TATA MOTORS
Connecting Aspirations

CII National Award in Excellence in Energy Management 2024

Tata Motors Limited, Pantnagar

Gateway to substantial saving, long term sustainability and more promising future for generations ahead

Team Members :

Mr. Manjit Singh, DGM Central Maintenance
Mr. Sudhakar Kumar, DGM Manufacturing
Mr. Samarendra Patro, Certified Energy Auditor

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1 Company Profile

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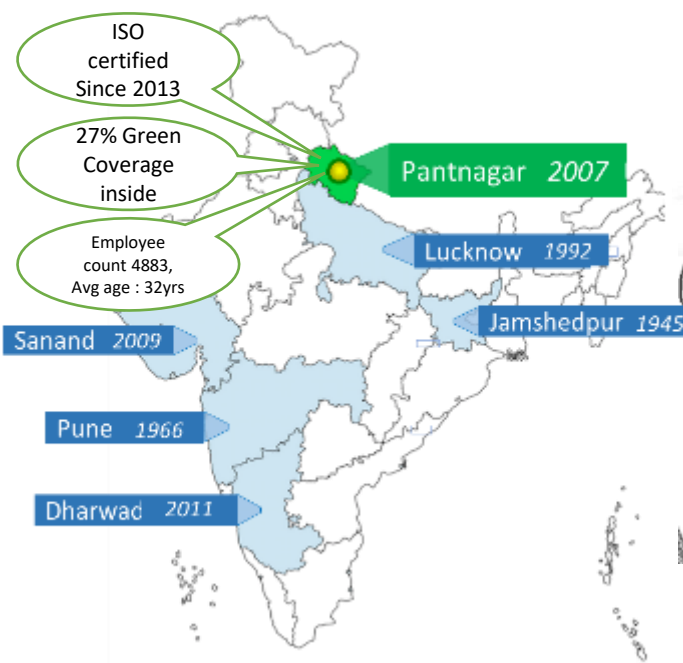
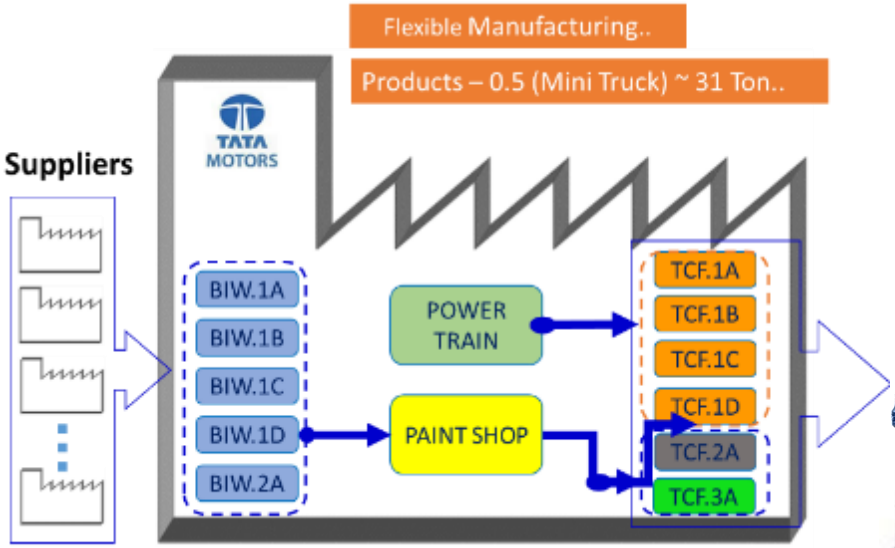


Enabling Green Supply Chain....



Key Achievements in Energy Management

2015
- Green Co Gold Rating 2015
- Golden Peacock Environment Management award 2015

2016
- CII National Energy Management Award 16-17
- Golden Peacock Environment Management Award 2016

2017
- CII National Energy Management Award 2017

2018
- CII Energy Efficiency Circle competition Winner 17-18
- CII National Energy Management Award 2018
- Golden Peacock Award for Energy Efficiency 2018
- Green CO Platinum Rating 2018

2019
- Winner of overall SHE performance
- CII National Award for Excellence in Energy Management 2019

2020
- Green Co Star Performer Award 2020
- CII National Award for Excellence in Energy Management 2020

2021
- Winner of 8th CII Northern Region Inter Industry Competition on EHS
- CII National Award for Excellence in Energy Management 2021

2022
- CII National Award for Excellence in Energy Management 2022

2023
- CII National Award for Excellence in Energy Management 2023

Winner of CII National Energy Leader 2018, 2019, 2020, 2021 ,2022 and 2023

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Product Specifications: Manufacturing Capability

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Engine	275 IDI; 694cc Petrol/CNG; 700cc; 800cc DICOR; 1.2 L; 1.4 DICOR; 1.5 L
Payload	0.75 Ton; 0.9 Ton; 1.0 Ton; 1.3 Ton; 1.5 Ton; 1. 75 Ton
Drive	LHD; RHD
Fuel Type	Petrol; Diesel; CNG; Bi-fuel; Electric
Emission	BS-II; BS-III; BS-IV; BS-VI; EURO-II; EURO-IV
Transmission	4 -Speed; 5-Speed; 6-Speed
Axles	2-Axle
Suspension	Independent; Rigid Axle
Seating Capacity	2; 7; 9
Climate Control	Blower; Heater; Air Conditioned; Natural Ventilation
Load Body	ow Deck; High Deck; T.O.; Flat Bed
Brakes	ABS; Non-ABS

Migration towards Greener Fuel

More than 100+ Variants in Production

MANUFACTURING PROCESS FLOW

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Weld Shop

Paint Shop

Assembly Shop

Production Plan

Order Generation

Dealer

Customer

External Suppliers
Dashboard, Seat Belt, Windshield, etc.

Internal Suppliers
Engine & Gearbox

BODY DROP PING

LOADING LIFT

FLOOR CONVEYOR

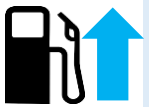
50% PART ASSEMBLY

OVERHEAD CONVEYOR
40% PART ASSEMBLY

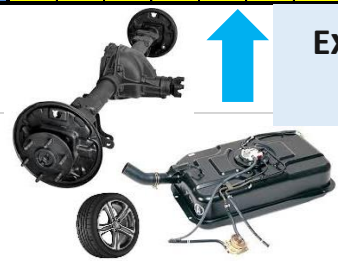
FILLING LINE 10% PART ASSEMBLY

TESTING

UNLOADING LIFT



External Suppliers
Seats, Bumper, etc.



External Suppliers
Axle, Wheels, Fuel Tank, etc.

Customer

Finished Product Dispatch to Customer

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Energy Consumption Overview

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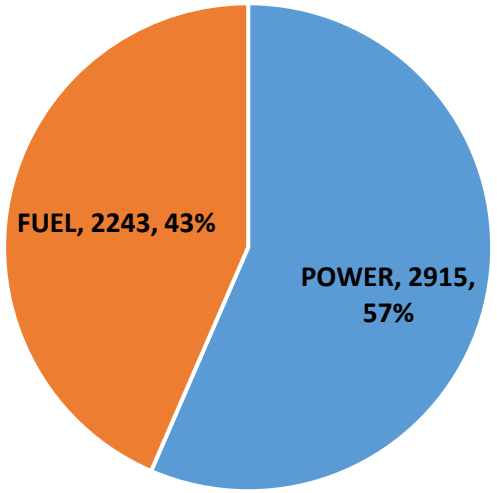
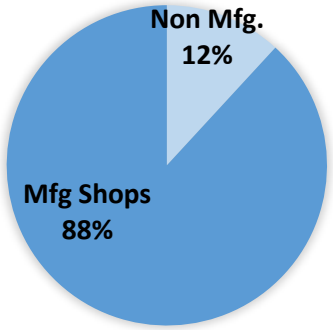
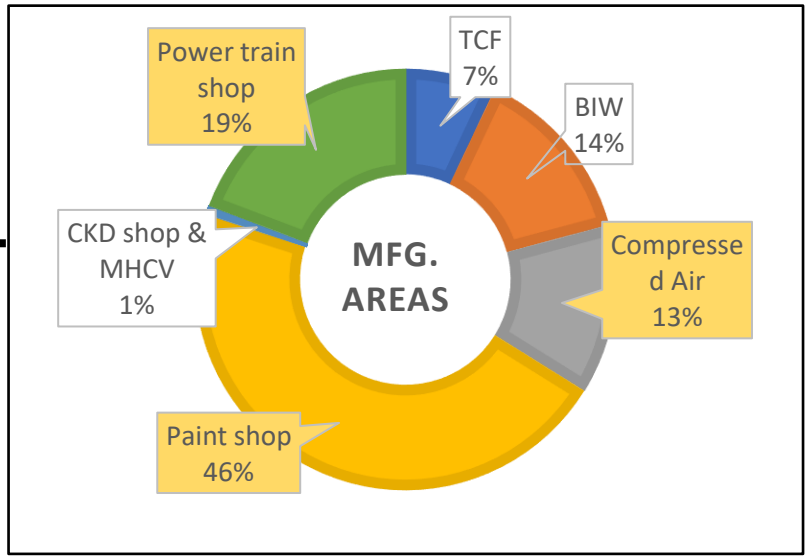
Plant total MTOE 5158

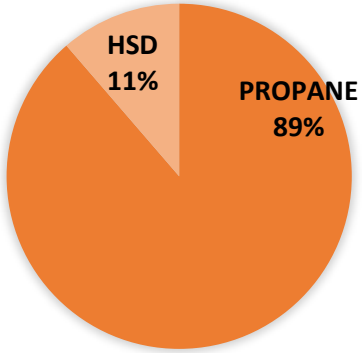


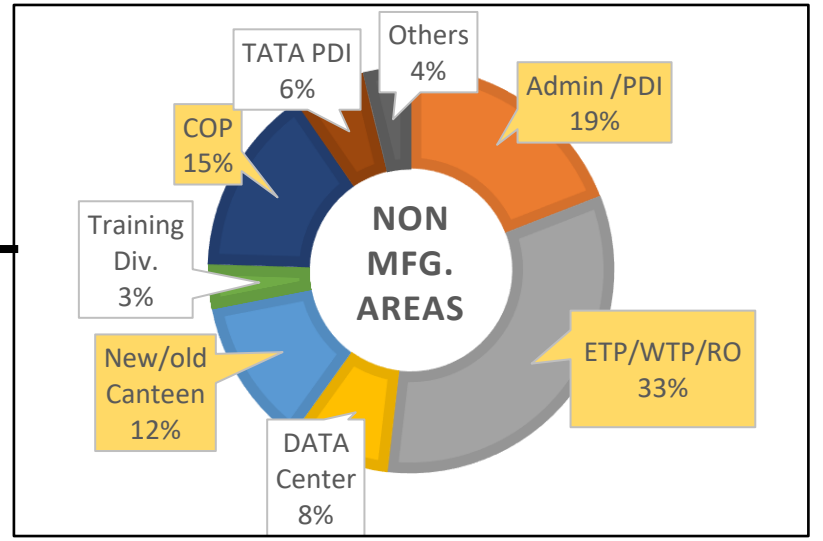
Power Consumption: 2915 MTOE (33.90 Million Kwh)





Fuel Consumption: 2243 MTOE





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3 Specific Energy Consumption Trend

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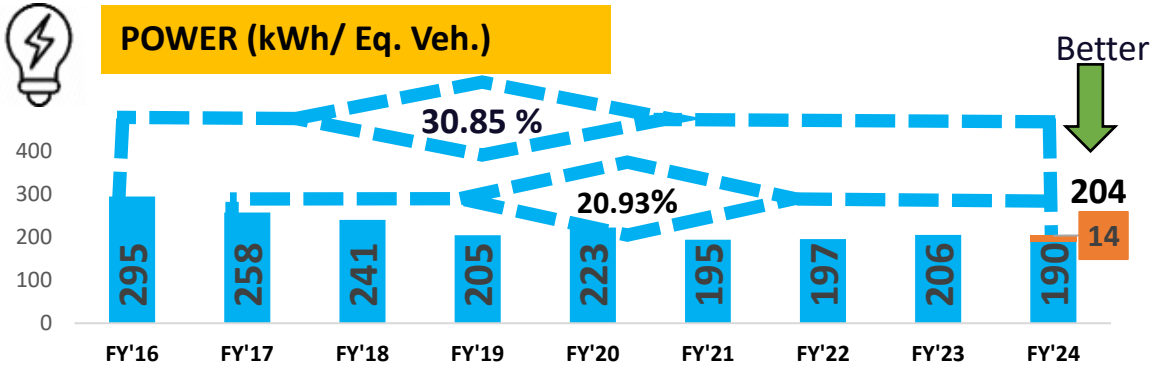
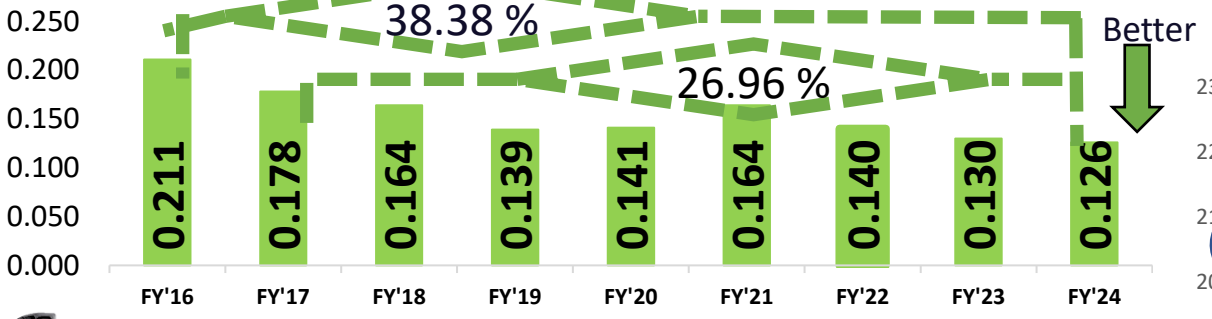
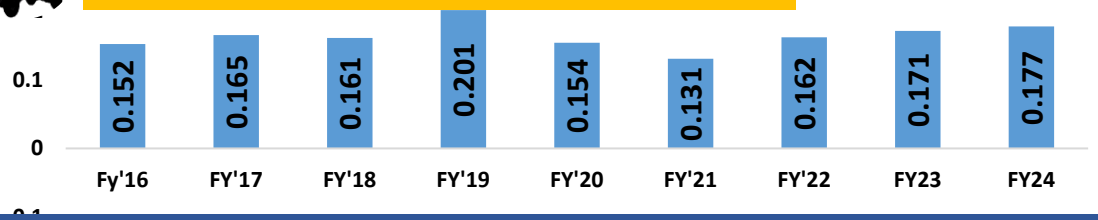
POWER (kWh/ Eq. Veh.)



FUEL (MkCal/ Eq. Veh.)



PRODUCTION VOLUME (Million Eq. Veh.)



Target kWh/Eq Veh

...st @ 22KWh

...in winter

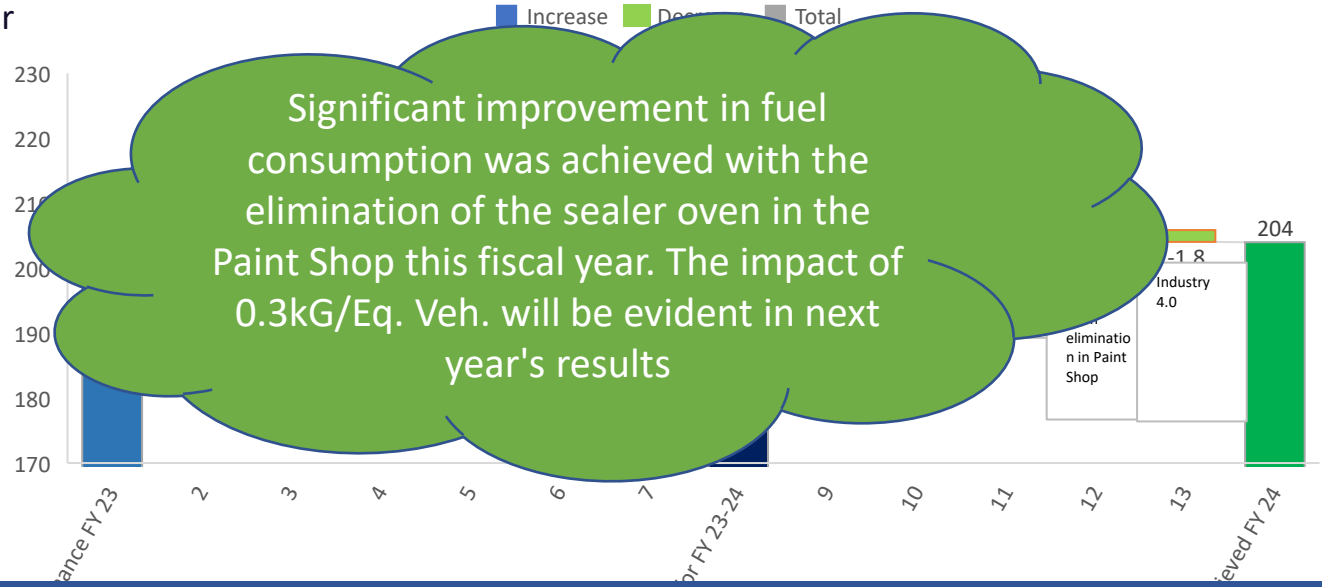
...Volume

...ditional Equipment

...extended facility usage for v50

6. 1.56 kW... ...EV metallic paint double coat

We have achieved 204 kWh/Eq. Veh. , even with the addition of a 14 kWh/Eq. Veh. fixed load. Excluding this, our performance would have been 190 kWh/Eq. Veh., which is a benchmark in itself



Significant improvement in fuel consumption was achieved with the elimination of the sealer oven in the Paint Shop this fiscal year. The impact of 0.3kG/Eq. Veh. will be evident in next year's results

TML Pantnagar has achieved a SEC of 204 kWh/Eq.Veh against a target of 224.76 kWh/Eq.Veh. set after taking into consideration all the new loads and new products added to the portfolio and operation changes done because of change in product mix . Also, Fuel consumption reduced by 5% from last year despite the additional heat requirement because of product mix.

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Competitors, National & Global Benchmarking

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BENCHMARKING

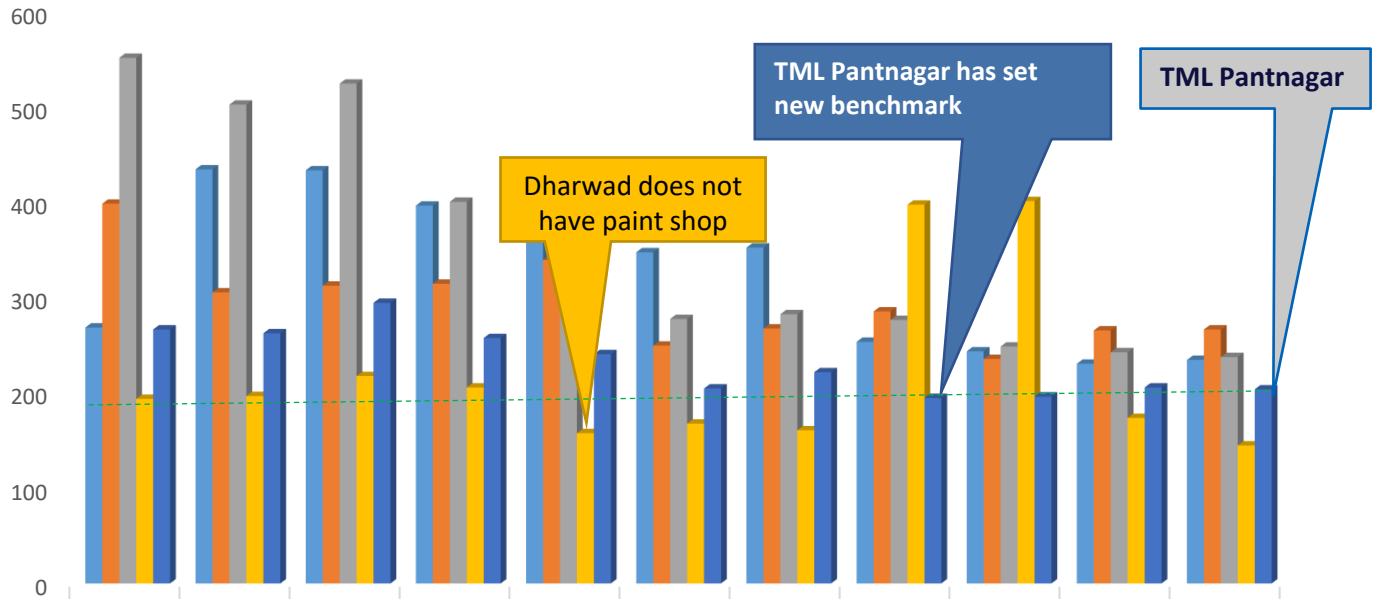
INTERNAL

- TML
- With past best performance of plant, factory or machine
- Performance comparison : shop to shop, equip. to equip.
- For non production days

EXTERNAL

- With Competitor National & Global

Benchmarking within TML (KWH/Eq Veh)



	FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Jamshedpur	269	435	434	397	383	348	353	254	244	231	235
Lucknow	399	306	313	315	340	250	268	286	236	266	267
Pune CV	552	503	525	401	303	278	283	277	249	243	238
Dharwad	194	197	218	206	158	168	161	398	402	174	145
Pantnagar	267	263	295	258	241	205	222	195	197	206	204

Jamshedpur Lucknow Pune CV Dharwad Pantnagar

TML Pantnagar has performed best among TML companies who have in-house painting process.

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4 Internal Benchmarking

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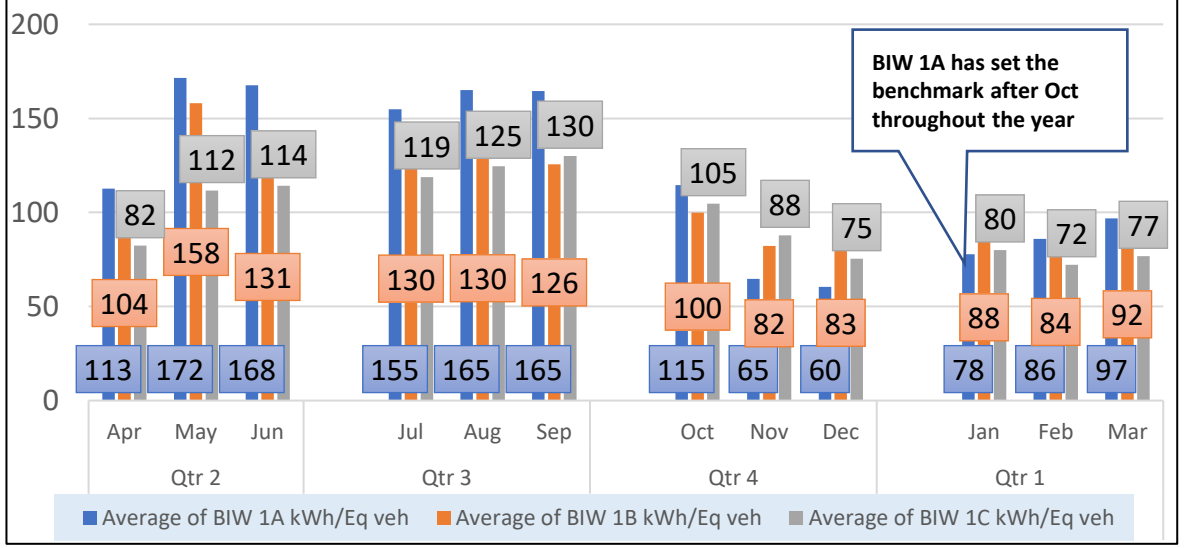
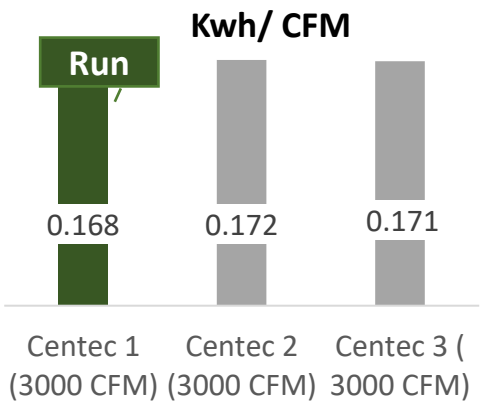
Shop to Shop Benchmarking



Machine to Machine Benchmarking



Benchmarking wrt Design

Comp. Name	Model No	(CFM)	Designed kW/ CFM	Current kW/ CFM
Comp. 1 (VFD)	ZR250 VSD	1500	0.167	0.162
Comp. 2 to 4	ZR250	1500	0.167	2> 0.164, 3> 0.161, 4> 0.164
PS comp. 3 with inbuilt drier	ZR250 FF	1500	0.210	0.201
PS comp. 2 (VFD)	ZR250 FF-VSD	1500	0.167	0.168
PS comp. 1 (VFD)	ZR160 FF-VSD	1000	0.167	0.169
Centec 1-3	Centec	3000	0.174	0.168

Benchmarking for Non working days: with no maintenance activity

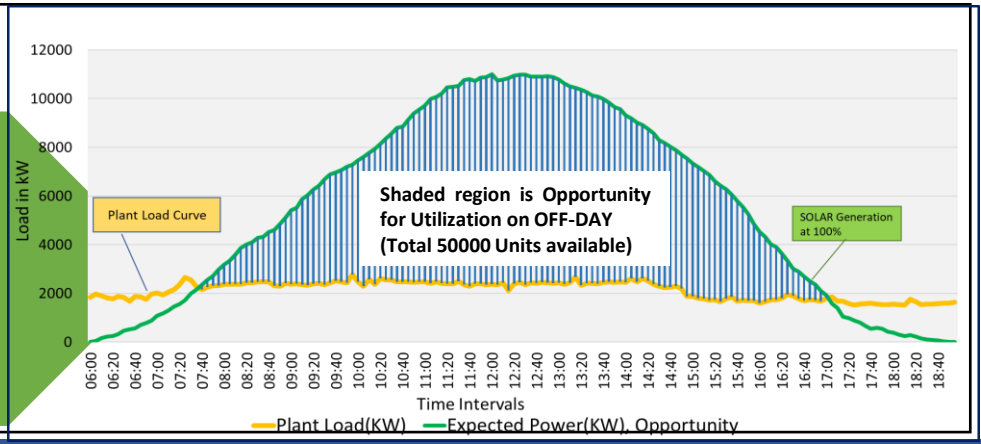
FY'21

Benchmark set on 01 April 2021

13000 kWh/ Day

FY'24

As a measure to maximize utilization of Green Power from solar plants, we have started rescheduling activities to Non-Working days



We have rescheduled our flexible loads to Non-Working days in order to maximize the usage of Renewable Energy in our quest to achieve 100% Renewable Energy

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Plant Level Benchmarking (National & International)

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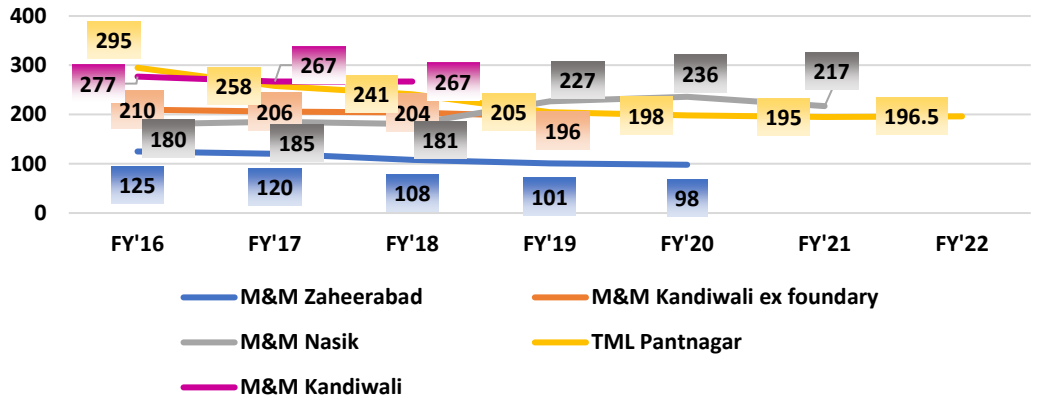
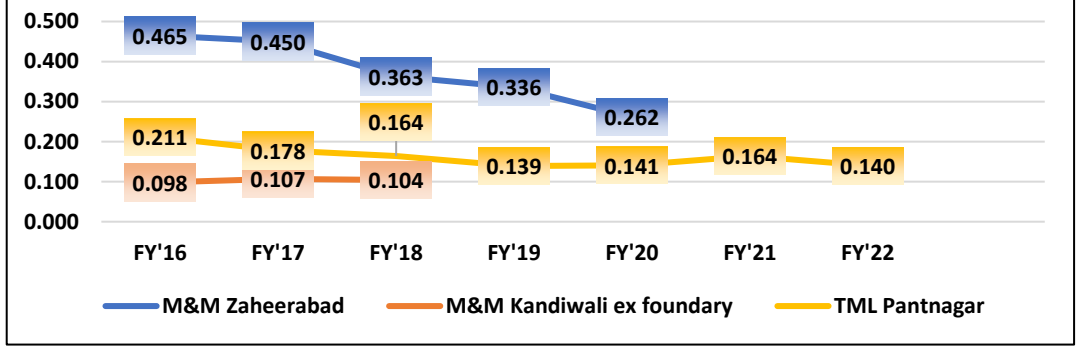
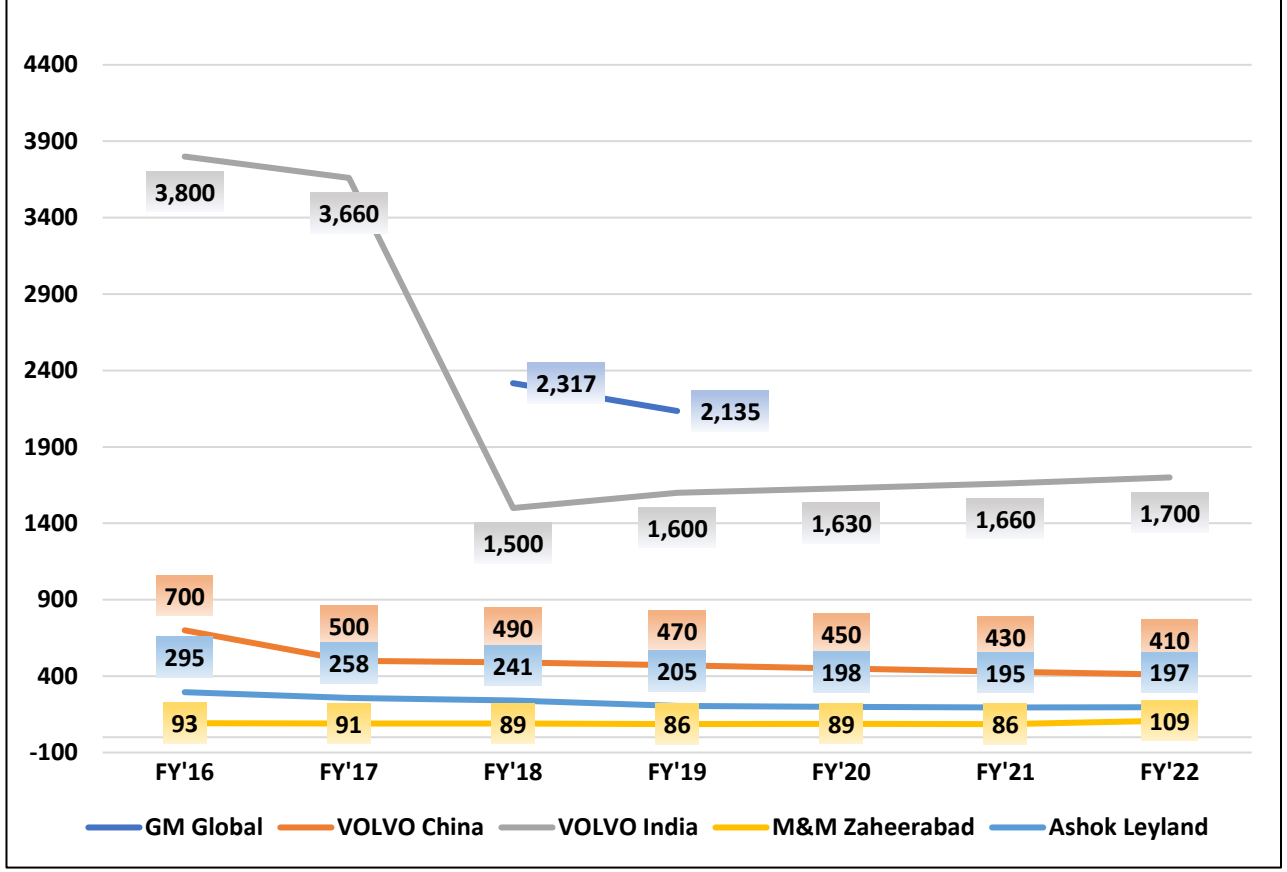
National Benchmarking for Power (kWh/ Eq Veh)



National Benchmarking for Fuel (MkCal/ Eq Veh)



International & National Benchmarking (kWh/Eq vehicle)



TML Pantnagar is Second best industry benchmark with fastest improving SEC year on year better than its competitors, however, accurate benchmarking can't be done due to different processes & size of product (UVs).

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Process Benchmarking (CII Certified best in Energy Efficiency across Industries)

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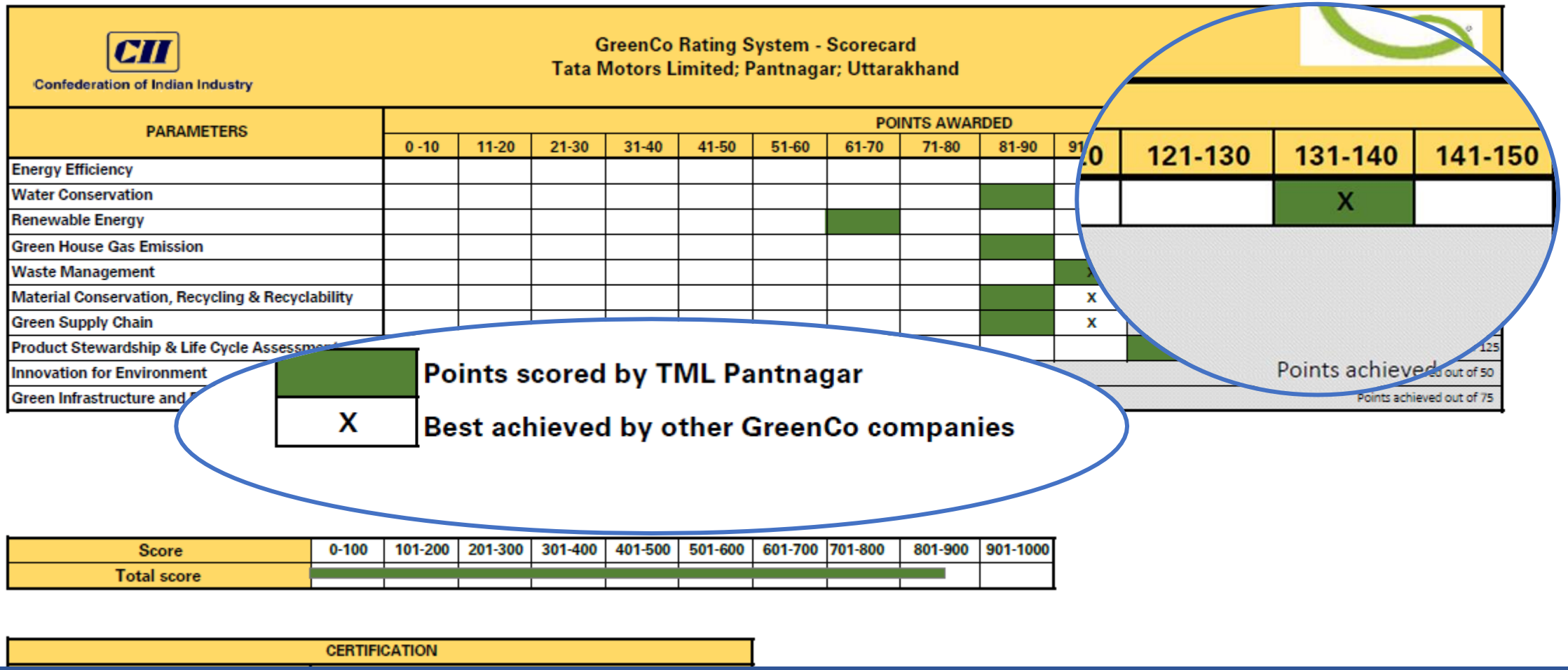

CII
Confederation of Indian Industry

GreenCo Rating System - Scorecard
Tata Motors Limited; Pantnagar; Uttarakhand

PARAMETERS	POINTS AWARDED												
	0 -10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	121-130	131-140	141-150
Energy Efficiency													
Water Conservation												X	
Renewable Energy													
Green House Gas Emission													
Waste Management													
Material Conservation, Recycling & Recyclability										X			
Green Supply Chain										X			
Product Stewardship & Life Cycle Assessment													
Innovation for Environment													
Green Infrastructure and													

Points achieved out of 125
Points achieved out of 50
Points achieved out of 75

Points scored by TML Pantnagar

X — Best achieved by other GreenCo companies

Score	0-100	101-200	201-300	301-400	401-500	501-600	601-700	701-800	801-900	901-1000
Total score										

CERTIFICATION

TML Pantnagar is the first plant across TML to be certified Platinum+ in GreenCo by CII , where we have been judged the best in Energy Efficiency across industries.

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Major Projects Planned in FY25

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Major Projects impacting plant energy performance and achieving Net-Zero targets

1. Heat Pump in place of Hot Water Generators used in Paint Shop PT line
2. Elimination of ED chiller by using Cooling load of heat pump

Idea picked from CII conference

3. Indirect to Semi-indirect heat exchanger for Paint Shop oven heating
4. Electric burner to replace Paint Shop Propane burners
5. Cooling Tower fan replacement with Energy Efficient blades
6. Replacement of inefficient ACs with 5* rated ACs, inefficient water coolers with energy efficient ones
7. Replacement of Conventional Ceiling fans with BLDC fans

Ongoing projects

Exploring Options

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Energy Conservation Projects

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Key EnCON projects FY 2023-24

Sr. No.	Description of Energy Conservation Efforts / Encon Activity	Annual Saving in Lakh KWh	Fuel (Propane) Savings in Kg	Annual CO_2 Reduction in tCO_2e
1	Reduction of fire hydrant pump start per day from 48 times to 4 tir	20	NA	13.9
2	Replacement of Conventional lights by LED lights (Service Buildir	22	NA	15.5
3	CPED: Pressure scheduling in Paint Shop by installing IFC unit	.11	NA	7.8
4	VFD installation in BIW 1A ASP panels	1.31	NA	93.1
5	Installation of Motorized damper in discharge Line Of ASP	0.56	NA	39.8
6	Paint Shop: Energy Efficient IE4 motors for continuous running pumps	0.188	NA	13.4
7	Replacement of Conventional Ceiling fans with BLDC fans	0.01	NA	0.5
8	EnCon at Design- VRF in Engine Assembly, Power Train	1.26	NA	89.6
9	EnCon at Design- Transparent roof sheeting for 1.2L new Shed for utilization of day light	0.28	NA	20.2
10	Use of VFD in Air Compressor Operation	2.60	NA	185.1
11	Paint Shop: Upgradation of ED WHRS system	0	26000	52
12	Paint Shop: Optimization of WHRS system through I 4.0	0	30875	62
13	Paint Shop: Elimination of Baking of Sealer in Sealer oven	2	120000	255
14	SCV 1: Optimization of vaccum pump running	0.04	NA	2.9
15	SCV 1: Optimization of vehicle washing pump running consumption by installation of VFD	0.27	NA	19.2
16	SCV 1&SCV 2 : Replacement of lamps with LED lamps	0.32	NA	22.8
17	BIW :Provide a heating jacket with self cut off switch which consumes less energy and provide temperature with setting.	0.10	NA	7.3
18	BIW: Provide a Solenoid valve to reduce the air leakage at Underb			
19	BIW: Air leakage from pneumatic header line near BIW1A change there seal.			
20	BIW: Replacement of lamps with LED lamps			
21	EnCon at Design- ASP with VFD driven blower in 1.2L Engine			
22	All Shops except Paint Shop: Industry 4.0 for improved monitoring of power, compressed air and			

Idea given by Supervisor

Idea given by Operator

More than 550 tCO2 reduction

No. of projects= 22
Zero investment projects= 8

5

Energy Saving projects implemented in last three years

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Year	No of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal/ MTOE)	Savings (INR Million)	Impact on SEC (Electrical)	Impact on SEC (Thermal)
FY'22	28	9.34 (30%) ↑	2.88	1814	3.04	6.7 kWh/Eq. Veh.	1133 kCal/Eq. Veh.
FY'23	25	16.46 (76%) ↑	2.62	1548	3.55	5.07 kWh/Eq.Veh.	2211 kCal/Eq.Veh.
FY' 24	22	32.09 (195%) ↑	0.95	1959	15.88	5.37 kWh/Eq. Veh	10963 kCal/Eq. Veh.

Consistent increase in investment towards energy efficiency and greener technologies showcases our commitment towards a greener tomorrow.

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Propane & Power Consumption reduction by Elimination of Sealer Oven in Paint Shop

Jan-2023→ Jan-2024

OUR CULTURE CREDO

AT TATA MOTORS
We are connecting aspirations by being bold in thought and action, owning every opportunity and challenge, Solving together as one team and engaging all our stakeholders with empathy.
We are **MORE WHEN ONE!**

MORE WHEN ONE

Scope-1 Propane consumption reduction (Aalingana Project)

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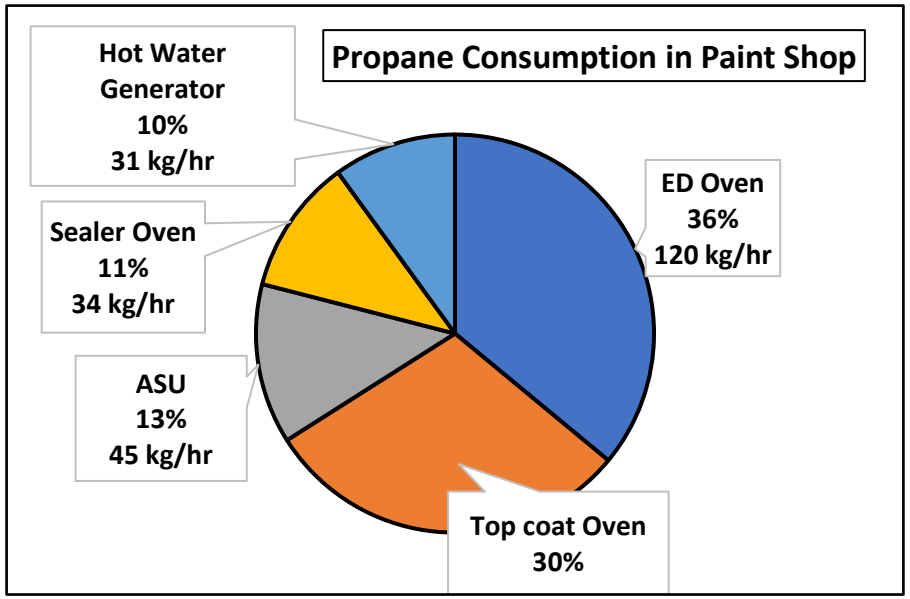
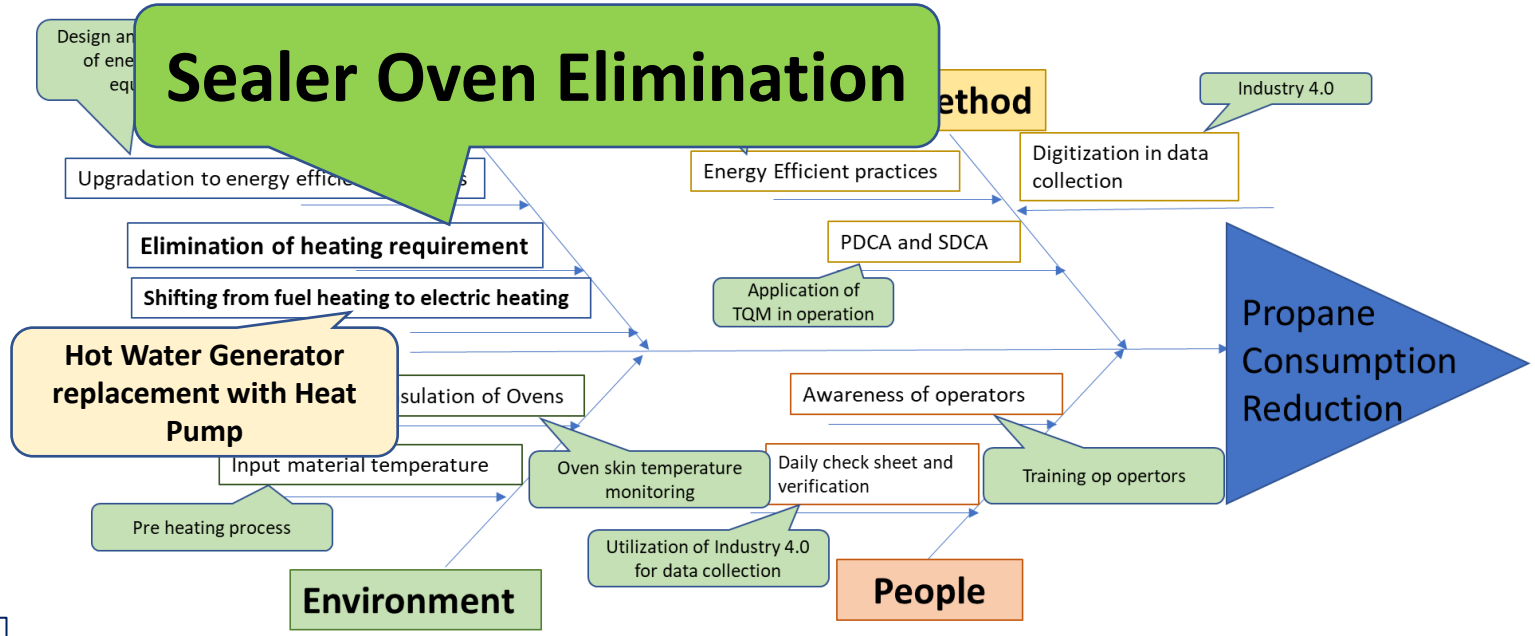
- **Paint shop is single user of Propane in Pantnagar plant**





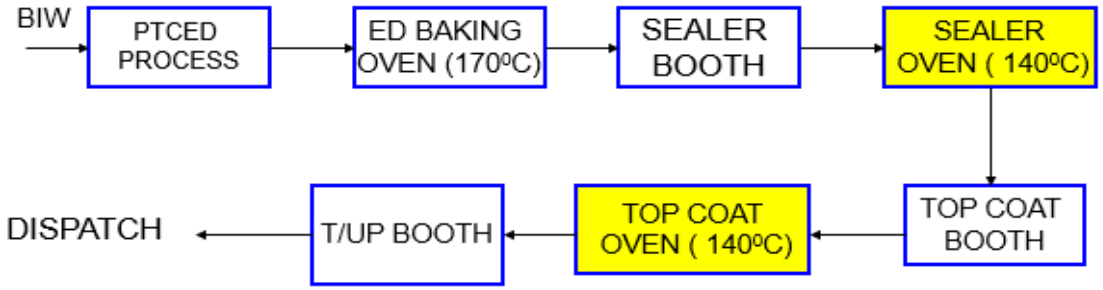
Feasibility Study for Propane reduction

S.No	Equipment	Process Feasibility for elimination or reduction	Usage in OEM's
1	ED Oven	Optimization of Propane Consumption	All OEM's are using CG800 or equivalent
2	Sealer Oven	Wet on wet sealer painting available	SMG & AL(Green Field)
3	Top Coat Oven	Optimization of Propane Consumption	All OEM's are using same painting technology
4	Hot Water generator	Migration from fuel heating to Electric heating	All OEM's are using propane fired burners
5	ASU	Optimization of Propane Consumption	All OEM's are using propane fired burners

Challenges for wet on wet sealer painting

- Difficult to introduce in Brown field project
- Operators were habitual of handling baked sealer while painting
- Layout modification without any shutdown
- Proving of new sealer to meet TML standard(TS 7901)
- All type of Paint compatibility with new sealer
- Implementation in phases by producing with oven & without oven

PAINTING PROCESS



Selaer is baking two times at same temperature .i.e.140^{0}c

SEALER BAKING WINDOW

Sealer baking map

Product : Terolan 792 I

Baking time	Baking temperature 110°C	120°C	130°C	140°C	150°C	160°C	170°C	180°C	190°C	200°C
5min.	x	x	^	^	^	^	^o	^o	o	o
10min.	^	^	^	^	^o	o	o	o	o	xx
15min.	^	^	^	^o	o	o	o	o	xx	xx
20min.	^	^	^o	o	o	o	o	o	xx	xx
25min.	^	^	^o	o	o	o	o	xx	xx	xx
30min.	^	^o	^o	o	o	o	o	xx	xx	xx
35min.	^	^o	^o	o	o	o	o	xx	xx	xx
40min.	^	^o	^o	o	o	o	o	xx	xx	xx
45min.	^	^o	^o	o	o	o	o	xx	xx	xx
50min.	^	^o	o	o	o	o	xx	xx	xx	xx
55min.	^	^o	o	o	o	o	xx	xx	xx	xx
60min.	^	^o	o	o	o	o	xx	xx	xx	xx
65min.	^	^o	o	o	o	xx	xx	xx	xx	xx
70min.	^	^o	o	o	o	xx	xx	xx	xx	xx
75min.	^	^o	o	o	o	xx	xx	xx	xx	xx
80min.	^	^o	o	o	o	xx	xx	xx	xx	xx
85min.	^	^o	o	o	o	xx	xx	xx	xx	xx
90min.	^	o	o	o	xx	xx	xx	xx	xx	xx
95min.	^	o	o	o	xx	xx	xx	xx	xx	xx
100min.	^	o	o	o	xx	xx	xx	xx	xx	xx
110min.	^	o	o	o	xx	xx	xx	xx	xx	xx
120min.	^	o	o	o	xx	xx	xx	xx	xx	xx

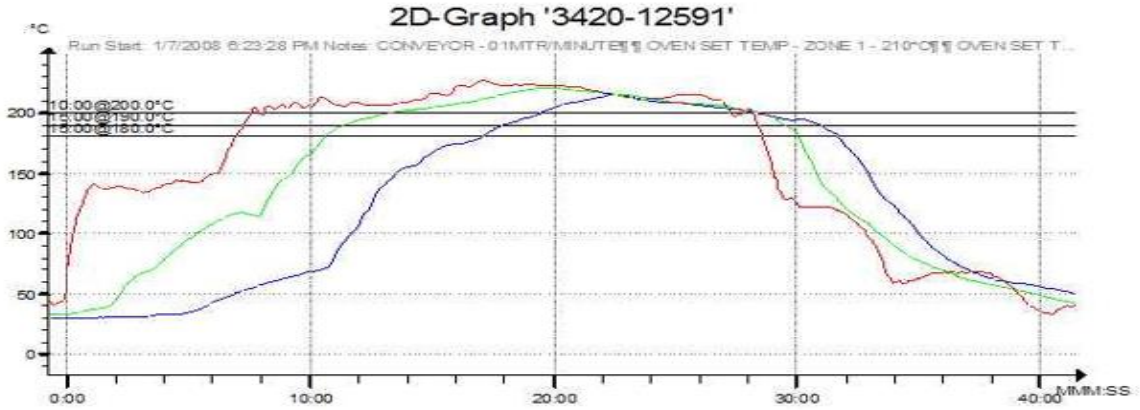
Remarks:-

Symbol	Contents
x	Sealer does not harden/gel
^	Hardening of the sealer observe,but the adhesion is poor
^o	Hardening of the material is complete,adhesion is not thorough cohesive
o	Properties of the sealer are thoroughly O.K.
xx	Deterioration of the material due to overbaking has occured with formation of blister due decomposition of vinyl resin

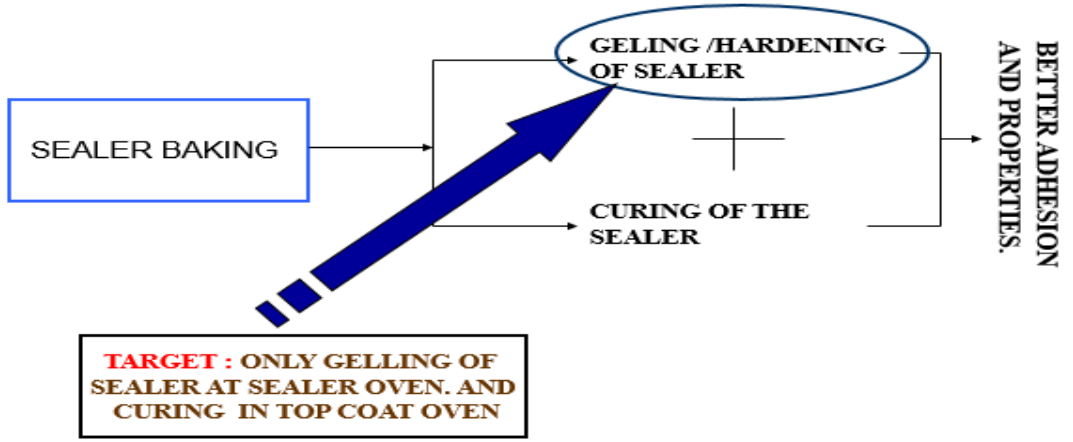
TTR Reading :

It is Temperature Vs Time reading of the oven.It is used to calculate the Effective Metal Temperature of the Oven. Baking of the paint film depends on the EMT.

It includes Temperature sensing probes one end of which is fix to the PCU which is along with it and other end to different locations of the body .Every two sec. it records the temperature and give us the graph of temperature (EMT) vs time .e.g.



SITUATION ANALYSIS

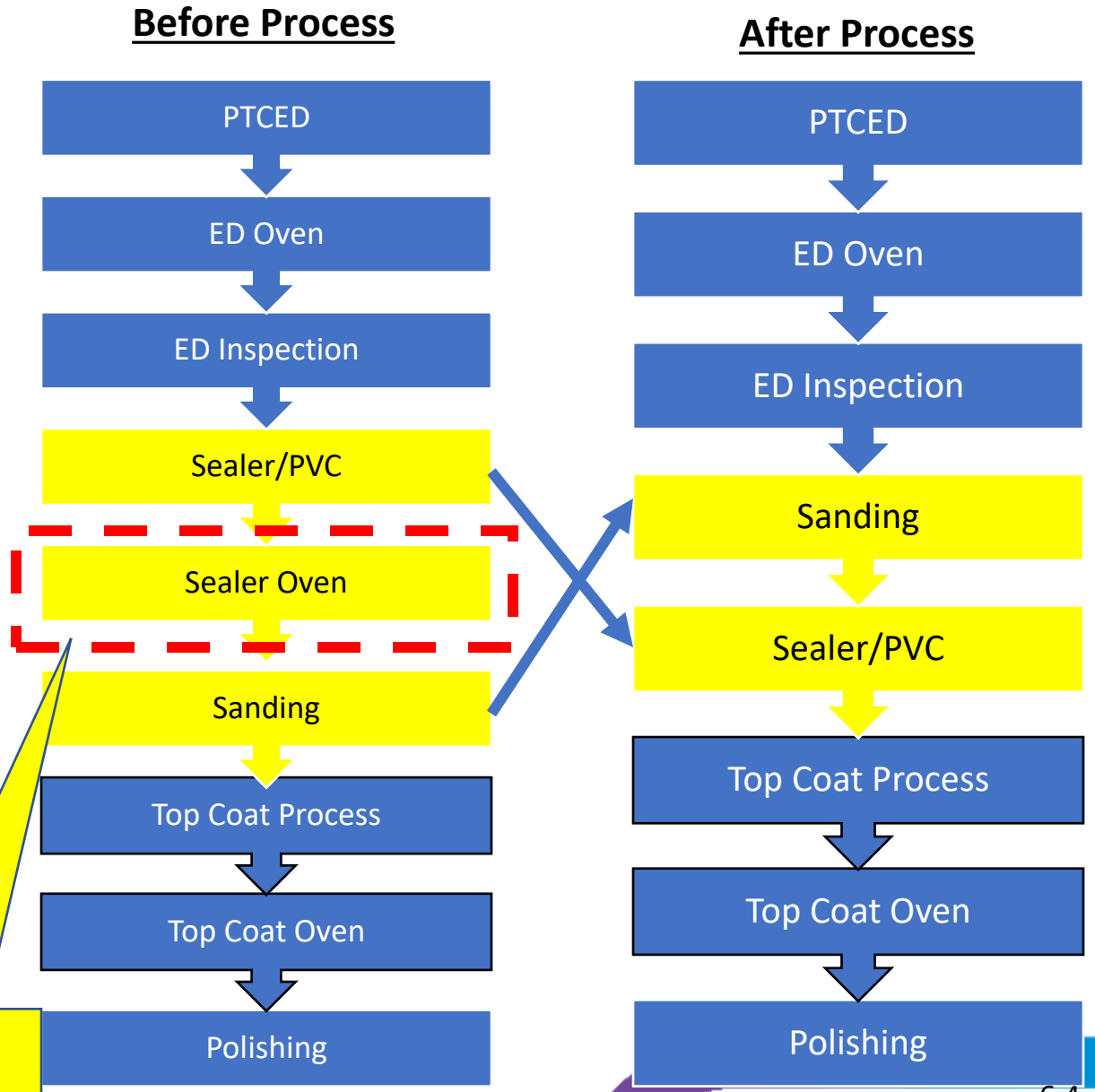


Sealer Oven Elimination in Paint Shop Process

TATA MOTORS
Connecting Aspirations

S.No	Impacted Area/Station
1	ED inspection
2	ED Sanding line 1 &2
3	Sealer line 1& 2
4	Sealer Oven & Sealer ONS
5	Color Selection & PUDL 4 Lift

S.No	Parameters	Major Activities
1	Facility Modification	Conveyor Modification at ED Inspection Exit
2		Conveyor Modification at Entry side of Sanding line 1 & 2
3		Conveyor Modification at Exit side of Sanding line 1 & 2
4		Conveyor Modification at Sealer ONS for Oven by Pass
5		Conveyor Modification at Top Coat ONS
6		Electrical & PLC system modification as per New process
7		Sealer Dispensing System for Booth 1& 2
8		Columns Modification – 4 Nos
9	Process	New Sealer Development & Validation with all Running Paints
10		Trails on actual vehicles

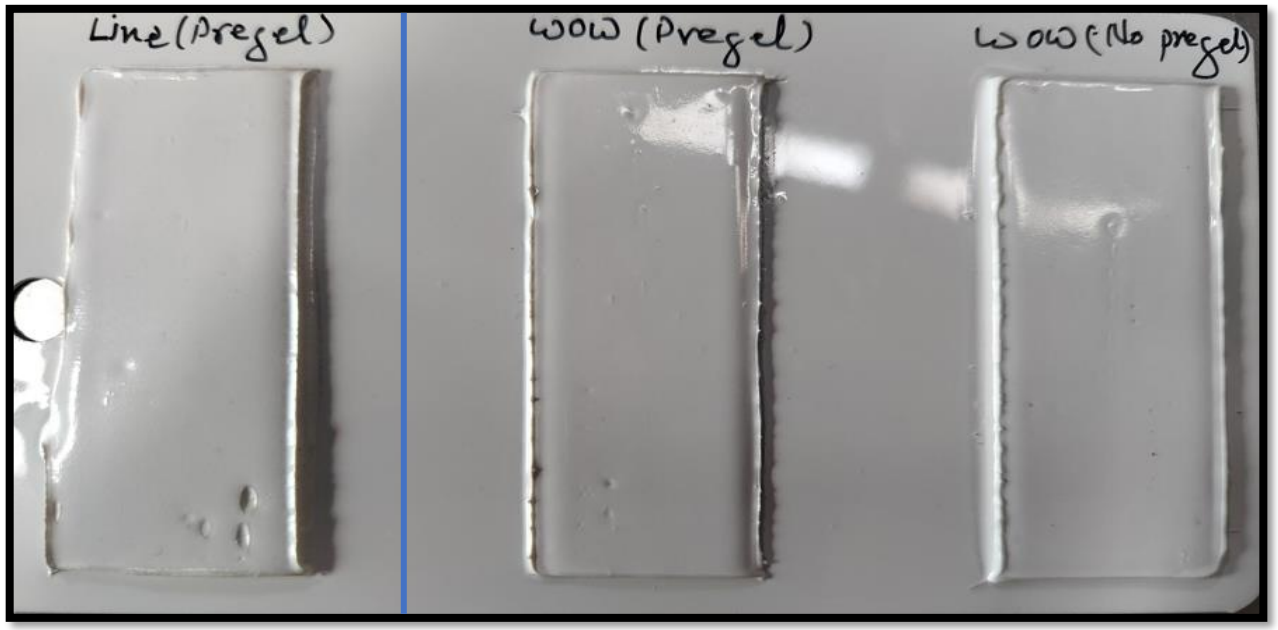


MORE WHEN ONE

Quality Proving: Paint Compatibility in wet-on-wet as well as pre-gel condition: Mono Coat Paint system

TATA MOTORS
Connecting Aspirations

(Titanium White)

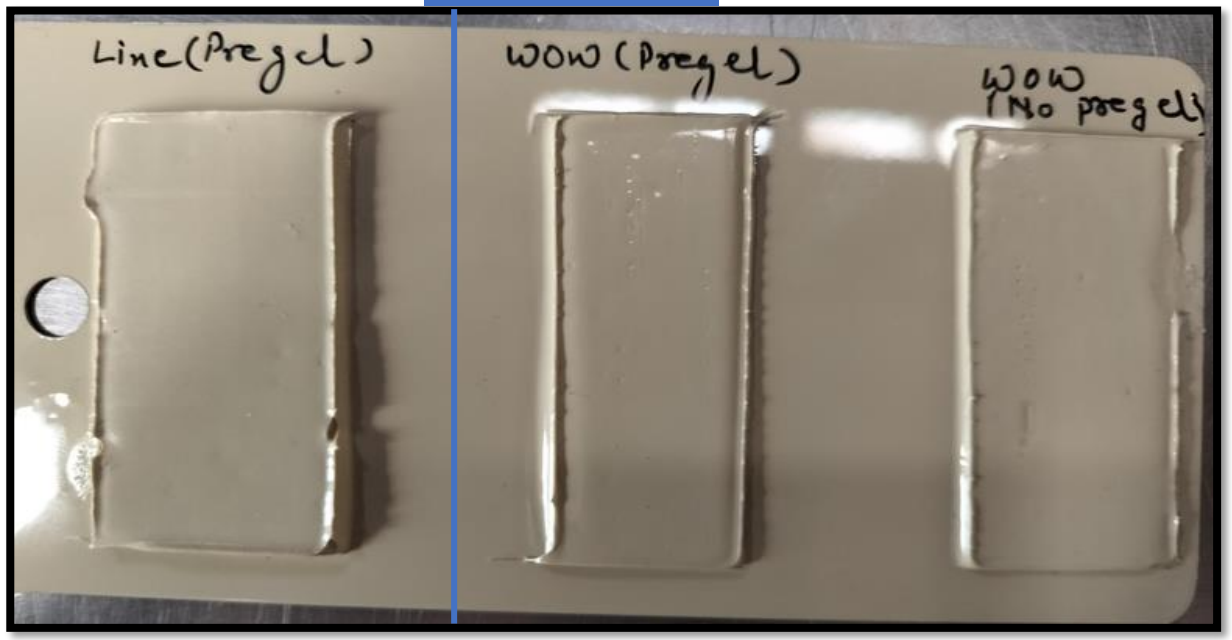


Line sealer (Pregel in sealer oven)

WOW sealer (Pregel in sealer oven)

WOW sealer (No Pregel)

Irish Cream



Line sealer (Pregel in sealer oven)

WOW sealer (Pregel in sealer oven)

WOW sealer (No Pregel)

Lab Trials Conclusion:

a)Phirol SS 1100 (WOW) sealer is compatible with paint system in **wet-on-wet** application. Gloss and coverage is ok in both shades (Titanium white and Irish cream), compared to pre-gelled existing line sealer.

b) Phirol SS 1100 (WOW) sealer is compatible with paint system in **pre-gelled** application. Gloss and coverage is ok in both shades (Titanium white and Irish cream), compared to pre-gelled existing line sealer.

Quality test report

Microsoft Excel
97-2003 Worksheet

MORE WHEN ONE

Scope -1 Propane & Power Consumption reduction→ Sealer Oven Elimination from UTK Paint Shop Financial benefits

TATA MOTORS
Connecting Aspirations

S.no	Energy	Annual Savings
1	Power Saving (Oven circulation fan/Oven Conveyor drive/Supply/Exhaust fan)-**Power consumption : 98KWH**	0.33 crs
2	Fuel Savings (propane) **34 kg/hr {Avg)**	1.22 Crs
3	Operational Cost *saving/Yr* (Preventive maintenance manpower cost/Supply exhaust filters replacement/ Conveyor Spares cost)	0.20 Crs
4	Total Recurrence Saving/Yr.	1.75 Crs
5	ROI Payback	5 months
4	*GHG Emission* : Co2 emission avoidance Power-333MT Propane-486 MT	819 MT

2.24 kWh/Eq. Veh.

0.8 kG Propane/Eq. Veh.

The Impact :

✓ Power and Fuel consumption Saving

✓ Total Cost saving of Rs.1. 75 Cr per annum.

✓ CO2 Emission (Scope 1)
✓ Co2 avoidance/Yr.: 736 MT

First of its kind in TML CVBU/PVBU Plants and in Brown field Paint shop in INDIA.

Learning & Sharing:
Horizontal deployment to all TML CV/PV plants and Overall Cost impact will be more than recurrence 10 Crs/annum.

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Tangible Benefits of Sealer oven elimination(Per Annum)

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Power Saving :- 0.33 Cr's

Propane saving 1.22 Cr's

ROI:-5 Months

GHG Avoidance:- 819 MT

MOREWHEN ONE

TATA MOTORS
Connecting Aspirations

To optimize energy consumption and hazardous waste generation from vacuum pumps

OUR CULTURE CREDO

AT TATA MOTORS
We are connecting aspirations by being bold in thought and action, owning every opportunity and challenge, Solving together as one team and engaging all our stakeholders with empathy.
We are **MORE WHEN ONE!**

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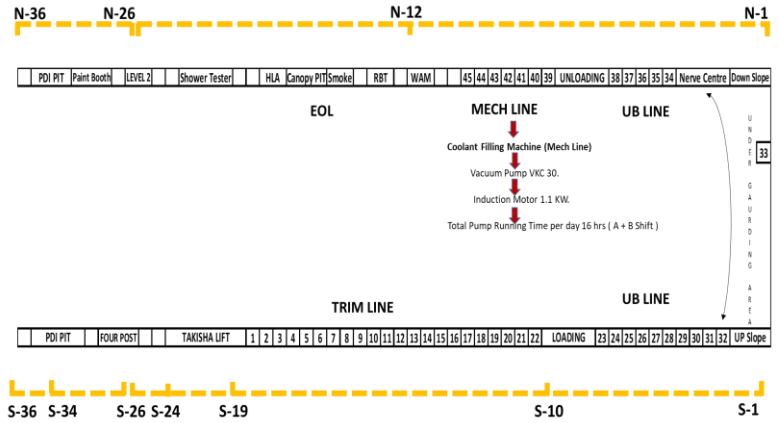
Problem Statement and before condition

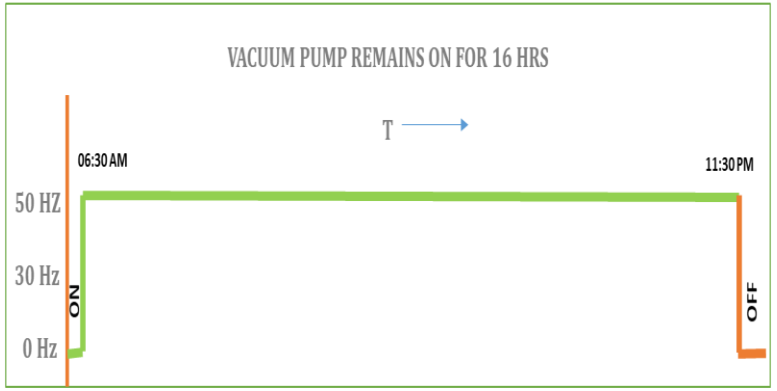
Problem and Need Of Implementation

- **Skin temperature of the Pump Motor is also reaches at the hazardous level nearly 80°c to 90°c.**
- Vacuum Pump Motor runs continuously thru-out the two Shifts (A+B) .
- **Causing higher energy consumption.**
- Pump and Motor life getting deteriorated due to continuous running and due to generating access heat .
- **Generating more hazardous waste in form of VM 4 Oil.**

Layout of shop and utilization of Vacuum Pump

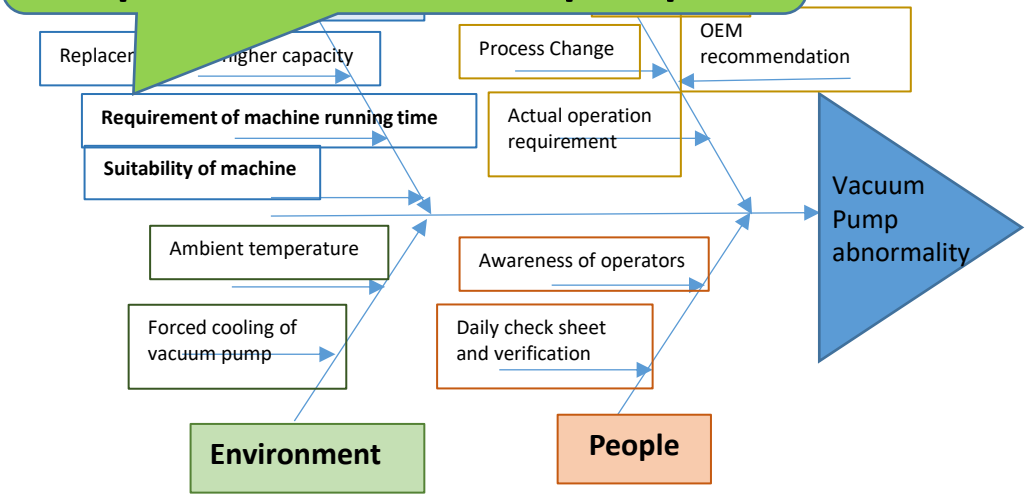


BEFORE CONDITION



Analysis of problem and suggested solution

Optimization of running time and pressure of vacuum pump



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Auto cycle steps of coolant filling machine

Cycle steps	Duration
AIRING.	10 Secs.
Airing leak Check .	05 Secs.
Airing Vent.	05 Secs.
Vacuum.	45 Secs.
Vacuum Leak Check .	10 Secs.
Re – Vacuuming .	10 Secs.
Filling .	20 Secs.
Filling Hold .	10 Secs.
Reservoir Filling .	20 Secs.
Leveling	02 Secs.
Total	**137 Secs**

Use of VFD to run the Vacuum pump as per operation cycle time and variable speed

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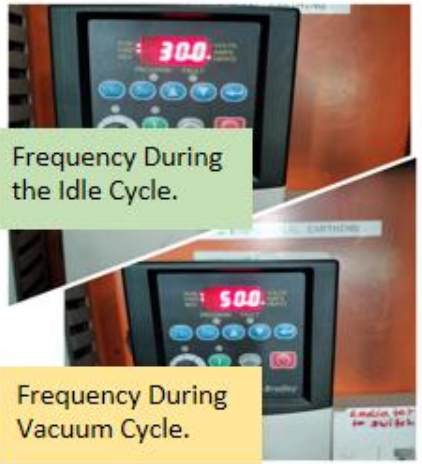
Introduction of the VFD in coolant machine_1

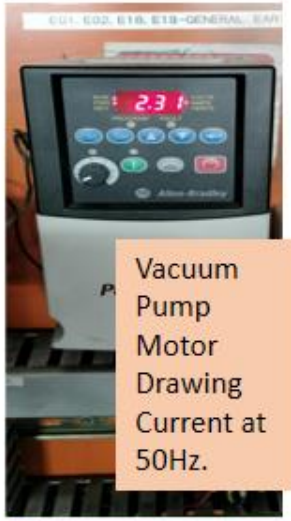
Implemented Solution



Frequency During the Idle Cycle.

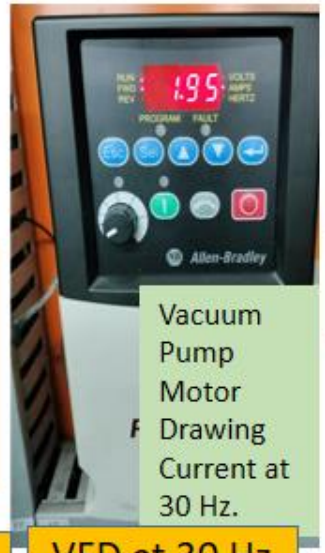
Frequency During Vacuum Cycle.

VFD to Switch Over the Idle Cycle to Vacuum Cycle .



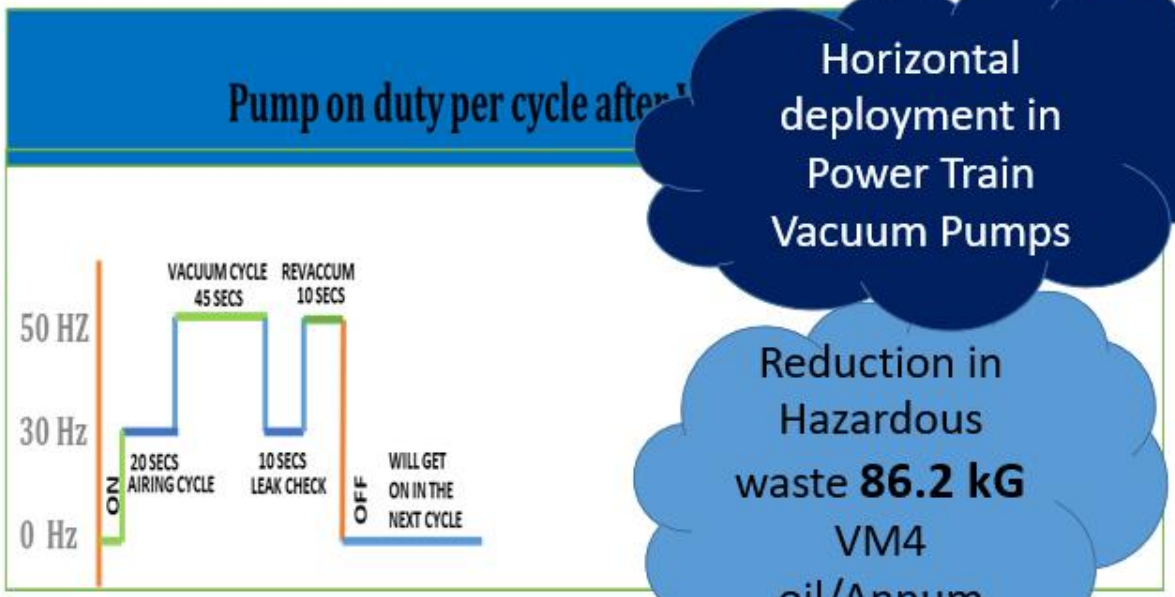
Vacuum Pump Motor Drawing Current at 50Hz.

VFD at 50 Hz



Vacuum Pump Motor Drawing Current at 30 Hz.

VFD at 30 Hz



Horizontal deployment in Power Train Vacuum Pumps

Reduction in Hazardous waste **86.2 kG** VM4 oil/Annum

Benefits

Benefits:

- **Skin temp low up to 40°C.**
- Low Power consumption
- **Reduction in hazardous waste.**
- Vacuum pump reliability will increase.
- Machine up-time increase.
- Machine repairing cost low.

Before temp. of pump

AFTER TEMP OF PUMP

Energy Saving **8048 kWh**/Annum & GHG emission reduction **5714 kG CO2** /Annum

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TATA MOTORS
Connecting Aspirations

Leverage Industry 4.0 to optimize water utilization

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Project Approach

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Digitization in Real Time Monitoring of Water Consumption

Approach

- Turnkey Solution
  - ETD was more
  - ROI > expected
  - Overshooting Allotted Budget
- In-House Solution
  - Lack of Manpower for Laborious work
- Hybrid Solution
  - Adheres to the allocated budget
  - Training In-House manpower results in boosting morale
  - ETD & ROI were as per requirements

Water Consumption Overview

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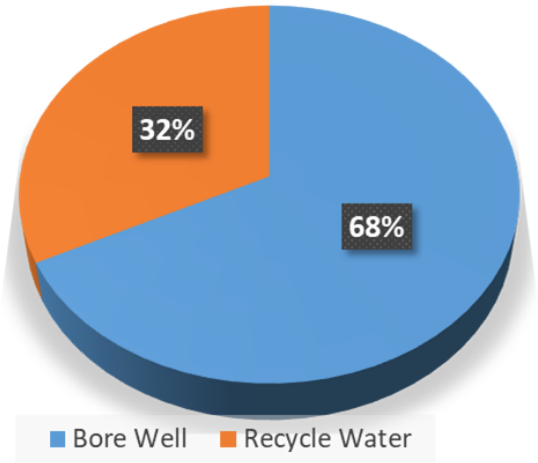
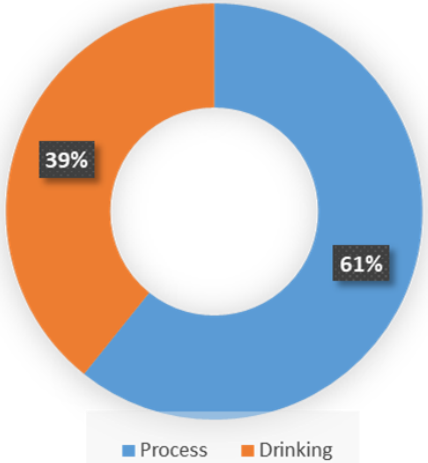
Fresh vs Recycle Water Share



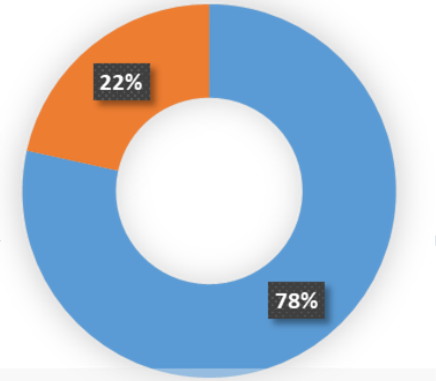
Bore Well	2,19,941
RO Water	1,04,924

Water Consumption



Process	1,89,144
Drinking	1,22,166

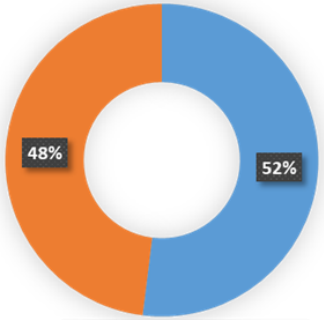
Process Water Shopwise



Paint Shop	1,45,542
other shop total	39,926

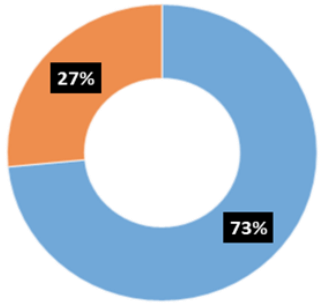
Drinking Water

Breakup Mfg vs Non-Mfg



MFG	53216
Non -MFG	49190

Process Water Mfg vs Non Mfg



Mfg	29442
Non-Mfg	10623

Note: All units in kL / year

TATA MOTORS

Water Distribution Overview

TATA MOTORS
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Sources

- Bore-well 1
- Bore-well 2
- Bore-well 3

Storage

- Raw Water Tank
- Fire Water Tank

WTP

Water Processing

- Process Water Tank
- Drinking Water Tank

Mfg & Non – Mfg areas covered in FY24

Non Mfg. Areas

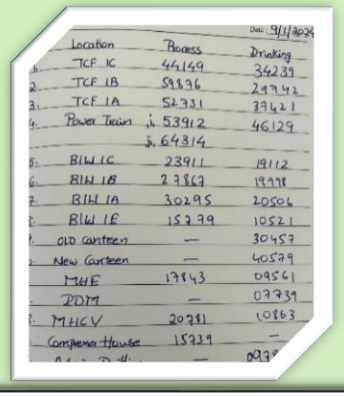
- Training Division
- Dispatch pad
- Compressor House
- Canteen
- Admin Building

Mfg. Areas

- Weld Shop
- Paint Shop
- Power Train
- Assembly Shops

Analog Flow Meters

- Manual data entry recording
- Remote Location of Meters



Hardware Installation

TATA MOTORS
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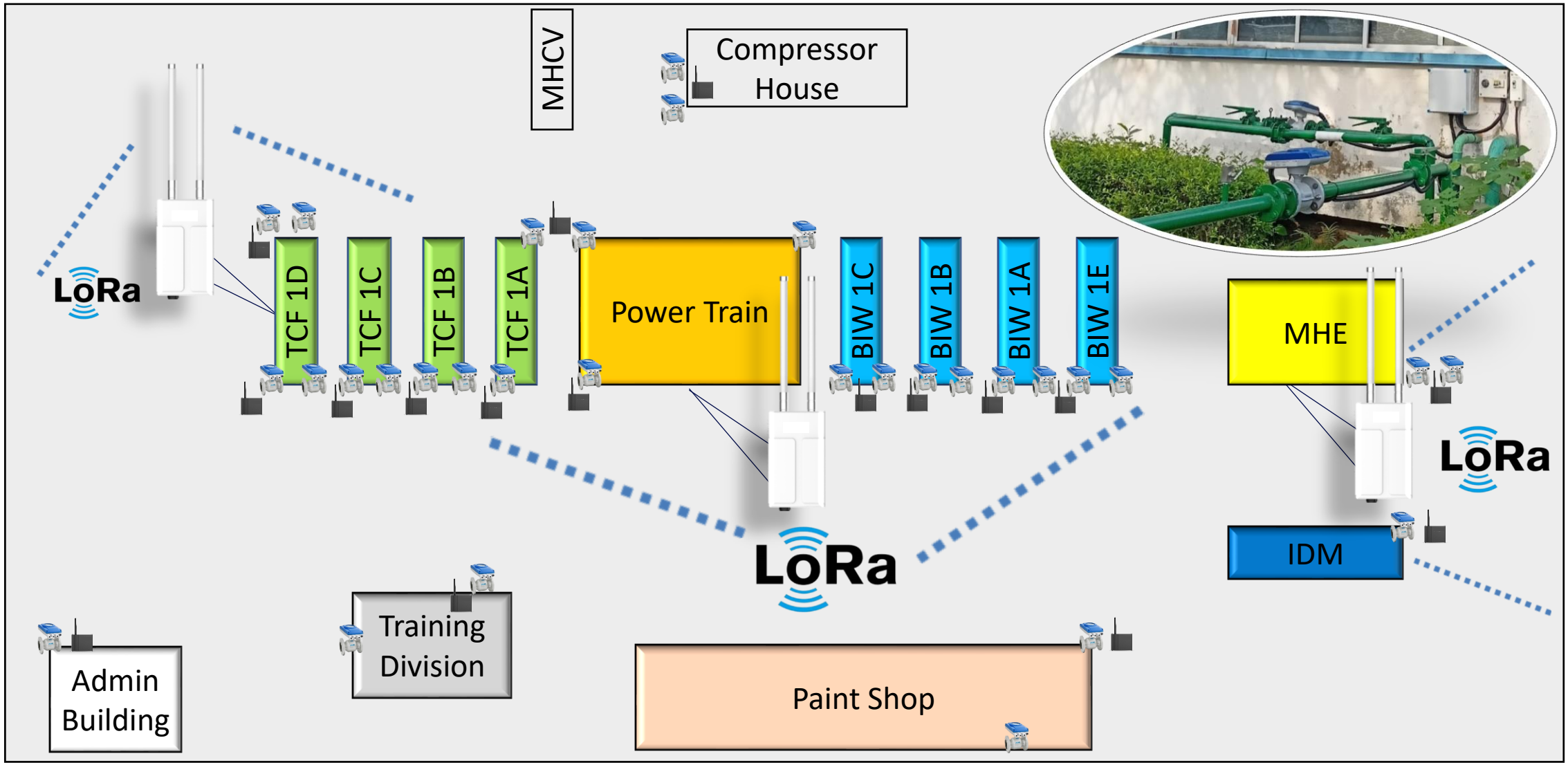

Data Acquisition

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Connecting Aspirations

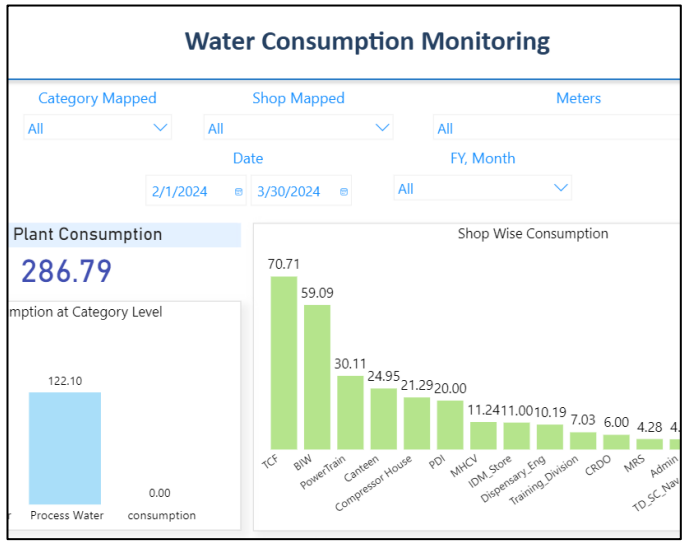
Water Flow Meter's data is stored in it's input registers

IoT Controller
Fetches data from Water Flow Meters through RS485 Comm. & Transmits data via LoRaWan N/w

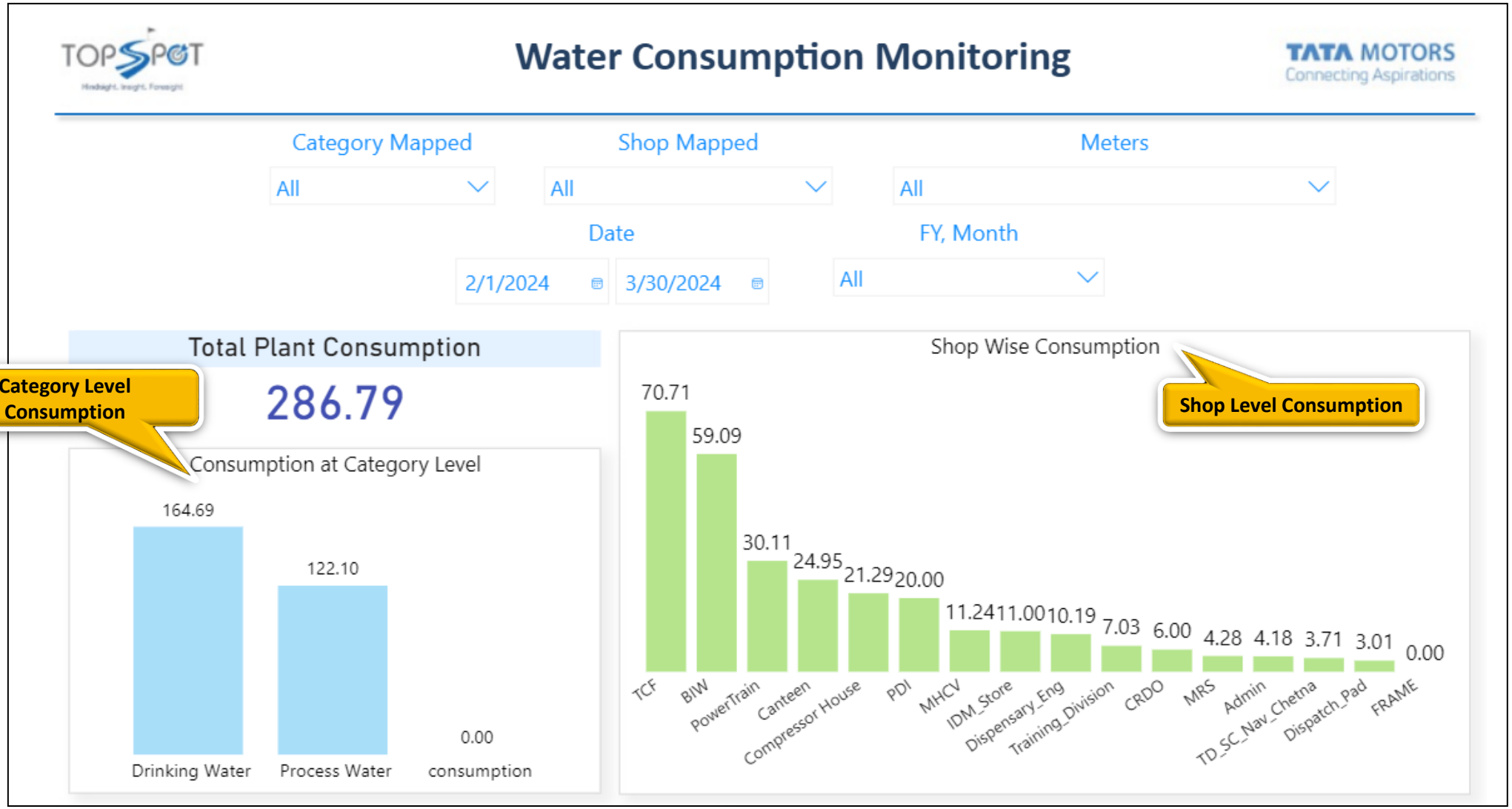
LoRaWan receives data from IoT Controllers and log data in SQL server through Node Red

A Program fetches data from SQL and converts into json format which is pushed to AWS

Dashboard



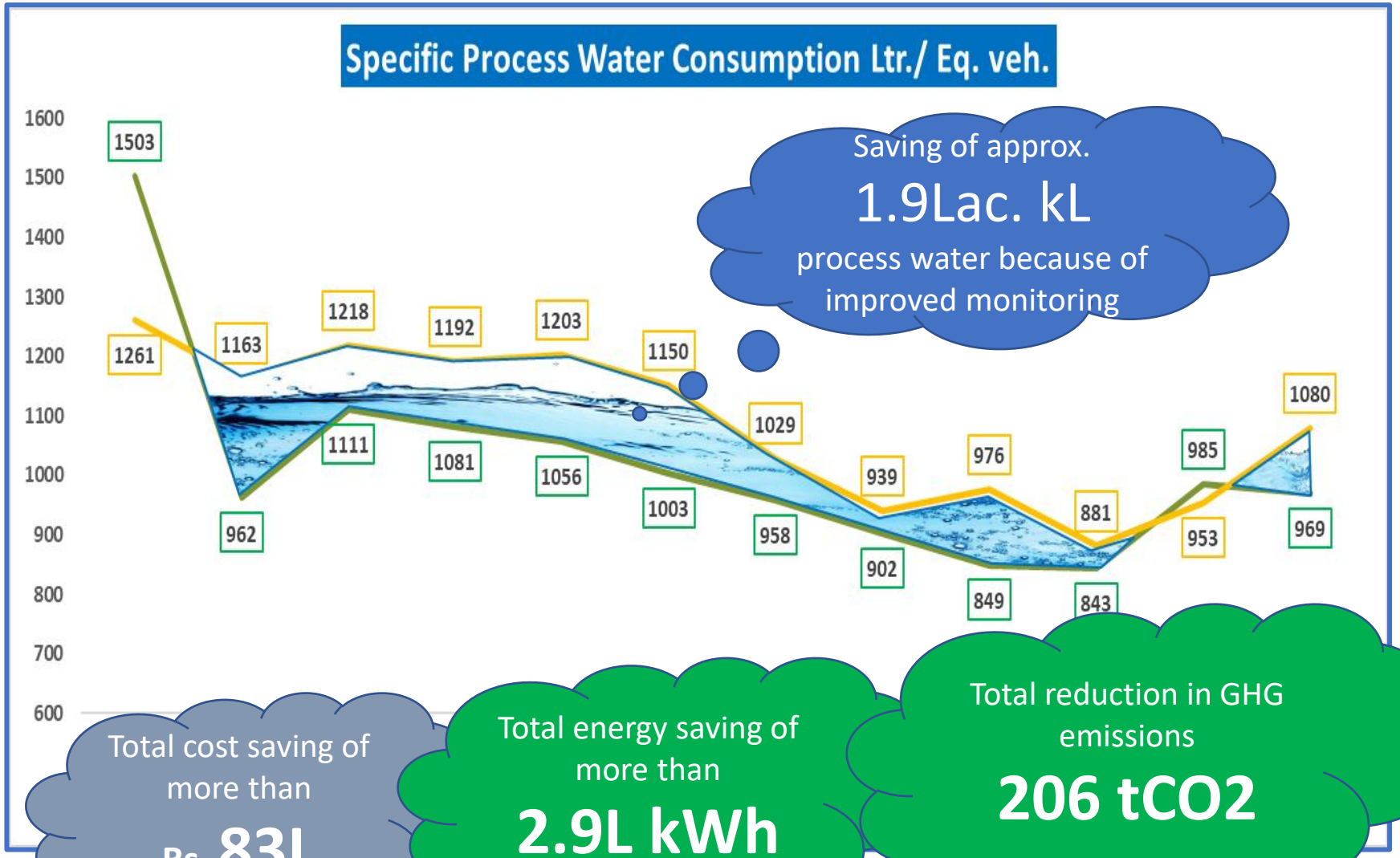
Effectiveness : Dashboard



Action taken and Results Achieved

Identification and arresting of leakage in under ground water pipe lines

Shifting to over-the ground pipe line from existing under ground pipe lines



Utilization of Renewable Energy Sources

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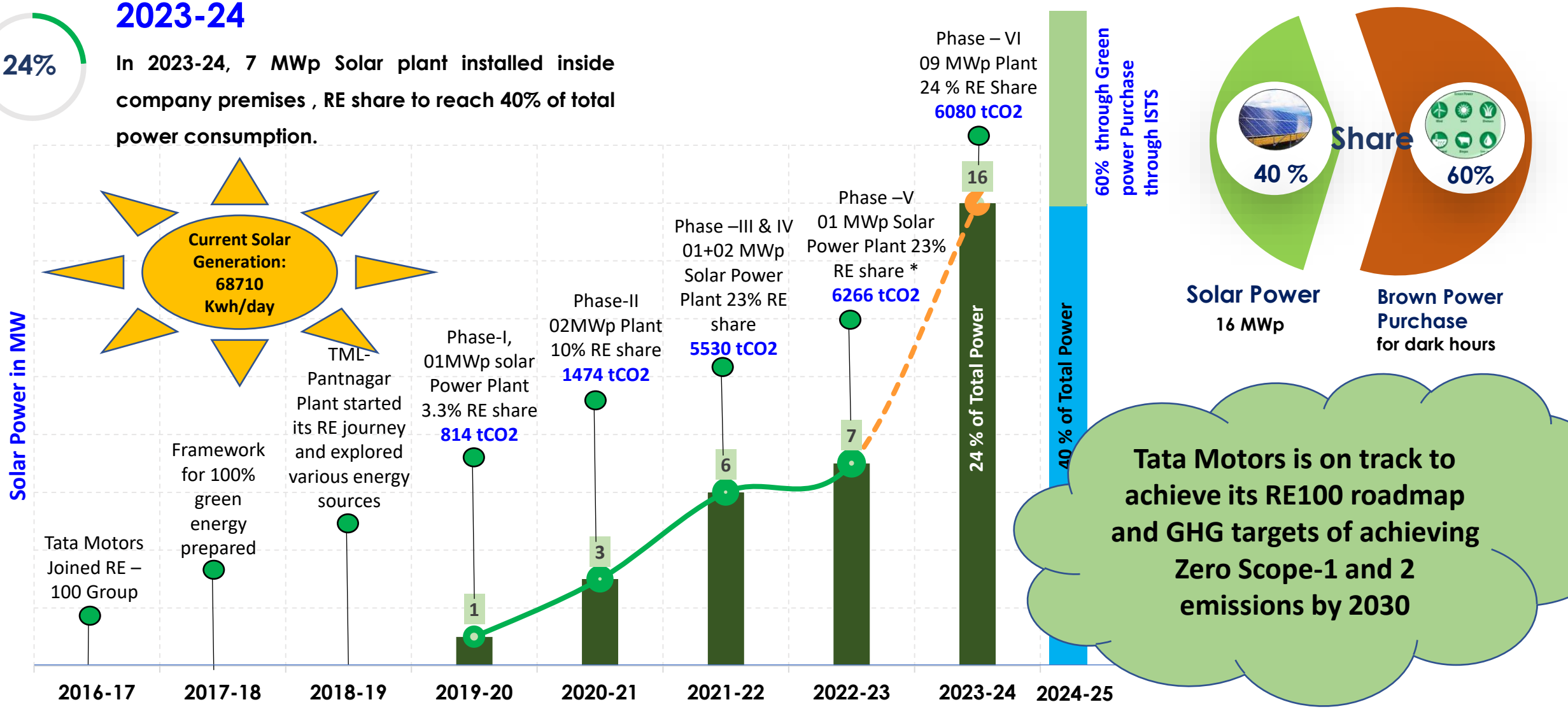
24%

2023-24

In 2023-24, 7 MWp Solar plant installed inside company premises , RE share to reach 40% of total power consumption.



Tata Motors is on track to achieve its RE100 roadmap and GHG targets of achieving Zero Scope-1 and 2 emissions by 2030

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TML Pantnagar is on track as per RE 100 Roadmap

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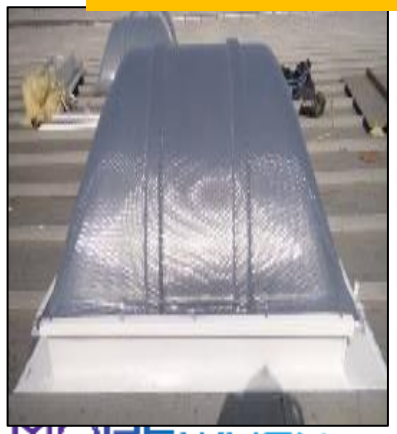
Other Renewable Energy Applications

Solar Thermal
5000 Ltr per day

Solar Street Lights: 55 Nos

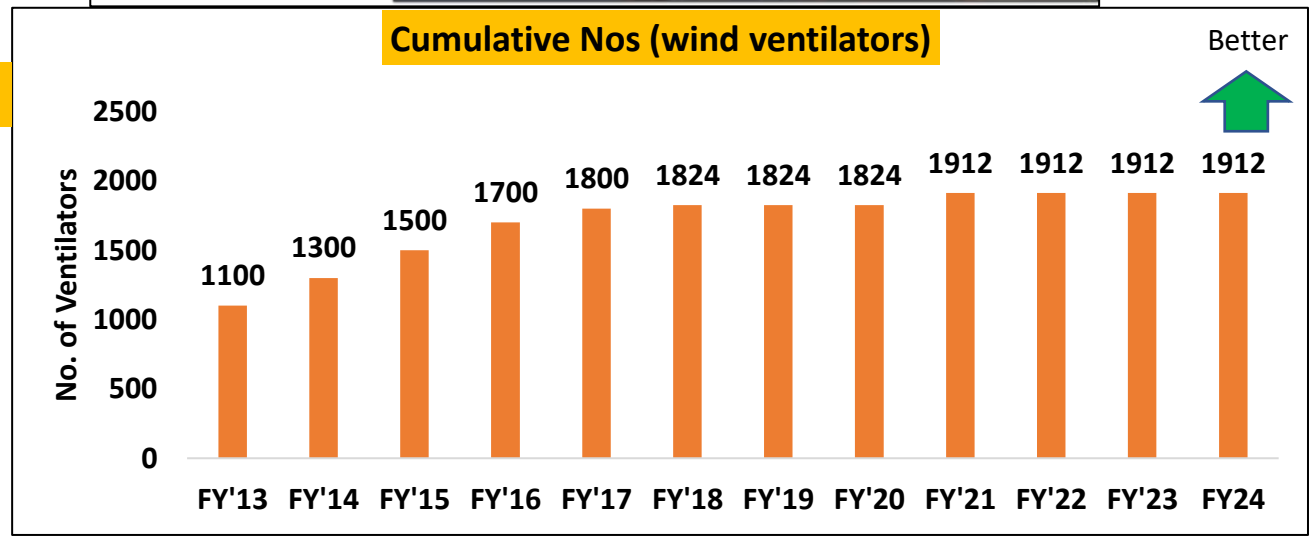
Wind ventilators

Solar day light pipe & Dome 46 Nos



Revival of old day-light panels

Cumulative Nos (wind ventilators)



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Waste Utilization And Management

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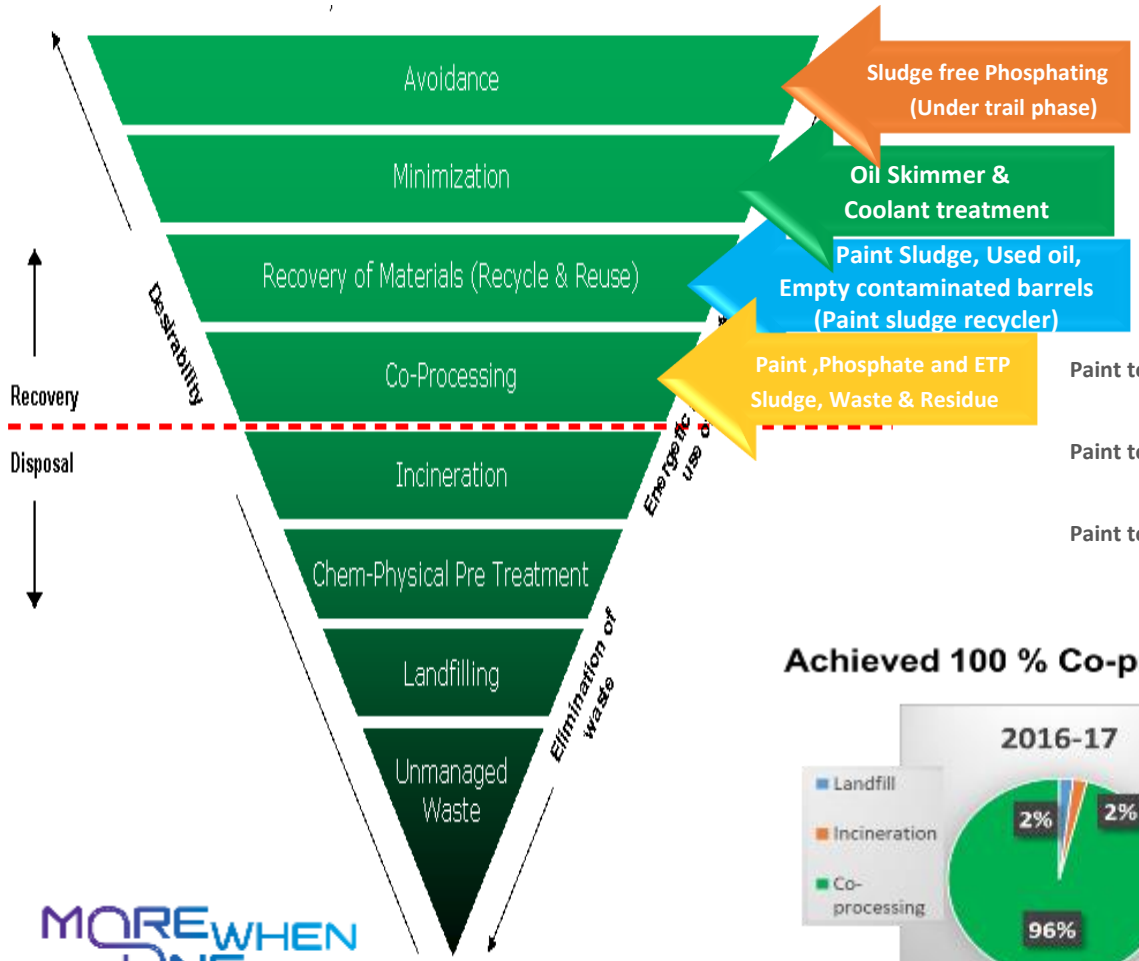
Connecting Aspirations

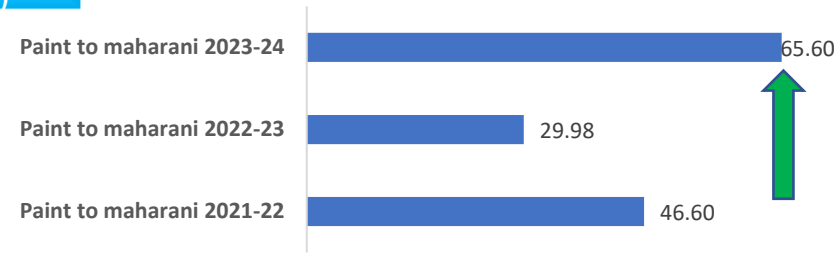
Mile Stone achieved :

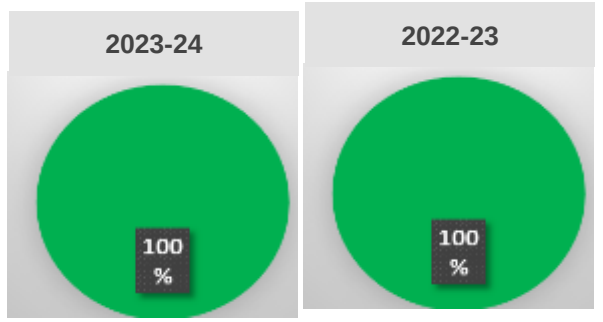
1) 100 % Elimination of Incineration and Landfill
2) 100 % Co-processing of Hazardous waste
3) 24T increase in recycling of Paint Sludge

S. No	Type of waste	Unit	Waste disposed (FY 22-23)	Disposal Mechanism
1	Paint Sludge	MT	88.04 **46.16**	Co-processing Recycling
2	Waste and Residue	MT	**144.98**	Co-processing
3	Phosphate Sludge	MT	44.59	Co-processing
4	Chemical Sludge (ETP Sludge)	MT	99.32	Co-processing



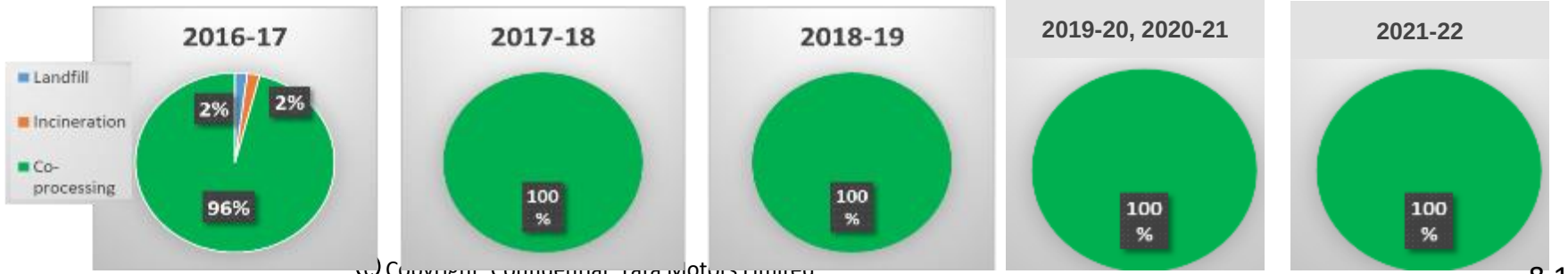
Percentage Recycling of Paint Sludge





Achieved 100 % Co-processing

- M/s Shree Cement Ltd, Bewer
- M/s Ambuja Cement, Rabriyawas
- M/s Ultratech Cement, Rajasthan



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Tata Motors Ltd. Pantnagar, Uttarakhand Certified with Zero waste to Landfill & Water Positive Certification from CII-GREENCO GBC

TATA MOTORS
Connecting Aspirations

Waste Sealer Recycle Machine installed in Paint Shop
Recycling of more than **24T** of used sealer

- *Tata Motors Pantnagar is Certified with Zero Waste to landfill (ZWtL) and Water Posi*
- *asses*
- *is firs*
- *ication*
- *Landfil*
- *by a te*
- *of Mr. K*
- *a two-st*
- *d of a p*
- *by the 2nd Step involving a re*
- *including review of Process*
- *Visit*

Installation of bore-wells in hilly areas

Heartiest Congratulations to entire Pantnagar Team for this achievement !

These Certificate reconfirms our commitment towards Sustainability and the continual participative approach of Team Pantnagar towards our journey for Sustainable Future.

GreenCO Rating Score

TATA MOTORS
Connecting Aspirations

Confederation of Indian Industry

GreenCo Rating System - Scorecard
Tata Motors Limited; Pantnagar; Uttarakhand

PARAMETERS	POINTS AWARDED														
	0 -10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150
Energy Efficiency														X	
Water Conservation										X	Points achieved out of 100				
Renewable Energy										X					
Green House Gas Emission										X					
Waste Management										X					
Material Conservation, Recycling & Recyclability										X					
Green Supply Chain										X					
Product Stewardship & Life Cycle Assessment												X		Points achieved out of 125	
Innovation for Environment					X	Points achieved out of 50									
Green Infrastructure and Ecology								X	Points achieved out of 75						

Points scored by TML Pantnagar

X — Best achieved by other GreenCo companies

Score	0-100	101-200	201-300	301-400	401-500	501-600	601-700	701-800	801-900	901-1000
Total score										

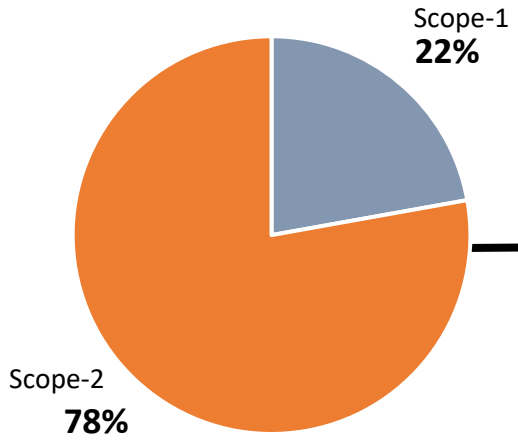
CERTIFICATION						
LEVELS	POINTS AWARDED					
	350-449	450-549	550-649	650-749	750-849	≥850
Certified						
Bronze						
Silver						
Gold						
Platinum						
Platinum +						

MAHINDRA
BE BOLD | OWN IT | SOLVE TOGETHER | BE EMPATHETIC

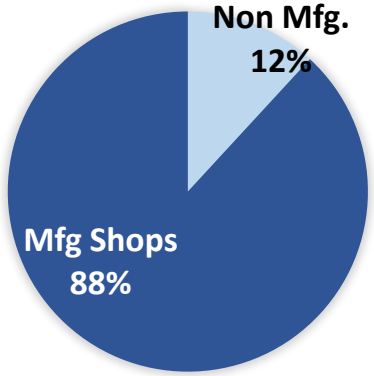
GHG Distribution overview

TATA MOTORS
Connecting Aspirations

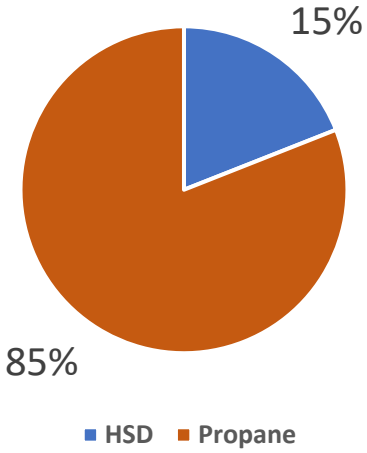
Total GHG Emissions tCO2

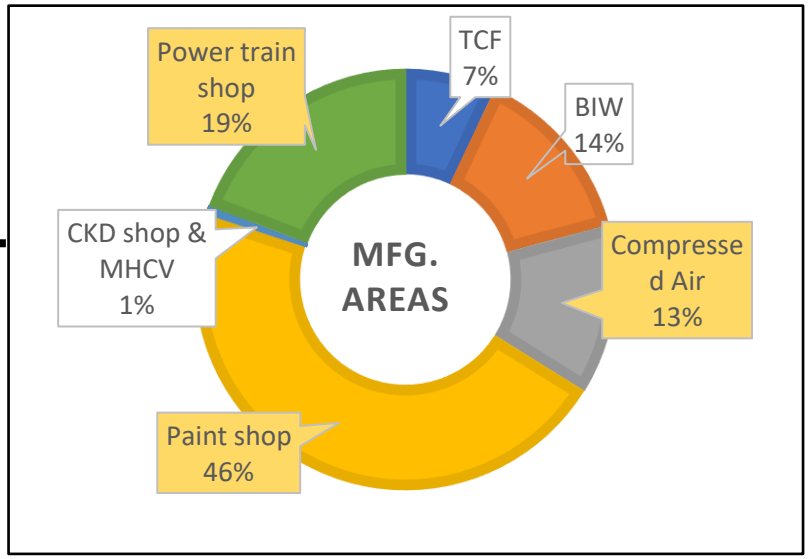


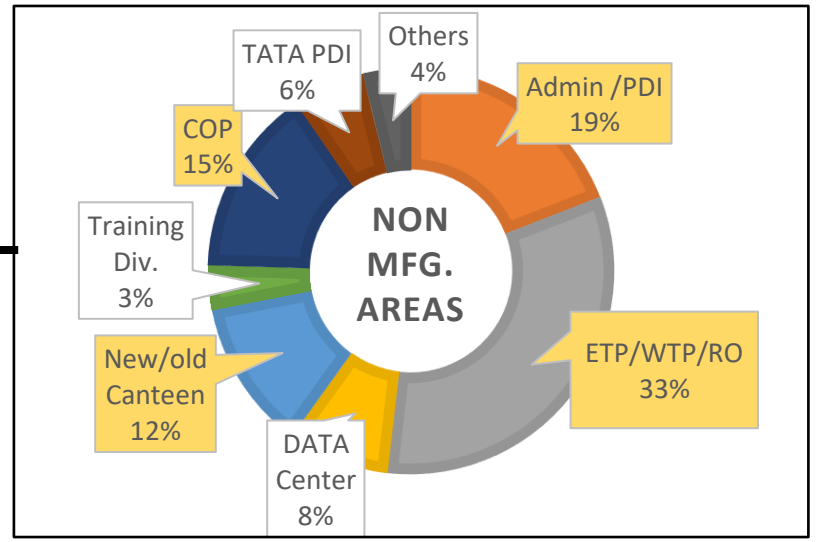
Scope-2 Distribution



Scope-1 Distribution







MOREWHEN ONE

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GHG Intensity of Peers/Competitors

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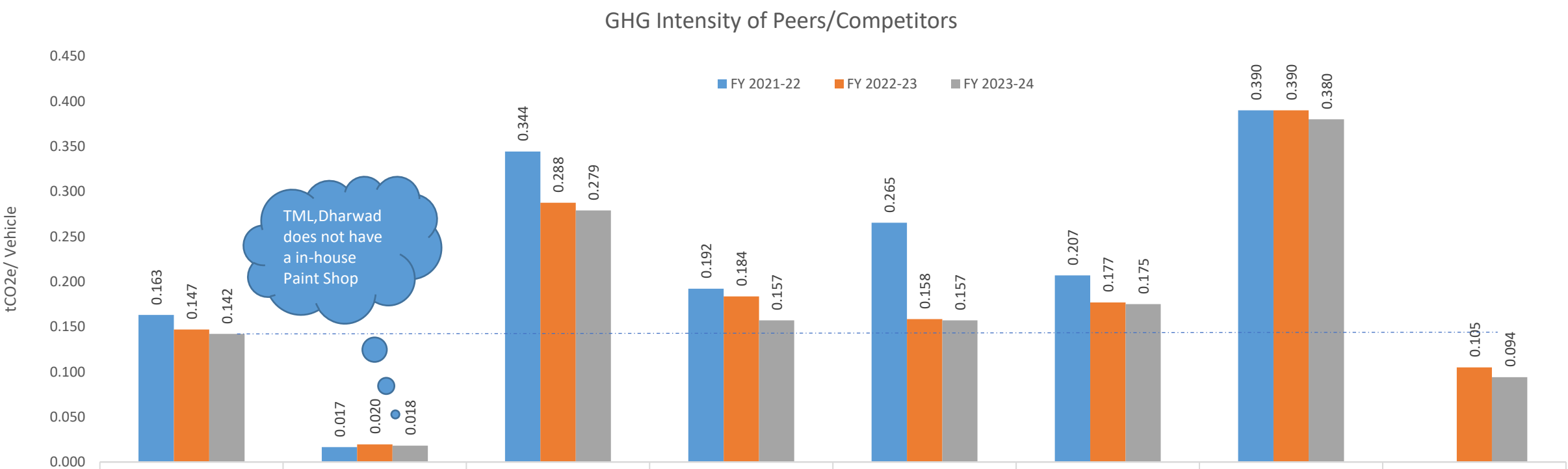

	Tata Motors Pantnagar (tOC2e/Eq.Vehicle)	TML Dharwad(tOC2e/Eq.Vehicle)	TML Jamshedpur(tOC2e/Eq.Vehicle)	TML Lucknow(tOC2e/Eq.Vehicle)	TML Pune CVBU(tOC2e/Eq.Vehicle)	Mahindra & Mahindra Ltd (tCO2e/Eq.Tractor)*	Ashok Leyland(tCo2e/Vehicle)*	Mahindra & Mahindra Ltd (tCO2e/Eq.Vehicle)*
FY 2021-22	0.163	0.017	0.344	0.192	0.265	0.207	0.390	
FY 2022-23	0.147	0.020	0.288	0.184	0.158	0.177	0.390	0.105
FY 2023-24	0.142	0.018	0.279	0.157	0.157	0.175	0.380	0.094

*Source of Information: Integrated Annual Reports

TML is committed to achieve Net Zero by 2030

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GHG Inventorization

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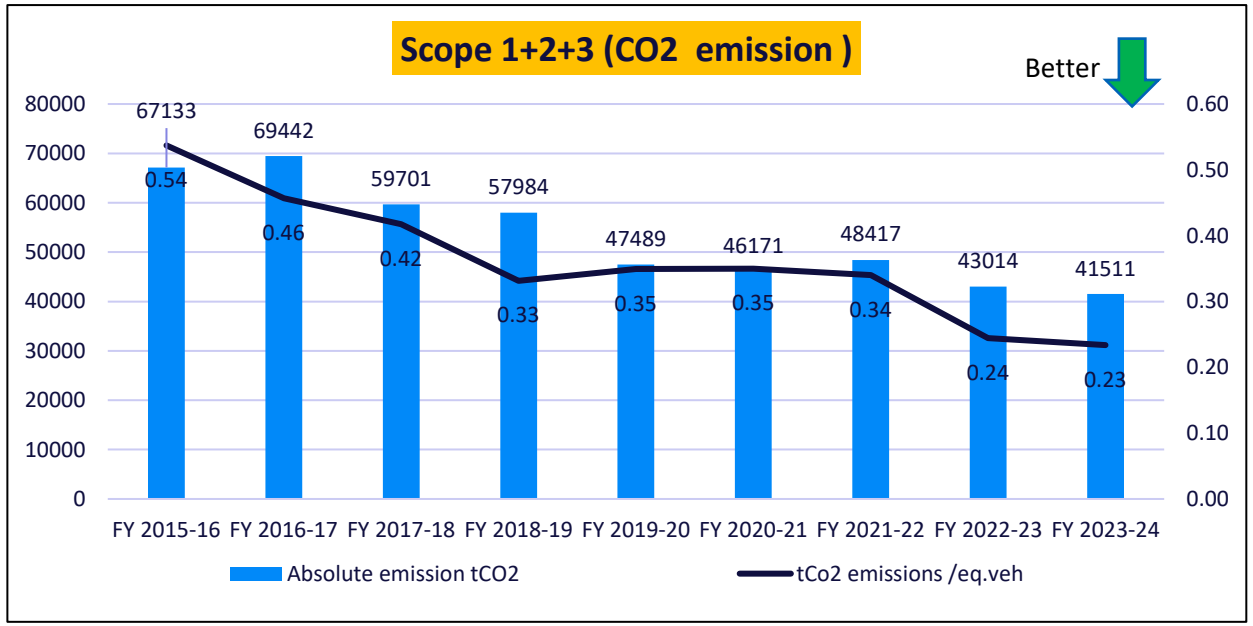
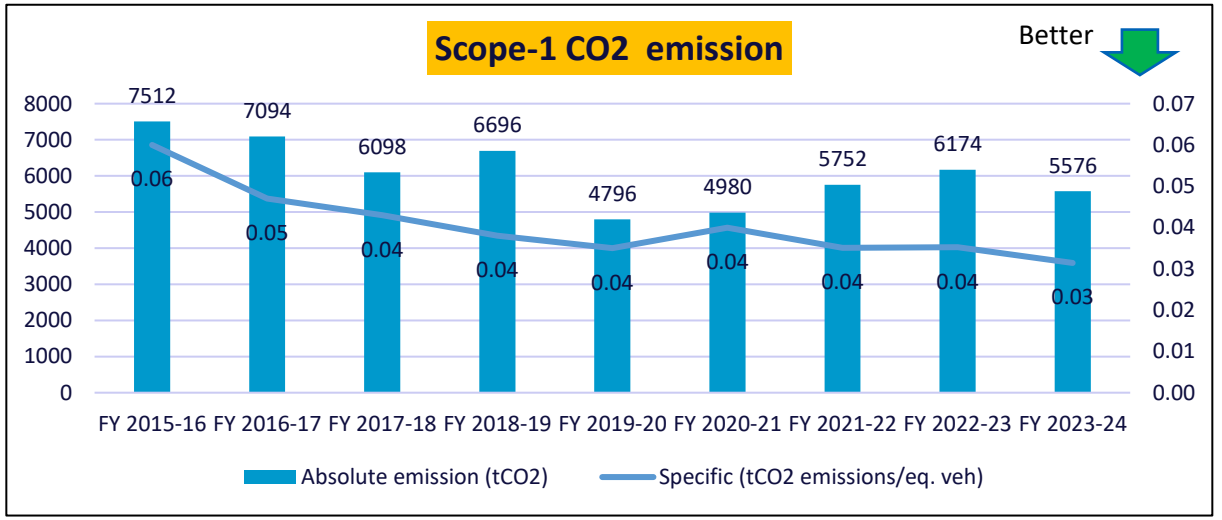
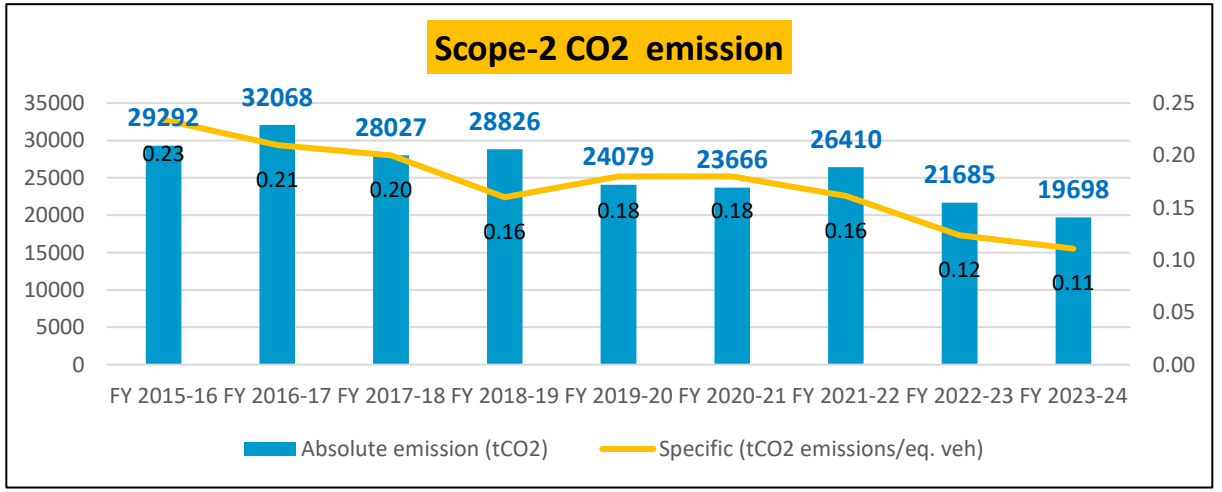
Reduction in Sp. GHG emission (Kg CO2 emission/ 25 SMH based Eq. Vehicle Produced).

Public disclosure is done through Annual Sustainability Report at TML







Supplier Scope 3 data collection from inside and outside vendor park is done in a structured manner and the frequency of collection is quarterly

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Reduction In Scope 3 Emission Intensity In The Last 3 Years

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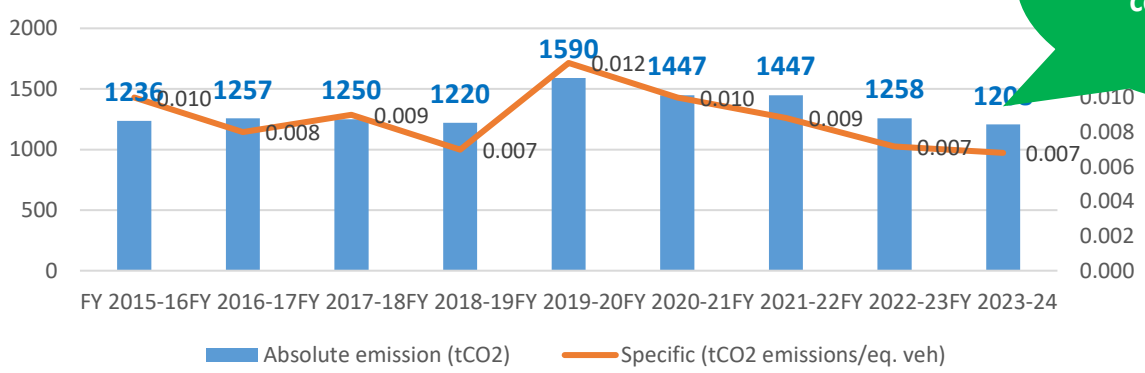
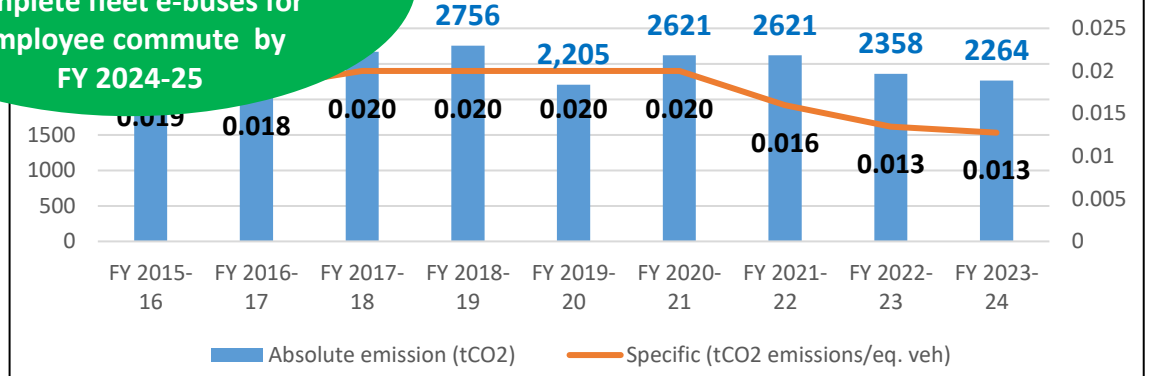
Scope 3 accounts for all other indirect emission that occur such as supply chain, canteen related, employee transportation and business trips. All business trip requests are monitored through Quest2travel portal.

TML, Pantnagar is going to be the first plant across TML to move towards complete fleet e-buses for employee commute by FY 2024-25

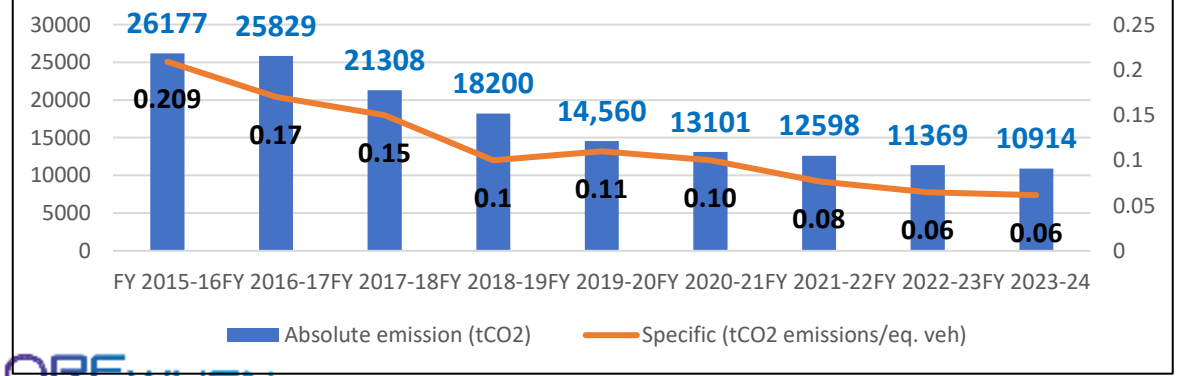
Scope-3 (EmplOyee Daily commute) CO2 emission



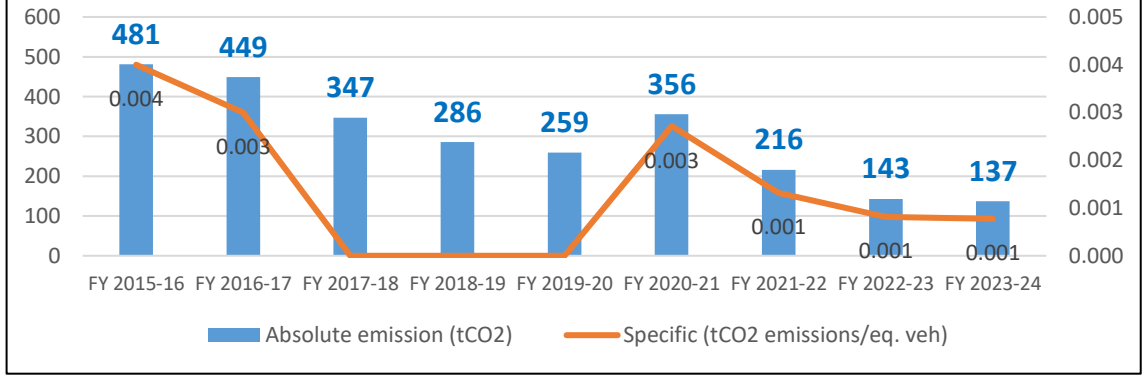
(Vendor Park) CO2 emission



Scope-3 (Outstation)CO2 emission



Scope-3 (Employee travel for business commute) CO2 emission



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Green Supply Chain Management

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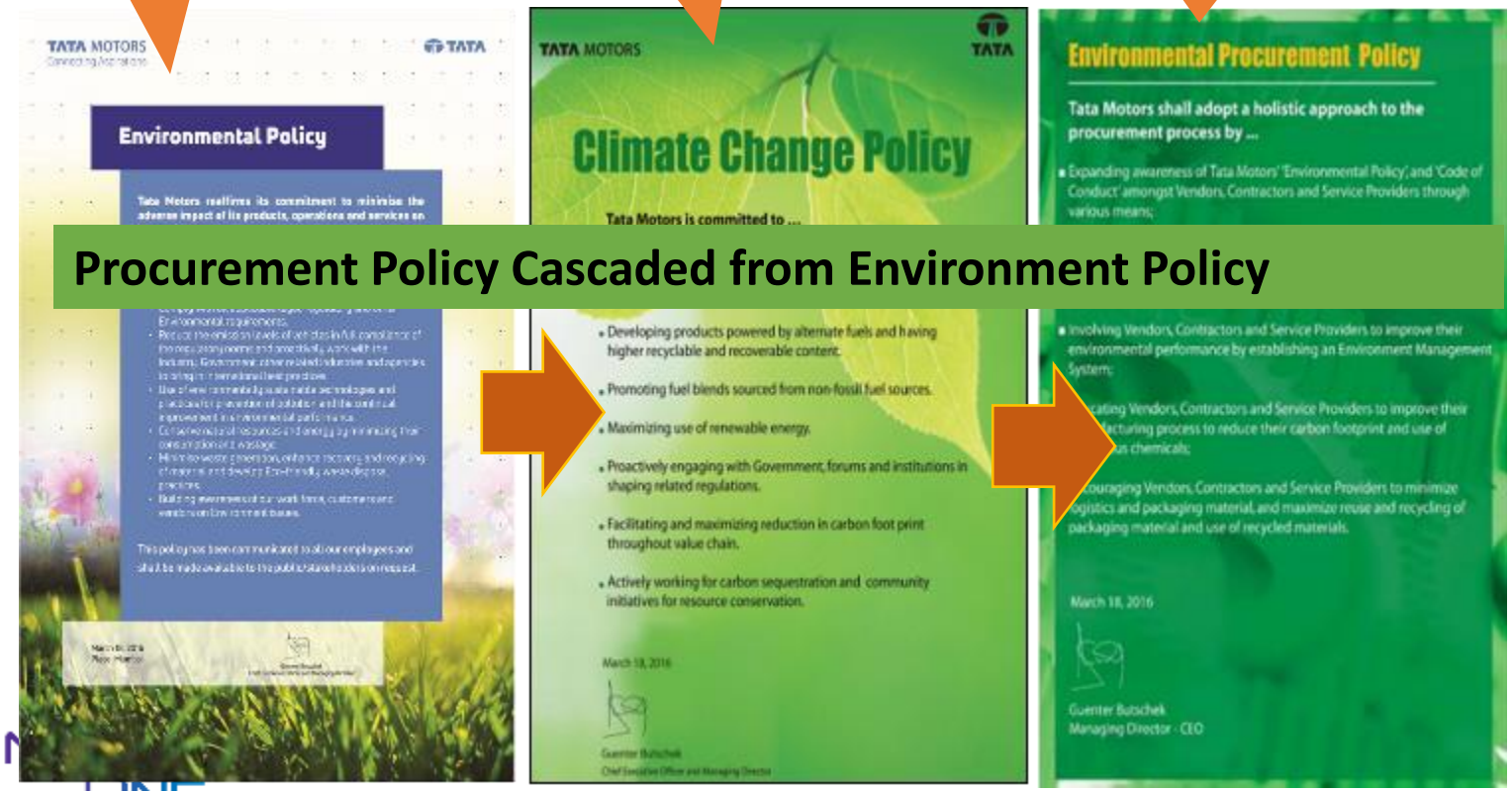
Building awareness of our workforce, customers and vendors on Environment issues.

Facilitating and maximizing reduction in carbon footprint throughout value chain.

Awareness… Evaluating environmental performance… Involving, Educating & Encouraging vendors…



Procurement Policy Cascaded from Environment Policy

Approaches

- **Set up local vendor park with 64 suppliers**
- Sequential supplies for vendor park suppliers
- Procurement policy cascaded from environment
- Resource allocation in SCM
- **Supplier sustainability**
- Training & awareness creation for suppliers
- Supplier selection: MSA

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Supplier Sustainability Dashboard

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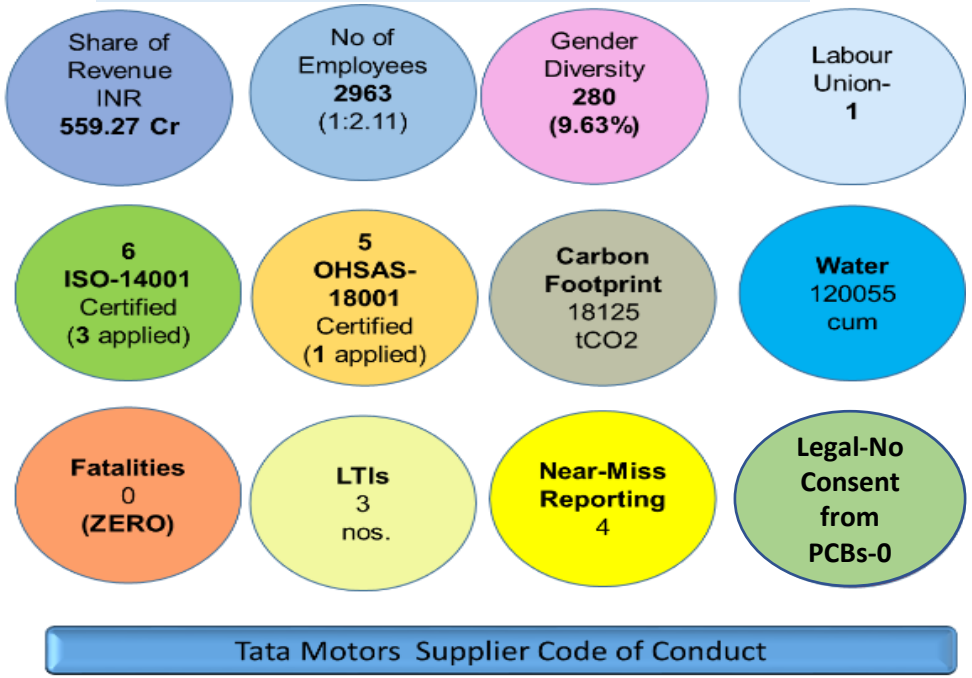
Supplier Sustainability Overview:



Education & awareness creation for suppliers:

Activities in Sustainable Supply Chain Initiative	No of Suppliers
Total Suppliers in Vendor Park	72 (66 Active)
No of Supplier Workshop done	46
Site assessment done	24
Supplier's Felicitation	7

Sustainable Procurement Implementation Guideline:

1) Supplier Selection : Manufacturing Site Assessment (MSA)
2) Evaluation of Supplier :
3) Managing Supply Chain : Maximizing Usage of Returnable Packaging
4) Supplier Sustainability : Training and capacity building of suppliers on sustainability

Sequential supplies for vendor park suppliers

Supplier	Commodity	No. of Parts (FY'23)	No of parts (FY'24)	Status
M/s Adient	Front seat	17	23	Done
M/s Mutual	Front Bumper	18	24	Done
M/s D&S	Fuel Tank	2	4	Done
M/s Mitter & Mitter	Steering Wheel	2	6	Done
M/s Syndicate	Silencer	7	12	Done
M/s Mahabal	Front Axle	5	18	Done
M/s Taco	Front Panel	17	21	Done
M/s Spicer	Rear Axle	3	8	Done
M/s Tata Toyo	Radiator	2	6	Done
M/s Jay Suspension	Suspensions	0	10	Done
M/s Mayur	Door Pads	0	12	Done
	Total	73	144	

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Implementation of ISO 50001/Green Co/IGBC rating

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Tata Motors Ltd. Pantnagar, Uttarakhand Certified with Zero waste to Landfill and Water Positive Certification By CII

CERTIFICATE
OF VERIFICATION

This is to certify that

TATA MOTORS LIMITED, PANTNAGAR

Involved in the manufacturing and assembling of Commercial Vehicles is verified as

ZERO WASTE TO LANDFILL FACILITY

Certificate No : CII-ZWTL-2024-02

Issued Date : 29 August 2024 Expiry Date : 28 August 2027

K S VENKATAGIRI
Executive Director
CII Godrej GBC

PRADEEP BHARGAVA
Chairman, CII GreenCo Council
CII Godrej GBC

CERTIFICATE
OF VERIFICATION

This is to certify that

Tata Motors Limited, Pantnagar

Involved in the manufacturing and assembling of Commercial Vehicles is verified as

WATER POSITIVE

Certificate No : CII-WNC-2024-02

Issued Date : 29 August 2024 Expiry Date : 28 August 2027

K S VENKATAGIRI
Executive Director
CII Godrej GBC

PRADEEP BHARGAVA
Chairman, CII GreenCo Council
CII Godrej GBC

"At TML Pantnagar, we're leading the charge toward that Healthy, sustainable future with our Zero waste to landfill Plant (ZWtL) and Water Positive "

This Certificates reconfirm our commitment towards Sustainability and the continual participative approach of Team Pantnagar towards our journey for Sustainable Future.

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Team work, Employee Involvement and Monitoring

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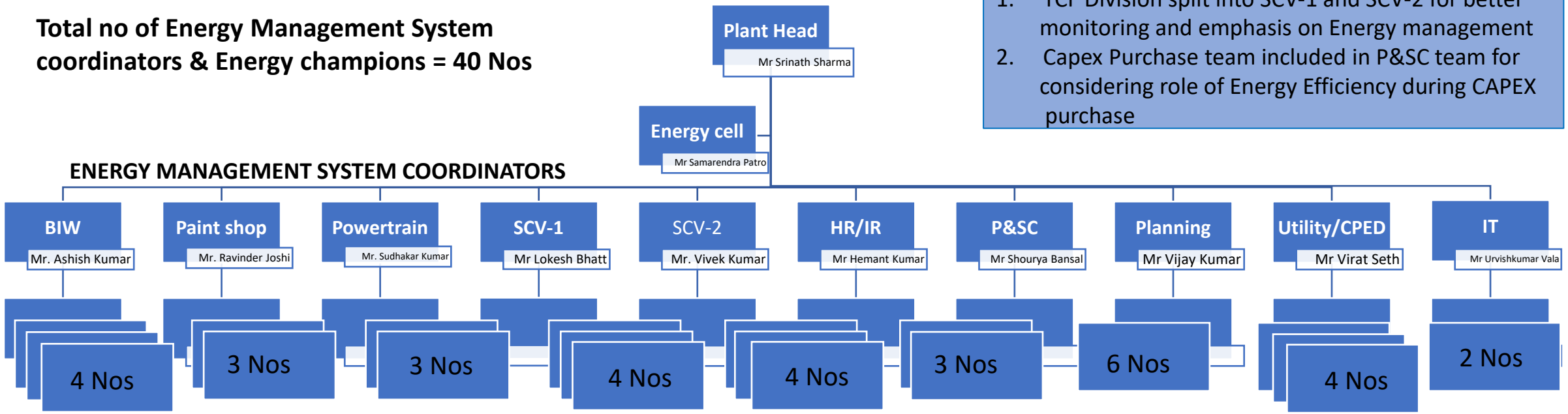
Changes in FY 23:

1. TCF Division split into SCV-1 and SCV-2 for better monitoring and emphasis on Energy management
2. Capex Purchase team included in P&SC team for considering role of Energy Efficiency during CAPEX purchase

Total no of Energy Management System coordinators & Energy champions = 40 Nos



- Daily monitoring & control
- Gap analyses
- Zero investment idea implementation
- Operational efficiency during fluctuating demand
- Idea generation
- Motivate employee involvement
- Training need identification

- Facilitate external training
- Participation in external events
- Rewards and recognition

- Green supply chain initiatives
- Supplier training
- Sharing best practices to supplier thru supplier meet
- ISO 50001 handholding for implementation

- Energy eff. Facility planning
- Upgradation to eff. Technologies
- Process study and gap analyses
- Benchmarking

- Efficient O&M of utility/IT facilities
- Energy eff. Facility planning
- Upgradation to eff. Technologies
- Process study Benchmarking

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Training and Employee Involvement

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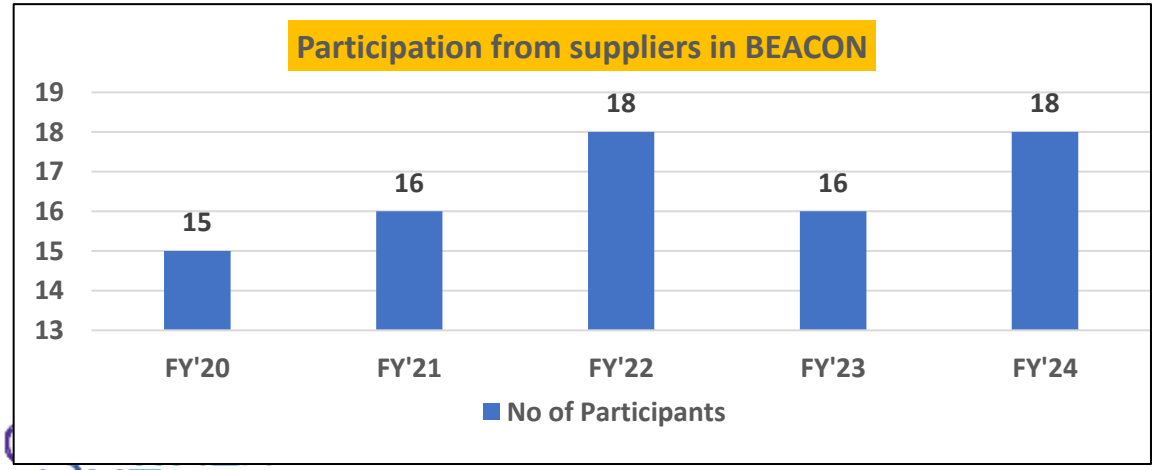
Trainings Mechanisms On Energy Management :

S N	Description	Frequency
1	Energy management system – ISO 50001 training through HR	Monthly
2	Participation in external trainings	Need based
3	Participation in Award functions and expositions	Frequent- need based
4	Online training through Tata motors academy	Online – always available
5	Participation in 30 Nos events in Energy conservation months	30 -35 days in a year
6	Energy Nuggets – through email	30 - 40 mailer



2 Nos employees trained as Lead auditor and 17 employees trained as Internal Auditor in ISO 50001:2018 . These are certified Auditors to conduct energy audits.

Online suggestion portal

- Average 55000 suggestions per year
- Monitory reward – Rs 200 – Rs 5000
- Special suggestions schemes

Kaizen Promotion Cell
Monthly Area Wise Kaizen Tracking

KAIZEN IMPLEMENTATION SUMMARY REPORT

Sr.No.	Department/Area	Apr'19	May'19	Jun'19	July'19	Aug'19	Sep'19	Oct'19	Nov'19	Dec'19	Jan'20	Feb'20	Mar'20	Cumm. Total
1	AQ	0	0	0	0	0	0	0	0	0	0	0	0	0
2	BIW 1A	238	283	76	0	0	0	48	0	0	122	122	90	979
3	BIW 1B	146	152	199	189	212	231	205	203	0	192	301	200	2432
4	BIW 1C	12	53	35	35	46	36	28	38	0	39	15	24	394
5	Frame	20	41	29	32	19	32	14	0	19	18	0	0	206
6	CMS	3	3	36	0	2	2	0	2	2	50	11	12	127
7	CPED	0	0	0	0	0	0	0	0	0	0	33	28	61
8	CKD	5	0	0	0	0	0	0	0	0	0	0	0	5
9	CKD Quality	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Powertrain	23	17	17	0	0	21	20	38	22	30	10	36	254
11	Paint Shop	182	174	0	210	169	173	159	0	117	180	120	155	1909
12	SQIG	0	0	0	0	0	0	0	0	0	0	0	0	0
13	TCF 1A	0	26	53	49	75	0	25	0	0	150	100	80	586
14	TCF 1B	118	27	26	85	127	64	110	0	0	236	175	220	1427
15	TCF 1C	110	110	140	110	109	119	132	136	136	167	167	180	1616
16	TCF 1D	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Scrap yard	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Export Cell	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	857	880	787	727	762	678	745	592	745	1184	1054	1025	10036

Sample year FY 23-24

Total Kaizen 10036

Suggestions generated in Unique EnCon suggestion scheme

Sugg ID	Date Entry	Title	Category Name	Pertaining Category	Place Applicable	Name Of Block	Scheme Type	Present Status	Proposed Changes	Benefits
2023408	02/04/2021	Digitization done of machine manual and other documents.	Environment	PROCESS	Power train	NTC machines	IMPLEMENTED	Earlier There was no provision for checking soft copy of machine manual or its history cards insistently.	Generate separate QR code for each machine and pasted on machine or panel.	1) Document Digitization done 2) Paper saving
2023980	07/04/2021	OCCUPATIONAL HELTH AND ENVIRONMENT	Environment	PROCESS	WELD SHOP	WIND MOVING EXHAUST ON SHOP ROOF	NORMAL	EXHAUST FOR SHOP FUME AND ALL GASES FLOW OUT TO OUTSIDE OF THE SHOP. BUT DUE TO SHOP HEIGHT, WELDING FUME SPREADED ON SHOP FLOOR AND ALL	FROM WIND MOVING EXHAUST TO WELDING STATION . IN THIS CASE WELDING FUME EXHAUSTED COMPLETLY FROM STATION AND NO CHANCE TO SPREADED WHOLE	NO HEALTH ISSUE REGARDING LUNG DISEASE FOR ALL EMPLOYEE OPERATOR MORAL HIGH
2030336	03/06/2021	Addon Holding tank installation for BOD TSS reduction	Environment	PROCESS	STP	HOLDING TANK	IMPLEMENTED	No provision of holding tank leads to floc and high TSS ,BOD load over the Fine Screen	additional Holding tank with aeration system added in the system which reduce the floc load and reduce TSS & BOD	improve the quality of treated effluent of the STP
2030338	03/06/2021	Online Real time Monitoring system	Environment	PROCESS	STP	OCEQMS	IMPLEMENTED	No continuous monitoring System to check the system efficacy	OCEQMS system implemented for continuous monitoring of parameter	helps in system quality parameter efficacy check
2030340	03/06/2021	Fine screen implementation to improve the STP parameter	Environment	PROCESS	STP	SS FINE SCREEN	IMPLEMENTED	MS fine Screen	SS fine screen with high capacity	reduce TSS load over the STP System
2030341	03/06/2021	STP Upgradation¿ Design Improvement , Preventive Maintenance	Environment	PROCESS	stp	INLET TANK	IMPLEMENTED	NO BAFFLE IN THE SYSTEM	BAFFLE AND LAUNDER ADDED IN THE INLET TANK	REDUCE THE TSS AND FLOCS TO THE SYSTEM
2031845	13/06/2021	RBT should be done in a closed chamber	Environment	PROCESS	ALL TCF SHOPS	RBT	SPECIAL	At present, RBT is done in open area due to which all smoke got spread in environment and ultimately which is causing pollution and health issues to the workers.	It should be done in closed chamber so that all smoke can exhaust directly from the shop.	1. Pollution will reduce 2. Chances of Health issues will reduce
2031846	13/06/2021	Oil Tray should be available in Mechanical line	Environment	PROCESS	TCF 1B	Mechanical Line	SPECIAL	At Present, whenever there is any leakage in vehicle all oil got spilled on floor which ultimately make environment polluted.	leakage in vehicle all oil will be collected in it which can further easily be transferred in scrap oil drum. This will help to reduce pollution.	1. Pollution will reduce 2. Chances of slip will reduce
2031847	13/06/2021	Install Aerators in Washrooms	Environment	PROCESS	All shops		SPECIAL	At Present there is no provision to control the flow of water due to which water wastage are more in plant.	There should be taps having low-flow aerators installed to reduce water wastage.	1. water saving
2032035	14/06/2021	Shower water not timely recycling.	Environment	PROCESS	On tcf 1A shower.	shower testing machine .	NORMAL	Unpleasent smell coming on shower due to shower water not timely recycling .	timely shower water recycling.	For benefits of environment & operator helth .
2032633	16/06/2021	fresh air ventilation	Environment	PROCESS	Powertrain/ Engine assembly	Clean room conveyor	NORMAL	Presently not any system for fresh air ventilation inside clean room conveyor. There is ac system presently	Need to provide ventilation for fresh air it may be provide by normal filtration system of fresh air	Safety from covid
2033835	21/06/2021	Provided new design mist collector to prevent mist fumes hazard to operator.	Environment	PROCESS	800 CC CBL HONING	Honing machine (Ghearing,Nagel)	IMPLEMENTED	Mist filter not in working, mist fumes not extracted by filter.	Mounted new mist collector for effective mist collection and prevent hazard from operator.	Operator health, environment
2036364	28/06/2021	ENERGY SAVING IDEA	Energy Saving	PROCESS	ALL SHOP FLOOR	SHOP FLOOR LUX LEVEL	NORMAL	starting me light ki jarurat hoti hai , uske baad 10-11 am tak sun ki light se kam chai jata hai, lekin light on rahti hai , switch off karna bhul jate hai. Energy loss hota hai.	waha par light Sensor(photo sensor) lagaya jana chahiye . jo station par 300-400 lux level se jayada hone par light ko off kar denge.	Energy saving Cost saving Operator Moral high

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11 Learnings from CII Energy Award or Any Other Award Program

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1. Learned about ESCO model- All our solar plants installed based on ESCO model
2. Picked up heat pump project for Powertrain and Paint shops, IFC for Compressed Air system and FFC for fuel optimization
3. Picked up HVLS fans project for our Frame shop and TCF shops
4. Learned about heat recovery system and implemented projects
5. Interacted with many suppliers from energy sector
6. Learned best practices from other automobile companies
7. Increased the % dependence on RE sources (such as Solar Power, Green Power Purchase)

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GHG Target Setting –short term & Long term targets

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CV Plants - FY23 GHG (Scope 1 + 2) related target

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1. **Alingana Ask** – Based on 25% reduction in Scope 1+2 Emissions by 2030 from a FY20 Base Year level
2. **SBTi Ask** – Intensity from SBTi Tool
3. **RE-100 Visibility** – Based on Bridge to India's suggested roadmap of RE%

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Alingana Vs SBTi Vs RE-100 (Intensity)

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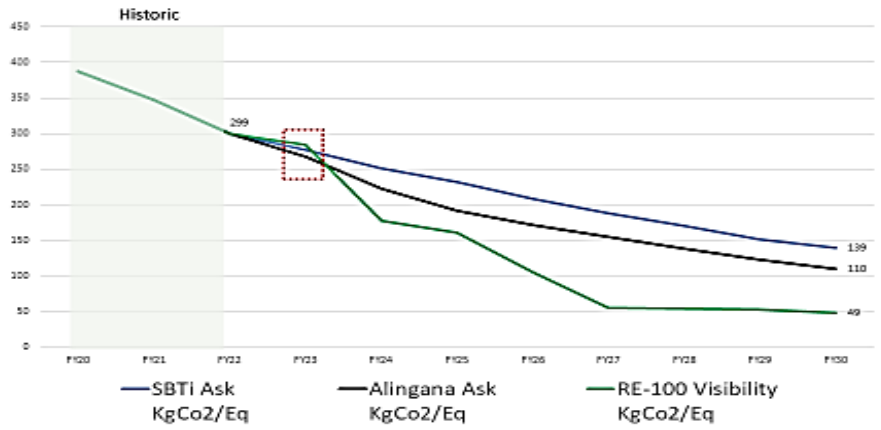

- For FY 23, Alingana is most demanding of the three at TML Level.
- Thus for BSC Target setting for FY 23, Alingana should be the guiding principle

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Target setting basis Alingana

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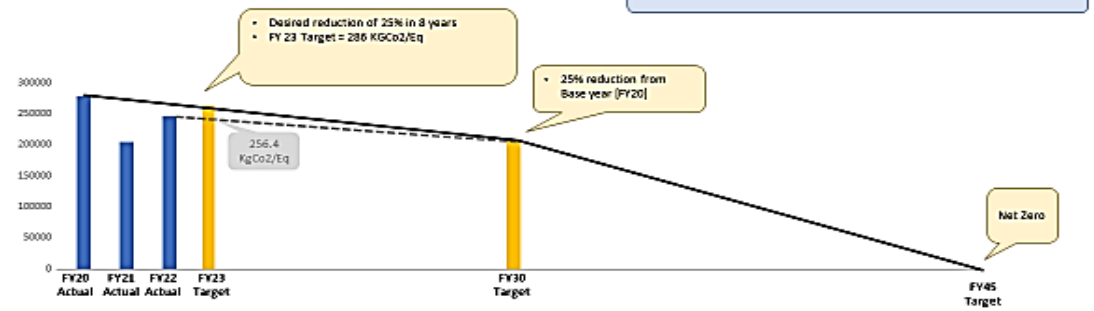
- Alingana Milestones:
  1) ~~Cap the Scope 1+2 emissions to that of base year of 19-20~~
  2) Reduce S1+2 emission by 25% by 2030
  3) Net zero by 2045

		2020	2021	2022	2023
CV	Absolute	277984	205059	246618	266724
	Intensity	396	344	298	283

- As per Alingana, for FY 2022, required intensity is 283 KgCo2/Eq
- *CVBU has proposed to take a target of 280KgCo2/Eq*



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Tata Motors aims to achieve net zero greenhouse gas emissions by 2045: Executive Director

3 min read • 26 Aug 2023, 12:59 PM IST

Livemint

Tata Motors plans to achieve net-zero greenhouse gas emissions by 2045 through technologies like electric and hydrogen fuel.

ONE
BE BOLD | DARE | SOLVE TOGETHER | BE EXPERTISE

Absolute GHG (tCO2e) (Scope1 & 2) – Net Zero Plan

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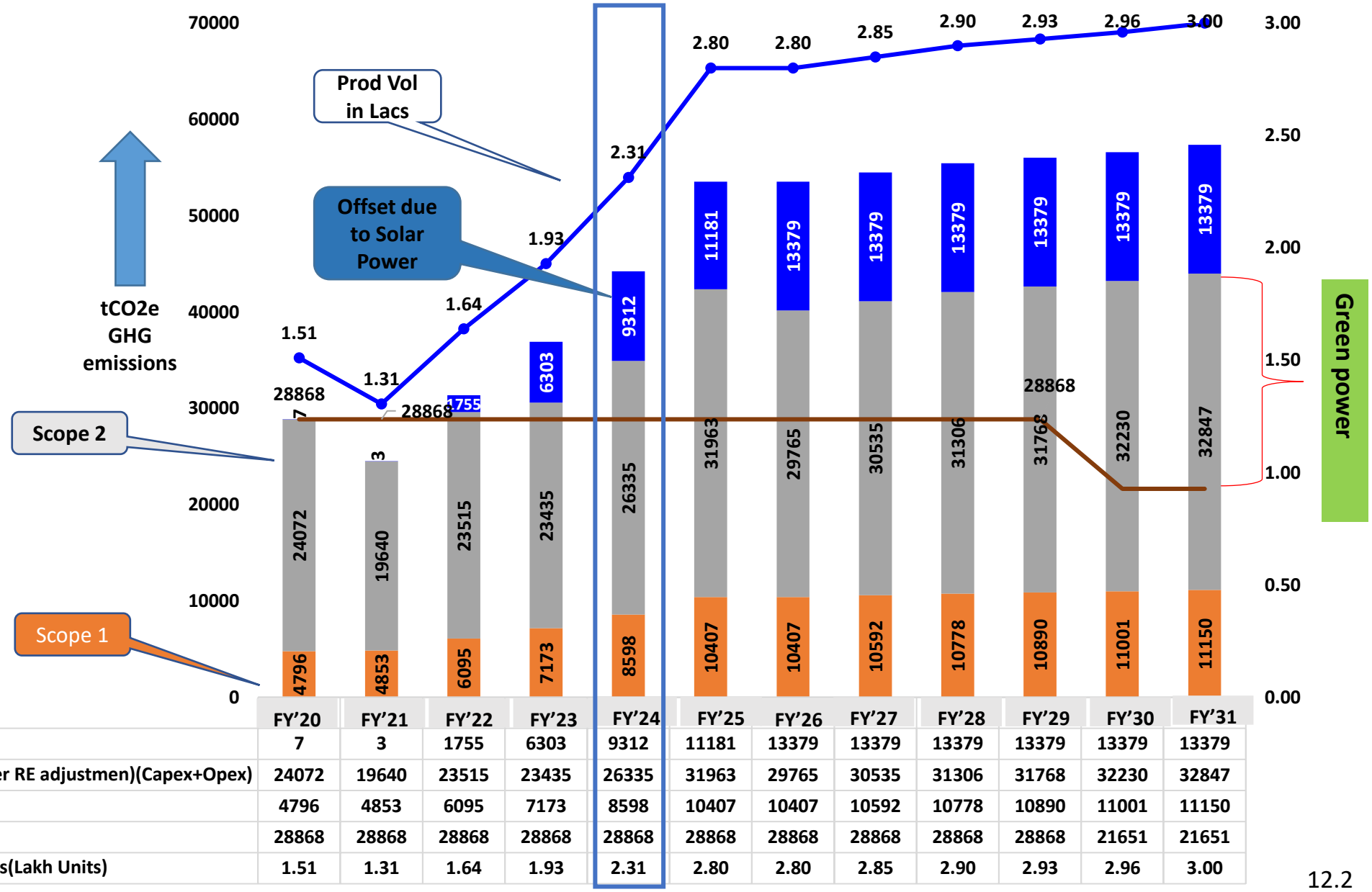
FY2024 GHG Reduction Activities

- Additional 07 MWp installed. Total solar 16MWp
- Industry 4.0 in other shops including energy and water
- Transition of CED paint from CG500 to CG800
- Sealer oven elimination
- DO based Automatic Aeration system
- EnCon projects at design phase of 1.2 L facility like VRF,VRV
- VFDs for ASUs
- VFD 30kw*2 for booth-1 preparation zone
- RO & ETP Final Outlet Tank working in Sunday & Holiday (around 3386 KWh saving in August'21, projected Saving around 32836 KWh i.e around 21 tCO2).
- Conducting Monthly Compressed Air Leakage Audit with optimized leakage of 5-6%



	FY'20	FY'21	FY'22	FY'23	FY'24	FY'25	FY'26	FY'27	FY'28	FY'29	FY'30	FY'31
RE (Capex +Opex)	7	3	1755	6303	9312	11181	13379	13379	13379	13379	13379	13379
Scope 2 tCO2e (after RE adjustmen)(Capex+Opex)	24072	19640	23515	23435	26335	31963	29765	30535	31306	31768	32230	32847
Scope 1 tCO2e	4796	4853	6095	7173	8598	10407	10407	10592	10778	10890	11001	11150
Target (Alingana)	28868	28868	28868	28868	28868	28868	28868	28868	28868	28868	21651	21651
Production Volumes(Lakh Units)	1.51	1.31	1.64	1.93	2.31	2.80	2.80	2.85	2.90	2.93	2.96	3.00

12

Actions towards Net Zero Plan

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Glimpses :Utilities (Scope-1 & 2) CLT Strategy Workshop on 23rd May @Pantnagar Plant

Utilities CLT Champion	Srinath Sharma
SME	Chinmoy Roy
SME	Subhendu Mondal

Team 1	
Adil Bala	PNA
Sudhir Kadam	DWD
Gaurav Bansal	LKO
Ravindra Joshi	UTK
Ajay Jain	UTK
Yatish rajput	UTK

Team 2	
Deepak Kumar	JSR
Rajeev Bharadwaj	UTK
Sachin Kasture	PNA
Amrendra Singh	UTK
Samarendra Patro	UTK
Sudhakar Kumar	UTK

Team 3	
Sanjay Waghchaure	UTK
Dilip Patel	LKO
Vivek Deshpande	PNA
Anil Khan	UTK
Brijesh Sharma	UTK

Team 4	
Iliyas Ahmed	UTK
Vipin Jain	UTK
Ravi Sharma	DWD
Ramit Dutt	JSR
Devesh Pant	UTK
Kapil Sharma	UTK

Team 5	
Mohan Gururani	UTK
Yash Singh	UTK
Randhir Prasad	JSR
Dhiraj Wadhwa	LKO
Rakesh K Singh	UTK
Ashish Agrawal	UTK

CLT Utilities Workshop Workflow

1. Context setting
2. Highlights of locational Utilities CLT Workshop
3. Brainstorming on TGR and TGW
4. Strategy Development-Key Challenges (Current and Future)
5. Finalization of Strategic considerations and Strategic priorities
6. Five Year Roadmap of Finalized Priorities
7. Development of action Plans for Priorities
8. 3X3 Matrix of Action Plan (Impact & Ease of Implementation)
9. Report consolidation of action plans for discussion at respective plants

Key highlights of CLT Strategy Workshop

Summary

1. 30 members participated from 5 plants (DWD team joined virtually)
2. 67 ideas generated from 9 levers
3. 62 impact ideas identified based on 3X3 matrix
4. Step by step development of strategy for 5 years based on past learnings (TGR/TGW) , challenges and advantages (Current & Future), Strategic Priorities and Considerations.
5. Prioritization of ideas based on Impact and Ease of implementation
6. Session on innovative and efficient Solar Heat/Evaporators by a Startup –The Quadsun
7. Integration with KT02 initiative

Sr.No.	Key Ideas Examples
1	Hydroxy generator introduction in Ovens to reduce fuel consumption by 10% across all plants
2	Sealer Oven elimination from paint shop process
3	Rework and Emission lab work planning on non working days to use deemed Solar Power generation
4	Room temperature phosphating introduction
5	Use of Analytics , AI & ML for predictive decision making. (KT02)
6.	Waste heat recovery projects in Paint Shop

Idea Break-up	No of ideas
Impact, Ease (High, High)	22
Impact. Ease (High , Medium)	21
Impact , Ease (Medium, High)	19
Total	62

Outcome of the Workshop: 5 Years Draft Strategies

Roadmap for Year wise Priorities

Levers	2023-24	2024-25	2025-26	2026-27	2027-28
Measurement & Analysis	1. Real time equipment monitoring for Power Train 2. AI & ML and other projects based on insights from Real Time Equipment monitoring in Paint Shop	1. Real time equipment monitoring for other high consuming areas 2. AI & ML and other projects based on insights from Real Time Equipment monitoring in Paint Shop & Power Train	1. AI & ML and other projects based on insights from Real Time Equipment monitoring in entire CVBU Level	1. Sustenance of actions and realized savings.	1. Sustenance of actions and realized savings.
Operational Efficiency	1.Energy Efficient equipment procurement for new facility and projects. 2.Replacement of IE2 motors(Significant load) with IE4 motors in 24x7 running process. 3. Shift optimization	1.Energy Efficient equipment procurement for new facility and projects. 2.Replacement of IE2 motors(Significant load) with IE4 motors running in 2 shifts/seasonal	1.Energy Efficient equipment procurement for new facility and projects. 2.Replacement of IE2 motors(Significant load) with IE4 motors running in 2 shifts/seasonal.	1.Energy Efficient equipment procurement for new facility and projects. 2.Replacement of IE2 motors(Non-Significant load) with IE4 motors.	1.Energy Efficient equipment procurement for new facility and projects. 2.Replacement of IE2 motors(Non-Significant load) with IE4 motors.
New technology introduction	1. Adoption of alternate energy source for process heating as POC in Paint shop(Heat Pump, Solar Thermal energy)	1. Based on ROI adoption of alternate energy source in heating applications(Heat Pump, Solar energy) in other areas.	1. Based on ROI adoption of alternate energy source in heating applications(Heat Pump, Solar energy) in all over the plant.	1. Based on ROI adoption of alternate energy source in heating applications(Heat Pump, Solar energy) in all over the plant.	1. Based on ROI adoption of alternate energy source in heating applications(Heat Pump, Solar energy) in all over the plant.
Renewable energy	1. Increase in on-site RE installation capacity	1. Increase in on-site RE installation capacity. 2. Utilization of RE power during off peak hour.	1. Increase in on-site RE installation capacity. 2. Utilization of RE power during off peak hour.	1. Increase in on-site RE installation capacity. 2. Utilization of RE power during off peak hour.	1. Increase in on-site RE installation capacity. 2. Utilization of RE power during off peak hour.
Benchmarking	1.Participation in external platforms. 2.Cross locational/business workshop on utility cost. 3) Benchmarking Exercise by third party consultants. (KPMG, E&Y , Nielsen etc.)	1.Participation in external platforms. 2.Cross locational/business workshop on utility cost. 3) Action Planning based On Benchmarking recommendations.	1.Participation in external platforms. 2.Cross locational/business workshop on utility cost.	1.Participation in external platforms. 2.Cross locational/business workshop on utility cost.	1.Participation in external platforms. 2.Cross locational/business workshop on utility cost.
Energy cost	1.Utilization of solar energy during off days (like COP lab, charging of EVs , Forklifts, tuggers, ETP RO operations etc.). 2. Quick adoption of cheaper power option, Open access. 3.Export of RE power (Subject to Statutory clearance). 4. RE power banking for night hours	1.Utilization of solar energy during off days (like COP lab, charging of EVs , Forklifts, tuggers, ETP RO operations etc.). 2. Quick adoption of cheaper power option, Open access. 3.Export of RE power (Subject to Statutory clearance). 4. RE power banking for night hours	1.Utilization of solar energy during off days (like COP lab, charging of EVs , Forklifts, tuggers, ETP RO operations etc.). 2. Quick adoption of cheaper power option, Open access. 3.Export of RE power (Subject to Statutory clearance). 4. RE power banking for night hours	1.Utilization of solar energy during off days (like COP lab, charging of EVs , Forklifts, tuggers, ETP RO operations etc.). 2. Quick adoption of cheaper power option, Open access. 3.Export of RE power (Subject to Statutory clearance). 4. RE power banking for night hours	1.Utilization of solar energy during off days (like COP lab, charging of EVs , Forklifts, tuggers, ETP RO operations etc.). 2. Quick adoption of cheaper power option, Open access. 3.Export of RE power (Subject to Statutory clearance). 4. RE power banking for night hours
Knowledge & Capability building	1.Participation in external platforms. 2. Organizing training on Energy efficiency and technologies	1.Participation in external platforms. 2. Organizing training on Energy efficiency and technologies	1.Participation in external platforms. 2. Organizing training on Energy efficiency and technologies	1.Participation in external platforms. 2. Organizing training on Energy efficiency and technologies	1.Participation in external platforms. 2. Organizing training on Energy efficiency and technologies
Fixed cost reduction Standardization	1.Elimination of rework. 2.Phasewise contractual demand optimization	1.Elimination of rework. 2.Phasewise contractual demand optimization	1)Phasewise contractual demand optimization		
Digitalization (KT 02) and process automation (KT 04)	KT2 implementation Based on plant energy consumption priority	KT2 implementation Based on plant energy consumption priority	Integrate process variables affecting energy consumption on to line dashboard.	AI/ML based predictive modelling	Maturity of AI/ML based predictive modelling .

MORE WHEN ONE

Awards & Accolades

TATA MOTORS
Connecting Aspirations

Green CO Gold rating 2015

Golden Peacock Environment Management award 2015

Golden Peacock Environment Management award 2016

CII National Energy Management Award 16-17

Excellent Energy Efficient Unit

CII Energy Efficiency Circle Competition 2017-18

Winner- Innovative Project

CII National Energy Management Award 17-18

Excellent Energy Efficient Unit

Green-Co Platinum Rating 2018

CII National Energy Leader Award 2018

Golden Peacock Award in Energy Efficiency 2018

Winner of overall SHE performance at TML Group level (CV)

CII National Award for Excellence in Energy Management 2019

1st Runner-up - 6th CII NR EHS Competition 2019

- *Tata Motors Ltd. Pantnagar, Uttarakhand declared as Winner in 8th CII Northern Region Inter Industry Competition on EHS - 2021*
- TML Pantnagar Plant wins GreenCO Star Performer Award 2020
- 2nd Runner up in 7th CII - Northern Region EHS Competition 2020
- CII National Award for Excellence in Energy Management 2020

- *Tata Motors Ltd. Pantnagar, Uttarakhand declared as National Energy Leader 2022 for the 5th time in a row*
- *Tata Motors Ltd. Pantnagar, Uttarakhand declared as Excellent Energy Efficient Unit 2022 for the 7th time in a row*

- *Tata Motors Ltd. Pantnagar, Uttarakhand Certified with GreenCo Platinum+ by CII*
- *Tata Motors Ltd. Pantnagar, certified with ZWtL by TUV and Water Neutral organization by CII this year*

2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023

HALL OF FAME : Key Awards Won by TML Pantnagar FY24

TATA MOTORS
Connecting Aspirations

9th CII National Competition
(Industry 4.0)

QCFI- 3rd Kaizen competition
(Safety, Quality, Delivery)

33rd National Convention & 25th All India Creativity Summit
(SQPDCME Deliverables)

Green-Co GBC
(Sustainability)

Green-Co GBC
(Sustainability)

19th National Six Sigma Competition held by CII-IOQ
(Quality)

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Thank You

We heart fully thank CII for :

- Giving us wonderful platform to learn and share our best practices
- We have picked up many project from CII platforms benchmarking data
- Giving us wonderful standards such as GreenCo and Green Building

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