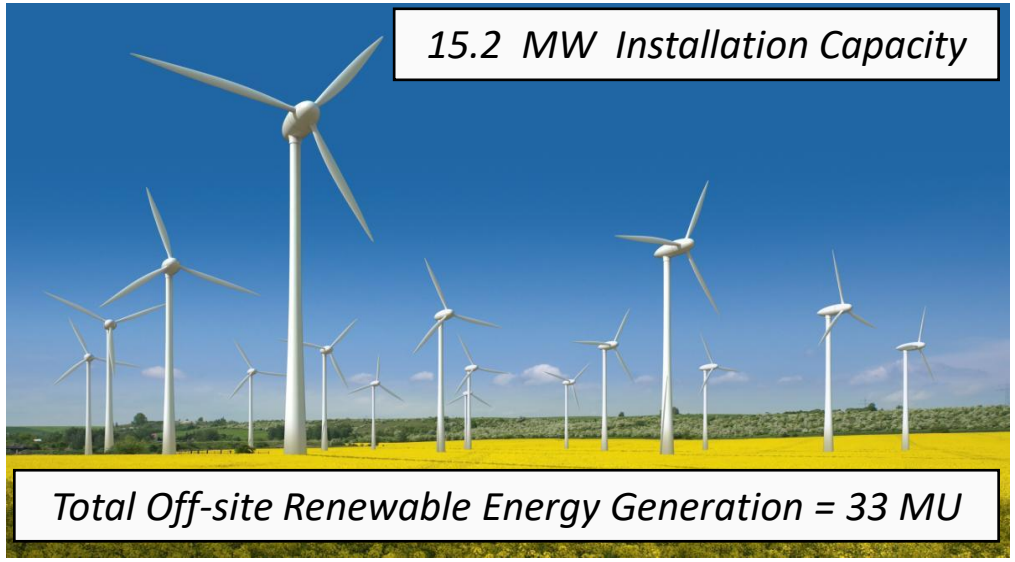
Type of Energy	ON Site / OFF Site	Installed capacity (MW)	Generation (million kwh)	% of overall electrical energy
Solar	ON site	6.0	8.165	10.07
Wind	OFF Site	15.2	30.801	37.97
TOTAL		21.2	38.97	48.04

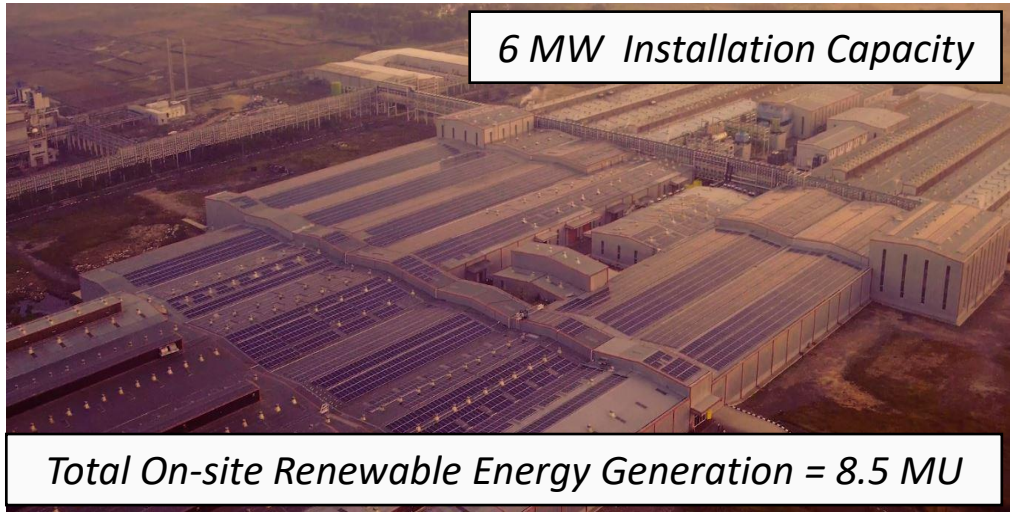
FY 2019-20

Type of Energy	ON Site / OFF Site	Installed capacity (MW)	Generation (million kwh)	% of overall electrical energy
Solar	ON site	6.0	7.954	12.35
Wind	OFF Site	15.2	29.93	46.48
TOTAL		21.2	37.88	58.83

FY 2020-21

Type of Energy	ON Site / OFF Site	Installed capacity (MW)	Generation (million kwh)	% of overall electrical energy
Solar	ON site	6.0	6.79	10.57
Wind	OFF Site	15.2	31.178	48.54
TOTAL		21.2	37.97	59.11





8.UTILISATION OF RENEWABLE ENERGY SOURCES - THERMAL

FY 2018-19

Type of Energy	ON Site / OFF Site	Equivalent energy savings (Mkcal)	% of overall Thermal energy
Biomass	ON site	4244	3.35
Wood/Garden	ON site	140	0.11
TOTAL		4384	3.46

FY 2019-20

Type of Energy	ON Site / OFF Site	Equivalent energy savings (Mkcal)	% of overall Thermal energy
Biomass	ON site	6088	5.92
Wood/Garden	ON site	180	0.18
TOTAL		6268	6.10

FY 2020-21

Type of Energy	ON Site / OFF Site	Equivalent energy savings (Mkcal)	% of overall Thermal energy
Biomass	ON site	5398	5.01
Wood/Garden	ON site	165	0.15
TOTAL		5563	5.16

Dried Leaves ,Wooden waste with Coal


Saw dust mix with Coal (23%)

9.WASTE UTILIZATION AND MANAGEMENT

PLANT VEGETATION WASTE USED AS FUEL FOR BOILER:

Plant Vegetation Waste has been sent to Recycler and then Crushed into Wooden Dust. Then Wooden dust mixed with Coal in 20% ratio and used in Boiler

ASH RECYCLING FOR UNBURNT REDUCTION

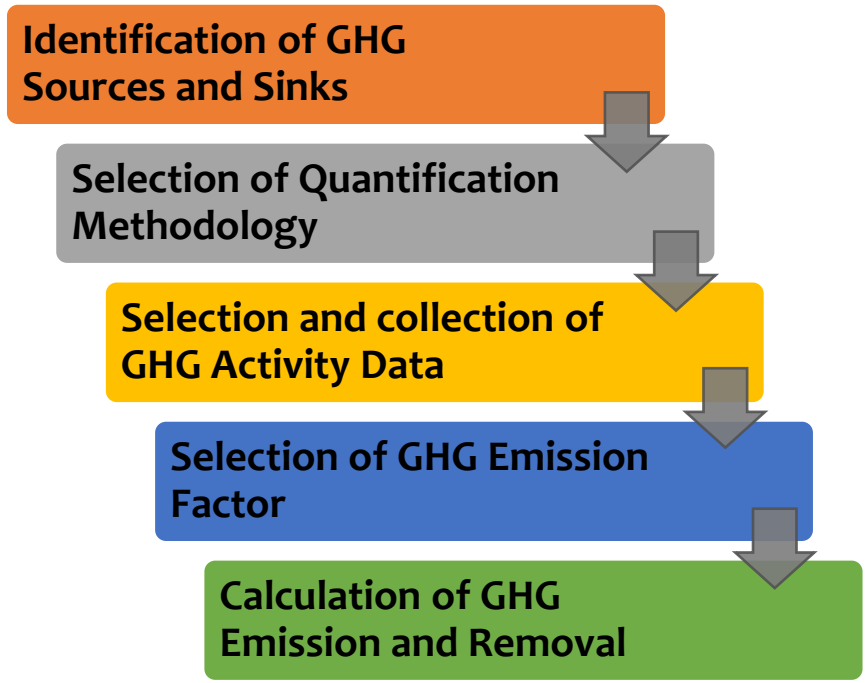
Bed Ashes are collected from the Boiler Bank Zone, Economizer & APH Hopers where Un burnt content is high. Collected Ashes are recycled in the Boiler for further combustion.

Waste		Unit	2018-19	2019-20	2020-21	Generation	Recycle /Reuse	Disposal
A	Metal scrap	Tons	157.56	83.83	61.88	Maintenance Activity	Reused to make MS parts	Sent to authorized recycler for reuse
B	Rubber	Tons	576.61	363.07	191.13	Process	Reused for Rubber Parts	
C	Paper	Tons	319.33	240.59	234.99	Office	Reused for making cardboard & paper bags.	
D	E-Wastes	Tons	0.79	4.16	1.41	IT &EEI	Recycled	Sent to authorized vendor for recycling.
E	Polythene	Tons	297.71	236.03	226.81	Process	Reused for making Tarpaulin and Poly ropes	Sent to authorized recycler for reuse

10. GHG INVENTORISATION

Carbon foot print of any entity is the measure of the Green House Gas (GHG) emitted due to the activities of that entity.

- **All Plant (decentralized level) GHG Inventorisation**
- **Rolling up the inventory to Corporate Level**

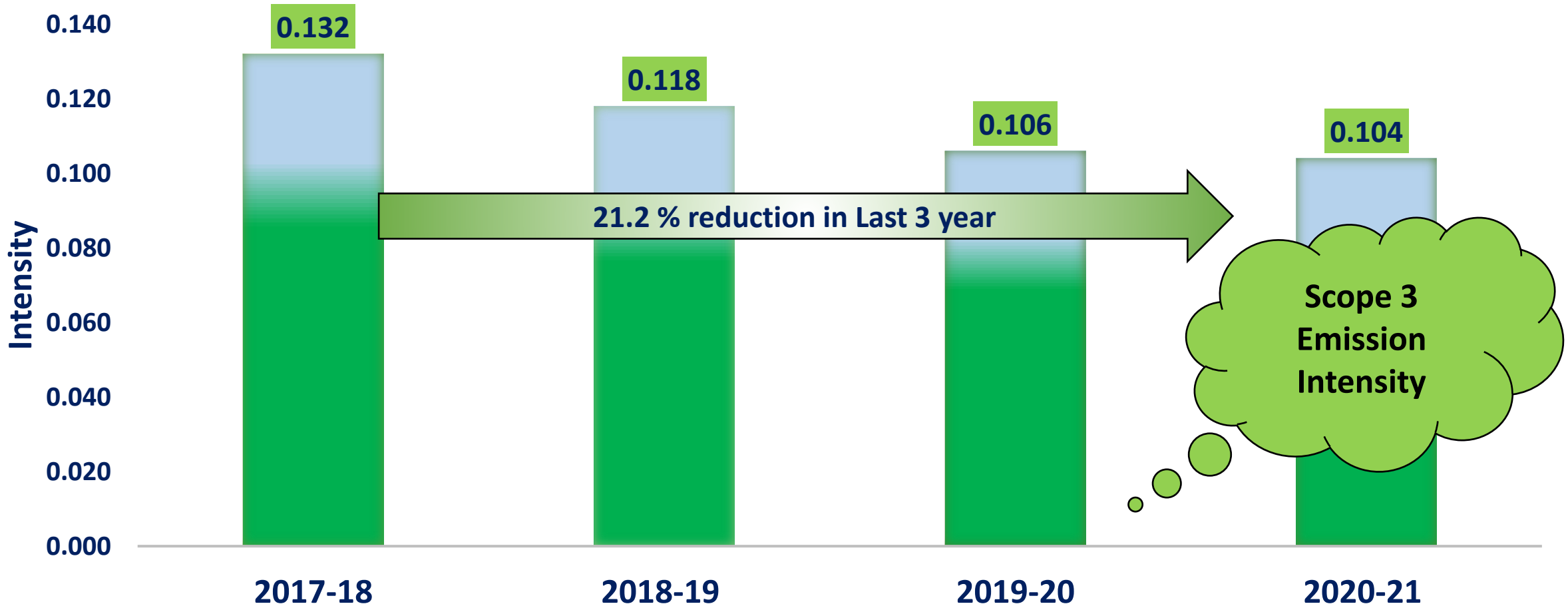


Setting GHG Operational Boundaries Emission Sources:

Emission Sources	Scope of Emission
Diesel for internal material transport	**Direct Emission (scope 1)**
Diesel for generators	
Boiler coal	
HSD (High speed diesel)	
Company vehicle-Diesel	
Company vehicle-Petrol	
LPG consumption (GH)	
Release of refrigerant	
Use of Acetylene	
Weight of CO_2 released from fire extinguishers	
Overall purchase of Electricity Energy	**Indirect Emission (scope 2)**
Material Logistics (Raw Material & FG Transportation)	**Other Indirect Emission (Scope 3)**
Business Travel	
Employee Commute	
Waste Disposal	

10. GHG INVENTORISATION

EMISSION INTENSITY GRAPH (CO2E TON/TON OF TYRE



10. GHG INVENTORISATION

1st Indian tyre company to have verified Carbon Footprint as per IS-14064

bsi.

By Royal Charter

CARBON FOOTPRINT VERIFICATION
VERIFICATION OPINION STATEMENT

This is to verify that: **JK Tyre & Industries Ltd.**
Link House
3 Bahadur Shah Zafar Marg
New Delhi 110 002
India

Holds Statement No: **CFV 637319**

Verification opinion statement

As a result of verification procedures, it is the opinion of BSI with reasonable assurance that:

- The Greenhouse Gas Direct and Energy Indirect Emissions for the period from 01/04/2019 to 31/03/2020 is 246,992 tonnes of CO2 equivalent for JKTIL, and 187,541 tonnes of CO2 equivalent for CIL.
- The inventory year for the period from 01/04/2013 to 31/03/2014 is considered as the base year for JKTIL.
- The inventory year for the period from 01/04/2017 to 31/03/2018 is considered as the base year for CIL.
- Emissions due to biomass combustion is separately quantified.
- Main operational activities carried out in the defined organizational boundary include 'Design and Manufacture of Conventional (Bias), Radial Truck, Bus & Car Tyres, Tubes and Flaps, Off the Road Tyres & Pre-Cured Tread Rubber'.
- No material misstatements in the selected year Greenhouse Gas Emissions calculation for JK Tyre & Industries Limited were revealed.
- Data quality was considered acceptable in meeting the principles as set out in ISO 14064-1:2012.

Theuns Kotze, Managing Director – IMETA Assurance

For and on behalf of BSI:
Originally registered: **26/08/2020** Latest Issue: **26/08/2020**

"making excellence a habit."

11. GREEN SUPPLY CHAIN MANAGEMENT

GREEN PURCHASE POLICY

Objective:

To responsibly purchase products and services by considering environmental protection issues into the sourcing decision making process and to encourage all upstream suppliers 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 environment 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 Areas:

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 Green House Gas emissions & measure the carbon footprint
   - Minimizing the generation of waste and safe disposal of the hazardous wastes generated
   - Recycle & reuse material to reduce absolute consumption
   - Incorporating 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.

K A Unni Nayar
Vice President Works
Chennai Tyre Plant

JK TYRE & INDUSTRIES LTD.
CHENNAI TYRE PLANT

SUPPLIER VISITS: TO SHARE THE GREEN PRACTICES



Annual Energy Conference is organized to share the Energy Projects, Improvements & Best practices within JK organization, Supplier and Vendors. Horizontal deployment done across the verticals based on the Applicability of the Projects.

11. GREEN SUPPLY CHAIN MANAGEMENT

S.No	Material	Green Procurement Guideline
1	Energy Products	100% Procurement of BEE Star rated products (Motors, AC's , LED etc)

Admin. Office :
Patriot House,
3, Bahadur Shah Zafar Marg
New Delhi -110002.
Ph. Off : 91-11-33001112, 33001122
Fax: 91-11-23322059

Purchase Order
Chennai Tyre Plant

Plant Address:
SRIPERUMBUDUR - TAMBARAM ROAD (SH 110)
KOLATHUR VILLAGE, SRIPERUMBUDUR TALUK
KANCHEEPURAM DISTRICT,
P.O. SRIPERUMBUDUR - 602106
TAMILNADU(INDIA)
PHONE: 044-33001122,30978111
FAX: 044-30978555
GSTIN:33AACJ6716F1ZV
PAN No: AAACJ6716F

M/s. CLASSIC ENGINEERING COMPANY
Plot No:5, 3rd Floor
Anupam Plaza-II,Gazipur,
DELHI - Delhi
PIN : 110006 -India
Vendor Code : 307541
Vendor GSTIN : 07AEWPM3886J1ZK
PAN No. : AEWPM3886J

Plant : Chennai Tyre Plant
Purchase Order. No : 3500019526
P.O. Date : 07.08.2018
Effective From : 30.07.2018
Your Reference : PRICELIST'18

SNo	Item Code / Item Description	UOM	Quantity	Rate (₹)	Total Value (₹)	Discount
1	63109904281 MTR,AC,55KW,ND250MX,1480RPM,105A,MAKE:CG	Numbers	1	501,900.00	501,900.00	69.50%

MTR,AC,55KW,FRAME:M2BAX250SMA4,MVOLTAGE:380 +-10%,NO OF POLE:4,FREQUENCY:50+-,IP55,MOUNTING:V1,METHOD OF COOLING:IC411,LOAD:100%,CONNECTION:DELTA, NET WEIGHT:453, BEARING DE/NDE: 6314-C3 / 6314-C3..... ..FLANGE MOUNTING MOTOR. V1 FLANGE , IE3 MAKE ABB

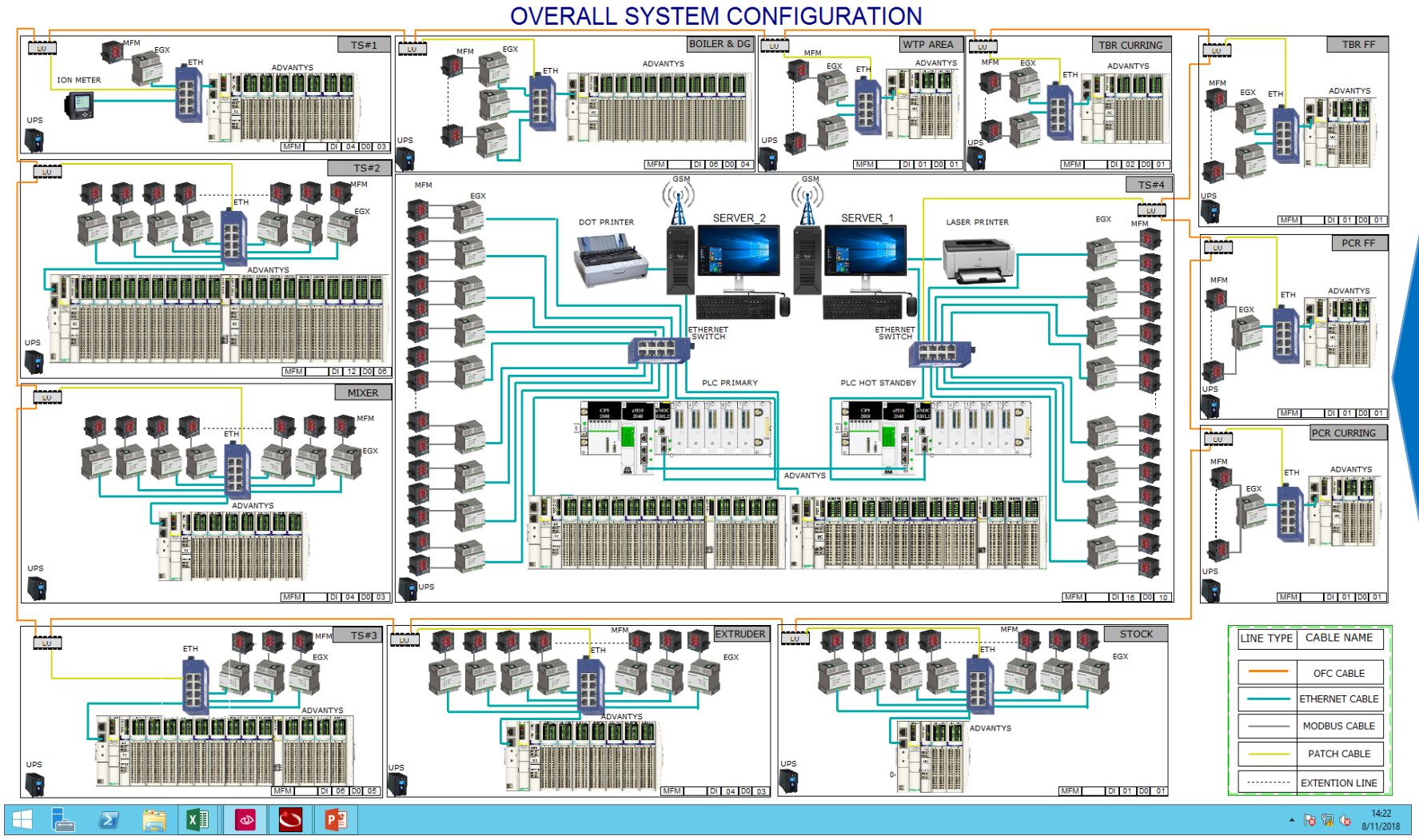
High Energy Efficiency Motor

OTHER INITIATIVES:

- Requirement of energy efficiency gets reflected in all Purchase documents
- Transport route optimization: Raw material supply truck used to carry our finished goods to various customers and depots.
- We minimise the transit distance by selecting the vendor which is near to our plant.
- Coins type stuffing to Lacing type stuffing for increasing load capacity and reduce trucks & fuel.

12. TEAM WORK , EMPLOYEE INVOLVEMENT & MONITORING

Energy Management System – Plus Breaker Control – Plant over all architecture

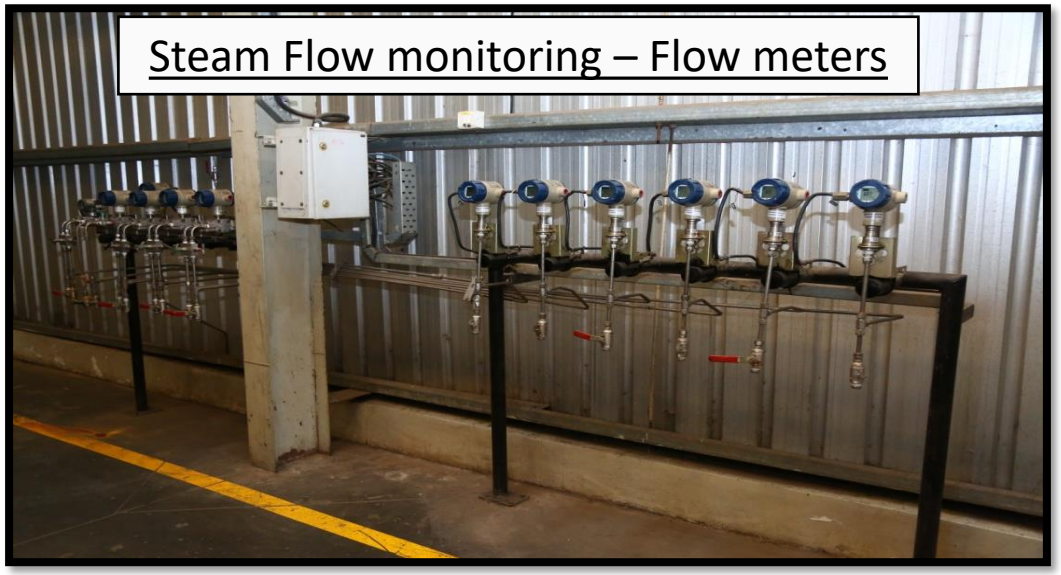


- ✓IOT based advance Energy management system connected with 1013 Energy meters and 256 Nos Breakers
- ✓EMS plus breaker controlling system to control energy
- ✓System alerts the excess energy consumption immediately thro Auto SMS, and E-mail helps to take appropriate actions immediately rather than afterward investigation
- ✓System records Sag/swell and transients and all electrical parameters at the sampling rate of 1024 samples/cycle

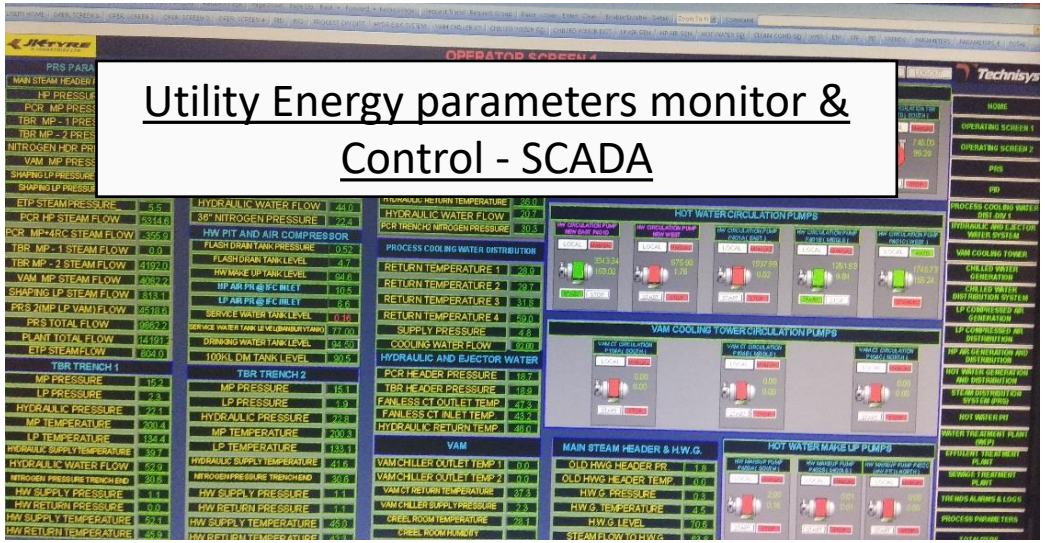
12. TEAM WORK , EMPLOYEE INVOLVEMENT & MONITORING

IOT based advance Energy management system

- Provides added information to the management and equipment operators
- Helps real time control on machine energy performance
- Helping to assess product, manpower, time wise energy performance
- Online alerts and control measures.



Steam Flow monitoring – Flow meters



Utility Energy parameters monitor & Control - SCADA

12. TEAM WORK , EMPLOYEE INVOLVEMENT & MONITORING

Daily Review Meeting chaired by Plant Head

Monthly Energy Review meeting chaired by Director Manufacturing

Monthly Business Review Meeting chaired by President – India Operations

EnMS Management Review Meeting chaired by Plant Head – Half Yearly

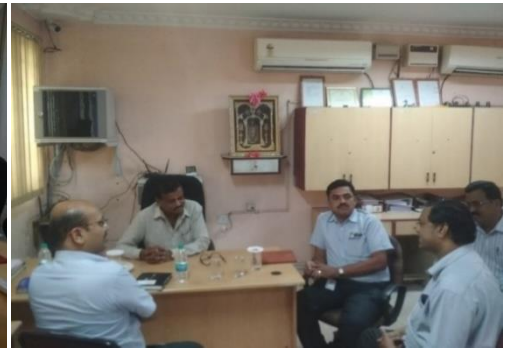
JK TYRE encourage the practice of continuously improving new ideas, suggestions and recommendations pertaining to energy efficiency and recognizing and rewarding ideas, which add value to the company's operations

- 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

12. AWARENESS CREATION FOR STAKEHOLDERS

SUPPLIER VISITS:





Annual Energy Conference is organized to share the Energy Projects, Improvements & Best practices within JK organization, Supplier and Vendors. Horizontal deployment done across the verticals based on the Applicability of the Projects.

TRAINING – CAPACITY BUILDING & SMALL GROUP ACTIVITIES


ENERGY AWARENESS – NEAR BY SCHOOLS & CONTRACT EMPLOYEES

12.ENERGY MANAGEMENT TEAM

Corporate Energy Cell

K.A. UNNI NAYAR VP (W)

S.K. SATHPATY (GM-ENGG)

T.JAYAKANTHAN
EM (Reg.No.16700/20)

B.RAMESH KUMAR
(ELECTRICAL ENERGY)

MR.VASU BABU (MIXING)
MR.ANIL (EXTRUDER)
MR.KARTHICK (ELEC)
MR.TAMILARASAN (MECH)

MR. SURESH (TECH)
MR.GOPI (PURCHASE)

MR.SATHYA (ELEC)
MR. SURESH RAJAN (MECH)

M.PANDIARAJAN
(THERMAL ENERGY)

MR.SIMON (PROD)
MR.NIKIL (PROD)
MR.MANOJKUMAR (ELEC)
MR. VIJAYABASKAR
(ENGG)

MR. PRABHU (UTILITY)
MR.AJOY (BOILER)

MR.RAGAVENDRA (ELEC)
MR.RAJESHKUMAR (INST)

- Energy Auditors As per ISO 50002:2014
  3 Nos
- BEE EM Certified – 2 Nos

13. ENERGY BUDGET

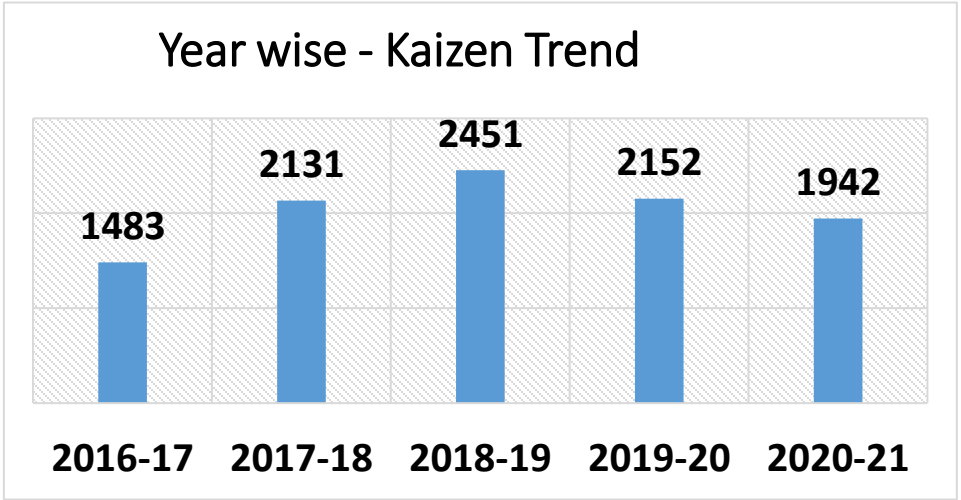
ENERGY PROJECT ANNUAL BUDGET

YEAR	PROJECT NOS.	BUDGET ALLOCATED (Rs. in Lacs)	SAVINGS REALISED (Rs. in Lacs)	ROI (Years)
2021-22	9	86.62	103.5	0.84
2020-21	9	64.1	152.0	0.42
2019-20	10	38.2	94.7	0.40
2018-19	8	135.9	132.4	1.0
2017-18	12	109.8	309.1	0.36

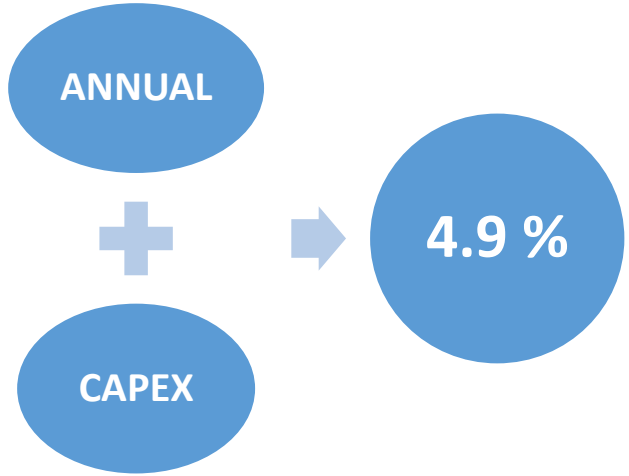
ENERGY CAPEX BUDGET

YEAR	BUDGET ALLOCATED (Rs. in Lacs)	PROJECT DETAIL
2021-22	25	BIO MASS STORAGE
2019-20	600	IOT BASED ENERGY MONITORING
2017-18	1500	3MW ROOF TOP SOLAR
2016-17	105	ADVANCED EMS SYSTEM & BREAKER CONTROL
2016-17	2000	3MW ROOF TOP SOLAR

PROJECT IMPLEMENTED THROUGH KAIZENS



AVG INVESTMENT % ON TOTAL TURNOVER



13. ISO 50001/Green Co/IGBC RATING

bsi.

By Royal Charter

Certificate of Registration

ENERGY MANAGEMENT SYSTEM - ISO 50001:2018

This is to certify that:

JK Tyre & Industries Ltd.
Chennai Tyre Plant
Sriperumbudur - Tambaram Road (SH-110)
Kolathur Village, Sriperumbudur Taluk
Kanchipuram District 602 106
Tamil Nadu
India

Holds Certificate No: **ENMS 596960**

and operates an Energy Management System which complies with the requirements of ISO 50001:2018 for the following scope:

The Manufacture and Supply of Automotive Radial Truck, Bus & Passenger Car Tyres and generation of Steam through Coal fired Boilers for Process use.

For and on behalf of BSI:

Chris Cheung, Head of Compliance & Risk - Asia Pacific

Original Registration Date: 2013-07-16
Latest Revision Date: 2019-05-29

Effective Date: 2019-05-30
Expiry Date: 2022-05-29

Page: 1 of 1

...making excellence a habit.

ISO 50001 : 2011
Certified on July 2013

14. LEARNING FROM CII AND OTHER AWARD PROGRAM

- CII National Award for Excellence in Energy Management is an excellent platform to benchmark our Energy Performance and to showcase the efforts and achievements.

- Imparting the requirements stated in the Energy award program supported us to improve our Energy performance by means of systems, methods, knowledge and technology development which has raised our capabilities to work and receive this National Energy leader award.

- The award builds our BRAND and National wide recognition

- The preparation for award application helps to inspire and align the entire workforce and rapidly accelerates the PACE OF SYSTEM IMPROVEMENT.

AWARDS AND ACCOLADES

CII –National Energy Leader 2018,2019&2020

CII - Green Co Certification 2019 - Platinum

Golden Peacock Energy Efficiency Award 2017

BEE – National Energy Conservation Award 2014 & 2015

CEM Global award - Excellence in Energy Management 2019 – First company from India

SEEM National Energy Management Award 2016,2017,2018&2019

CONNECT

B Ramesh Kumar

rameshkumar.b@jkmail.com +91 8754440031