



# JK Tyre & Industries Ltd Chennai Tyre Plant

**CII - NATIONAL AWARD FOR EXCELLENCE IN ENERGY  
MANAGEMENT 2022**

## Team Members

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# 1. Company Profile

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

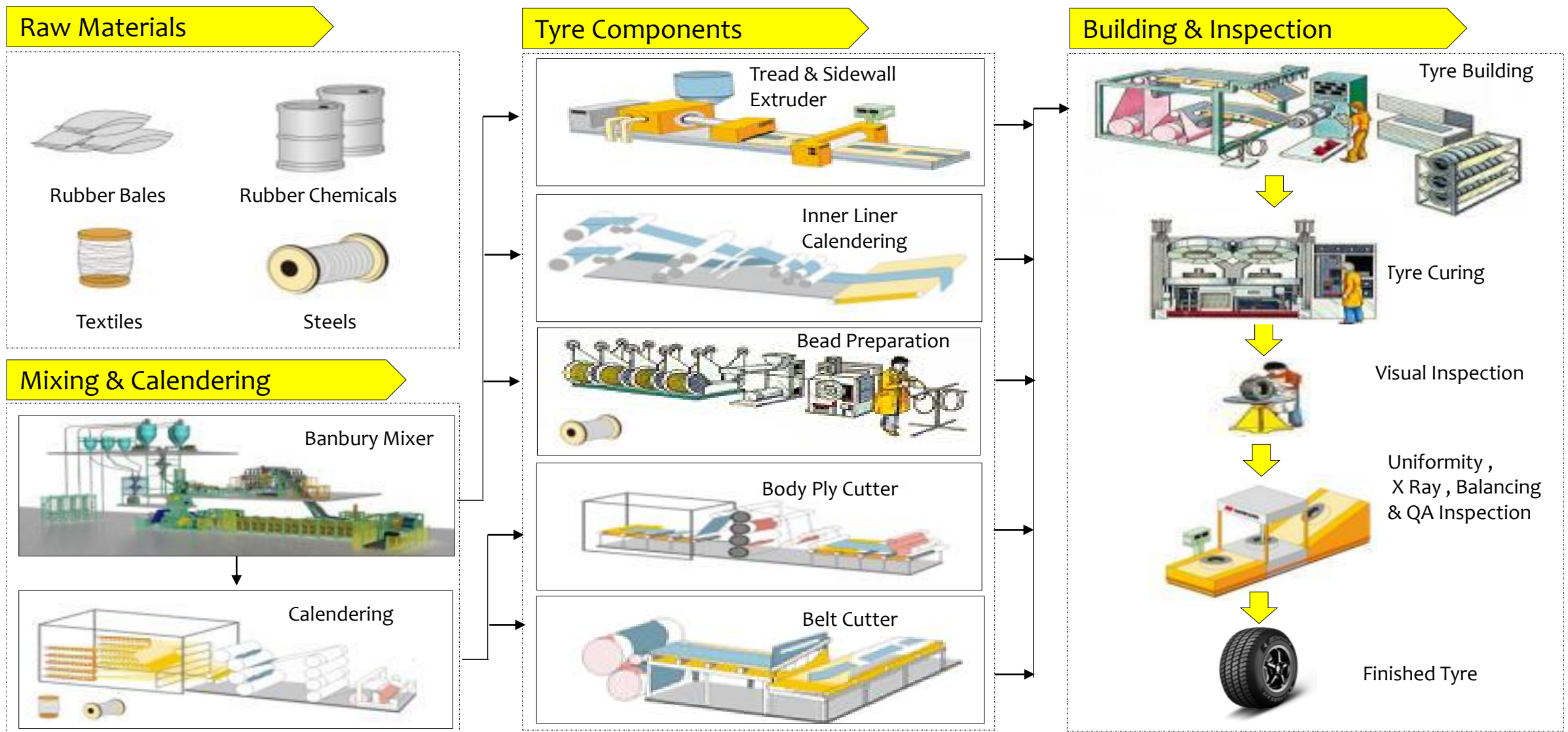
## *Salient Features of Chennai Tyre Plant*

- ❖ *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 – 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*





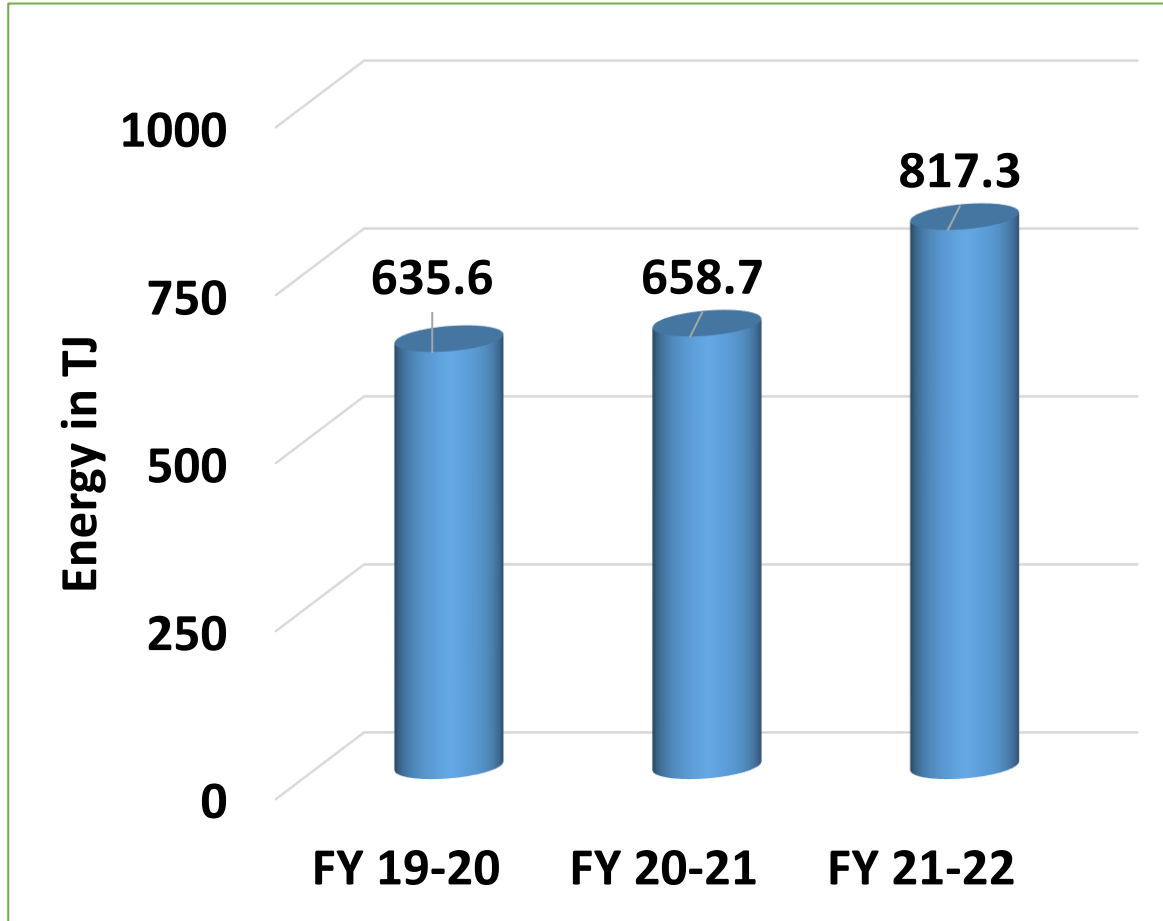
# 2. Manufacturing Process



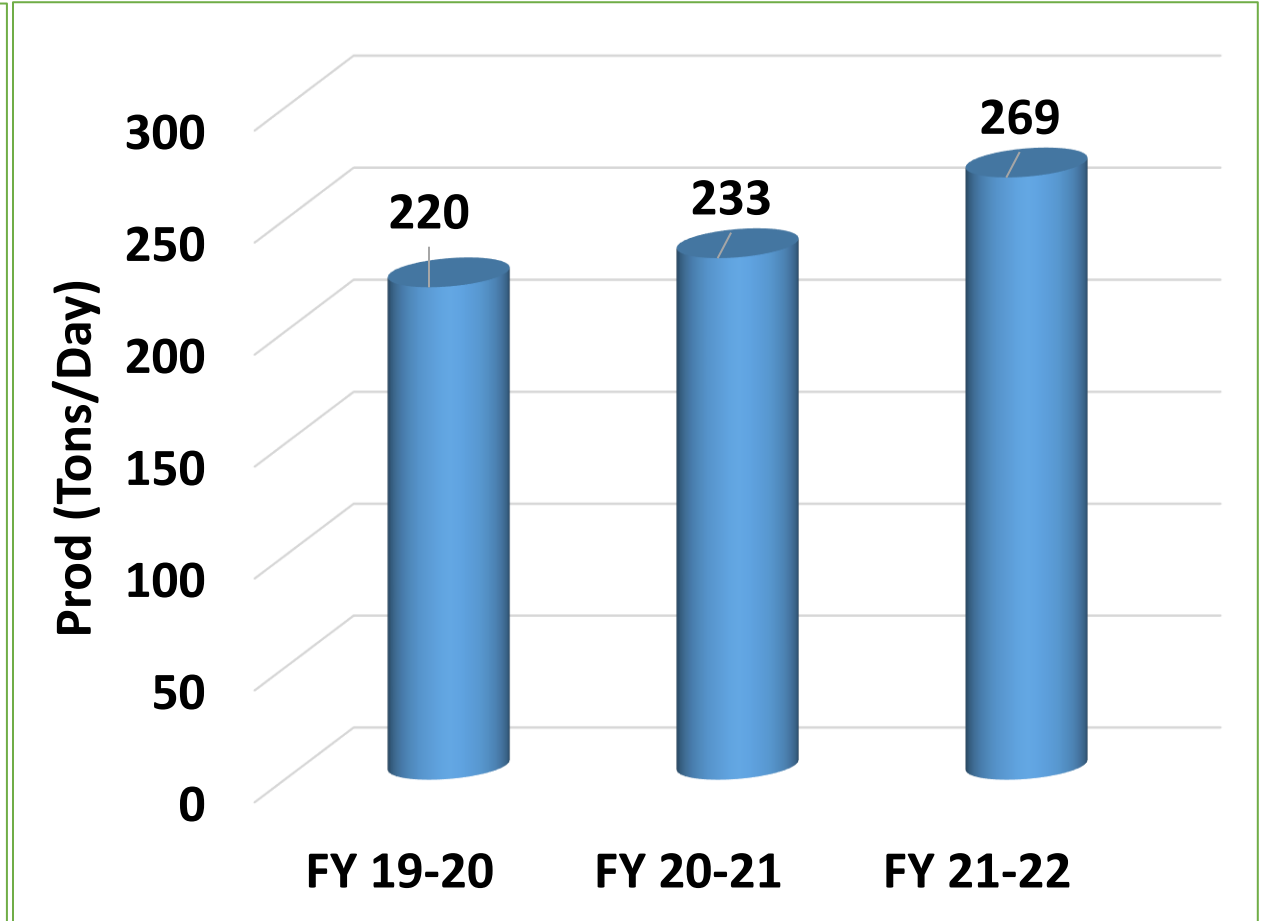


# 3. Overall Energy Consumption & Production Data – Last 3 Years

Plant absolute Energy consumption (in TJ)



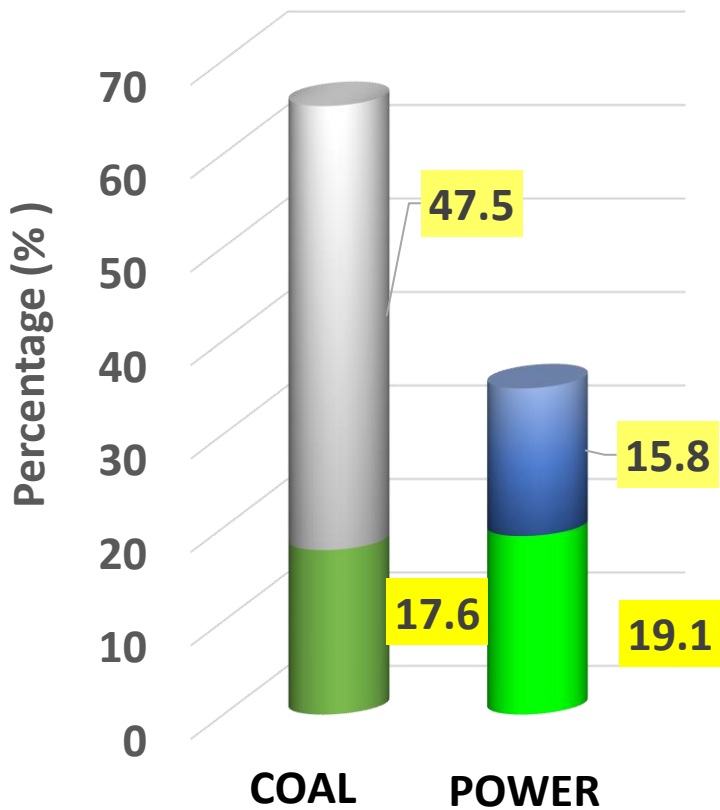
Plant Production (in Tons Per Day)



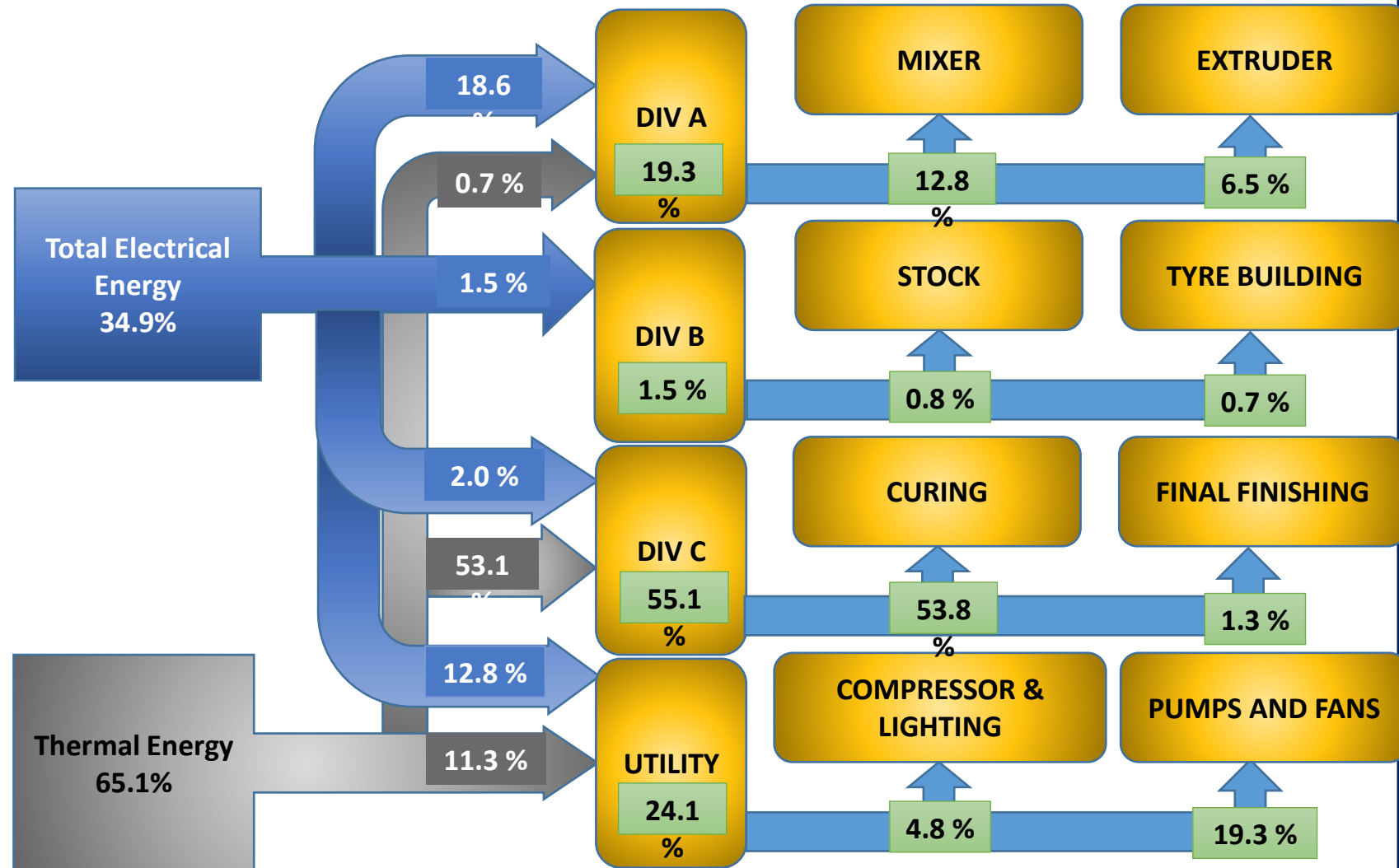


# 3. Energy Mapping 2021-22

Plant Source wise Energy consumption (Kcal)

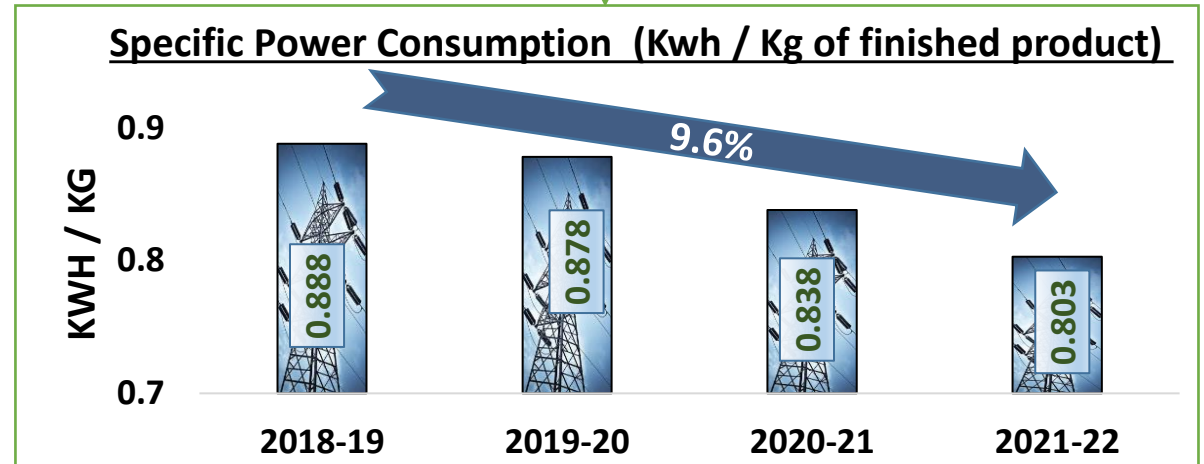
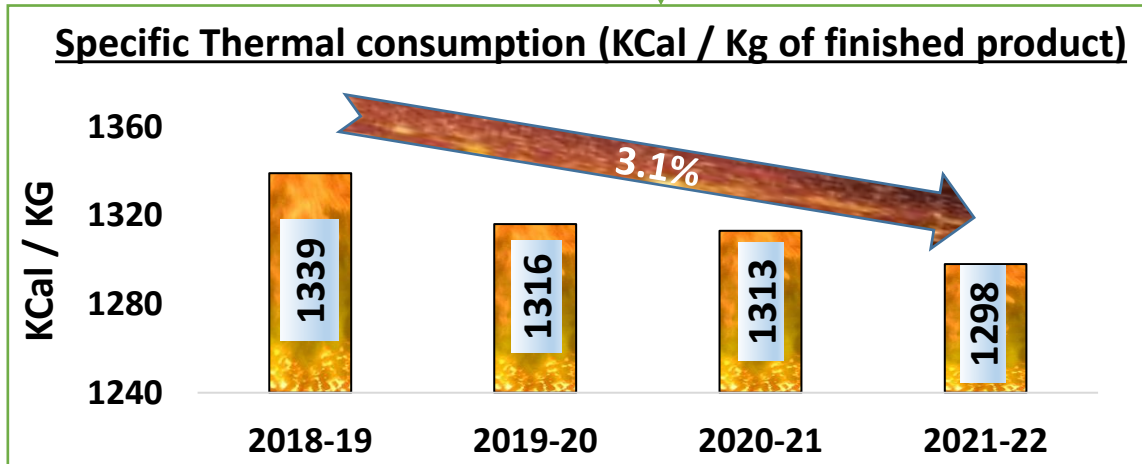
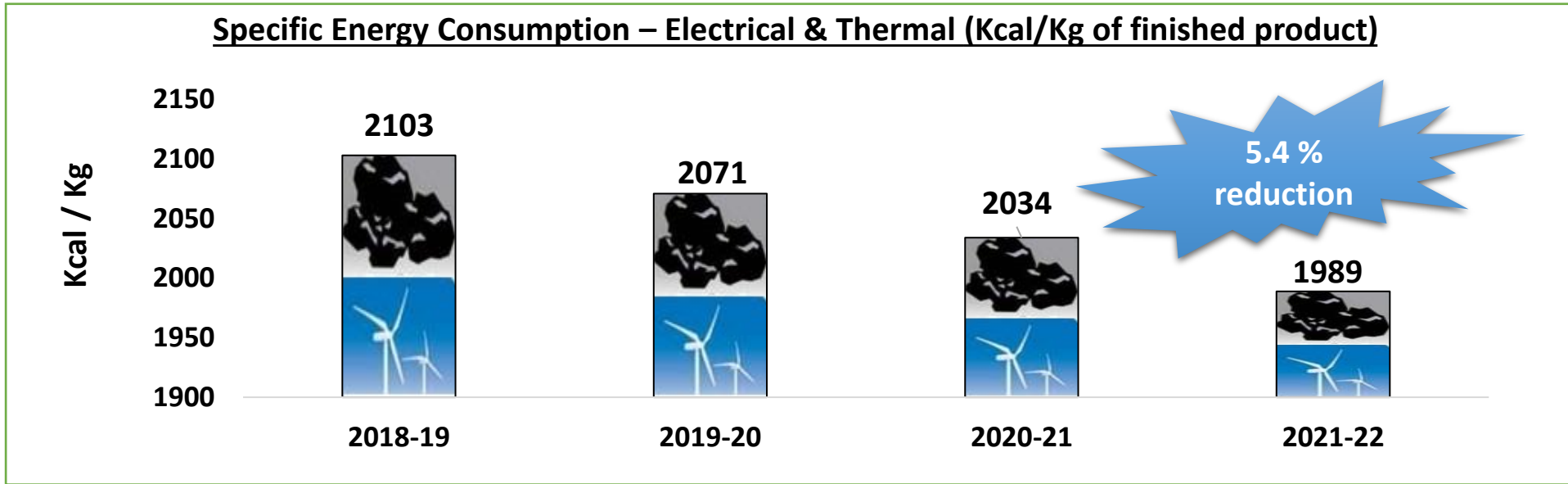


Plant Area/Equipment wise Energy consumption (Kcal in %)





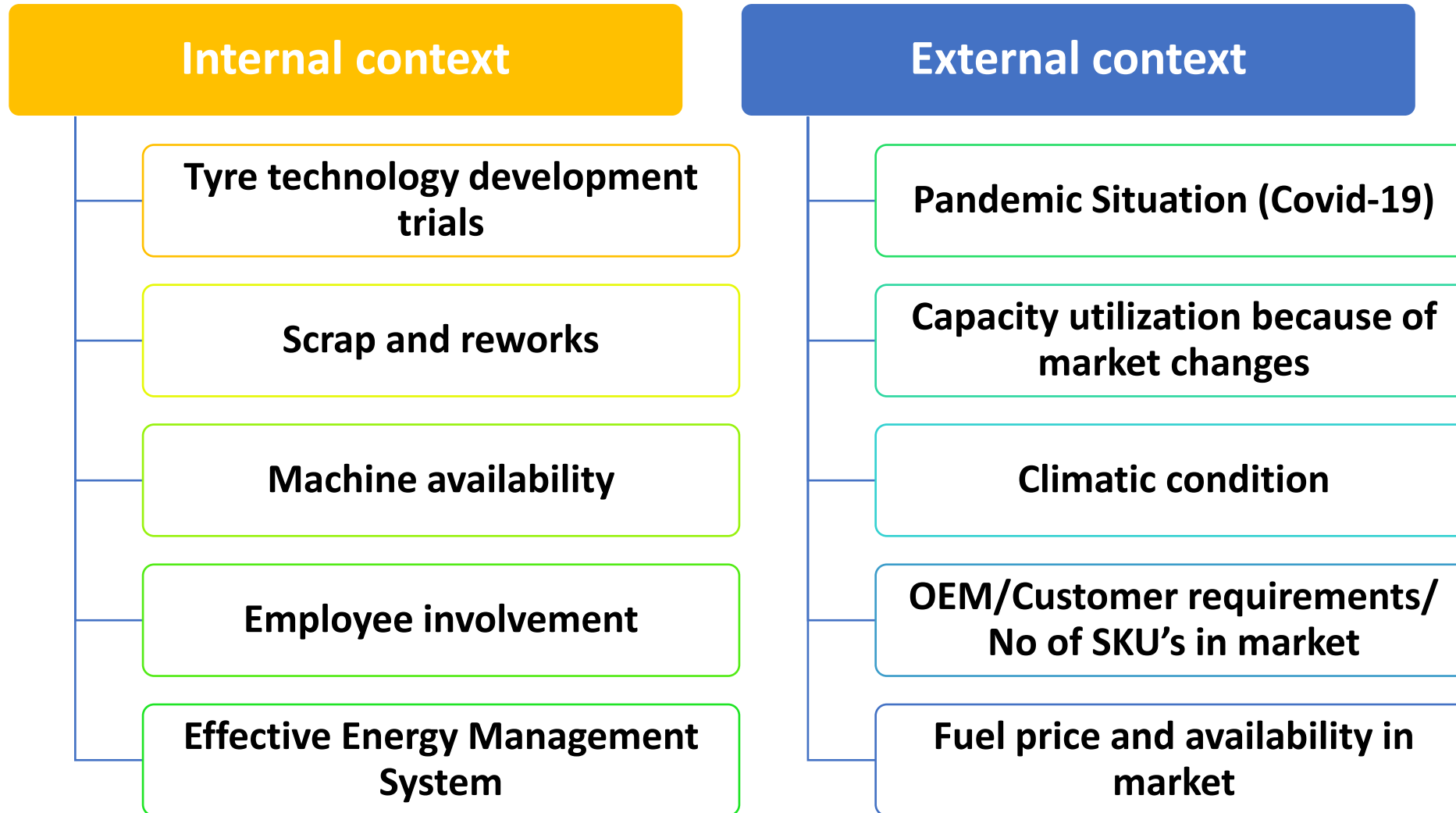
# 3. Specific Energy Consumption Trend





# 3. Reason for SEC Variation

## Factors influence SEC variation





# 4. Benchmarking

## Global Benchmarking

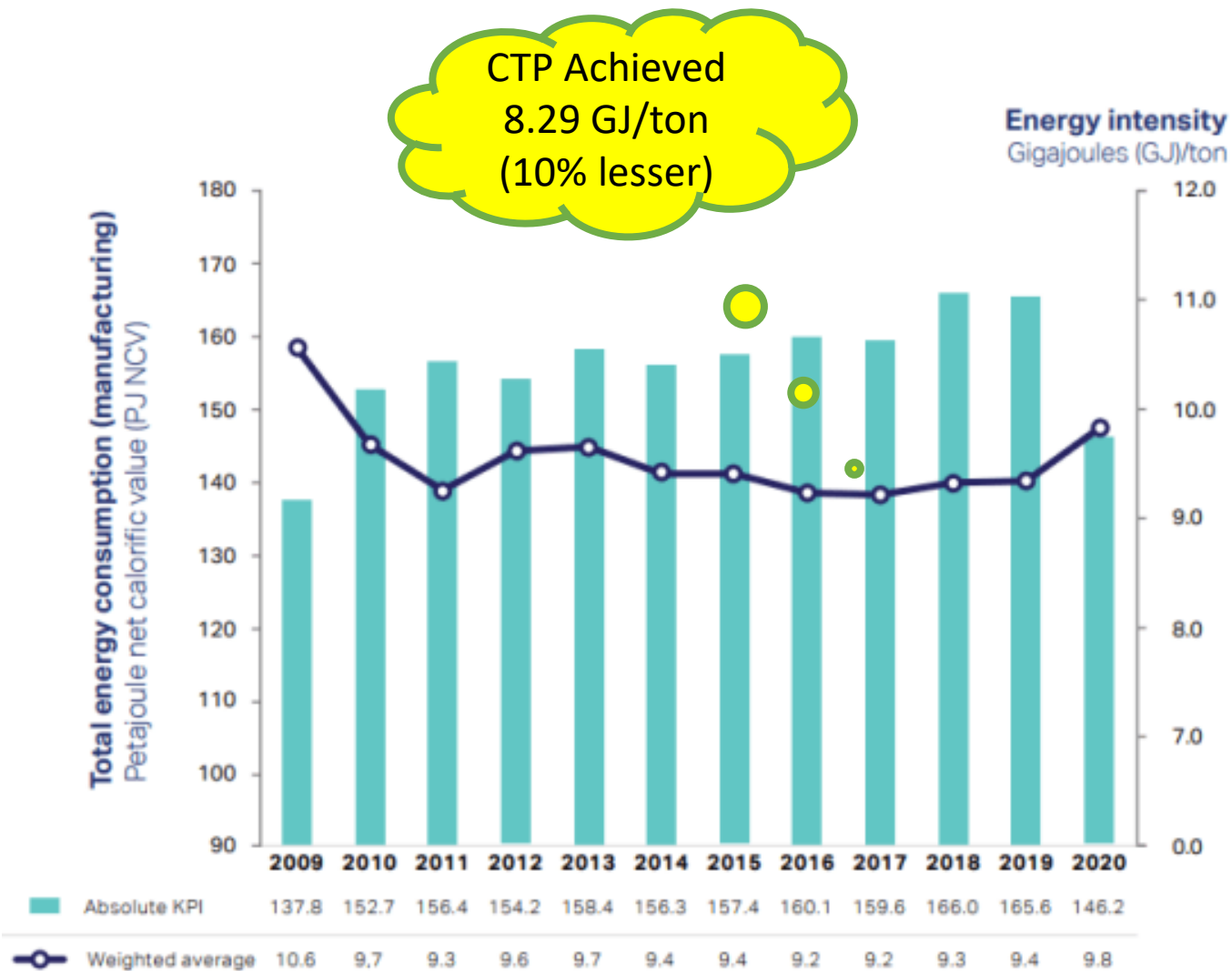
Members of the World Business Council for Sustainable Development (WBCSD) Tire Industry Project (11 Tyre companies) has published their weighted average Energy intensity for last 10 years; Minimum Specific power achieved is 9.2 GJ/Ton

Weighted average energy intensity:

Total energy consumption for 11 TIP members / Total production volume of these companies

Source :

<https://www.wbcSD.org/download/file/13500>

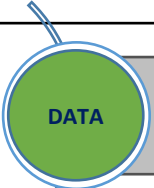
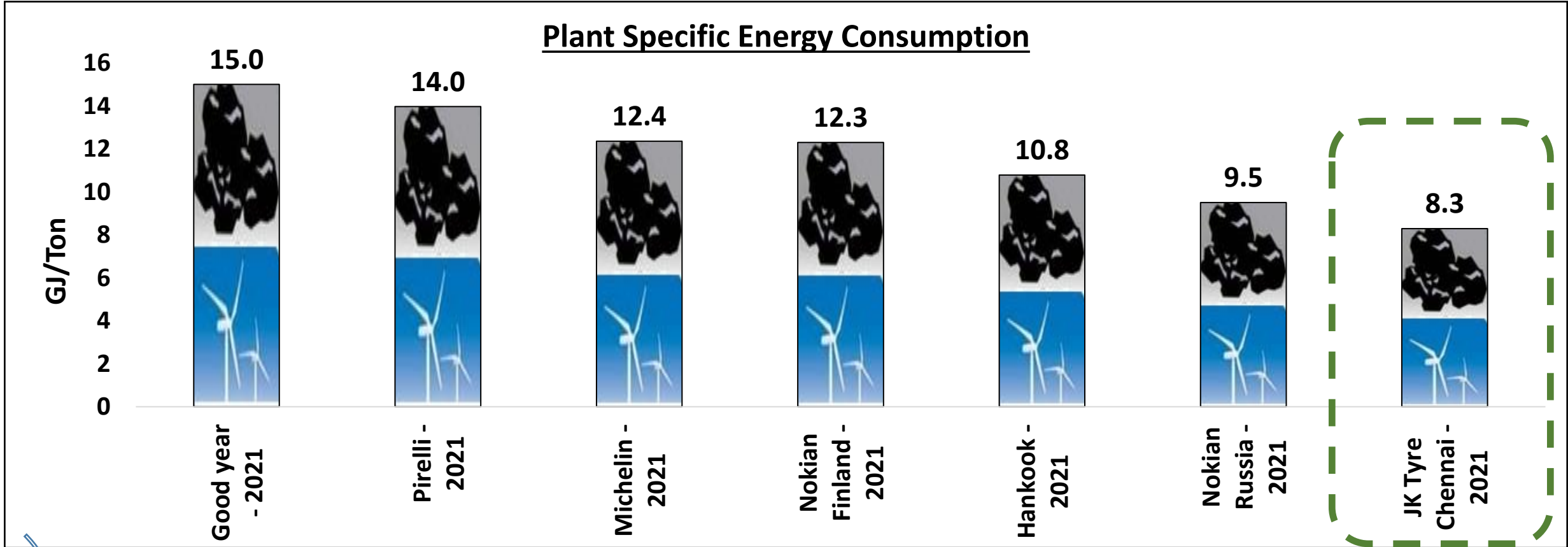






# 4. Benchmarking

## Global Benchmarking

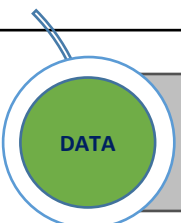
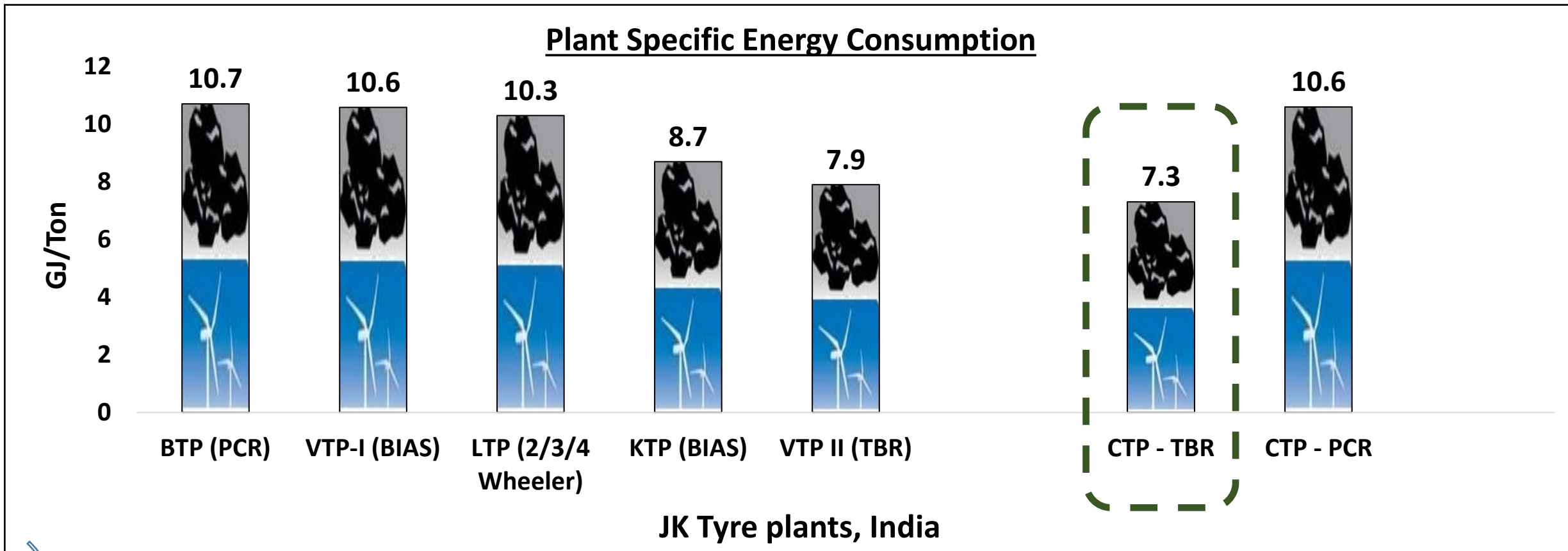


Chennai Tyre Plant is the one of the most Energy Efficient plant in the World. The Specific Energy values are taken from respective plant annual/Sustainable report published from their web page.



# 4. Benchmarking

## Internal Benchmarking

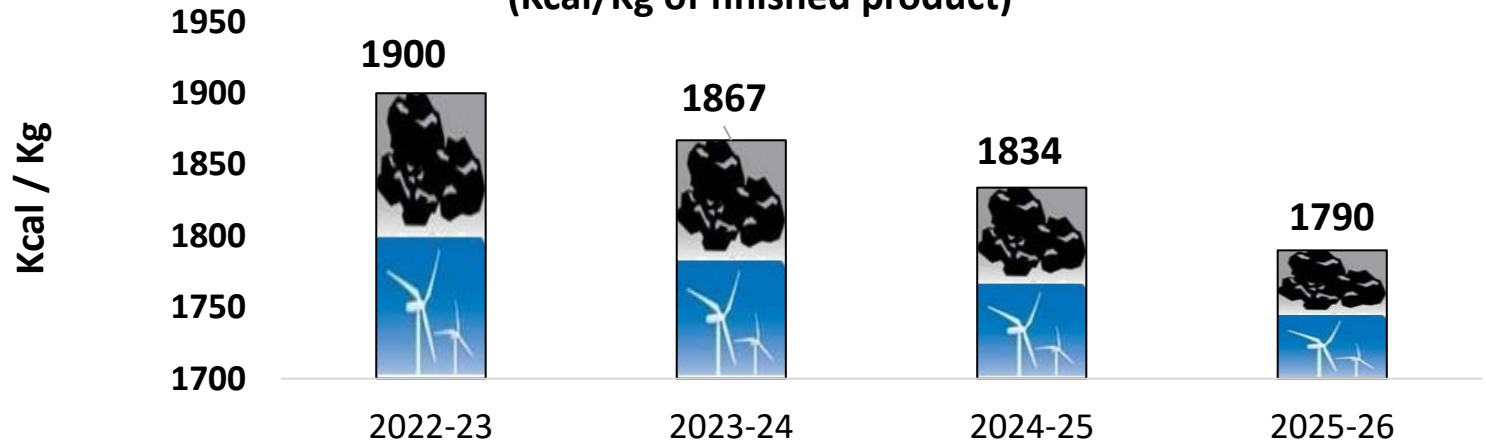


Chennai Tyre Plant is the most Energy Efficient plant among JK Tyre group, having six plants located various parts in India (FY 21-22)

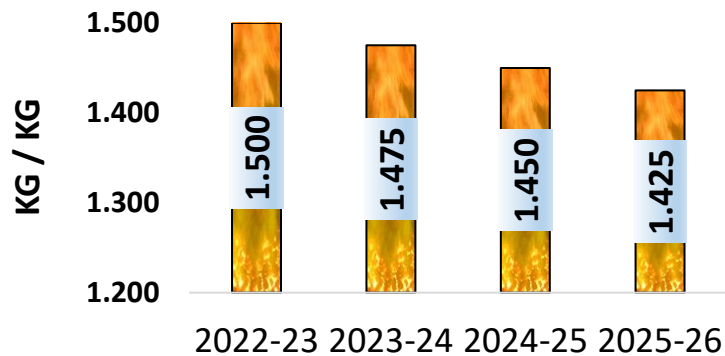


# 4. Long Term Vision on Energy Efficiency

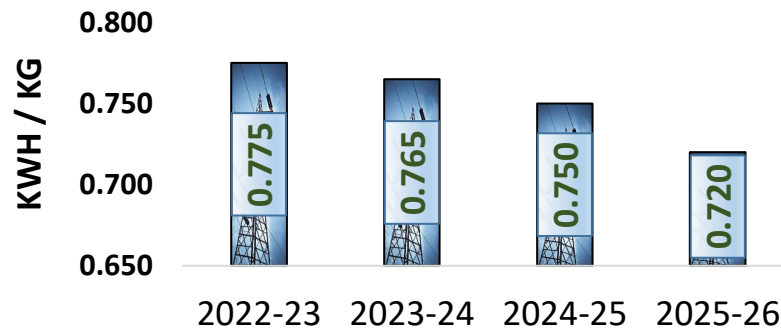
### Overall SEC (Kcal/Kg of finished product)



### Specific Steam consumption (Kg / Kg of finished product)



### Specific Power Consumption (Kwh / Kg of finished product)



## Short term Targets

- Energy reduction Chillers & Compressors
- *Nitrogen recovery and substitution to compressed air / PCI application.*
- *Energy Reduction in Rubber mixing process by reduction of cycle time*

## Medium Term Targets

- *Innovative project implementation at AHU system – 75 Nos of fans*
- *Hot Nitrogen system in place of steam - internal curing process.*

## Long term targets

- *80% Biomass fuel mix-up with coal @ boilers*
- *Increasing Renewable energy substitution from 100%*



# 4. List of Major EnCon Projects Planned FY 22-23

LIST OF ENCON PROJECTS PLANNED FY 22-23								
S.No.	Title of Project	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	Back Pressure turbine 22- 15 Kg . Cm2 installation	2.00	13.15			13.15	12.5	11.4
2	Platen insulation for TBR curing presses to eliminate surface radiation loss	0.00		1367.97		2.64	3.3	14.8
3	Screw chiller replacement to VAM chiller for HVAC system	0.00		5937.38		11.46	7.2	7.5
4	Dedicated compressor for ice blasting mould cleaning work (7 Kg/Cm2) @ curing presses so that eliminating high pressure generation loss (10 Kg/Cm2)	0.11	0.70			0.70	1.0	17.9
5	Upgrading Plant Irrigation system from manual control to Automatic and web based portal monitor and control, which will eliminate manpower & water wastage	0.004	0.02			0.29	0.8	33.2
6	Providing VFD on F270 Final and M440 Master TSS TCU pumps	0.03	0.17			0.17	0.5	35.7
7	Shed Provide in TS-2 & TS-3 substation Distribution transformers to reduce transformer losses (5 nos)	0.04	0.23			0.23	0.8	38.6
8	Drinking water RO reject recovery system	0.00				0.40	1.4	42.1
9	440M & K310 Final Mixers belt driven low efficiency Fume extrcators blowers replacement with Direct driven High efficiency blowers	0.09	0.62			0.62	2.5	49.3
10	Adiabatic cooling tower for Ejector & Hydraulic cooling water system	0.00				1.03	4.0	46.7
11	Fresh Air ventilation units energy performance improvement by replacing belt driven centrifugal type blowers with direct copled, high efficiency axial fans with VFD control - 40 Nos	1.83	12.03			12.03	43.0	42.9
		<b>4.10</b>	<b>26.93</b>	<b>7305.35</b>	<b>0.00</b>	<b>42.72</b>	<b>76.94</b>	<b>21.6</b>



# 5. Energy Saving Projects implemented in last 3 years

**LIST OF ENCON PROJECTS IMPLEMENTED FY 21-22**

S.No.	Proj No.	Title of Project	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.			2143.23	4.14	4.136	0.45	1
2	CEP 76	Cogged belt with weightless pulley replacement @ Air handling units, in place of V belt and higher weight pulley (20 Nos)	0.266	1.749			1.749	1.00	7
3	CEP 77	To improve the Energy Performance in Mixer Batch off Fan group by optimizing the Speed (Air Flow) of Fan - 5 Mixers	0.129	0.844			0.844	0.6	9
4	CEP 78	Quintoplex & Triplex machines BD water recovery				0.284	0.284	0.23	10
5	CEP 79	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.	0.007	0.043	575.42	0.802	0.845	0.85	12
6	CEP 80	Fresh Air ventilation units energy performance improvement by replacing belt driven centrifugal type blowers with direct copled, high efficiency axial fans with VFD control - 9 Nos	0.391	2.570			2.570	7.00	33
7	CEP 81	VFD on FAN with temperature controller @ Process Cooling Tower and VAM cooling towers	0.031	0.203			0.203	0.35	21
8	CEP 82	TBR hydraulic pressure optimisation. Operating Pressure reduction from 23Kg/Cm2 to 19 Kg/Cm2	0.106	0.695			0.695	1.10	19
9	CEP 83	Air Flow Meter Installation to process areas to set bench mark on consumption (CFM/Kg) and by eliminating losses and air consumption in the process - 10 Nos	0.533	3.499			3.499	1.00	3
			<b>1.462</b>	<b>9.603</b>	<b>2718.65</b>	<b>5.22</b>	<b>14.825</b>	<b>12.58</b>	<b>10</b>



# 5. Energy Saving Projects implemented in last 3 years

## LIST OF ENCON PROJECTS COMPLETED FY 20-21

S.No.	Proj No.	Title of Project	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 66	Air handling units operation optimisation based on machine sceduling and manpower occupation	0.37	2.42			2.42	0	0
2	CEP 67	Reduction of power consumption in in WTP & ETP by using TTRO water	0.32	2.11			2.11	0	0
3	CEP 68	35TPH Boiler fan system performance improvement by leak arresting and improving the draft pressure	0.30	1.98			1.98	0	0
4	CEP 69	Quintoplex/Quadraplex/Triplex cooling water circuit elimination project	0.24	1.57			1.57	0	0
5	CEP 70	VAM fixed energy consumption reduction plan by operational optimization / machine schedule (FY 20-21)	0.10	0.64			0.64	0	0
6	CEP 71	One Process Cooling Tower Stoppage, Mixer cooling water flow cutoff while mixer in idle condition, thereby saving PCT pump energy	0.62	4.07			4.07	0.50	1
7	CEP 72	Separating the headers for PCR curing hydraulic and ejector circuits, the Ejector pressure can be maintained at 16 Kg/cm2, where as the Hydr requirement can be separately maintained for 22 Kg/cm2.	0.07	0.47			0.47	0.60	15
8	CEP 73	Introducing Thermo compressor in Low Pressure steam (LPS) line by using flash steam for reducing LPS steam consumption	0.00	0.00	437	0.37	0.37	0.50	16
9	CEP 74	Vapour compression chillers for Extruders in place of VAM Chillers	0.00	0.00	2183	2.40	2.40	4.80	24
			2.02	13.26	2619.9	2.77	16.03	6.40	5



## 5. Energy Saving Projects implemented in last 3 years

### LIST OF ENCON PROJECTS IMPLEMENTED IN 2019-20

S.No.	Proj No.	Title of Project	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 56	Mixer TCU CWS valve replacement	0.32	2.07			2.07	1.12	6
2	CEP 57	VFD for HP compressor to avoid unloading timimng losses (VFD conversion)	0.04	0.28			0.28	0.15	7
3	CEP 58	Provide VFD on another 22KW and 7.5KW pump to avoid throttling - WTP RO pump	0.030	0.20			0.20	0.28	17
4	CEP 59	Modified and Installed third stage in New ETP and Reduced Steam & Power Consumption in EVAPORATOR			1597.5	0.76	0.76	1.10	17
5	CEP 60	Stopping one fanless cooling tower in old Ejector & Hydraulic	0.032	0.208			0.21	0.15	9
6	CEP 61	To isolate PCR and TBR Header and distribution system to make them independent thus the Pump operation to be optimised	0.213	1.385			1.38	0.60	5
7	CEP 62	Shed Provide in TS-2 substation Distribution transformers to reduce transformer losses	0.080	0.519			0.52	0.30	7
8	CEP 63	Air handling units operation optimisation based on machine sceduling and manpower occupation	0.584	3.793			3.79	0.00	0
9	CEP 64	To improve the Energy Performance in Mixer Batch off Fan group by optimizing the Speed (Air Flow) of Fan - F270 Final Mixer	0.023	0.150			0.15	0.12	10
10	CEP 65	Existing design of Nitrogen pumping system modified to avoid the vent losses during Nitrogen unloading (High pressure pump used in place of low pressure pump)	0.018	0.117			0.12	0.00	0
			<b>1.340</b>	<b>8.712</b>	<b>1597.5</b>	<b>0.756</b>	<b>9.47</b>	<b>3.82</b>	<b>5</b>



# 5. Energy Saving Projects implemented in last 3 years

## EnCON Projects Summary

2021-22	DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
	Projects in (Nos)	0	9	9
	Total savings in (Million Kcal)	0	3976	3976
	Total Savings in (Million Rs)	14.83		
	Total Investment in (Million Rs)	12.58		
	Payback in (Months)	10		

2020-21	DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
	Projects in (Nos)	5	4	9
	Total savings in (Million Kcal)	1142	3214	4356
	Total Savings in (Million Rs)	16.03		
	Total Investment in (Million Rs)	6.40		
	Payback in (Months)	5		

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		





## 6. Innovative Project

**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**



# 6. Innovative Project

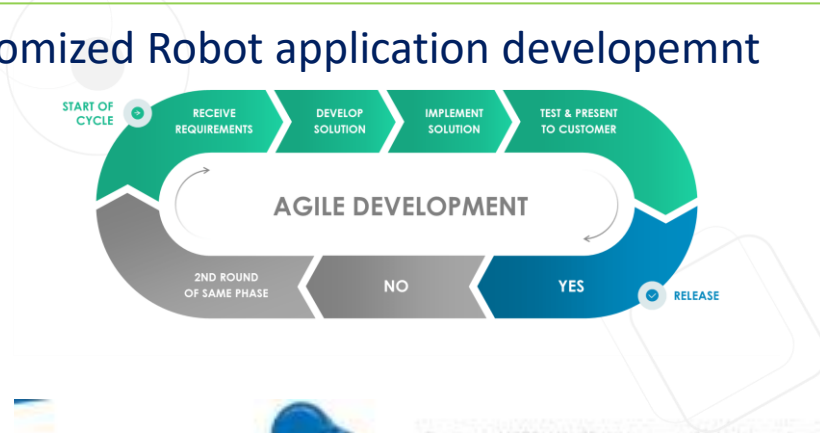
**Project Name:** Improve the Quality of Green Tyre Painting by using Robot in Truck Bus Radial section

**Problem/Present status :**

- Tubeless Green Tyre (GT), while doing Painting (Lube), uneven application happen due to Bowl type pneumatic finger gripper method machine used for painting.
- Higher machine breakdown and GT Scarp.
- Low Bladder Life & High defect



**Solution :** Customized Robot application developemnt



The 6-axis MOTOMAN GP180 is a versatile, high speed robot offering superior performance for a variety of applications, like material handling, machine and press tending.

Despite of providing a high payload of 180 kg and the wide motion range of 2702 mm, the MOTOMAN GP180 was designed with a width of 425 mm, therefore valuable floor space can be saved.

With the higher axis operation speed and speed reducer rigidity, a special vibration control system was developed. By reducing cycle times, the system realizes high increases in productivity.

- KEY BENEFITS**
- Fast, flexible and powerful
  - High payload: 180 kg
  - Wide motion range: 2702 mm
  - Maximum performance using minimal floor space





# 6. Innovative Project

**Advantages:** Idle time loss and scrap loss eliminated

Investment : 50 Lacs Rs

Savings: Energy, Scrap, Bladder life, Defects

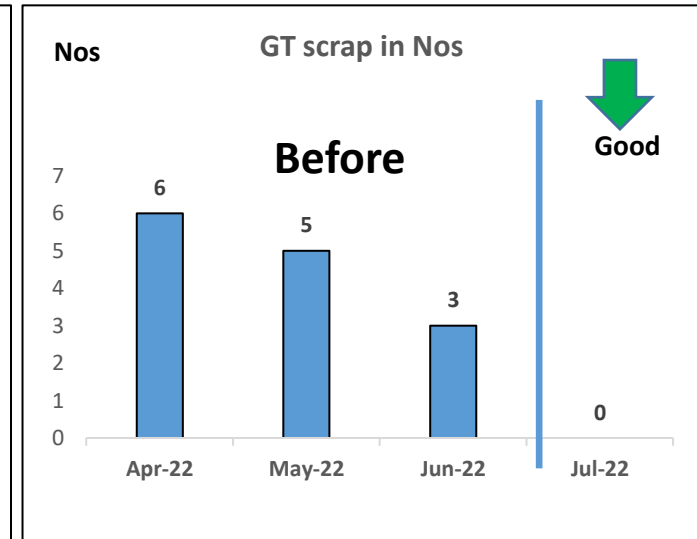
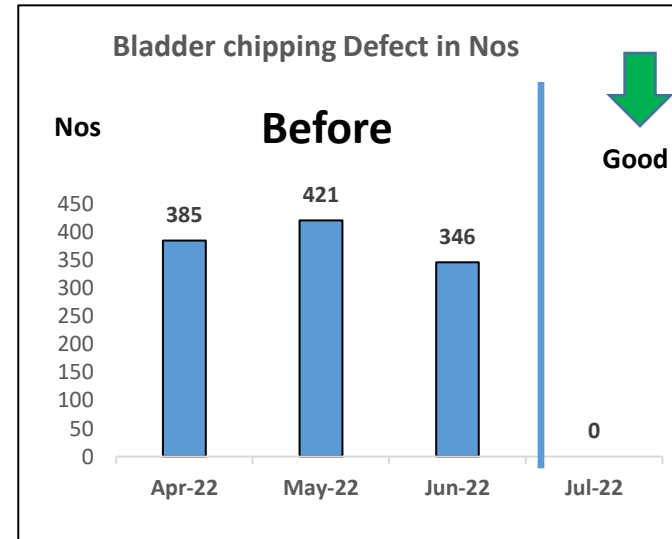
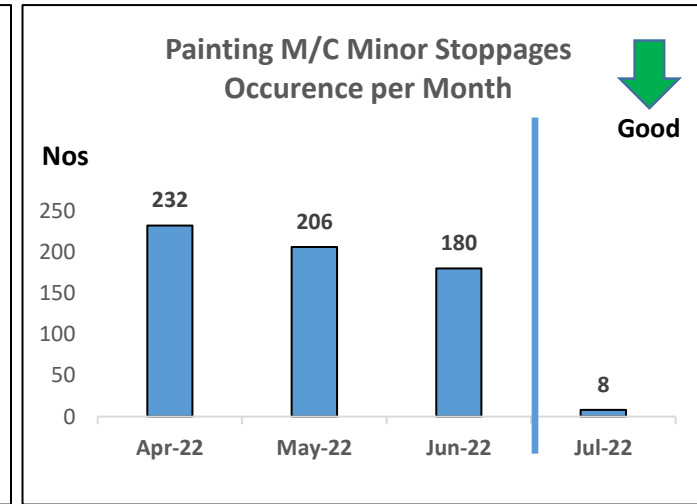
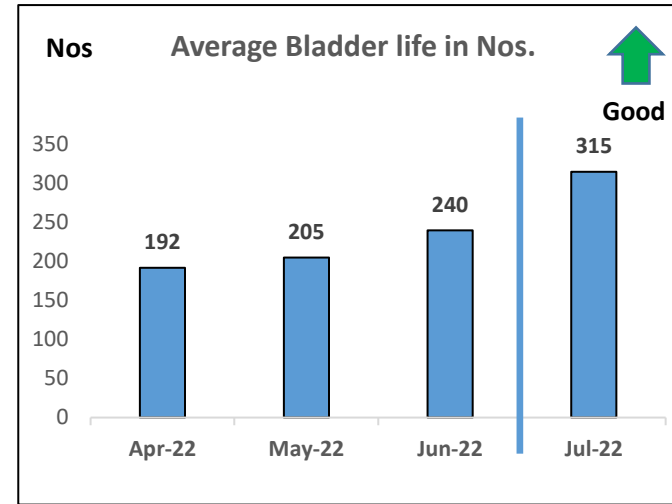
Energy savings of 42600 Kwh/annum

Total Cost savings of 15.0 Lacs Rs

ROI : 3.3 Years



## Result:





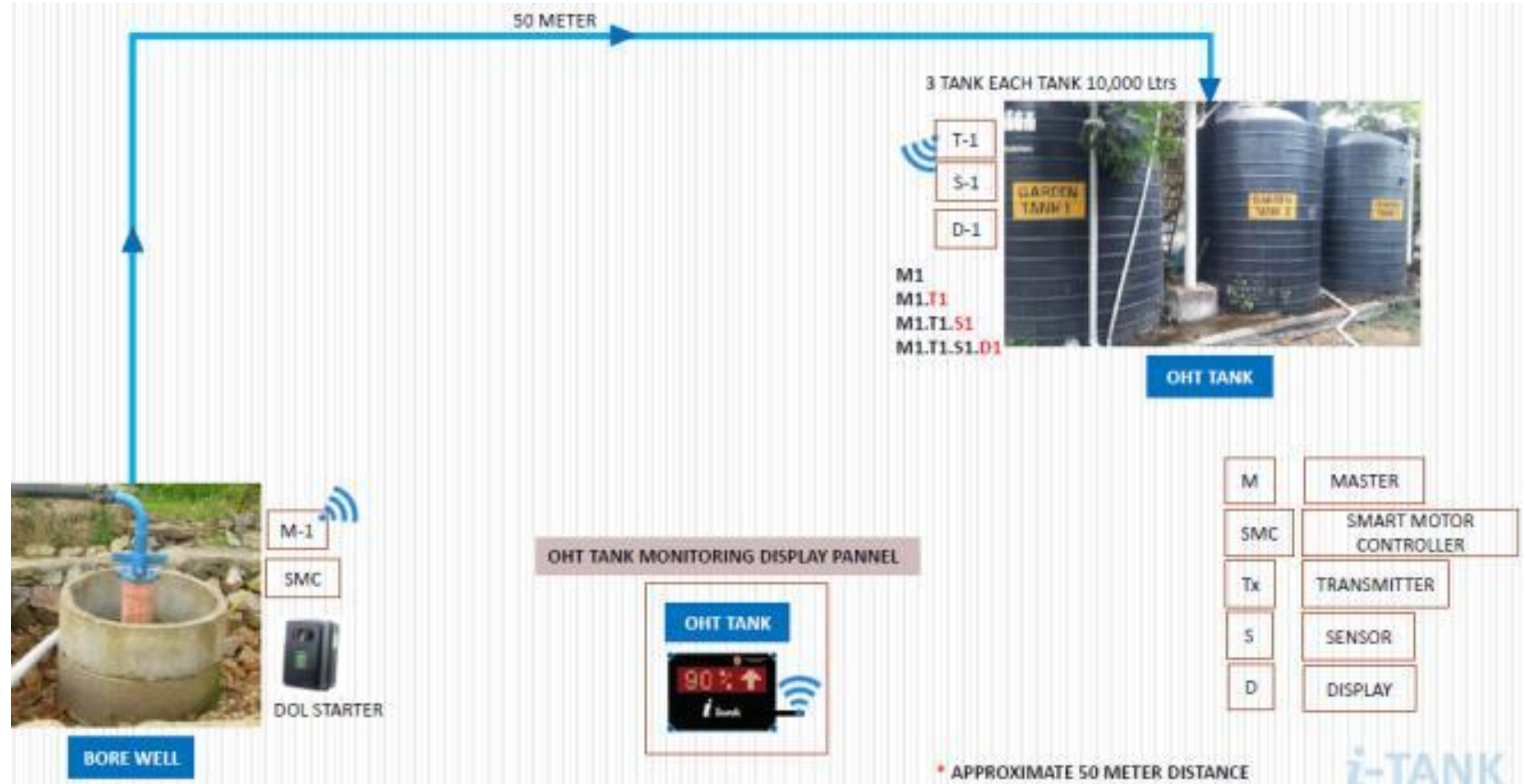
# 6. Innovative Project

**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





# 6. Innovative Project

## Advantages:

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

## Result

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

Investment : 8 Lacs Rs

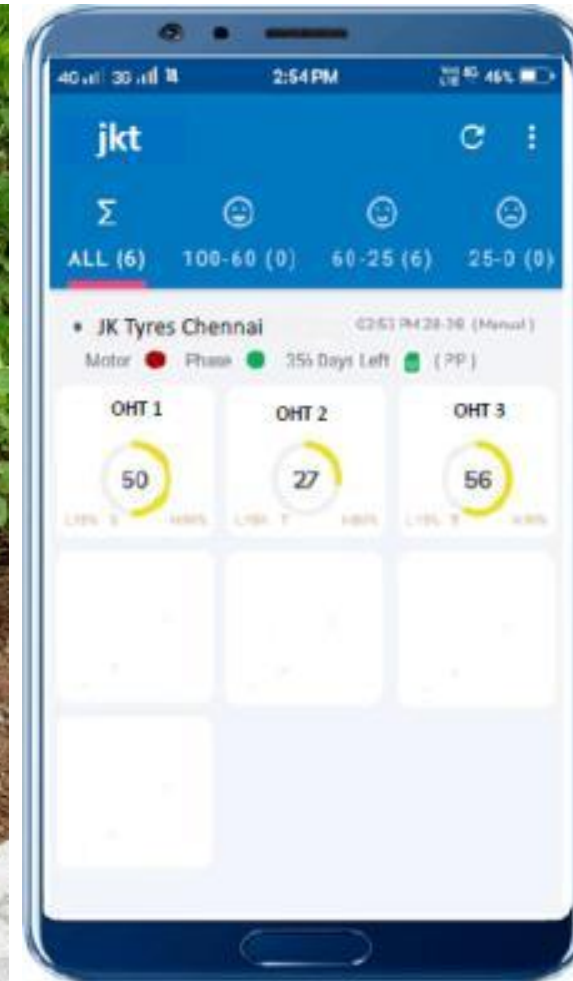
Savings:

1 Manpower

10KL/Day water

2.9 L Rs/annum

ROI : 2.8 Years





# 7.a Utilization of Renewable Energy Sources - Electrical

## 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	11.78
Wind	OFF Site	15.2	29.93	44.34
<b>TOTAL</b>		<b>21.2</b>	<b>37.88</b>	<b>56.12</b>

## 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	10.36
Wind	OFF Site	15.2	31.178	47.57
<b>TOTAL</b>		<b>21.2</b>	<b>37.97</b>	<b>57.93</b>

## FY 2021-22

Type of Energy	ON Site / OFF Site	Installed capacity (MW)	Generation (million kwh)	% of overall electrical energy
Solar	ON site	6.0	6.70	9.4
Wind	OFF Site	24.0	36.21	45.3
<b>TOTAL</b>		<b>30.0</b>	<b>42.91</b>	<b>54.7</b>



## PLAN - FY 2022-23

Type of Energy	ON Site / OFF Site	Planned Capacity (MW)	Generation (million kwh)	% of overall electrical energy
Solar	ON site	8.0	10.5	12.5%
Wind	OFF Site	24.0	49.0	58.3%
<b>TOTAL</b>		<b>32.0</b>	<b>59.5</b>	<b>70.8 %</b>

- Onsite Solar is Captive Power
- OFF Site Wind is Group Captive (26% Share)



# 7.b Utilization of Renewable Energy Sources – Thermal

## FY 2019-20

Type of Energy	ON Site / OFF Site	Equivalent energy savings (Mkcal)	% of overall Thermal energy	Biomass usage (%)
Biomass	ON site	6088	5.92	6.89
Wood/Garden	ON site	180	0.18	0.08
<b>TOTAL</b>		<b>6268</b>	<b>6.10</b>	<b>6.97</b>

## FY 2020-21

Type of Energy	ON Site / OFF Site	Equivalent energy savings (Mkcal)	% of overall Thermal energy	Biomass usage (%)
Biomass	ON site	5398	5.01	7.20
Wood/Garden	ON site	165	0.15	0.06
<b>TOTAL</b>		<b>5563</b>	<b>5.16</b>	<b>7.26</b>

## FY 2021-22

Type of Energy	ON Site / OFF Site	Equivalent energy savings (Mkcal)	% of overall Thermal energy	Biomass usage (%)
Biomass	ON site	19194	16.58	26.34
Wood/Garden	ON site	152	0.13	0.09
<b>TOTAL</b>		<b>19346</b>	<b>16.71</b>	<b>26.43</b>



## PLAN - FY 2022-23 / Target – 50%

Type of Energy	ON Site / OFF Site	Equivalent Coal savings (MT)	% of overall Thermal energy	Biomass usage (%)
<b>BIOMASS</b>	<b>ONSITE</b>	<b>70574</b>	<b>47</b>	<b>50</b>



# 8. Waste Utilization & Management



## 1. PLANT VEGETATION WASTE USED AS FUEL FOR BOILER:

Plant Vegetation Waste collected and used in boiler by shredding  
 FY 20 – 21 – total Qty used – 14.2 MT

## 2. ASH RECYCLING FOR UNBURNT REDUCTION

Bed Ashes are collected from the Boiler Bank Zone, Economizer & APH Hoppers where Un burnt content is high. Collected Ashes are recycled in the Boiler for further combustion. Unburnt content reduced from 8% to 6%



## 3. OTHER WASTE

Waste	Unit	2018-19	2019-20	2020-21	2021-22	Generation	Recycle /Reuse	Disposal
A	Metal scrap	Tons	157.56	83.83	61.88	59.56	Maintenance Activity	Reused to make MS parts
B	Rubber	Tons	576.61	363.07	191.13	179.2	Process	Reused for Rubber Parts
C	Paper	Tons	319.33	240.59	234.99	228.3	Office	Reused for making cardboard & paper bags.
D	E-Wastes	Tons	0.79	4.16	1.41	1.13	IT & EEI	Recycled
E	Polythene	Tons	297.71	236.03	226.81	199.2	Process	Reused for making Tarpaulin and Poly ropes



100 % Food Waste generated is converted into Manures

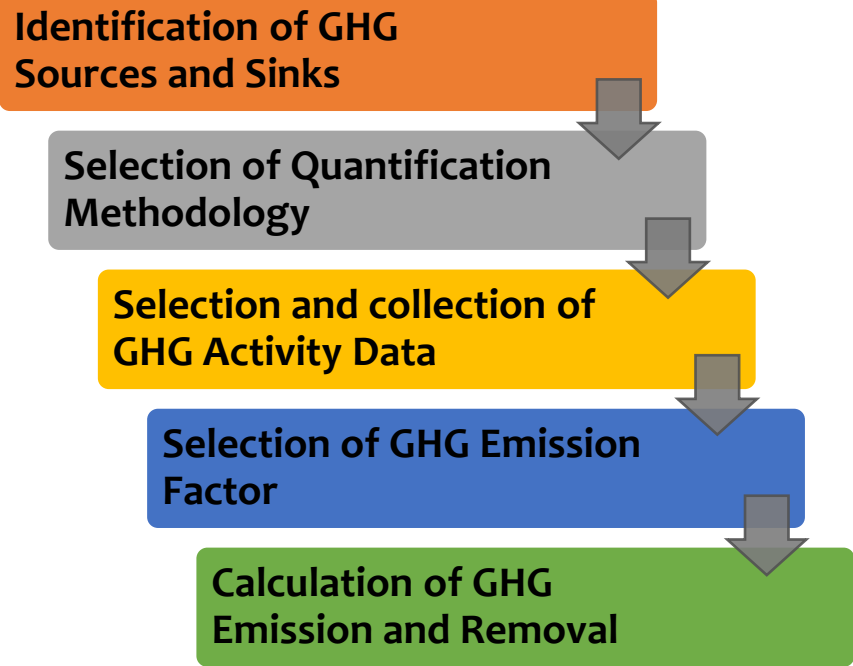




# 9. GHG Inventorisation

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



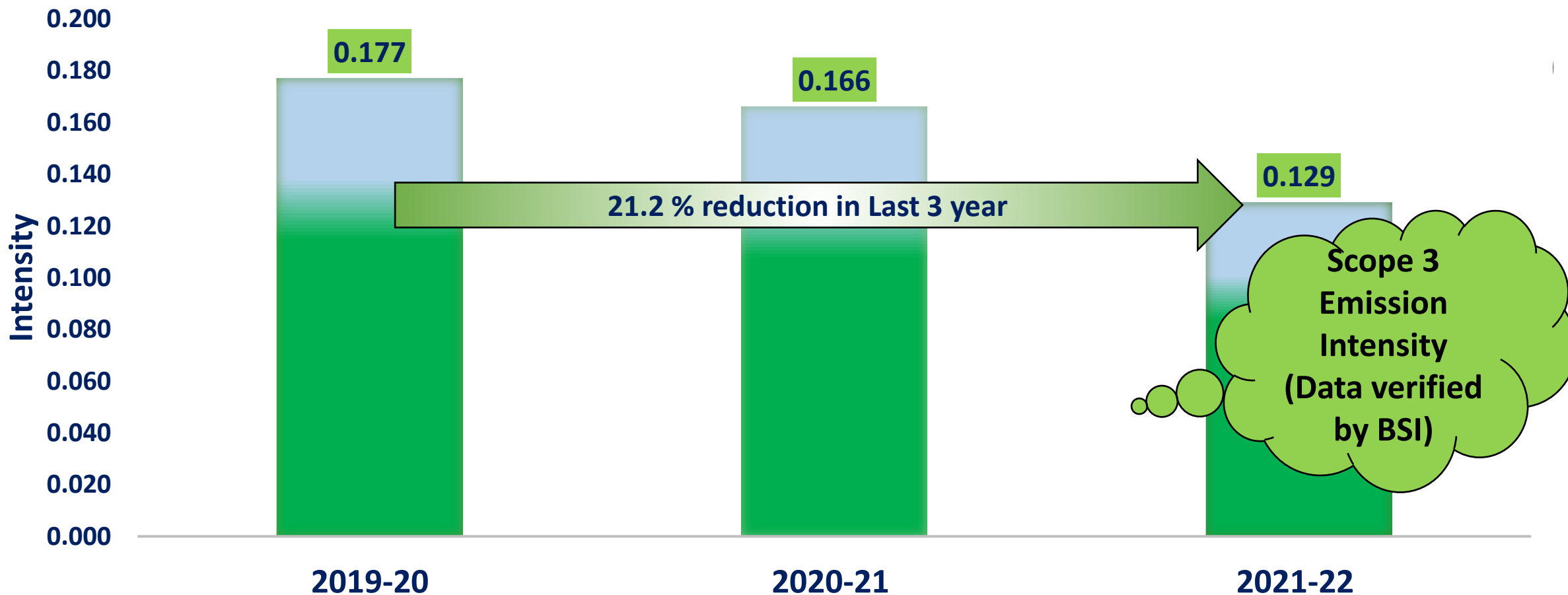
## Setting GHG Operational Boundaries Emission Sources:

Emission Sources	Scope of Emission
Diesel for internal material transport	<b>Direct Emission (scope 1)</b>
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 CO2 released from fire extinguishers	
Overall purchase of Electricity Energy	<b>Indirect Emission (scope 2)</b>
Material Logistics (Raw Material & FG Transportation)	<b>Other Indirect Emission (Scope 3)</b>
Business Travel	
Employee Commute	
Waste Disposal	



# 9. GHG Inventorisation

## EMISSION INTENSITY GRAPH (CO<sub>2</sub>E TON/TON OF TYRE





# 9. GHG Inventorisation

## Greening the Environment

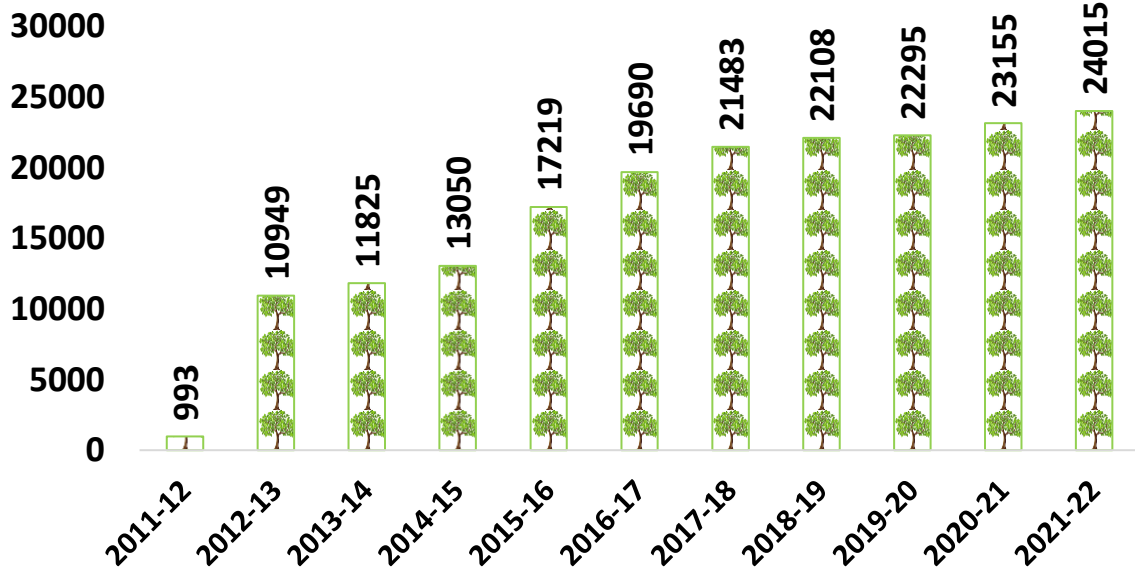
- Tree Plantation with in Fence
- Tree Plantation Beyond the Fence

## Tree Plantation with in Fence



**2363 tCo2**  
absorbed  
Annually  
through Trees  
inside the Plant

No of Trees Survived



Parameter	Unit	Value
a. Estimated total volume of wood in bole / trunk (Green)	cum (m <sup>3</sup> )	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 <sub>2</sub> )	2,363.87



# 9. GHG Inventorisation - Carbon Offset Calculation

## Spreadsheet calculation demonstrating emission Offset values

S.N.	Description	Unit	CTP	Total	fuel Density (kg/m <sup>3</sup> )	fuel Consumption (kg)	NCV (TJ/Gg)	emission factor (t CO <sub>2</sub> /TJ)	Emission (t CO <sub>2</sub> )
<b>General Information</b>									
A	Production	MT	95237.75898	95238					
B	Tree Plantation	Nos							
1	1.1 Coal Consumption	MT	25119	25118.8		25118810.0	15.60	96.1	37664
	Coal net calorific value	kcal/kg	3731	3731.3	← This is Average calorific value				
	1.2 Charcoal Consumption	MT	3.81	3.8		3810.0	29.5	112.0	12.6
2	Diesel (Stationary)								
	2.1 Genset (Including GH+Hydrant)	Ltr	28453	28453.0	820	23331.5	43.0	74.1	74.3
	2.3 Boiler-Startup	Ltr	11283	11283.0	820	9252.1	43.0	74.1	29.5
3	Diesel (Movable)								
	3.1 Company Operated vehicle	Ltr	9536	9536	820	7819.5	43.0	74.1	24.9
	3.2 Diesel for Forklift	Ltr	31206	31206	820	25588.9	43.0	74.1	81.5
	3.5 Coal Handling-JCB	Ltr	17191	17191	820	14096.6	43.0	74.1	44.9
4	Petrol (Movable)								
	4.1 Company Operated Vehicles	Ltr	379.8	380	720	273.5	44.3	69.3	0.8
5	Fire Extinguishers - CO2	kg	391	391		391.0			0.4
6	Air Conditioners – Refrigerants								
	6.1 Type 1 (R22)	kg	444	444		444.0	1810		803.6
7	LPG Consumption								
	7.2 Canteen, Pantry & Guest house	kg	114	114		114.0	47.3	63.1	0.3
11	Welding - Acetylene	m <sup>3</sup>	169.5	170		5985		0.1100	0.7
<b>SCOPE 2</b>									
						Emission factor (kg CO <sub>2</sub> /kWh) Same for all Grid (NEWNE & S)		Emission (t CO <sub>2</sub> )	
Purchased Electricity from Grid		kWh	36108819	36108819		0.82			29609.2
Renewable Energy		kWh	43726549	43726549		0.82			35855.8

GHG Emission-	CO <sub>2</sub> e Tons
Scope 1 Emission	38737
Scope 2 Emission	29609
Scope 3 Emission	12358
Renewable Energy	35856
<b>Total</b>	<b>116560</b>
Renewable Energy (Carbon Offset)	35856
Biomass as Alternate Fuel (Green Fuel)	4024
Carbon Offset due to Tree Plantation	2363
<b>Total</b>	<b>42243</b>
	<b>36.2</b>

**36.2 %**  
offset/sequestration with respect to overall emission



# 9. GHG Inventorisation

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

bsi.



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 JKTL, 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 JKTL.
- 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



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### Green House Gases Emission Annual Report 2020-21



Quantification of Green House Gases Emission  
Revision 01  
Date : 25/04/2021



JK Tyre & Industries Ltd. – GHG Emission Annual Report

INTEGRATED ANNUAL REPORT  
2021-22





# 10. 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:**
- 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
  - We are committed to support our suppliers in adopting green practices through awareness creation and training on the compliance requirements.
  - 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
  - We shall seek to implement the hierarchy of preference to avoid, reduce, reuse, recycle, recover, prevent and dispose throughout the sourcing activity.
  - 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*  
K A Unni Nayar  
Vice President Works  
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.





# 10. Green Supply Chain Management

S.N	Material	Green Procurement Guideline
0		
1	Energy Products	100% Procurement of BEE Star rated products (Motors, AC's , LED etc)

## 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.



**Admin. Office :**  
Plot No. 5, 3rd Floor,  
New Delhi - 110005  
Ph. 011-3304111, 3304112  
Fax: 011-3304200



**Purchase Order**  
Chennai Tyre Plant

**Plant Address:**  
KORUMBURU ROAD - 600088 (CHENNAI)  
POLAKKAL VILLAGE, CHENNAI (INDIA)  
KANNIYAKUMARI DISTRICT  
P.O. KANNIYAKUMARI - 601106  
TAMIL NADU, INDIA  
PHONE: 044-3304111, 3304112  
FAX: 044-3304200  
GSTIN: 33AAAC2079F1E9  
PAN: 01AAAL0001

<p>M/s. CLASSIC ENGINEERING COMPANY Plot No. 5, 3rd Floor Anupam Plaza-II, Gazipur, DELHI - Delhi PIN : 110005 -INDIA Vendor Code : 307641 Vendor GSTIN : 07AEWPM3886J1ZK PAN No. : AEWPM3886J</p>	<p>Plant : Chennai Tyre Plant Purchase Order No : 3500019526 P.O. Date : 07.05.2018 Effective From : 30.07.2018 Your Reference : PRICELIST 15</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------

SNo	Item Code	UOM	Quantity	Rate (₹)	Total Value (₹)	Discount
1	63709904281	Numbers	1	501,900.00	501,900.00	88.50%

MTR, AC, 55KW, ND250MM, 1460RPM, 105A, MAKE: CG  
MTR, AC, 55KW, FRAME M28AX250SMA4, MVOLTAG 380  
V-10%, NO OF POLE 4, FREQUENCY 50+, IP55, MOUNTING V1, METHOD OF COOLING IC411, LOAD 100%, CONNECTION DELTA, NET WEIGHT 453, BEARING DEHDE: 6314-C3 / 6314-C3  
V1 FLANGE - 63 MAKE: ABB

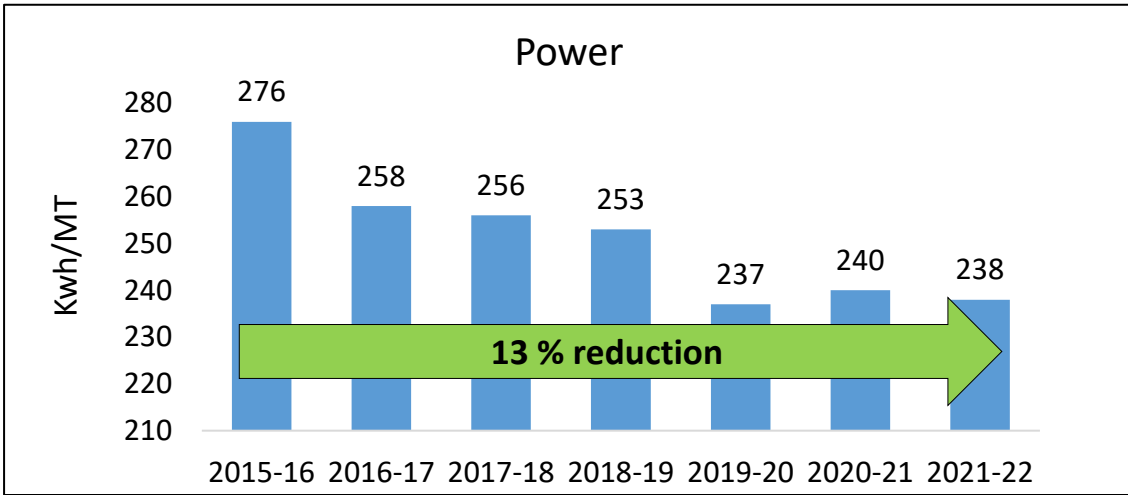
High Energy Efficiency Motor



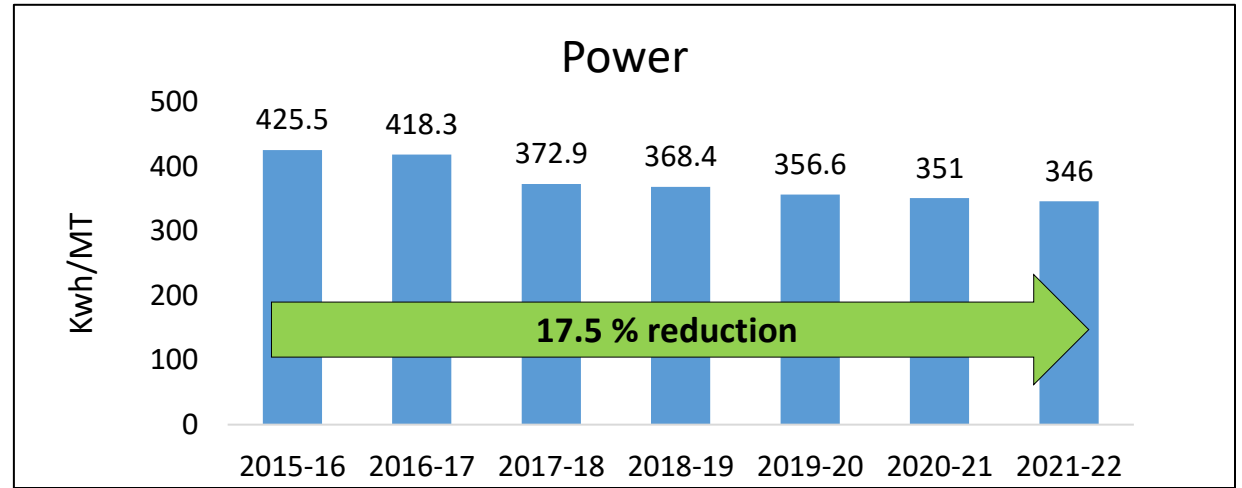


# 10. Green Supply Chain Management

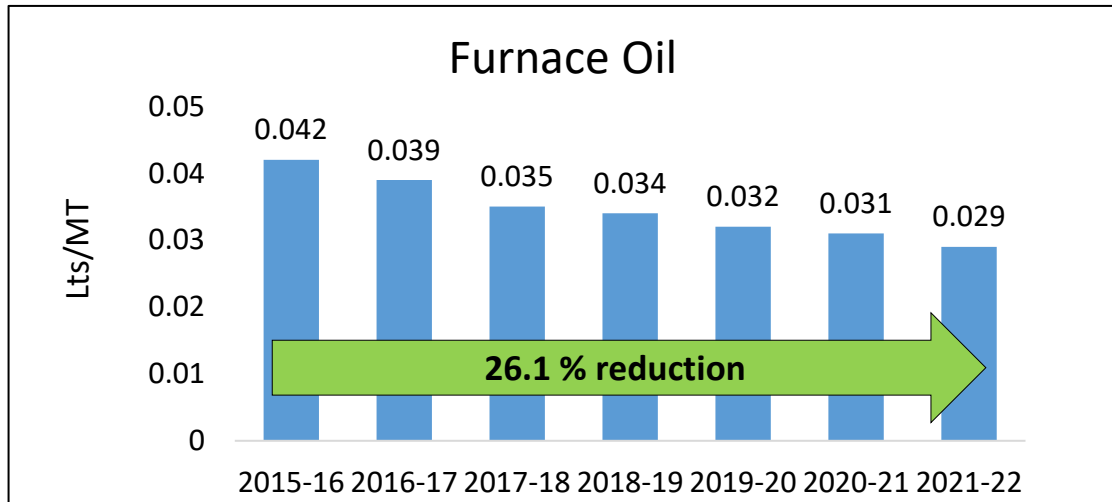
❖ Supplier 1 – Pondicherry



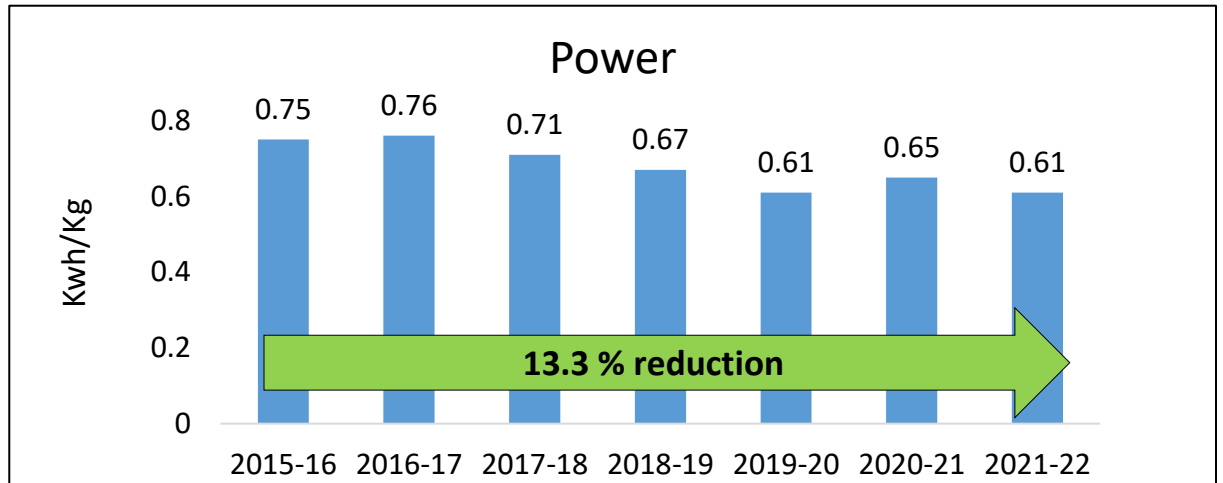
❖ Supplier 3 – Alwar



❖ Supplier 2 –Chennai



❖ Supplier 4 –Chennai (Recycler)

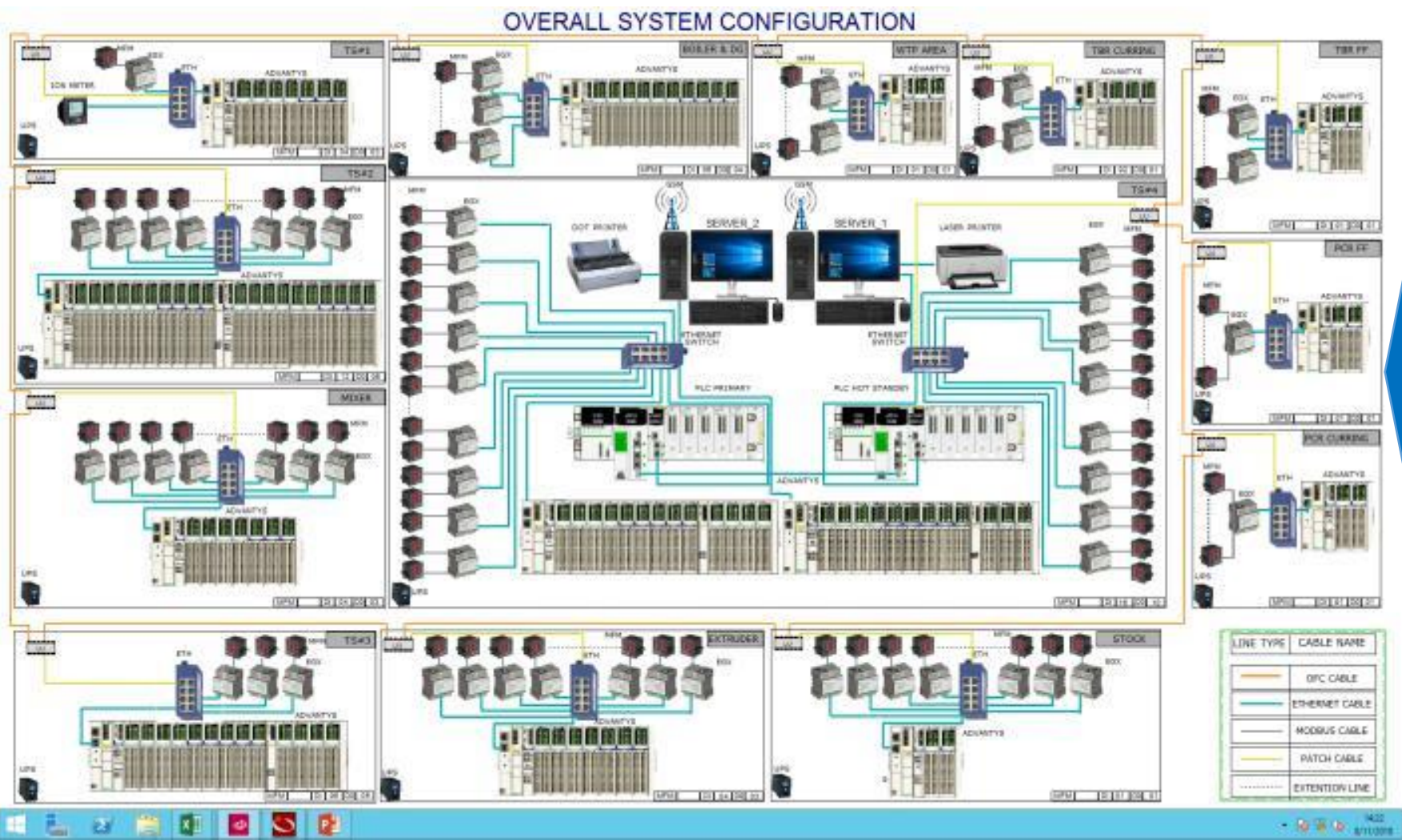






# 11. Team Work, Employee Involvement & Monitoring

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





# 11. Team Work, Employee Involvement & Monitoring

## IOT based advance Energy management system – Key deliverables

Real-time WIP monitoring; Input-Output ratio tracking

Real-time OEE of work-center, Condition based monitoring

Downtime Analysis, Cycle-time Analysis, comparative process data analysis

Real-time Data Exchange between ERP and Shop Floor



Activity Based Energy Monitoring

Centralized Recipe Management that leverages for Time to Market

Predictive Analytics

Enhanced FIFO, Aging Monitoring and Adherence

Future Ready Compliance and Regulatory Framework



# 11. Team Work, Employee Involvement & Monitoring

## Review Mechanism

- ❑ 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





# 11. Team Work, Employee Involvement & Monitoring

## 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





# 11. Team Work, Employee Involvement & Monitoring

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.,





# 11. Team Work, Employee Involvement & Monitoring

## 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.

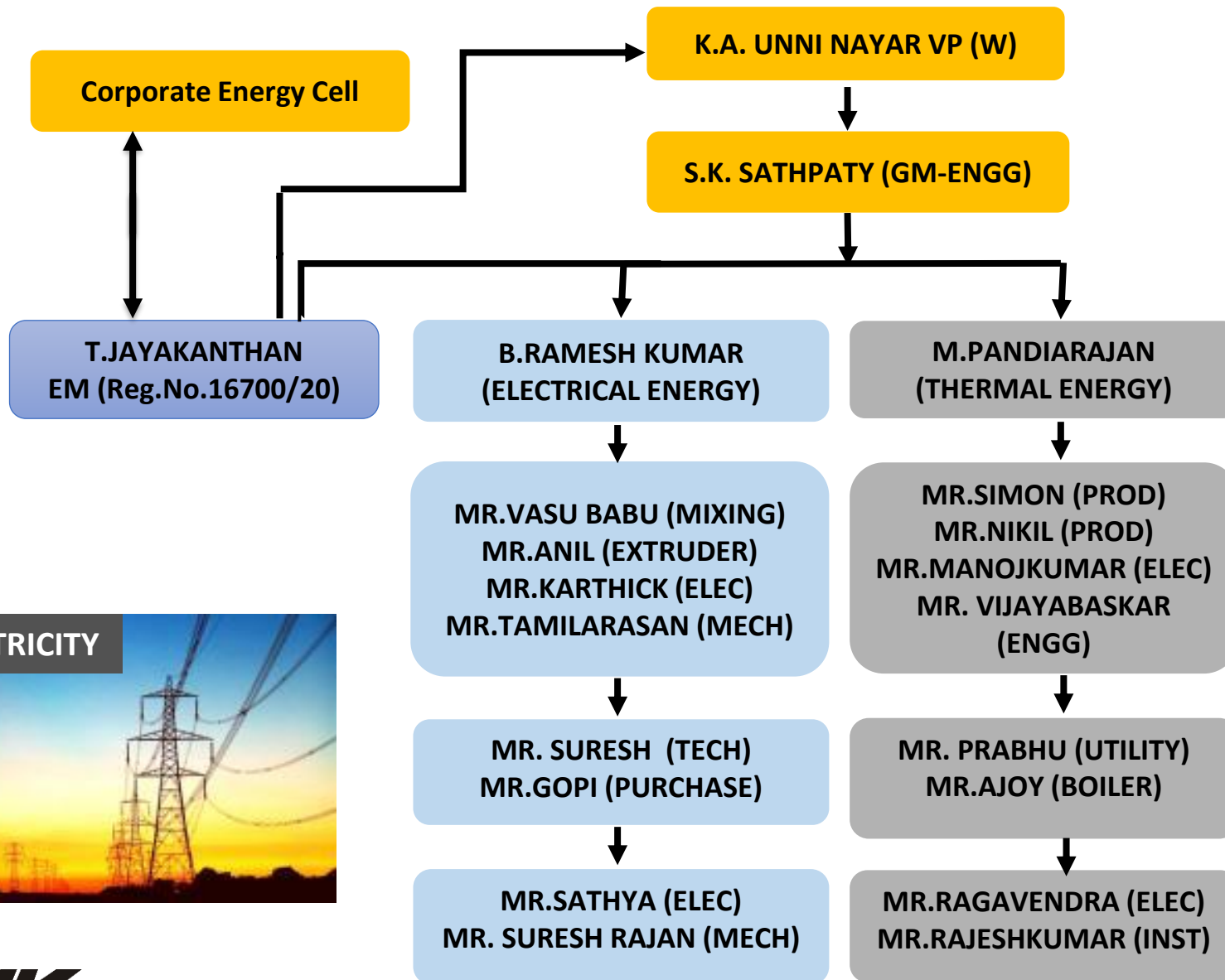
I pledge that I will strive to:

- 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.





# 11. Energy Management Team



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





# 11. Energy Budget

## ENERGY - SMALL PROJECT

YEAR	PROJECT NOS.	BUDGET ALLOCATED (Rs. in Lacs)	SAVINGS REALISED (Rs. in Lacs)	ROI (Years)
2022-23	11	769.4	427.2	1.8
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 – LARGE PROJECT

YEAR	BUDGET ALLOCATED (Rs. in Lacs)	PROJECT DETAIL
2022-23	500	1.5MW ROOF TOP SOLAR
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

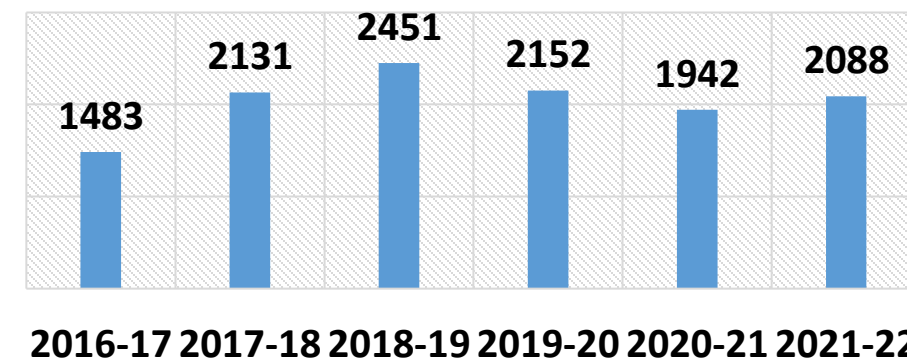
## AVG INVESTMENT % ON TOTAL TURNOVER

Last Six years, JKTIL Chennai Tyre plant spent Average of Rs. 989 Lacs per annum for EnCON projects

- Investment is 0.43 % in total turnover.
- Avg savings realised 1219 lacs per annum  
ROI – 10 Months

## PROJECT IMPLEMENTED THROUGH KAIZENS

Year wise - Kaizen Trend







# 12. ISO 50001/Green Co /IGBC Rating

**bsi.**  
**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"

**ANAB ACCREDITED**  
 MANAGEMENT SYSTEMS INTERNATIONAL

**Information and Contacts:** BSI, 88, The Quadrant, London WC1R 4DU, UK  
 BSI Assurance UK Limited, a Member of the BSI Group

**ISO 50001 : 2011  
 Certified on July 2013**

**CII - Sohrabji Godrej Green Business Centre**  
*hereby certifies that*  
**JK Tyre & Industries Limited**  
**Chennai Tyre Plant**  
*has successfully achieved the standards as required for the following level of certification under the GreenCo - Green Company Rating System which is valid for a period of 3 years*

**GreenCo Platinum**  
 May 2019

**Pradeep Bhargava**  
 Chairman  
 GreenCo Rating System

**L S Ganapati**  
 Chairman  
 GreenCo Assessor Panel

**K S Venkatagiri**  
 Executive Director  
 CII-Godrej GBC

**Indian Green Building Council (IGBC)**  
*hereby certifies that*  
**JK Tyre & Industries Ltd.**  
 Chennai Tyre Plant  
 (IGBC Registration No: GF 15 1123)  
*has successfully achieved the Green Building Standards required for the following level of certification under the IGBC Green Factory Building Rating System*

**IGBC Green Factory Building Platinum**  
 July 2016  
*This certification is valid for the next 3 years*

**Pradeep Bhargava**  
 Chairman, IGBC Green Factory Building Rating System

**Dr Prem C Jain**  
 Chairman, IGBC

**K S Venkatagiri**  
 Executive Director, CII-Godrej GBC





# 13. Learning from CII & 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.



The award builds our BRAND and National wide recognition



Imparting the requirements stated in the Energy award program supported us to improve our Energy performance which has raised our capabilities to work and receive this National Energy leader award.



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





# 14. Awards & Accolades



**CII –National Energy Leader  
2018,2019,2020&2021**



**CII - Green Co Certification 2019 -  
Platinum**



**Golden Peacock Energy Efficiency  
Award 2017**



**BEE – National Energy Conservation  
Award 2014,2015&2021**



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



**SEEM National Energy Management  
Award 2016,2017,2018,2019 & 2020**





CONNECT



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**Rameshkumar.b@jkmil.com**



**+91 8754440031**